

S.No.489

FINISHED PLAN
CAPT TASOS
IMO No.9966233

MITSUI-MAN B&W

INSTRUCTION BOOK
VOLUME 5
COMPONENT No.3
OTHERS



MITSUI E&S
MITSUI E&S Co., Ltd.

No.
MB5

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Remarks)

On April 1st 2023, we changed our company name to "MITSUI E&S Co., Ltd."
The former name may be on this book depending on the date of issue.

IMITSUI E&S CO.,LTD.

VOL.5: COMPONENT NO.3(OTHERS)

ELECTRIC POWER SUPPLY UNIT

R E V I S I O N S 図面来歴					MSR JOB No.	工事番号 (TE33H0/H1)																				
No.	DATE 日付	DESCRIPTION 改正事項	BY	APPR.	PURCHASER	顧客																				
1	25 Apr, 2023	見直し (2,7,8)	Y.I.	N.Y.	NAMURA S.No.489/490																					
2																										
3																										
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5																										
6																										
7																										
					RULE: NK-M0																					
					SYSTEM 装置 ME CONTROL SYSTEM FOR MITSUI-MAN B&W DIESEL ENGINE (7G60ME-C10.5-EGRBP TYPE)																					
					TITLE 名称 POWER SUPPLY UNIT A/B																					
					DESIGNING DEPT. ELECTRONIC DEVICES & CONTROL SYSTEMS DIV. SYSTEM ENGINEERING HEADQUARTERS MITSUI E&S SYSTEMS RESEARCH INC.																					
					三井 E&S システム技研株式会社 システムエンジニアリング事業本部 電子ソリューション事業部 設計部																					
					APPROVED 承認 <i>R.Yamamoto</i>																					
					CHECKED 照査 <i>T.Kondo</i>																					
					DESIGNED BY 作成 <i>Y.Inada</i>																					
					DATE 作成日 08 Mar., 2023																					
					DRAWING No. 図番 REV.																					
					NAM0489-UPS-001K <i>1</i>																					
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MSR電事品	1																									
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合計	3																									

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Terminal Arrangement for Power Supply (UPS-A/B)

Spare parts list for Power Supply (UPS-A/B)NAM0489-200PS

Instruction Manual for Power Supply

Info. No.:	Item Name: Power Supply					Item Id.:
7B4210	ME Requirements					5372677-2
Scale:	Size: A4	Product Type:		Page No.:	1 (2)	Projection:
Date	Des.	Chk.	A.C.	Revision Change		Chg. Not. Rev.
20130102	JYA	JYA				00
20150105	JYA	JARY	Z4	Missing text "pcs 10A" added to MPC as CCU rows		02
20150130	CAHV	JYA	Z4	Data for supply B: corrected		03
						04

Power supply requirements for ME Engine Control System (ME-ECS)

These requirements apply to isolated UPS units as introduced in DUN32.2012.

The Engine Control System requires two separate power supplies as shown on Fig 1, with battery back-up in power supply A and B.

The ME-ECS power supplies must be separated from other DC systems, i.e. only ME-ECS components must be connected to the supplies.

Data for supply A:

System	IT (Floating), DC system w. individually isolated outputs
Voltage	Input: 100-240VAC, 45-65Hz, output 24VDC
Protection	Input over current, output over current, Output high/low voltage ¹
Alarms as potential free contacts	AC power, UPS battery mode, Batteries not available (fuse fail)

Data for supply B:

System	IT (Floating), DC system w. individually isolated outputs
Voltage	Input: 100-240VAC, 45-65Hz, output 24VDC
Protection	Input over current, output over current, Output high/low voltage ¹
Alarms as potential free contacts	AC power, UPS battery mode, Batteries not available (fuse fail)

Capacity of each supply dependent on the cylinder quantity of the engines

Capacity must be available at 24VDC output terminals at 45°C ambient conditions

	4. Cyl	5. Cyl.	6. Cyl	7. Cyl.	8. Cyl	9. Cyl.
Capacity	1200 W	1200 W	1200 W	1300 W	1300 W	1300 W
No of breakers (MCB)	19	20	21	22	23	24
DC/DC converters	7 pcs 5A	8 pcs 5A	9 pcs 5A	10 pcs 5A	11 pcs 5A	12 pcs 5A
MPC-10 as CCU	12 pcs 10A					
MPC as CCU	19 pcs 10A	20 pcs 10A	21 pcs 10A	22 pcs 10A	23 pcs 10A	24 pcs 10A

	10. Cyl	11. Cyl	12. Cyl.
Capacity	1400 W	1400 W	1400 W
No of breakers (MCB)	25	26	27
DC/DC converters	13 pcs 5A	14 pcs 5A	15 pcs 5A
MPC-10 as CCU	12 pcs 10A	12 pcs 10A	12 pcs 10A
MPC as CCU	25 pcs 10A	26 pcs 10A	27 pcs 10A

Battery Capacity

Capacity	Deliver 40 amp in 30 min
	After 30 minutes UPS output voltage must be minimum 21.6V

¹ High/Low voltage protection may be integrated in DC/DC converter functionality or implemented separately. The output voltage must be in the range 18-31VDC.

Info. No.:	Item Name: Power Supply				Item Id.:
7B4210	ME Requirements				5372677-2
Scale:	Size:	Product Type:	Page No.:	Projection:	MAN Diesel & Turbo
A4			2 (2)		
Date	Des.	Chk.	A.C.	Revision Change	Chg. Not. Rev.
20150130	CAHV	JYA	Z4	Data for supply B: corrected	03

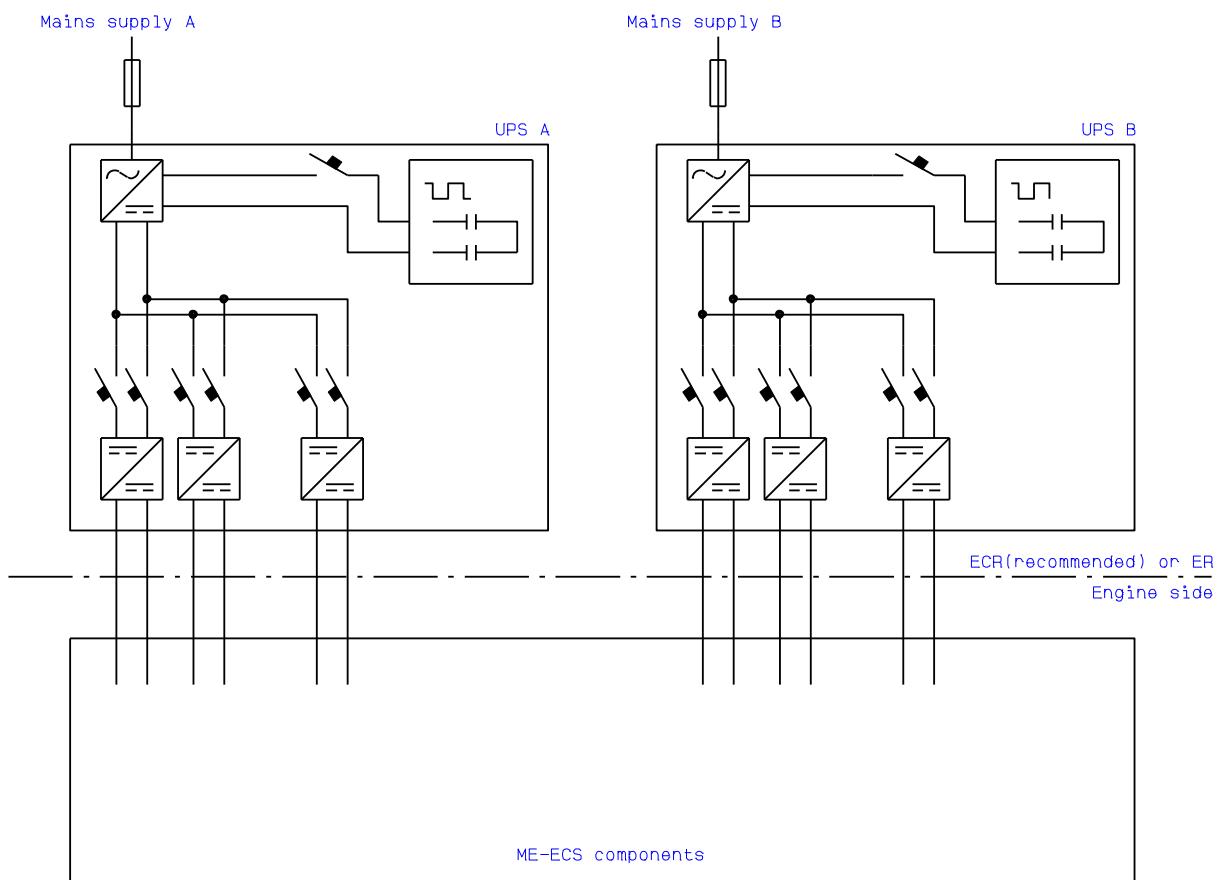


Fig. 1 : Diagram of power supply system for ME-ECS.

As indicated, supply must come from separate parts of ships main switch board.

Function test requirements

The UPS units must be able to start up automatically under load. With load connected to the UPS units, the mains power and the DC output is shut off. Upon restoration of main power, the UPS unit must start up with no further user intervention.

Switch between mains and battery operation must be verified. The UPS units must retain DC output when main power is turned off and on again.

All alarms must be verified.

Info. No.:	Item Name: Power Supply					Item Id.:
7B4210	5886797-6					
Scale:	Size: A4	Product Type: ERCS Requirement		Page No.:	1 (2)	Projection:
Date	Des.	Chk.	A.C.	Revision Change		Chg. Not.
20181207	LKOL	JYA				Rev.
						00
						01
						02
						03

Power supply requirements for Exhaust Reduction Control System (ERCS)

The Exhaust Reduction Control System is designed as one single power supply as shown on Fig 1, with battery back-up.

The ERCS power supplies must be separated from other DC systems, i.e. only ERCS components must be connected to the supplies.

Data for supply:

System	IT (Floating), DC system w. individually isolated outputs
Voltage	Input: 100-240VAC, 45-65Hz, output 24VDC
Protection	Input over current, output over current, Output high/low voltage ¹
Alarms as potential free contacts	AC power, UPS battery mode, Batteries not available (fuse fail)

Capacity of supply

Capacity must be available at 24VDC output terminals at 40°C ambient conditions

Capacity	500 W
No of breakers (MCB)	7
DC/DC converters	7pcs 10A

Battery Capacity

Capacity	Deliver 23 amps in 30 min
	After 30 minutes UPS output voltage must be minimum 21.6V

¹ High/Low voltage protection may be integrated in DC/DC converter functionality or implemented separately. The output voltage must be in the range 18-31VDC.

Info. No.:	Item Name: Power Supply					Item Id.:
7B4210	ERCS Requirement					5886797-6
Scale:	Size:	Product Type:	Page No.:	Projection:	MAN Diesel & Turbo	
A4			2 (2)			
Date	Des.	Chk.	A.C.	Revision Change	Chg. Not.	Rev.
20181207	LKOL	JYA				00

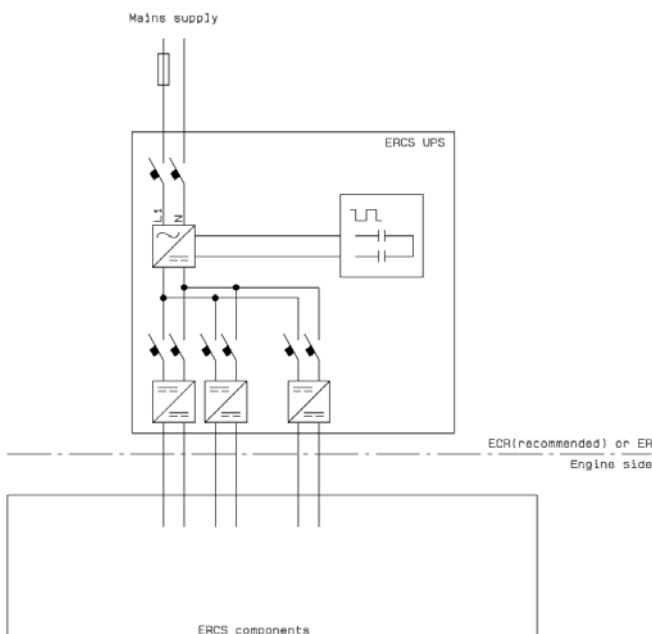


Figure 1: Diagram of power supply system for ERCS.

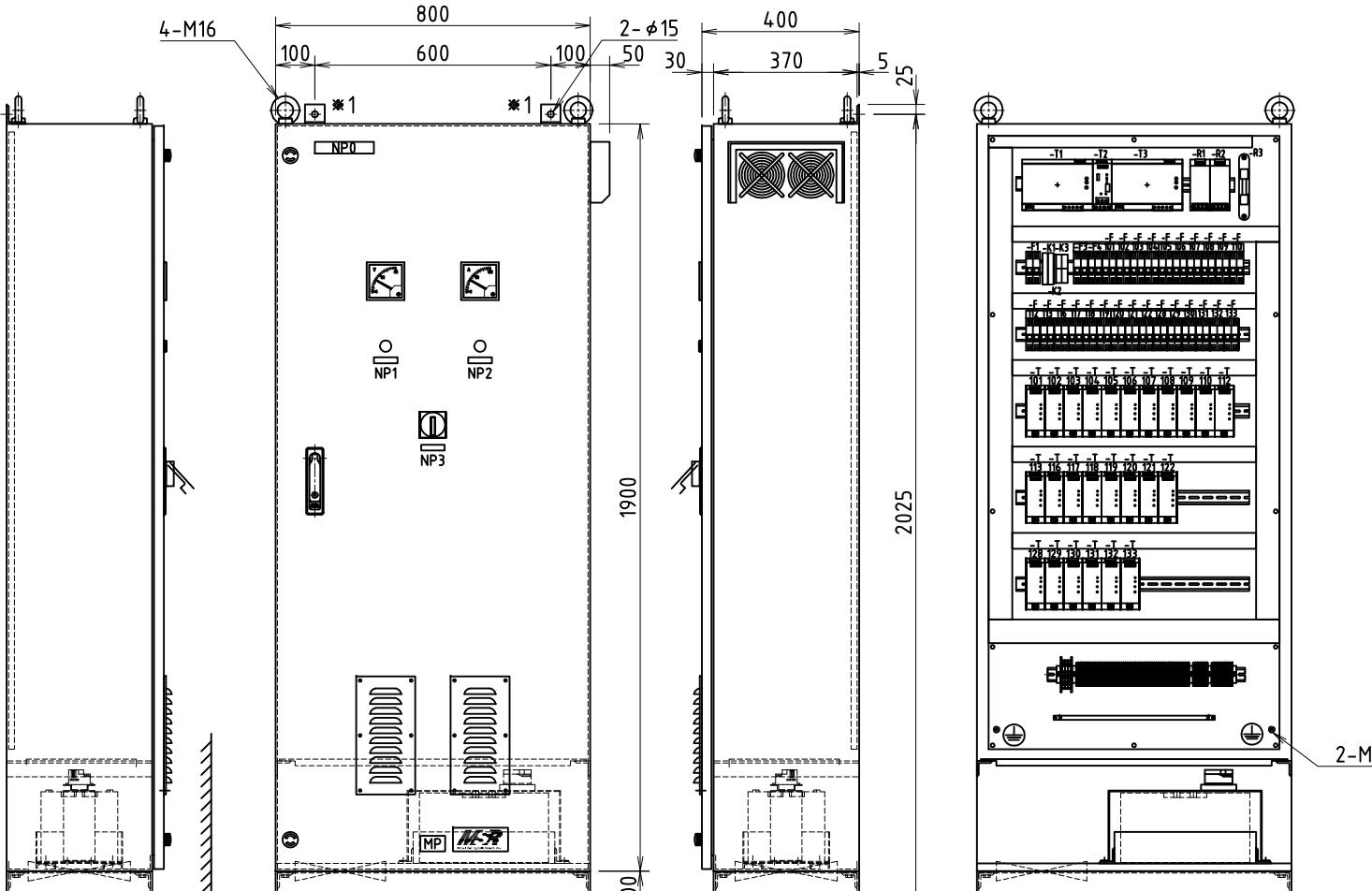
As indicated, supply must come from separate parts of ships main switch board.

Function test requirements

The UPS units must be able to start up automatically under load. With load connected to the UPS units, the mains power and the DC output is shut off. Upon restoration of main power, the UPS unit must start up with no further user intervention.

Switch between mains and battery operation must be verified. The UPS units must retain DC output when main power is turned off and on again.

All alarms must be verified.



CAUTION

Please keep exhausting when a stand is welded to the hull.

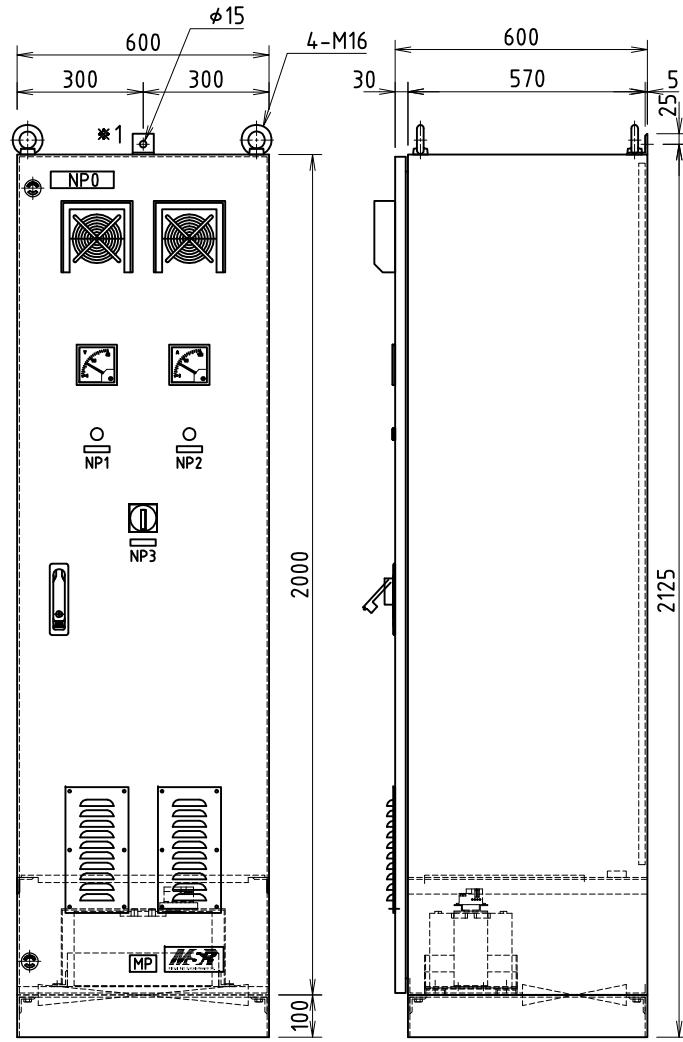
Otherwise, the smoke and the dust, which occur during welding, may cause serious troubles to equipment inside the power supply.

Required open angle 90°

MARK	LETTER OF NAME PLATE
NP0	POWER SUPPLY UPS-A
NP1	AC ON
NP2	DC ON
NP3	POWER SWITCH
MP	MANUFACTURER'S NAME PLATE

TYPE	UPS-1
PAINT. COLOR	MUNSELL 7.5BG7/2 HALF GLOSS
WEIGHT	220 kg (APPROX.)
WORKING NO.	1 SET/SHIP
IP	22

TITLE		OUTLINE DRAWING OF POWER SUPPLY (UPS-A/B)		DATE	BY
1	見直しによる	25 Apr., 2023	Y.I		
No.	REVISION	DATE	BY	JOB No.	DRAWING No.
					EPSU-OL-METF
					REV. 1 / 2



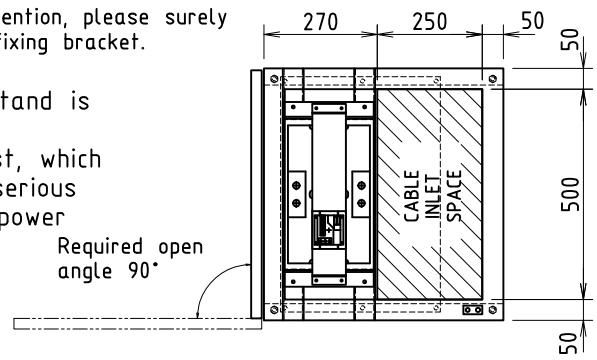
*1: To fall prevention, please surely attach the fixing bracket.

CAUTION

Please keep exhausting when a stand is welded to the hull.

Otherwise, the smoke and the dust, which occur during welding, may cause serious troubles to equipment inside the power supply.

Required open
angle 90°



MARK	LETTER OF NAME PLATE
NP0	POWER SUPPLY UPS-B
NP1	AC ON
NP2	DC ON
NP3	POWER SWITCH
MP	MANUFACTURER'S NAME PLATE

TYPE	UPS-1
PAINT. COLOR	MUNSELL 7.5BG7/2 HALF GLOSS
WEIGHT	220 kg (APPROX.)
WORKING NO.	1 SET/SHIP
IP	22

		.	.	TITLE OUTLINE DRAWING OF POWER SUPPLY (UPS-A/B)		
		.	.		DATE	BY
1	見直しによる	25 Apr., 2023	Y.I		24 Apr., 2023	E.FUJIWARA
No.	REVISION	DATE	BY	JOB No.	DRAWING No.	REV.
					EPSU-OL-METF	1 / 2
	FILE	ME				

TERMINAL ARRANGEMENT FOR POWER SUPPLY (UPS-A)

TB	TB NO.	CABLE ID	CABLE SPEC.	REMARK
X0-	L1	L-2E10	HDPYC-4	L1
	N			N
	PE			PE
X1-	1	M-A-WMOP-A M-A-WEIC-A M-A-WEIC-B M-A-WECC-1 (N/A)	HDPYCSLA-2.5 HDPYCSLA-2.5 HDPYCSLA-2.5 19x2.5	EC-MOP A
	2			
	3			
	3			EICU-A
	4			
	5			EICU-B
	6			
	7			ECU-A
	8			
	9			ECU-B
	10			
	11			ACU-1
	12			
	13			ACU-2
	14			
	15			ACU-3
	16			
	17			SCU
	18			
	19			PMI
	20			
X2-	21	(N/A) M-A-WECC-1 M-A-WHUB	19x2.5 HDPYCSLA-2.5	CWCU ROUTER+MANAGED SWITCH
	22			
	23			
	24			
	25			
	26			
	27			
	28			
	29			
	30			

TERMINAL ARRANGEMENT FOR POWER SUPPLY (UPS-A)

TB	TB NO.	CABLE ID	CABLE SPEC.	REMARK
X1-	31	M-A-WECC-2	14x2.5	CCU-1
	32			CCU-2
	33			CCU-3
	34			CCU-4
	35			CCU-5
	36			CCU-6
	37			CCU-7
	38			
	39			
	40			
	41			
	42			
	43			
	44			
X2-	45	(N/A)	LMPYCSLA-2	ALARM AC NO VOLTAGE
	46			
	47			
	48			
	49			
	50			
	51			
	52			
	53			
	54			
	1			
	2			
	3			
X3-	4	M-ERC-19A	14x2.5	ALARM UPS BATTERY MODE
	5			
	6			
	7			
	1	M-EGR-11A	HDPYCSLA-2.5	ALARM BATTERIES NOT AVAILABLE(FUSE FAIL.)
	2			ERCS-MOP
	3			EGR-CU
	4			EGR-I1
	5			EGR-I2
	6			EGR-I3
	7			
	8			
	9			
	10			
	11			
	12			EGR-SPC

TERMINAL ARRANGEMENT FOR POWER SUPPLY (UPS-B)

TB	TB NO.	CABLE ID	CABLE SPEC.	REMARK
X0-	L1	M-CP08	HDPYC-4	L1
	N			N
	PE			PE
X1-	1	M-B-WMOP-B M-B-WEIC-A M-B-WEIC-B M-B-WECC-1	HDPYCSLA-2.5 HDPYCSLA-2.5 HDPYCSLA-2.5 19x2.5	EC-MOP B
	2			
	3			
	3			EICU-A
	4			
	5			EICU-B
	6			
	7			ECU-A
	8			
	9			ECU-B
	10			
	11			ACU-1
	12			
	13			ACU-2
	14			
	15			ACU-3
	16			
	17			SCU
	18			
	19			PMI
	20			
X2-	21	M-B-LOP	HDPYCSLA-2.5	LOP
	22			
	23	M-B-WECC-1	19x2.5	CWCU
	24			
	25	(N/A)		
	26			
X3-	27	(N/A)		
	28			
	29	(N/A)		
	30			

TERMINAL ARRANGEMENT FOR POWER SUPPLY (UPS-B)

TB	TB NO.	CABLE ID	CABLE SPEC.	REMARK
X1-	31	M-B-WECC-2	14x2.5	CCU-1
	32			CCU-2
	33			CCU-3
	34			CCU-4
	35			CCU-5
	36			CCU-6
	37			CCU-7
	38			
	39			
	40			
	41			
	42			
	43			
	44			
X2-	45	(N/A)	LMPYCSLA-2	ALARM AC NO VOLTAGE
	46			
	47			
	48			
	49			
	50			
	51			
	52			
	53			
	54			
	1			
	2			
	3			
	4			ALARM UPS BATTERY MODE
	5			
	6			
	7			ALARM BATTERIES NOT AVAILABLE(FUSE FAIL.)

SPARE PARTS LIST FOR POWER SUPPLY(UPS-A/B)

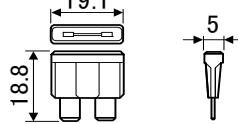
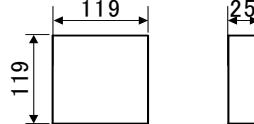
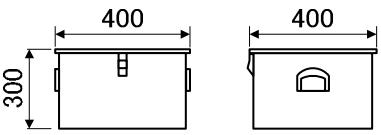
予備品表

NAMURA
S.No.489/490

DESIGNING DEPT.
ELECTRONIC DEVICES & CONTROL SYSTEMS DIV.
SYSTEM ENGINEERING HEADQUARTERS
MITSUI E&S SYSTEMS RESEARCH INC.

三井 E&S システム技研株式会社
システムエンジニアリング事業本部
電子ソリューション事業部 設計部

USER 引当先		SPARE PARTS LIST FOR 予 備 品 表			U S E 用 途		SETS/PLANT 台／装置	
		POWER SUPPLY(UPS-A/B)						1/1
ITEM NO. 項目	NAME OF PART 名 称	O U T L I N E 外 形 図			QUANTITY 数 量		REMARK 備 考	
					WORKING 常用数	PER SET /1 セット	PER VESSEL /船	SPARE 予備
-1	CIRCUIT BREAKER				46	-	5	SCHNEIDER M9F21216
-2	CIRCUIT BREAKER				4	-	1	SCHNEIDER M9F21210
-3	POWER SUPPLY UNIT				4	-	1	PHOENIX CONTACT QUINT-PS 1AC/24DC/40
-4	UPS				2	-	1	PHOENIX CONTACT QUINT-UPS 24DC/24DC/40
-5	DC/DC CONVERTER				44	-	1	PHOENIX CONTACT QUINT4-PS 24DC/24DC/10/PT
-6	DC/DC CONVERTER				-	-	-	PHOENIX CONTACT QUINT-PS 24DC/24DC/5
-7	RELAY				2	-	1	IDECK RU4S-CD-D24
-8	TIMER RELAY				4	-	1	PHOENIX CONTACT PLC-TR-1T- MUL-300M DC24V 1-10 Sec.
-9	RELAY				2	-	1	IDECK RU2S-C-A200(220V)
-10								
							DRW. NO. 図 番	NAM0489-200PS 1/2

USER 引当先		SPARE PARTS LIST FOR 予 備 品 表		U S E 用 途		SETS/PLANT 台／装置		
		POWER SUPPLY(UPS-A/B)				1/1		
ITEM NO. 項目	NAME OF PART 名 称	O U T L I N E 外 形 図	QUANTITY 数 量		REMARK 備 考		Maker Type	
			WORKING 常用数		SPARE 予備			
			PER SET /1 セット	PER VESSEL /船				
-11								
-12								
-13								
-14								
-15								
-16								
-17								
-18	FUSE		4	-	4	PHOENIX CONTACT	9 25A/32V ATOF	
-19	FAN		4	-	1	SANYO DENKI 9G1224H401 DC24V	9	
-20	SPARE PARTS BOX		-	1	-	Mitsui	g	
					DRW. NO. 図 番	NAM0489-200PS 2/2		

Customer: NAMURA SHIPBUILDING Co., Ltd.

**INSTRUCTION MANUAL
for
POWER SUPPLY**

MITSUI-MAN B & W Diesel Engine

S.No.489/490, Type: 7G60ME-C10.5-EGRBP

DESIGNING DEPT.
ELECTRONIC DEVICES & CONTROL SYSTEMS DIV.
SYSTEM ENGINEERING HEADQUARTERS
MITSUI E&S SYSTEMS RESEARCH INC.

三井 E&S システム技研株式会社
システムエンジニアリング事業本部
電子ソリューション事業部 設計部

 **Mitsui E&S Systems Research Inc.**

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· Contact information.....	P4
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3 Functions	P9
4 How to Change Battery	P11
5 How to Change Power Supply Unit.....	P15
6 How to Change UPS Controller	P16
7 How to Change DC/DC Converter	P17

For Safety Operation

Strict attention is to be paid to the Marks to ensure safety handling and operations of the Power Supply, avoiding any risk of damages.

We strongly recommend following the instructions of the Marks, by reading and well understanding the descriptions of each.

	Warnings	Indicates that neglect or mishandling may result in serious injury or death.
	Cautions	Indicates that neglect or mishandling may result in any personal injury or product damage.

Example:



Mark Δ tells that you should pay attention to the description (caution, warning) alerting you to be careful.

This example indicates that it includes any to alert, warning or caution.



Mark \otimes tells something prohibited.

This example indicates that you must not disassemble it.

Descriptions of “Warnings” & “Cautions”



Warnings

	This is a UPS Power Supply for the Electronic Engine Control Systems Must be used only for the specified purpose.
	Turn “OFF” the AC power, do repair work for recovery, in the event of: • Unable to recover from any abnormal condition • Unusual circumstances like odd smell, smoke or abnormal high temp. • Foreign matters such as metal piece or water entrapped/fell inside or gap • Battery case swelling or cracking detected
	Do not disassemble or modify. It may cause an accident or failure.
	Do not open the front door while charging. Do not touch terminal blocks or metal portions of each component, which can result in a fire, accident or failure.
	Do not touch it with a wet hand. It can cause an electric shock.



Cautions

	Turn “OFF” the SW Q1 on the front door for long-term shutdown or AC power source shutdown: • On AC power source shutdown, it auto. shifts to battery mode. • Full battery discharge (residual Q'ty: $\leq 10\%$) is judged as a battery failure to issue a fail. signal.
	Change the battery acc. to the instruction and: • Use designated products only. • Do not use any undesignated. A violation can result in loss of functions as temp. monitoring warning, or other monitoring. • 2 batteries for 12V are equipped. In case of exchange, change both of them at the same time. Using old and new battery together can cause damage.

	<p>The Power Supply is not of water- or drip-proof (not meeting standard IP22). To avoid serious mechanical troubles, do not place those areas.</p> <ul style="list-style-type: none"> ▪ Scattered oil or water may reach, equally with the dew condensation. ▪ Can be hot, more than 45 degree. (shorten the battery life span) (See the Recommended Battery Change Procedure.) ▪ Generates a spark and a dust particle. ▪ Extreme vibration can be applied.
	<p>Important notes for storage and preservation of the battery</p> <ul style="list-style-type: none"> ▪ Please recharge the battery once in every 6 months while it's in stock. (in case that ambient temperature is 25°C or under) The battery needs to be recharged half period earlier at every 10°C higher from the ambient temperature at 25°C. It will self-discharge twice as faster at every 10°C higher. If you leave the battery for long period without recharging, the capacity of battery may not be restored. It may cause some trouble after delivery of vessel. ▪ The battery is shipped in fully charged condition. The battery won't be treated as a guarantee if it was left without being recharged for over 6 months and would not be restored.

CONTACT INFORMATION

▪ **About the contents of this document:**

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 System Engineering Headquarters
 Mitsui E&S Systems Research Inc.
 Phone: +81-863-23-3470 FAX: +81-863-23-3404

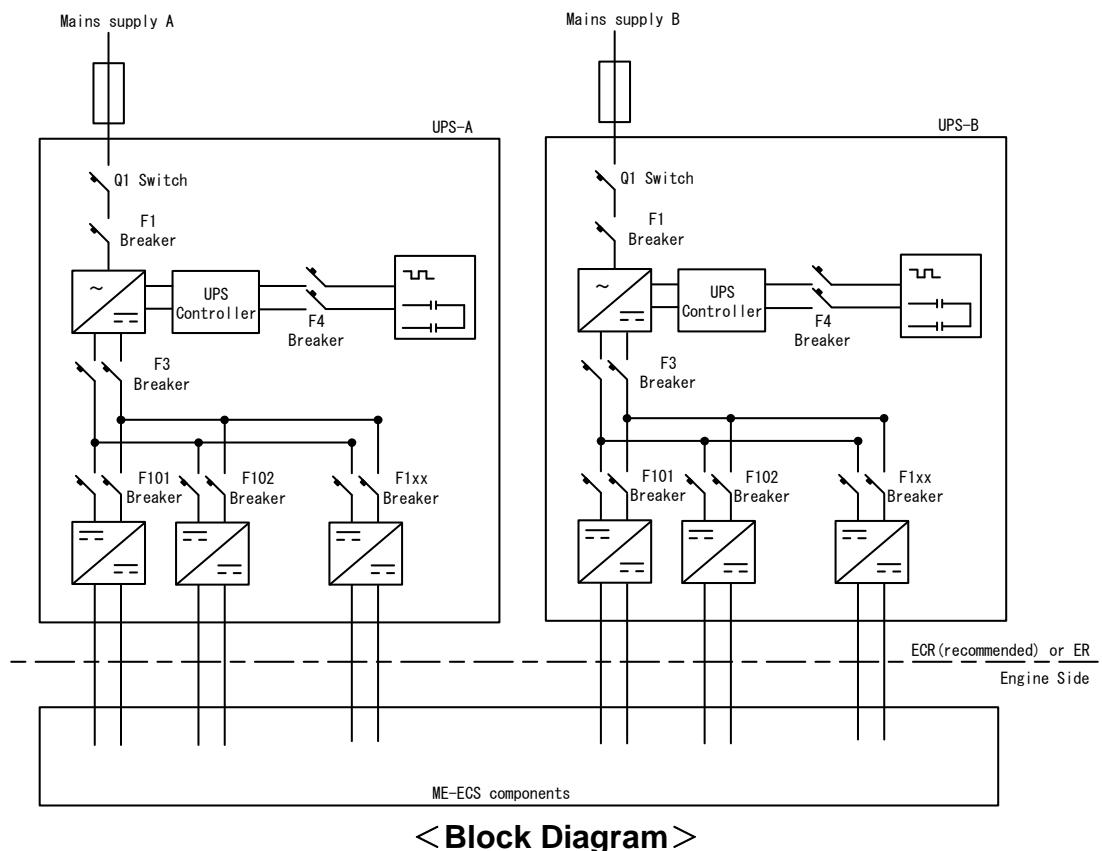
▪ **About Guarantee, Failures, Customer services:**

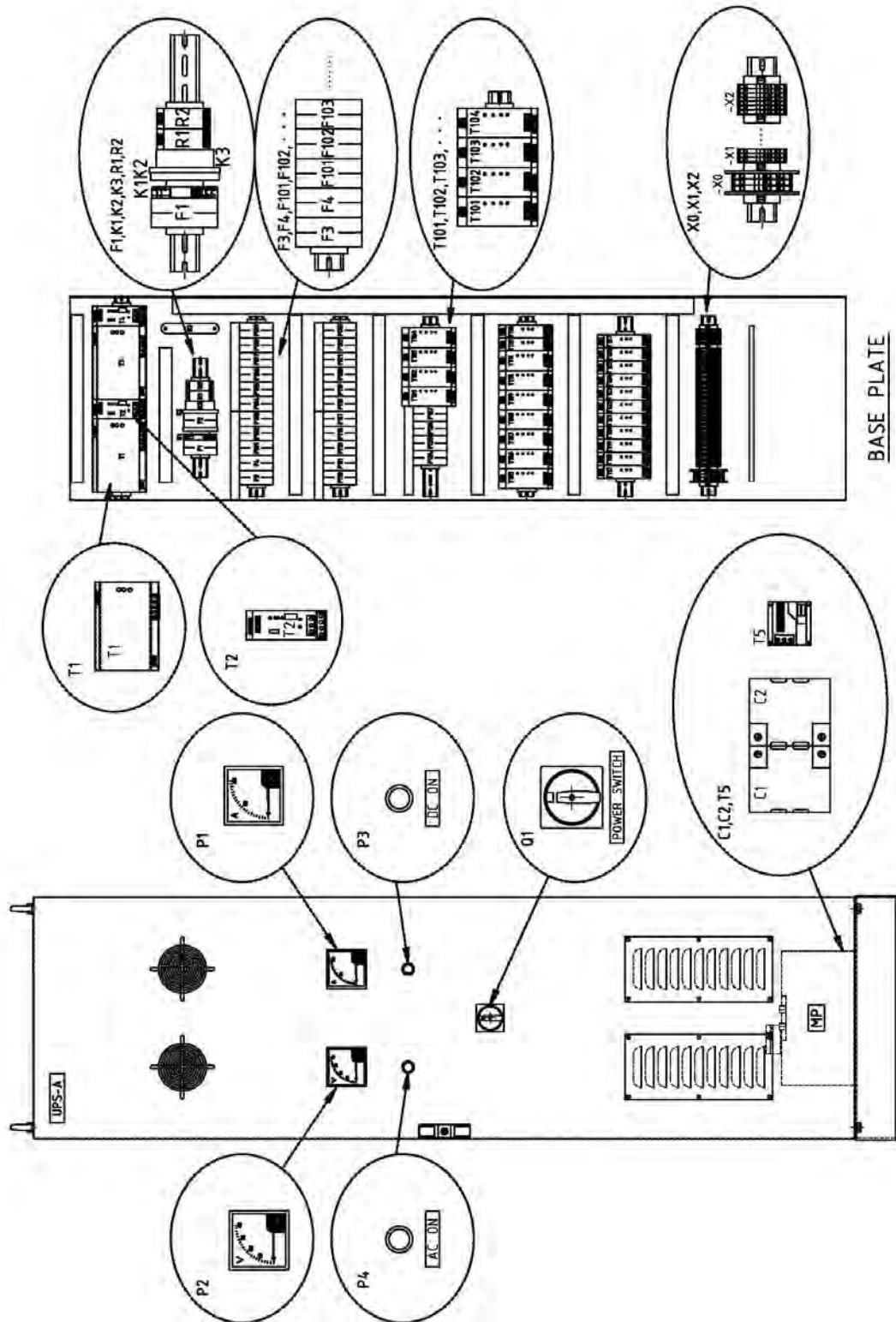
Field Service Dept.,
 System Engineering Headquarters
 Mitsui E&S Systems Research Inc.
 Phone: +81-863-23-3500 Fax: +81-863-23-3530

1 INTRODUCTION

This is a UPS Power Supply equipped with a Control Valve Type Storage Battery to supply the power to the Main Engine Control System. It has the charge control and monitoring functions.

This manual describes this Power Supply; how to operate it, how to change the battery, and the major component functions.





< Cabinet Layout >

This drawing shows general component arrangement for the standard specifications, and therefore may not be exactly identical with that for this vessel. See the drawings of this vessel for the actual arrangement.

2 How to Operate

2-1 Start of Power Supply

- 1) Ensure that the input AC power is being supplied, and that the Power Supply SW(Q1) on the front door is "OFF".



<Power SW "OFF">

- 2) Turn "ON" the Breaker inside the UNIT.

- ① Turn "ON" F1, F3 & F4.
 - ② Turn "ON" all on and after F101.
(Q'ty of them varies depending on the type of the Main Engine.)



<Breaker "ON">

- 3) Turn "ON" the Power Supply SW(Q1) at the front door, to start the power supply.

Then, the Indicators "DC ON" (P3) and "AC ON"(P4) light up.

Ammeter (P1) and the Voltmeter (P2) indicate the normal readings.



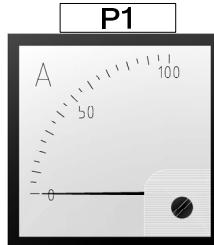
<Power SW "ON">

P3,P4



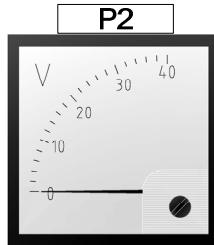
<DC-AC Indicator>

P1



<Ammeter>

P2

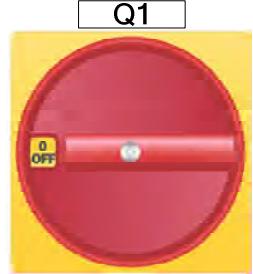


<Voltmeter>

2-2 Stop of Power Supply

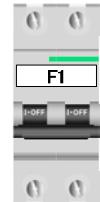
- 1) The normal way of Power ON / OFF is to be done through the Power SW (Q1).

When shutting down the input AC power, turn “OFF” the Power SW (Q1) to prevent shifting to the battery power supply.



<Power SW "OFF">

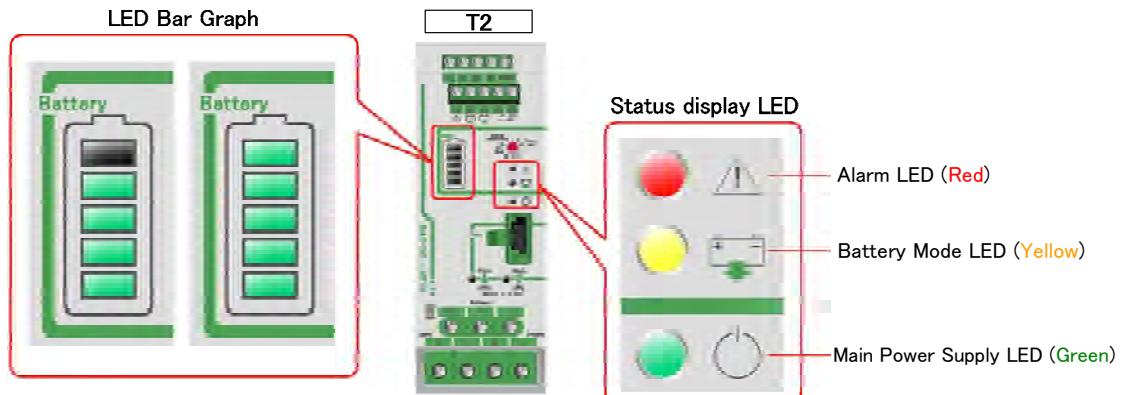
- 2) For long-term shutdown, turn “OFF” F1 on the Breaker as well as turning “OFF” the Power SW (Q1).



<Breaker "OFF">

3 Functions

3-1 UPS Controller (T2)



Each block shows 20% of the capacity, i.e.:

- All green: Residual Q'ty stays at 80%-100%
 - The top turns black: Residual drops to 60%-80%
- While charging, the corresponding LED flickers to indicate the current amount.

1) Alarm Issuance (LED lights up RED)

Non-voltage Contact of External Output terminals (X2-6,X2-7): Opens to alarm.

<Alarm Issuance Conditions>

- Battery residual Q'ty: $\leq 10\%$
- Battery output voltage in the battery mode: $\leq \text{DC}20.4\text{V}$
- Battery Module un-detectable
- In Service mode

2) Battery Mode (LED lights up Yellow)

Non-voltage Contact of External Output terminals (X2-4,X2-5): Opens to alarm.

- Changes to this mode when the input AC power is shutdown,
- The blocks in the LED bar graph indicate the residual Q'ty (all lit when fulfilled).

3) UPS Controller Power Supply (LED lights up Green)

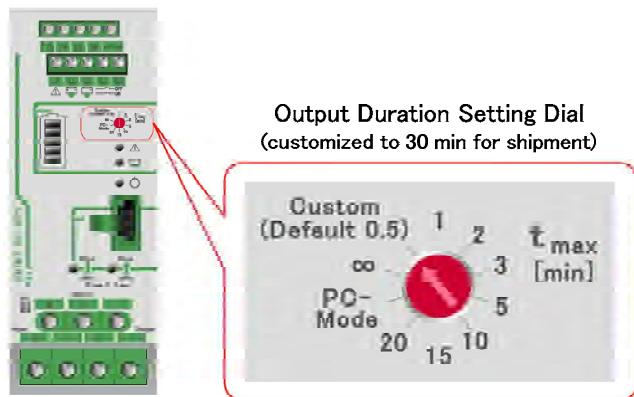
Non-voltage Contact of External Output terminals (X2-1,X2-2): Opens to alarm.

- Supplies the input AC power and lights up the "AC ON" Indicator on the front.

External alarm contact opens if AC power supply fails.

4) Output duration setting

- The output duration available in the battery mode is arbitrarily settable through the Setting Dial shown below.



[Parameter setting/change]

With a slotted screwdriver, turn the Dial to direct the arrow to a desired position.

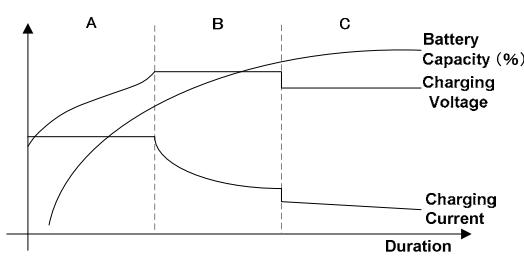
For shipment, the maker customized it to 30 minutes. When it changes to the battery mode, the battery stops discharging after 30 minutes from the moment of the change.

3-2 Charging Characteristics

The UPS Controller and the Battery Module function to achieve the optimal charging, taking the battery current and the temperature under considerations.

The charging duration depends on the charging current and the total capacity of the battery connected. The charging process is controlled in three stages as shown below by IUoU (PLC Control type constant current and voltage charger)

<Charging Characteristics>



Stage	Name	Description
A	Main charge	Constant current charging phase (CC), initial charging current
B	Compensation charging	Constant voltage charging phase (CV), compensation trickle charge voltage
C	Trickle charging	Constant voltage charging phase (CV), trickle charging final voltage



4 How to Change Battery

4-1 Recommended Battery Change Procedure

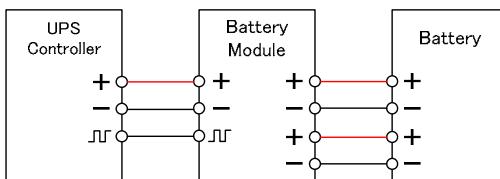
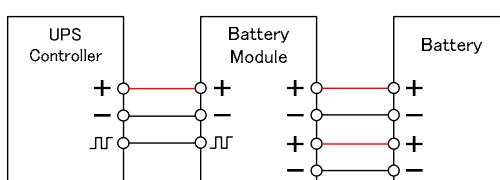
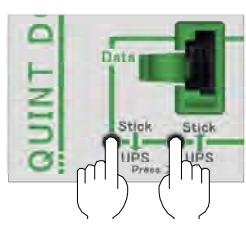
Follow the below for the change:

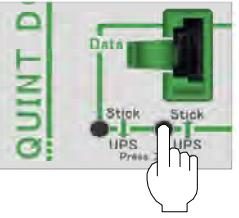
- * To use the designated Batteries below:

Type: UPS-BAT/VRLA/24DC/38AH, Maker: Phoenix Contact

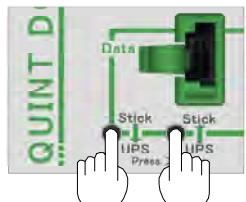
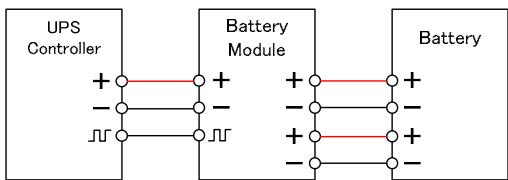
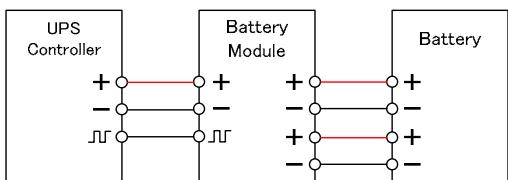
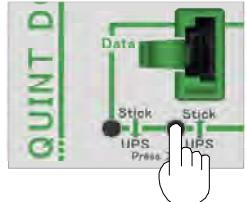
- * The Service life span being widely depends on the ambient Temp. conditions. The unit should be located in an air-conditioned cool place.
- * Battery change is recommended to be done after stopping the power supply. In the event of changing it while the power is being supplied, follow the procedure on the table <During Power Supply> to ensure safety work.

<During No Power Supply>

Steps	Descriptions
1	Turn "OFF" F1 on the Breaker as well as turning "OFF" the Power SW (Q1).
2	Disconnect the wires connected to the Battery Module Terminal Block in the following order, carefully to prevent contact of (+) line with (-) line: <ul style="list-style-type: none"> ① Plus line (+) ② Negative line (-) ③ Communication line 
3	Install new Battery Module and Battery, and connect the wires in the following order. Carefully connect them since it can cause some small flames. <ul style="list-style-type: none"> ① Plus line (+) ② Negative line (-) ③ Communication line  <p>(Whenever changing Battery, Battery Module must be changed as well.)</p>
4	Turn "ON" (F1) on the Breaker and turn "ON" the Power SW (Q1), to start electric supply to the System in the Main Power mode. <ul style="list-style-type: none"> Main Power Supply LED (Green)/Lights up
5	Keep pressing the two Memory Plugging Buttons on the front of UPS Controller Console simultaneously for 6 seconds, to switch the mode from the Main Power Supply mode to the Service mode. <ul style="list-style-type: none"> Alarm LED (Red)/Lights up, LED Bar Graph/Lights off 

6	<p>Keep pressing the right Memory Plugging Button on the front of UPS Controller Console for 6 seconds to check the connection of Battery . LED Bar Graph will flicker for 5 seconds.</p> 
7	<p>Keep pressing the two Memory Plugging Buttons on the front of UPS Controller Console simultaneously for 6 seconds, to end the Service mode and switch to the Main Power Supply mode.</p> <ul style="list-style-type: none"> • Alarm LED (Red)/Lights off, LED Bar Graph/Activated
8	<p>Shutdown the input AC power, to change to the Battery mode.</p> <ul style="list-style-type: none"> • Main Power Supply LED (Green)/Lights off, Battery Mode LED (Yellow)/Lights up
9	<p>Resume the input AC power, to be back to the main power supply mode.</p> <ul style="list-style-type: none"> • Main Power Supply LED (Green)/ Lights up, Battery Mode LED (Yellow)/Lights off

<During Power Supply>

Steps	Descriptions
1	<p>Keep pressing the two Memory Plugging Buttons on the front of UPS Controller Console simultaneously for 6 seconds, to switch the mode from the Main Power Supply mode to the Service mode.</p> <ul style="list-style-type: none"> • Alarm LED (Red)/Lights up, LED Bar Graph/Lights off 
2	<p>Disconnect the wires connected to the Battery Module Terminal Block in the following order, carefully to prevent contact of (+) line with (-) line:</p> <ol style="list-style-type: none"> ① Plus line (+) ② Negative line (-) ③ Communication line 
3	<p>Install new Battery Module and Battery and connect the wires in the following order. Carefully connect them since it can cause some small flames.</p> <ol style="list-style-type: none"> ① Plus line (+) ② Negative line (-) ③ Communication line  <p>(Whenever changing Battery, Battery Module must be changed as well.)</p>
4	<p>Keep pressing the right Memory Plugging Button on the front of UPS Controller Console for 6 seconds to check the connection of Battery.</p> <p>LED Bar Graph will flicker for 5 seconds.</p> 
5	<p>Keep pressing the two Memory Plugging Buttons on the front of UPS Controller Console simultaneously for 6 seconds, to end the Service mode and switch to the Main Power Supply mode.</p> <ul style="list-style-type: none"> • Alarm LED (Red)/Lights off, LED Bar Graph/Activated
6	<p>Turn “OFF” the input AC Power, to switch the mode from the Main Power Supply mode to the Battery mode</p> <ul style="list-style-type: none"> • Main Power Supply LED (Green)/Lights off, Battery Mode LED (Yellow)/Lights up
7	<p>Resume the input AC power, to switch the mode from the Battery mode to the Main Power Supply mode</p> <ul style="list-style-type: none"> • Battery Mode LED (Yellow)/Lights off, Main Power Supply LED (Green)/Lights up

4-2 Recommended Battery Change Interval (unit: year)

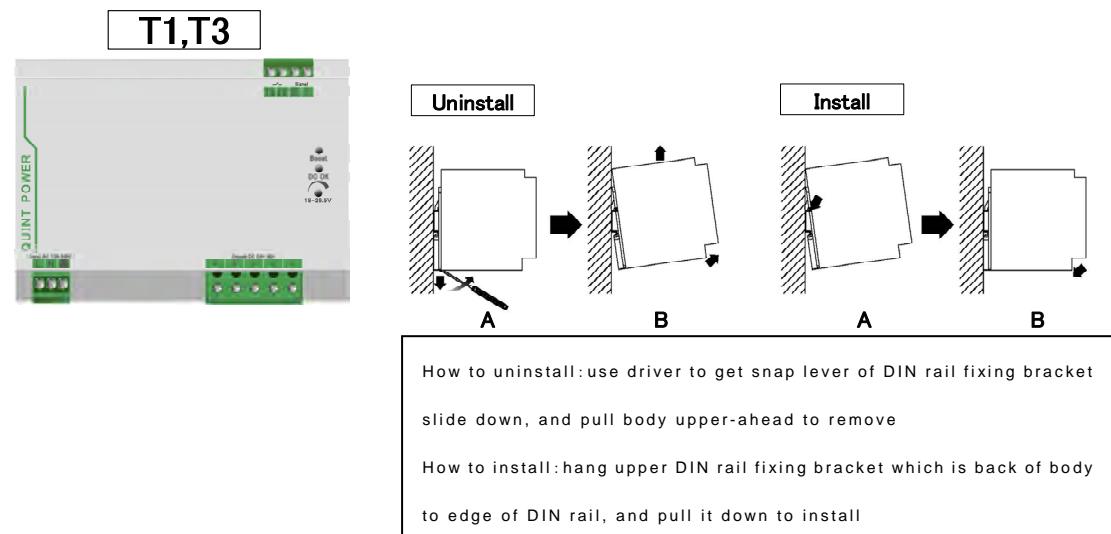
- 1) Ambient Temp. 20°C: 10 - 12
- 2) Ambient Temp. 30°C: 5 - 6
- 3) Ambient Temp. 40°C: 2.5 - 3
- 4) Ambient Temp. 45°C: 2 - 2.5

(The periods are to guide when to change, not indicate the Compensation Life.)

5 How to Change Power Supply Unit



5-1 Power Supply Unit Change Procedure



Follow the below for the change:

*Power Supply Unit change should be done after stopping the power supply.

*We show change procedure of T1 as an example.

Please substitute T1 with Item you concern.

Steps	Descriptions
1	Prepare new Power Unit from spare parts. Type: QUINT-PS/1AC/24DC/40
2	Turn "OFF" all off and after F101. (Q'ty of them varies depending on the type of the Main Engine)
3	Turn "OFF" F1 on the Breaker as well as turning "OFF" the Power SW (Q1) to stop electric supply to the System from the main power mode and from batteries. Indication lamp "DC ON" (P3) and "AC ON" (P4) lights off.
4	After confirmed shutdown, uninstall Power Unit (T1), and install new Power Unit.
5	Turn "ON" F1 on the Breaker as well as turning "ON" the Power SW (Q1) to start electric supply to the System from the main power mode and from batteries. Indication lamp "DC ON" (P3) and "AC ON" (P4) lights up.
6	Turn "ON" all on and after F101 (Q'ty of them varies depending on the type of the Main Engine)

6 How to Change UPS Controller

6-1 UPS Controller Change Procedure

T2



Follow the below for the change:

*UPS Controller change should be done after stopping the power supply.

*We show change procedure of T2 as an example.

Please substitute T2 with Item you concern.

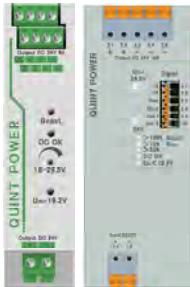
Steps	Descriptions
1	Prepare new UPS controller from spare parts Type: QUINT-UPS/24DC/24DC/40
2	Turn "OFF" all off and after F101. (Q'ty of them varies depending on the type of the Main Engine)
3	Turn "OFF" F1 on the Breaker as well as turning "OFF" the Power SW (Q1) to stop electric supply to the System from the main power mode and from batteries. Indication lamp "DC ON"(P3) and "AC ON"(P4) lights off.
4	After confirmed shutdown, uninstall UPS controller (T2), and install new UPS controller.
5	Turn "ON" F1 on the Breaker as well as turning "ON" the Power SW (Q1) to start electric supply to the System from the main power mode and from batteries. Indication lamp "DC ON"(P3) and "AC ON"(P4) lights up.
6	Turn "ON" all on and after F101 (Q'ty of them varies depending on the type of the Main Engine)

7 How to Change DC/DC converter



7-1 DC/DC Converter Change Procedure

T101~



Follow the below for the change:

*DC/DC converter change should be done after stopping the power supply.

*We show change procedure of T101 as an example.

Please substitute T101 with Item you concern.

Steps	Descriptions
1	Prepare new DC/DC converter from spare parts Type: QUINT4-PS/24DC/24DC/10/PT
2	Turn "OFF" all off and after F101. (Q'ty of them varies depending on the type of the Main Engine)
3	Turn "OFF" F1 on the Breaker as well as turning "OFF" the Power SW (Q1) to stop electric supply to the System from the main power mode and from batteries. Indication lamp "DC ON"(P3) and "AC ON"(P4) lights off.
4	After confirmed shutdown, uninstall DC/DC converter (T101) and install new DC/DC converter.
5	Turn "ON" F1 on the Breaker as well as turning "ON" the Power SW (Q1) to start electric supply to the System from the main power mode and from batteries. Indication lamp "DC ON"(P3) and "AC ON"(P4) lights up.
6	Turn "ON" all on and after F101 (Q'ty of them varies depending on the type of the Main Engine)

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VOL.5: COMPONENT NO.3(OTHERS)

ARR. OF TOP BRACING

1

2

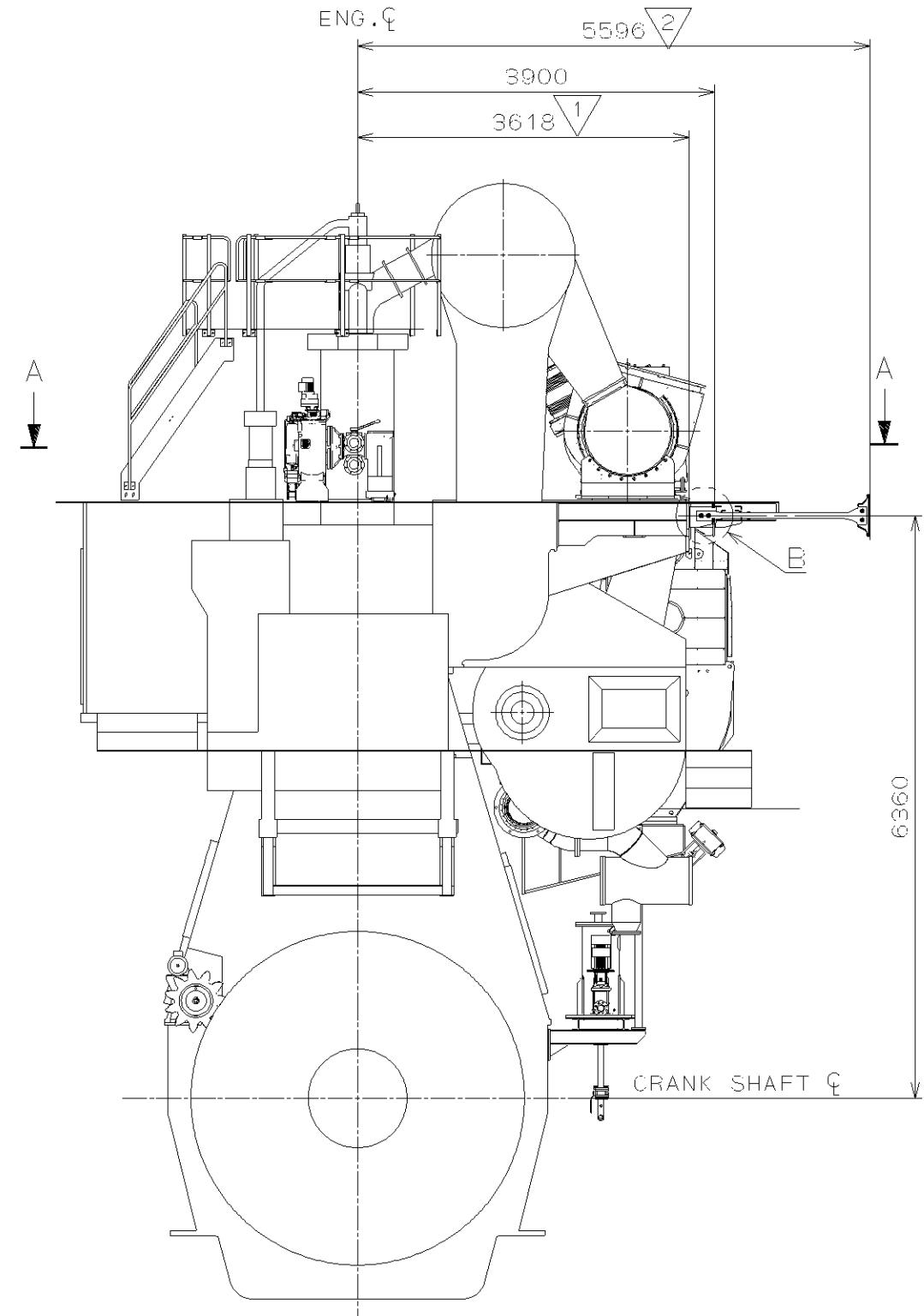
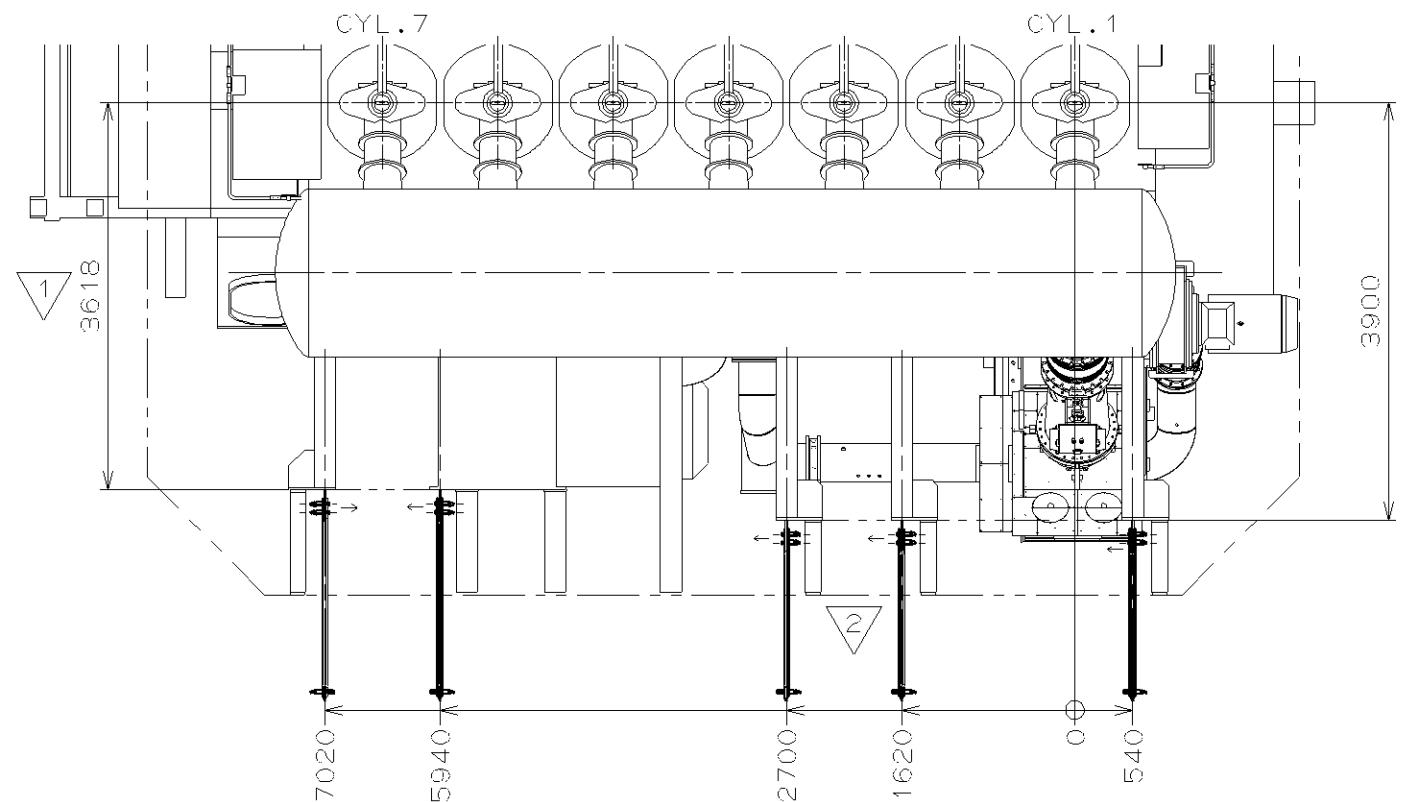
3

4

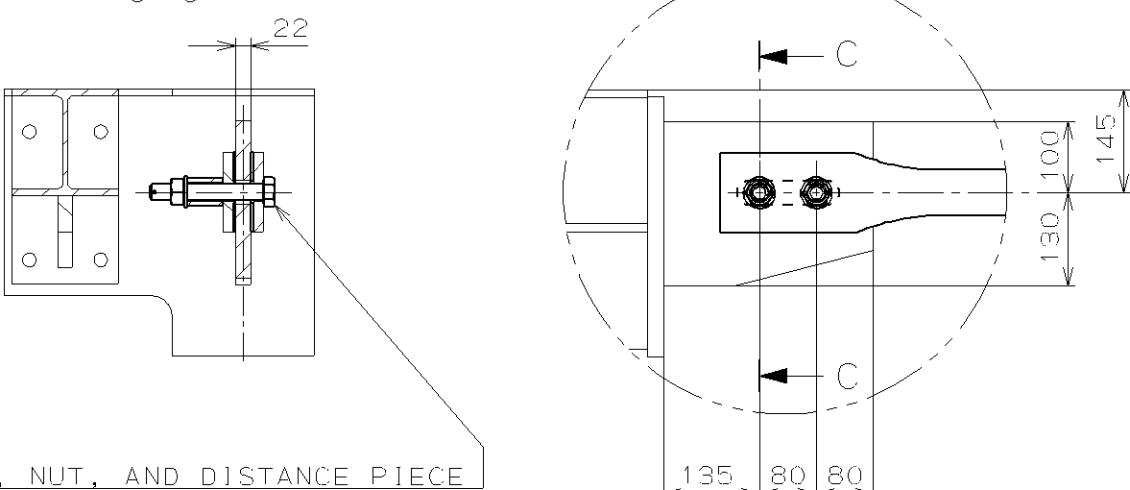
5

6

A - A



C - C



BEAM, BOLT, NUT, AND DISTANCE PIECE
TO BE SUPPLIED BY SHIPBUILDER.

REMARKS

* SEE THE DRAWING DETAIL OF TOP BRACING. (DWG. No. 4Y-07134)

Date	Des.	Chk.	APRD.	A.C.	Revision change	GSD No.	Rev.
20220614	E長代	百々	内田	RB	船体側取合寸法, DWG. No. : 追記, 機関側取付位置変更	89160A	02
20220520	E平井	近藤	内田	RB	トッププレーシング取付寸法変更	88733A	01
20220309	E長代	百々	内田	-		NX87596A	00
Basic Standards JISD SBI, EN21F-m Tolerances, Material / Blank							
EN21CA Surf. roughness							
Similar Drawing No. 3Y-57302							
Parts List / Reference Drawing No.							
Scale: 1:50 Size: A2 Product Type: 7G60ME-C10.5-EGRBP Page No.: 01 (01) Projection: 三井E&Sマシナリー							
Info. No.: Item Name:							
Final User Info. No.: Final User Description: ARR. OF TOP BRACING							
Final User Ident. No.: 3Y-66139							

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TIGHTENING OF TOP BRACING

Bolts for top bracing are to be tightened by means of a torque wrench. As regards tightening force, see the table on the right.

The bolts at the engine side are to be tightened to "X" Nm. The bolts at the hull side are to be tightened to "A" Nm.

When during the trial trip the engine has reached its working temperature, the two bolts for the frictional assembly of the top bracing at the hull side are to be loosened. After approximately one minute the bolts are tightened again. This procedure is to be carried out for each individual top bracing.

Make sure that the beams are supported in the vertical direction during this operation.

The tightening should be checked as follows:

Check if relative movements occur between top bracing and fastening plate by following method. (or similar)
Carry out checking of the top bracing at the fore end, the center, and the aft end of the engine.

- 1) Add the scratch mark on the fork plate and observe the mark.
or
- 2) Finger-touch at the same time the casing bracket plate and one of the fork plate.

If relative movements larger than $\pm 0.02\text{mm}$ are ascertained, increase the tightening torque of the bolts at the hull side to "B" Nm (at all top bracings). At the same time, observe at which tightening torque the nuts are loosened at all top bracings. If the relative movement (after having increased the tightening torque) has still not disappeared, increase the tightening torque to "C" Nm, and again observe the loosening torque at each bolt.

After some time in service top bracing might become ineffective (due to setting or wear of the friction material). The tightening should therefore be checked (as described above) if:

Engine bore	Engine side (Friction shim)		Hull side (Friction shim)			
	Thread size	Tightening torque (Nm)				
	X	A	B	C		
90	M36	2700	M30	550	1000	1500
80	M30	1250	M30	450	820	1200
70	M30	1400	M24	280	520	750
60	M24	800	M20	170	310	450
50	M20	470	M20	120	215	310
46	M20	400	M20	100	180	260
45	M20	470	M20	120	215	310
40	M20	400	M20	100	180	260
35	M16	190	M16	50	90	120
30	M16	190	M16	50	90	120

主機振動防止装置用のボルトは、トルクレンチにより均等に締付けを行う。

締付けトルクは、上の表を参照のこと。

主機側の締付けボルトは、" X" Nm、船体側の締付けボルトは" A" Nmでそれぞれ締付ける。

航海運転中に主機関が通常運転温度に達した時に、船体付プレートの締付けボルト2本を緩める。

約1分後、緩めたボルトを締付ける。この手順を、各々の主機振動防止装置の箱端・中間・艉端の順番に行う。

- 1) 船体付プレートとホークプレートの取付境界線にケガキ線をマークする。或いは、
- 2) 船体プレートとホークプレートを指で触れて相対的な動きを確認する。

上記の船体側接続部に±0.02mm以上の相対変位が認められた場合は、船体側の締付けボルトを全ての主機振動防止装置において一度緩めて" B" Nmで締め直す。
この時、すべての主機振動防止装置のボルトが緩むトルクを確認すること。
更に相対変位が認められる場合は、全ての主機振動防止装置において一度緩めて" C" Nmのトルクで締め直す。
この時、すべての主機振動防止装置のボルトが緩むトルクを確認すること。
長時間の使用においては、主機振動防止装置の摩擦材料に摩耗及びその他の理由により、有効に作用しなくなる可能性がある。その為、上述の要領にて締付け状態を確認する。

9

9

DATE	DES.	CHKD	AC	SC	GSD	R
2018 09 20	F小原		百々	稻住	注記及び図面枠変更	70298A 6
2020 10 02	E堀	百々	内田	村上	注記を一部削除する。	80607A 9
2019 08 02	E堀	百々	内田	村上	表題欄:Eng. type-->Eng. boreに変更、	74538A 8
2018 10 31	E堀		百々	稻住	対象機種他追加、	70881A 7
1998 06 01	東條			矢村	MAN B & W STD	0
All engines					8/5	三井E&Sマシナリー
INSTRUCTION FOR TOP BRACING					DRG. NO.	3E-57858

5

IMITSUI E&S CO.,LTD.

VOL.5: COMPONENT NO.3(OTHERS)

WATER TREATMENT SYSTEM AND SUPPLY UNIT

図面來歴 PLAN HISTORY

NAMURA
S. No. 489

TE33H0

7G60ME-C10.5-EGRBP

配 布 先	
舶玉生	(計) (技) (輸)
玉調	(デ) (管)
舶玉製	溶(エン) 組(エン) 組(エン)進行
舶玉品	組(産) (品) (試) (調)
マキタ	
MSR電設一制	
協 設	三友
	MES特機
	イデアス
	山陽
舶工ン設	計(担当者)
	(基)
	(詳)
	三國玉原 宮原製作所
合計	

水处理装置

WATER TREATMENT SYSTEM AND SUPPLY UNIT

類似参考図

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prior written permission.

DATE	STAFF	CHG. ENGR	CHECK	APPROVE	REVISION CHANGE	R
						9
						8
						7
						6
						5
						4
						3
						2
						1
2023/5/8	-	林	中禮/菅	谷口	初回発行	

舶用推進システム事業部
エンジン設計部
Marine Propulsion Systems Div.
Engine Design Dept

四面種類

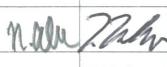
区分番号

図面番号 DRG. NO.

TE33H072A

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表紙共 144 枚

DOCUMENT and DRAWING 提出図書			No. of COPIES						
	for CONFERENCE 協議用図			Mitsui E&S Machinery Co., Ltd. 株式会社 三井E&Sマシナリー 殿					
	for SPECIFICATION 納入仕様書		PDF						
	for APPROVAL 御承認用図			CLIENT 顧客 NAMURA SHIPBUILDING CO.,LTD.					
	for CONSTRUCTION 工事用図			SHIP No. 船番 -487/489/490-					
<input checked="" type="checkbox"/>	for COMPLETION 完成図		PDF	Model No. 型式 ONZ16-PN35E/SU20L					
NOTICE									
Refer to the following publication before designing and setting out the installation work aboard the ship. MITSUBISHI EGR Water Treatment System ONZ - SERIES Design guidance									
注意 機器設計および組立工事に関しては、弊社発行の『ONZ-SERIES 設計ガイド』をご参照願います。									
Selfjector Design Section Marine Machinery Design Dept. Mitsubishi Kakoki Kaisha, Ltd.									
三菱化工機株式会社									
Approval : T.Nakano 承認									
Checked : N.Abe 確認									
Made : T.Ogawa 作成									
Date Apr. - 15 - '22 Scale: NONE									
B	Mar.-24-'23	for COMPLETION	T.Ogawa		Our Order No. A3006715-1000				
A	Oct.-3-'22	Revised No.23	T.Ogawa	N.Abe	T.Nakano	弊社工事番号 A3006716-1000 A3006717-1000			
Rev.	DATE	DESCRIPTION	MADE	CHKD	APPR.				

DOCUMENT LIST

提出図書リスト

No.	DOCUMENT NAME 図書名称	DOCUMENT NUMBER 弊社書類番号	REV. DATE 改訂日					
			0	1	2	3	4	5
○ 1	Water Treatment System Specifications WTS仕様書	S-LW-13721-02	Apr.- 15. '22					
○ 2	Supply Unit Specifications サプライユニット仕様書	S-LW-13721-03	Apr.- 15. '22	Mar.- 24. '23				
○ 3	Separator Specification 分離機 仕様書	S-LW-13721-04	Apr.- 15. '22	Mar.- 24. '23				
○ 4	Filter Specification フィルター仕様書	S-LW-13721-16	Apr.- 15. '22					
○ 5	EGR Dirty water Pump Specification EGRストラト凝集水用ポンプ仕様書	S-LW-13721-27	Apr.- 15. '22					
○ 6	NaOH Pump Specification NaOHポンプ仕様書	S-LW-13721-06	Apr.- 15. '22					
○ 7	Treated Water Supply Pump Specification 供給ポンプ仕様書	S-LW-13721-07	Apr.- 15. '22					
○ 8	WTS PUMP PERFORMANCE CURVES & SPECIFICATION WTSポンプ性能曲線と仕様	S-LW-13721-22	Apr.- 15. '22					
○ 9	Control Valves Specification For ONZ ONZ用制御弁仕様書	S-LW-13721-09	Apr.- 15. '22					
○ 10	Valves Specification For Supply Unit SU用弁仕様書	S-LW-13721-30	Apr.- 15. '22					
○ 11	Sensor Specification 計装品仕様書	S-LW-13721-10	Apr.- 15. '22					
○ 12	Oil monitor Specification オイルモニタ仕様書	S-LW-13721-11	Apr.- 15. '22					
○ 13	LIQUID LEVEL INDICATOR SPECIFICATION 液面計仕様書	S-LW-13721-23	Apr.- 15. '22	Mar.- 24. '23				
○ 14	Lubrication Oil List 潤滑油リスト	S-LW-13721-15	Apr.- 15. '22					
○ 15	Inverter Specification インバータ仕様書	S-LW-13721-21	Apr.- 15. '22	Mar.- 24. '23				
○ 16	A.C. starter Specification 交流始動器仕様書	S-LW-13721-20	Apr.- 15. '22					
○ 17	Automatic Control Panel Specification 自動制御盤仕様書	S-LW-13721-12	Apr.- 15. '22	Mar.- 24. '23				
○ 18	Flocculant Pump,Flocculant tank Specifications 凝集剤ポンプ、凝集剤タンク仕様書	S-LW-13721-28	Apr.- 15. '22					
○ 19	Defoaming Chamber Dimensions 脱気装置外形図	S-LW-13721-29	Apr.- 15. '22					
○ 20	Tool List(For SJ35HWT) 要具リスト(SJ35HWT用)	S-LW-13721-13	Apr.- 15. '22					
○ 21	Accessories & Spare Parts List(For SJ35HWT) 付属品&予備品リスト(SJ35HWT用)	S-LW-13721-19	Apr.- 15. '22					
○ 22	Tool List(For ONZ16-PN35E) 要具リスト(ONZ16-PN35E用)	S-LW-13721-24	Apr.- 15. '22					
○ 23	Accessories & Spare Parts List(For ONZ16-PN35E/SU20L) 付属品&予備品リスト(ONZ16-PN35E/SU20L用)	S-LW-13721-25	Apr.- 15. '22	Oct.- 3. '22	Mar.- 24. '23			

Document Number 弊社書類番号	S-LW-13721-01	Rev. B
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Our Order No. A3006715-1000

弊社工事番号 A3006716-1000

A3006717-1000

WATER TREATMENT SYSTEM SPECIFICATIONS

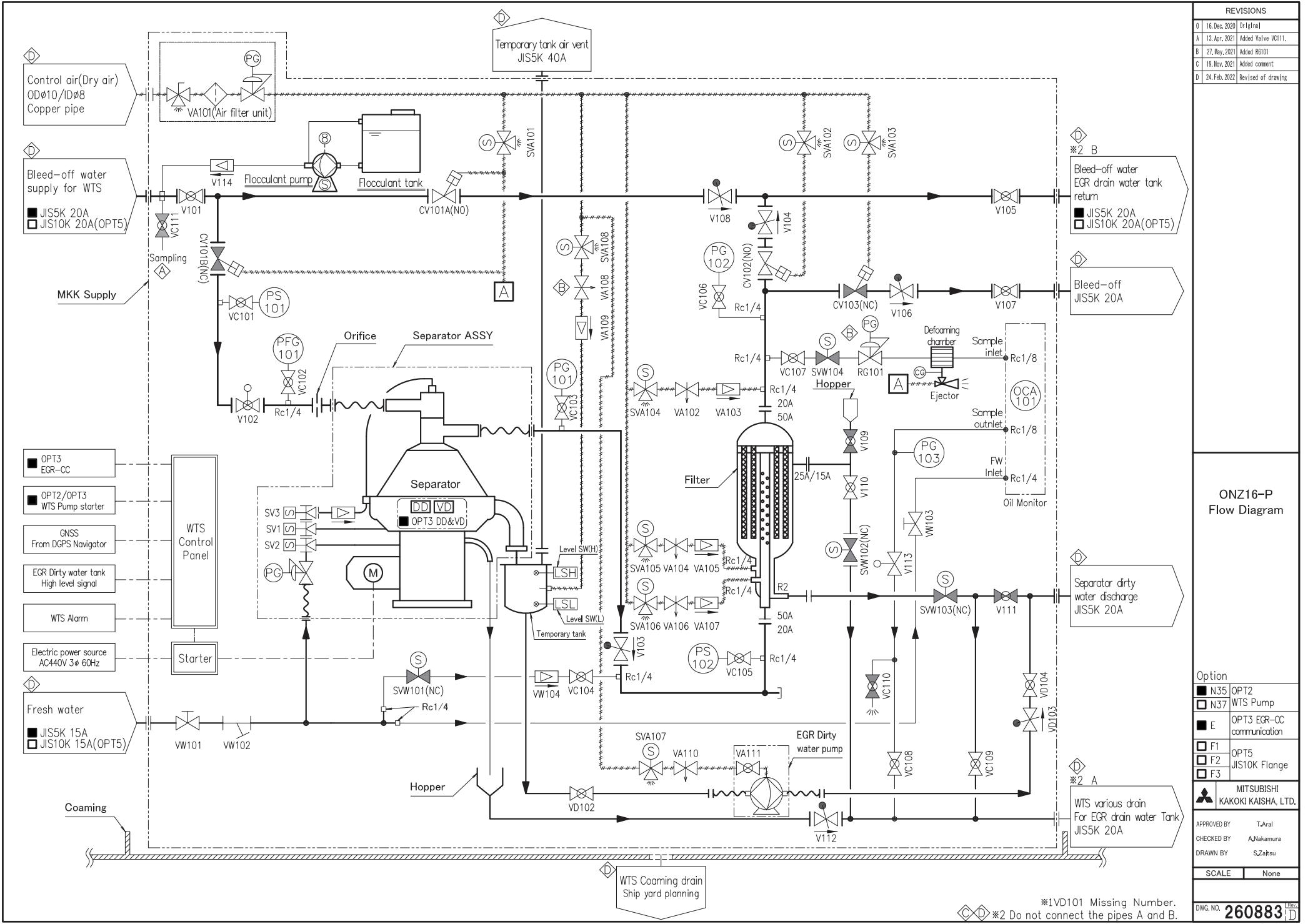
WTS仕様書

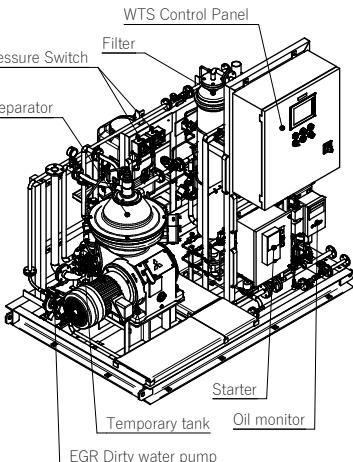
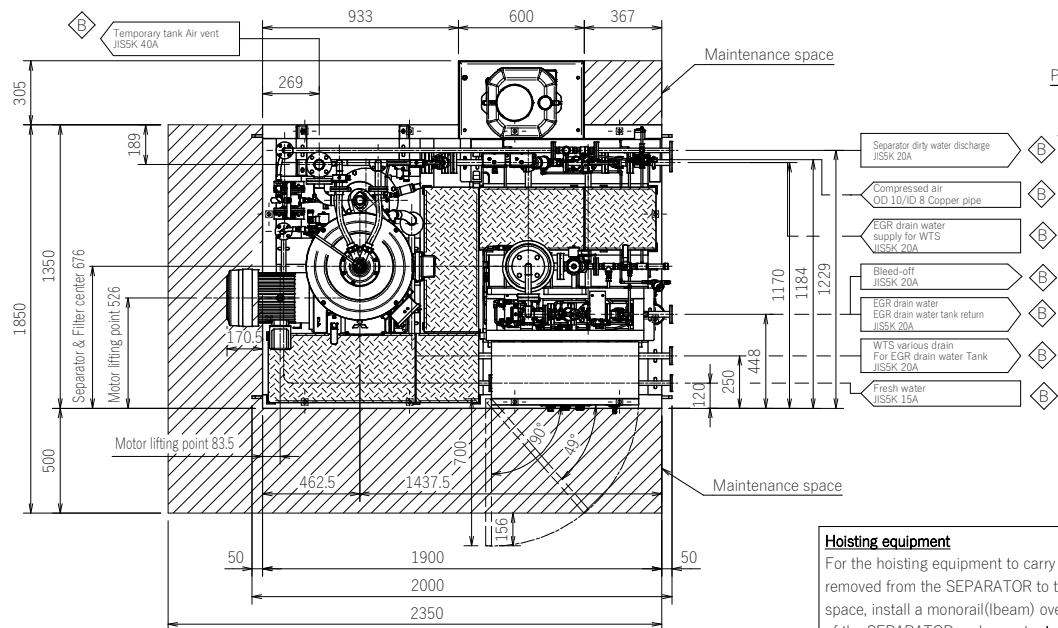
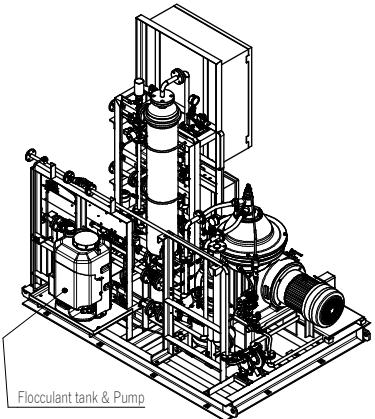
Use 用途	High pressure EGR unit Process water purification and outboard discharge treatment 高圧EGRユニット プロセス水の清浄及び船外排水処理					
Main Unit Model 主要ユニット 型式	Water Treatment System Model WTS 型式			ONZ16-PN35E		
	OPT.1	Dirty water Transfer kit ストラッカーフィルターキット				P
	OPT.2	WTS Pump WTS ポンプ				N35
	OPT.3	EGR連動運転 EGR連動運転				E
Main Material 主要材質			Name 名 称	Material 材 質		
	Common 共 通		Unit Frame／Support ユニット架台・サポート	Carbon steel (Paint) 7.5BG7/2 炭素鋼 (塗装色) 7.5BG7/2		
			Pipe/Flange 配管・法兰ジ	Low-carbon stainless steel 低炭素ステンレス鋼		
			Flange gasket 法兰ジガスケット	Non-asbestos joint sheet ノンアスペストシートガスケット		
			Bolt／Nut ボルト／ナット	Carbon steel + Zn 炭素鋼 + Znメッキ		
Motor list 電動機リスト			Name 名 称	Power source 電 源	Rated 定 格	Consumption 消 費
	SJ35HWT		Separator 分離機	AC440V 60Hz	7.5 kW	
Pump list ポンプリスト	ONZ16-PN35E	Flocculant Pump 凝集剤ポンプ	AC100V 60Hz	—	20 W	
Utility ユーティリティ			Temp. 温 度 [°C]	Press. 压 力 [kPa]	Flow rate 流 量 [Nm ³ /h]	Consumption 消 費 量 [Nm ³ /h]
	Control air (Dry air) 制御空気 (乾燥空気)		—	500～800		
	Fresh water 清 水		5～50	350～500		
Class of ship 船 級	NK					
Unit Size ユニット寸法	W:2,000 mm × D:1,655 mm × H:1,875 mm					
Flow Rate 処理流量	Nor. 常用(Max 最大)			公称排水量(Nominal overboard flow rate)※		
	1.4m ³ /h			Approx.0.9m ³ /h		
Unit weight 重量	Empty weight 空 重	乾燥重量 乾燥重量	1230 kg			
	Operating weight 運転重量	運転重量	1330 kg			
※標準設定の場合です。EGRプロセス水の水質等によって運転設定を変更する場合がございます。 This is the case of standard settings. Operation settings is changed by EGR process water properties and other factors.						
				Document Number 弊社書類番号	S-LW-13721-02	Rev.
Our Order No. 弊社工事番号						
A3006715-1000 A3006716-1000 A3006717-1000						

REVISIONS

0	16. Dec. 2020	Original
A	13. Apr. 2021	Added Valve VC111.
B	27. May. 2021	Added RG101
C	19. Nov. 2021	Added comment
D	24. Feb. 2022	Revised of drawing

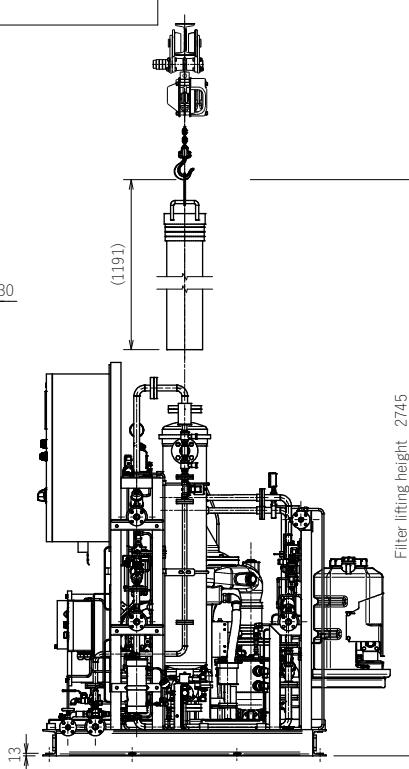
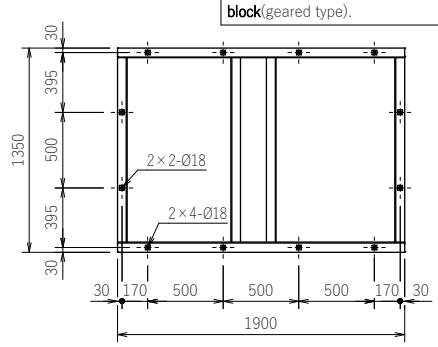
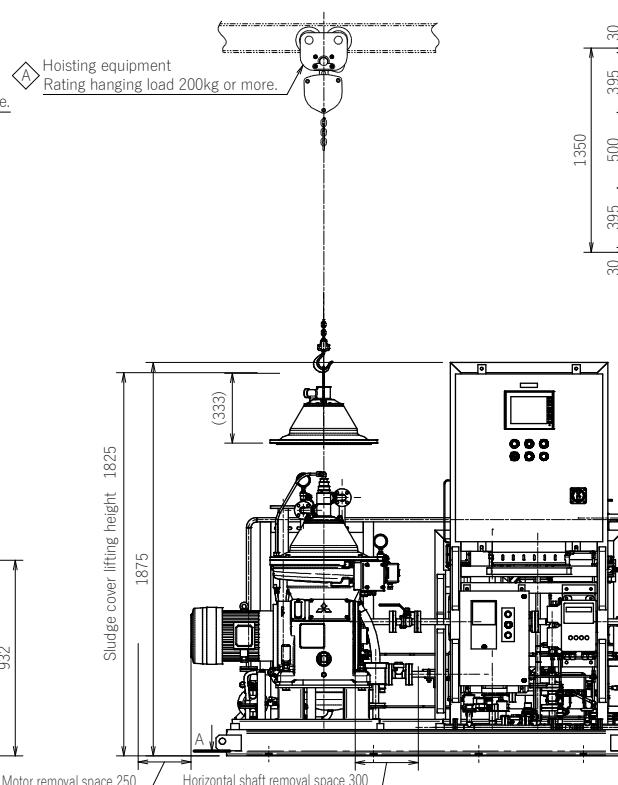
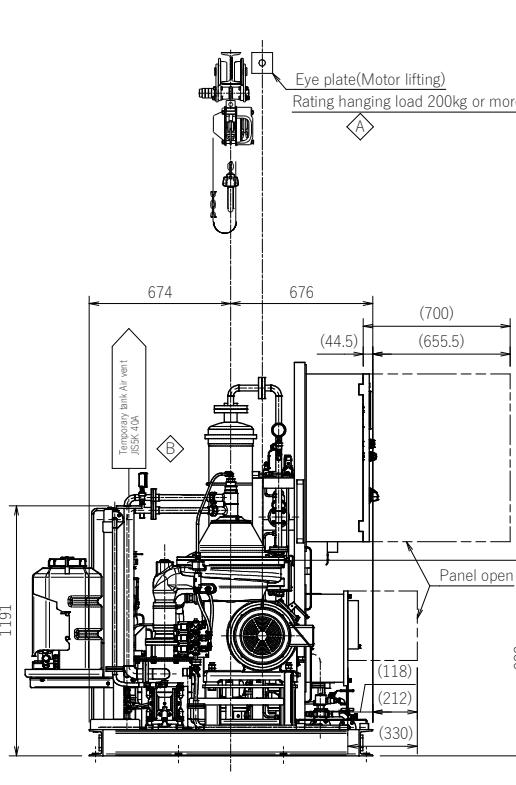
ONZ16-P Flow Diagram





Hoisting equipment

For the hoisting equipment to carry the bowl removed from the SEPARATOR to the maintenance space, install a monorail(lbeam) over the centerline of the SEPARATOR and mount a **trolley type chain block**(geared type).



ONZ Series
Water Treatment System
OUTLINE DRAWING(1)
ONZ16-P
Flocculant tank & Pump

MITSUBISHI
KAKOKI KAISHA LTD

APPROVED BY T.Arai
CHECKED BY A.Nakamura

SCALE

DWG. NO. 260819

Page 1010

Empty weight : 1,230kg
Operating weight : 1,330kg

IS

O	17. Nov. 2020	Original
A	13. Apr. 2021	Add rating hanging load.
B	24. Feb. 2022	Revised of drawing

SUPPLY UNIT SPECIFICATIONS

サプライユニット仕様書

Model 型式	Unit Model 型式		SU20L					
		Name 名称	Material 材質					
Main Material 主要材質	Common 共通	Unit Frame／Support ユニット架台・サポート	Carbon steel (Paint) 7.5BG7/2 炭素鋼 (塗装色) 7.5BG7/2					
		Pipe/Flange 配管・フランジ	Low-carbon stainless steel 低炭素ステンレス鋼					
		Flange gasket フランジガスケット	Non-asbestos joint sheet ノンアスペストシートガスケット					
		Bolt／Nut ボルト／ナット	Carbon steel + Zn 炭素鋼 + Znメッキ					
Motor list 電動機リスト		Name 名称	Power source 電源	Rated 定格	Consumption 消費			
	SU20L	Treated water Supply pump	AC440V 60Hz	1.5 kW	1.3 kW			
		NaOH Dosing pump	AC100V 60Hz	62 W	41 W			
Class of ship 船級	NK							
Unit Size ユニット寸法	W: 1,470 mm × D: 743 mm × H: 1,606 mm							
Flow rate 処理流量	Max 最大		Min 最小					
	2.4 m ³ /h		1.0 m ³ /h					
Unit weight 重量	Empty weight Operating weight	乾燥重量 運転重量	425 kg 430 kg					
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 2px;">Document Number 弊社書類番号</td> <td style="padding: 2px;">S-LW-13721-03</td> <td style="padding: 2px; text-align: center;">Rev. A</td> </tr> </table>						Document Number 弊社書類番号	S-LW-13721-03	Rev. A
Document Number 弊社書類番号	S-LW-13721-03	Rev. A						
<table border="0" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Our Order No. 弊社工事番号</td> <td style="width: 70%; text-align: right; vertical-align: bottom;"> A3006715-1000 A3006716-1000 A3006717-1000 </td> </tr> </table>						Our Order No. 弊社工事番号	A3006715-1000 A3006716-1000 A3006717-1000	
Our Order No. 弊社工事番号	A3006715-1000 A3006716-1000 A3006717-1000							

HISTORY	
O	Original
	21 Apr. 2020
A	Correction of drawing
	29 May. 2020
B	Correction of drawing
	1 Jun. 2020
C	Correction of drawing
	17 Nov. 2020
D	Correction of drawing
	12 Nov. 2022

Supply Unit (SU)
Flow diagram
SU20L/SU40L

MITSUBISHI
KAKOKI KAISHA, LTD.

CHECKED BY T.Arai

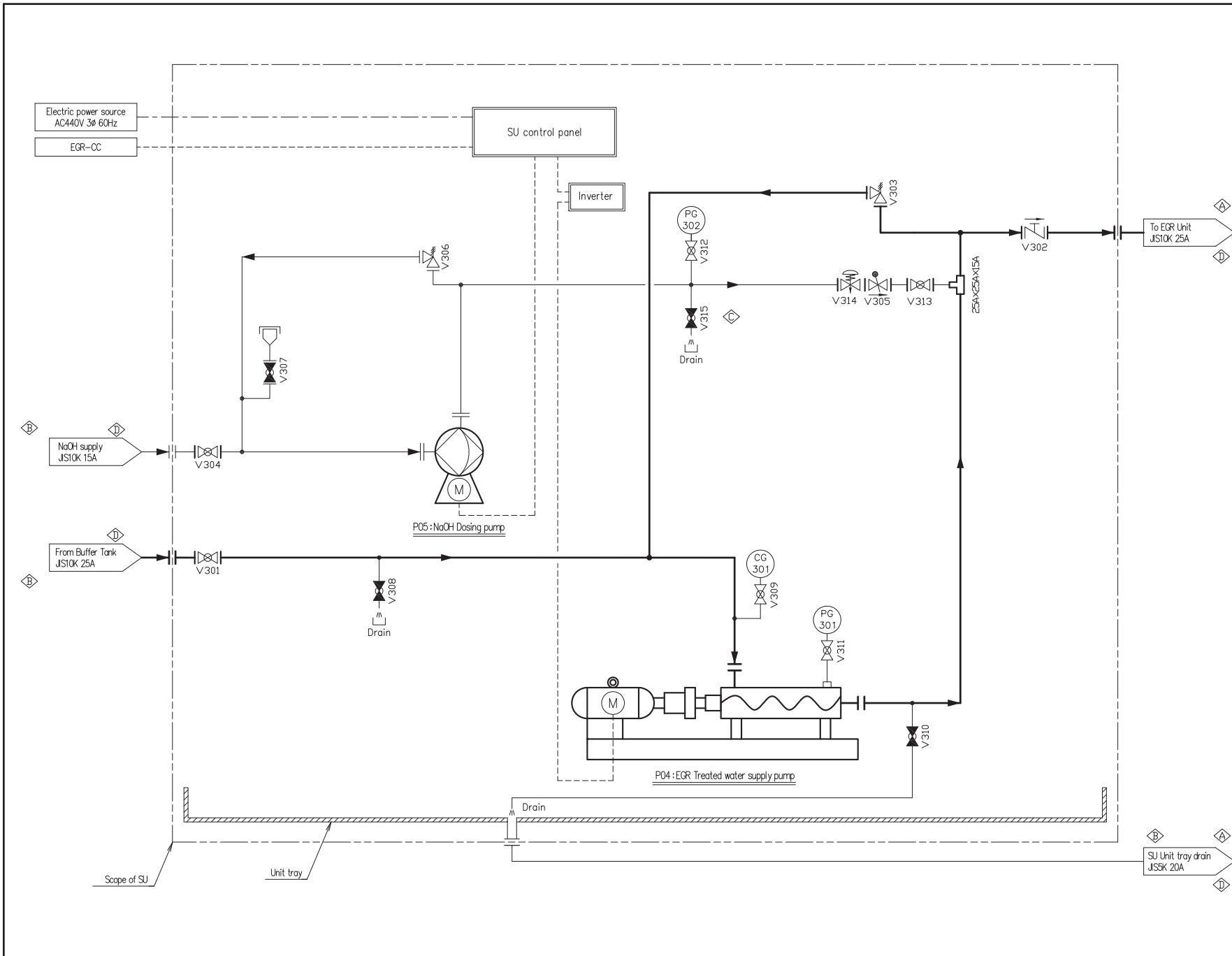
DESIGNED BY A.Nakamura

DRAWN BY T.Ogawa

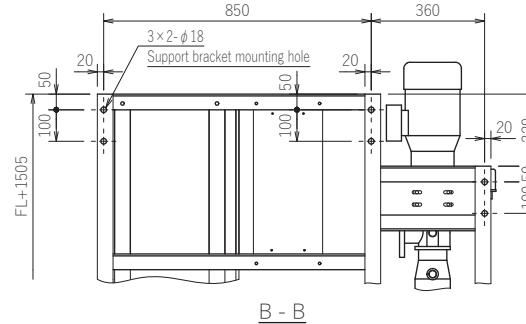
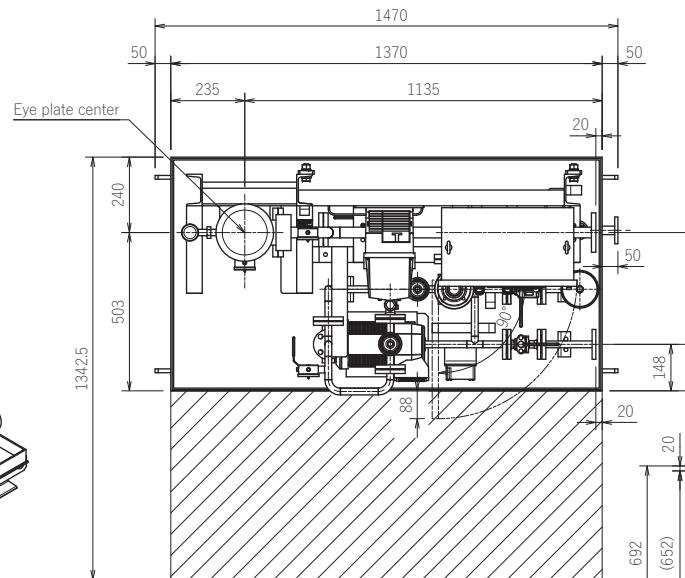
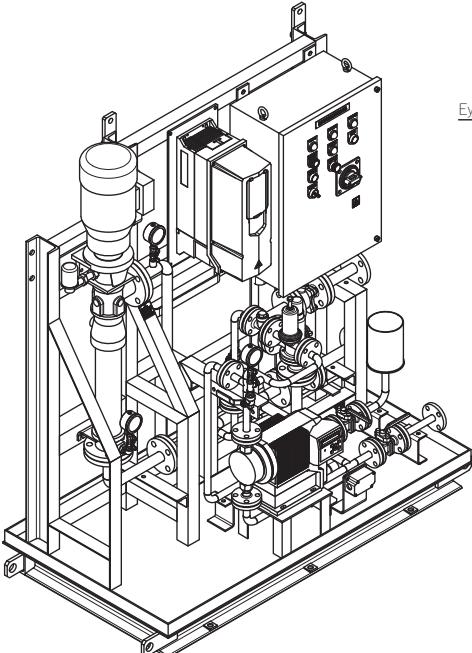
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DWG. NO. 189185D

Form J-002

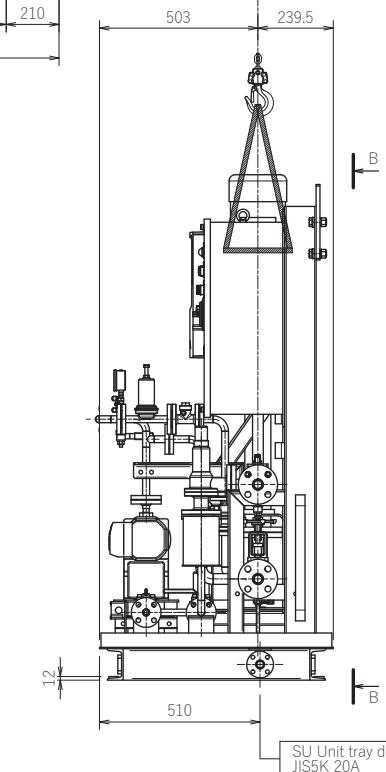
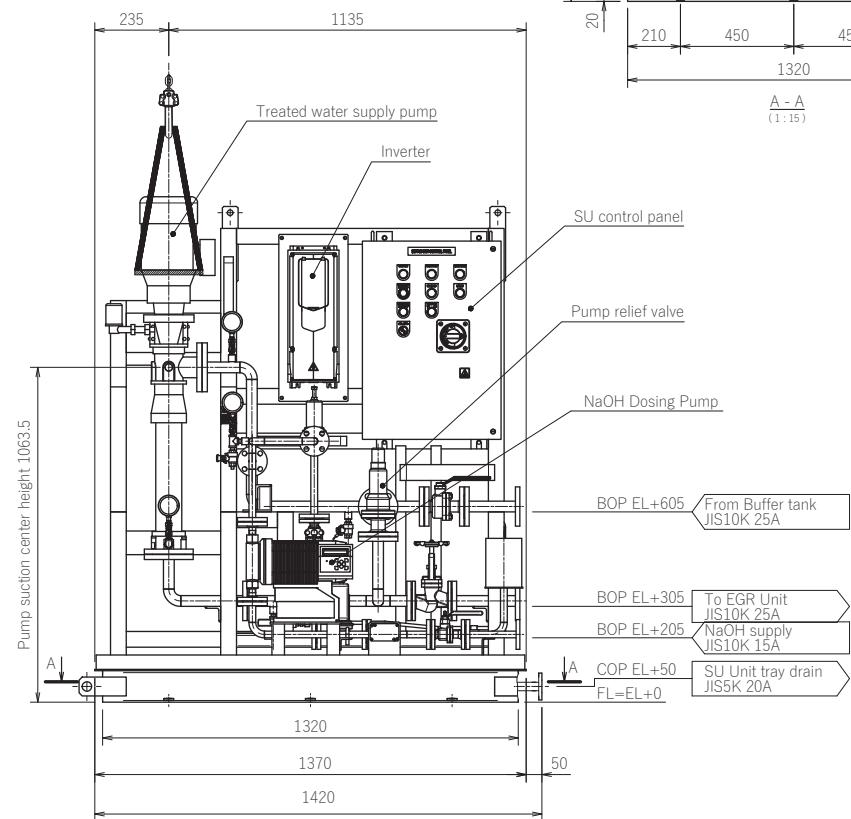
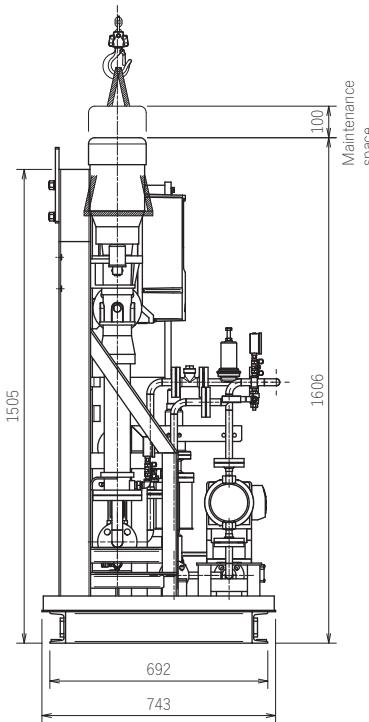


Empty weight : 425kg
Operating weight : 430kg



B - B

Hoisting equipment
Mount an Eye plate right above the motor so that the chain block will can be suspended.
Rating hanging load 200kg or more.



ONZ Series
Supply Unit
OUTLINE DRAWING(1)
SU20L

MITSUBISHI
KAKOKI KAISHA, LTD.

APPROVED BY T.Arai
CHECKED BY A.Nakamura
DRAWN BY K.Ono
H.Mukai

SCALE None

DWG. NO. 261474 Rev. 0

Form J-012

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LEGEND of FLOW DIAGRAM	
EXAMPLE OF LETTERING	
 PG XXX	Pressure gauge
 CG XXX	Compound gauge
 PS XXX	Pressure switch
 PHT XXX	pH transmitter
 TUT XXX	Turbidity transmitter
 PAHT XXX	PAH transmitter
 PFG XXX	Pressure gauge (with Flow indicator scale)
 OCA XXX	Oil content Alarm
 FIS XXX	Flow rate indicating sensor
 M	Electric motor
 	Flexible tube
 —	Main piping (Process water)
 —	Other piping (Fresh water, Drain, NaOH, aq)
 -----	Air piping
 ----	Electric wiring
 - - - -	Scope of supply
 	Diaphragm pump (Air operated)
 	Screw pump
 	Globe valve
 	Ball valve
 	Swing check valve
 	Inline check valve
 	Butterfly valve
 	Needle ball valve
 	3-way valve
 	Speed control valve
 	Screw-down stop check valve
 	Needle valve
 	2-way solenoid valve
 	3-way solenoid valve
 	Solenoid valve
 	Angle sheet piston valve
 	Pressure reducing valve
 	Back pressure valve
 	Pump relief valve
 	Air filter
 	"Y" type strainer
 	Discharge Detector
 	Vibration Detector
 	Constant flow valve
 	Hopper
 	Static mixer
 	Ejector



MITSUBISHI KAKOKI KAISHA,LTD.

DWG.NO.

470046C

SEPARATOR SPECIFICATION

分離機仕様書

Use 用 途	For process water cleaning of the EGR unit. Bleed-off water cleaning. EGRプロセス水清浄用ユニット ブリードオフ水清浄用			
Type 型 式	SJ35HWT			
Actual Capacity 実 容 量	1,400 L/h	Detector 検知器	Rotation & Discharge Detector (RDD), Vibration Detector (VD) 回転/排出不良検知器, 振動検出器	
Discharge pump 吐出ポンプ [°]	(Centripetal pump) (求心ポンプ)	Delivery head 吐出揚程	50 m	
BOWL 回転体	No. of revolution 回転数	10500 min ⁻¹	Bowl weight 回転体重量	
MOTOR 電動機	AC 440 V 60 Hz	Output 出 力	7.5 kW 4 poles Ins. :B	
TOTAL WEIGHT 総 重 量	390 kg (Inc. Bowl)			
Material 材 質	Bowl : Hood : Frame & cover : Shaft : Gear :	High-tension stainless steel Stainless steel casting Iron cast Special alloy steel Special bronze	高張力ステンレス鋼 ステンレス鑄物 鉄 特殊合金鋼 特殊青銅	
Solenoid valves 電磁弁	SV1 : SV2 : SV3 :	For opening bowl For closing bowl For cleaning water supply	開弁用 閉弁用 洗浄水供給用	
UTILITY ユーティリティ	Water 水	0.35~0.5 MPa		
REMARKS 備 考	Lubricating oil (Separator Gear Box) Oil quantity : 5.8 (L) 潤滑油(ギアケース)油量:			
	Required Operating Water quality 水 質	Suspended Substance 懸濁物質	Less than 10mg/L 10mg/L以下	
		Particle size 粒径	Less than 50 μm 50 μm以下	
		Total Hardness 全硬度	Less than 6° dH (110mg/L or less CaCO ₃) 6° dH以下 (110mg/L CaCO ₃ 以下)	
		pH pH 値	6.5 ~ 8.6	
		Chloride Content 塩化物	Less than 100mg/L NaCl 100mg/L NaCl以下	
		Document Number 弊社書類番号	Rev. S-LW-13721-04 A	
		Our Order No. 弊社工事番号	A3006715-1000 A3006716-1000 A3006717-1000	

GENERAL THREE VIEW SJ35HWT

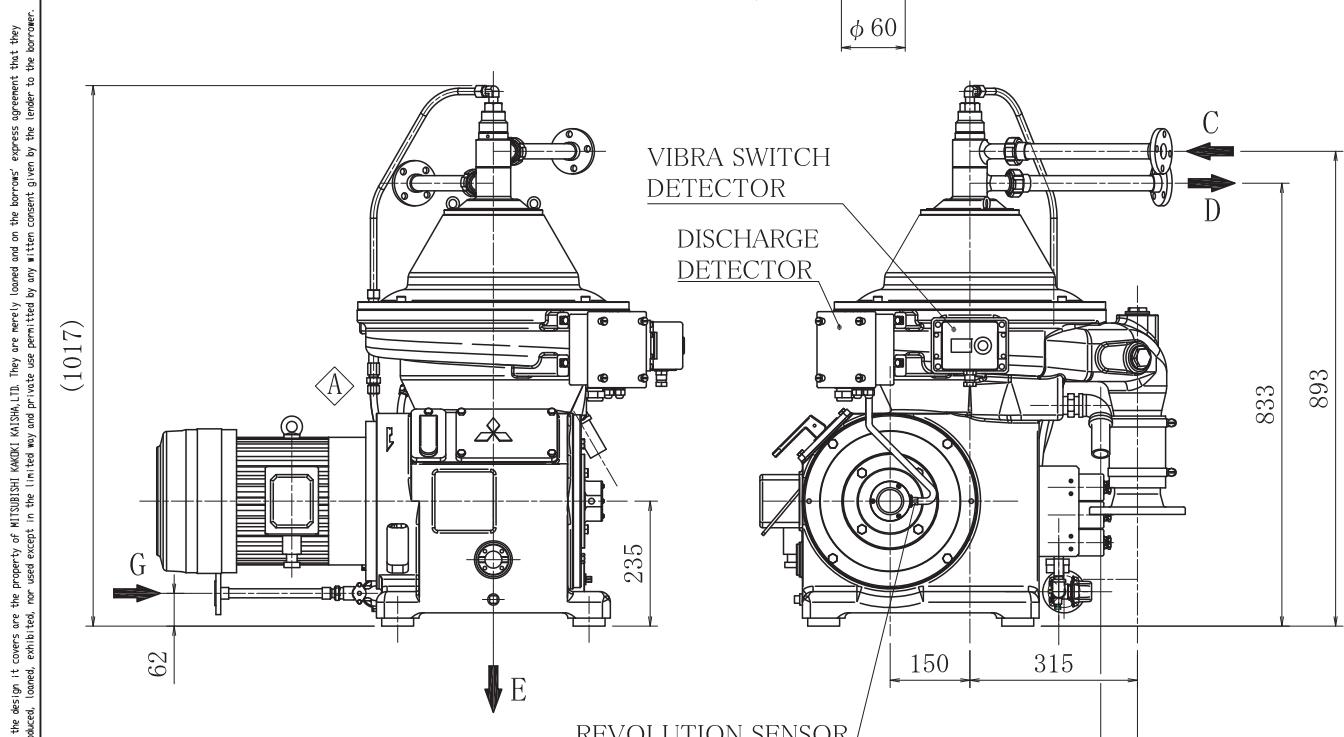
T.Arai
T.Arai
CHECKED

A.Nakamura
A.Nakamura
DESIGNED

T.Ogawa
DRAWN H.Mukai

REV.A 28.Apr.2021
Date 21.Apr.2020
DRAWN

Film No.



Bore table

	Piping Connection	Bore	Rating
A	—	—	—
B	—	—	—
C	Process water inlet	25A	JIS5K FF
D	Process water outlet	25A	JIS5K FF
E	EGR Dirty water outlet	100A	JIS5K FF
F	Operating water outlet	25A	PIPE
G	Operating water inlet	15A	JIS5K LJ

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MITSUBISHI KAKOKI KAISHA, LTD.

DWG. NO.

260414A

Form J-005

FRAME & COVER ASSEMBLY

T. Nakano
T. Araki
T. Araki

MODEL

A. Nakamura
A. Nakamura
A. Nakamura

CHECKED

T. Igawa
N. Abe
Y. Takata

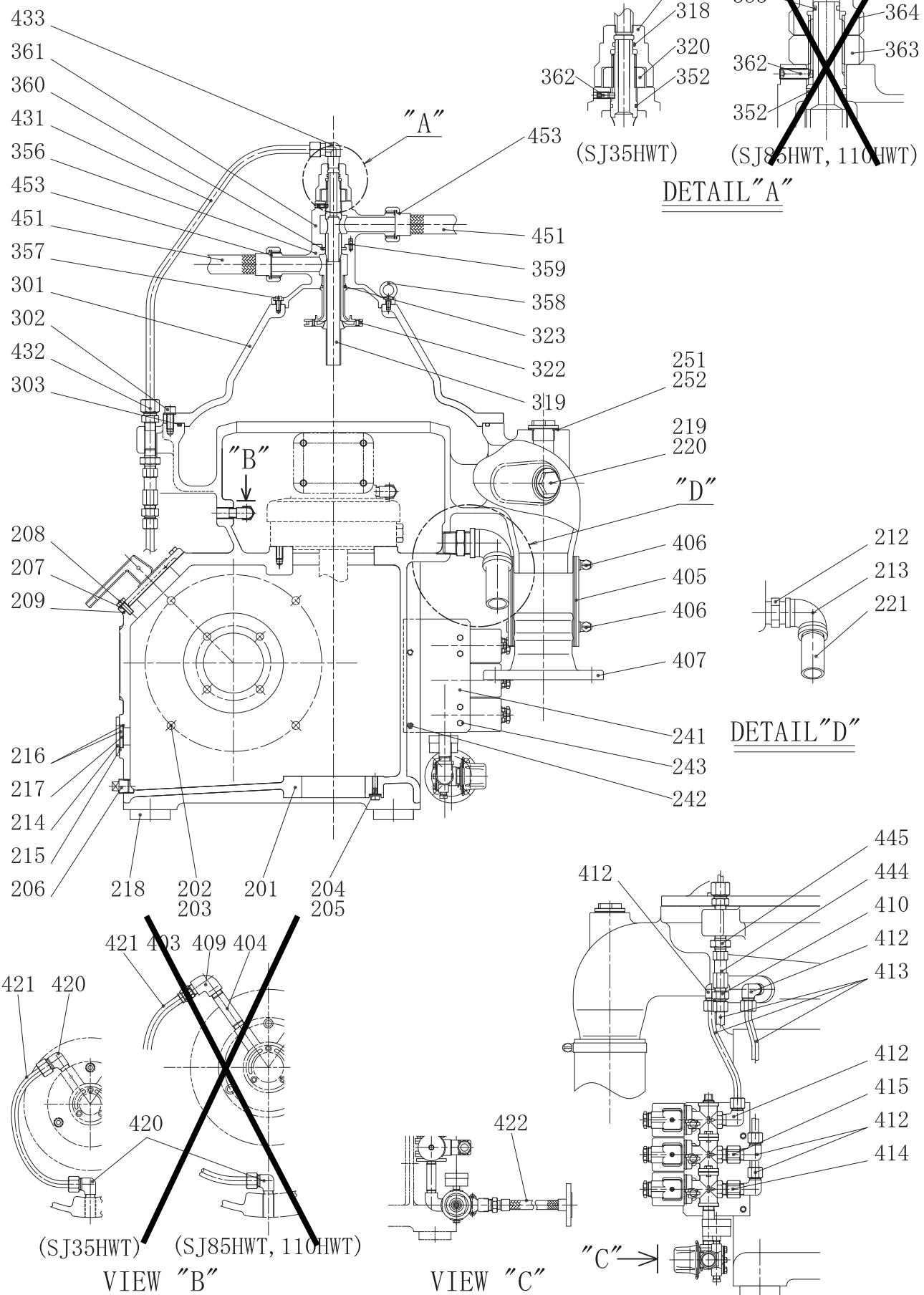
DESIGNED

Rev. C Jun. 17, 2022
Rev. B Sep. 10, 2021
Date May. 7, 2019

DRAWN

Film No.

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MF AP AB BC CD E F GH I JK...
RL A-B-A-C-D-E-F-G-H-I-J-K...



MITSUBISHI KAKOKI KAISHA, LTD.

DWG.NO.

2 5 9 7 2 5 C

Form J-005

Parts List

DWG No. 259725B

Symbol	Parts Name	Material	Q'ty	Parts No
201	フレーム	cast iron	1	033073001
202	六角ボルト	structural steel	4	F1012040C
203	ばね座金	carbon steel wire	4	H1012D1
204	六角穴付きフランジボルト	socket cap flange screw	4	F8008010R
205	シートパッキン	gasket	4	L01400805
206	プラグ	plug	1	NA0015C1
207	ギヤカバー	gear cover	1	253682001
208	六角ボルト	bolt	4	F1008020C
209	シートパッキン	gasket	1	455820001
212	ニップル	nipple	1	N4A025C1
213	エルボ	elbow	1	N1A025C1
214	油面計枠	oil gauge retainer	1	436710001
215	十字穴付きなべ小ねじ	set screw (3)	4	E200612C2
216	シートパッキン	gasket	2	L03402610
217	覗窓ガラス	sight glass	1	466125001
218	フレームゴム座	rubber plate	4	420695001
219	プラグ	plug	1	453713001
220	Oリング	O ring	1	A10032A
221	片ねじロングニップル	nipple	1	N4E025A1
241	水用電磁弁取付座	base plate	1	362295001
242	六角穴付きボルト	socket cap screw	2	F3008016B
243	六角ボルト	bolt	4	F1005010B
251	プラグ	plug	1	468952001
252	シートパッキン	gasket	1	L04503515
301	スラッジカバー	sludge cover	1	188390001
302	六角穴付きボルト	socket cap screw	4	F3010025G
303	Oリング	O ring	1	A20455A
318	Oリング	O ring	1	A10016A
319	液入口管	inlet pipe	1	374116103
320	六角ナット	nut	1	G1022B110
322	軽液インペラ	impeller (1)	1	259109104
323	Oリング	O ring	1	A10031A
352	Oリング	O ring	1	A10020A
356	液出口ハウ징	outlet housing	1	261164001
357	六角穴付きボルト	socket cap screw	4	F3006016B
358	アイボルト	eye bolt	2	F4006000B
359	平行ピン	pin	1	B3005014B
360	Oリング	O ring	1	420856001
361	原液入口フード	inlet hood	1	374250001
362	六角穴付き止めねじ	socket set screw	1	E400616B5
364	カバーナット	cover nut	1	371309001
405	スラッジ接続管	sludge pipe	1	371271001
406	ホースバンド	hose band	2	NB0110H0
407	接続フランジ	connecting flange	1	254317001
410	おねじコネクタ	male connector	1	ND0010I1
412	エルボコネクタ	elbow connector	5	N00010I1
413	テフロンチューブ	teflon tube	1set	NF0010L0
414	ノズル継手	nozzle joint	1	464332002
415	ノズル継手	nozzle joint	1	464332004
420	エルボコネクタ	elbow connector	4	N00010I1
421	テフロンチューブ	teflon tube	1set	NF0010L0
422	作動水フレキ管	connecting tube for water	1	352264106

Parts List

DWG No. 259725B

Symbol	Parts Name	Material	Q'ty	Parts No
431	洗净水入口管	washing water tube	stainless steel	1 371273001
432	ハーフユニオン	half union	stainless steel	1 N90010K11
433	エルボユニオン	elbow union	stainless steel	1 N80010K11
444	逆止弁	check valve	stainless steel	1 P2010EA
445	ニップル	nipple	stainless steel	1 N4A010H1
451	液接続フレキ管	connecting tube (1)	stainless steel	2 374117106
453	シートパッキン	gasket	non-asbestos fiber	2 LB0382815

BOWL ASSEMBLY

DESIGNED I. Tokuda

CHECKED A. Nakamura

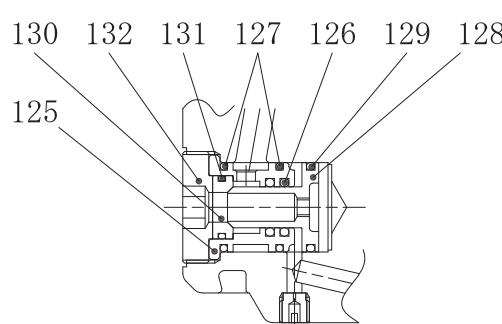
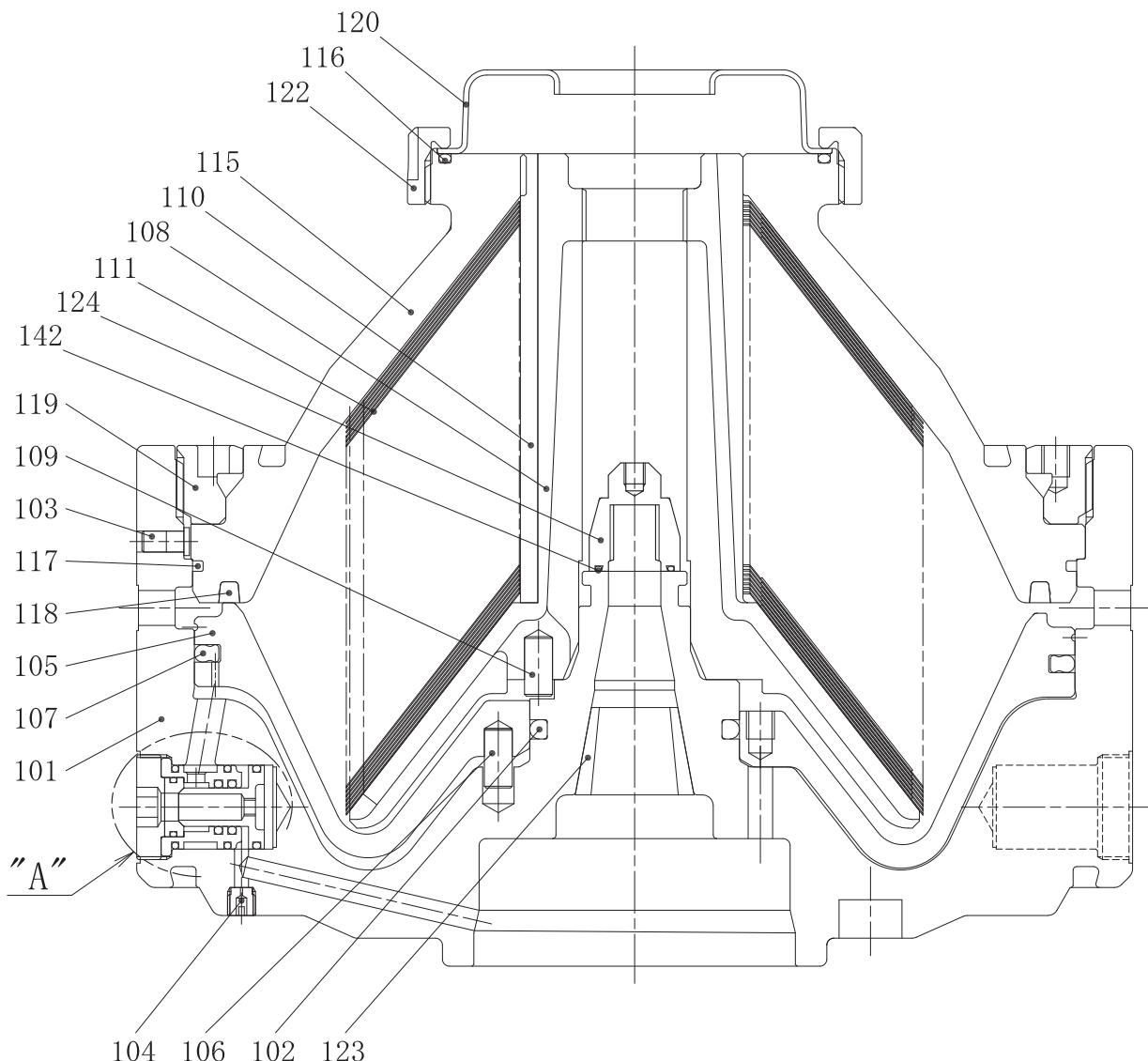
MODEL SJ35HWT

DRAWN K. KAMBE

Date Feb. 1, 2019

File No.

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DETAIL "A"

A	B	C	D	E	F	G	H	I	J	K
M	N	O	P	Q	R	S	T	U	V	W



MITSUBISHI KAKOKI KAISHA, LTD.

DWG.NO.

2 5 9 3 8 6

Form J-005

Parts List

DWG No. 259386

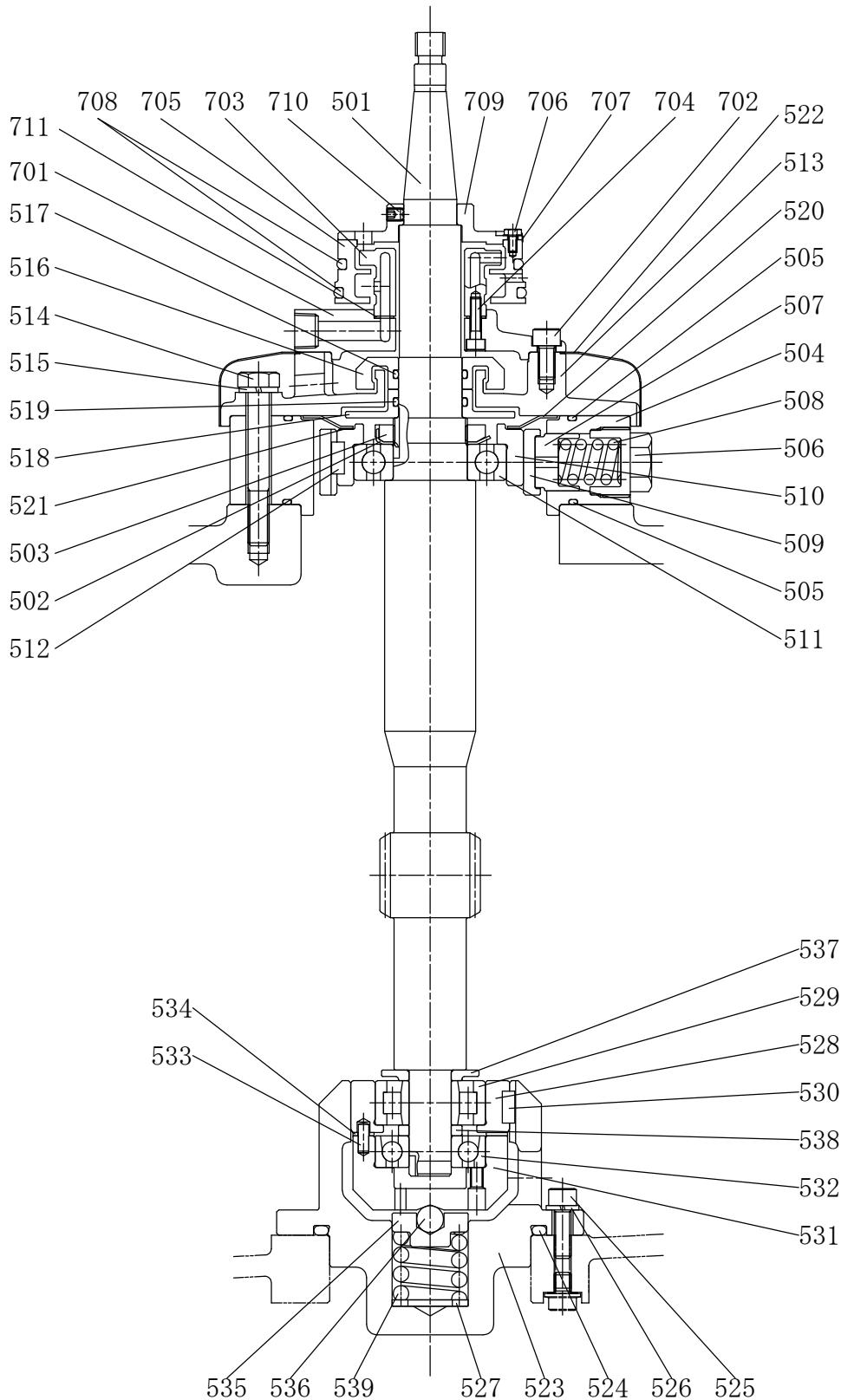
Symbol	Parts Name	Material	Q'ty	Parts No
101	回転胴	special stainless steel	1	183687001
102	Oリング	NBR	1	465264001
103	ノックピン	stainless steel	1	463592001
104	水抜きノズル	copper-alloy	2	450553005
105	弁シリンダ	special stainless steel	1	254284001
106	平行ピン	stainless steel	1	463730001
107	Oリング	NBR	1	463599002
108	案内筒	stainless steel casting	1	184708001
109	平行ピン	stainless steel	1	463730001
110	平行キー	stainless steel	1	463600001
111	分離板	stainless steel	1set	254182102
115	回転体蓋	special stainless steel	1	188391001
116	Oリング	NBR	1	465267001
117	Oリング	NBR	1	465272001
118	弁パッキン	nylon	1	463601001
119	回転体ナット	carbon steel	1	254279001
120	軽液チャンバ	stainless steel	1	371454102
122	ディスクナット	stainless steel	1	371455001
123	回転体ブッシュ	copper-alloy	1	463602001
124	袋ナット	stainless steel	1	367440001
125	バルブガイド	copper-alloy	2	317750001
126	Oリング	FKM	4	A10011F
127	Oリング	FKM	4	A42017F
128	パイロットバルブ	titan	2	450428001
129	Oリング	FKM	2	A42017F
130	バルブシート	nylon	2	436000001
131	Oリング	FKM	2	A41013F
132	バルブナット	carbon steel	2	450489001
142	Oリング	NBR	1	A80017A

VERTICAL SHAFT ASSEMBLY

T. Nakano
A. Nakamura
T. Nakada
I. Takada
A. Nakamura
CHECKED
DESIGNED

N. Abe
DRAWN
H. MUKAI
Date Feb. 1, 2019
Sep. 26, 2022

Film No. MF AP A-B-C-D-E-F-G-H-I-J-K-R
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MITSUBISHI KAKOKI KAISHA, LTD.

DWG. NO.

2 5 9 4 6 1 A

Form J-005

Parts List

DWG No. 259461A

Symbol	Parts Name	Material	Q'ty	Parts No
501	豎軸(60Hz)	vertical shaft(60Hz)	carbon steel	1 183698001
502	軸受用座金	lock washer	structural steel	1 J3007C0
503	軸受用ナット	locknut	structural steel	1 J2007C0
504	上部軸受ハウジング	bearing housing (1)	carbon steel	1 253085001
505	Oリング	O ring	NBR	2 A20130A
506	上部ばね押え	spring retainer (1)	stainless steel	6 450524001
507	上部ばね受	spring case	carbon steel	6 450523001
508	上部ばね	upper spring	spring steel	6 411981001
509	上部軸受スリーブ	bearing sleeve	carbon steel	1 361647001
510	上部軸受ケース	bearing case (1)	carbon steel	1 361648001
511	深みぞ玉軸受	ball bearing (1)	bearing steel	1 I16207J8
512	平行キー	key	carbon steel	1 C106015A2
513	上部軸受カバー	bearing cover (1)	cast iron	1 253086001
514	六角ボルト	bolt	structural steel	3 F1010075C
515	ばね座金	spring washer	carbon steel wire	3 H1010D1
516	上部軸受キャップ1	bearing cap (1)	aluminium alloy casting	1 463615001
517	Oリング	O ring	NBR	1 A20030A
518	上部軸受キャップ2	bearing cap (2)	aluminium alloy casting	1 463616001
519	Oリング	O ring	NBR	1 A20030A
520	板ばね	flat spring	tool steel	1 463617001
521	スペーサ(1)	spacer (1)	structural steel	1 *1
522	ミストカバ	mist cover	structural steel	1 361649001
523	下部軸受ハウジング	bearing housing (2)	cast iron	1 254222001
524	Oリング	O ring	NBR	1 A10095A
525	六角穴付きボルト	socket cap screw	chromium molybdenum steel	4 F3008025G
526	ばね座金	spring washer	carbon steel wire	4 H1008D1
527	平座金	washer	structural steel	1 H4020C1
528	下部軸受ケース	bearing case (2)	carbon steel	1 361650001
529	円筒ころ軸受	bearing (2)	bearing steel	1 I42304J1
530	平行キー	key	carbon steel	1 C106015A2
531	アンギュラ軸受ケース	bearing case (3)	carbon steel	1 363794001
532	アンギュラ玉軸受	ball bearing (3)	bearing steel	1 I27304J2
533	平行ピン	pin	carbon steel	2 B3005014A
534	スペーサ(2)	spacer (2)	structural steel	1 463619001
535	下部ばね受	spring seat	carbon steel	1 463620001
536	鋼球	steel ball	bearing steel	1 J1016J0
537	下部軸受カバー	bearing cover (2)	carbon steel	1 463621001
538	カラー	collar	carbon steel	1 463623001
539	下部ばね	lower spring	spring steel	1 463959001
701	給水盤	operating water disc	bronze casting	1 361652001
702	六角穴付きボルト	socket cap screw	stainless steel	3 F3008016B
703	給水ノズル	operating water nozzle	bronze casting	1 361653001
704	六角穴付きボルト	socket cap screw	stainless steel	3 F6005020B
705	給水チャンバ	operating water chamber	bronze casting	1 361654001
706	六角ボルト	bolt	stainless steel	4 F1004008B
707	両舌付き座金	tongued washer	stainless steel	4 H5004B2
708	Oリング	O ring	NBR	2 464854001
709	チャンバカバ	chamber cover	bronze casting	1 361655001
710	六角穴付き止めねじ	socket set screw	chromium molybdenum steel	1 E400608G7
711	パッキン	packing	non-asbestos fiber	1 463626001

*1 付属品リストを参照ください。

*1Please refer to the accessories list.

HORIZONTAL SHAFT ASSEMBLY

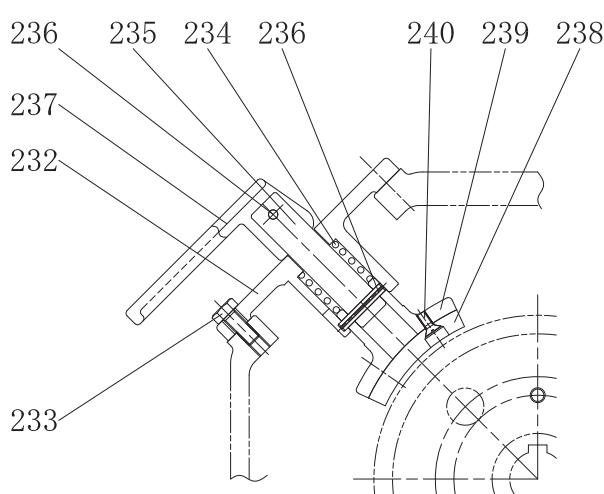
DESIGNED A. Nakamura
CHECKED T. Takada
MODEL SU35HWT

DESIGNED H. Mukai

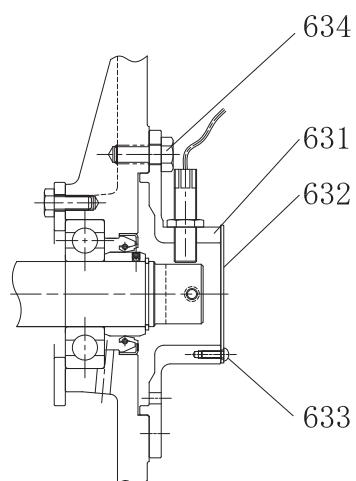
DRAWN H. Mukai
Date Feb. 1, 2019

File No.

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BRAKE



with Discharge detector

MF	AP	A-B-C-D-E-F-G-H-I-J-K
RL	A-B-C-D-E-F-G-H-I-J-K	.



MITSUBISHI KAKOKI KAISHA, LTD.

DWG. NO.

2 5 9 4 6 0

Parts List

DWG No. 259460

Symbol	Parts Name	Material	Q'ty	Parts No
232	ブレーキ座	cast iron	1	205548001
233	六角ボルト	structural steel	2	F1008020C
234	ブレーキばね	piano wire	1	04095
235	ブレーキ軸	structural steel	1	457032001
236	スプリングピン	tool steel	2	B4005032E
237	ブレーキハンドル	cast iron	1	317755001
238	ブレーキライニング	resin	1	363874001
239	ライニング座	cast iron	1	363870001
240	十字穴付き皿小ねじ	set screw (2)	2	E200512I1
601	横軸	horizontal shaft	1	253088001
602	深みぞ玉軸受	ball bearing (1)	2	I16306J1
603	平行キー	key	2	C110040A2
604	軸受用ナット	locknut	1	J2006C0
605	軸受用座金	lock washer	1	J3006C0
606	軸用C形同心止め輪	retaining ring (C)	1	D3030D2
607	六角穴付き止めねじ	socket set screw	1	E400620G6
608	大軸受盤	bearing housing (3)	1	183699001
609	オイルシール	NBR	1	K1406211A
610	Oリング	NBR	1	A20275A
611	ベアリング押え	bearing retainer	1	463624001
612	六角ボルト	bolt	4	F1010030C
613	ギヤボス	gear boss	1	253089001
614	六角ボルト	bolt	3	F1010025C
615	ばね座金	spring washer	3	H1010D1
616	スパイラルギヤ(60Hz)	spiral gear(60Hz)	1	253095001
617	カラー(1)	collar	1	463625001
618	フリクションプーリ	friction pulley	1	253090001
619	フリクションボス	friction boss	1	253092001
620	六角穴付き止めねじ	socket set screw	1	E401012G7
621	フリクションクラッチ(60Hz)	friction clutch(60Hz)	4	362591105
622	小軸受盤	bearing housing (4)	1	253093001
623	六角ボルト	bolt	4	F1010025C
624	Oリング	NBR	1	A20130A
625	オイルシール	NBR	1	K1406211A
626	六角ボルト	bolt	2	F1008020C
627	カラー(2)	collar	1	464803001
628	六角穴付き止めねじ	socket set screw	1	E400404G7
630	横軸カバー	cover	1	201655001
631	横軸カバー	cover	1	253214001
632	横軸カバー用蓋	cover cap	1	463720001
633	十字穴付きなべ小ねじ	set screw (3)	3	E200412CA
634	六角ボルト	bolt	4	F1010020C
635	シートパッキン	gasket	1	450991001

OUTLINE OF VALVES FOR AUTO. CONTROL DEVICE(1)

WATER VALVE UNIT

IP GRADE : IP 55

CABLE GLAND

15F ($\phi 9 \sim 11$)

SV1

SV3

SV2

Rc3/8

OPENING
WATER

WASHING
WATER

CLOSING
WATER

"A"

R4

PRESSURE GAUGE

REDUCING VALVE
with STRAINER

10

JIS5K 15A

WATER
INLET

(107)

(348)

VIEW "A"

DWG. NO.

260670

Film No. _____ Date SEP. 7, '20 DRAWN T. OGAWA DESIGNED A. NAKAMURA CHECKED T. ARAI MODEL SJ35HW-T~SJ220HWT

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A-B C-D E-F G-H I-J K-L
R-Q P-S T-U V-W X-Y



MITSUBISHI KAKOKI KAISHA,LTD.

Form J-005

ASSEMBLY OF VALVES FOR AUTO. CONTROL DEVICE(1)

SOLENOID VALVE (SV1, SV2, SV3, ~~SV9~~)

IP GRADE: IP 55

SJ35HWT~SJ220HWT

MODEL

T_i Arq i

A. Nakamura
N. Aloe

DESIGNED

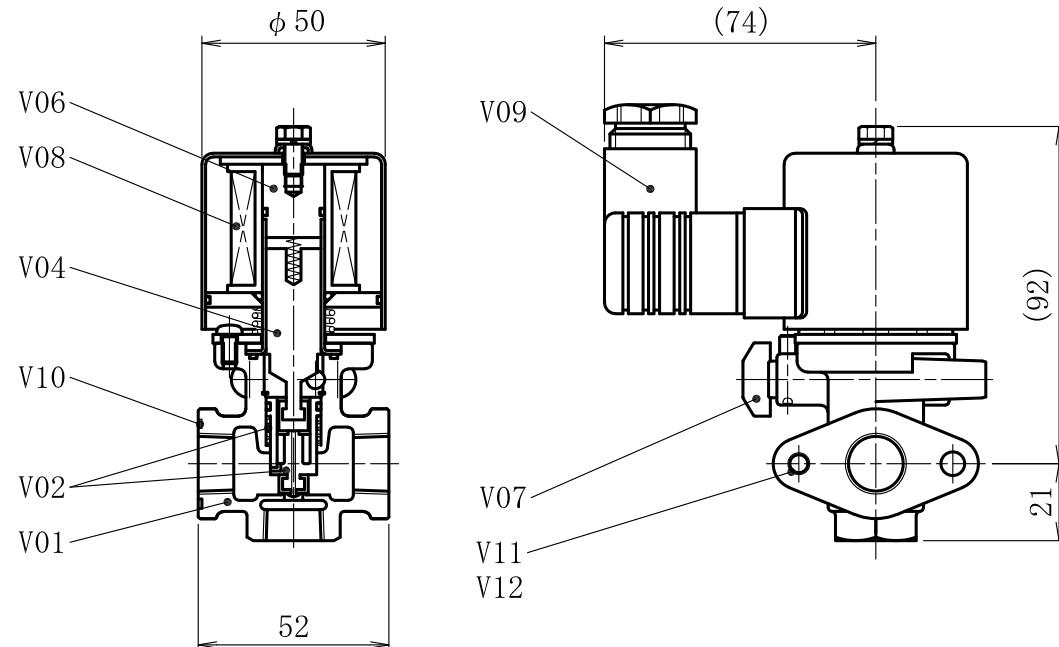
T. Ogawa

4. '2020
31. '2016

Date

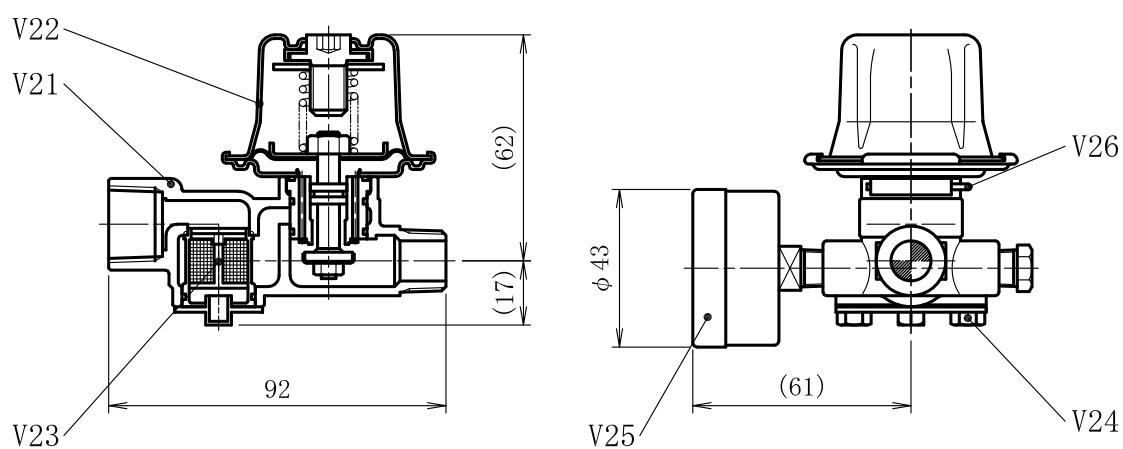
No. 1

REDUCING VALVE (R4)



Mass: 0.8kg

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Mass: 0.5kg



MITSUBISHI KAKOKI KAISHA LTD

DWG No

257917 A

Forn. I-005

Parts List

DWG No.257917A

Symbol	Parts Name	Material	Q'ty	Parts No
V01～V07 バルブボディアセンブリ	valve body assembly	bronze casting / stainless / resin	1	JDSPE8001S
V01 バルブボディ	valve body	bronze casting	1	
V02 パイロットバルブスプリング / メインバルブアセンブリ	pilot valve spring / main valve assembly	stainless steel / special resin	1	JDSPE8002S
V04 プランジャ / プランジャスプリング	plunger / plunger spring	stainless steel / stainless steel	1	JDSPE8004S
V06 パックレスアセンブリ	packless assembly	stainless steel	1	JDSPE8006
V06 パックレスアセンブリ	packless assembly	stainless steel	1	
V07 ハンドル	handle	special resin	1	JDSPE8007
V08 コイルアセンブリ	coil assembly	-	1	JDSPE8008
V09 ターミナルボックス	terminal box	resin	1	JDSPE7022
V10 Oリング	O ring	NBR	1	A50022A
V11 六角ボルト	bolt	stainless steel	2	F1006012B
V12 ばね座金	spring washer	stainless steel	2	H1006B1
V21 ボディ	body	bronze casting	1	RU1542001
V22 ダイヤフラムアセンブリ300kPa	diaphragm assembly 300kPa	stainless steel	1	RU1542106
V23 ストレーナアセンブリ	strainer assembly	stainless steel	1	RU1542003
V24 十字穴付きボルト	bolt	stainless steel	2	RU1542004
V25 圧力計	washer	copper-alloy	1	RU1502010
V26 U型止めピン	O ring retainer	stainless steel	1	RU1542005

DISCHARGE-DETECTOR

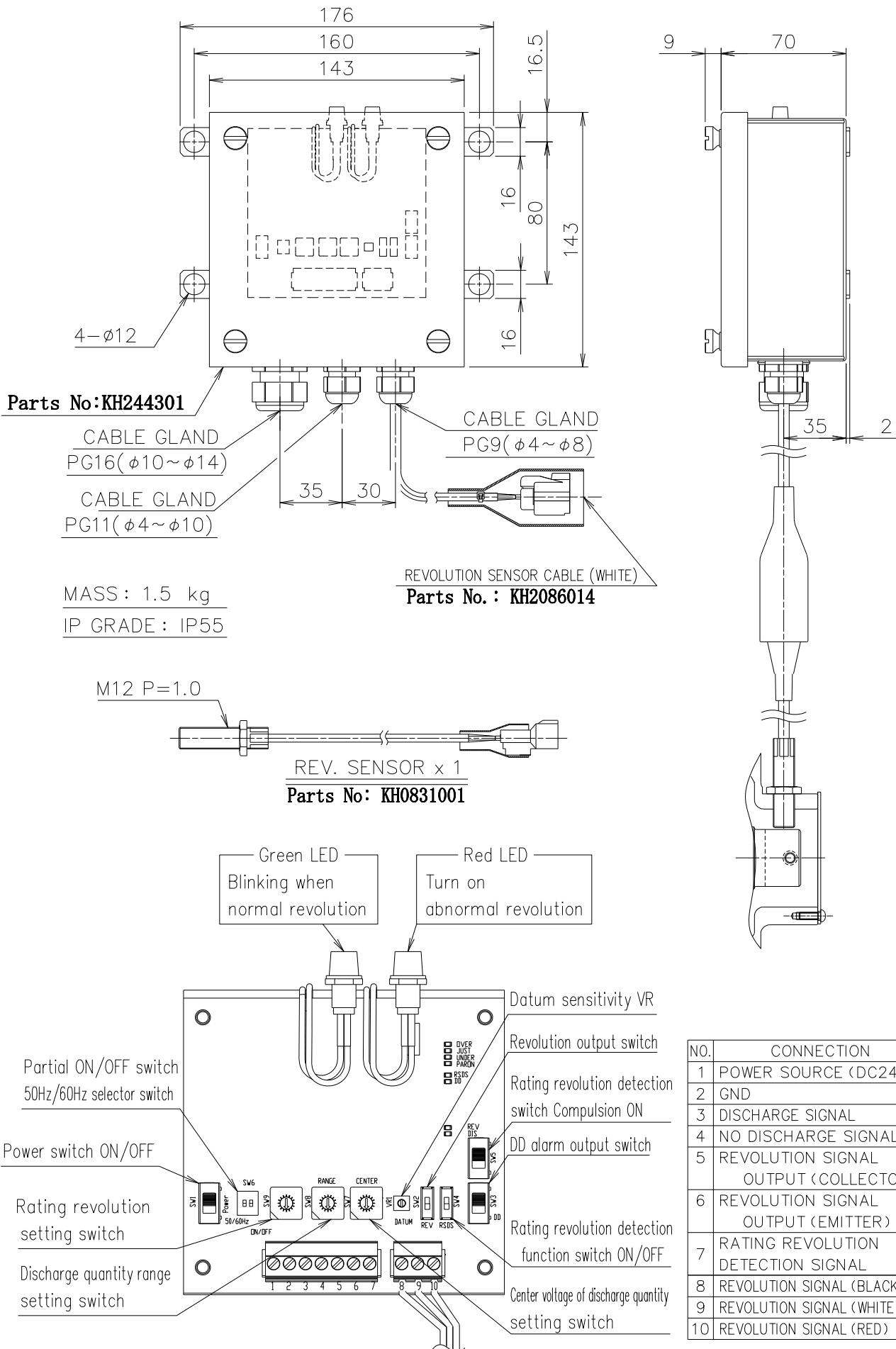
CHECKED T. Arai MODEL DDP(HWT)

DESIGNED A. Nakamura DRAWN A. Nakamura

Date 4. JUL. '18

Film No.

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MITSUBISHI KAKOKI KAISHA, LTD.

DWG. NO.

258941

VIBRA SWITCH DETECTOR

VD-10
T.Takada
MODEL

S.Noritake
CHECKED
D.Saitou
DESIGNED

Date 2015.04.08

Film No.

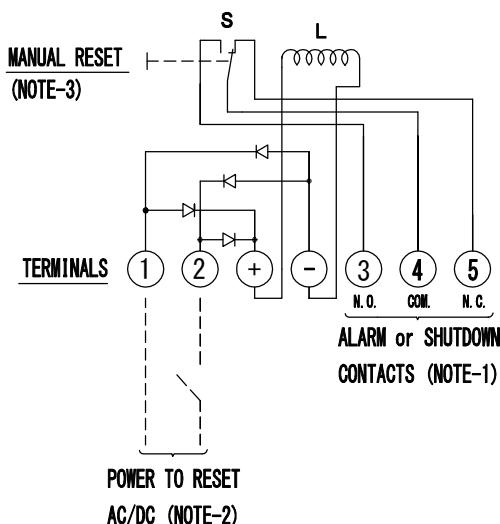
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L; RESET COIL INTERMITTENT DUTY

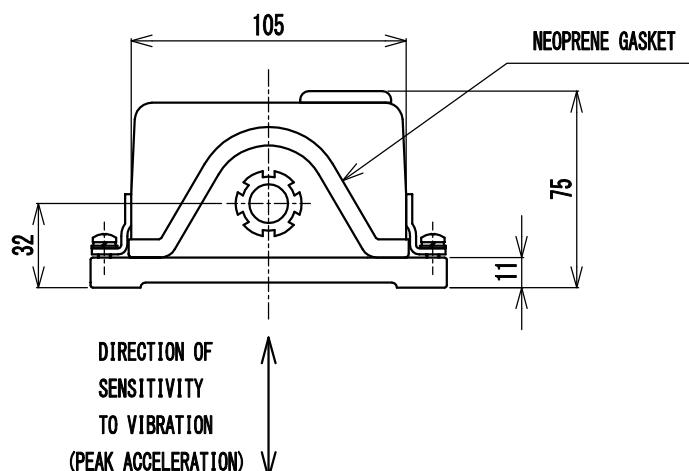
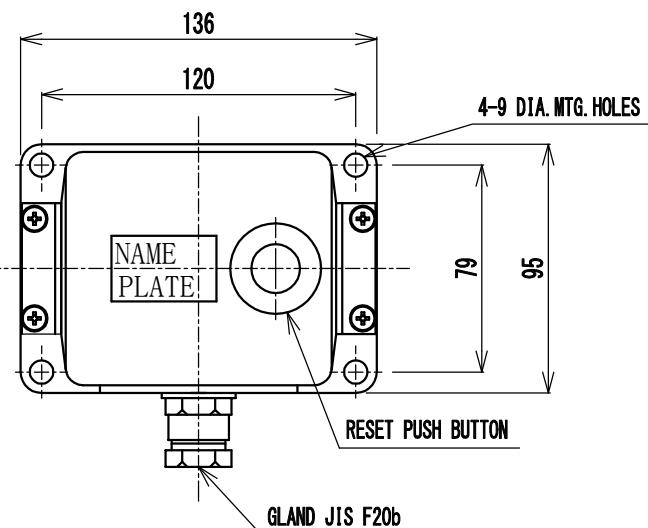
570Ω 220mA MAX.

S; SWITCH SNAP ACTION MECHANISM

S.P.D.T.



- NOTE-1) SWITCH SHOWN IN NORMAL OR RESET POSITION REVERSES ON ACTUATION FROM INCREASED VIBRATION.
- NOTE-2) RESET COIL IS REQUIRED FOR REMOTE OR CONTROL UNIT OPERATION.
- NOTE-3) CAPABLE OF MANUALLY RESET BY DEPRESSION OF RESET PUSH BUTTON.
- NOTE-4) USE #18 STRANDED WIRES.



SPECIFICATIONS

HOUSING:	GENERAL PURPOSE, MEETS SPLASH-PROOF TYPE JIS C 0920
ACCELERATION RANGE:	0 TO 4.5G ADJUSTABLE.
ACCURACY:	±5% OF FULL RANGE AT FREQUENCIES UP TO 300Hz
CONTACT RATINGS:	5A TO 250V AC, 1A AT 48V DC.
(NON-INDUCTIVE):	0.5A AT 125V DC, 0.25A AT 250V DC.
CONTACT ARRANGEMENT:	S.P.D.T.
RESET COIL:	25W MAX. INTERMITTENT DUTY.
(AC/DC)	VOLTAGES & RATINGS ARE GIVEN BELOW. 100V AC /DC-5 MINUTES. 110V AC /DC-3 MINUTES. 115V AC /DC-2.5 MINUTES. 125V AC /DC-2 MINUTES.
TEMPERATURE LIMITS:	MAXIMUM 80°C
MATERIALS OF CASING:	ALUMINIUM ALLOYS.
FINISHED COLOR:	GREY-HAMMERTONE.
MASS:	0.9kg

MFG. ; TOKYO KEIKI INC.

MODEL: VD-10



MITSUBISHI KAKOKI KAISHA, LTD.

DWG.No.

4 6 7 8 1 4

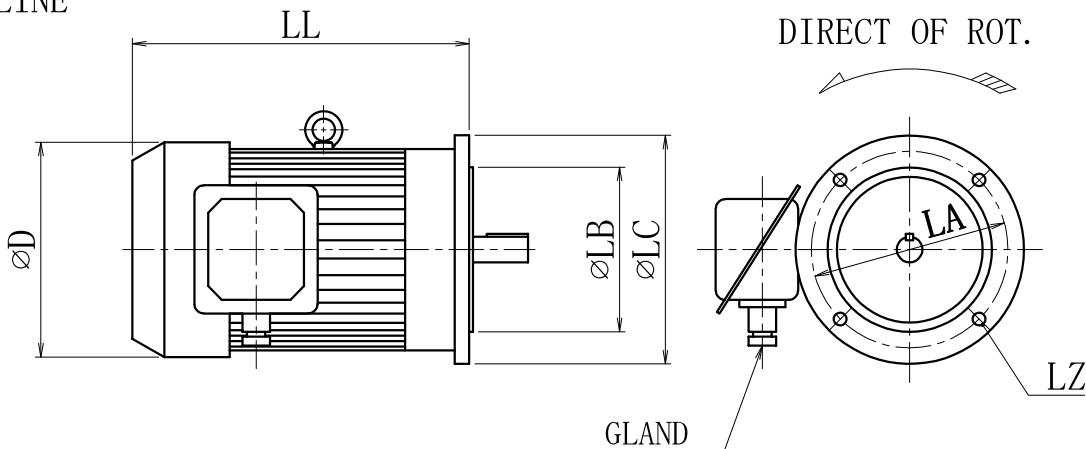
Form J-005

INDUCTION MOTOR

AC440V, 220V 60Hz 4P

INSULATION CLASS	<input type="checkbox"/> 3.7kW:E, <input checked="" type="checkbox"/> 5.5~22kW:B	No. of PHASE	3
CLASS OF SHIP	<input type="checkbox"/> ABS, <input type="checkbox"/> BV, (<input checked="" type="checkbox"/> NK, <input type="checkbox"/> JG, <input type="checkbox"/> DNV, <input type="checkbox"/> LR, <input type="checkbox"/> KR)	RATING	CONTINUOUS
AMBIENT TEMPERATURE	<input type="checkbox"/> 50°C, (<input checked="" type="checkbox"/> 45°C)	IP GRADE	IP44

OUTLINE



1. 構(□)に□又は■(チェック)を付してあるものが、弊社供給品です。

SPECIFICATION AND DIMENSION

1. The items marked check (□ or ■) in the column (■) show items to be supplied by MITSUBISHI KAKOKI KAISHA, LTD.

NO.	FRAME NO.	OUTPUT (kW)	■ 440V			□ 220V			Separator MODEL
			AMP'S	min⁻¹	GLAND	AMP'S	min⁻¹	GLAND	
<input type="checkbox"/>	1	112MHJ	3.7	6.5	1720	20a	12.9	1720	20a
<input type="checkbox"/>	2	132SHJ	5.5	9.3	1755	20a	18.5	1755	20b
<input checked="" type="checkbox"/>	3	132MHJ	7.5	12.7	1770	20a	25.4	1770	20c
<input type="checkbox"/>	4	160MJ	11	18.5	1770	20b	37.0	1770	25b
<input type="checkbox"/>	5	160LJ	15	24.4	1765	20c	48.8	1765	25b
<input type="checkbox"/>	6	180MJ	18.5	30.1	1760	25a	60.2	1760	30a
<input type="checkbox"/>	7	180MJ	22	35.3	1758	25b	70.7	1758	30a

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APR 2017 DRAWN Feb. 20. 2017 Date Film No. A. Nakamura S. Zaitsu A. Nakamura T. Arai T. Arai Model SJ-HWT



MITSUBISHI KAKOKI KAISHA, LTD.

DWG.No.

257914B

Form J-005

FILTER SPECIFICATION

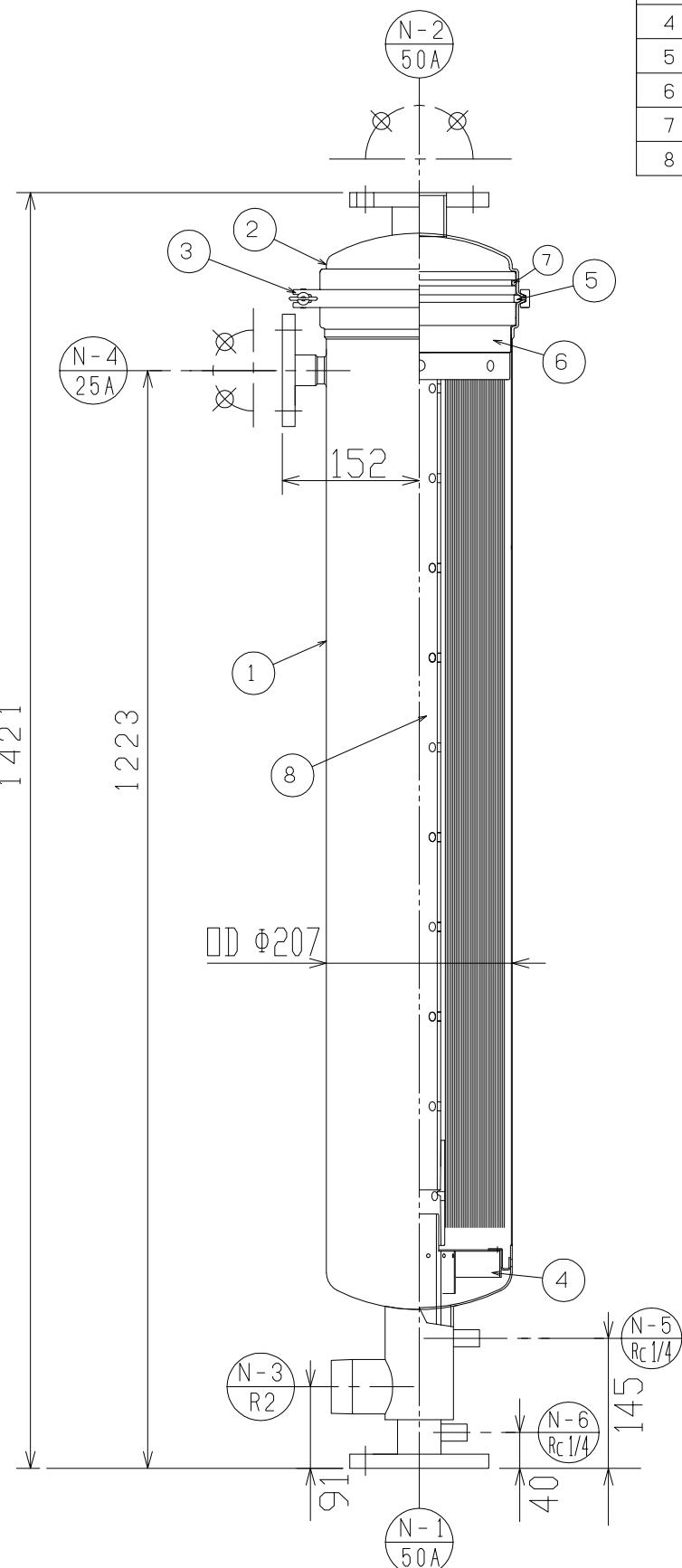
フィルター仕様書

Use 用 途	Bleed-off water cleaning ブリードオフ水清浄用		
Type 型 式	Hollow fiber membrane 中空糸膜		
Material 材 質	Stainless steel SUS316L	Quantity 数量	1
Housing specification ハウジング仕様	External dimension 外形寸法		φ 207 × 1,421 [mm]
	Volume 容 量		39 [L]
	Weight 重 量		Empty weight 22 [kg]/module Operating weight 67 [kg] (Including elements)/module
Elements specification エレメント仕様	Material 材 質	Hollow fiber membrane 中空糸膜	PVDF ポリフッ化ビニリデン
		Water pipe 導水管	PVC ポリ塩化ビニル
		Net ネット	PE ポリエチレン
		O ring／Packing Oリング／パッキン	Silicon rubber シリコンゴム
	Membrane area 膜面積		40 [m ² /module]
	Flow rate(Case of Fresh water) 流 量(清水の場合)		Max. 13 [m ³ /hr/module]
	Weight (Wet weight) 重 量 (湿潤重量)		14 [kg/module]
	Maximum operating pressure 最大使用圧力		0.5 [MPa]
	Maximum 最大膜内外圧差		0.3 [MPa]
Operating condition 使用条件	Operating temperature limits 使用温度範囲		1～50 [°C]
	pH range pH範囲		1～11

Document Number 弊 社 書 類 番 号	S-LW-13721-16	Rev.
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Our Order No.
弊 社 工 事 番 号

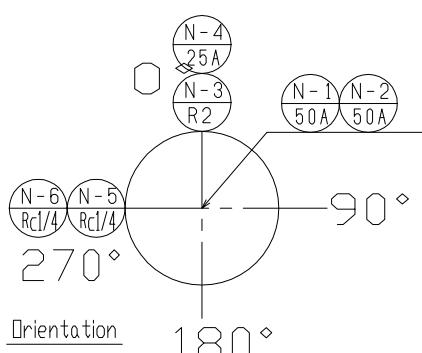
A3006715-1000
A3006716-1000
A3006717-1000



No.	Usage	Specification	Quality of material	qty.	Remarks column
1	Housing	-	SUS316L	1	
2	Cap	-	SUS316L	1	
3	Clamp band		SUS304	1	purchase separately
4	Air diffuser	-	SUS316L	1	
5	Packing		Silicone rubber	1	purchase separately
6	Element	GL Element	-	1	purchase separately
7	O-ring	G-200	Silicone rubber	1	purchase separately
8	Center distributor		U-PVC	1	

accessories: repair needle

Nozzle orientation		
No.	Size	Name
N-1	10K-50	Feed inlet
N-2	10K-50	Filtrate outlet
N-3	R2	Drain outlet
N-4	10K-25	Air vent
N-5	Rc 1/4	Air inlet to the air diffuser
N-6	Rc 1/4	Air inlet to the center distributor



DATE : 28-Oct-21

KNR

MG-001953

kuraray

品名 GL Module

GL-0101-S6L(US02-125)

N8A00371

APPD

CHKD

CHKD

DRWD

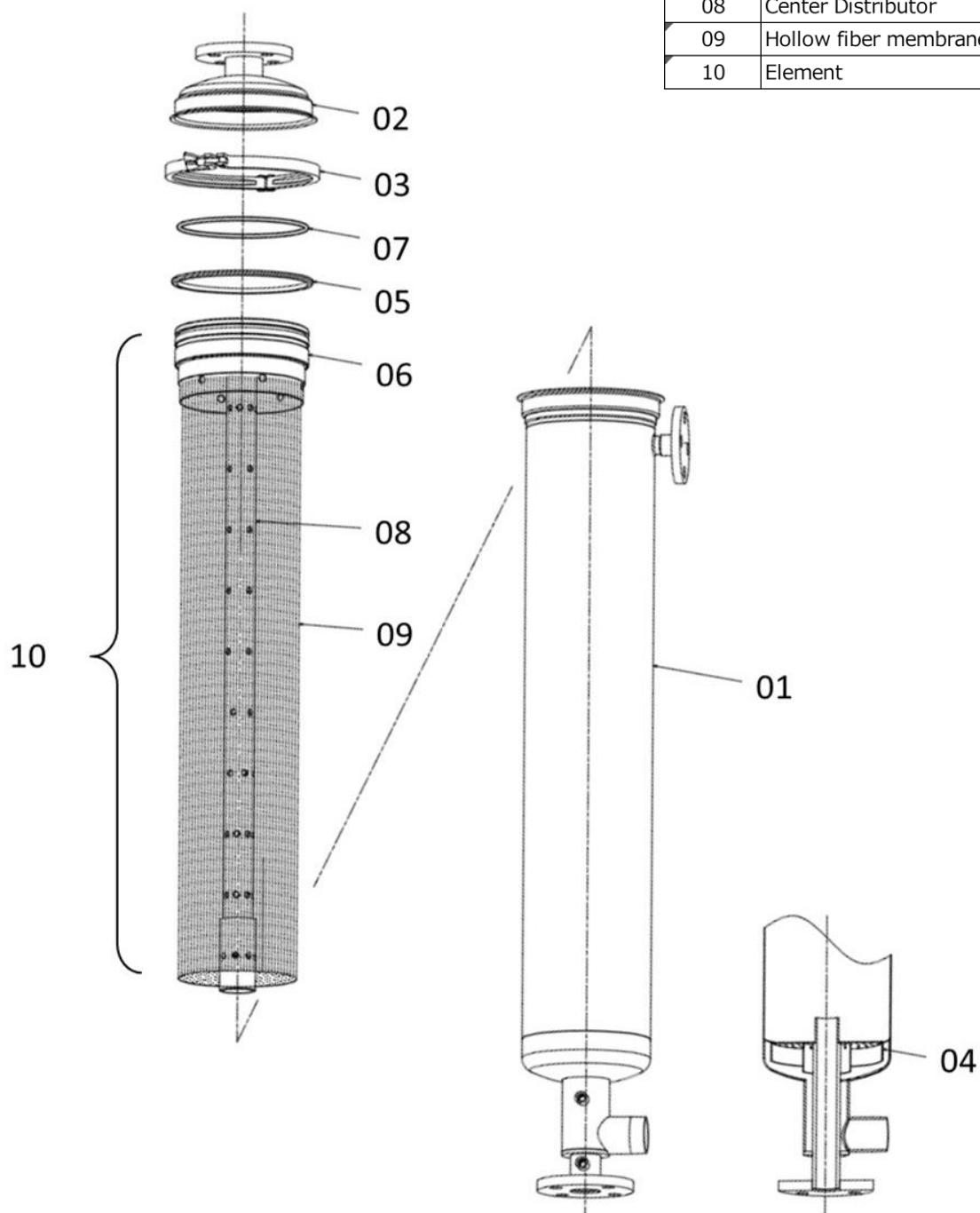
Komatsu

Yabuno

Miyake

Kuchiki

Part No.	Name
01	Housing
02	Cap
03	Clamp band
04	Aeration Board
05	Packing
06	Sheath
07	O-Ring
08	Center Distributor
09	Hollow fiber membrane
10	Element



DATE: 15-Oct-21

kuraray	品名 GL Module GL-0101S6L (US02-125)	NBA00371	APPD	CHKD	CHKD	DRWD	KNR	MGO-00
----------------	--	----------	------	------	------	------	-----	--------

EGR DIRTY WATER PUMP SPECIFICATION

EGRストート凝集水用ポンプ仕様書

1. 用途/【用途】 / Application

本ポンプは分離機から排出されたストート凝集水をテンポラリータンクで一次受けし、EGRストート凝集水タンクへ移送する。

This Pump primarily receives Dirty water discharged from the Separator in the Temporary tank and transfers it to the EGR dirty water tank.

2. 構造・外形寸法/【構造・外形尺寸】 / Structure and dimensions

該当図面に基づく。

【基于相关图纸。】

Pursuant to the drawings. (Refer to Model No.)

A10NB	1D00030MP[MN]	S10NB	1D00035MP[MN]
A10BB	1D00031MP[MN]	S10BB	1D00036MP[MN]
A10TB	1D00032MP[MN]	S10TB	1D00037MP[MN]
A10HB	1D00033MP[MN]	S10HB	1D00038MP[MN]
A10SB	1D00034MP[MN]	S10SB	1D00039MP[MN]



3. 据付姿勢/【安装状态】 / Installation

据付姿勢は水平とする。

【安装状态需要水平】

It should be installed horizontally.

4. 性能/【性能】 / Performance

該当性能曲線に基づく。

【基于相关性能曲线。】

Pursuant to the "Standard Performance Curves". (Refer to Model No.)

測定条件:移送液剤:清水(常温)

吸込揚程: 0 m

【测定条件】输送液剤: 清水(常温)

吸入高度: 0 m

Test conditions: <Test fluid> Clear water (room temp.)

<Lifting height> 0 m

Document Number 弊社書類番号	S-LW-13721-27	Rev.

Our Order No.

A3006715-1000

弊社工事番号

A3006716-1000

A3006717-1000

5. 使用材料/【使用材料】/Materials

主要使用材質を表1、表2に示す。

【表1、表2为主要使用材质】

Main materials are shown in Table 1 and Table 1 and Table 2.

表1. アルミタイプ使用材質/【表1.主要使用部件】Table 1. Materials used in Alminum type pumps

型 式 / MODEL 型式	A10NB	A10BB	A10TB	A10HB	A10SB
本体切換部/ 【本体气动机构】/Switching Part	ADC12				
本体接液部/ 【本体接触液体部分】/Wet Part	ADC12				
ダイアフラム/ 【膜片】/DIAPHRAGM	CR	NBR	PTFE	TPEE	TPO
ボール/ O リング/ 【球阀/PTFE O形环】BALL/O-RING	CR/PTFE	NBR/PTFE	PTFE	NBR/PTFE	EPDM/PTFE
バルブシート/ 【阀座】VALVE SEAT	A5056				
センターディスク/ 【中心盘】/ CENTER DISK	A5056				

→ 表2. ステンレスタイプ使用材質/【表2.主要使用部件】Table 2. Materials Used in Stainless steel Type pumps

型 式 MODEL	S10NB	S10BB	S10TB	S10HB	S10SB
本体切換部/ 【本体气动机构】/Switching Part	ADC12				
本体接液部/ 【本体接触液体部分】/Wet Part	SCS14				
ダイアフラム/ 【膜片】/DIAPHRAGM	CR	NBR	PTFE	TPEE	TPO
ボール/ O リング/ 【球阀/PTFE O形环】 BALL/O-RING	CR/NBR	NBR	PTFE	NBR	EPDM
バルブシート/ 【阀座】VALVE SEAT	SUS316				
センターディスク/ 【中心盘】/ CENTER DISK	SUS316				

6. ポンプ仕様/【泵的性能参数】 / Pump specifications

ポンプ仕様を表3に示す。【表3为泵的性能参数】

Pump specifications are shown in Table 3.

表3. ポンプ仕様/【表3泵的性能参数】 / Table 3. Pump specifications

型 式【型号】 Model	A10□B	S10□B
呼び口径 【公称口径】 Nominal diameter	3/8" (10mm) [0.39 inch]	
材料接続 【材料接口】 Fluid connection	吸入口/【吸入接口】 Suction port	Rc 3/8 [NPT 3/8]
	吐出口/【吐出接口】 Discharge port	
エア接続 【供气接口】 Air connection	供給口/【供气接口】 Supply port	Rc 1/4 [NPT 1/4]
	排気口/【排气接口】 Exhaust port	Rc 3/8 [NPT 3/8]
常用エア圧力 【常用供气压力】 Operating pressure	0.2~0.7 MPa [30~100 psi]	
最高吐出圧力 【最高吐出压力】 Maximum discharge pressure	0.7 MPa [100 psi]	
吐出量/サイクル※1 【吐出量/行程】※1 Discharge volume per cycle※1	50 mL	
最大吐出量 【最大吐出量】 Maximum discharge volume	23 L/min [6.1 Gallon/min]	
最大エア消費量 【最大空气消耗量】 Maximum air consumption	300 L/min(ANR) [10.6 SCFM]	
スラリー限界(最大通過粒子径) 【颗粒限界(最大通过颗粒直径)】 Slurry limitation	1 mm 以下 [1 mm or less]	
粘度限界 【粘度限界】 Limitation of viscosity	0.5 Pa·s 以下 [0.5 Pa·s or less]	
使用環境温度範囲 【使用环境温度范围】 AMB. temperature range	環境温度 【环境温度】 Environment temperature	0~70 °C [32~158° F]
	液体温度 【液体温度】 Liquid Temperature	※2
作動音 【工作噪音】 Maximum operation noise	騒音レベル※3 【噪音等级】※3 A-Weighted sound pressure level※3	84 dB
	音響パワーレベル※4 【暗噪音功率等级】※4 A-Weighted sound power level※4	92 dB
質量/ 【重量】 /Weight	3.5kg [7.7 lbs]	5.2 kg [11.5 lbs]
設計標準使用期間/ 【设计标准使用期间】 /Design standard use period	10 年 [10 years]	

※1 使用条件により異なる。【根据使用条件不同会有差异。】

Discharge volume (per cycle) varies according to use conditions.

※2 ダイアフラム材質/ DIAPHRAGMS 【膜片。】

NBR/CR:0~70 °C [32~158° F] TPEE:0~80 °C [32~176° F] TPO/PTFE:0~100 °C [32~212° F]

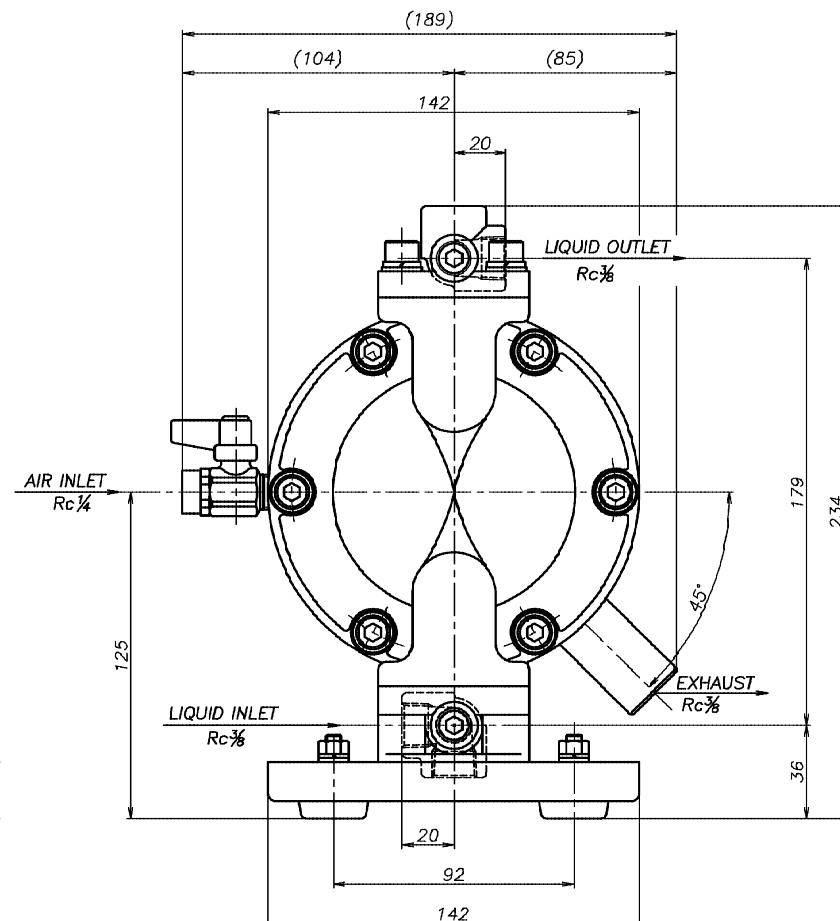
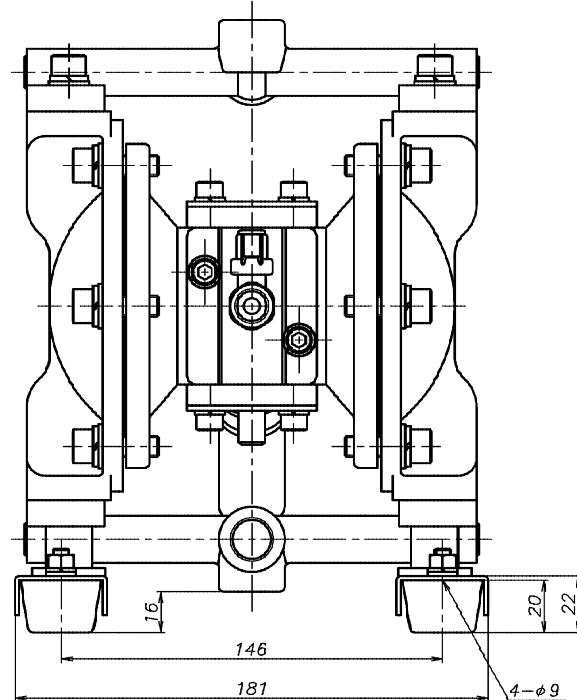
※3 測定方法は ISO 1996 に準じる。【测定方法采用 ISO1996 为基准。】

Measurement method of A-weighted sound pressure level is based on ISO 1996.

※4 測定方法は ISO 3744 に準じる。【测定方法采用 ISO 3744 为基准。】

Measurement method of A-weighted sound power level is based on ISO 3744.

SYM	DWG.NO	CHANGE NO	DATE	REV'D BY
	ALL	1DE0002	'14. 7.30	K.Nakada



TCS10SB
THIRD ANG. PROJ. DWG.NO.
SCALE Free **1D00039YP-A**

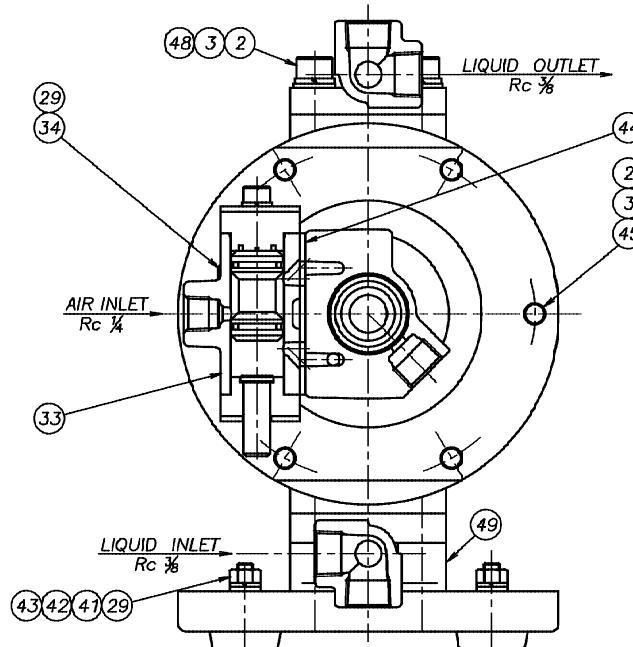
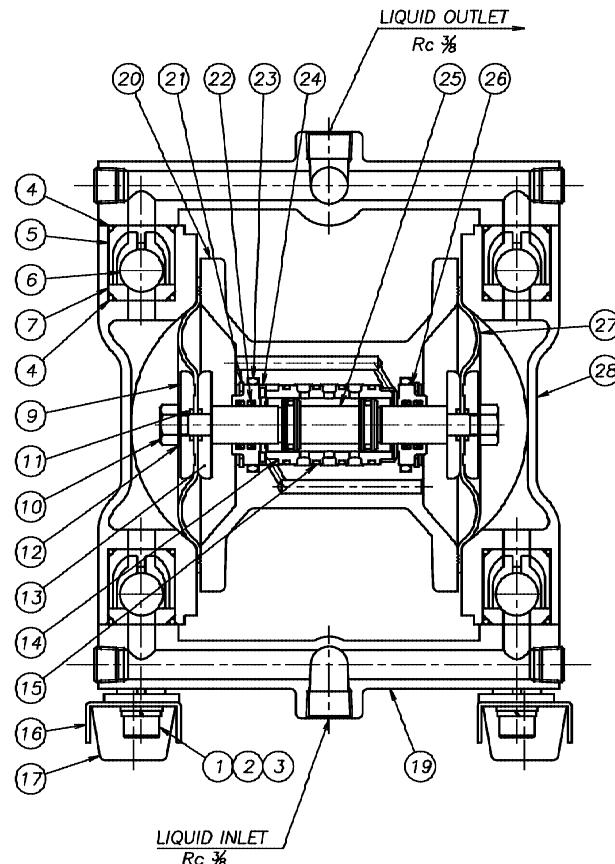
TCS10HB
THIRD ANG. PROJ. DWG.NO.
SCALE Free **1D00038YP-A**

TCS10TB
THIRD ANG. PROJ. DWG.NO.
SCALE Free **1D00037YP-A**

TCS10BB
THIRD ANG. PROJ. DWG.NO.
SCALE Free **1D00036YP-A**

APP'D BY '14. 7.30 S.Murata	DIAPHRAGM PUMP ASSEMBLY
CHECKED BY '14. 7.30 K.Nakano	TCS10NB
DRAWN BY '14. 7.30 K.Nakada	THIRD ANG. PROJ. DWG.NO.
YTS Co., Ltd JAPAN	SCALE Free 1D00035YP-A

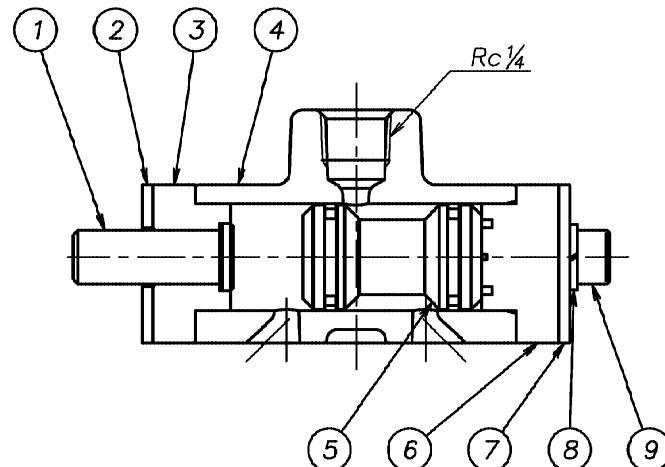
SYM	CHANGE NO	DATE	REV'D BY
1	1DE0002	'14. 7.30	K.Nakada
△	1DE0018	'18. 3.19	K.Nakada



Accessories supplied 付属品 ⑯⑰⑲⑳⑳

REF. NO.	PART NO.	DESCRIPTION	MATERIAL	REMARKS	Q'TY
49	1D30019MB	SPACER	GFRPP		2
48	9B3210820	BOLT	SUS304		4
47				29 9W2210600 SPRING LOCK WASHER SUS304	30
46	1D90001MP	SILENCER		1 28 1D20023SM OUT CHAMBER SCS14	
45	9B3210825	BOLT	SUS304	12 27 1D20018BB DIAPHRAGM NBR	
44	1D30017MB	VALVE BODY GASKET	TPEE	1 26 1D30015MM CENTER ROD GUIDE MC NYLON	
43	9N1210600	NUT	SUS304	4 25 1D10004MK CENTER ROD ASSEMBLY	
42	9W1210600	PLAIN WASHER	SUS304	4 24 1D30014MB SPACER PE	
41	9B1210622	BOLT	SUS304	4 23 9S1BG0030 O RING NBR	
40				22 9S2BA0014 PACKING NBR	
39	1H90001MB	SEAL TAPE	PTFE	1 21 9R1120030 RETAINING RING SWRH62	
38				20 1D30013MP BODY ADC12	
37				19 1D10007MP MANIFOLD ASSEMBLY	
36	1E90002MP	BALL VALVE		1 18 9P63P9903 PLUG SUS316	
35				17 1C30004MB RUBBER FEET TPO △	
34	9B3220635	BOLT	SUS304	2 16 1D30004MM BASE SUS304	
33	1D10003MP	VALVE BODY ASSEMBLY		1 15 9S1BJ1026 O RING NBR	
32				14 1D30023MM SIEVE SUS304	
APP'D BY '18. 3.19 S.Murata					
CHECKED BY '18. 3.19 K.Nakano					
DRAWN BY '18. 3.19 K.Nakada					
THE DWG. OF: DIAPHRAGM PUMP ASSEMBLY					
TCS10BB					
YTS Co., Ltd JAPAN					
DWG. NO. 1D00036MP-B					

SYM	CHANGE NO	DATE	REV'D BY
/	1CE0001	'14. 3.10	K.Nakada



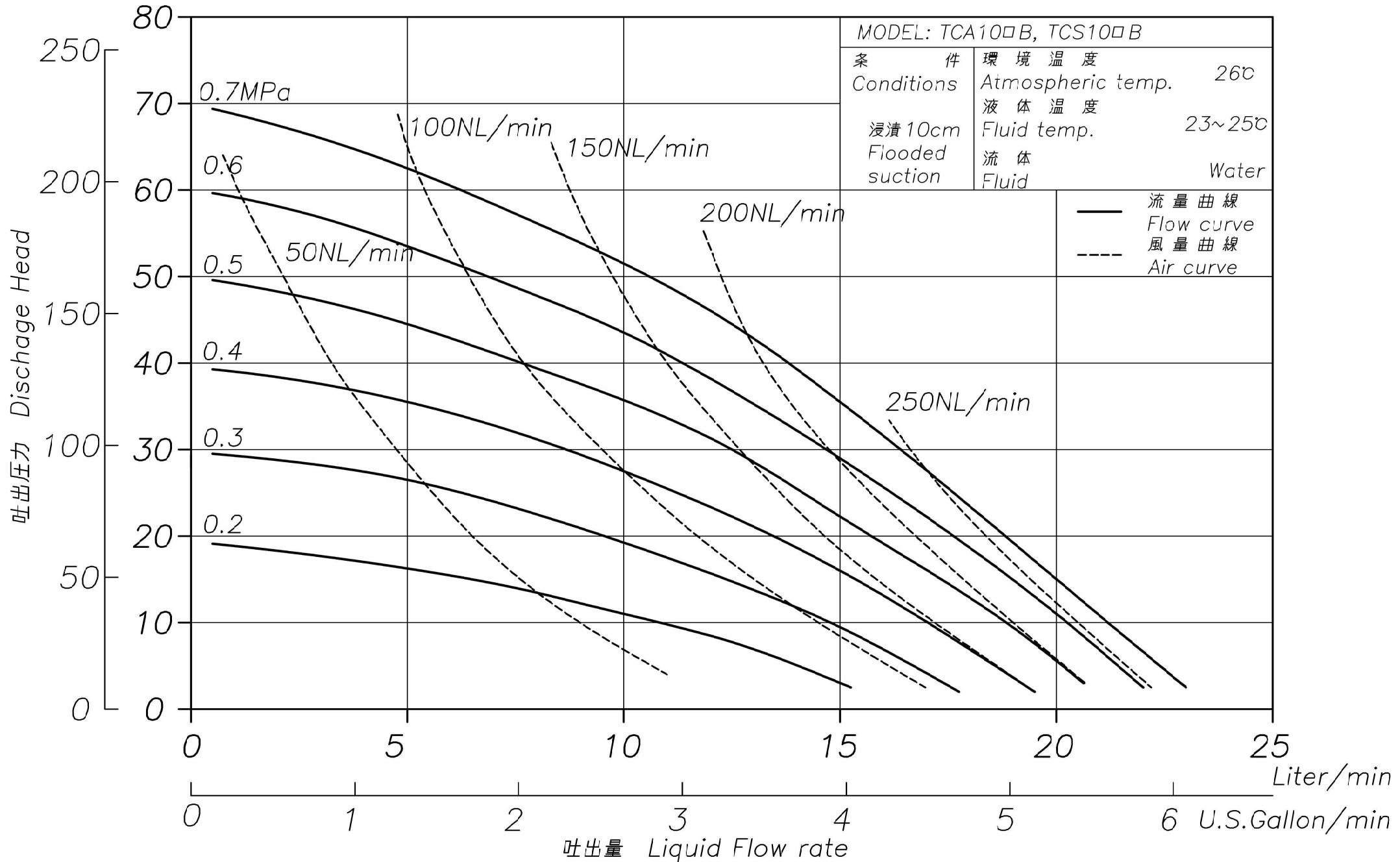
注1)④と⑨はロッカタイト242で接着のこと

REF. NO.	PART NO.	DESCRIPTION	MATERIAL	REMARKS	Q'TY
9	9B3210618	BOLT	SUS304		4
8	9W2210600	SPRING LOCK WASHER	SUS304		4
7	1D30012MM	REINFORCEMENT VALVE UPPER	SUS304		1
6	1D30011MB	SPPOOL STOPPER UPPER	TPO		1
5	1D10002MK	SPPOOL ASSEMBLY			1
4	1D30010MP	VALVE BODY	ADC12		1
3	1D30009MB	SPPOOL STOPPER LOWER	TPO		1
2	1D30008MM	REINFORCEMENT PLATE VALVE LOWER	SUS304		1
1	1D30007MM	RESET BUTTON	SUS304		1
APP'D BY	'14. 3.24	S.Murata	THE DWG. OF:		
CHECKED BY	'14. 3.24	K.Nakano	VALVE BODY ASSEMBLY		
DRAWN BY	'14. 3.24	K.Nakada	TCO 10		
YTS	Co., Ltd JAPAN		THIRD ANG. PROJ.	DWG.NO.	
			SCALE Free		1D10003MP-A

標準性能曲線

Performance Curves

Feet Meter



NaOH PUMP SPECIFICATION(P05)

NaOHポンプ仕様書(P05)

Required spec.

Flow Rate	1 L/min		
Max	L/min		
Discharge Press.	Nor	MPa	Max 1 MPa
Suction Press.	Nor	MPa	Max MPa
NPSHa	m		MPa
Installed Place	indoor		
Running Time	continuous	intermittent	hr/day

Model: IX-C060S6R-RF1-16

Quantity: 1

Pump spec.

Type / Structure	Brush less DC motor drive Diaphragm
Flow Rate	1 L/min
Discharge Press.	Max 1 MPa
Effective Dia.	60 mm
Stroke Speed	0.2~160 spm
Stroke Length	3 mm
Flow Rate Control	Auto
Operation mode	Analogue control
Connecti on	Suc. R 1/2"
	Disch. R 1/2"

Wet-end materials

Pump head	SUS316
Valve	SUS316
Valve sheet	SUS316
Gasket	PTFE
Diaphragm	EPDM+PTFE

Handled liquid

Liquid	NaOH
Conc.	50 %
Temp.	50 °C
Viscosity	mPa·s
Vapor	kPa
Slurry	No Name:
Slurry conc.	Particle dia. Micron wt%

Motor spec.

Type	Brush less DC motor
Structure	Indoor
Dust/water-proofness	IP65
Average power consumption	62 W
Current	E Class
Ins. Class	E Class
Power voltage	single Phase 100~240 V AC
Frequency	50/60 Hz

Spare parts

Diaphragm	(IX0061)	1
Valve Set	(IX0082)	2
Retainer Plate	(IX0062)	1

Accessories (Yes) / No)

■ Relief valve Model RV-2S6B-15 Setting 0.95 MPa	1
■ Back pressure valve Model BV-2S6-15 Setting 0.15 MPa	1

■ Din 5-pin female connector cable for output signal	1
■ Din 5-pin female connector cable for external signal	1

Special version spec. (Yes) / No

*Measure against vibration is applied for PCB and threads

Dwg.	Nº 1A354410
Witn.test	Yes * (No)

Standard	

Change record	① Day: Month: Year:	③ Day: Month: Year:
② Day: Month: Year:	④ Day: Month: Year:	

Delivery times	
EDP №	

Document Number 弊社書類番号	S-LW-13721-06	Rev.

Our Order No. 弊社工事番号	A3006715-1000 A3006716-1000 A3006717-1000
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標準性能曲線

Performance Curves

1SIX-004

イワキハイテクノポンプ

IWAKI Hi-Techno Pumps

型式

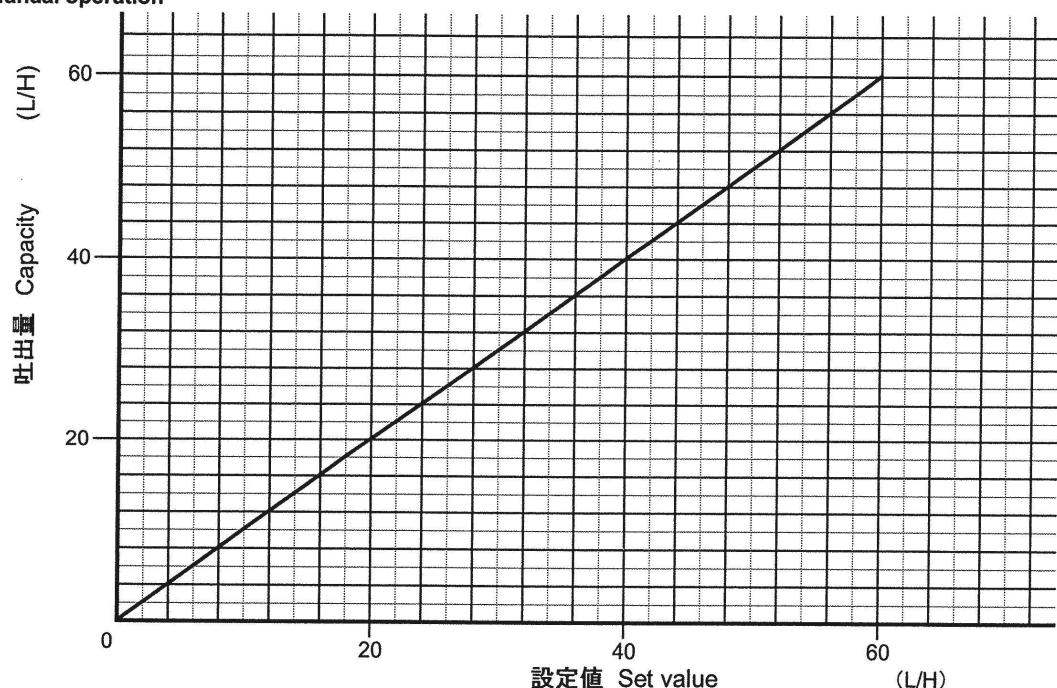
Model

IX-C060S6

最大吐出量 Max. Capacity	60 L/H	電源電圧 Power Supply	AC 100 ~ 240 V
最大吐出圧力 Max. Pressure	1.0 MPa	周波数 Frequency	50 / 60 Hz
設定範囲 Turndown ratio	0.08 ~ 60L/H (1:750) ※1	電流 Current	0.8 A
ストローク数 Stroke Speed	0.2 ~ 160 spm ※2	平均消費電力 Power consumption	62 W

マニュアル運転

Manual operation

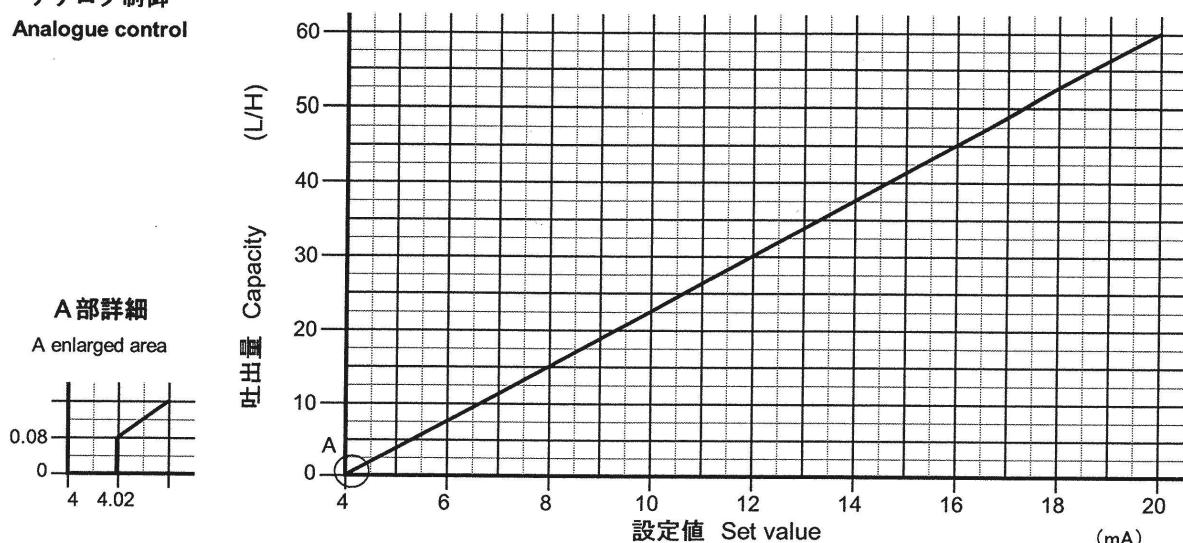


アナログ制御

Analogue control

A部詳細

A enlarged area



試験液 ; 常温・清水

Test Liquid Room Temperature · Clear Water

※1 0.4L/H以下の少流量域でご使用の場合、吐出流量が設定値より少なくなることがあります。

※1 A flow may not meet a target rate of 0.4L/H or below.

※2 ストローク数は参考値となります。

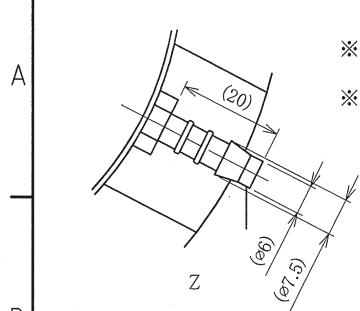
ご使用条件に合わせた流量校正を行うことにより変動します。

※2 Use the stroke speed above to get a rough idea.

The stroke speed range obtained in actual operation may change with operating conditions.

承認 Approved By	作成 Made By
S. Tomita	J. Matsumoto

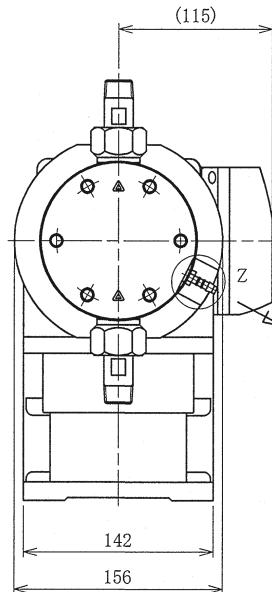
1 2 3 4 5 6 7 8



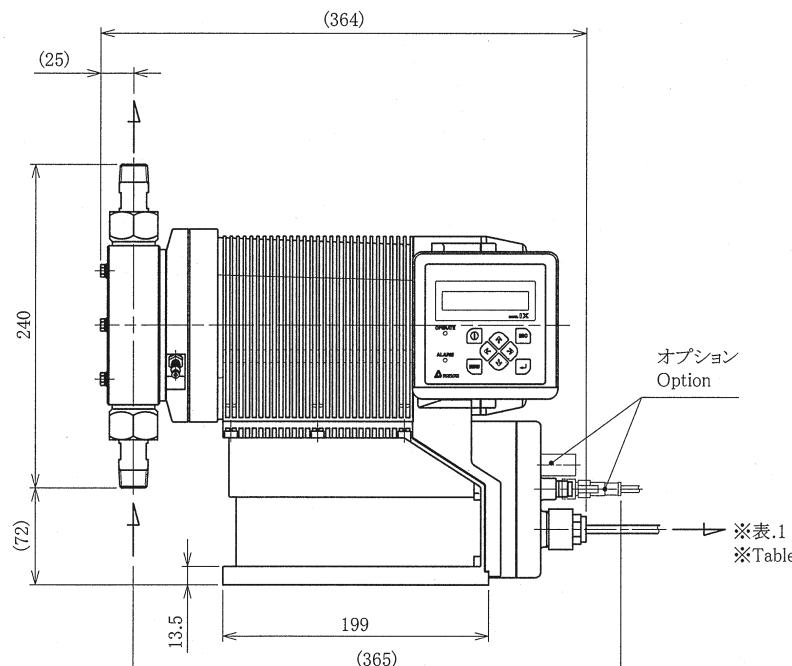
※注記1. 通気孔、ダイヤフラム破損検知時ドレン移送液に対し、耐食性のあるチューブを接続してください。

※Note1. Air ventilation.

Liquid will be released when the diaphragm breaks.
Connect a chemically-resistant tube to the liquid transferred.
Do not close the tube.



※注記1
※Note1



※表.1 ※Table.1
配線部 End terminal

- | | |
|---|--|
| ① | EXT運転端子 (アナログ制御/パルス制御/バッチ制御/インターバルバッチ制御/インターロック)
Input terminal (Analogue control / Pulse control / Batch control / Interval batch control / Interlock) |
| ② | STOP端子 (STOP/Pre-STOP)
STOP terminal (STOP / Pre-STOP) |
| ③ | 入出力端子 (AUX / アナログ出力)
Input terminal/Output terminal (Aux input / Analogue output) |
| ④ | 通信端子 (FIELD BUS)
Fieldbus terminal |
| ⑤ | 出力端子 (STOP/Pre-STOP/インターロック/異常圧力検知/ダイヤフラム破損検知/バッチ完了/ポンプ異常検知/吐出量比例パルス出力)
Output terminal (STOP / Pre-STOP / Interlock / Motor Overload / Leak Detection / Batch complete / Drive Error / VolumeProp.PLS) |

* 外部入力信号または、出力信号を使用する場合は、弊社オプションのケーブル付きDINコネクタを使用してください。
* Use our option connector cables when using signal input and output.

※表.1 ※Table.1

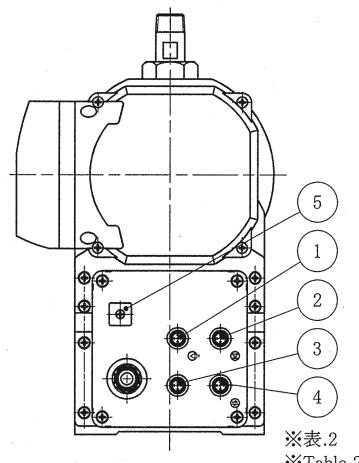
地域記号 Area cord	J
電源コード種類 Power cord	
電源コード長さ Length of power cord	(1950)

ポンプ仕様 Pump specification

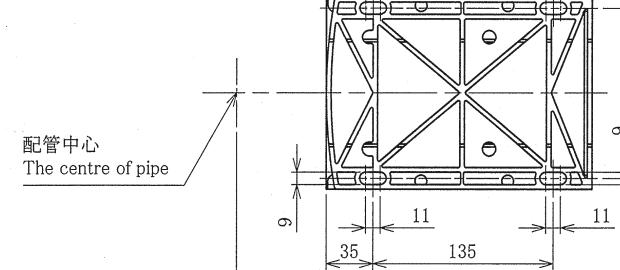
最大吐出量 MAX flow	60L/H
設定範囲 Flow rate	0.08L/H~60L/H
最高吐出圧力 Max. discharge pressure	1.0MPa
接続 Connection	R1/2"
駆動方式 Drive system	ブラシレスDCモータ駆動 Brush less DC motor drive
電源電圧 Power Voltage	100~240VAC
周波数 Frequency	50/60Hz
電流値 Current	0.8A
平均消費電力 Average power consumption	62W

ポンプ部材質 Wet end materials

ポンプヘッド Pump head	SUS316
バルブ Valve	SUS316
バルブシート Valve seat	SUS316
バルブガスケット Valve gasket	PTFE
ダイヤフラム Diaphragm	PTFE+EPDM
接続口 Fitting	SUS316



※表.2
※Table.2



マーク MARK	改訂事項 REVISION	改訂No. REV. No.	日付 DATE	承認 APPROVED BY	設計担当 DESIGNED BY
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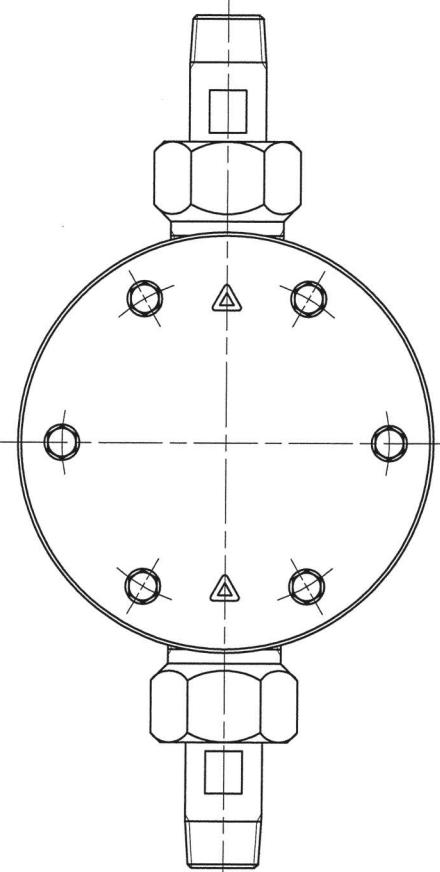
承認 APPROVED BY <i>J.Yamada</i>	設計 DESIGNED BY <i>H.Itoh</i>	尺度 SCALE N T S	単位 UNIT mm
検査 CHECKED BY <i>K.Sekiguchi</i>	製図 DRAWN BY <i>M.Tatsumi</i>	質量 MASS 	名称 NAME ハイテクノポンプ TITLE HI-TECHNO PUMP
		10.5 kg	型式 MODEL IX-C060S6R-RF1-16
			図番 DWG No. 1A354410

FEB. 6, 2019

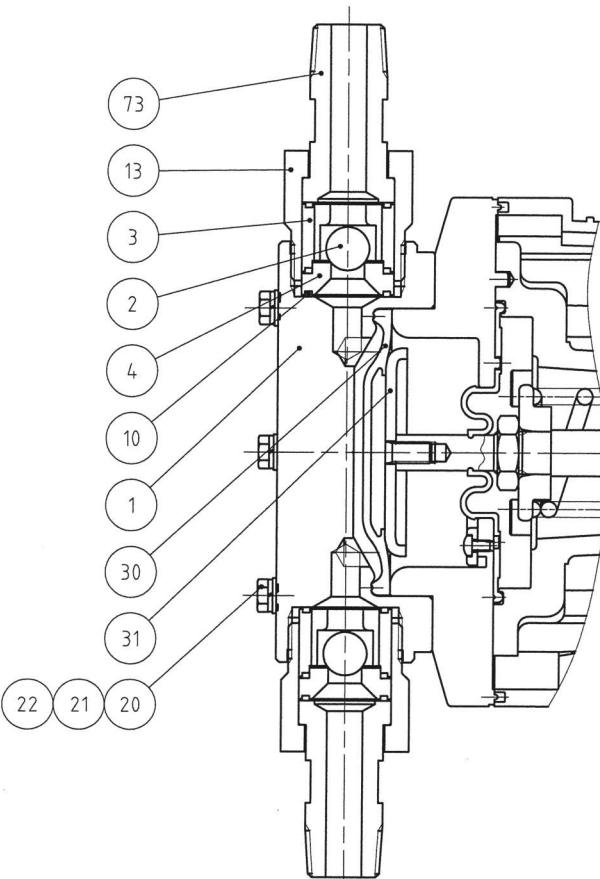
IWAKI CO., LTD.

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マーク MARK	改訂事項 REVISION	改訂No. REV. No.	日付 DATE	承認 APPROVED BY

1 2 3 4 5

NO.	名 称 PARTS NAME	数 QTY	材 質 MATERIALS	備 考 REMARKS
1	ポンプヘッド PUMP HEAD	1	SUS316	
2	バルブ VALVE	2	SUS316	1/2"
3	バルブガイド VALVE GUIDE	2	SUS316	
4	バルブシート VALVE SEAT	2	SUS316	
10	バルブガスケット VALVE GASKET	6	PTFE	
13	バルブキャップ VALVE CAP	2	SUS316	
20	六角ボルト HEX. HEAD BOLT	6	ステンレス鋼 STNLSS STL	M5X70
21	スプリングワッシャ SPRING WASHER	6	ステンレス鋼 STNLSS STL	M5
22	プレートワッシャ PLAIN WASHER	6	ステンレス鋼 STNLSS STL	M5
30	ダイヤフラム DIAPHRAGM	1	PTFE+EPDM	
31	リテナ RETAINER PLATE	1	SUS304	
73	接続口 FITTING	2	SUS316	*

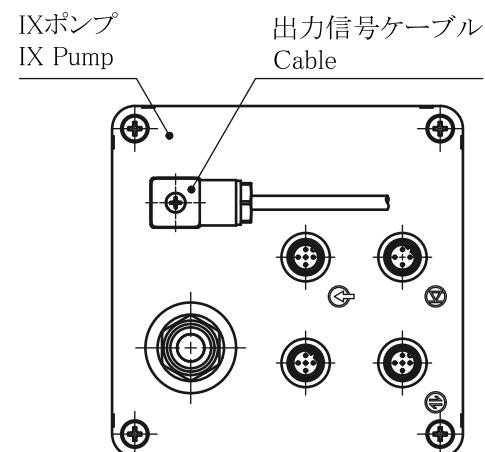
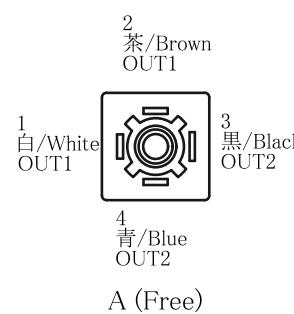
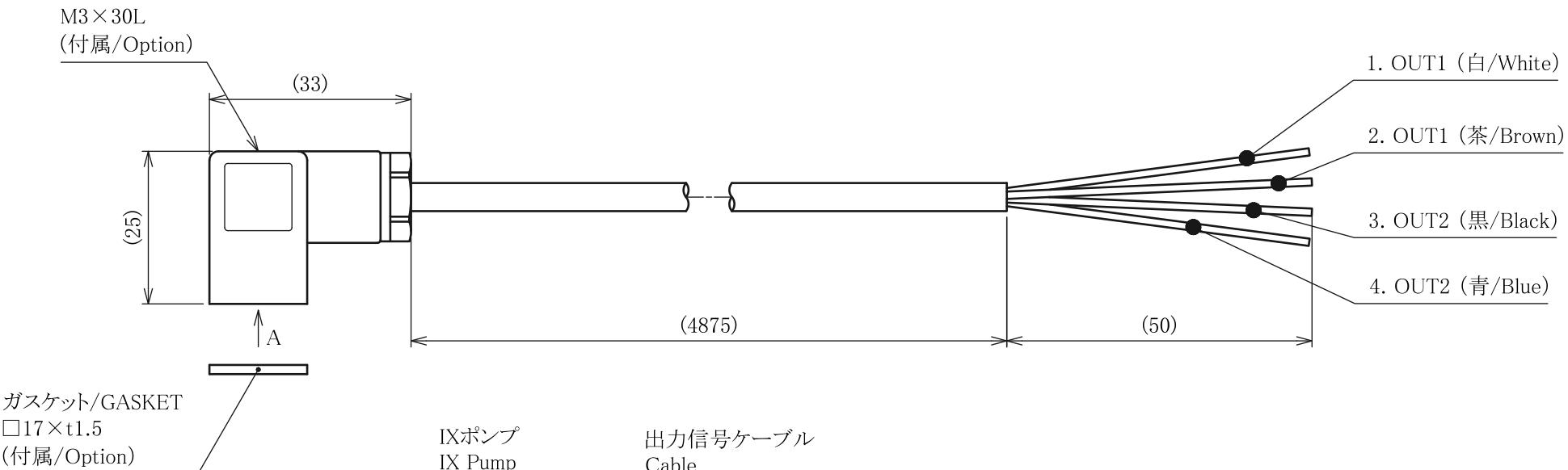
* 型式 MODEL 名称 PARTS NAME	R	N
接続口 FITTING	R1/2"	1/2-14NPT

承認 APPROVED BY	設計 DESIGNED BY	尺度 SCALE	単位 UNIT	質量 MASS	名称 TITLE
m.kurita	K.oatobe	NTS	mm	kg	HI-TECHNO PUMP
検査 CHECKED BY	製図 DRAWN BY	Dec. 16	2010	○	型式 MODEL
s.Tomita	m.Sekiuchi				IX-C060S6 (R)
IWAKI CO.,LTD.	TOKYO JAPAN	図番 DWG No.	1A351248	△	F

1 2 3 4 5 6 7 8

1 2 3 4

A



注記 1. 端末は未処理のため、接続機器に合わせて被覆を剥いてご使用ください。
2. ケーブルは左図の通り取付けてください。

Note 1 : Bare terminal sleeves along with a usage condition.
2 : Connect the cable as shown on the left diagram.

ケーブル取付方向
Cable connecting direction

May. 31, 2021		UNIT mm	TITLE 出力信号ケーブル (DINコネクタ出力用)
APPROVED BY Y. Yamada	DESIGNED BY K. Atobe	SCALE N T S	Din 4-pin female connector cable for output signal
CHECKED BY K. Sekiguchi	DRAWN BY T. Fukushima	MASS kg	MODEL IX
1 Correction Rev.	MET04218 EC No.	IWAKI CO., LTD.	No. 1A408107 1

1 2 3 4

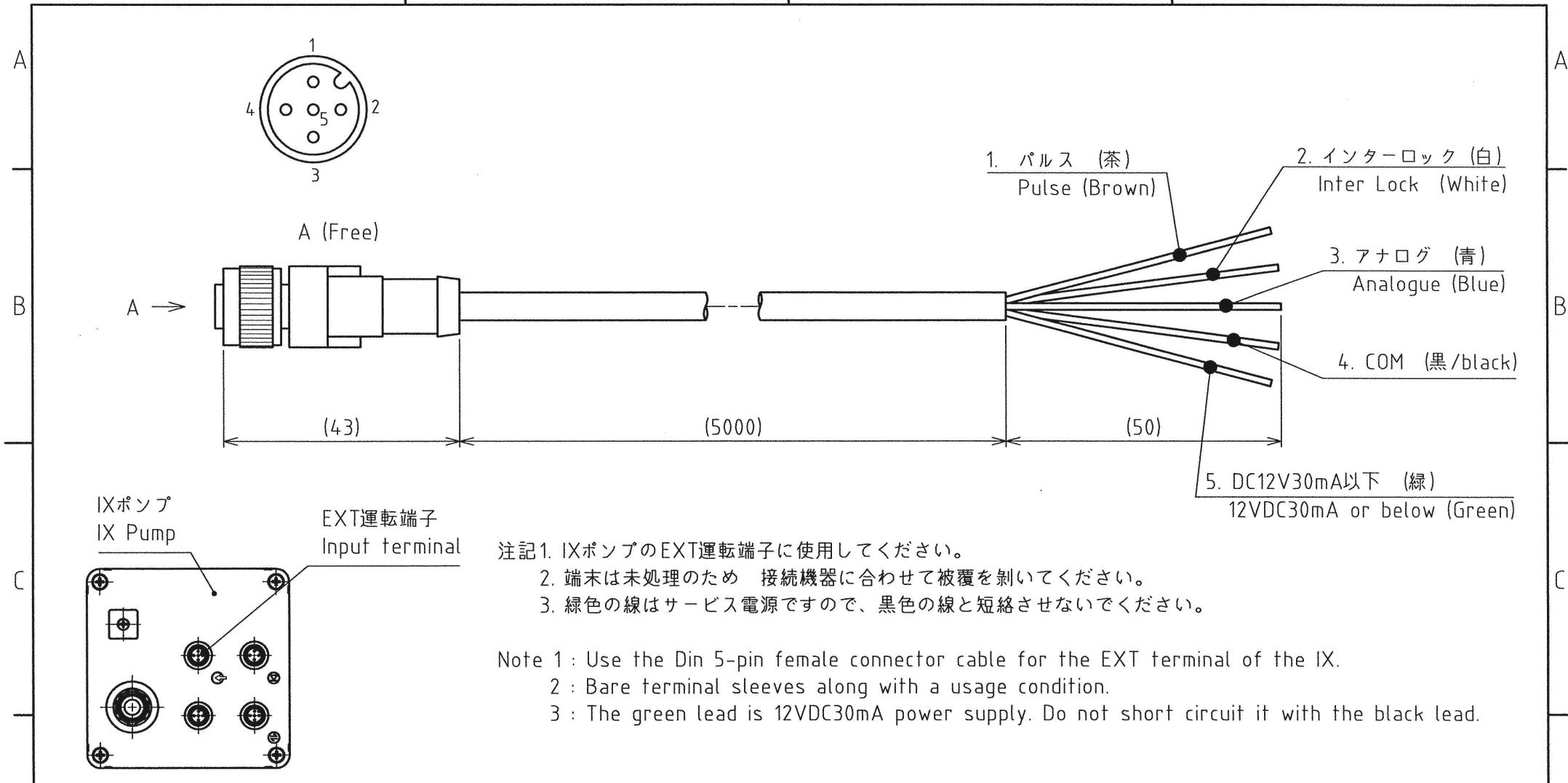
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D	承認 APPROVED BY	設計 DESIGNED BY	尺度 SCALE	単位 UNIT	質量 MASS	名称 TITLE
D	M.Kurita	S.Tomita	N T S	mm	kg	Din 5-pin female connector cable for external signal
D	検図 CHECKED BY	製図 DRAWN BY				型式 MODEL
D	APR. 14, 2010	S.Tomita	M.Sekiguchi	IWAKI CO.,LTD.	TOKYO JAPAN	IX
マーク MARK	改訂事項 REVISION	改訂No. REV.No.	日付 DATE	承認 APPROVED BY	図番 DWG No.	1A408108

1

4

TREATED WATER SUPPLY PUMP SPECIFICATION (P04)

供給ポンプ仕様書 (P04)

Pump Information			
Pump Model	C2XBS81RMA/J4UX	Quantity	1
Application Information			
Liquid	Like water		
Capacity	0.95~2.4	m3/hr	
Concentration	0	%	
Solid Content(Assumed)	1	%	
S. G. (Assumed)	1.05		
Temperature	50	C	
Viscosity	1	cp	
PH	3~9		
Suction Pressure(Assumed)	0	Bar	
Discharge Pressure	10	Bar	
Differential	10	Bar	
NPSH(r)	1.90	m	

Pump Build/Material Specification		
Casing	SS316	
Drive Mechanism	Coupling Rod	-SS316
Stator	RR-Nitrile Rubber	
Rotor	HCP SS316L	
Drive Shaft	Stainless Steel	
Baseplate	Not Included	
Seal	Mechanical Seal	
Coupling	Close Coupled	
Solids Handling	Soft 24 mm, Hard 6 mm	
Rotation	SOG	
Suction Size	50	mm
Discharge Size	50	mm
Paint Finish	Mono Standard-Blue	
Suction Direction	Right, view from motor end	

Drive Specification		
Absorbed Power	1.25	KW
Installed Power	1.5	KW
Starting Method	Inverter	
Drive Type	Fixed Speed Gear box, suitable for variable frequency to 25~60Hz	
Motor	254/440V,3PH/ 60Hz, IP55, IE3, Ambient temperature max.50° C Terminal box direction-TOP	
Pump required Speed	439	RPM@60Hz
Gearbox output Speed	439	RPM@60Hz
Anti-Con Heaters	Not Included	
Thermistors	Included	
Drive Reference	Nord SK01FAL + 90LP/4 TF	

Comments		
1)Please advise if any assumption can't meet your request.		
2)		
3)		

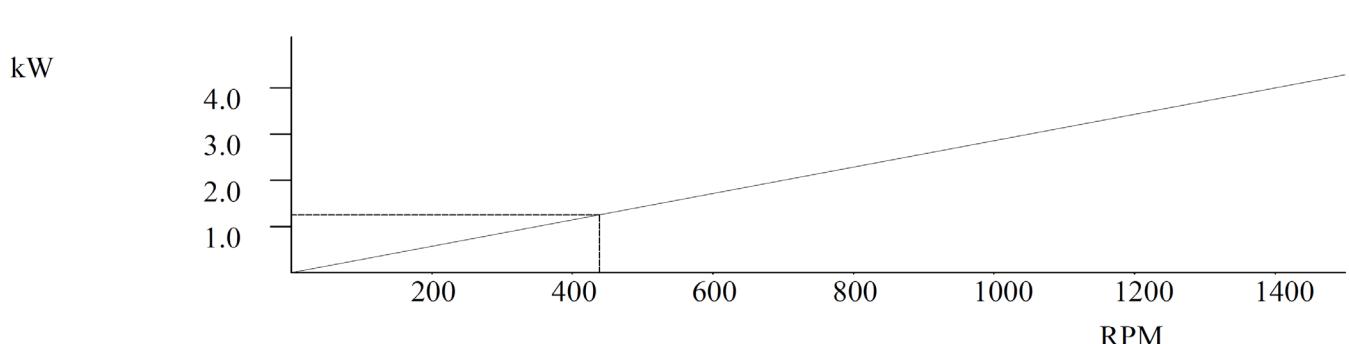
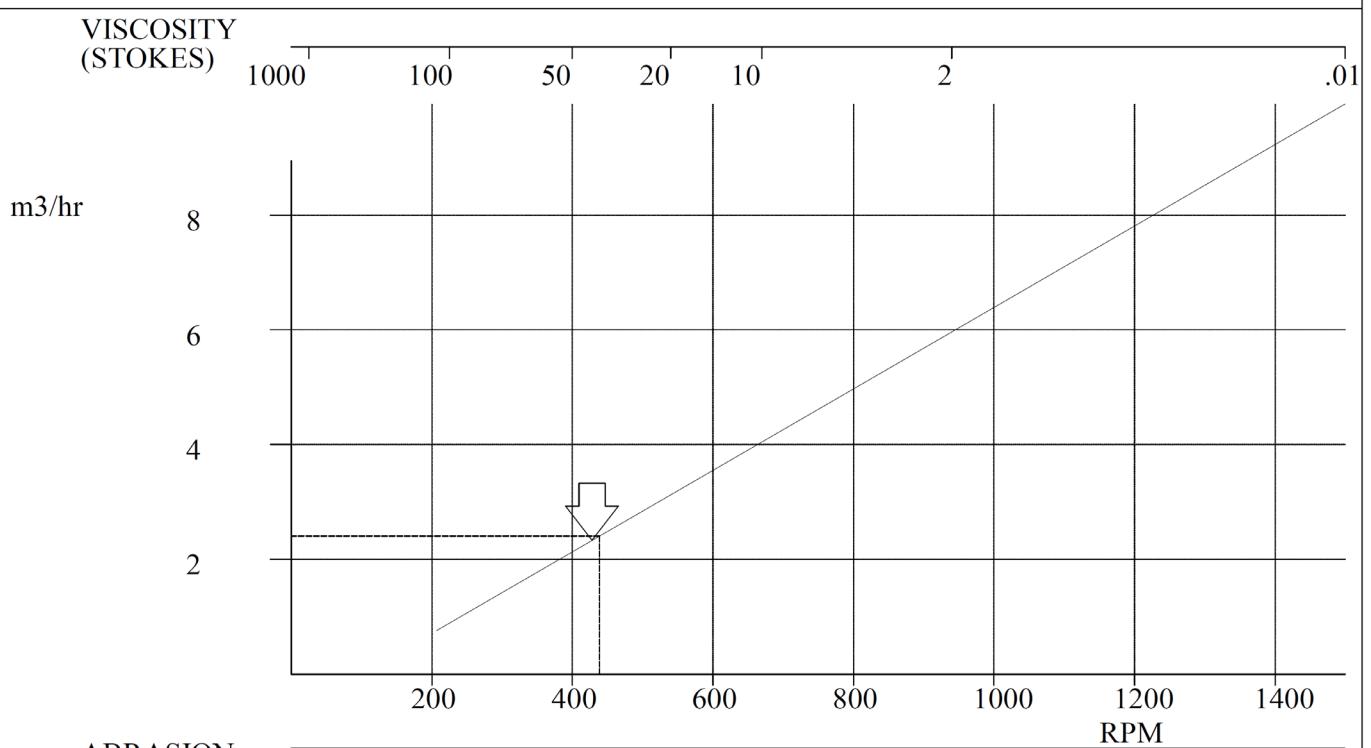
Document Number	S-LW-13721-07	Rev.
弊社書類番号		

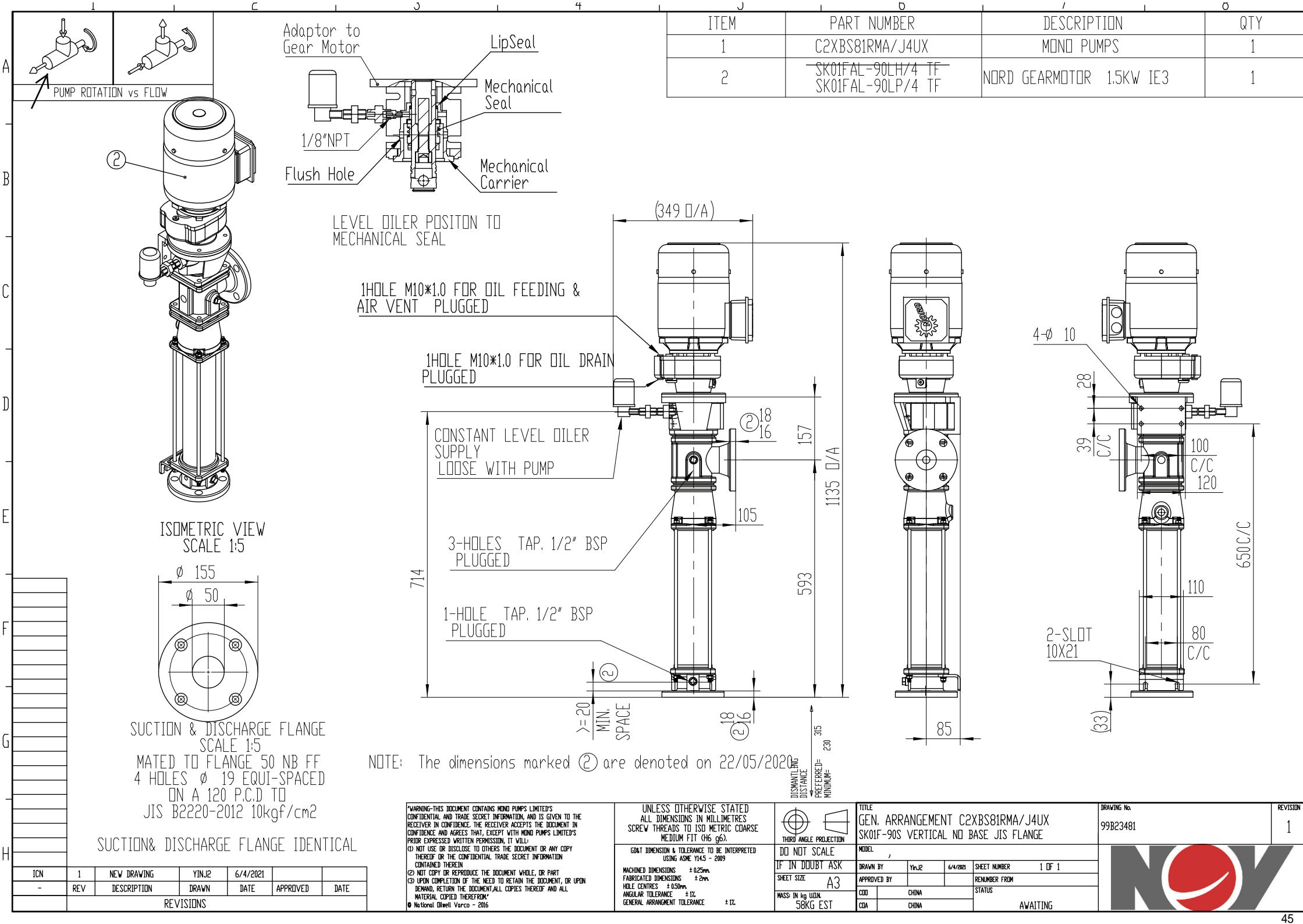
Our Order No. A3006715-1000
 弊社工事番号 A3006716-1000
 A3006717-1000

Project Ref: - 18AUG44-1-Rev3

Performance Curve for - C2XBS81RMA

Liquid Viscosity	1.00 cP	Min Pwr Req.	1.50 kW
Capacity	2.40 m3/hr	Absorbed Power	1.25 kW
Pressure	10.00 bar	Start Torque	30.0 Nm
Speed	439 RPM	Running Torque	27.2 Nm
Solids	24/6 mm (soft/hard)	NPSHR	01.90 m

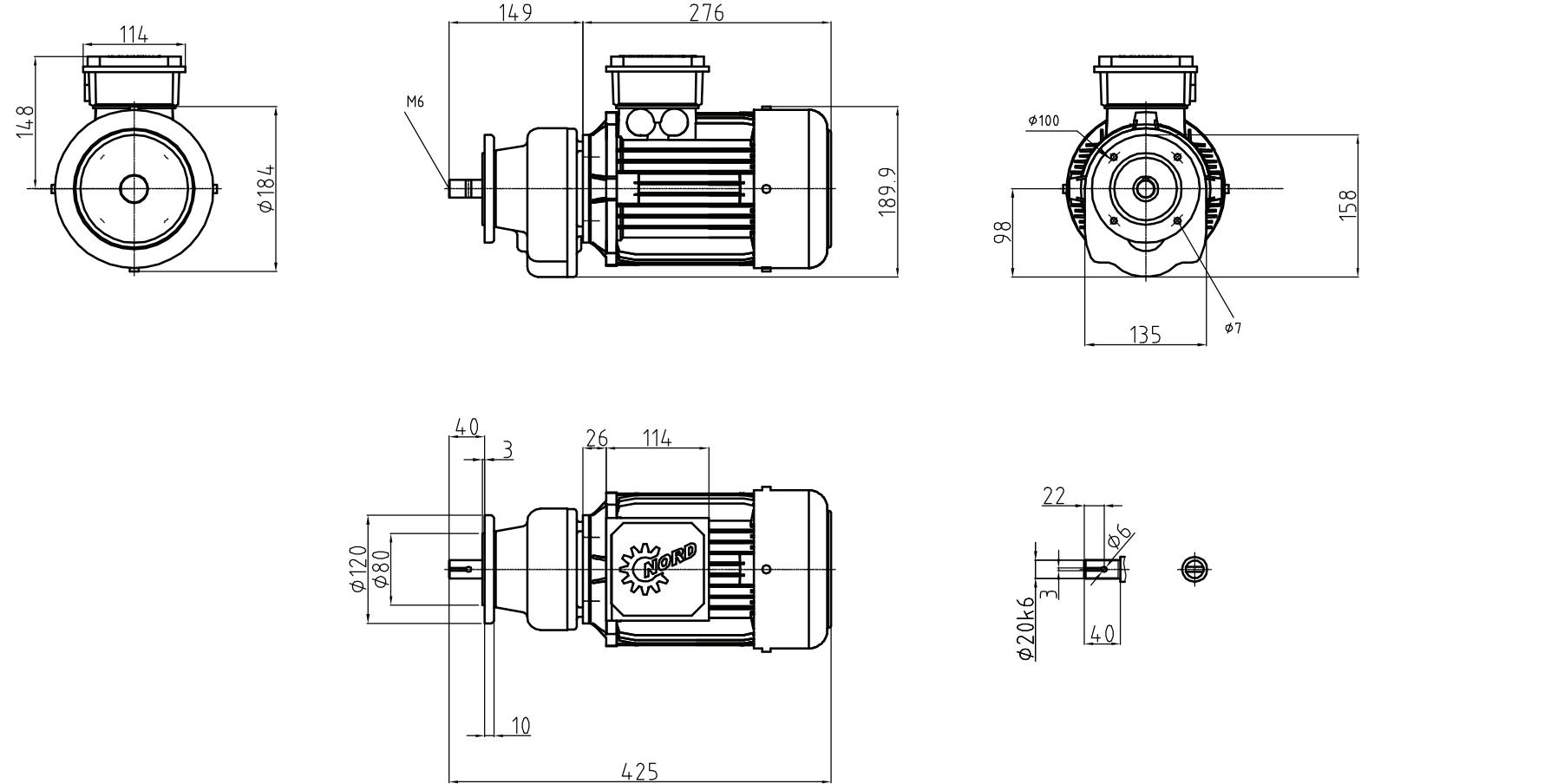




Motor Data Sheet



3 phase motor			Motor type: 90LP/4 TF						
Electrical data:			Order data:						
Frequency (f):	60	Hz	Order No.:	203294160-100					
Output (P):	1,50	kW	Customer reference No.:						
Speed (n):	1730	1/min	Serial No.:						
Connection of stator:	D/Y		Motor No.:						
Voltage (V):	254/440	V	Stator No.:	14532877					
Current (I):	5,07/2,93	A	General data:						
Voltage range (U _{WB}):	V		Direction of rotation:	CW/CCW					
Wide range current (I _{WB}):	A		Design:	Mot mount acc. NORD specs 901					
Starting current/Current (I _A /I):	7,60		Duty:	S1					
Rated motor torque (M _N):	8,28	Nm	Type bearing:						
Starting motor torque (M _A):	32,40 (3,91)*	Nm	Housing material:	Aluminium					
Minimum motor torque (M _s):	31 (3,74)*	Nm	Insulation class:	F					
Breakdown motor torque (M _k):	36 (4,35)*	Nm	Type of protection:	IP 55					
cos phi:	0,78	Last	Cable entry:	2 I					
Eta(%):	87,00	100%	Moment of inertia:	0,0039	kgm ²				
Eta(%):	87,40	75%	Maximum altitude of site:	1.000	m				
Eta(%):	86,30	50%	Ambient temperature:	-20°C	to +50°C				
Service Faktor:			Fan Type:	Standard IC 411					
Code letter:			Tested data:						
Connection of stator:	D/Y		Classification authorities:						
Voltage (V):	254/440	V	EN 60034, -1, -5, -6, -7, -9, -11, -14, -30; IE3, EN 60204-1,						
No load current (I ₀):	3,10/1,79	A	EN 61000-6-2, EN 61000-6-4						
No load output (P ₀):	0,101	kW							
Noise level (L _{PA}):	53	dB(A)							
Resistance stator winding at 20°C (R):	2.91	U1-U2 Ohm							
Temperature rise (T):	26,30	K							
(at the stator resistance method)									
Insulation resistance (R _{isol.}):	100	Mega Ohm							
Winding test:	2352	V/4 sek.							
Class of vibration:	A								
Motor options:									
TF: Thermistor									
Please look at de-rate for special environmental conditions written in operating and maintenance instructions B 1091 and in catalogue M7000									
* related dimension (without units) Technical data are subject to change.									
3 phase motor			Motor type: 90LP/4 TF						
Electrical data:			Order data:						
Frequency (f):	60	Hz	Order No.:	203294160-100					
Output (P):	1,50	kW	Customer reference No.:						
Speed (n):	1730	1/min	Serial No.:						
Connection of stator:	D/Y		Motor No.:						
Voltage (V):	254/440	V	Stator No.:	14532877					
Current (I):	5,07/2,93	A	General data:						
Voltage range (U _{WB}):	V		Direction of rotation:	CW/CCW					
Wide range current (I _{WB}):	A		Design:	Mot mount acc. NORD specs 901					
Starting current/Current (I _A /I):	7,60		Duty:	S1					
Rated motor torque (M _N):	8,28	Nm	Type bearing:						
Starting motor torque (M _A):	32,40 (3,91)*	Nm	Housing material:	Aluminium					
Minimum motor torque (M _s):	31 (3,74)*	Nm	Insulation class:	F					
Breakdown motor torque (M _k):	36 (4,35)*	Nm	Type of protection:	IP 55					
cos phi:	0,78	Last	Cable entry:	2 I					
Eta(%):	87,00	100%	Moment of inertia:	0,0039	kgm ²				
Eta(%):	87,40	75%	Maximum altitude of site:	1.000	m				
Eta(%):	86,30	50%	Ambient temperature:	-20°C	to +50°C				
Service Faktor:			Fan Type:	Standard IC 411					
Code letter:			Tested data:						
Connection of stator:	D/Y		Classification authorities:						
Voltage (V):	254/440	V	EN 60034, -1, -5, -6, -7, -9, -11, -14, -30; IE3, EN 60204-1,						
No load current (I ₀):	3,10/1,79	A	EN 61000-6-2, EN 61000-6-4						
No load output (P ₀):	0,101	kW							
Noise level (L _{PA}):	53	dB(A)							
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Temperature rise (T):	26,30	K							
(at the stator resistance method)									
Insulation resistance (R _{isol.}):	100	Mega Ohm							
Winding test:	2352	V/4 sek.							
Class of vibration:	A								
Motor options:									
TF: Thermistor									
Please look at de-rate for special environmental conditions written in operating and maintenance instructions B 1091 and in catalogue M7000									
* related dimension (without units) Technical data are subject to change.									

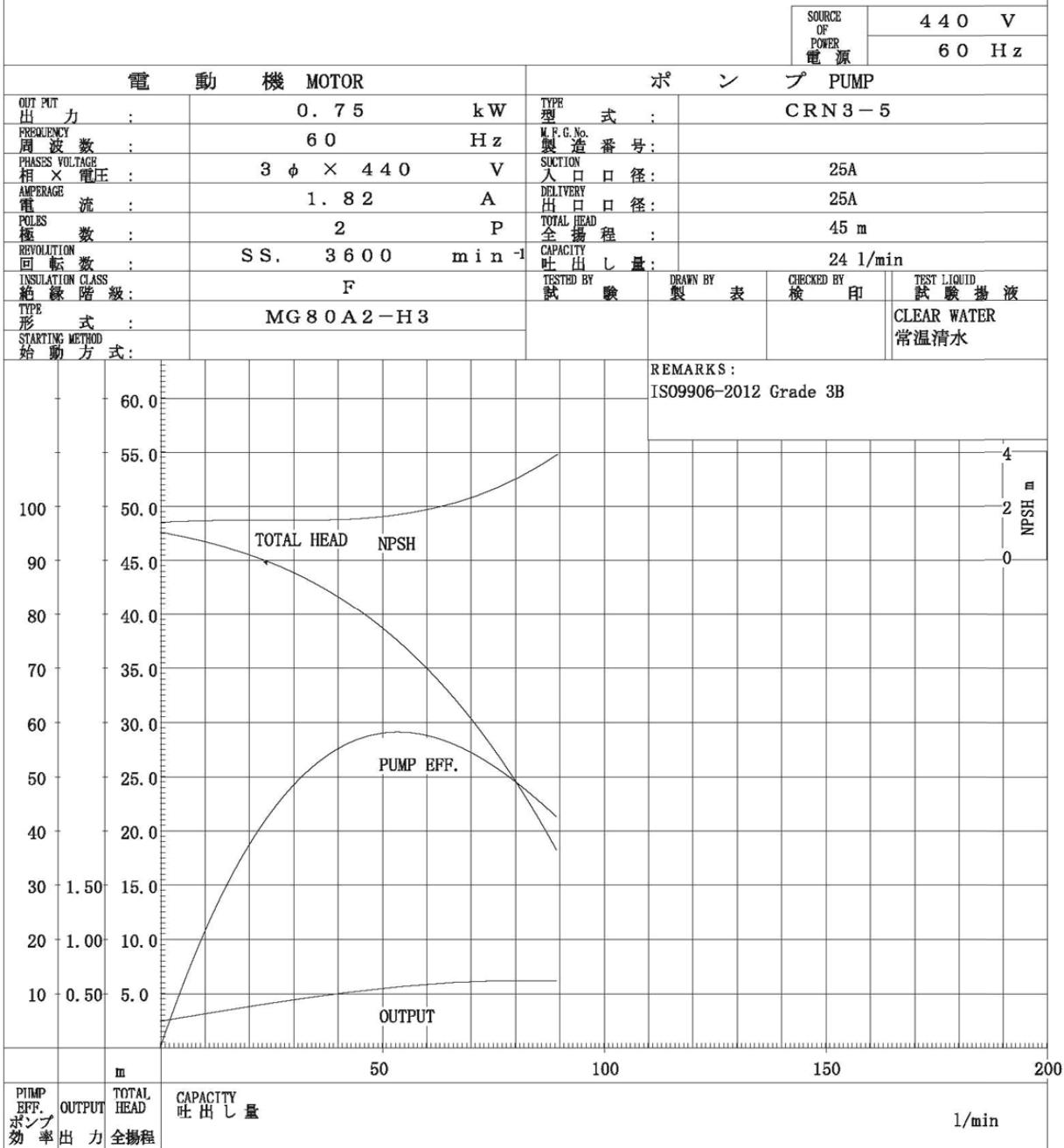


Einbaulage/Mounting Pos.:	Angewandte Normen	Applied Standards	NORD (China) Power Transmission Co., Ltd. No.510 Changyang Street, Suzhou, Sip 215026 Jiangsu, P.R.China Tel. +86-512-65180277/ Fax. +86-512-65180278	 DRIVESYSTEMS	Schutzvermerk nach ISO 16016 beachten	Maßstab Scale	Format Format
	Wellen bis $\phi 50$ nach ISO k6 Wellen über $\phi 50$ nach ISO m6 Nuten nach DIN 6885 Flanschzentrierungen bis $\phi 230$ nach ISO j6 Flanschzentrierungen über $\phi 230$ nach ISO h6	Shafts up to $\phi 50$ according to ISO k6 Shafts above $\phi 50$ according to ISO m6 Keyways according to DIN 6885 Flange centering up to $\phi 230$ according to ISO j6 Flange centering above $\phi 230$ according to ISO h6	Datum/Date Name/Name Bearb. Drawn 2018/07/11 zhudp Skizze Outline Zust. Änderung Datum Name State Changes Date Name Motor / Motor: NM	SK 01FAL - 90 LP/4 TF			1 Blatt Page

WTS PUMP PERFORMANCE CURVES & SPECIFICATION

WTSポンプ性能曲線&仕様書

PUMP PERFORMANCE CURVES
ポンプ性能曲線図



Document Number 弊社書類番号	Rev.
	S-LW-13721-22

Our Order No. A3006715-1000
 弊社工事番号 A3006716-1000
 A3006717-1000

31-60C17A

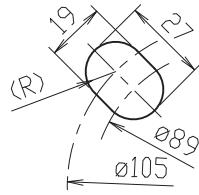
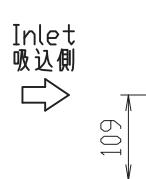
Dwg.No.図番

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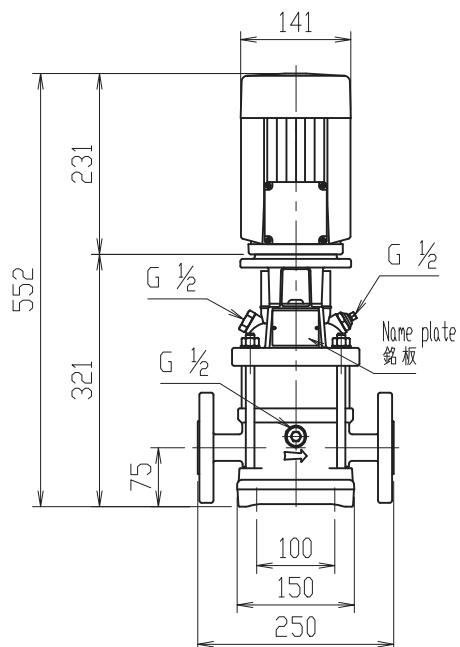
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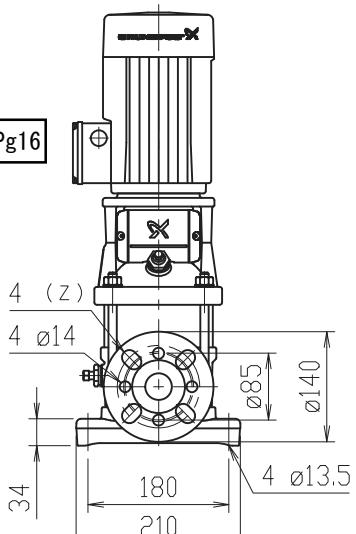
Mark 記号	Alterations 訂正事項	Date 訂正日付	Sign 署名	Appr. 承認
▲	Changed Motor 電動機変更	14.09.10	H A T	F K



Detail
ボルト穴形状 (Z)



CABLE GLAND:Pg16



Total weight 25kg

Specifications.仕様

[Motor/電動機]

GRUNDFOS

グランドフォス MG IE3 ▲

0.75 kW 60Hz

Enclosure class

保護方式 : IP55

[Connection/接合]

JIS20K 25A

All units are in [mm]

GRUNDFOS PUMPS K.K.

Dimensional drawing
外形寸法図

CRN3-5 A-FGJ-G

Design
設計

t y

Check
校査

H A T

Appr.
承認

F K

Scale 比例

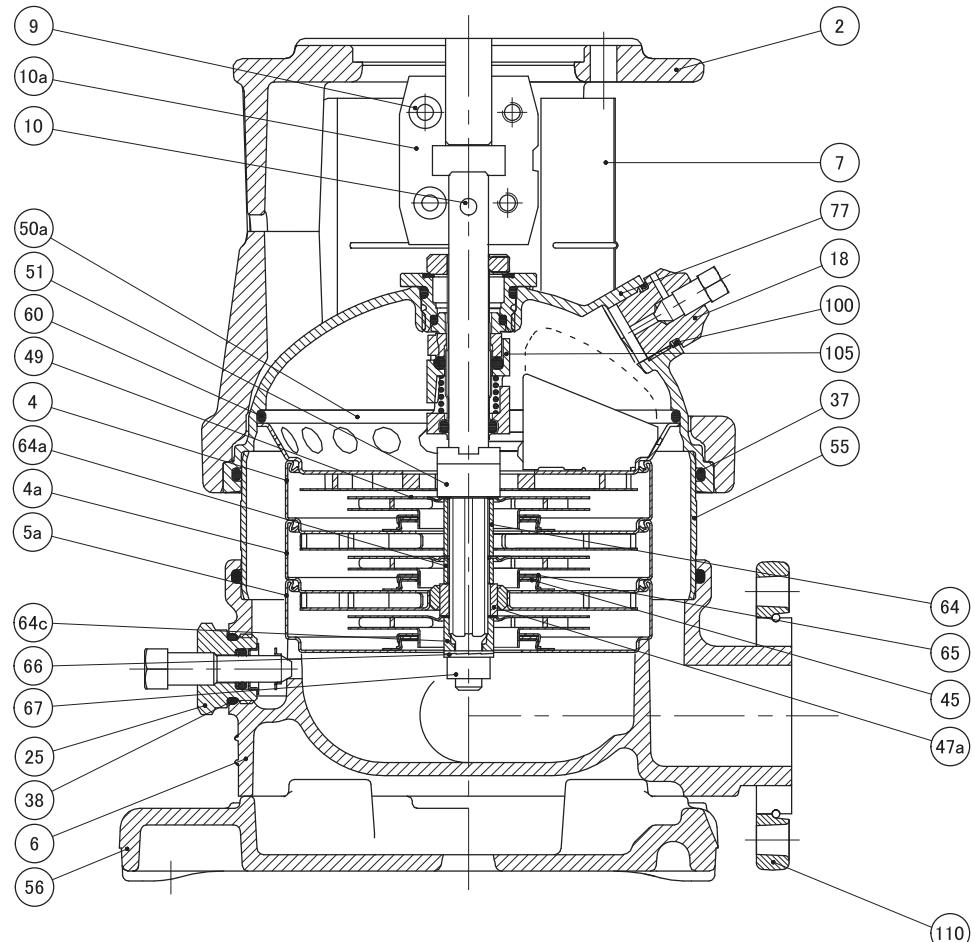
Date 作成日付

1:10 12.11.01

GRUNDFOS • X

Dwg.No.図番

31-60C17A

Rubber Material
※1 No.37,38,100 ゴム材質

Type 型式	Mark 記号	Rubber ゴム材質
Standard 標準	V	FKM
Option オプション	E	EPDM
Option オプション	K	FFKM
Option オプション	F	FXM

Mechanical seal code
メカニカルシールコード

Type 型式	Rubber ゴム材質	Stationary seal 固定環材質	Rotating face 回転環材質
HUVU	FKM	WC	WC
HUEE	EPDM	タンゲステンカーバイド	タンゲステンカーバイド
HUUK	FFKM		
HQBV	FKM	Carbon カーボン	SiC シリコンカーバイド
HQBE	EPDM		
HQVQ	FKM		
HQE	EPDM	SiC シリコンカーバイド	SiC シリコンカーバイド
HQQK	FFKM		
HQQF	FXM		
HUBV	FKM	Carbon カーボン	WC
HUBE	EPDM		タンゲステンカーバイド

110	Flexible flange	フレキシブルフランジ	FCD500	W.nr.0.7050	
105	Mechanical seal	メカニカルシール	SUS316	W.nr.1.4401	
100	O-ring	Oリング	※1	※1	
77	Pump head cover	ポンプヘッドカバー	SCS14A	W.nr.1.4408	
67	Lock nut	ロックナット	SUS316	W.nr.1.4401	with coating
66	Washer	ワッシャー	SUS316	W.nr.1.4401	
65	Retainer for Neck ring	ネックリングリテナー	SUS316	W.nr.1.4401	
64c	Clamp	クランプ	SUS316	W.nr.1.4401	
64a	Spacing pipe	スペーシングパイプ	SUS316	W.nr.1.4401	
64	Spacing pipe	スペーシングパイプ	SUS316	W.nr.1.4401	
60	Corrugated spring	コルゲートスプリング	SUS316JI ▲	W.nr.1.4436 ▲	
56	Base plate	ベースプレート	FC200	W.nr.0.6020	
55	Outer sleeve	アウタースリーブ	SUS316	W.nr.1.4401	
51	Pump shaft	ポンプシャフト	SUS316	W.nr.1.4401	
50a	Top guide vanes	トップガイドベーン	SUS316	W.nr.1.4401	
49	Impeller	インペラ	SUS316	W.nr.1.4401	
47a	Bearing ring	ベアリングリング	SiC	SiC	
45	Neck ring	ネックリング	PTFE	PTFE	
38	O-ring	Oリング	※1	※1	
37	O-ring	Oリング	※1	※1	
25	Drain plug	ドレンプラグ	SUS316	W.nr.1.4401	
18	Air vent screw	エア抜きバルブ	SUS316	W.nr.1.4401	
10a	Coupling	カップリング	Sintered Metal Alloy 焼結合金	PNC45	
10	Shaft pin	シャフトピン	SUS304	W.nr.1.4301	
9	Hexagon socket screw	六角穴付ボルト	Steel	-	
7	Coupling guard	カップリングガード	SUS430	W.nr.1.4016	
6	Base	ベース	SCS14A	W.nr.1.4408	
5a	Bottom intermediate chamber	ボトムチャンバー	SUS316	W.nr.1.4401	
4a	Intermediate chamber with bearing	ベアリング付 チャンバー	SUS316	W.nr.1.4401	
4	Intermediate chamber	チャンバー	SUS316	W.nr.1.4401	
2	Pump head	ポンプヘッド	FCD450-10	-	

Part No. 品番	Description 名 称	Material J I S 相当材質	Material EN / D I N 材質		Remarks 備 考
Specifications.仕様		Design 設計		Check 検査	Appr. 承認
[Connection/接合]		t y H A T F K			
flange フランジ		Scale 尺度		Date 作成日付	
Free		12.10.15			
GRUNDFOS					
Dwg.No.図番		C R N 1 / 3 / 5		31-01057B	
All units are in [mm]		GRUNDFOS PUMPS K.K.			

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Postscript 遺記

14.06.27 HAT FK

Changed material name notation 製品名等記入変更

14.04.07 HAT FK

Mark 記号

Alterations 訂正事項

Date 訂正日付

Sign 署名

Appr. 承認

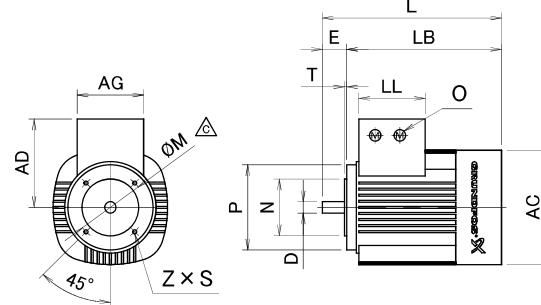
All units are in [mm]

GRUNDFOS PUMPS K.K.

31-01057B

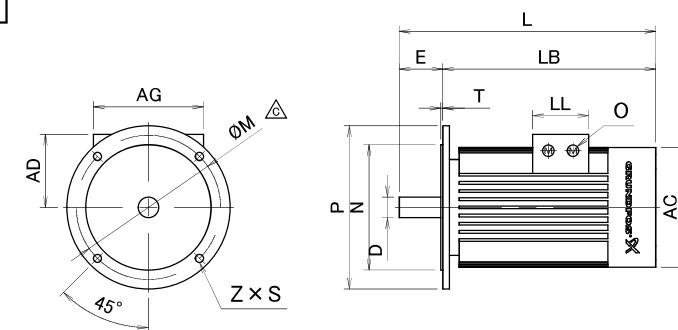
Mounting : B14/V18

[0.75~4.0kW]



Mounting : B5/V1

[5.5~7.5kW]



Motor Output 出力 [kW]	Type 型式	Mounting 取付 (IM code)	Dimensions 寸法 [mm]												Net Weight 概略質量 [kg]		
			Stator 主要部			Flange フランジ部				Shaft 軸部		Terminal box 端子台部					
AC	AD	L	LB	M	N	P	Z x S	T	D	E	AG	LL	※1 O	△			
0.75	MG80A2-H3	B14/V18	141	109	271	231	100	80	120	4 × M6	3	19	40	82	2 × Pg16	8	
1.1	MG80C2-H3	B14/V18	141	109	291	251	100	80	120	4 × M6	3	19	40	82	2 × Pg16	10	
1.5	MG90SD2-H3 △	B14/V18	178	110	331	281	115	95	135	4 × M8	3	24	50	162	103	2 × Pg16, 2 × M20	16 △
2.2	MG90LE2-H3 △	B14/V18	178	110	371	321	115	95	135	4 × M8	3	24	50	162	103	2 × Pg16, 2 × M20	20 △
3.0	MG100LC2-H3	B14/V18	198	120	395	335	130	110	160	4 × M8	3.5	28	60	162	103	2 × Pg16, 2 × M20	25
4.0	MG112MC2-H3	B14/V18	220	134	432	372	130	110	160	4 × M8	3.5	28	60	202	103	2 × Pg21, 2 × M25	37
5.5	MG132SC2-H3	B5/V1	220	134	471	391	265	230	300	4 × Ø15	4	38	80	202	103	2 × Pg21, 2 × M25	43
7.5	MG132SB2-H3	B5/V1	260	159	459	379	265	230	300	4 × Ø15	4	38	80	203	135	2 × Pg21, 2 × M25	53

Specification of three-phase cage induction motor 三相誘導電動機仕様	
Type 型式	Totally Enclosed Fan Cooled 全閉外扇
Standard 規格	IEC60034
Enclosure class 保護方式	IP55
Thermal class 耐熱クラス	F(IEC60085)
Poles 極数	2
Efficiency 効率	IE3

Voltage 使用電圧	
※50Hz	
400V Y	
※60Hz	
400V / 440V Y △	

※1

ケーブルグランド付属
Including Cable GLAND

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Mark 記号	Alterations 訂正事項	Date 訂正日付	Sign 署名	Appr. 承認
---------	------------------	-----------	---------	----------

Specifications.仕様
[Motor / 電動機]
GRUNDFOS
グランド・フォス
50/60Hz
Japan
All units are in [mm]
GRUNDFOS PUMPS K.K.

Dimensional drawing
代表外形寸法図

M G

Design 設計	Check 檢査	Appr. 承認
KTR	HAT	FK
Scale 尺度	Date 作成日付	
Free	14.07.18	
GRUNDFOS		
Dwg.No.図番 58-00079D		

59-00220

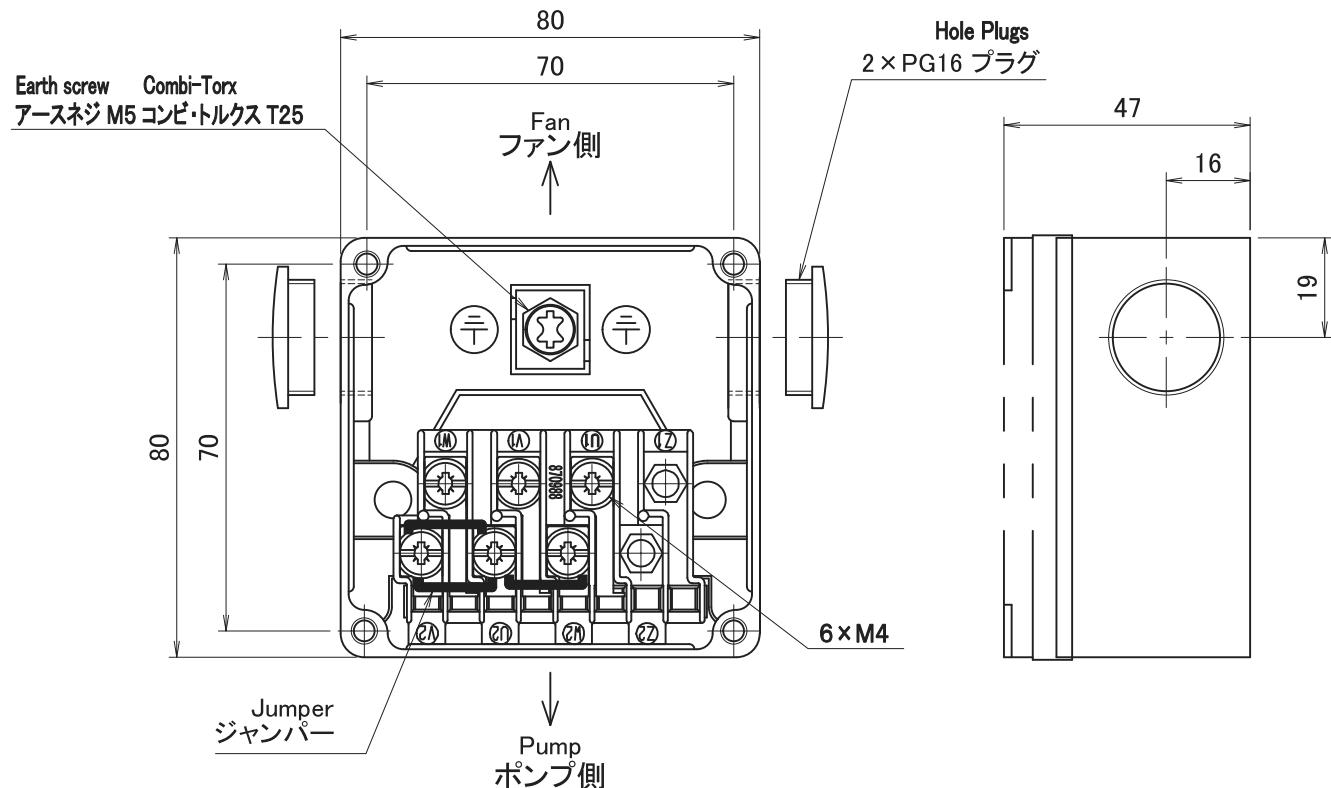
Dwg.No.図番

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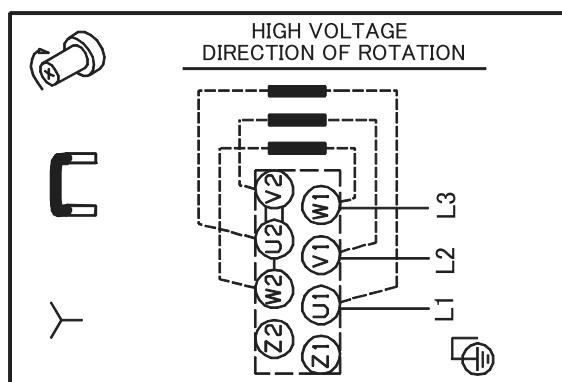
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Mark 記号	Alterations 訂正事項	Date 訂正日付	Sign 署名	Appr. 承認



	2P	4P
MG80	0.75~1.1kW	0.75kW



Specifications.仕様

MG Top Runner
50Hz 400V
60Hz 400/440V

All units are in [mm]

GRUNDFOS PUMPS K.K.

Terminal box ターミナルボックス詳細

MG80

Design 設計	Check 検査	Appr. 承認
KTR	HAT	FK
Scale 尺度		Date 作成日付
Free		15.01.09
GRUNDFOS		Dwg.No.図番
59-00220		

CONTROL VALVE SPECIFICATION FOR ONZ

ONZ用制御弁仕様書(1/2)

SPECIFICATIONS

仕様

USE 名称	Angle seat valve アングルシート弁	Air filter unit エアフィルタユニット	Solenoid valve for air 空気用電磁弁
Tag No. タグナンバー	CV101A,CV101B, CV102,CV103	VA101	SVA101,SVA102,SVA103, SVA104,SVA105,SVA106, SVA107,SVA108
Model 型式	CV101A・CV102: PA20S3T5R050S CV101B・CV103: PA20SAT5R050S	C1000-UN-X1-201019	PMS2306-02- D24DKLH-MKK2
Power source or Inlet pressure 電源又は入口圧力	Air supply (0.45~0.9 MPa)	-	DC24V
Material 材質	Body:ANSI316L Seat:PTFE	Body:Polyamide copper	Body:ADC
Connection 接続	BSPT3/4	Rc1/4	Rc1/4
Pressure range 使用圧力範囲	0~0.8MPa	Max 1.0 MPa	0~0.9 MPa
Quantity 数量	4	1	8
Remarks 備考	CV101A・CV102: Normal Open type CV101B・CV103: Normal Close type	Assembly of filter regulator and shut-off / exhaust valve フィルタレギュレータと 残圧排出弁の組立品	With manual operation mechanism 手動操作機構付き

Document Number 弊社書類番号	S-LW-13721-09	Rev.

Our Order No.

弊社工事番号

A3006715-1000

A3006716-1000

A3006717-1000

CONTROL VALVE SPECIFICATION FOR ONZ

ONZ用制御弁仕様書(2/2)

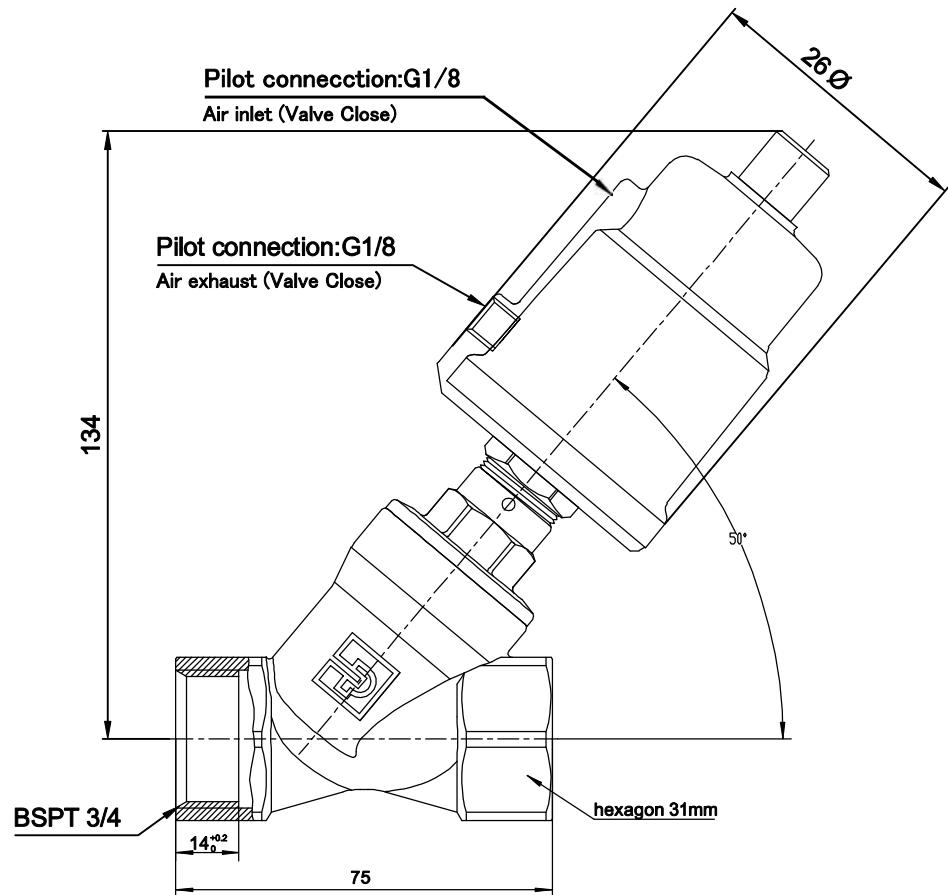
SPECIFICATIONS

仕様

USE 名称	Solenoid valve for water 水用電磁弁	Solenoid valve for water 水用電磁弁	
Tag No. タグナンバー	SVW101, SVW102, SVW103	SVW104	
Model 型式	VKSSD-15WGIPJ	MSSD-1030-8WIPJ	
Power source or Inlet pressure 電源又は入口圧力	DC24V	DC24V	
Material 材質	Body: SCS14 Seat: NBR	Body: SUS316L Oring: NBR	
Connection 接続	Rc1/2	Rc1/4	
Pressure range 使用圧力範囲	0~0.5 MPa	0~0.5 MPa	
Quantity 数量	3	1	
Remarks 備考	Normal Close type	Normal Close type	

Document Number 弊社書類番号	S-LW-13721-09	Rev.

Our Order No. A3006715-1000
 弊社工事番号 A3006716-1000
 A3006717-1000



Tag.No. CV101A • CV102

PA20S3T5R050S

PA20: DN20

S3: Normal open, Flow direction under seat

T5: BSPT 3/4

R: Body AISI 316L

050S: Actuator dimension 50mm, material AISI 304

Kv: 9.5m³/h

Operating pressure differential: see flow chart

Pilot control pressure range: see flow chart

Weight: 1.06 KG

Control Pressure&Operating Pressure

Ctrl(bar)

8

7

6

5

4

3

2

1

0

50

DN20

8

7

6

5

4

3

2

1

0

0

2

4

6

8

10

12

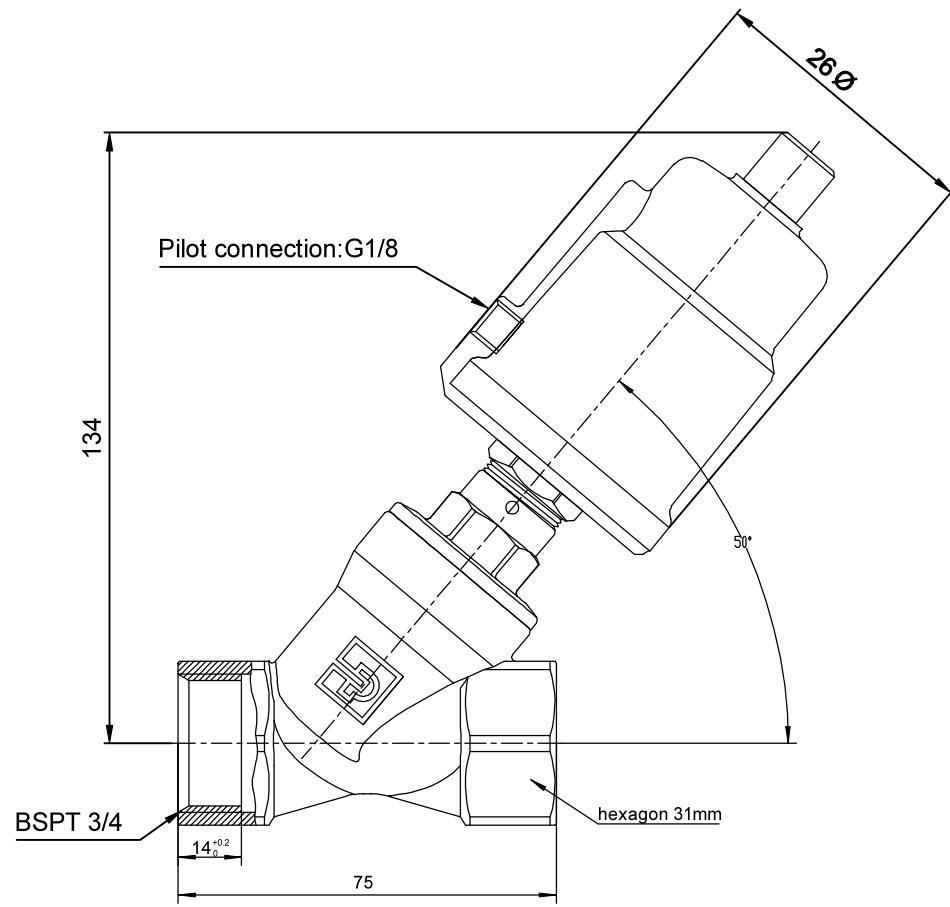
14

16

△P(bar)

Revision	Level	Date	Description		ECN/ECR No	Check by
			Original:C400484	Scale: 1:1	Material: - -	
Tol Sys	Owner:C	Format A4	Treatment:	Check by: Rick Liu	Date: 2019-11-7	
Part designation		Part No/Drw No		Part Rev/Drw Re		
Parker			PA20S3T5R050S		PA20S3T5R050S	A
AUG - FLUID CONTROL DIVISION						

1000~2000	0.5	1.2	3
315 ~1000	0.3	0.8	2
120~315	0.2	0.5	1 2
30~120	0.15	0.3	0.8
6~30	0.1	0.2	0.6
3~6	0.06	0.1	0.2
0.5~ 3	0.05	0.1	-
DIMENSION (mm)	1 st	2 nd	3 rd
TOLERANCE(±)			



Tag.No. CV101B • CV103

PA20SAT5R050S

PA20: DN20

SA: Normal close, Flow direction under seat

T5: BSPT 3/4

R: Body AISI 316L

050S: Actuator dimension 50mm, material AISI 304

Kv: 9.5m³/h

Operating pressure differential: 0-10bar

Pilot control pressure range: min. 4.5bar

Weight: 1.06 KG

1000~2000	0.5	1.2	3
315 ~1000	0.3	0.8	2
120~315	0.2	0.5	1.2
30~120	0.15	0.3	0.8
6~30	0.1	0.2	0.5
3~6	0.05	0.1	0.2
0.5~ 3	0.05	0.1	-
DIMENSION (mm)	1 st	2 nd	3 rd
	TOLERANCE(±)		

Revision	Level	Date	Description	ECN/ECR No	Check by
Tol Sys		Original:C400287	Scale: 1:1 Material: --	Drawn by: Gene Gou	Date: 2019-11-7
E		Owner:C	Format: A4 Treatment:	Check by: Rick Liu	Date: 2019-11-7
Part designation				Part No/Drw No	Part Rev/Drw Re
parker		PA20SAT5R050S Angle Body Valve		PA20SAT5R050S	A

OUTLINE OF VALVES FOR AIR FILTER UNIT

€1000-UN-N-1-201019

MODEL

T.Arai

DESIGNER T.Takada

DRAWN T.Ogawa

Don't.e 2021.2.10

E-mail No.

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This technical drawing illustrates the dimensions and components of a filter regulator assembly. The assembly consists of a top section labeled 'Filter regulator' and a bottom section labeled 'Shut-off / exhaust valve'. Key dimensions include:

- Total height: 160.5 mm
- Width: 80 mm
- Height of the top section: 2.5 mm
- Height of the bottom section: 40 mm
- Height from base to outlet: 42 mm
- Height from base to inlet: 45 mm
- Height from base to exhaust: 35 mm
- Height from base to drain outlet: 40 mm
- Width of the top section: 40 mm
- Width of the bottom section: 40 mm

Components and features labeled in the drawing include:

- OUTLET:** Located on the left side, connected via an $Rc1/4$ fitting.
- INLET:** Located on the right side, connected via an $Rc1/4$ fitting.
- Silencer:** Located at the bottom right, connected via an $Rc1/8$ fitting.
- EXHAUST:** Located at the bottom center, connected via a $2-\phi 5.5 \times 7.5$ fitting.
- DRAIN OUTLET:** Located at the bottom center, connected via an M5 fitting.
- Filter regulator:** The top section containing a pressure gauge and two filter elements.
- Shut-off / exhaust valve:** The bottom section containing a valve handle and a drain outlet.
- For maintenance:** A label indicating the height for maintenance access.
- Tag No.: VA1**
- Mass: 0.35kg**



MITSUBISHI KAKOKI KAISHA LTD

DWG NO

260977

Form I-005

OUTLINE OF 3-WAY SOLENOID VALVE

PMS2306-02-
D24DKLH-MKK2

MODEL

CHECKED T.ARAI

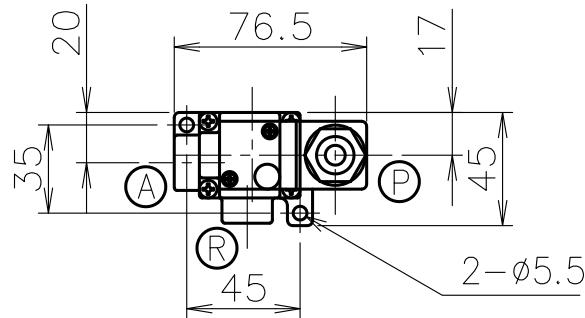
DESIGNED K.ONZO

DRAWN S.ZAITSU

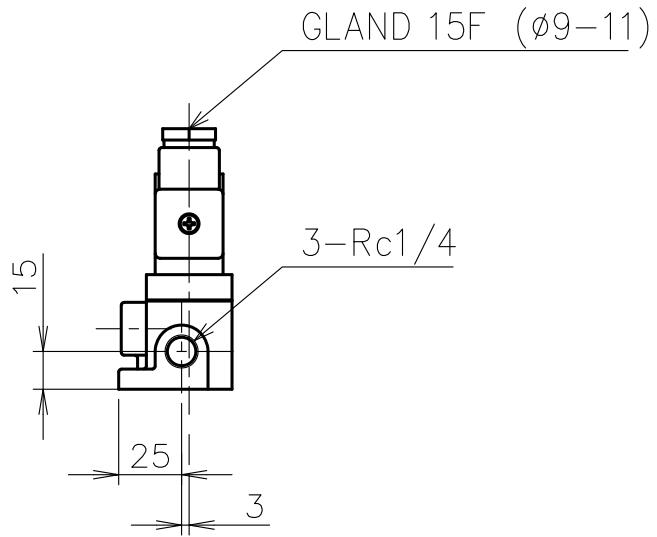
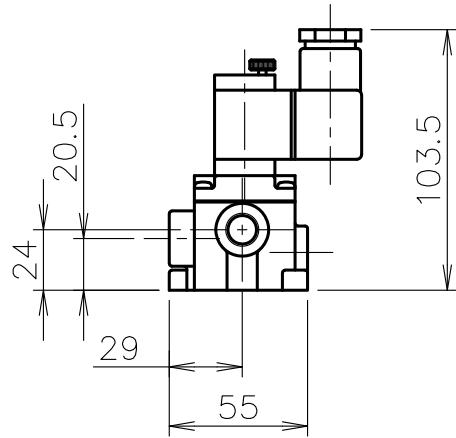
DATE 2020.1.7

Film No.

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- (A) : OUTLET (TO FEED VALVE)
- (P) : INLET
- (R) : EXHAUST



IP GRADE: IP 65

Tag No. : SVA101~SVA108

Mass: 0.3kg



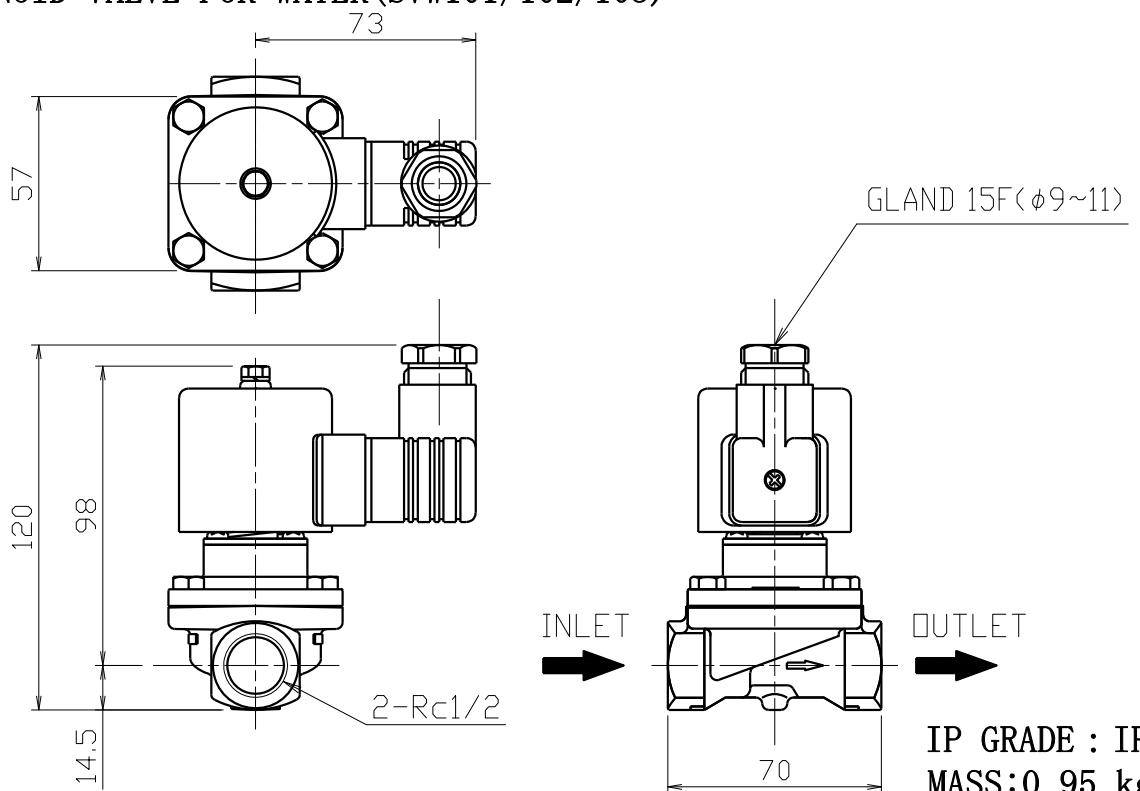
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DWG. NO.

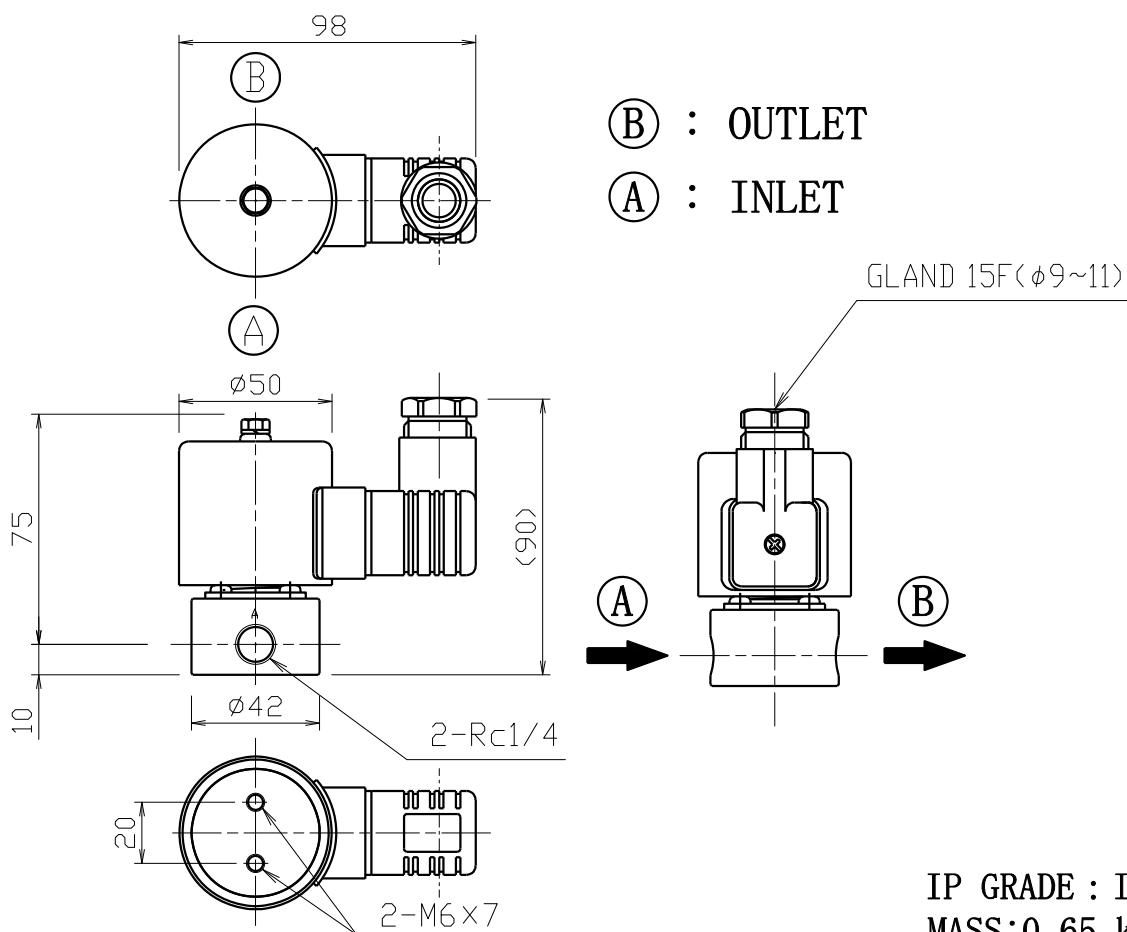
260230

OUTLINE OF VALVES FOR AUTO CONTROL DEVICE

SOLENOID VALVE FOR WATER(SVW101/102/103)



SOLENOID VALVE FOR WATER(SVW104)



Drawn by S.Zaitatsu
Date 2019.10.1
File No. JH
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MITSUBISHI KAKOKI KAISHA,LTD.

DWG.NO.

260043

VALVE SPECIFICATION FOR SUPPLY UNIT

SUPPLY UNIT用弁仕様書

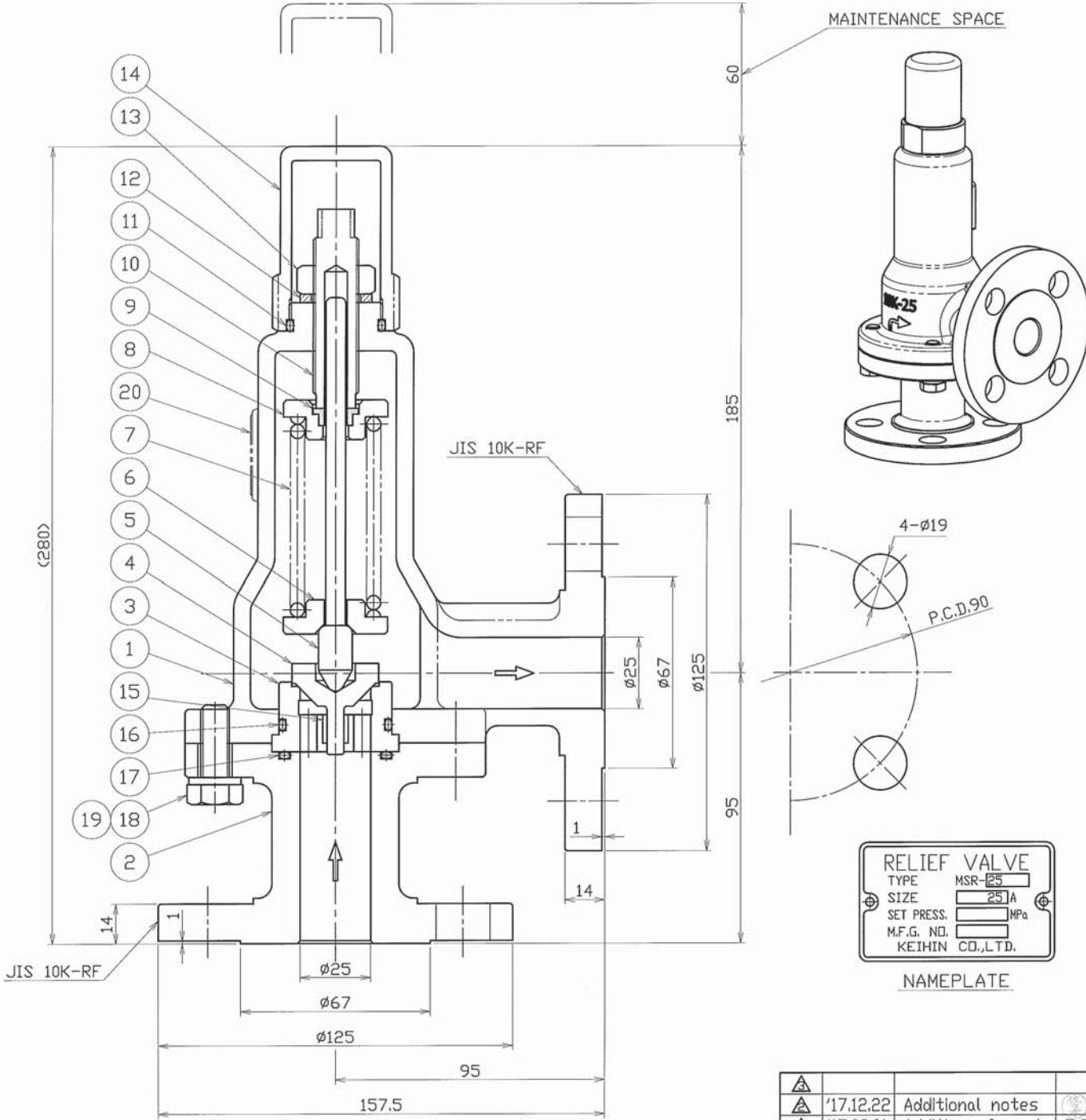
SPECIFICATIONS

仕様

USE 名称	Relief valve リリーフ弁	Relief valve 安全弁	Back pressure valve 背圧弁
Tag No. タグナンバー	V303	V306	V314
Model 型式	MSR - 25	RV-2S6B-15	BV-2S6-15
Power source or Inlet pressure 電源又は入口圧力	-	-	-
Material 材質	Body: SCS16 Seat: SUS316	Body: SCS14 Seat: SUS316	Body: SCS14 Seat: SUS316
Connection 接続	JIS10K-25A	JIS10K-15A	JIS10K-15A
Pressure range 使用圧力範囲	Max. 0.95 MPa	Max. 0.95 MPa	Max. 0.95 MPa
Quantity 数量	1	1	1
Remarks 備考	Set Pressure:0.95MPa 設定圧:0.95MPa	Set Pressure:0.95MPa 設定圧:0.95MPa	Set Pressure:0.15MPa 設定圧:0.15MPa

Document Number 弊社書類番号	S-LW-13721-30	Rev.

Our Order No. A3006715-1000
 弊社工事番号 A3006716-1000
 A3006717-1000

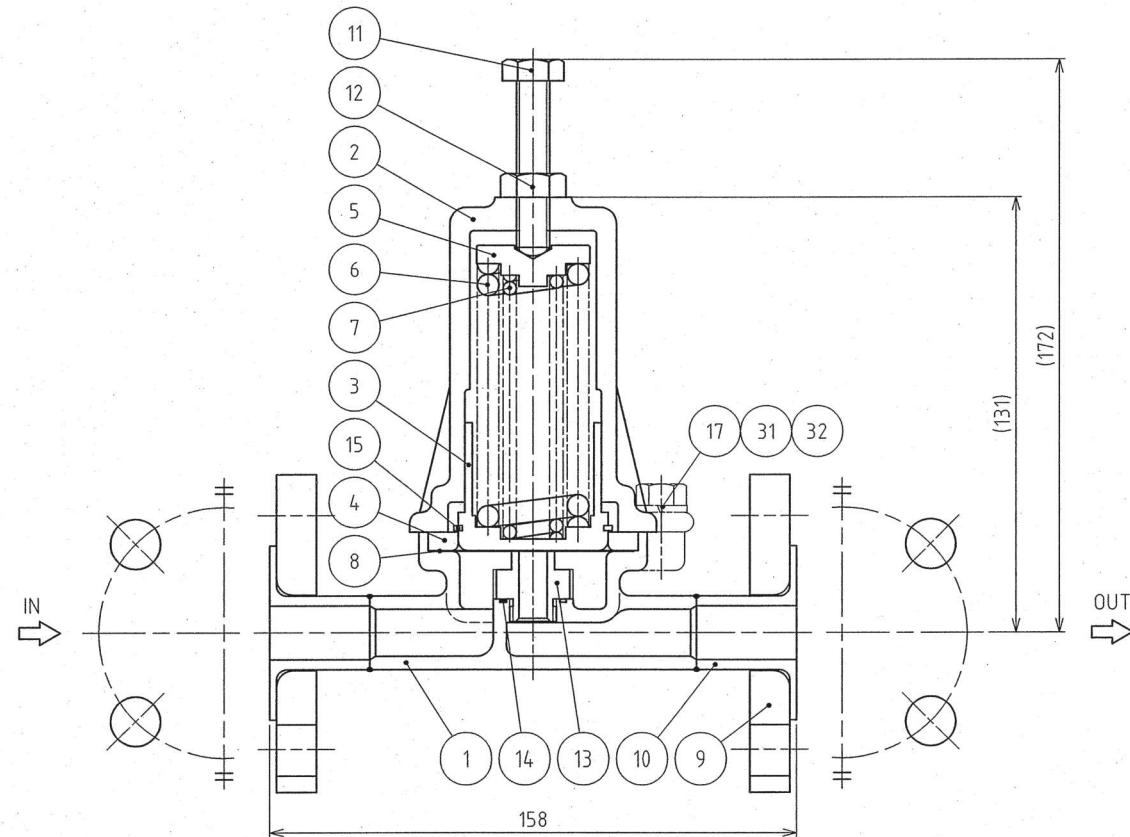


Tag No : V303

No	PART NAME	MATERIAL	QTY	REMARKS
20	NAMEPLATE	SUS 304	1	
19	PLAIN WASHER	SUS 304	4	ø10
18	HEXON BOLT	SUS 304	4	M10
17	O-RING	NBR	1	G35
16	O-RING	NBR	1	G35
15	BUSH	PTFE	1	
14	CAP	SUS 316	1	
13	LOCK NUT	SUS 316L	1	
12	LOCK WASHER	SUS 316L	1	(EN 1.4404)
11	O-RING	NBR	1	G30
10	ADJUST SCREW	SUS 316	1	
9	FLANGE BUSH	PPS	1	
8	SPRING HOLDER A	SUS 316	1	
7	SPRING	SUS 316WPA	1	
6	SPRING HOLDER B	SUS 316	1	
5	STEM	SUS 316	1	
4	VALVE	SUS 316	1	
3	VALVE SEAT	SUS 316	1	
2	LOWER BODY	SCS 16	1	
1	MAIN BODY	SCS 16	1	
NOTE				
Nominal pressure JIS 10K				
TITLE	RELIEF VALVE			
SCALE	DATE	RECOG	CHECK	DESIGN
FREE	July-18,2017	17.07.21	17.07.21	17.07.18
TYPE	MSR-25			
Assembly Draw. DWG No.		A3-06766	Rev. 2	
No	DATE	NOTE	CHARGE	RECOG

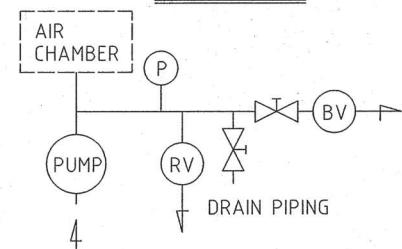
KEIHIN Co.,LTD

1	2	3	4	5	6	7	8							
No.	名称 Parts Name	数 Q'ty	材質 Material	備考 Remarks	No.	名称 Parts Name	数 Q'ty	材質 Material	備考 Remarks	No.	名称 Parts Name	数 Q'ty	材質 Material	備考 Remarks
A	13 バルブシート VALVE SEAT	1	SUS316		7	スプリングB SPRING B	1	SUS304		1	下ケース LOWER CASE	1	SCS14	
	14 ガスケット GASKET	1	PTFE		8	ダイヤフラム DIAPHRAGM	1	PTFE		2	上ケース UPPER CASE	1	FC250	
	15 サークリップ CIR-CLIPS	1	SUP	WR45	9	フランジ FLANGE	2	SUS304	JIS10.16K15ARF	3	リテナプレート RETAINER PLATE	1	S45C	MICr2
B	17 六角ボルト HEXBOLT	4	ステンレス鋼 STNLS STL	M8X20	10	ラップエンド LAP END	2	SUS316		4	ストッパー STOPPER	1	S45C	MICr2
	31 スプリングワッシャ SPRING WASHER	4	ステンレス鋼 STNLS STL	M8	11	圧力調整ボルト ADJUSTING BOLT	1	ステンレス鋼 STNLS STL	M10X50	5	スプリング座 SPRING SEAT	1	SS400	MFZn
	32 プレートワッシャ PLAIN WASHER	4	ステンレス鋼 STNLS STL	M8	12	六角ナット HEX NUT	1	ステンレス鋼 STNLS STL	M10	6	スプリングA SPRING A	1	SUS304	



(7) スプリングBは、設定圧力0.8MPa以下は、不要。
 (7) SPRING B IS NOT REQUIRED WHEN THE SET PRESSURE IS LESS THAN 0.8 MPa.

PIPING SKETCH



取扱説明

安全弁、背圧弁の取付け位置は、安全弁の場合ポンプに近い位置に取付けて下さい。背圧弁の場合は、吐出管の先端に取付けて下さい。

INSTRUCTIONS FOR USE

ATTACH RELIEF VALVE NEAR PUMP AND ATTACH BACK PRESSURE VALVE TO THE TOP END OF DISCHARGE PIPE.

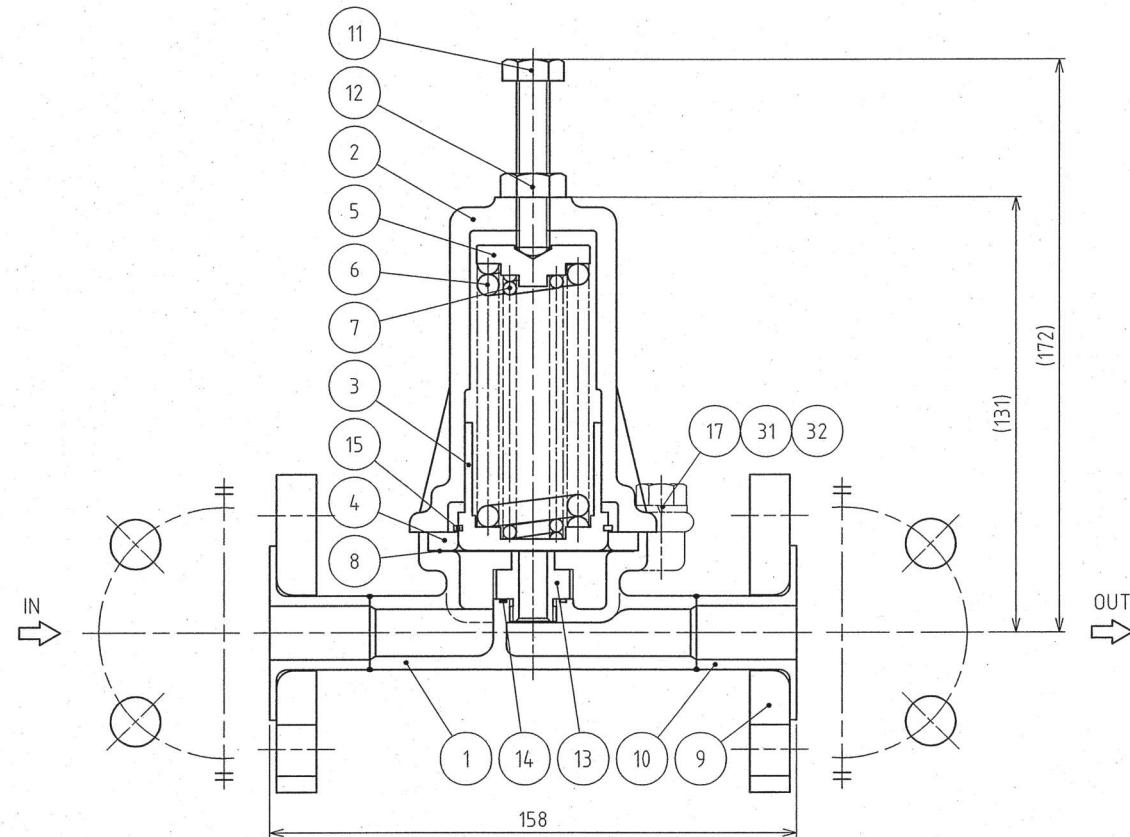
Tag No.V306

設定圧力
SET PRESSURE 0.95 Mpa

△ Correction	RV-174	SEP.6, 2016	Y. Yamada	G. Kitani
△ Correction	RV-081	AUG.23, 1995	Y. Hattori	-
△ Correction	-	JAN.30, 1992	Y. Ichikawa	-
△ Correction	RV-062	MAR.29, 1988	A. Ohkubo	-
△ Correction	-	JAN.26, 1988	A. Ohkubo	-
マーク MARK	改訂事項 REVISION	改訂No. REV.No.	日付 DATE	承認 APPROVED BY
				設計担当 DESIGNED BY

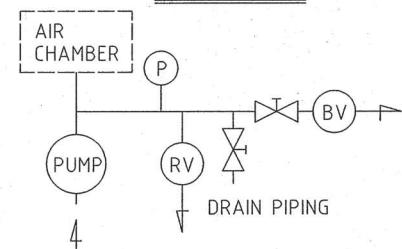
承認 APPROVED BY T.Kusama	設計 DESIGNED BY S.Doi	尺度 SCALE N T S	単位 UNIT mm	名称 TITLE IWAKI RELIEF VALVE BACK PRESSURE VALVE
検査 CHECKED BY S.Chida	製図 DRAWN BY H.Uematsu	質量 MASS 3.5 kg	寸法 DIMENSION	型式 MODEL RV-2S6B-15
FEB. 8, 1986	IWAKI CO., LTD.			図番 DWG No. 5A31947

1	2	3	4	5	6	7	8							
No.	名称 Parts Name	数 Q'ty	材質 Material	備考 Remarks	No.	名称 Parts Name	数 Q'ty	材質 Material	備考 Remarks	No.	名称 Parts Name	数 Q'ty	材質 Material	備考 Remarks
13	バルブシート VALVE SEAT	1	SUS316		7	スプリングB SPRING B	1	SUS304		1	下ケース LOWER CASE	1	SCS14	
14	ガスケット GASKET	1	PTFE		8	ダイヤフラム DIAPHRAGM	1	PTFE		2	上ケース UPPER CASE	1	FC250	
15	サークリップ CIR-CLIPS	1	SUP	WR45	9	フランジ FLANGE	2	SUS304	JIS10·16K15ARF	3	リテナプレート RETAINER PLATE	1	S45C	MICr2
17	六角ボルト HEXBOLT	4	ステンレス鋼 STNLS STL	M8X20	10	ラップエンド LAP END	2	SUS316		4	ストッパー STOPPER	1	S45C	MICr2
31	スプリングワッシャ SPRING WASHER	4	ステンレス鋼 STNLS STL	M8	11	圧力調整ボルト ADJUSTING BOLT	1	ステンレス鋼 STNLS STL	M10X50	5	スプリング座 SPRING SEAT	1	SS400	MFZn
32	プレートワッシャ PLAIN WASHER	4	ステンレス鋼 STNLS STL	M8	12	六角ナット HEX NUT	1	ステンレス鋼 STNLS STL	M10	6	スプリングA SPRING A	1	SUS304	



(7) スプリングBは、設定圧力0.8MPa以下は、不要。
 (7) SPRING B IS NOT REQUIRED WHEN THE SET PRESSURE IS LESS THAN 0.8 MPa.

PIPING SKETCH



取扱説明

安全弁、背圧弁の取付け位置は、安全弁の場合ポンプに近い位置に取付けて下さい。背圧弁の場合は、吐出管の先端に取付けて下さい。

INSTRUCTIONS FOR USE

ATTACH RELIEF VALVE NEAR PUMP AND ATTACH BACK PRESSURE VALVE TO THE TOP END OF DISCHARGE PIPE.

Tag No.V314

設定圧力
SET PRESSURE 0.15 Mpa

△ Correction	RV-174	SEP. 6, 2016	Y. Yamada	G. Kitani
△ Correction	RV-081	AUG. 23, 1995	Y. Hattori	-
△ Correction	-	JAN. 30, 1992	Y. Ichikawa	-
△ Correction	RV-062	MAR. 29, 1988	A. Ohkubo	-
△ Correction	-	JAN. 26, 1988	A. Ohkubo	-
マーク MARK	改訂事項 REVISION	改訂No. REV.No.	日付 DATE	承認 APPROVED BY
				設計担当 DESIGNED BY

承認 APPROVED BY T.Kusama	設計 DESIGNED BY S.Doi	尺度 SCALE N T S	単位 UNIT mm	名称 イワキ 安全弁・背圧弁 TITLE IWAKI RELIEF VALVE BACK PRESSURE VALVE
検査 CHECKED BY S.Chida	製図 DRAWN BY H.Uematsu	質量 MASS 3.5 kg	寸法 Φ 158	型式 BV-2S6-15 MODEL
FEB. 8, 1986	IWAKI CO., LTD.			図番 DWG No. 5A31947

SENSOR SPECIFICATION

計装品仕様書

SPECIFICATIONS

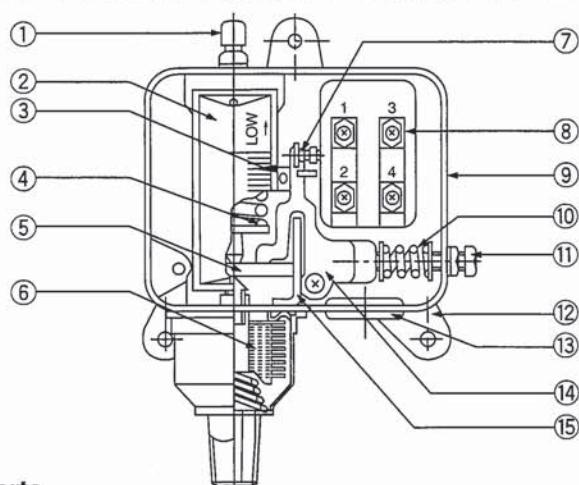
仕様

USE 名称	Pressure switch 圧力スイッチ	Level switch 液面スイッチ	
Tag No. タグナンバー	PS101 PS102	LSH LSL	
Model 型式	ISG221-031	SG10-13	
Power source 電源	DC24V	DC24V	
Material 材質	Stainless steel (SUS316)	Fork: SUS316 Housing: SUS304	
Connection 接続	R3/8	R1	
Pressure range 圧力調整範囲	0.05 ~ 0.7MPa	-101kPa~10MPa	
Ambient Temp. 周囲の環境温度	-5 ~ +80 °C	-40 ~ +80 °C	
Unit weight 重量	1.3 kg	0.5 kg	
Degree of protection 保護等級	IP44	IP67	
Quantity 数量	2	2	

Document Number 弊社書類番号	S-LW-13721-10	Rev.

Our Order No. A3006715-1000
 弊社工事番号 A3006716-1000
 A3006717-1000

Construction



Component Parts

No.	Description
1	Setting pressure adjusting bolt
2	Scale plate
3	Pointer
4	Setting pressure adjusting spring
5	Main lever
6	Bellows assembly
7	Adjusting bolt
8	Snap switch (1a + 1b type)

No.	Description
9	Body
10	Hysteresis adjusting spring
11	Hysteresis adjusting bolt
12	Bracket
13	Grommet
14	Connection lever for switch operation
15	Stopper for operation lever



[Option]

How to Order

ISG **2** **2** **1** - **03** **1** - **□** - **□** **7**

- Select one by one, item for item.
- For semi-standard, indicate symbols numerically, then alphabetically.
- Ex.) ISG110-030-PW

	Symbol	Contents
①	Enclosure	1 Open type (Equivalent to IP40) 2 Driproof (Equivalent to IP44)
	+	
②	Operating pressure range	1 -0.02 to 0.3 MPa 2 0.05 to 0.7 MPa 3 0.1 to 1.0 MPa 9 -10 to -100 kPa
	+	
	③ Body material in contact with fluid material	0 Brass/phosphor bronze 1 Stainless steel 316
	+	
④	Port size	03 R 3/8 N03 -NPT 3/8-
	+	
⑤	Hysteresis scale plate	0 -None- 1 Note 1) Hysteresis scale plate
	+	
⑥	Contacts	N11 1a1b W Note 2) -2ab-
		+
⑦	Scale-plate pressure unit	N11 MPa P Note 2) -Both MPa and psi-
		+
⑧	CE-compliant Note 2)	Nil Noncompliant Q Compliant

Note 1) Not available for ISG19□, 29□

Note 2) Not available for CE-compliant products. CE-compliant products conform to 220 VAC or less, 110 VDC or less.

Other

Caution

1. Bellows assembly is available for maintenance. When replacing other parts, please contact SMC, since it cannot be repaired by user. Order Bellows assembly with the part number as follows:
Bellows assembly for ISG□□□-□□□
(No other part numbers exist.)
Ex.) Bellows assembly for ISG 110-030

Operating Environment

1. Never use in an environment, where flammable fluids or gases are used. Since this product is not explosion-proof and may trigger an explosive disaster.

Precautions

- Be sure to read this before handling the products.
- Refer to back page 50 for Safety Instructions and pages 11 and 12 for Pressure Switch Precautions.

Selection

Caution

1. Select the model taking into consideration the material suitable for the operating fluid. Type of operating fluid is limited by the material of wetted parts. Please contact SMC for materials not specified.

Wiring

Warning

1. Do not have the internal wiring attached to the connection lever for switch operation. It may malfunction.

Caution

1. The grommet size of open type switch is ø17. It is possible to connect the electric piping 1/2B without grommet.
2. Terminal thread type is M4.

Mounting/Piping

Caution

1. Mounting is possible in either horizontal or vertical orientations.

Pressure Source

Warning

1. In the case of using switch in any liquid, install a water hammer or surge reducer to prevent the damage to switch caused by surges or pulsation pressure.

Pressure Setting

Caution

1. Set the pressure by adjusting the setting pressure adjusting bolt to the right to increase and to the left to decrease.
2. Adjust the hysteresis with hysteresis adjusting bolt. In case of switch with scale plate, adjust the hysteresis with a flat head screwdriver tightening the adjusting bolt in the thread cap. Turn to the right to increase and to the left to decrease.
3. Hysteresis must be within the specified range in this catalog, operation may be unstable when activated out of the specified range.
4. Scale plate is only for reference. Use the gauge to get the correct pressure value.
5. Set pressure scale at the value of the pressure increase.

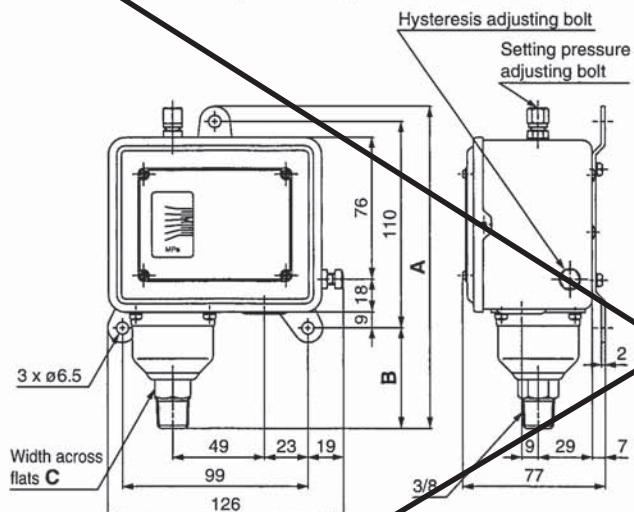
Tag No. PS101、PS102

ISG Series

Dimensions

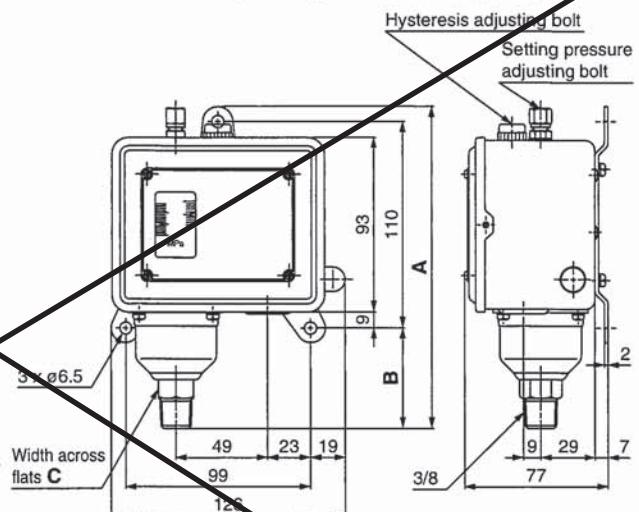
Open type

ISG110 to 191-030 (Without hysteresis scale plate)



Dimensions (mm)			
Part no.	A	B	C
ISG110-030(-W)	172	54	19
ISG1□0 to 1□0-030(-W)	169	51	19
ISG1□1 to 1□1-030(-W)	177	59	23

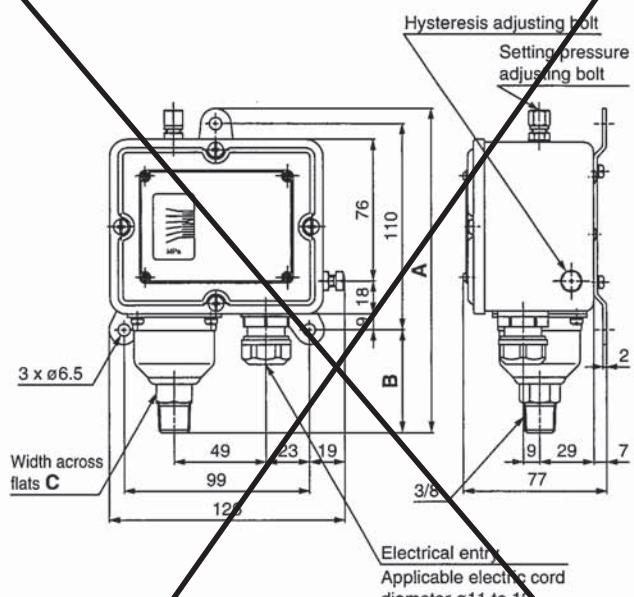
ISG110 to 131-031 (With hysteresis scale plate)



Dimensions (mm)			
Part no.	(A)	(B)	C
ISG110 to 130-031(-W)	172	54	19
ISG111 to 131-031(-W)	177	59	23

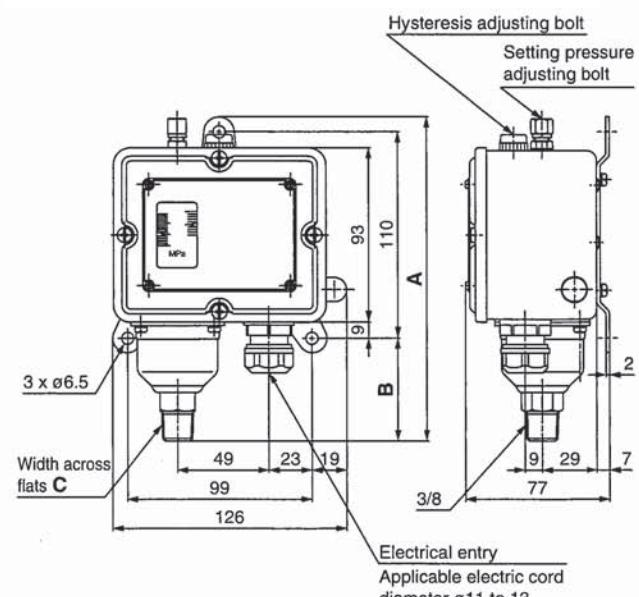
Driproof type

ISG210 to 291-030 (Without hysteresis scale plate)



Dimensions (mm)			
Part no.	A	B	C
ISG2□0 to 2□0-030(-W)	173	55	19
ISG2□1 to 2□1-030(-W)	178	60	23

ISG221-031 (Without hysteresis scale plate)



Dimensions (mm)			
Part no.	(A)	(B)	C
ISG210 to 230-031(-W)	173	55	19
ISG211 to 231-031(-W)	178	60	23

Tag No. LSH, LSL

DATE (YYYY-MM-DD)

2018-05-10

APP. BY

Tsu

CH. BY

D.S.

PREP. BY

Y.O.

S P E C I F I C A T I O N S

1. NAME : LIQUID FORK SENSOR (Mini-Squing)
 2. MODEL : SG10-13 (Drawing No. AS104680)
 3. MEASURED OBJECT : Liquids
 4. OPERATION CHARACTERISTICS
 (1) LED operation : Lit continuously - ON
 1 flash per second - OFF
 3 flashes per second - internal failure
 1 flash per 4 seconds - short circuit / overload
 (2) Specific gravity : 0.6 to 2.0
 (3) Viscosity : 0.2 to 10000 cP
 (4) Switching point : Approx. 13.5 mm (with water) from tip (top mount)^{*1}/edge (horizontal mount) of fork
 (5) Hysteresis : Approx. 2 mm (with water)
 (6) Switching delay : Approx. 1 s (with water, wet to dry/dry to wet)
 5. ELECTRICAL CHARACTERISTICS
 (1) Wiring : 3 wire
 (2) Power supply : 18 to 60V DC
 (3) Current consumption : 3 mA (when sensor is OFF)
 (4) Controlled output : PNP open collector output, 500 mA Max.
 (5) Residual voltage : 3 V Max. (when sensor is ON.)
 (6) Leakage current : 100 μA Max. (when sensor is OFF.)
 (7) Surge resistance : 5A / 0.04 s
 6. MECHANICAL CHARACTERISTICS
 (1) Working pressure : -101 kPa to 10 MPa (Fig. 1)
 7. ENVIRONMENTAL (Fig. 2)
 (1) Working temperature : -40 to +150°C
 (2) Ambient temperature : -40 to +80 °C
 8. PROTECTION CLASS : IP67
 9. OTHERS
 (1) Material
 (a) Wetted parts : 316 stainless steel
 (b) Housing : 304 stainless steel
 (c) LED window : Polyamide
 (d) Plug : Polyamide, glass reinforced
 (2) Mounting : R1
 (3) Plug
 (a) Code : 121201 DIN Form A
 (b) Cable : 2 core/3 core cable
 (c) Cable O.D. : 4 to 9mm
 (d) Wire size : 1.5 mm² Max. (AWG 16)
 (e) Mounting : 4 positions (90-degree intervals)

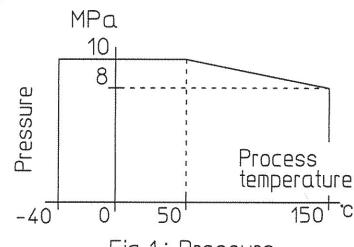


Fig.1: Pressure

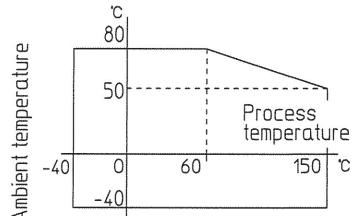
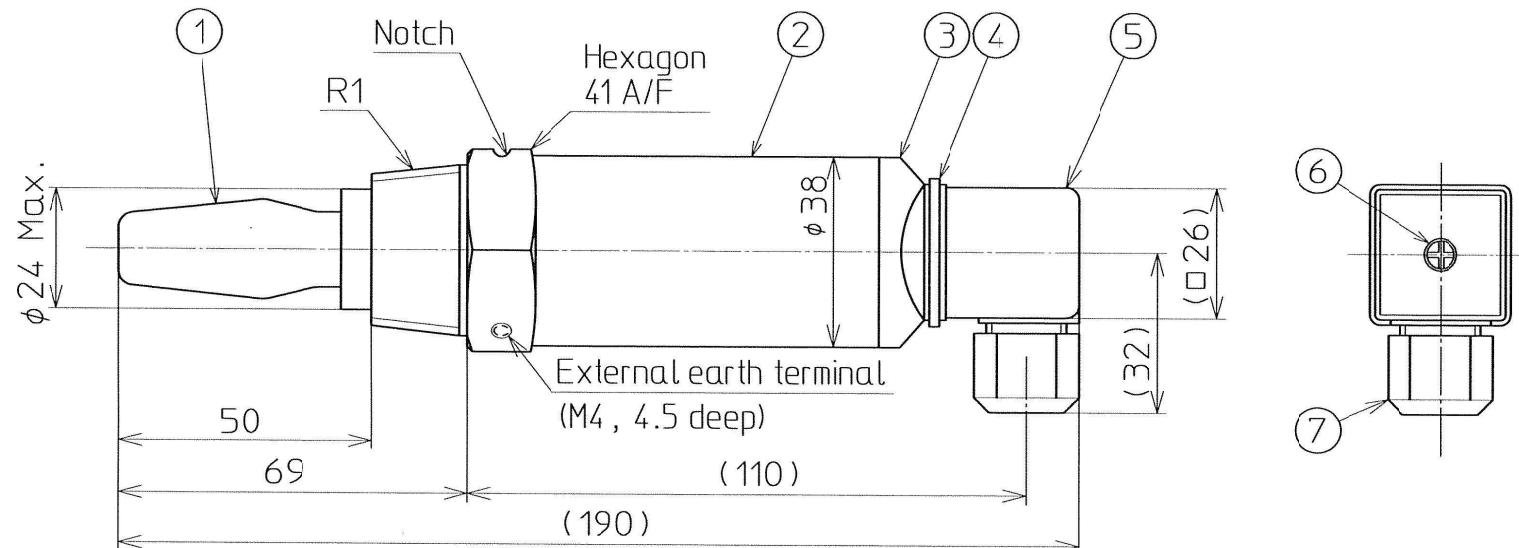


Fig.2: Environmental

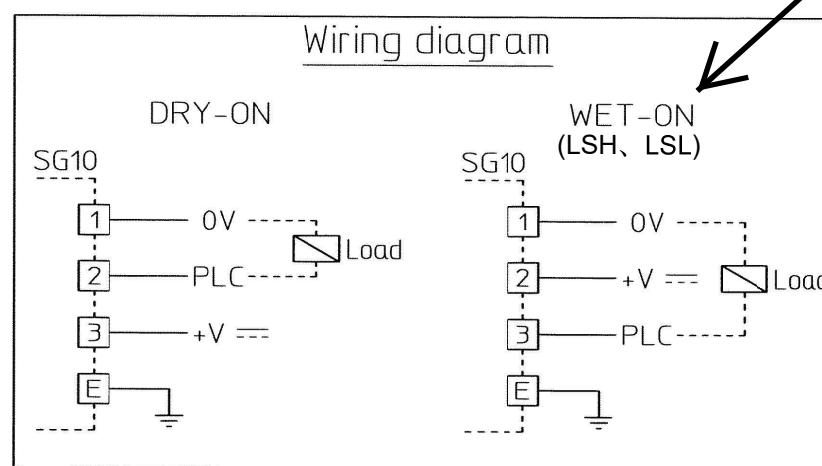
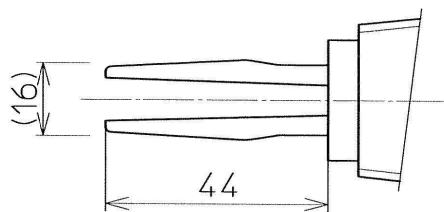
*1 To mount the sensor vertically on top of the tank or pipe.

W A R R A N T Y

NOHKEN INC. products are warranted for a period of one (1) year from date of original factory shipment, provided that handling, operation and maintenance of products shall be subjected to "INSTRUCTION MANUAL".



Tag No.	Qty.
LSH, LSL	2



Plug : molex , 121201 DIN Form A
Cable O.D. : 4mm to 9mm

P.No.	Name	Qty.	Material
7	Gland head	1	Polyamide glass reinforced
6	Fixing screw	1	Steel
5	Plug	1	Polyamide glass reinforced
4	Gasket	1	NBR
3	LED Window	1	Polyamide
2	Housing	1	304 Stainless steel
1	Fork	1	316 Stainless steel

P.No. Name Qty. Material

REV	DATE	DESCRIPTION	BY	APP.BY
REVISIONS				



NOHKEN INC.
OSAKA, JAPAN

DATE 2018-05-10 DR.BY 4.Ogawa
SCALE N.T.S. CH.BY D.Ishino
UNITS mm APP.BY T.Makino

TITLE OUTLINE DRAWING OF LIQUID FORK SENSOR
MODEL SG10-13 REFERENCE Mini-Squing
DRAWING NO. AS 104680

OIL MONITOR SPECIFICATION

オイルモニタ仕様書

Tag No. タグナンバー	OCA101	Model 型式	FOCAS-2000
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(MKK SUS316-Type)

Main item	Specifications		Drawing No.
Application	Bilge concentration monitor (bilge drainage)		
Measurement method	Optical continuous measurement		
Operation method	Automatic operation using sample water pressure		
Response time	Within 5sec , comply with MEPC107(49)		
Power supply /power consumption	AC90 ~ 240 V 50 ~ 60 Hz 20 VA or less		
Measurement range	30ppm in full scale		
Measurement accuracy	Within ±5ppm (at 15ppm)		
Conditions on sample water	pressure : 0.03 ~ 0.3MPa flow rate : 0.2 ~ 3 L/min water temperature : +2 ~ +50°C		
Clean water pressure for washing	0.03 ~ 0.6MPa		
Material measured and identified	light oil 10ppm in 100ppm iron oxide solution		
Battery for clock and lifetime	Lithium battery(CR2450) about 2 years (recommended manufacturer : Panasonic Corporation Automotive & Industrial Systems Company, Mitsubishi Electric Home Appliance Co., Ltd.)		
Service temperature·humidity	0 ~ 50°C 5 ~ 90%RH no dew condensation		
Maximum measurement angle of inclination	Within 22.5° in each direction		
Indications and Outputs	Indication of oil concentration : displayed in 24 digits 2 lines. alpha-numeral Character LCD、oil alarm lamp : red LED blinks Alarm1、Alarm2、VALVE Each contact output、REC Analog output		
Terminal specification /oil alarm operating point	VALVE (for three-way valve)	1 circuit for contact output, 1 B contact (Max AC250V 2 A) Supply voltage output	
	Alarm1 alarm (5~15ppm variable)	1 circuit for contact output, C contact (Max AC250V 2 A) delay time 0~5 seconds	
	Alarm2 alarm (5~15ppm variable)	1 circuit for contact output, C contact (Max AC250V 2 A) delay time 0~600 seconds	
	REC (Analog output)	DC4-20mA(0-24mA) line resistance less than 750Ω	
Operation recording function	Power turn-on and off, time of each alarm output/release (record memory 2Mbit) comply with MEPC107(49)		
Piping bore	For sample water inlet, clean water inlet and drain outlet : preferred O.D. of copper pipe is φ 8 or φ 10 with ring joint.		
Cable gland	4 pcs(φ 10.5 ~ φ 14.5)		
Water-proof grade	IP = 54		
Coating color	7.5BG 7/2 (Since this color is manufacturer standard, it cannot be changed.)		
Outside dimension weight	W=251 mm × H=283.5 mm × D=122 mm Total weight:approx. 4.8 kg (excluding accessories) (body=approx. 3.0 kg. Sensor unit=approx. 0.6 kg. Solenoid valve unit = 1.2 kg)		

Document Number 弊社書類番号	S-LW-13721-11	Rev.

Our Order No.

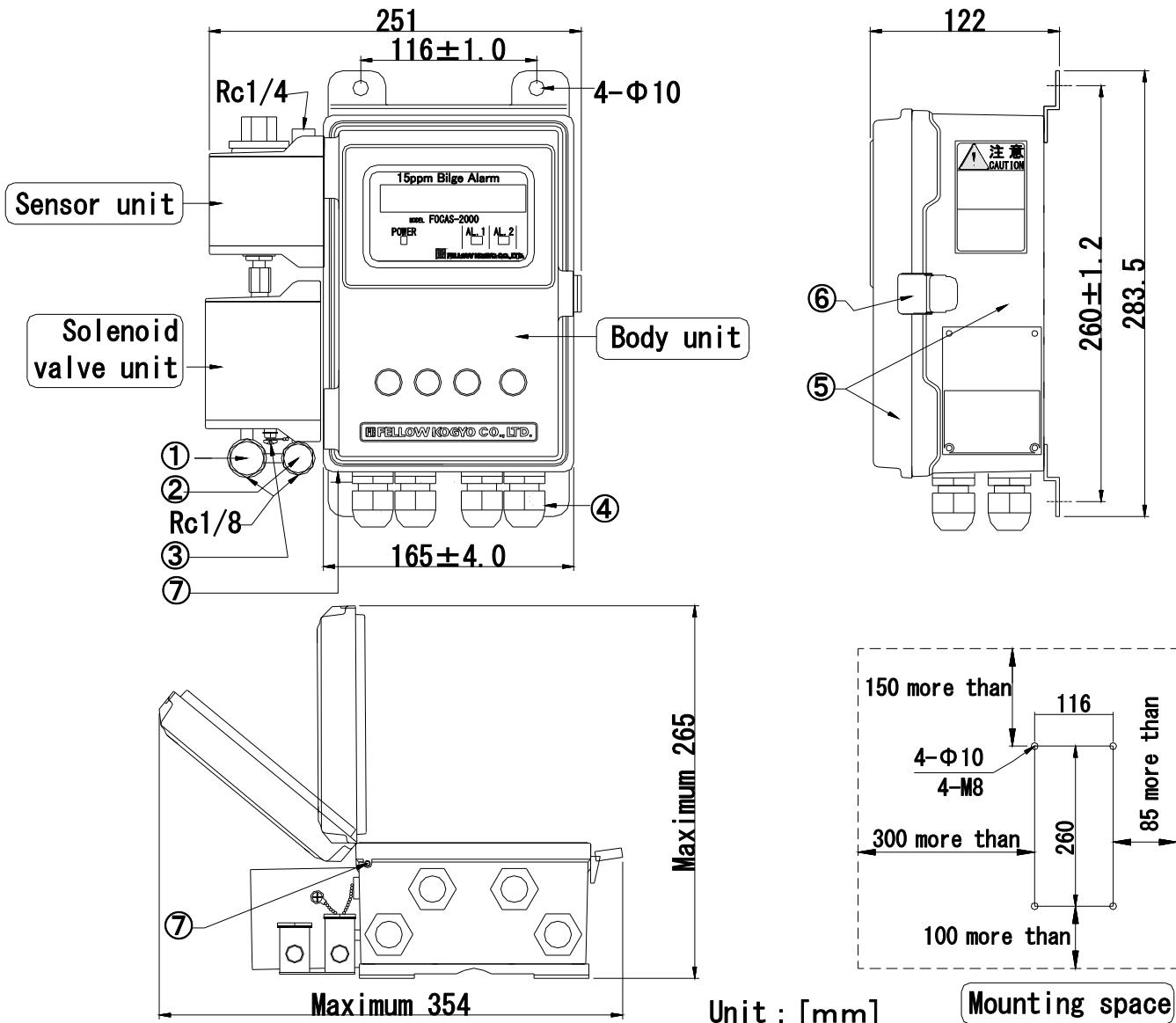
A3006715-1000

弊社工事番号

A3006716-1000

A3006717-1000

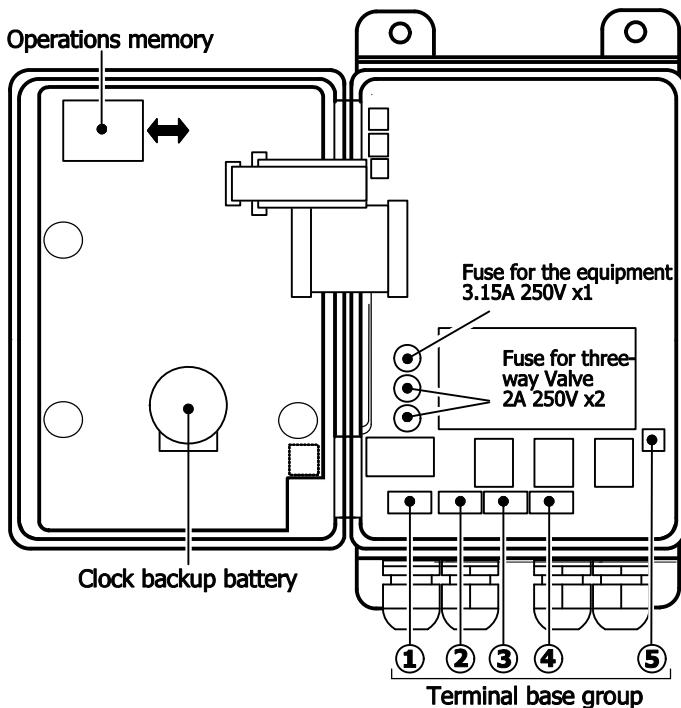
■ Outline dimensions -Material etc



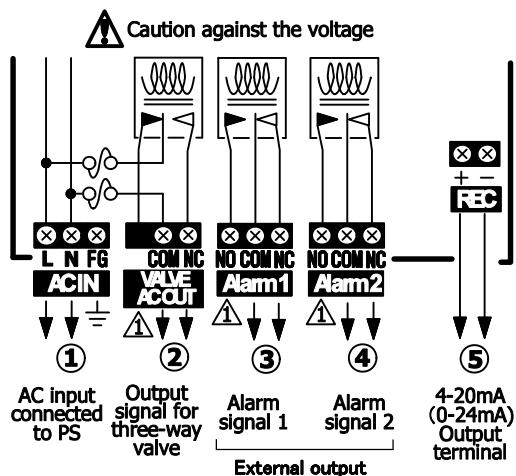
*A distance of at least 210 mm is required on the left.
This amount is required for replacing the sensor unit or solenoid valve unit.

No.	PART NAME	QTY	MATERIAL	REMARKS
①	Sample water filter	1	SUS316	
②	Clean water filter	1	SUS316	
③	drain	1	SUS316	
④	Wiring ports	4	Polyamide	Cable size $\phi 10.5 \sim \phi 14.5$
⑤	Case cover	1	ADC-12	
⑥	Snap latch	1		
⑦	Earth screw	1	SUS304	M4

■ Internal Arrangement Drawing and the Terminal Base Arrangement



Terminal block Alignment and FOCAS-2000 inner connection



*1 All terminal blocks are removable.

*2 Symbol figures of relay show standby conditions when primary power is supplied.

	Name	Rating	Remarks			
①	AC IN	AC90V~240Vrms, 50~60Hz	FG(=frame gland) grounds housing			
②	VALVE	B contact 250VAC, 2A max. Supply voltage output	Output signal for three-way valve		Alarm operating point of Valve and Alarm 1 is synchronized. Delay setting is available for Alarm 1 only.	
③	Alarm 1	C contact 250VAC, 2A max. Dry contact	Alarm signal 1 (external signal)			
④	Alarm 2	C contact 250VAC, 2A max. Dry contact	Alarm signal 2 (external signal)			
⑤	REC	4-20mA (0-24mA) current output	When 20mA is loaded, the line resistance is 750Ω or less			

■ List of contact output of relay, movement of alarm lamp etc

Terminal name・operation conditions etc			At outage	When applying current							unit error
				Primary source (no current)	Operation mode				Washing mode	Setup mode	
					Standby	Warm up	Under set density value	More than set density value	Over 30ppm Over scale	washing	Customized setup
VALVE	• between relay terminal	COM-NC	No output	No output		Supply voltage output	No output				
Alarm1	• between relay terminal	NO-COM	Close	Open	※1	Open	Close		※1	Close	
		COM-NC	Open	Close		Close	Open			Open	
• alarm lamp (AL1)			Light off	Light off	Blinking	Light off	Blinking				
Alarm2	• between relay terminal	NO-COM	Close	Open	※1	Open	Close		※1	Close	
		COM-NC	Open	Close		Close	Open			Open	
• alarm lamp (AL2)			Light off	Light off	Blinking	Light off	Blinking				
REC	factory default value	unit (mA)	0 (powerOFF)	0	4	Density value	Density value	20	4	0	0
	Value assignable by panel operation (step up by 1mA)		N/A	0 ~ 4	N/A	N/A	Density value or 20 ~ 24	20 ~ 24	0 ~ 4 or 20 ~ 24	0 or 20 ~ 24	0 or 20 ~ 24

*1 Reverse movement of contact output is possible by operating panel switch at setup mode, washing mode, warming up .

(However, factory shipments are the same outputs as standby.)

LIQUID LEVEL TRANSMITTER SPECIFICATION

液面計仕様書

液面計 仕様書 Specification Sheet for Liquid Level Indicator																D.W.G.NO.113204			
番号 Item No.	タンク 名称 Tank Name	設 置 方 式 Install. Type	寸 法 Dimensions (mm)							フランジ サ イズ (材 料) Flange Size (Mat'l)	温 度 Temp. Max. (°C)	液 比 重 Specific Gravity	計 测 范 围 Measur- ing Range (mmH ₂ O)	Output 4~20mA	二次計 2nd. Indicator	警 告 及 び 制 御 Alarm & Control (mm)		図 面 番 号 Ref. Dwg. No.	備 考 Remarks
			H	A	B	C	D	G	E							LAH (*) ASP (*)	LAL (*) AST (*)		
1	EGR DRAIN WATER TANK	Flange Mount	2950	-	-	100	-	-	-	JIS5K40A SUS316	50	1.0	4mH ₂ O用 2850	●	1	2850 (B) 310 (A) 200 (A) 410 (A)	P-31006-01 5 m	Cable Length	
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			

Remarks :

1. Measuring Range = (H-C) × Specific Gravity/計測範囲 = (H-C) × 比重
2. Item1: Provide Junction box. /ジャンクションボックス1台支給。
3. Sensor O-ring is a material equivalent of FKM /センサーOーリング材質はFKM
4. Provide BarGraph Meter(output 4 conduct, 4~20mA output)/バーグラフメーター支給(4接点及び4~20mAを出力します。)
5. The base Level is liquid level 0/液面高さの基準は0mmを基準とします。
6. LAH=SP1,AST=SP2,ASP=SP3,LAL=SP4

上記()には、貴社御要求が

A接点の場合は (A)

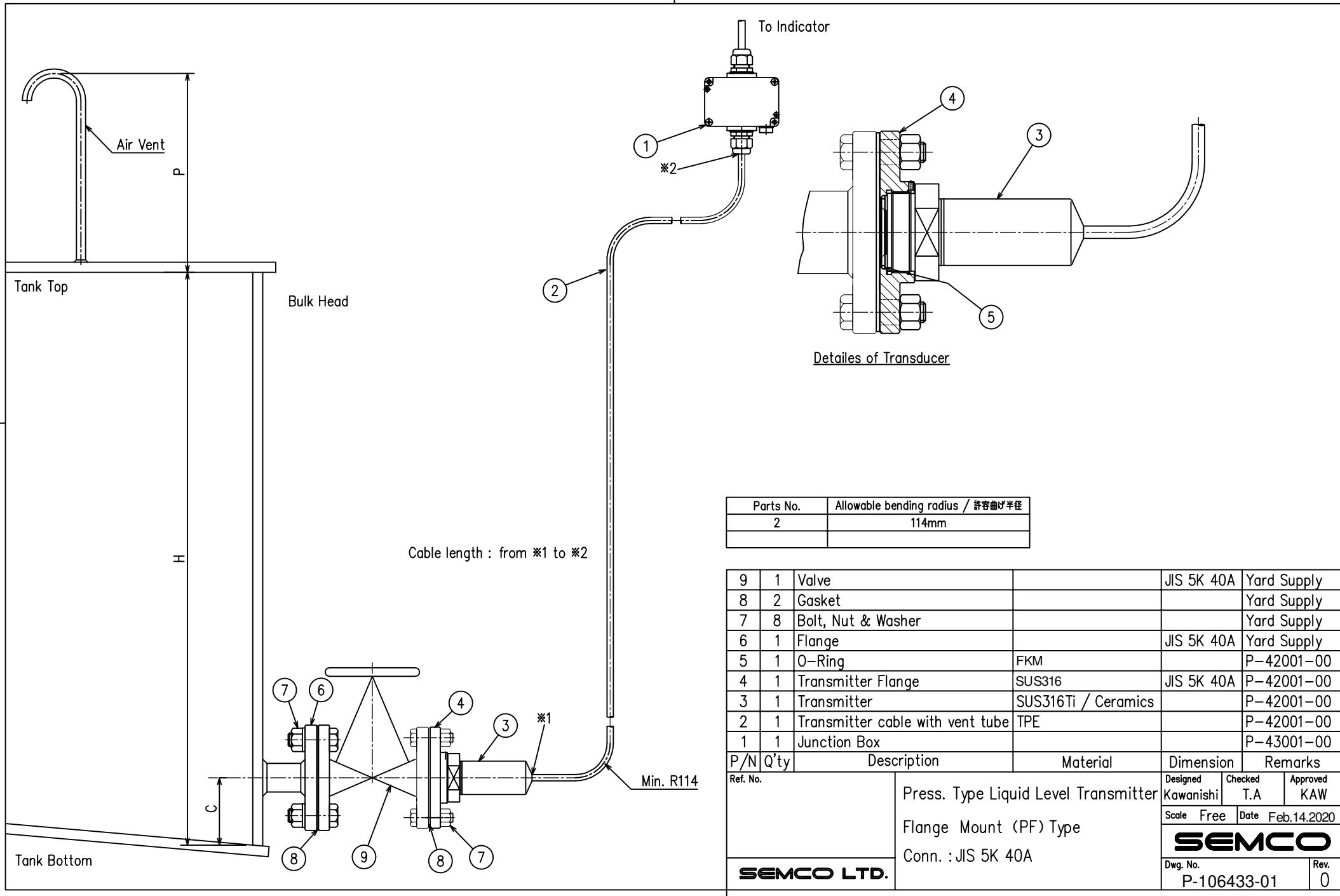
B接点の場合は (B) を記入してください。

*To be filled "A" or "B" Contact.

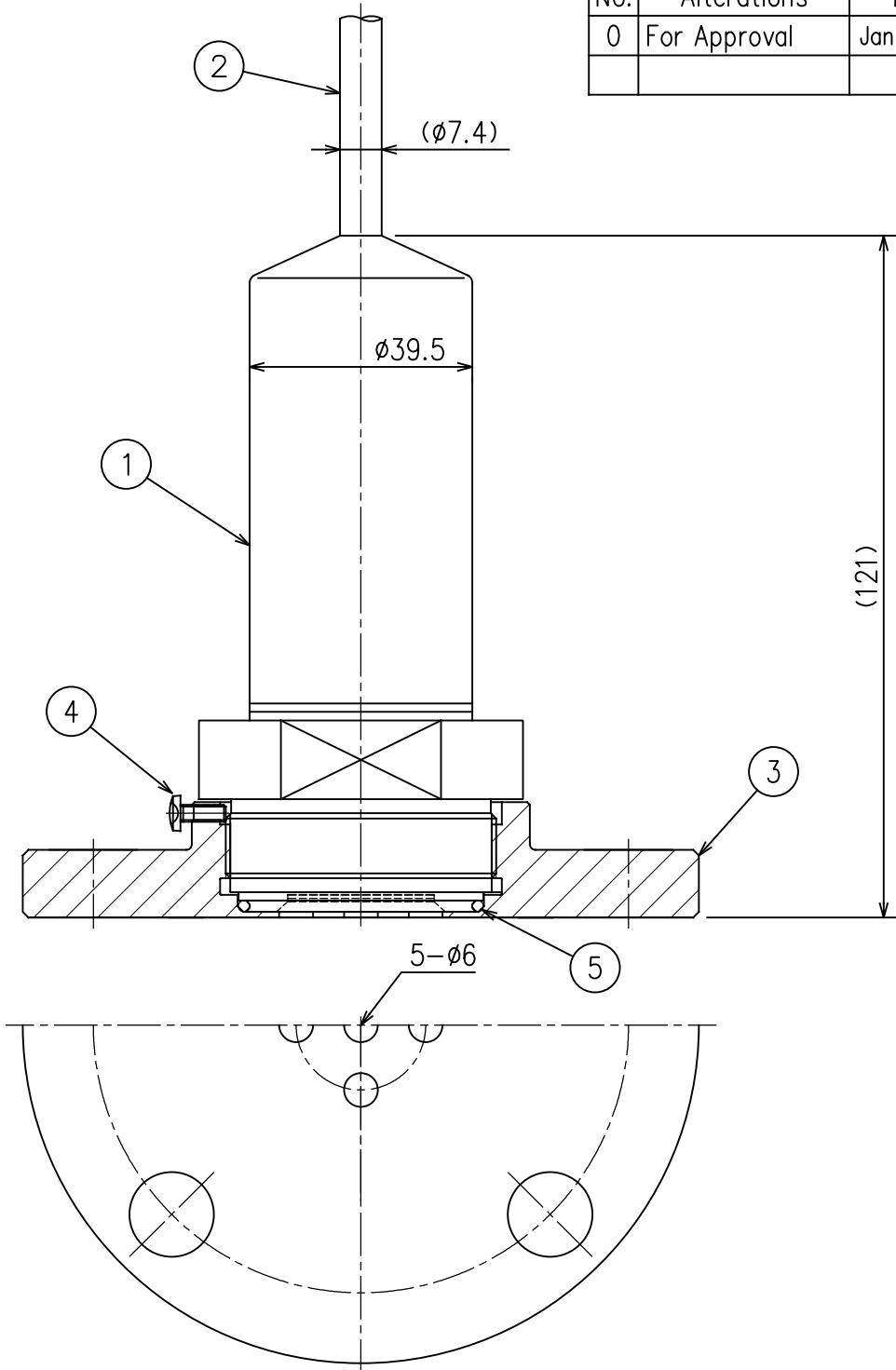
Fig.6000のフロートワイヤーは必要長さに約500mm長く設定しています。

Float wire is set about 500mm longer than required length.

Document Number 弊社書類番号	S-LW-13721-23	Rev. A
Our Order No. 弊社工事番号	A3006715-1000 A3006716-1000 A3006717-1000	

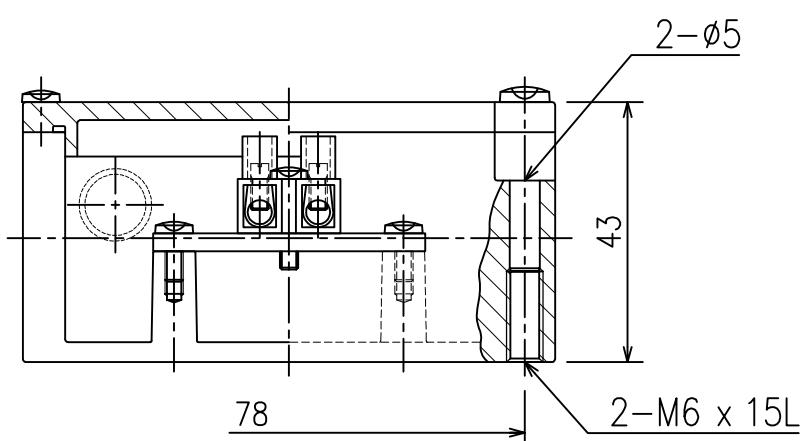
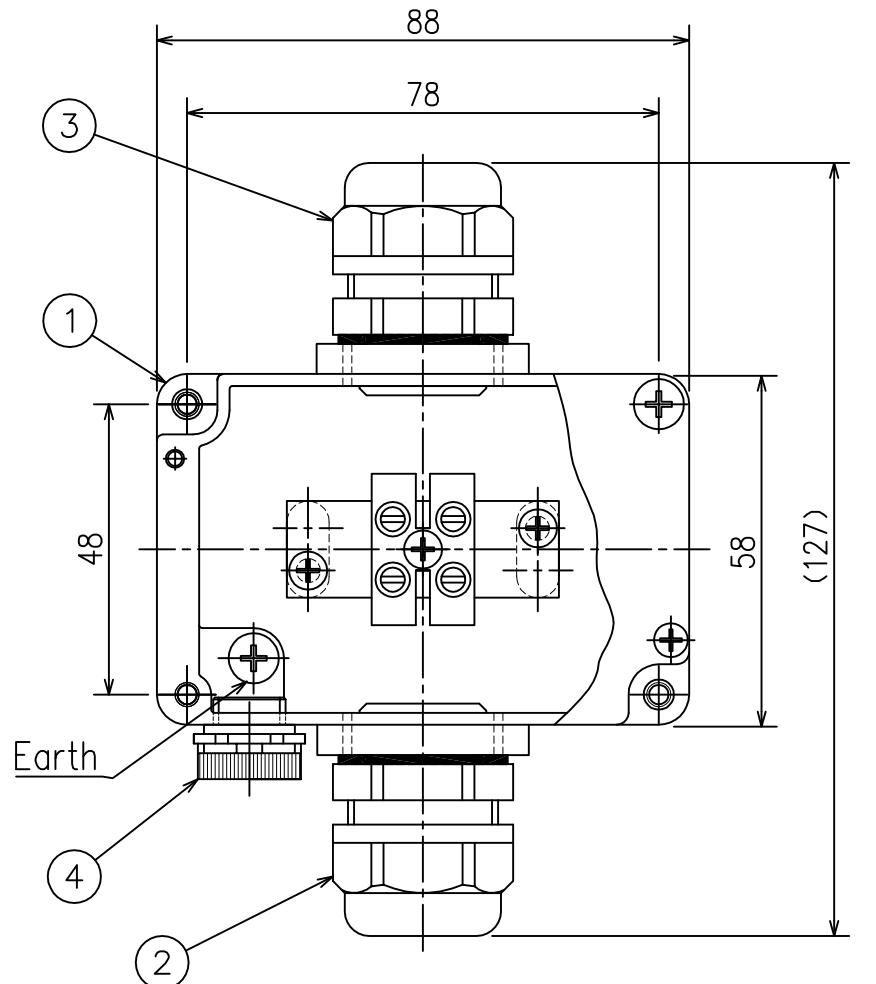


No.	Alterations	Date	Signe
0	For Approval	Jan.12.2009	KAW



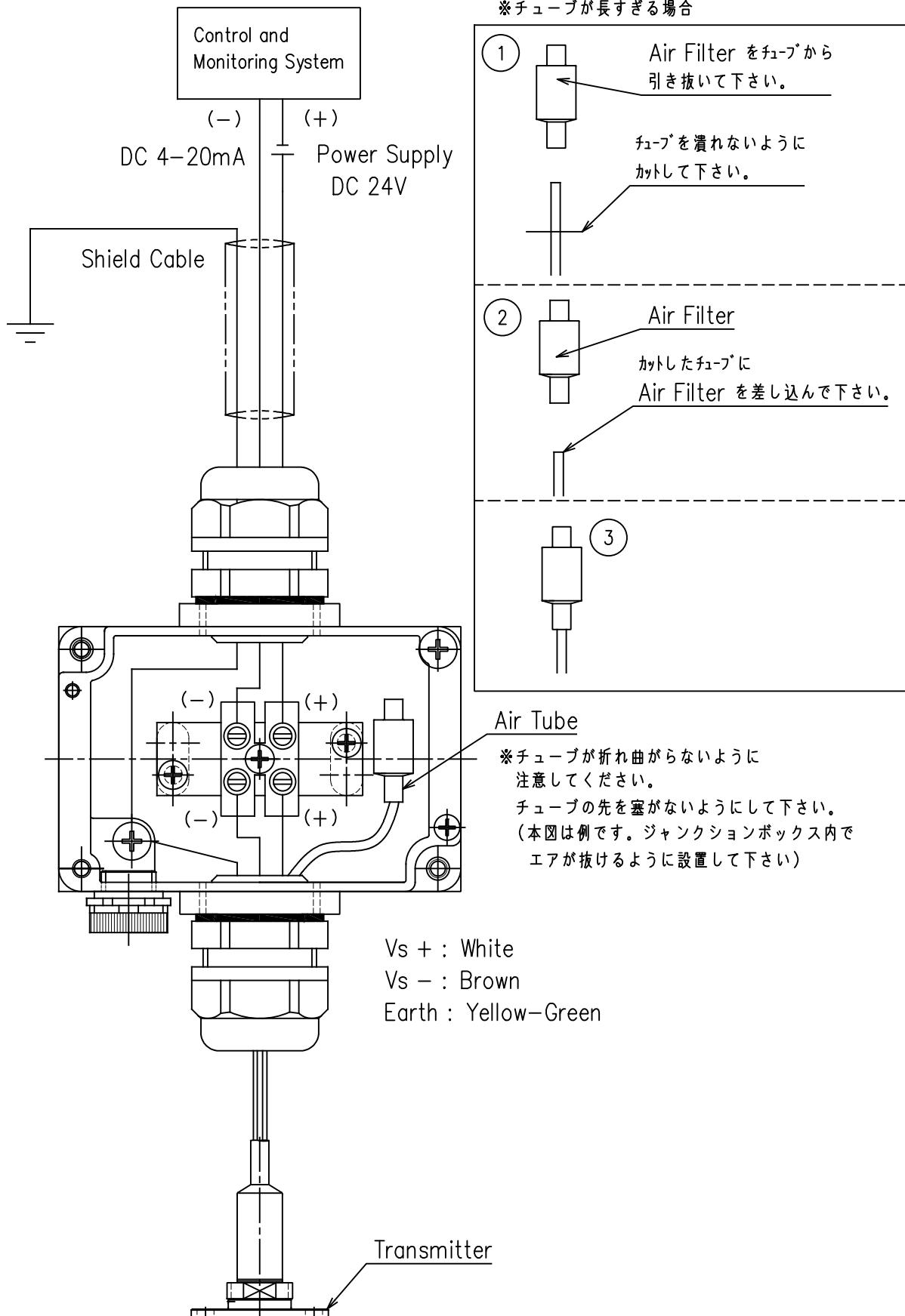
5	O-Ring	(Refer to Spec.Sheet)	1	SG40 (Ø39.5 x Ø2)
4	Screw	SUS316	1	M3
3	Flange Ass'y	SUS316	1	JIS 5K 40A
2	Cable	TPE	1	
1	Transmitter	SUS316Ti / セラミック	1	
No.	Name of Parts	Material	Q'ty	Remarks

Ref. No.	Press. Type Liquid Level Transmitter Flange Mount (PF) Type Conn.: JIS 5K 40A	Designed	Checked	Approved
		Kawanishi	T.A	KAW
		Scale	None	Date Jan.12.2009
		SEMCO		
		Dwg No.		Rev.
		P-42001-00		0

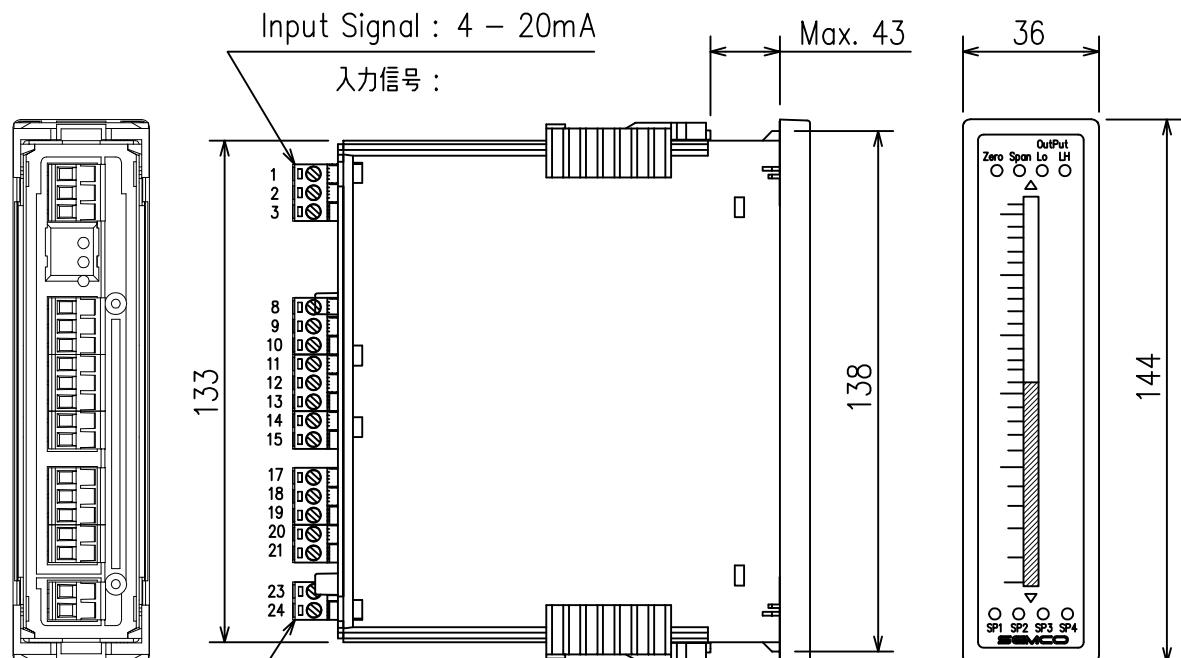


No.	Name of Parts	Material	Q'ty	Remarks
4	Press. Compensate Plug	Polyamide	1	
3	Cable Gland	Nylon 66	1	Cable Size: Ø9–Ø14
2	Cable Gland	Nylon 66	1	Cable Size: Ø6–Ø11
1	Junction Box	ADC	1	

Ref. No.	Press. Type Liquid Level Transmitter Junction Box	Designed T.A.	Checked T.K.	Approved KAW
		Scale None	Date MAR.26..2009	
SEMCO				
Dwg No.		Rev.		
	P-43001-00		0	

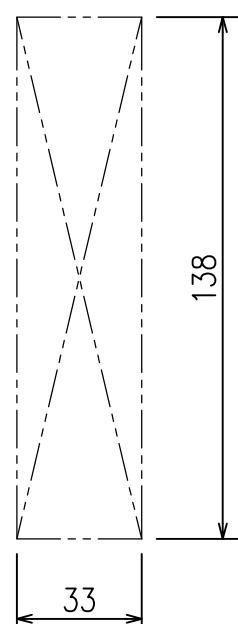


Ref. No.	Press. Type Liquid Level Transmitter Junction Box Circuit	Designed T. A	Checked T.K	Approved KAW
		Scale None	Date Mar. 26. 2009	
SEMCO				
Dwg No. SEMCO LTD.	P-44001-00	Rev. B		

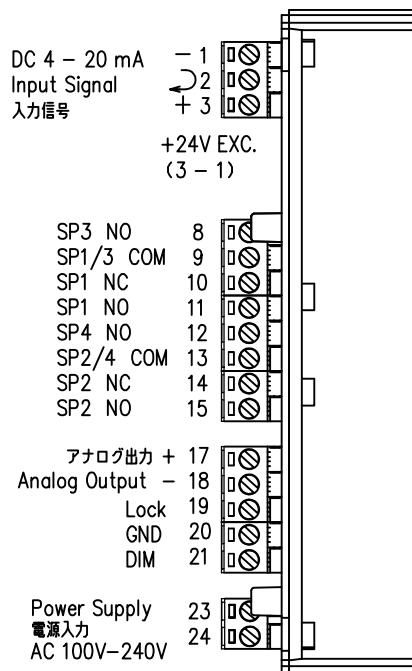


電源入力
Power Supply
AC 100-240V

DIN Socket
DIN ソケット



パネル カット
Panel Cut



Terminal Arrangement
端子配置

Ref. No. レバード シリーズ
D-83803

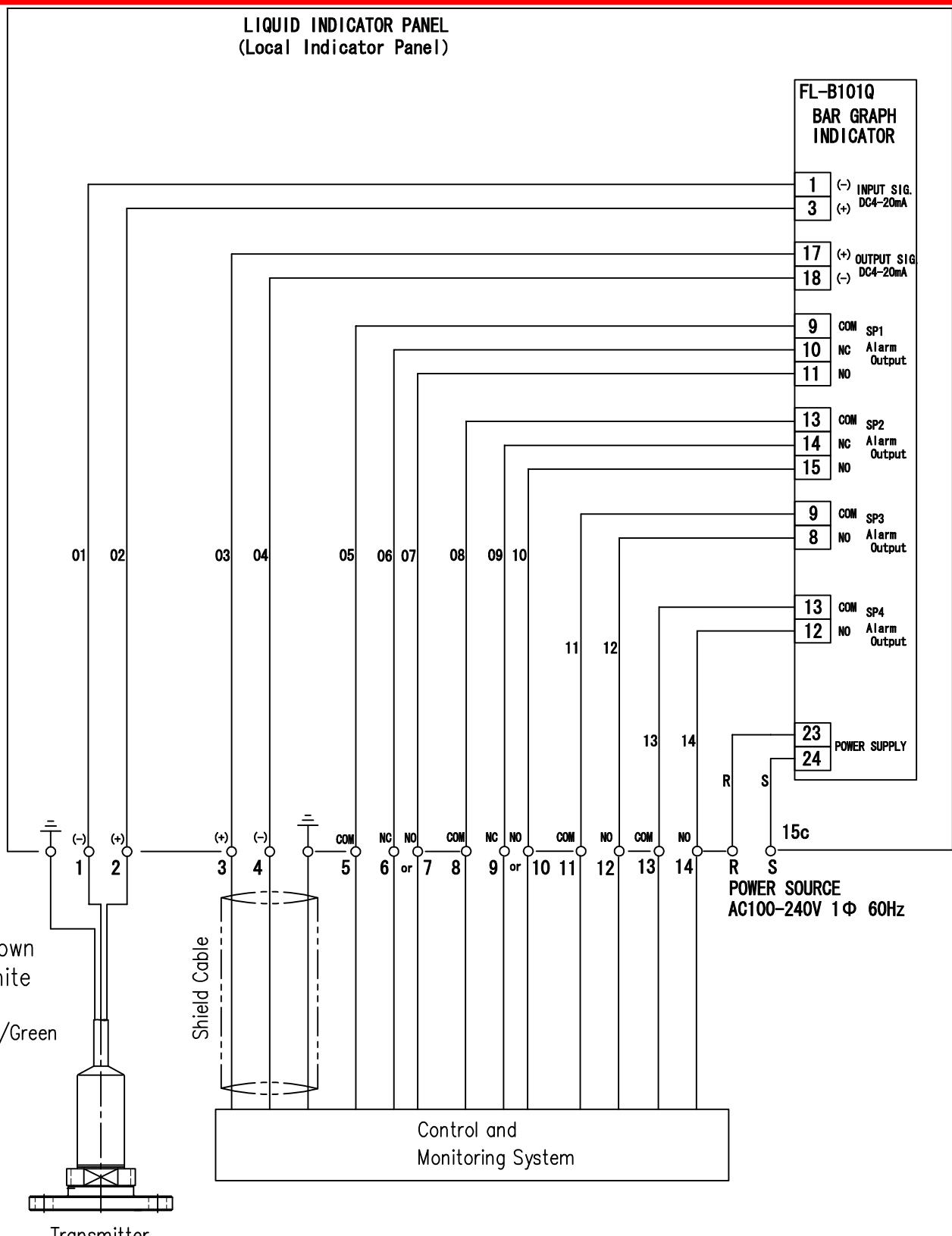
TK-42003-00 Rev.A
Rev.A Mar.03.2009
AC100V-240V was AC110V/220V

SEMCO LTD.

二次計（現場指示計）/バーグラフ型
SECONDARY INDICATOR
(Bar Graph Type)
Model / 型式 : TFL-B101Q

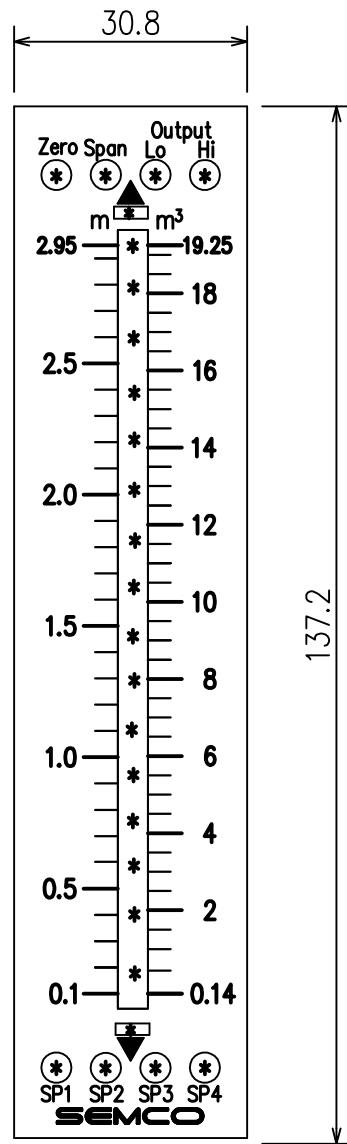
Designed Kawanishi	Checked T.A	Approved KAW
Scale None	Date Apr.08.2009	
SEMCO		
Dwg No. S-46003-00		Rev. 0

SP1, SP2 can select NO or NC, but SP3, SP4 are only NO.
(The base Level is liquid level 0.)



Ref. No.	Press. Type Liquid Level Transmitter Panel Circuit Model : FL-B101Q	Designed	Checked	Approved
		Kawanishi	T.K	KAW
Scale	None	Date	Mar.07.2011	
SEMCO				
Dwg No.	P-44004-01	Rev.	0	
SEMCO LTD.				

EGR DRAIN WATER
① TANK



LUBRICATION OIL LIST

潤滑油リスト

MODEL 型式	EQUIPMENT 装 置		PARTS TO BE LUBRICATED 潤滑する部品		LUBRICANTS OIL 潤滑油	Q'TY/PART AND INTERVAL 数／区分		NOTES 注 記	
	ITEM NO. アイテム	Q'TY 台数	PART NAME 部品名称	PART Q'TY/ UNIT バーツ 数／ ユニット	SPEC OR BRAND 仕様又は銘柄	REPLACEMENT 交 換			
						Q'TY 油 量	INTERVAL 間 隔		
ONZ16- PN35E	Separator (分離機) SJ35HWT	1	Gear case ギアケース	1	Industrial Gear oil ISO VG 150 ギアオイル ISO VG 150	5.8(L)	300H or 6M	600H or 12M	2000H or 12M
			Motor Bearing (D-end & N-end) 電動機ベアリング	2	—	—	16,000 H	16,000 H	16,000 H
SU20L	EGR Treated Water Supply Pump EGR処理 給水ポンプ	1	Pump drive joint ポンプ駆動 ジョイント	2	KLUBERSYNTH GH6-460 or SUITABLE ALTERNATIVE クリューバーシンス GH6-460 または相当品	12ml (12ml/ Part)	4,000 H	4,000 H	4,000 H
			Level oiler レベルオイラ	1	KLUBERSYNTH GH6-460 or SUITABLE ALTERNATIVE クリューバーシンス GH6-460 または相当品	105 (ml)	Add it when the liquid Level is less than half. レベル半分以下の場合は 追加すること		Please refer to recommended barands list. "Refer to operation manual"
			Geared driver ギヤードドライバ	1	Industrial Gear oil ISO VG 220 ギアオイル ISO VG220	0.38(L)	10,000H or 24M	10,000H or 24M	10,000H or 24M

Document Number	S-LW-13721-15	Rev.
弊社書類番号		

Our Order No.	A3006715-1000
弊社工事番号	A3006716-1000
	A3006717-1000

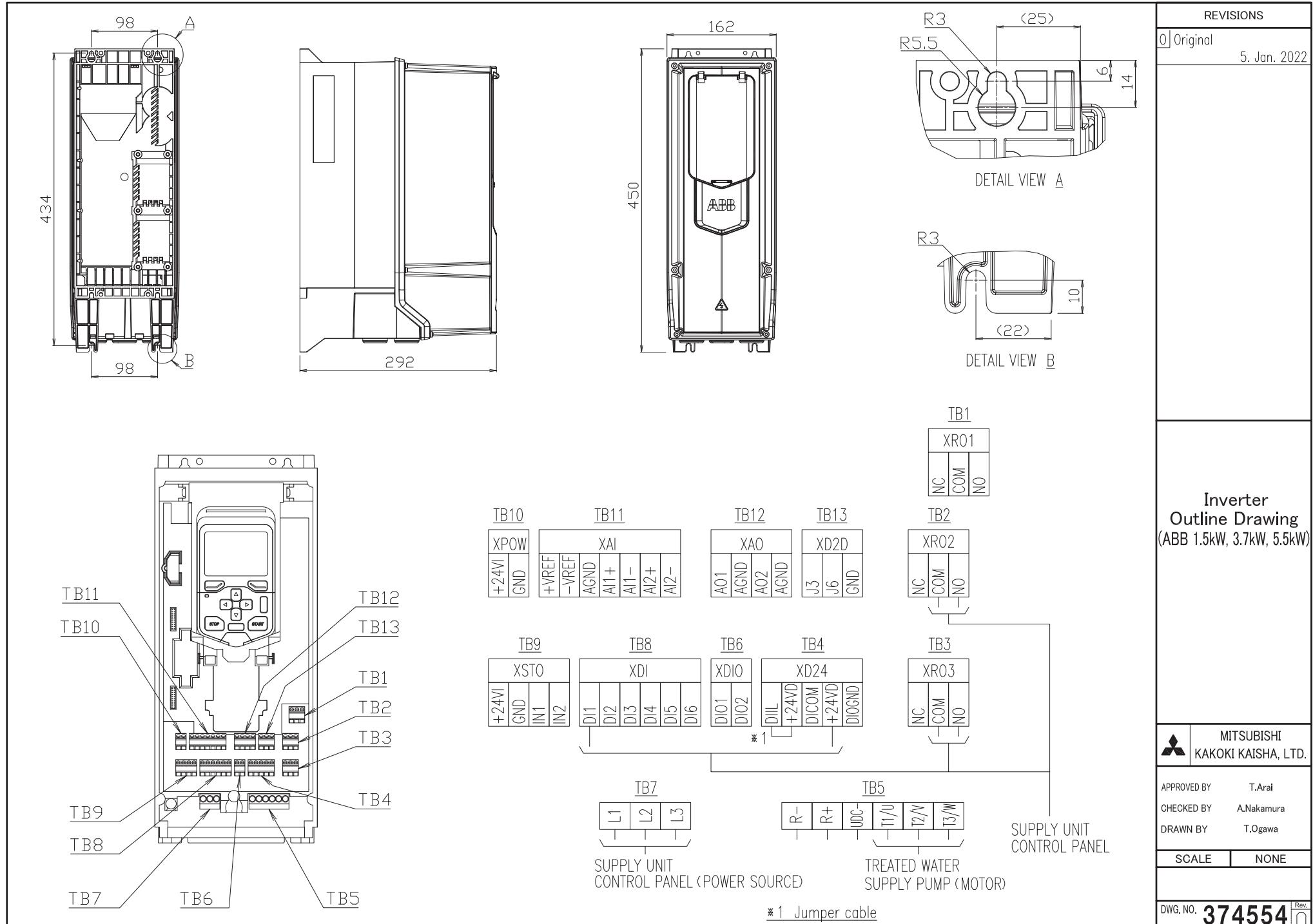
INVERTER SPECIFICATION

インバータ仕様書

Model 型式	ASC880-01-03A4-5
Power source 電源	400V Class
Rated 定格	1.5 kW
Class of ship 船級	NK
Ambient. Temp. 周囲の環境 温度	50 °C
Size 寸法	W:162 mm × D:292 mm × H:450 mm
Unit weight 重量	7 kg
Degree of protection 保護等級	IP55

Document Number 弊社書類番号	S-LW-13721-21	Rev. A
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Our Order No. A3006715-1000
 弊社工事番号 A3006716-1000
 A3006717-1000



A.C. STARTER

交流始動器仕様書

CUSTOMER MESSRS

顧客

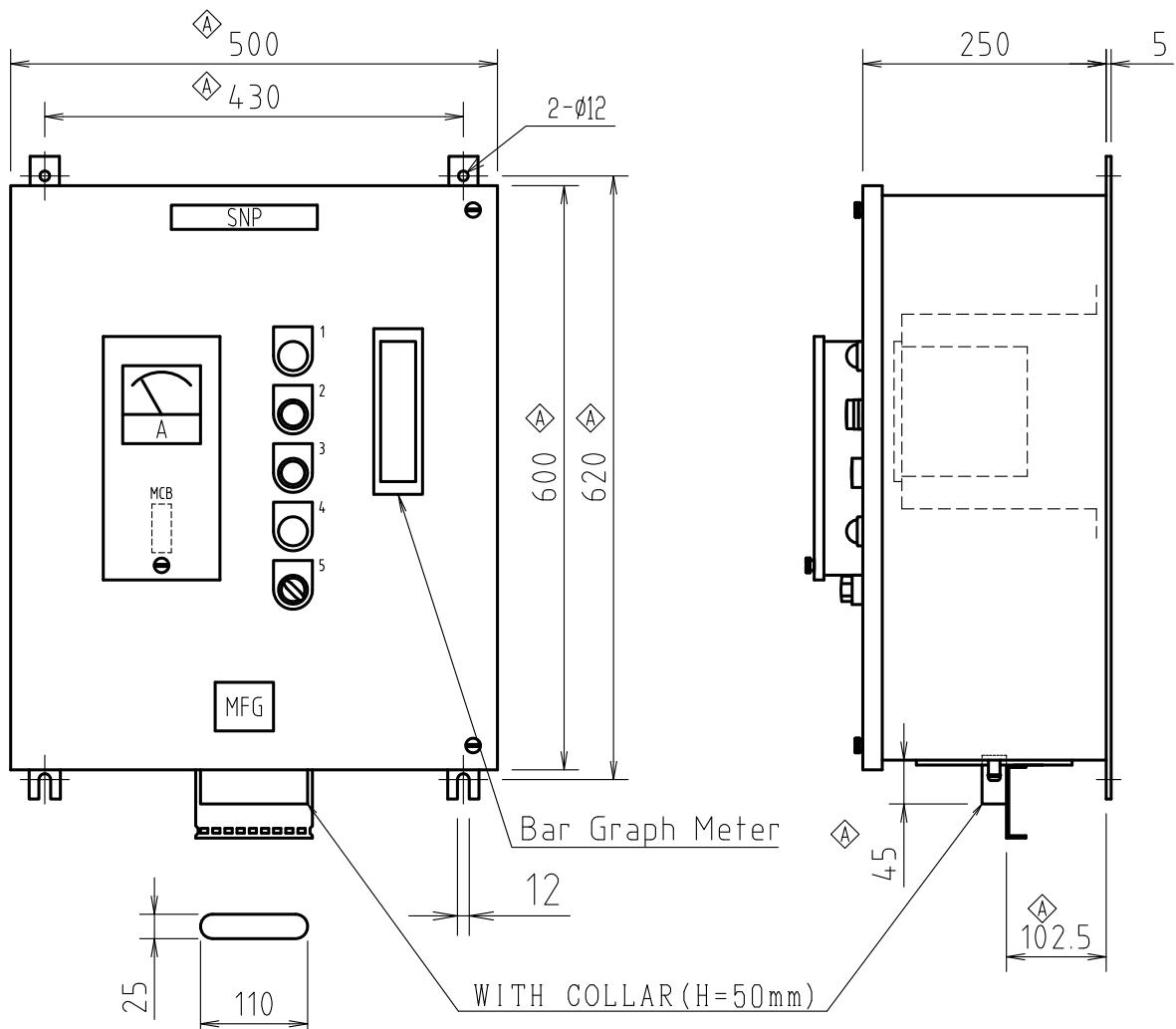
NAMURA SHIPBUILDING CO.,LTD.

Ship No.

船番

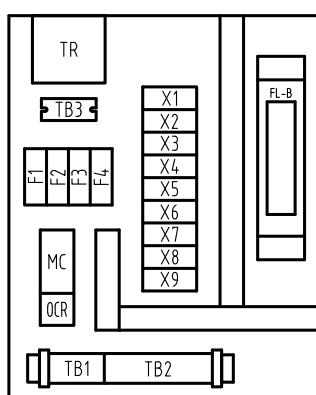
487/489/490

Model 型式	Service 用途	Supply 供給数	Weight 重量
CRN3-5	WTS PUMP STARTER PANEL	1 set/s	27 kg
ONZ16-PN35E	WTS STARTER PANEL	1 set/s	17 kg
SCREW	ISO	ITEMS 項目	
		Name plate 銘板	Letter 記入文字
		For use 用途銘板	English 英文
Marine Machinery Design Dept. MITSUBISHI KAKOKI KAISHA, LTD.	Color of panel 盤塗装色	Munsell No. マッセル No.	7.5BG7/2
三菱化工機株式会社 舶用機械技術部	Class of ship 船級	NK	
	Power source 電源	AC 440 V, 60 Hz	
Approval : 承認	T.Arai	Control voltage 操作電圧	AC 100 V
Checked : 確認	A.Nakamura	Degree of protection 保護等級	IP44
Made : 作成	T.Ogawa	Document Number 弊社書類番号	S-LW-13721-20 Rev.
Scale : 尺度	NONE	Our Order No. 弊社工事番号	A3006715-1000 A3006716-1000 A3006717-1000

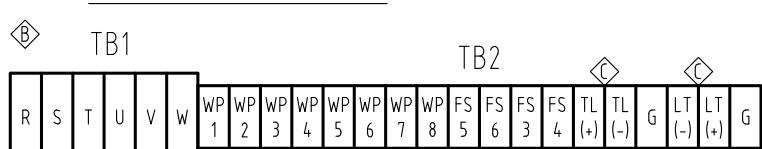


IP GRADE:IP44

	NAME PLATE	
1	SOURCE	WL1
2	RUNNING	PBL1 /GL
3	STOP	PB1
4	STANDBY	OL
5	REMOTE LOCAL	COS
SNP	(SERVICE N.P.)	
NP	(MANUFACTURE N.P.)	—



INTERNAL ASSEMBLY



TERMINAL BLOCK

C	2021.12.3	Correction of Terminal block.
B	2020.3.23	Correction of Terminal block.

A	2019.11.28	Changed outside dimension.
□	2019.4.26	ORIGINAL

REVISIONS

DRAWN BY

N. Abe

CHKD. BY

A.Nakamura

APPR. BY

T.Arai

TITLE

WTS PUMP
STARTER PANEL
OUTLINE VIEW



MITSUBISHI KAKOKI KAISHA, LTD.

SCALE

—

DWG NO.

470243

REV.

C

Form J-014

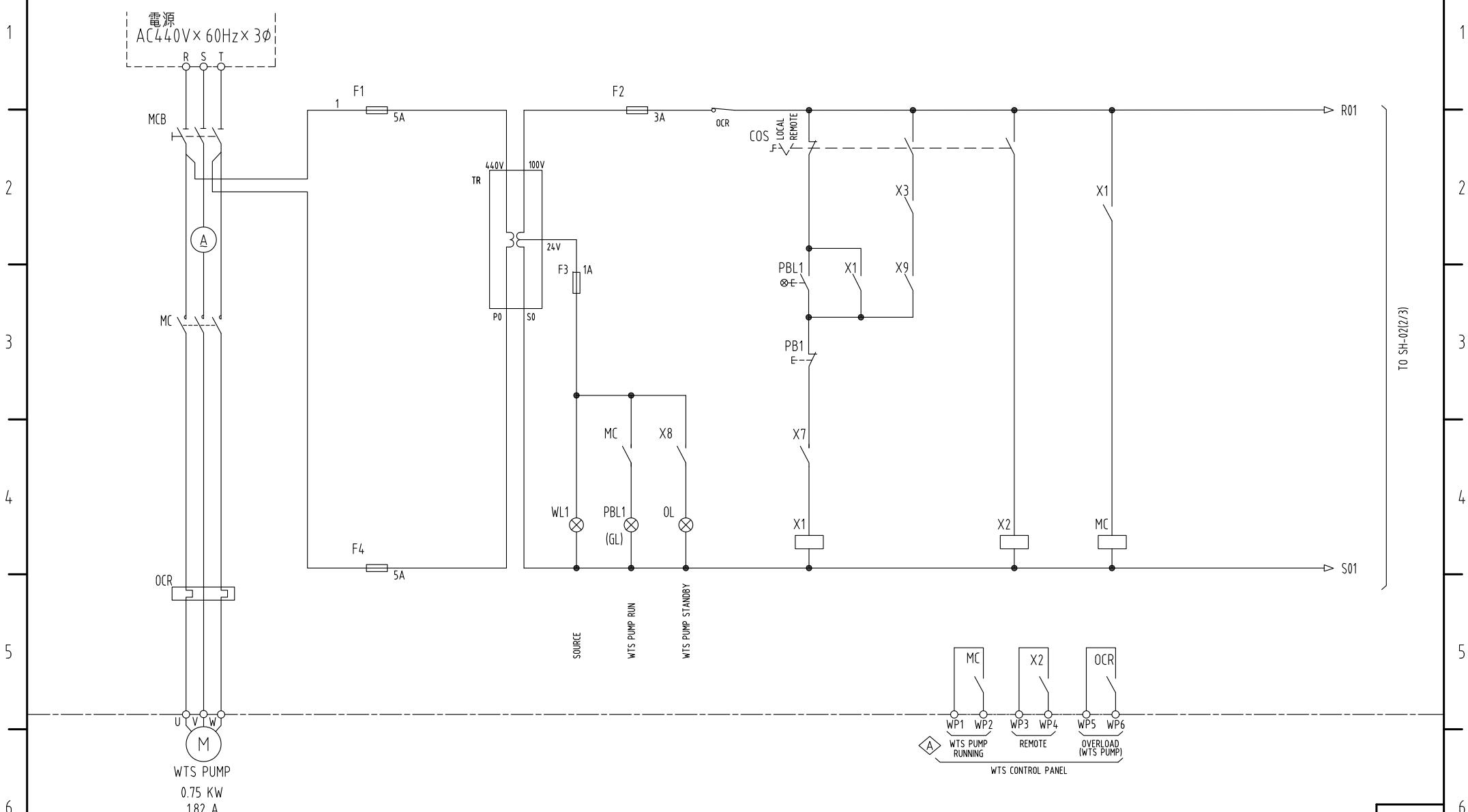
A B C D E F G H

TITLE WTS ONZSERIES (MKK2) WTS PUMP STARTER PARTS LIST
部品表

	NAME OF PART 名 称	MFR'S NAME 製 造 所	SPECIFICATION 仕 様	DEVICE No. 器具番号	
1	MOLDED CASE CIRCUIT BREAKER 配線用遮断機	MITSUBISHI ELECTRIC CORPORATION 三菱電機	Type : NF30-CS 3P 5A	MCB	
	AMMETER 電流計		Type : YS-8NAA 0~5~15A B, R.	A	
2	ELECTROMAGNETIC SWITCH 電磁開閉器	FUJI ELECTRIC CO., LTD. 富士電機	Type : SW-03 1.4~2.2A COIL AC100V WITH SZ-A11	MC (OCR)	
	SIGNAL LAMP 表示灯		Type : DR22DOL-E4W	WHITE WL1	
	PUSH BUTTON SWITCH WITH LAMP 照光式押ボタンスイッチ		Type : DR22DOL-E4A	ORANGE OL	
	PUSH BUTTON SWITCH 押釦スイッチ		Type : AR22G4L-10E4G	GREEN PBL1/GL	
	CHANGE OVER SWITCH 切換スイッチ		Type : AR22FOR-01R	RED PB1	
	FUSE ヒューズ		Type : AR22PR-2S2B	BLACK COS	
	AUXILIARY RELAY 補助リレー		5A Type : FCF2	5A F1, F4	
				3A F2	
				1A F3	
3	FUSE SOCKET ヒューズソケット	KIMURA ELECTRIC CO., LTD. キムラ電機	Type : HH54P AC100V SOCKET TP514X1	X1, X2, X3 X4, X5, X6 X7, X8, X9	
	TERMINAL BLOCK 端子台		Type : F-30NS		
			Type : TS804 6P 40A	TB1	
			Type : TS802 14P 20A	TB2	
			Type : TS615 6P 15A	TB3	
4	BAR GRAPH INDICATOR バーグラフメータ	TEXMATE, INC. TEXMATE, INC.	Type : FL-B101Q	FL-B	
	TRANSFORMER 変圧器	YAMANAKA DENKO CO., LTD. ヤマナカ電工	Type : 440V / 100V, 24V 1φ 40VA	TR	

C					CLIENT	DATE Nov. 8, '19	DWG. No.	REV.
B					UNIT No.	MADE N. Abe	372694	
A					CHKD.	A. Nakamura	JOB No.	
No.	DATE	REVISIONS	MADE	CHKD.	APPR.	LOCATION	APPR.	T. Arai

A B C D E F G H

TITLE WTS ONZSERIES Ver.3 WTS PUMP STARTER
結線図1
3

C	B	A	CLIENT			DATE Nov.8.'19	DWG. No.	REV. A
			DATE	MADE	UNIT No.			
			2019.12.26	N.Abe	T.Takada T.Arai			
No.	DATE		REVISIONS	MADE	CHKD.	APPR.	LOCATION	
							JOBD. A.Nakamura	JOB No. -
							APPR. T.Arai	

A

B

C

D

E

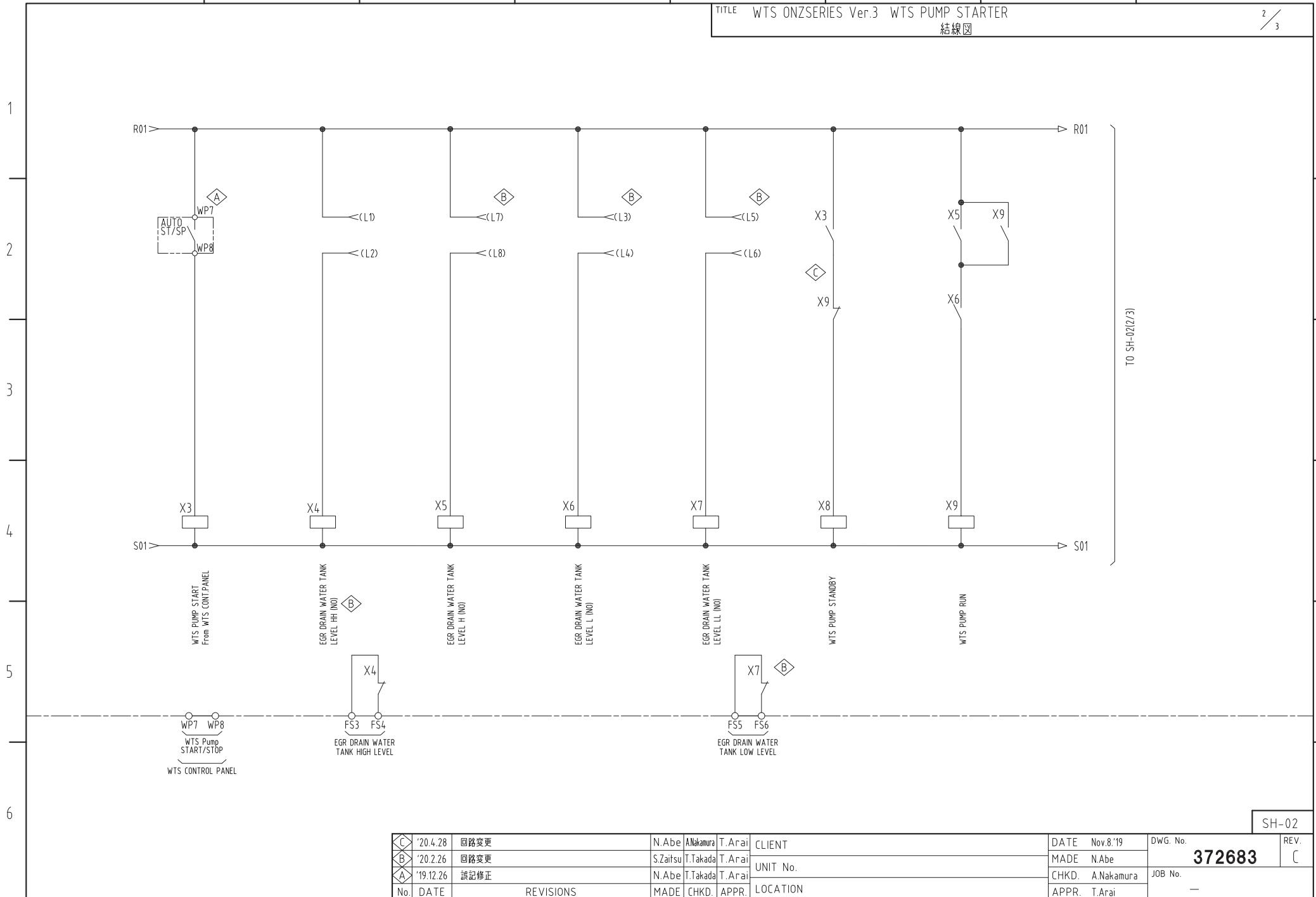
F

G

H

TITLE WTS ONZSERIES Ver.3 WTS PUMP STARTER
結線図

2 / 3



A

B

C

D

E

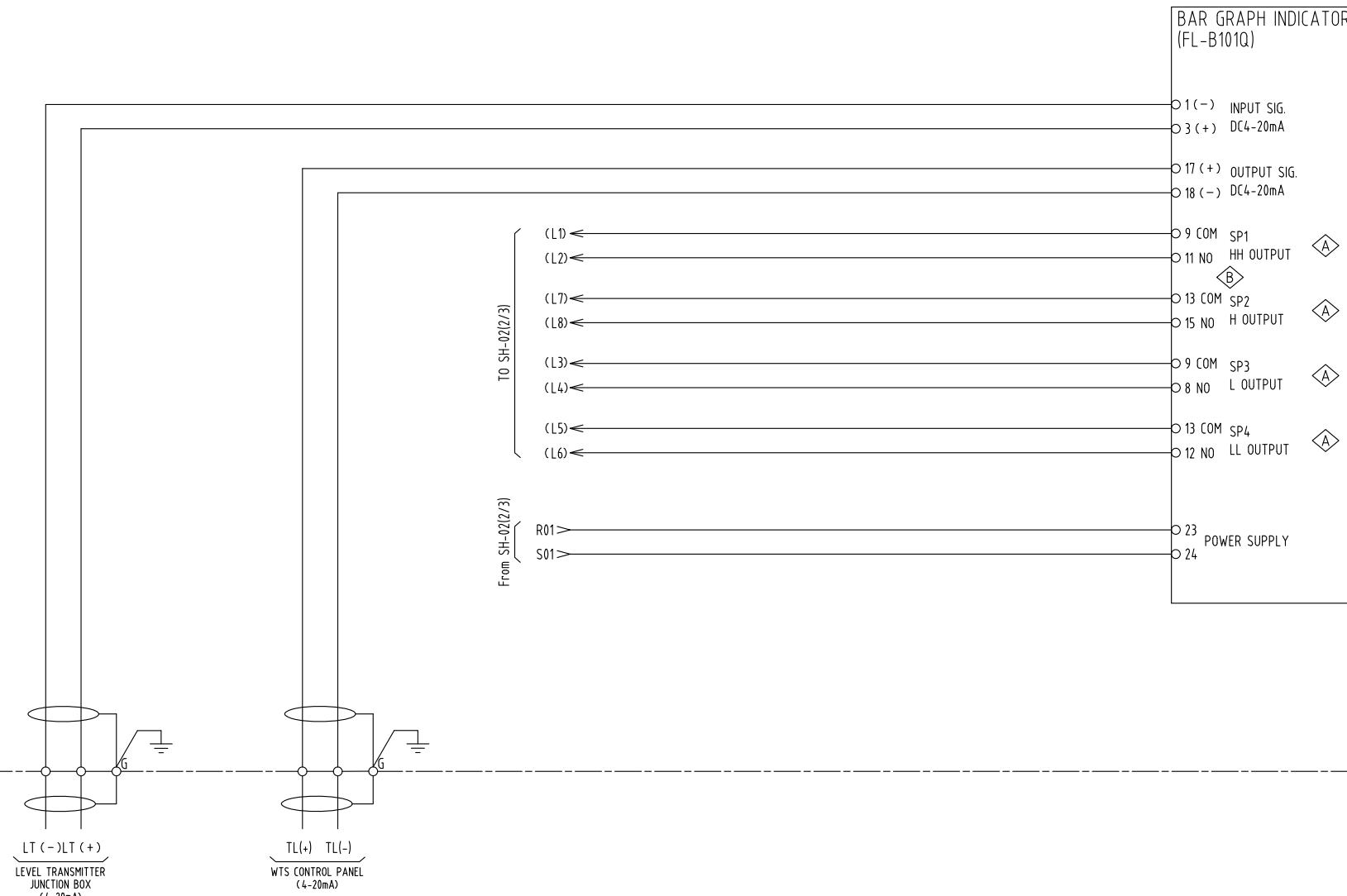
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G

H

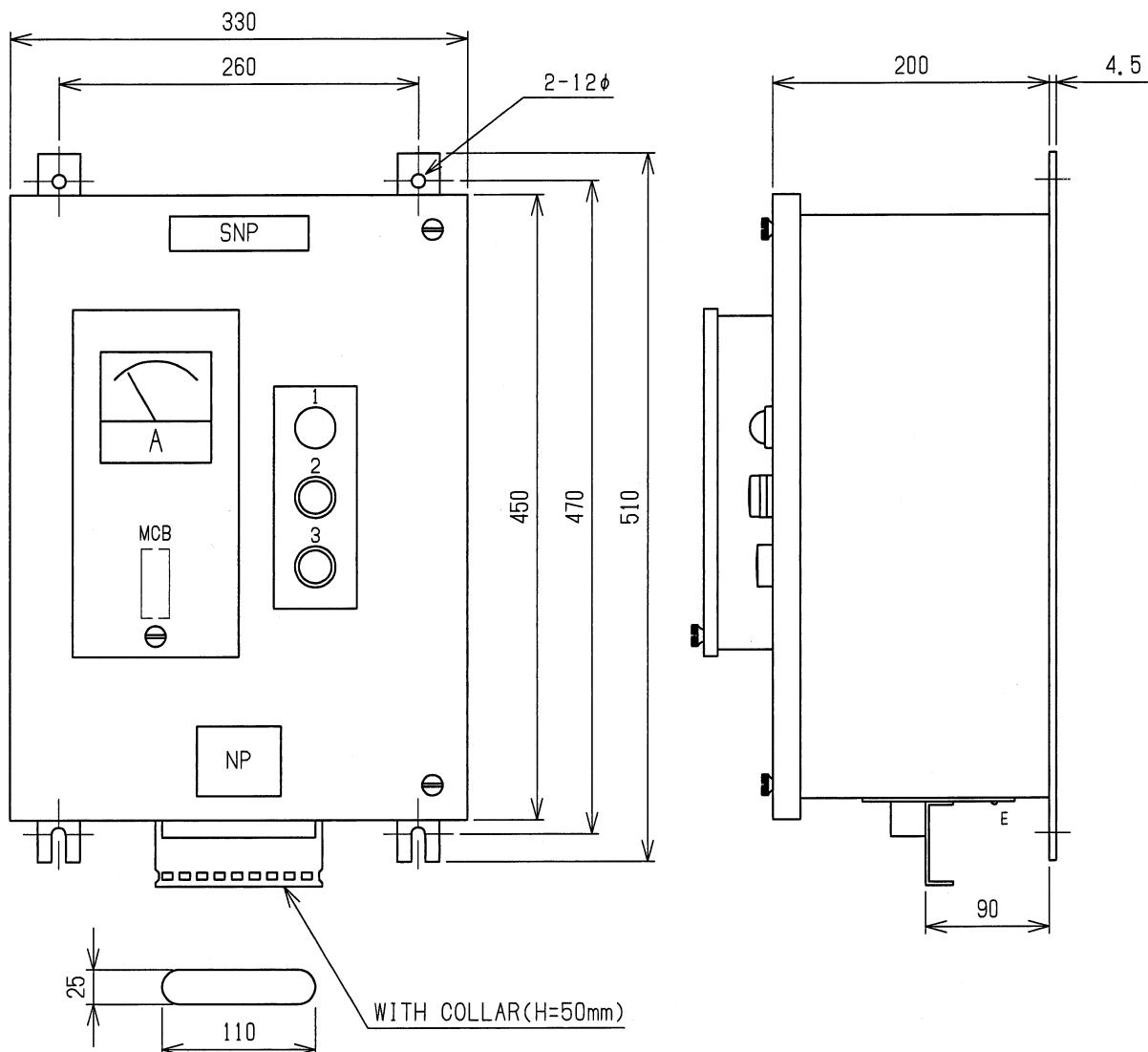
TITLE WTS ONZSERIES Ver.3 WTS PUMP STARTER
結線図

3 / 3



C				CLIENT	DATE Nov.8.'19	DWG. No.	REV.
B	'20.6.9	試記修正	N.Abe T.Takada T.Arai	MADE N.Abe			
A	'20.2.21	回路変更	S.Zaitsu T.Takada T.Arai	CHKD. A.Nakamura	JOB No.		
No.	DATE	REVISIONS	MADE	CHKD.	APPR.	LOCATION	APPRAISAL

REVISIONS					
NO.	DESCRIPTION	DATE	DRAWN	CHKD.	APPR.
(A)					
(B)					



NAMEPLATE			
1	電 源	SOURCE	WL
2	運 転	RUNNING	GL/ 3-88
3	停 止	STOP	3-5
SNP	(用途銘板)	(SERVICE N. P.)	—
NP	(社銘板)	(MANUFACTURE N. P.)	—

		DWG. NO.	REFERENCE DRAWINGS		TITLE	WTS STARTER PANEL OUTLINE		
			MITSUBISHI KAKOKI KAISHA, LTD. TOKYO, JAPAN			外 形 図		
		SCALE	DWN. BY	A.Nakamura	JOB NO.	DWG. NO.	470501	
DUPLICATE		NO. REQD.	CHKD. BY	T.Takada	DOC. NO.			REV.
ISSUED TO		DATE Oct.-17- '19	APPR. BY	T.Arai				

PARTS LIST

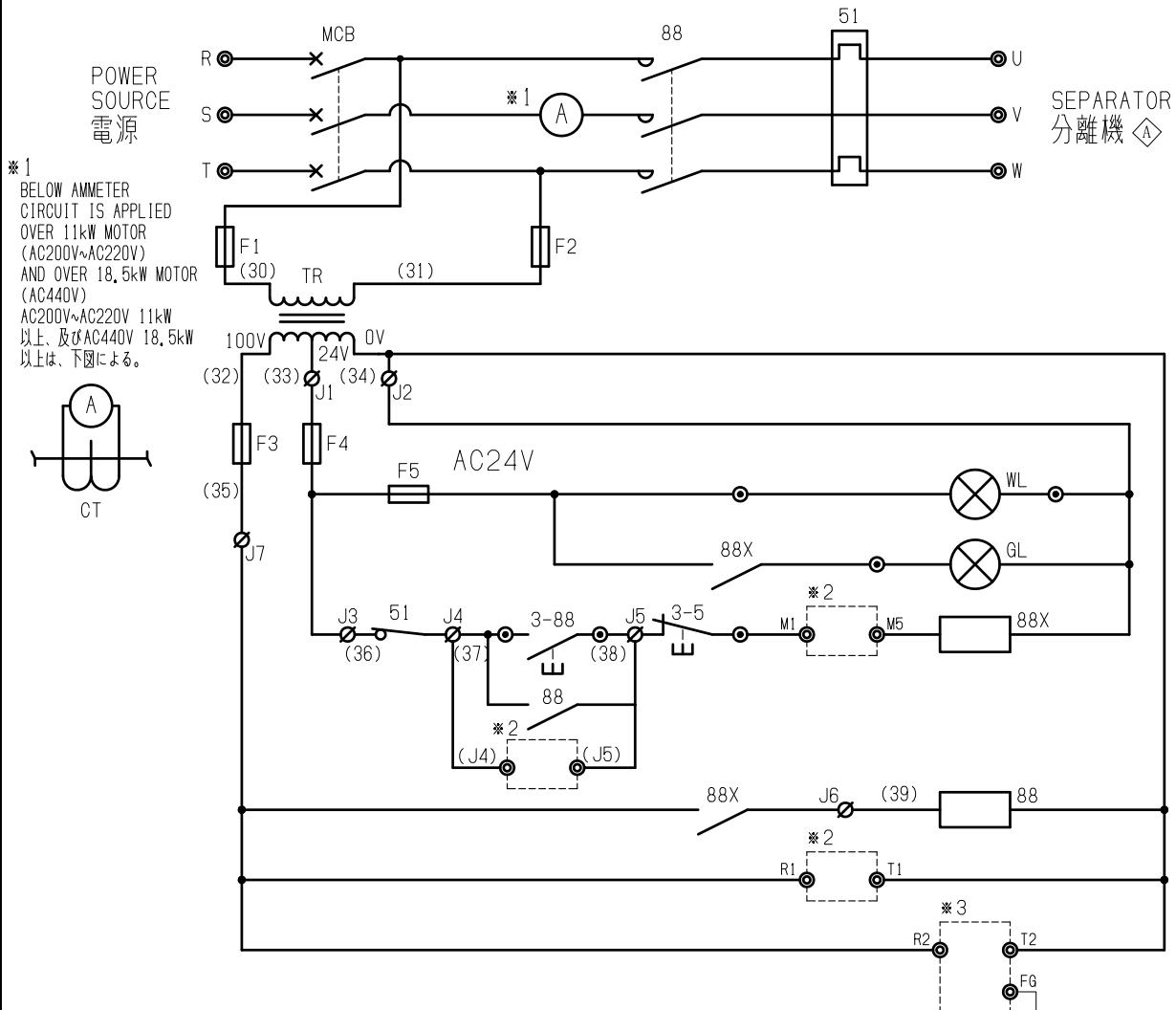
TYPE: AC440V/7.5kW

部 品 表

(1/1)

NAME OF PART 名 称	MFR'S NAME 製 造 所	SPECIFICATION 仕 様	DEVICE No. 器 具 番 号
MOLDED CASE CIRCUIT BREAKER 配線遮断器	MITSUBISHI ELECTRIC CORPORATION	TYPE : NF30-CS 30A	MCB ◇A
AMMETER 電流計	三菱電機	TYPE : YS-8 3 TIMES OVER SCALE WITH RED POINTER	A
ELECTROMAGNETIC SWITCH (THERMAL OVERLOAD RELAY) 電磁開閉器 (熱動形過負荷 継電器)		TYPE : SW-4-1 (TR-5-1N)	88 (51)
AUXILIARY RELAY 補助継電器		TYPE : HH54P	88X
PUSH-BUTTON SWITCH 押ボタンスイッチ	FUJI ELECTRIC CO., LTD. 富士電機	TYPE : AR22FOR-02R	RED 3-5
PUSH BUTTON SWITCH WITH LAMP 照光式押ボタンスイッチ		TYPE : AR22G4L-10E3G	GREEN GL/3-88
SIGNAL LAMP 表示灯		TYPE : DR22D0L-E3W	WHITE WL
FUSE ヒューズ	◇	TYPE : FCF2	10A F1, F2, F3
	FUJI TERMINAL INDUSTRY CO., LTD. 富士端子	TYPE : GLASS TUBE ガラス管ヒューズ	1A F4, F5
TRANSFORMER 変圧器	YAMANAKA DENKO CO., LTD. ヤマナカ電工	500VA	TR
PRINTED CIRCUIT BOARD プリント基板		TYPE : STY-P.C.B.	STY-P.C.B.
ELECTRIC WIRE 電線	CONFORMED TO THE RULES 船級規格適合品		
MITSUBISHI KAKOKI KAISHA, LTD.		DWG. NO.	470500B

REVISIONS					
NO.	DESCRIPTION	DATE	DRAWN	CHKD.	APPR.
△ A					
△ B					



MF	A · P	A · B · C · D · E · F · G · H · J · K ·
RL	R · L	A · B · C · D · E · F · G · H · J · K ·
· ·	· ·	· ·



注： () は、CNを示す。
 () は、中継端子を示す。
 () は、外部端子を示す。

	DWG. NO.	REFERENCE DRAWINGS		TITLE	CIRCUIT DIAGRAM		
	DWG. NO.	REFERENCE DRAWINGS			回路図 (OPT3仕様)		
	mitsubishi kakoki kaisha, ltd. toko, japan						
DUPLICATE	SCALE	DWN. BY	N. Abe	JOB NO.	REV.		
	NO. REQD.	CHKD. BY	T. Takada		DWG. NO.		
ISSUED TO	DATE OCT. -18-2019	APPR. BY	T. Arai	DOC. NO.	470659		A

AUTOMATIC CONTROL PANEL

自動制御盤仕様書

CUSTOMER MESSRS

顧客

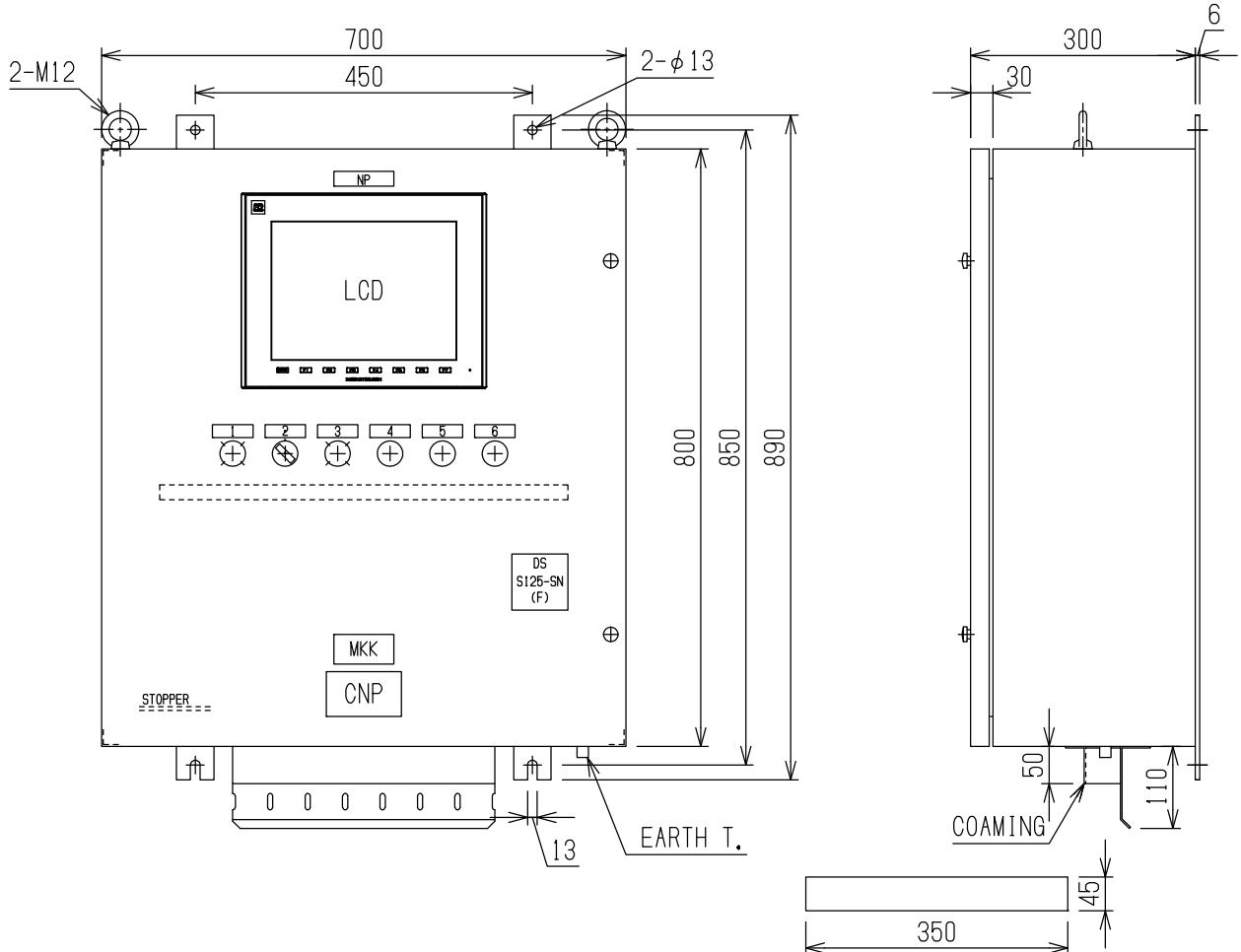
NAMURA SHIPBUILDING CO.,LTD.

Ship No.

船番

487/489/490

Model No. 型式	Service 用途	Supply 供給数	Weight 重量
ONZ16-PN35E	WTS CONTROL PANEL	1 set/s	80 kg
SU20L	SUPPLY UNIT CONTROL PANEL	1 set/s	35 kg
SCREW	ISO		ITEMS 項目
		Name plate 銘板	Letter 記入文字
		For use 用途銘板	English 英文
Marine Machinery Design Dept. MITSUBISHI KAKOKI KAISHA, LTD. 三菱化工機株式会社 船用機械技術部		Color of panel 盤塗装色	Munsell No. 7.5BG7/2 マンセル No.
		Class of ship 船級	NK
		Remarks 備考	
Approval : 承認	T.Arai	Degree of protection 保護等級	IP44
Checked : 確認	A.Nakamura	Document Number 弊社書類番号	Rev. S-LW-13721-12 A
Made : 作成	T.Ogawa	Our Order No. 弊社工事番号	A3006715-1000 A3006716-1000 A3006717-1000
Scale : 尺度	NONE		



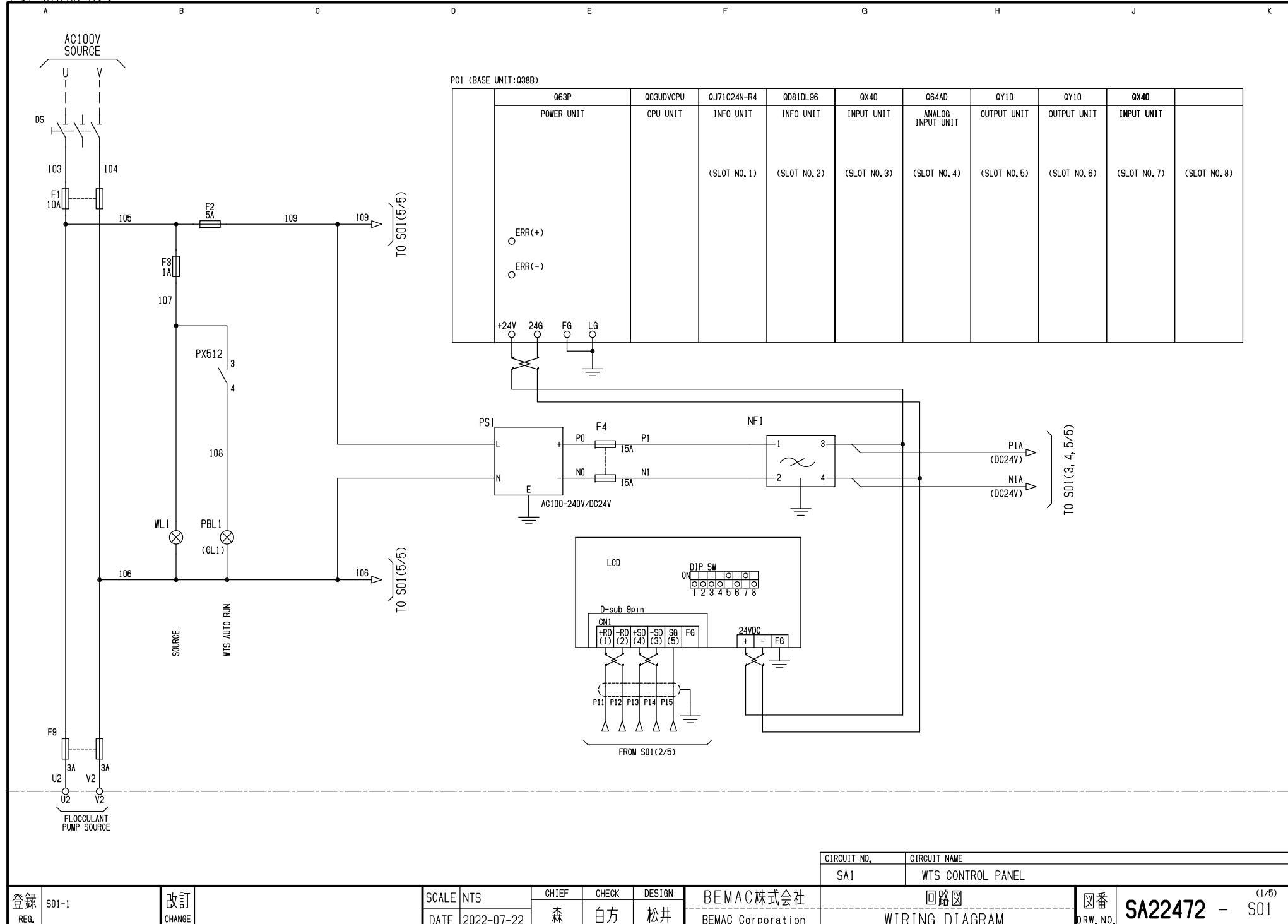
CNP : COMPANY NAME PLATE

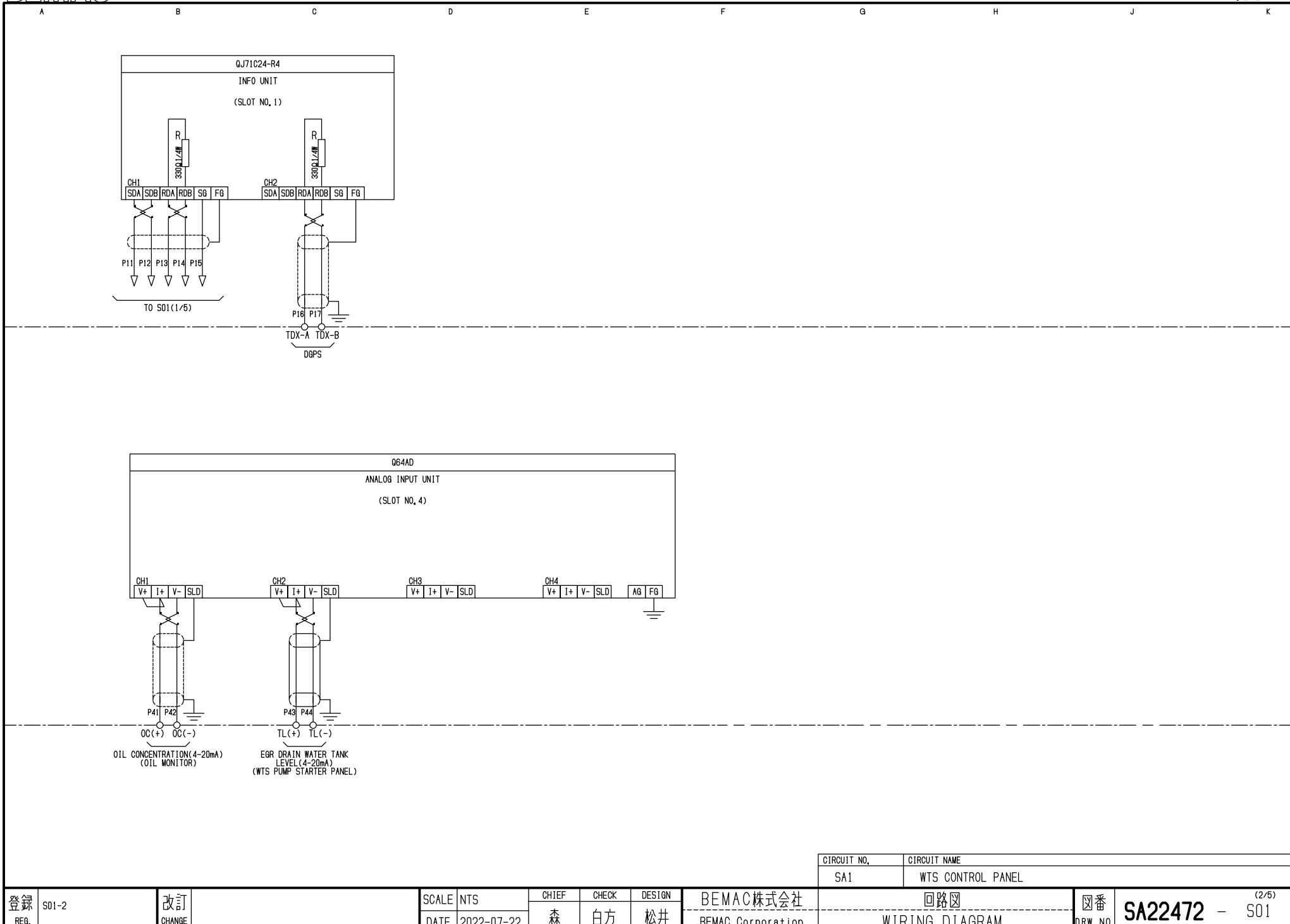
PLANNED MASS : 80kg

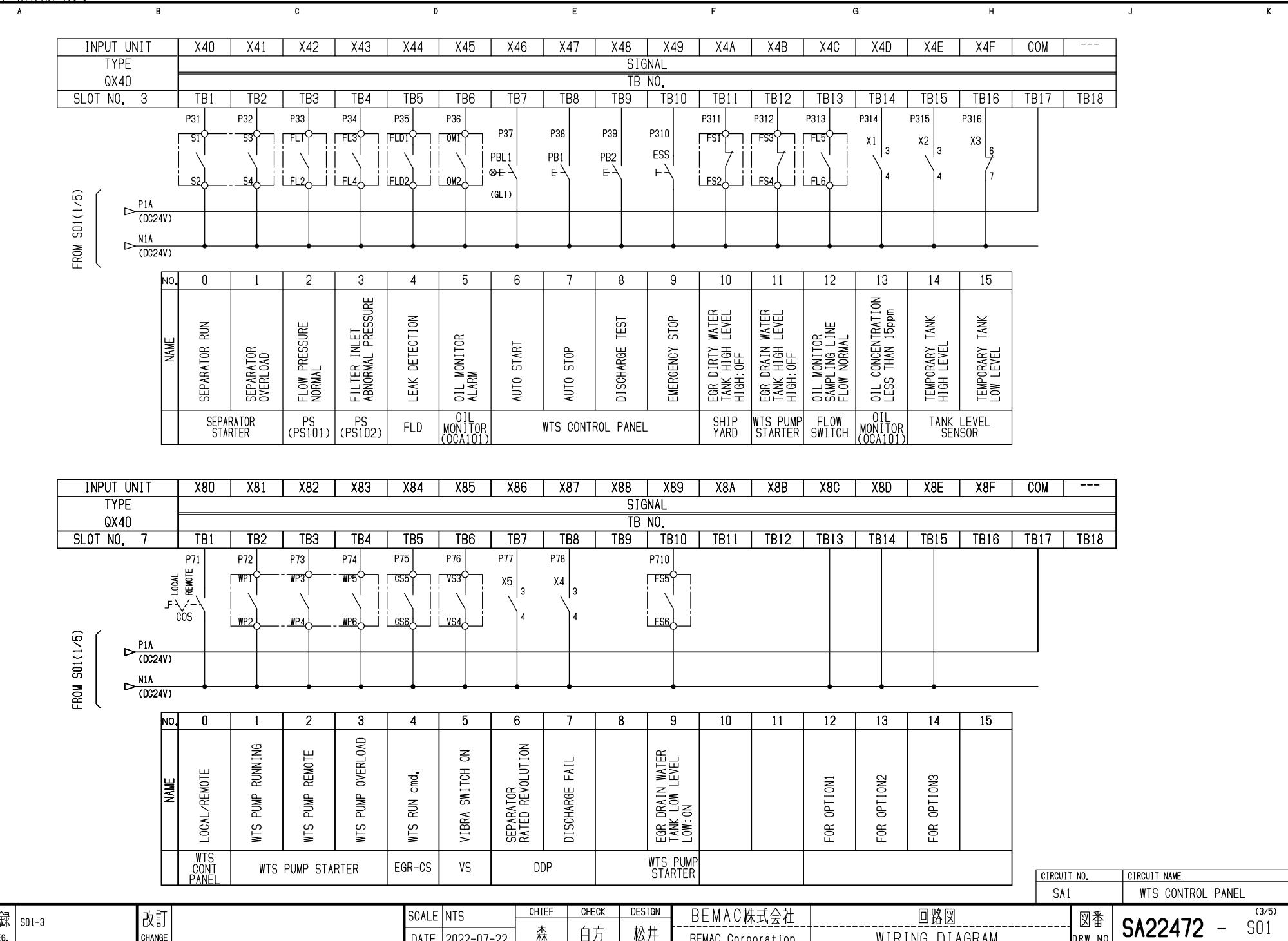
DEGREE OF PROTECTION : IP44

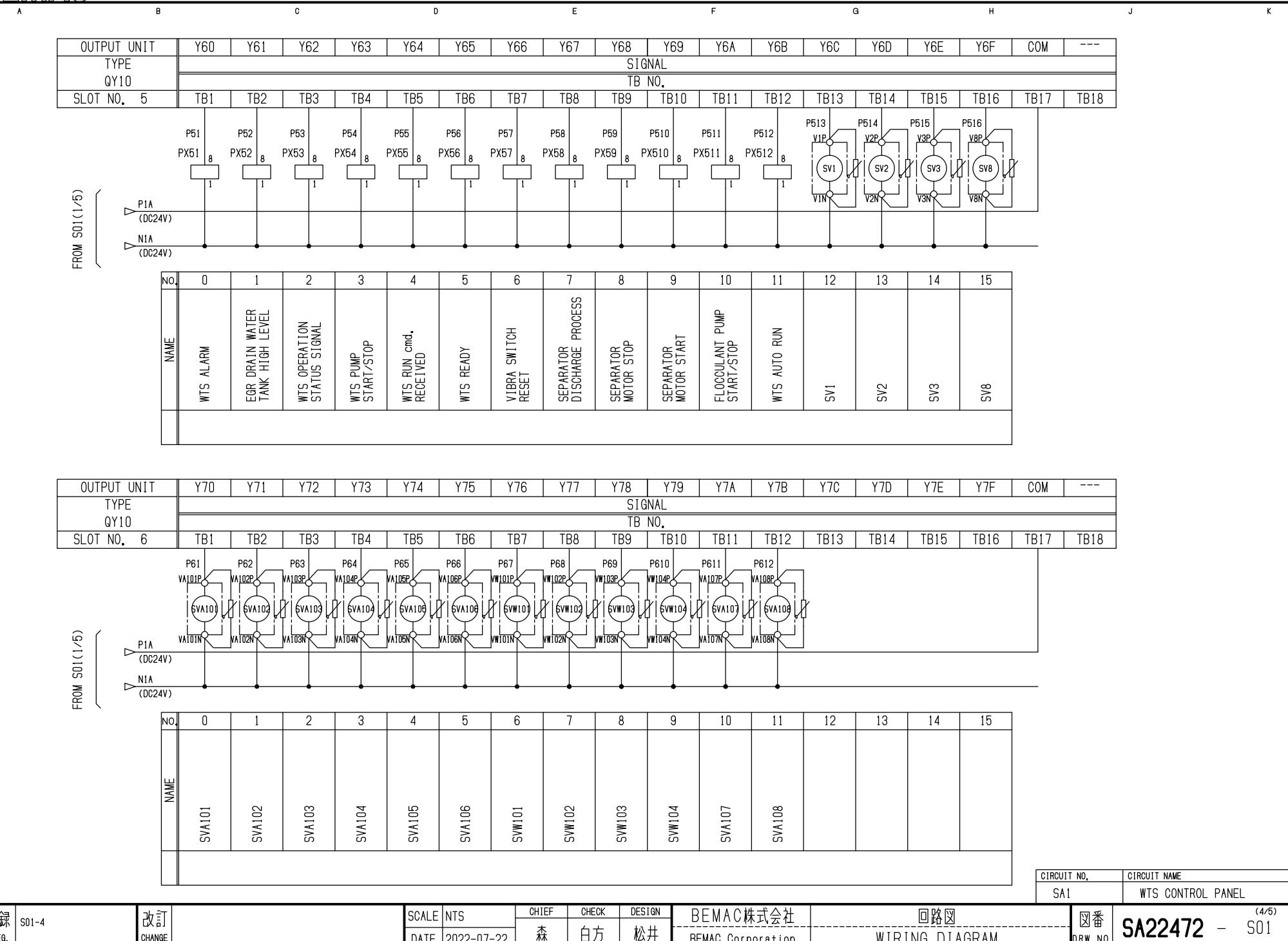
NAME PLATE TABLE			
NO.	LETTER	TYPE	
NP	WTS CONTROL PANEL	N10	
1	SOURCE	N54	WL1
2	LOCAL - REMOTE	N54	COS
3	AUTO START	N54	PBL1(GL1)
4	AUTO STOP	N54	PB1
5	DISCHARGE TEST	N54	PB2
6	EMERGENCY STOP NOR - LOCK	N54	ESS
7			
8			
9			
10			

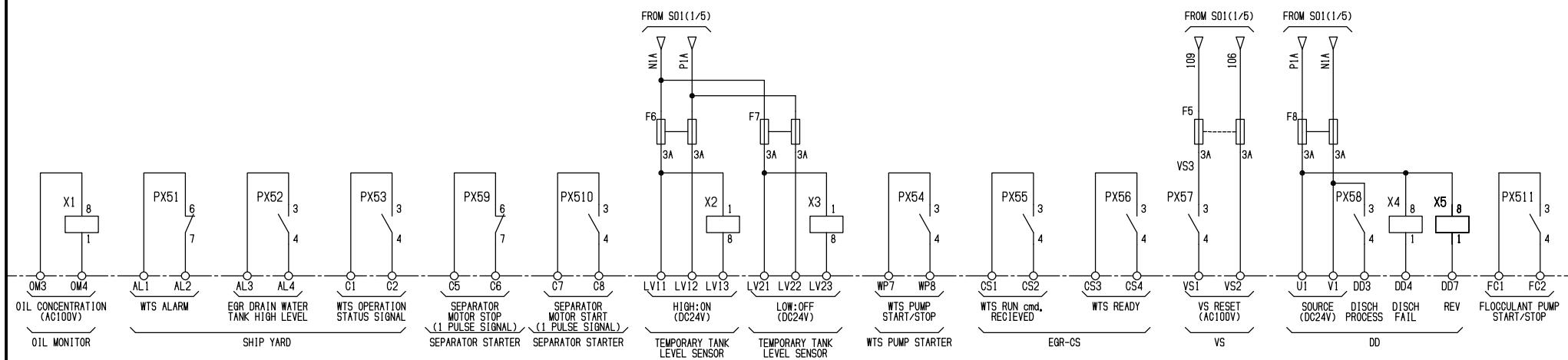
登録 REG.	改訂 CHANGE	SCALE DATE	CHIEF 森	CHECK 白方	DESIGN 松井
BEMAC株式会社 BEMAC Corporation	外形図 OUTLINE VIEW	1/10 2022/07/	図番 DRW. NO.	SA22472 - OV01	











909

登録 REQ.	S01-5	改訂 CHANGE		SCALE DATE	NTS 2022-07-22	CHIEF 森	CHECK 白方	DESIGN 松井	BEMAC株式会社 BEMAC Corporation	回路図 WIRING DIAGRAM	図番 DRW. NO. SA22472 - S01	(5/5)
									CIRCUIT NO. SA1	CIRCUIT NAME WTS CONTROL PANEL		

ABBREV.	DESCRIPTION	ABBREV.	DESCRIPTION	ABBREV.	DESCRIPTION	ABBREV.	DESCRIPTION
S1	H SPYC-1.5	M2	L MPYC-2	MS2	L MPYCSLA-2	FRTY1	H FR-TPYCY-1.5
S2	H SPYC-2.5	M4	L MPYC-4	MS4	L MPYCSLA-4	FRTY2	H FR-TPYCY-2.5
S4	H SPYC-4	M7	L MPYC-7	MS7	L MPYCSLA-7	FRTY4	H FR-TPYCY-4
S6	H SPYC-6	M12	L MPYC-12	MS12	L MPYCSLA-12	FRTY6	H FR-TPYCY-6
S10	H SPYC-10	M19	L MPYC-19	MS19	L MPYCSLA-19	FRTY10	H FR-TPYCY-10
S16	H SPYC-16	M27	L MPYC-27	MS27	L MPYCSLA-27	FRTY16	H FR-TPYCY-16
S25	H SPYC-25	M37	L MPYC-37	MS37	L MPYCSLA-37	FRTY25	H FR-TPYCY-25
S35	H SPYC-35	M44	L MPYC-44	MS44	L MPYCSLA-44	FRTY35	H FR-TPYCY-35
S50	H SPYC-50	M77	L MPYC-77			FRTY50	H FR-TPYCY-50
S70	H SPYC-70			TS1	H TPYCSLA-1.5	FRTY70	H FR-TPYCY-70
S95	H SPYC-95	DY1	H DPYCY-1.5	TS2	H TPYCSLA-2.5	FRTY95	H FR-TPYCY-95
S120	H SPYC-120	DY2	H DPYCY-2.5	TS4	H TPYCSLA-4	FRTY120	H FR-TPYCY-120
S150	H SPYC-150	DY4	H DPYCY-4			FRTY150	H FR-TPYCY-150
S185	H SPYC-185	DY6	H DPYCY-6	FRD1	H FR-DPYC-1.5	FRTY185	H FR-TPYCY-185
S240	H SPYC-240	DY10	H DPYCY-10	FRD2	H FR-DPYC-2.5		
S300	H SPYC-300	DY16	H DPYCY-16	FRD4	H FR-DPYC-4	FRMY2	L FR-MPYCY-2
		DY25	H DPYCY-25	FRD6	H FR-DPYC-6	FRMY4	L FR-MPYCY-4
D1	H DPYC-1.5	DY35	H DPYCY-35	FRD10	H FR-DPYC-10	FRMY7	L FR-MPYCY-7
D2	H DPYC-2.5	DY50	H DPYCY-50	FRD16	H FR-DPYC-16	FRMY12	L FR-MPYCY-12
D4	H DPYC-4	DY70	H DPYCY-70	FRD25	H FR-DPYC-25	FRMY19	L FR-MPYCY-19
D6	H DPYC-6	DY95	H DPYCY-95	FRD35	H FR-DPYC-35	FRMY27	L FR-MPYCY-27
D10	H DPYC-10	DY120	H DPYCY-120	FRD50	H FR-DPYC-50	FRMY37	L FR-MPYCY-37
D16	H DPYC-16	DY150	H DPYCY-150			FRMY44	L FR-MPYCY-44
D25	H DPYC-25	DY185	H DPYCY-185	FRT1	H FR-TPYC-1.5		
D35	H DPYC-35			FRT2	H FR-TPYC-2.5	FD1	H FA-DPYC-1.5
D50	H DPYC-50	TY1	H TPYCY-1.5	FRT4	H FR-TPYC-4	FD2	H FA-DPYC-2.5
D70	H DPYC-70	TY2	H TPYCY-2.5	FRT6	H FR-TPYC-6	FD4	H FA-DPYC-4
D95	H DPYC-95	TY4	H TPYCY-4	FRT10	H FR-TPYC-10	FD6	H FA-DPYC-6
D120	H DPYC-120	TY6	H TPYCY-6	FRT16	H FR-TPYC-16	FD10	H FA-DPYC-10
D150	H DPYC-150	TY10	H TPYCY-10	FRT25	H FR-TPYC-25	FD16	H FA-DPYC-16
		TY16	H TPYCY-16	FRT35	H FR-TPYC-35	FD25	H FA-DPYC-25
T1	H TPYC-1.5	TY25	H TPYCY-25	FRT50	H FR-TPYC-50	FD35	H FA-DPYC-35
T2	H TPYC-2.5	TY35	H TPYCY-35			FD50	H FA-DPYC-50
T4	H TPYC-4	TY50	H TPYCY-50	TTS1	L TTYCSLA-1		
T6	H TPYC-6	TY70	H TPYCY-70	TTS1T	L TTYCSLA-1T	TT4S	L TTYC-4SLA
T10	H TPYC-10	TY95	H TPYCY-95	TTS1Q	L TTYCSLA-1Q	TT7S	L TTYC-7SLA
T16	H TPYC-16	TY120	H TPYCY-120	TTS4	L TTYCSLA-4	TT10S	L TTYC-10SLA
T25	H TPYC-25	TY150	H TPYCY-150	TTS7	L TTYCSLA-7	TT14S	L TTYC-14SLA
T35	H TPYC-35	TY185	H TPYCY-185	TTS10	L TTYCSLA-10	TT19S	L TTYC-19SLA
T50	H TPYC-50			TTS14	L TTYCSLA-14	TT24S	L TTYC-24SLA
T70	H TPYC-70	MY2	L MPYCY-2	TTS19	L TTYCSLA-19	TT30S	L TTYC-30SLA
T95	H TPYC-95	MY4	L MPYCY-4	TTS24	L TTYCSLA-24	TT37S	L TTYC-37SLA
T120	H TPYC-120	MY7	L MPYCY-7	TTS30	L TTYCSLA-30	TT48S	L TTYC-48SLA
T150	H TPYC-150	MY12	L MPYCY-12	TTS37	L TTYCSLA-37		
T185	H TPYC-185	MY19	L MPYCY-19	TTS48	L TTYCSLA-48		
		MY27	L MPYCY-27				
		MY37	L MPYCY-37				
		MY44	L MPYCY-44			L = 150/250V H = 0.6/1kV HV = 6/10kV	
		MY77	L MPYCY-77				
改 定 CHANGE				SCALE	/ NTS	CHIEF	CHECK
				DATE	2022/7/22	森	白方
BEMAC株式会社 BEMAC Corporation			ケーブル 略語表 CABLE ABBREVIATION			図 番 DRW. NO.	
						SA22472- CA	

TERMINAL TYPE : 280-646/BE

A		E
B		
C	F	
D	G	H

NOTE A: TERMINAL SIZE D: CABLE ENTRANCE G: CORE No.
 B: TERMINAL BLOCK No. E: CIRCUIT NAME H: CABLE CLASS
 C: CIRC No. F: TERMINAL No.

TERMINAL SIZE	70P													
TERMINAL BLOCK No.	TB 1													
PANEL No.	-													
CABLE ENTRANCE	L													

TERMINAL SIZE	70P		DGPS			OIL MONITOR				FLOCCULANT PUMP			LEVEL SENSOR			
TERMINAL BLOCK No.	TB 1					CONCENTRATION 4~20mA	ALARM	LESS THAN 15ppm		SOURCE	START/ STOP		EGR DRAIN WTK LEVEL 4~20mA			
PANEL No.	-		TDX-A	TDX-B	E	OC (+)	OC (-)	E	OM1 OM2 OM3 OM4	U2	V2	FC1 FC2		TL (+)	TL (-)	E
CABLE ENTRANCE	L					TTS1						M7				

TERMINAL SIZE	70P		SEPARATOR						FLOW PRESS	FILTER INLET PRESS	FLD	FLOW SWITCH	WTS PUMP		
TERMINAL BLOCK No.	TB 1		RUN	OVERLOAD	STOP	START			FAIL	LEAK	OIL MONI SAMPLE	WTS PUMP	RUN	REMOTE	
PANEL No.	-		S1	S2	S3	S4	C5	C6	C7	C8	FL1 FL2	FL3 FL4	FLD1 FLD2	FL5 FL6	WP1 WP2 WP3 WP4
CABLE ENTRANCE	L														

TERMINAL SIZE	70P		WTS PUMP						EGR CS				VIBRA SWITCH		
TERMINAL BLOCK No.	TB 1		OVERLOAD	EGR DRAIN WTK HIGH	EGR DRAIN WTK LOW	START/STOP	RUN cmd RECEIVED	WTS READY	WTS RUN cmd.		RESET	ON			
PANEL No.	-		WP5	WP6	FS3	FS4	FS5	FS6	WP7	WP8	CS1 CS2	CS3 CS4	CS5 CS6	E	VS1 VS2 VS3 VS4
CABLE ENTRANCE	L												M4		

改定 CHANGE		SCALE	/	NTS	CHIEF	森	CHECK	白方	DESIGN 松井
			DATE	2022/07/					
BEMAC株式会社 BEMAC Corporation	端子ブロック図 TERMINAL BLOCK	図番 DRW.NO.	SA22472-	T01					

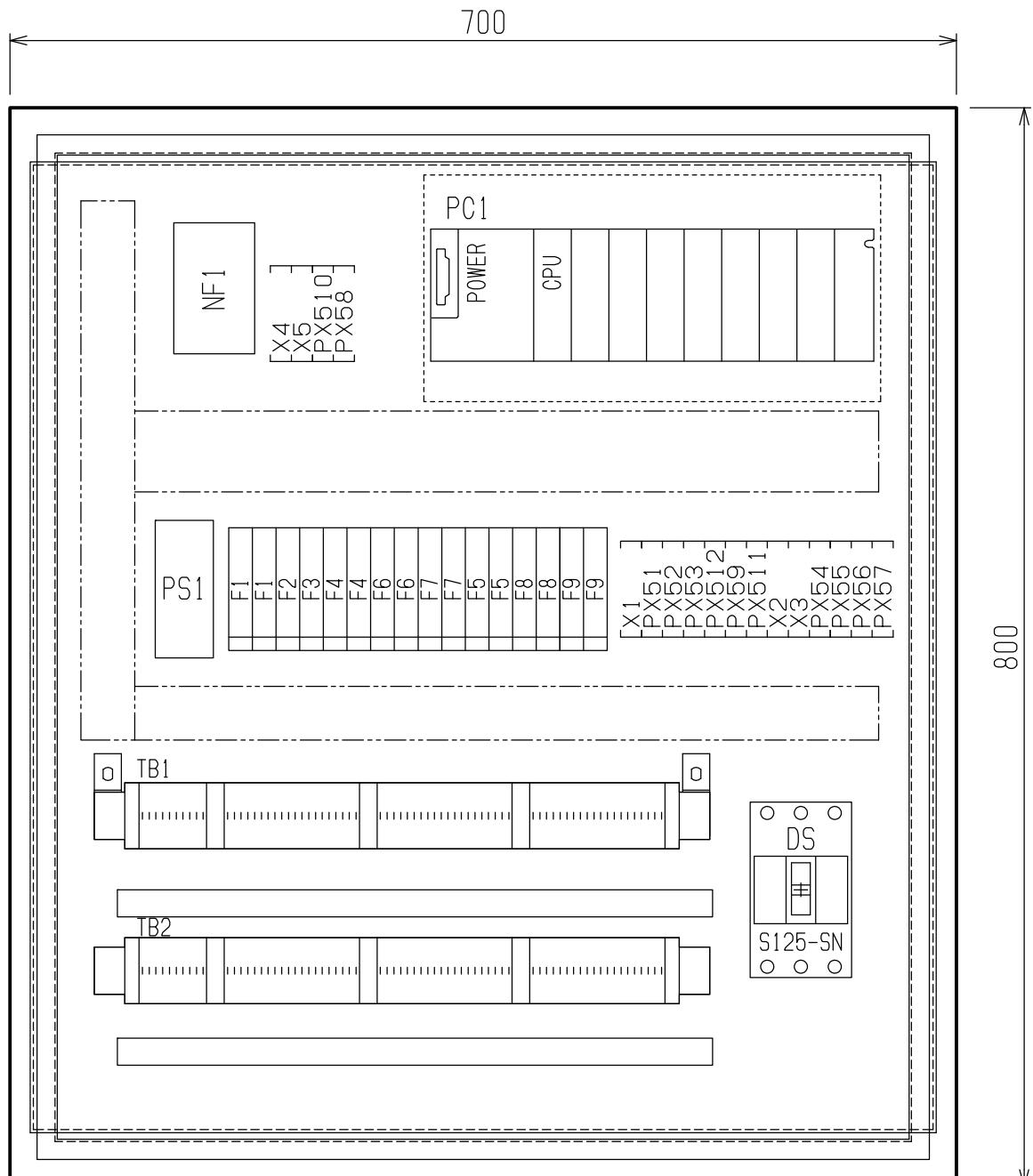
TERMINAL TYPE : 280-646/BE

A		E			
B					
C		F			
D		G			
			H		

NOTE A:TERMINAL SIZE D:CABLE ENTRANCE G:CORE No.
B:TERMINAL BLOCK No. E:CIRCUIT NAME H:CABLE CLASS
C:CIRC No. F:TERMINAL No.

TERMINAL SIZE	70P		SOLENOID VALVE						SHIP YARD							
TERMINAL BLOCK NO.	TB2															
			SVW101	SVW102	SVW103	SVW104	SVA107	SVA108	WTS ALRAM	EGR DRAIN	WTR HIGH	WTS OPEN	EGS DIRTY			
			VW 101P	VW 101N	VW 102P	VW 102N	VW 103P	VW 103N	VW 104P	VW 104N	VA 107P	VA 107N	VA 108P	VA 108N	AL1	
PANEL NO.	—												AL2	AL3	AL4	C1
CABLE ENTRANCE	L		M2	M2	M2	M2	M2	M2					C2	FS1	FS2	

改定 CHANGE		SCALE	/	NTS	CHIEF	森	CHECK	白方	DESIGN	松井
		DATE	2022/07/							
BEMAC株式会社 BEMAC Corporation	端子ブロック図 TERMINAL BLOCK	図番 DRW.NO.	SA22472- T02							



FRONT

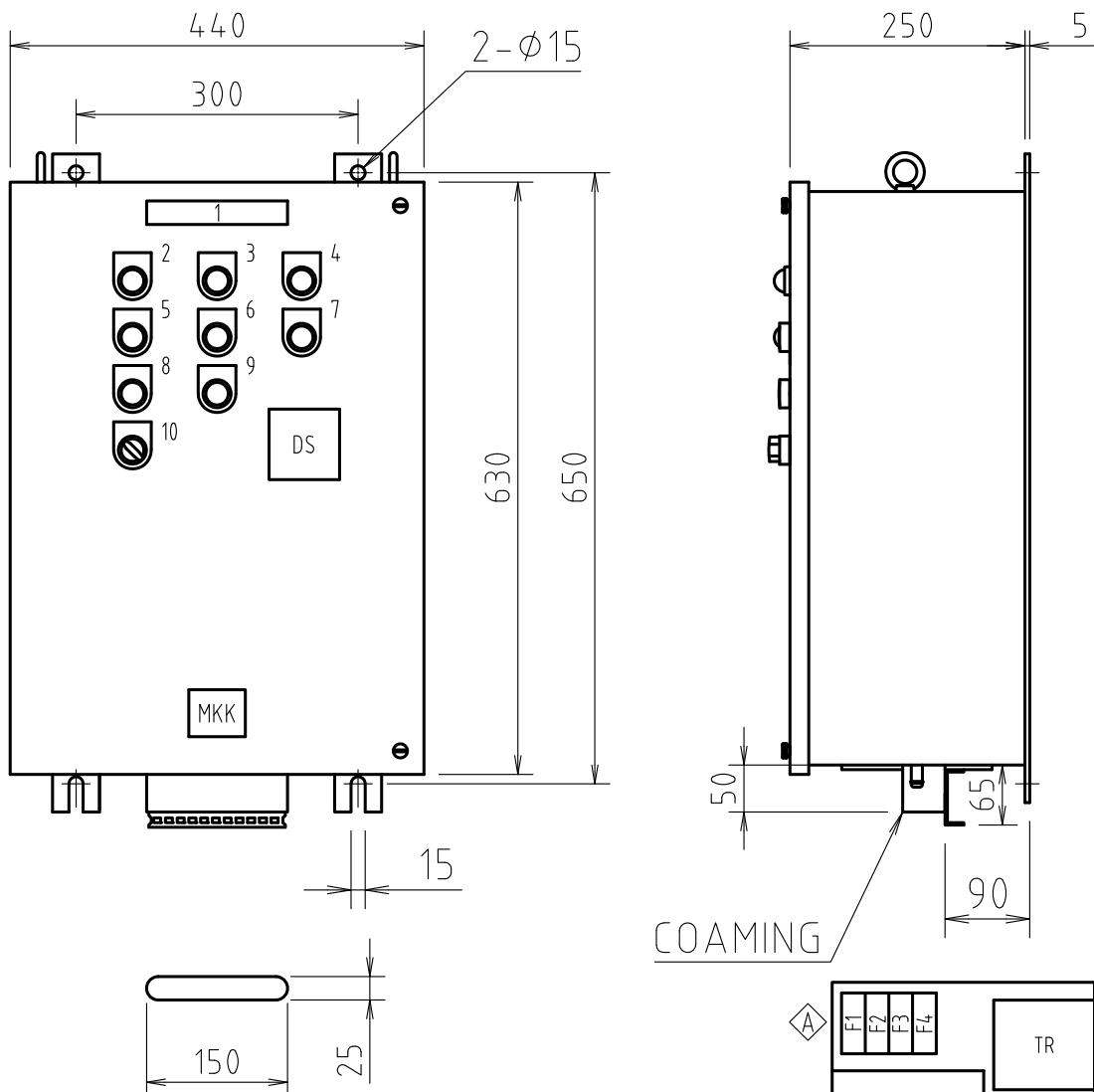
1909
WTS CP VER. 3

登録 REG.	改訂 CHANGE	SCALE DATE	CHIEF 森	CHECK 白方	DESIGN 松井
BEMAC株式会社 BEMAC Corporation	内部組立図 INTERNAL ASSEMBLY DRAWING	図番 DRW. NO.	SA22472 - DP01		

行 L I N E	符 号 SYMBOL	名 称 DESIGNATION	型 式 , 仕 様 , 電 壓 TYPE , SPEC. and/or VOLT.	数 量 QUAN TITY	コード番号 CODE No.	
1	DS	断路器 DISCONNECTING SWITCH	S125-SN 3P FRONT TYPE	1	1202071 TERASAKI	
2	(DS)	MCCB操作ハンドル MCCB CONT HDL	T2HB16L URSBT	1	1044671 TERASAKI	
3						
4						
5						
6						
7		ヒューズ FUSE	UCO 1A	1	1220121 UTSUNOMIYA	
8		ヒューズ FUSE	UCO 3A	10	1220122 UTSUNOMIYA	
9		ヒューズ FUSE	UCO 5A	1	1220123 UTSUNOMIYA	
10		ヒューズ FUSE	UCO 10A	2	1220124 UTSUNOMIYA	
11		ヒューズ FUSE	UCO 15A	2	1220125 UTSUNOMIYA	
12		ヒューズ台 FUSE HOLDER	KF-32K 690V 32A (for UCO)	16	1220027 KACON	
13						
14		補助継電器 AUXILIARY RELAY	RJ1S-C-A100 AC100/110V		1211872 IDEC	
15		補助継電器 AUXILIARY RELAY	RJ2S-C-A100 AC100/110V	1	1211874 IDEC	
16		補助継電器 AUXILIARY RELAY	RJ2S-CD-D24 DC24V	16	1211876 IDEC	
17		ソケット SOCKET	SJ1S-05B (FOR RJ1S)		1211895 IDEC	
18		ソケット SOCKET	SJ2S-05B (FOR RJ2S)	17	1211896 IDEC	
19						
20						
21						
備 考						
改 定 CHANGE				SCALE	/ NTS	
	DATE	2022/7/22				
BEMAC株式会社		部 品 表		図 番	SA22472- PL1	
BEMAC Corporation		PARTS LIST		DRW. NO.		

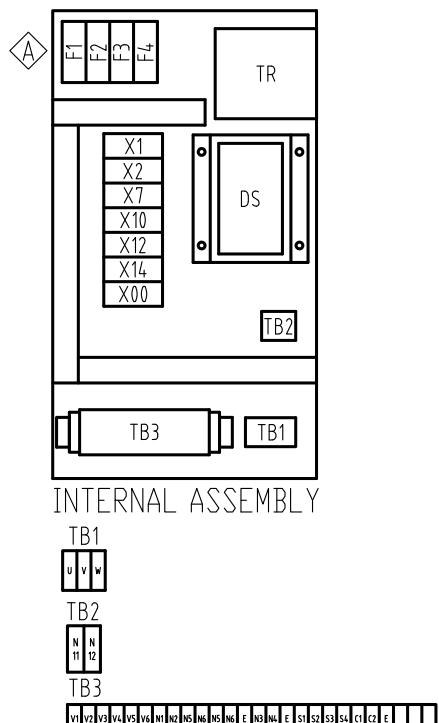
行 L I N E	符 号 SYMBOL	名 称 DESIGNATION	型 式 , 仕 様 , 電 壓 TYPE , SPEC. and/or VOLT.	数 量 QUAN TITY	コード番号 CODE No.	
1	PS1	スイッチング レギュレータ SWITCHING REGULATOR	S8FS-G30024CD AC100-240V/DC24V 300W	1	1234019 OMRON	
2	(PS1)	DINレール DIN RAIL	S82Y-FSG-30F	1	1530435 OMRON	
3						
4	LCD	モニタッチ MONITOUCHE	V9120iSD 12in, DC24V	1	1280525 HAKKO ELEC	
5	(LCD)	表面保護シート SCREEN PROTECTION SHEET	V912S-GSN10	1	1280354 HAKKO ELEC	
6	(LCD)	コネクタカバー CONNECTOR COVER	17JE-09LH1-1C-CF (inchネジ, 90° TYPE)	1	1241056 DDK	
7	(LCD)	コネクタ CONNECTOR	XM2A-0901	1	1241041 OMRON	
8	(LCD)	メモリーカード MEMORY CARD	SFSD4096L1BM1T0-E-ME-221STD SLCタイプ 4GB SDHCカード	1	1280581 SWISSBIT	
9	PC1	基本ベースユニット BASIC BASE UNIT	Q38B	1	1293187 MITSUBISHI	
10	PC1	電源ユニット POWER UNIT	Q63P DC24V	1	1293181 MITSUBISHI	
11	PC1	CPUユニット CPU UNIT	Q03UDVCPU	1	1293186 MITSUBISHI	
12	PC1	情報ユニット INFORMATION UNIT	QJ71C24N-R4	1	1293182 MITSUBISHI	
13	PC1	情報ユニット INFORMATION UNIT	QD81DL96	1	1293183 MITSUBISHI	
14	PC1	CFカード CF CARD	QD81MEM-4GBC 4GB	1	1293184 MITSUBISHI	
15		制御ネットワークユニット NETWORK CONT UNIT	QJ71MB91		1293188 MITSUBISHI	
16		メモリーカード MEMORY CARD	NZ1MEM-2GBSD SD CARD		1240831 MITSUBISHI	
17	PC1	入力ユニット INPUT UNIT	QX40	2	1293047 MITSUBISHI	
18	PC1	アナログ入力ユニット ANALOG INPUT UNIT	Q64AD	1	1293185 MITSUBISHI	
19	PC1	出力ユニット OUTPUT UNIT	QY10	2	1293055 MITSUBISHI	
20	NF1	ノイズフィルタ NOISE FILTER	B84742A0016R712	1	1490127 TDK LAMBDA	
21						
備 考						
改 定 CHANGE				SCALE	/ NTS	
				DATE	2022/7/22	
BEMAC株式会社		部 品 表		図 番	SA22472- PL2	
BEMAC Corporation		PARTS LIST		DRW. NO.		

行 L I N E	符 号 SYMBOL	名 称 DESIGNATION	型 式 , 仕 様 , 電 壓 TYPE , SPEC. and/or VOLT.	数 量 QUAN TITY	コード番号 CODE No.	
1	WL1	表示灯 INDICATION LAMP	DR30DOL-H3P (AC100-110V) (WHITE)	1	1165123 FUJI ELEC	
2						
3	PBL1 (GL1)	照光式押釦スイッチ P. B. S. WITH LAMP	AR30G4L-11H3G (AC100-110V) (GREEN)	1	1174541 FUJI ELEC	
4						
5	PB1	押釦スイッチ PUSH BUTTON SWITCH	AR30FOR-11R	1	1171101 FUJI ELEC	
6	PB2	押釦スイッチ PUSH BUTTON SWITCH	AR30FOR-11B	1	1171122 FUJI ELEC	
7	ESS	押釦スイッチ PUSH BUTTON SWITCH	AR30S6R-11R	1	1195925 FUJI ELEC	
8						
9	COS	セレクトスイッチ SELECTOR SWITCH	AR30PR-210B	1	1195860 FUJI ELEC	
10		サージアブソーバ SURGE ABSORBER	ERZV10D820 TND10V-820KB00AAA0	16	1428157 PANASONIC	
11						
12		端子台 TERMINAL	JTP-20 2P		3030101 YOSHIDA	
13		端子台 TERMINAL	JTP-30 2P		3030121 YOSHIDA	
14		端子台 TERMINAL	JTP-30 3P		3030122 YOSHIDA	
15		端子台 TERMINAL BLOCK	280-646/BE-10P 10P		3030149 WAGO	
16		端子台 TERMINAL BLOCK	280-646/BE-60P 60P		3030145 WAGO	
17		端子台 TERMINAL BLOCK	280-646/BE-70P 70P	2	3030146 WAGO	
18						
19						
20						
21		WTSコントロールパネル WTS CONTROL PANEL	VMW-V3	1	3747750 BEMAC	
備 考						
改 定 CHANGE				SCALE	/ NTS	
				DATE	2022/7/22	
BEMAC株式会社		部 品 表		図 番	SA22472-	
BEMAC Corporation		PARTS LIST		DRW. NO.	PL3	



DEGREE OF PROTECTION : IP44

NAME PLATE TABLE		
NO.	LETTER	
1	SUPPLY UNIT CONTROL PANEL	—
2	SOURCE	WL1
3	CLEAN WATER SUPPLY FAIL	RL1
4	NaOH SUPPLY FAIL	RL2
5	EGR TREATED WATER SUPPLY PUMP RUN	PBL1(GL1)
6	EMERGENCY STOP	RL3
7	ALARM RESET	PBR
8	EGR TREATED WATER SUPPLY PUMP STOP	PB1
9	EMERGENCY STOP NOR-LOCK	ESS
10	LOCAL - REMOTE	COS



B	2020.3.3	Correction of NAME PLATE TABLE		
A	2020.12.12	Added INTERNAL ASSEMBLY and TERMINAL BLOCK.	DRAWN BY N. Abe	
O	2019.4.26	ORIGINAL	CHKD. BY A.Nakamura	
REVISIONS		APPR. BY T.Arai	TITLE SUPPLY UNIT CONTROL PANEL	
			OUTLINE VIEW	
 MITSUBISHI KAKOKI KAISHA, LTD.		SCALE 1:8	DWG NO. 470217	REV. B

A

B

C

D

E

F

G

H

TITLE PARTS LIST
部品表

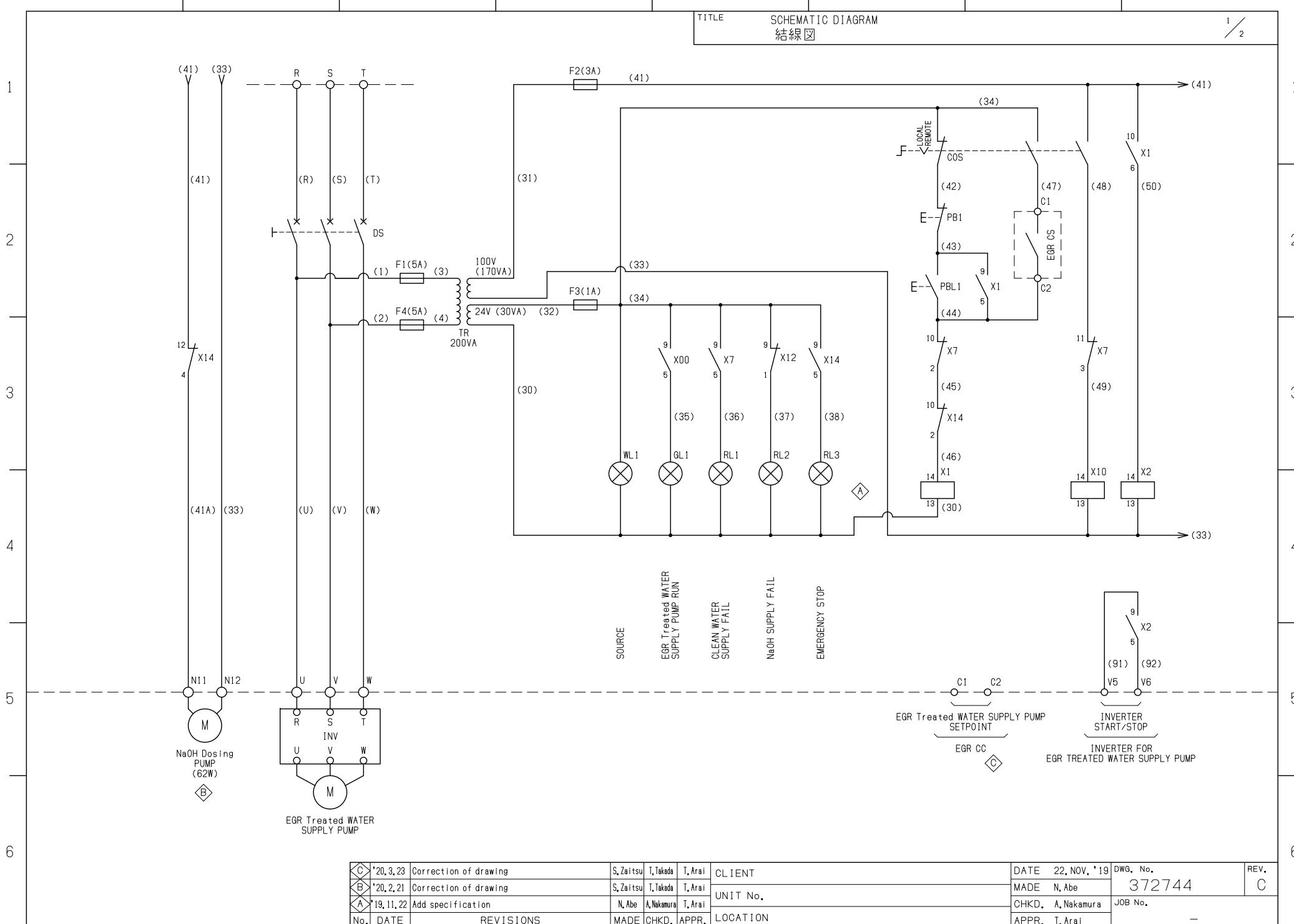
	NAME OF PART 名 称	MFR'S NAME 製 造 所	SPECIFICATION 仕 様	DEVICE No. 器具番号
1	DSN SWITCHES ノーヒューズスイッチ	TERASAKI ELECTRIC CO., LTD. 寺崎電気産業	Type : S125-SN 3P 100A WITH T2HB16L URSBT	DS
2	SIGNAL LAMP 表示灯	FUJI ELECTRIC CO., LTD. 富士電機	Type : DR22DOL-E3W	WHITE WL1
	PUSH BUTTON SWITCH WITH LAMP 照光式押ボタンスイッチ		Type : DR22DOL-E3R	RED RL1, RL2 RL3
	PUSH BUTTON SWITCH 押釦スイッチ		Type : AR22G4L-11E3G	GREEN PBL1/ GL1
	CHANGE OVER SWITCH 切換スイッチ		Type : AR22FOR-11R	RED PB1
	FUSE ヒューズ		Type : AR22FOR-22R	RED PBR
	AUXILIARY RELAY 補助リレー		Type : AR2256R-22R	RED ESS
			Type : AR22PR-222B	BLACK COS
			Type : FCF2	5A F1, F4
				3A F2
				1A F3
3			Type : HH54P AC100V SOCKET TP514X1	X2, X7 X10, X12 X14, X00
4			Type : HH54P AC24V SOCKET TP514X1	X1
5	FUSE SOCKET ヒューズソケット	KIMURA ELECTRIC CO., LTD. キムラ電機	Type : F-30NS	
	TERMINAL BLOCK 端子台	KIMURA ELECTRIC CO., LTD. 吉田電機	Type : JTP-20 3P	TB1
			Type : JTP-20 2P	TB2
		WAGO CO. OF JAPAN LTD. ワゴジャパン	Type : 280-901 22P WITH 280-309	TB3
			Type : 280-681 4P WITH 280-346	
6	TRANSFORMER 変圧器	YAMANAKA DENKO CO., LTD. ヤマナカ電工	Type : 440V / 100V, 24V 1φ 200VA	TR

C						CLIENT	DATE 27, AUG. '19	DWG. No.	
B	*21, 8, 3	Change parts.	N. Abe	N. Nakamura	T. Arai	UNIT No.	MADE Y. Mochizuki	372339	REV. B
A	*19, 11, 22	Add specification	N. Abe	N. Nakamura	T. Arai	LOCATION	CHKD. A. Nakamura	JOB No.	
No.	DATE	REVISIONS	MADE	CHKD.	APPR.		APPR. T. Arai		

A B C D E F G H

TITLE SCHEMATIC DIAGRAM
結線図

1 / 2



No.	DATE	REVISIONS	MADE	CHKD.	APPR.	CLIENT	DATE	22.NOV.'19	DWG. No.	REV.
C	'20.3.23	Correction of drawing	S, Zaitsu	T, Takada	T, Arai		MADE	N, Abe	372744	C
B	'20.2.21	Correction of drawing	S, Zaitsu	T, Takada	T, Arai	UNIT No.	CHKD.	A, Nakamura	JOB No.	
A	'19.11.22	Add specification	N, Abe	A, Nakamura	T, Arai	LOCATION	APPR.	T, Arai		-

A

B

C

D

E

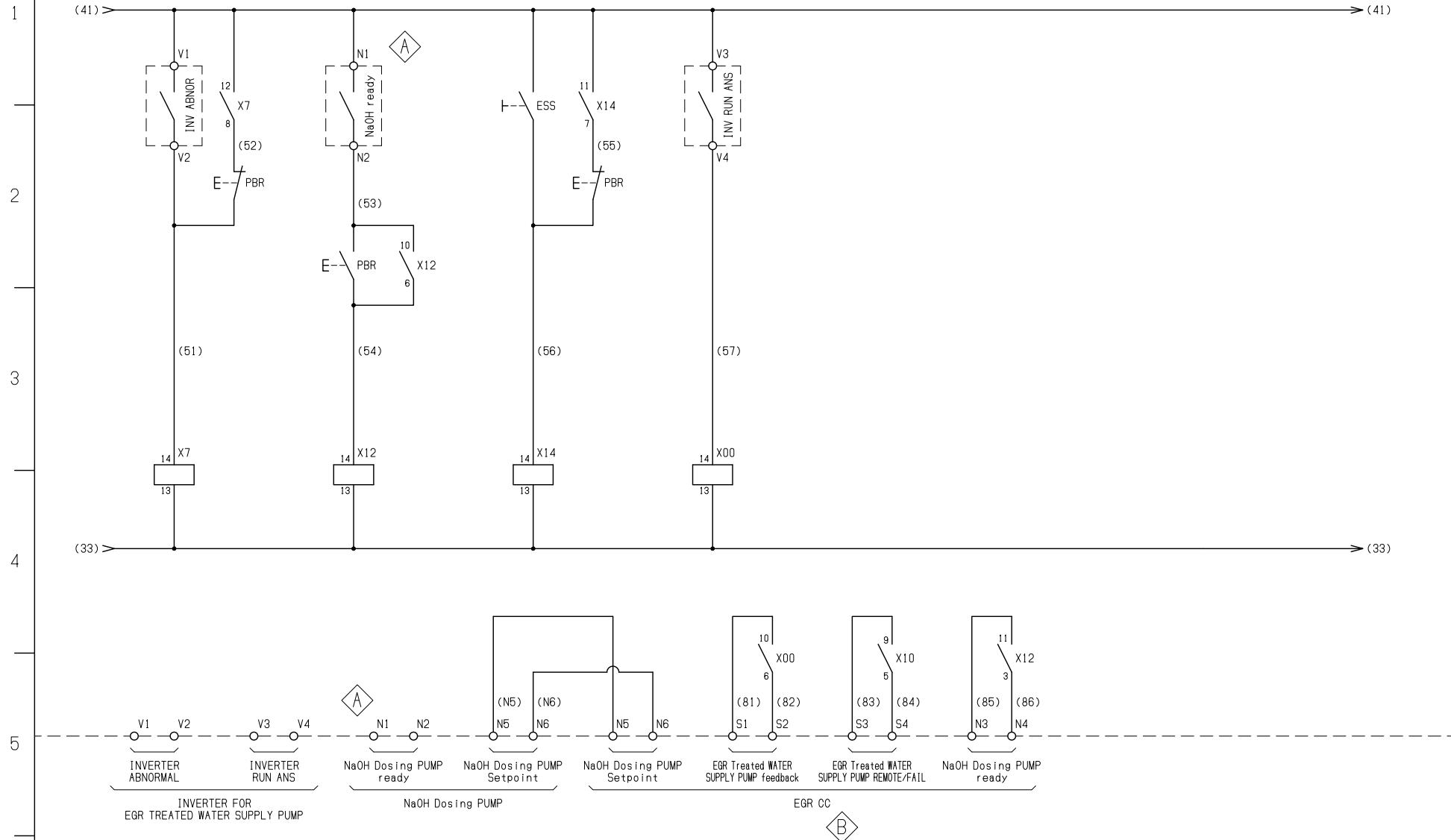
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G

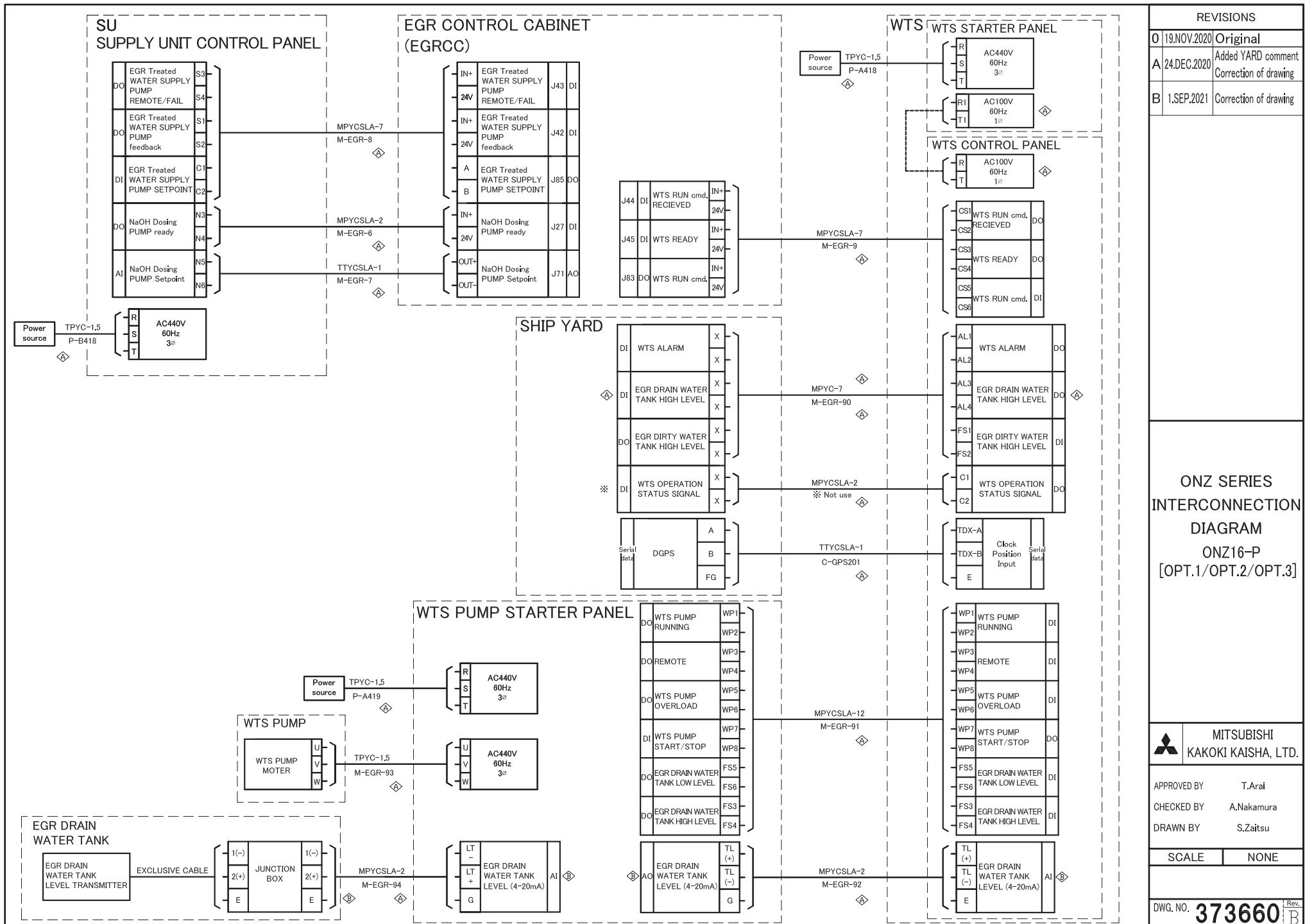
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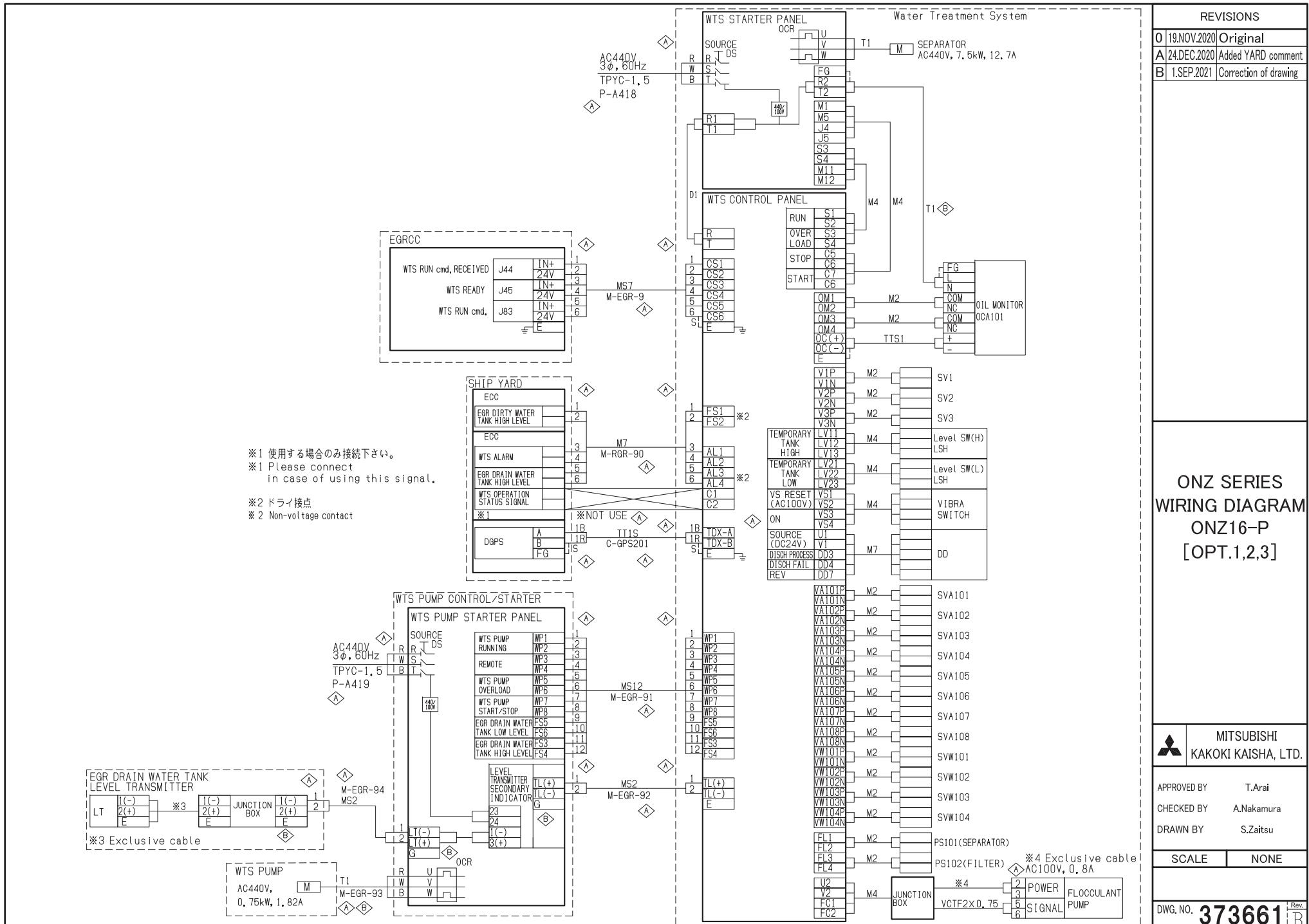
TITLE SCHEMATIC DIAGRAM
結線図

2 / 2

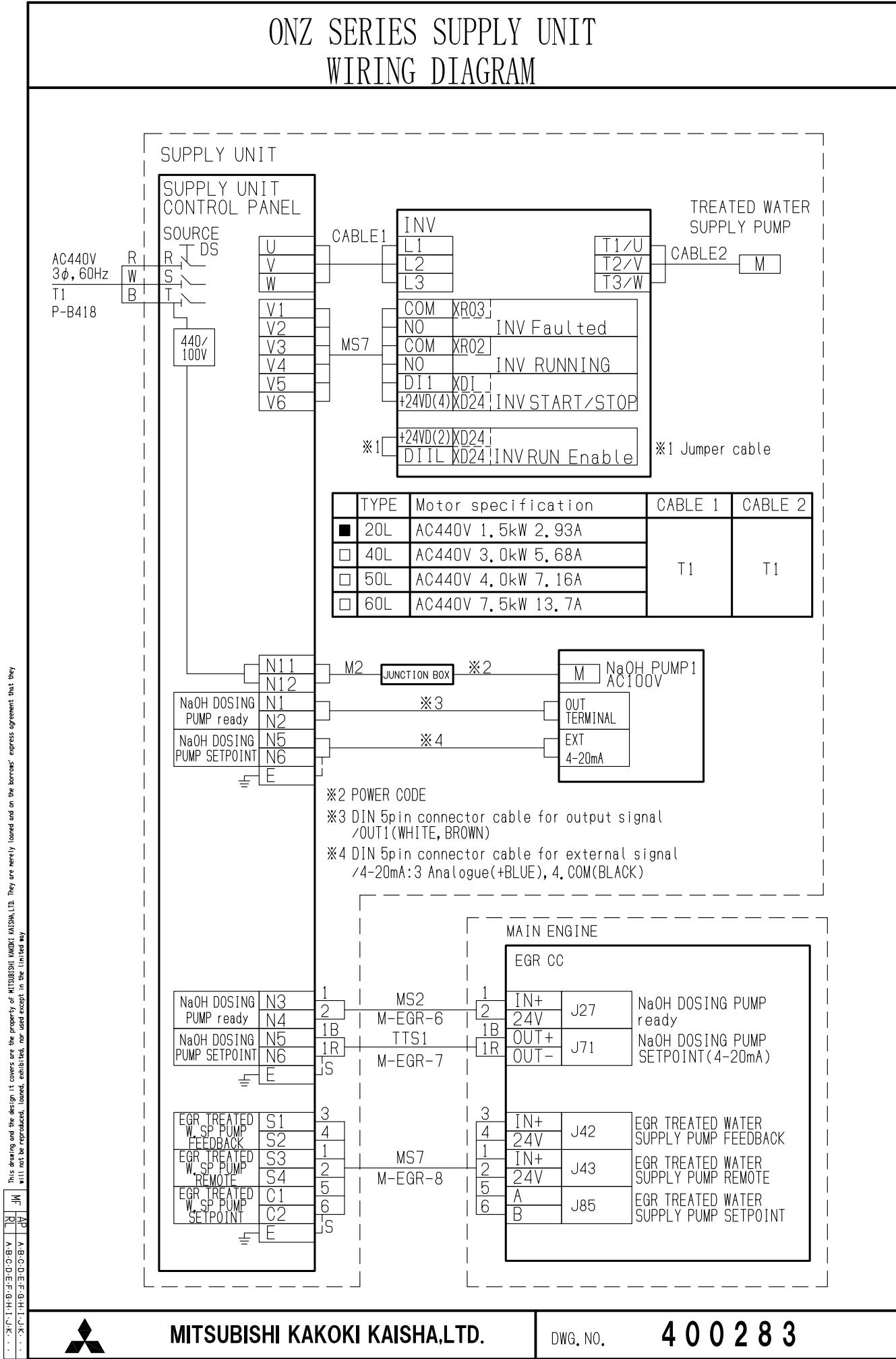


C				CLIENT	DATE 27.AUG.'19	DWG. No. 372342	REV. B
B	'20.3.23	Correction of drawing	S. Zaitsu T. Takada T. Arai	MADE N. Abe			
A	'19.11.22	Add specification	N. Abe N. Nakamura T. Arai	CHKD. A. Nakamura			
No.	DATE	REVISIONS	MADE CHKD. APPR.	LOCATION	JOB No.		





Film No. _____ Date 2022.5.23 DRAWN T. Ogawa DESIGNED A. Nakamura CHECKED T. Nakano MODEL P-B418



Flocculant Pump,Flocculant tank Specifications

凝集剤ポンプ、凝集剤タンク仕様書



標準性能曲線

Performance Curves

7SEH-424-3

イワキ電磁定量ポンプ [®] IWAKI Electromagnetic Metering Pumps		型式 Model	EHN-B11	VC VH PC PH	1 2 3 M TM 2M 3M R YT YN
吐出量 Capacity	38 ml/min · 2.28 l/hr	電源電圧 Power Supply	AC 100 - 240 V		
最大吐出圧力 Max. Pressure	1.0 MPa	周波数 Frequency	50 / 60 Hz		
ストローク長 Stroke Length	50 ~ 100 % (0.5 ~ 1.0 mm)	電流 Current (Input)	0.8 A		
ストローク数 Stroke Speed	1 ~ 360 spm	平均消費電力 Power (Input)	20 W		

吐出量
Capacity
(l/hr) (ml/min)

Stroke Length (%)	Capacity (l/hr) [0.17 MPa]	Capacity (l/hr) [1.0 MPa]
0	0	0
50	~1.8	~1.2
100	~3.6	~2.4

吐出量
Capacity
(l/hr) (ml/min)

Stroke Speed (spm)	Capacity (l/hr) [0.17 MPa]	Capacity (l/hr) [1.0 MPa]
0	0	0
36	~0.6	~0.4
72	~1.2	~0.8
108	~1.8	~1.2
144	~2.4	~1.6
180	~3.0	~2.0
216	~3.6	~2.4
252	~4.2	~3.0
288	~4.8	~3.6
324	~5.4	~4.2
360	~6.0	~4.8

試験液 ; 常温・清水
Test Liquid Room Temperature · Clear Water

承認 Approved By	作成 Made By
M.Kurita	Y.Yamada

Document Number

弊社書類番号

S-LW-13721-28

Rev.

Our Order No.

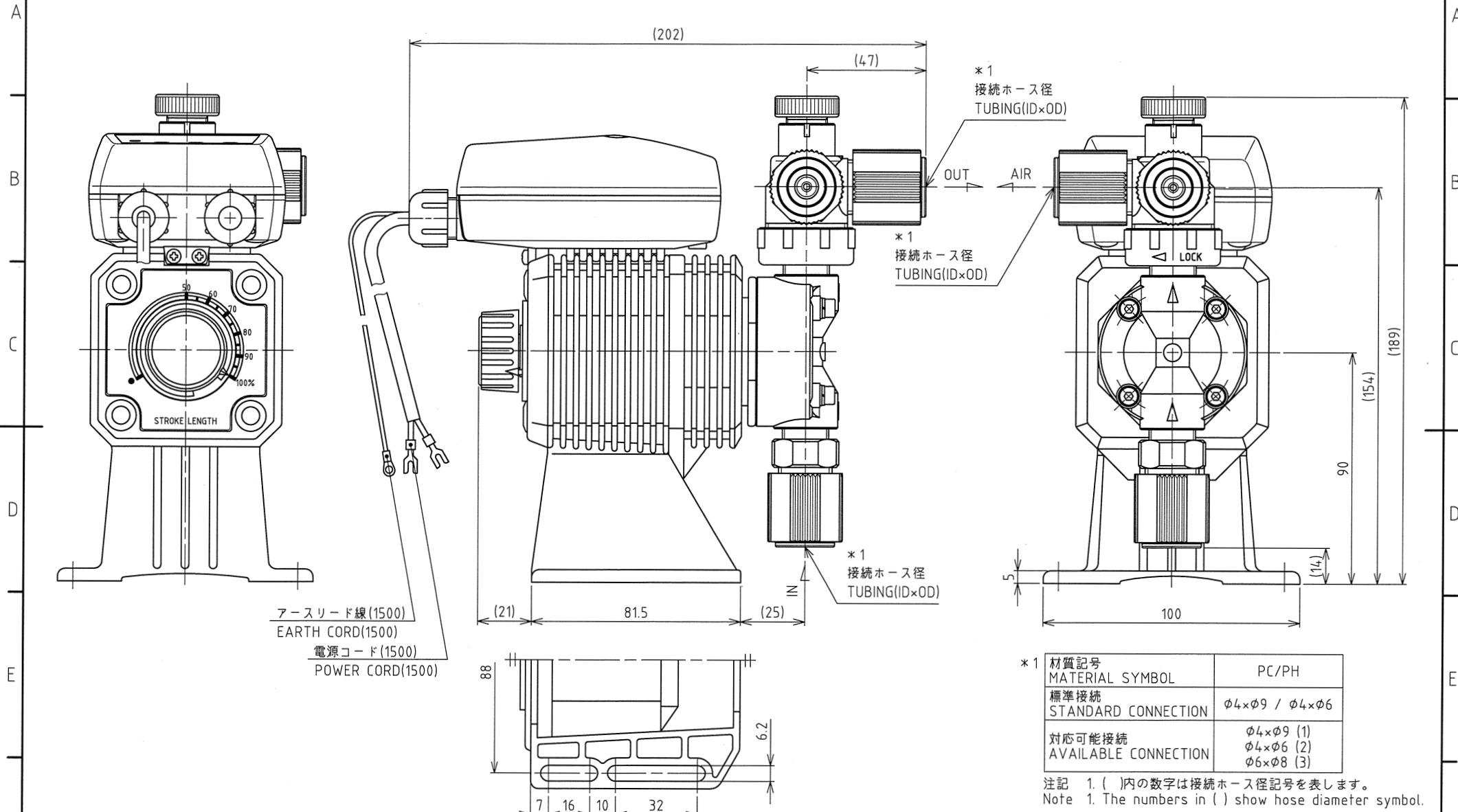
弊社工事番号

A3006715-1000

A3006716-1000

A3006717-1000

1 2 3 4 5 6 7 8



材質記号 MATERIAL SYMBOL	PC/PH
標準接続 STANDARD CONNECTION	$\phi 4 \times \phi 9 / \phi 4 \times \phi 6$
対応可能接続 AVAILABLE CONNECTION	$\phi 4 \times \phi 9$ (1) $\phi 4 \times \phi 6$ (2) $\phi 6 \times \phi 8$ (3)

注記 1. ()内の数字は接続ホース径記号を表します。
Note 1. The numbers in () show hose diameter symbol.

承認 APPROVED BY <i>Y.Yamada</i>	設計 DESIGNED BY <i>K.Umemoto</i>	尺度 SCALE N T S	単位 UNIT mm	名称 TITLE 電磁定量ポンプ外形図 Dimensional Drawing
検査 CHECKED BY <i>T.Ohida</i>	製図 DRAWN BY <i>S.Wakayama</i>	質量 MASS kg	モデル MODEL <input type="checkbox"/> MR	型式 MODEL EHN-B(11/16/21)(PC/PH) <input type="checkbox"/>
図番 DWG No. 1A353001				
DEC. 11, 2015	IWAKI CO., LTD.			

マーク MARK	改訂事項 REVISION	改訂No. REV. No.	日付 DATE	承認 APPROVED BY	設計担当 DESIGNED BY
----------	------------------	-------------------	------------	-------------------	---------------------

1 2 3 4 5 6 7 8

A

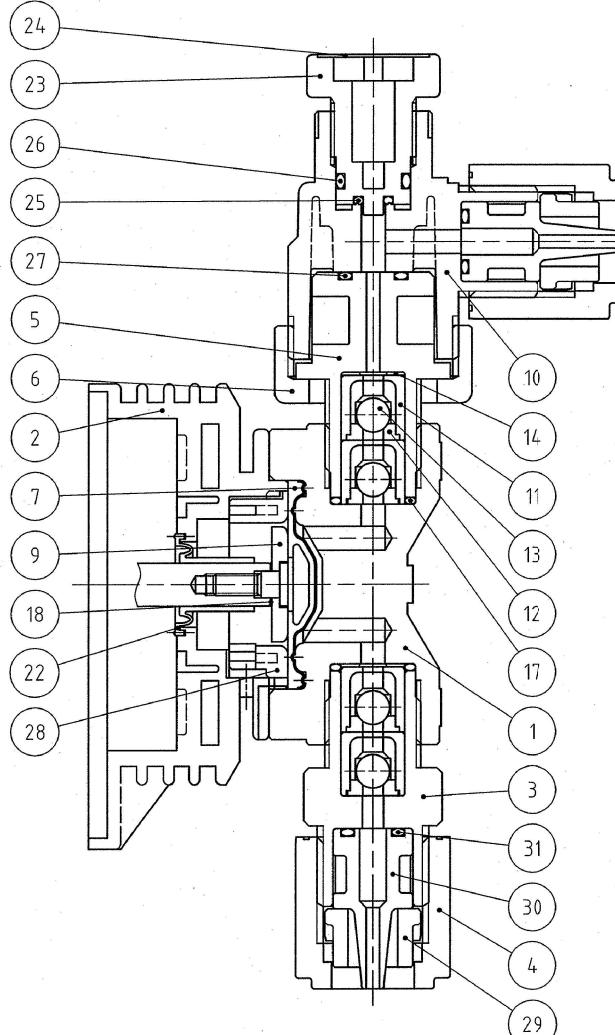
B

C

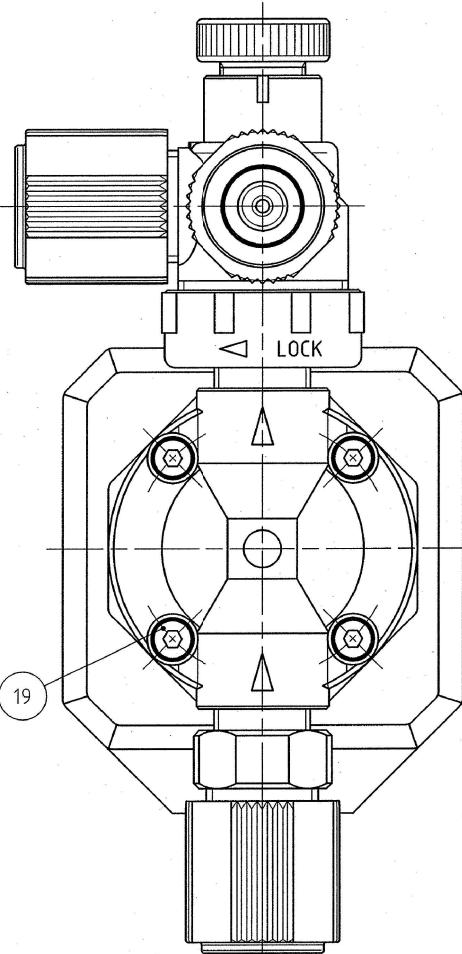
D

E

F



No.	名 称 PARTS NAME	数 QTY	材 質 MATERIALS	備 考 REMARKS
1	ポンプヘッド PUMP HEAD	1	GFRPP	
2	ブラケット BRACKET	1	PPE	
3	接続口 FITTING	1	GFRPP	
4	フィッティングナット FITTING NUT	3	GFRPP	
5	エア抜き本体B AIR VENT BODY B	1	GFRPP	
6	ロックナット LOCK NUT	1	GFRPP	
7	ダイヤフラム DIAPHRAGM	1	EPDM+PTFE	
9	リテナ RETAINER	1	PPS	
10	エア抜き本体A AIR VENT BODY A	1	GFRPP	
11	バルブガイド VALVE GUIDE	4	GFRPP	
12	バルブシート VALVE SEAT	4	*	
13	バルブ VALVE	4	*	
14	バルブガスケット VALVE GASKET	2	PTFE	
17	Oリング O RING	2	*	S14
18	ダイヤフラムスペーサ DIAPHRAGM SPACER	1	黄銅 BRASS	
19	六角穴付ボルト HEX.SOCK.CAP BOLT	4	ステンレス鋼 STAINLESS STEEL	M4x40 PW-SW付 M4x40 WITH PW-SW
22	ダイヤフラムシール DIAPHRAGM SEAL	1	EPDM	
23	エア抜き調整ネジ ADJUSTING SCREW	1	GFRPP	
24	調整ネジ銘板 NAME PLATE	1	ポリエステル POLYESTER	
25	Oリング O RING	1	*	P4
26	Oリング O RING	1	*	P10A
27	Oリング O RING	1	*	P10
28	ブラケットスペーサ BRACKET SPACER	1	PPE	
29	ホースストッパー HOSE STOPPER	3	PPS	
30	ホースアダプタ HOSE ADAPTOR	3	GFRPP	
31	Oリング O RING	3	*	P9



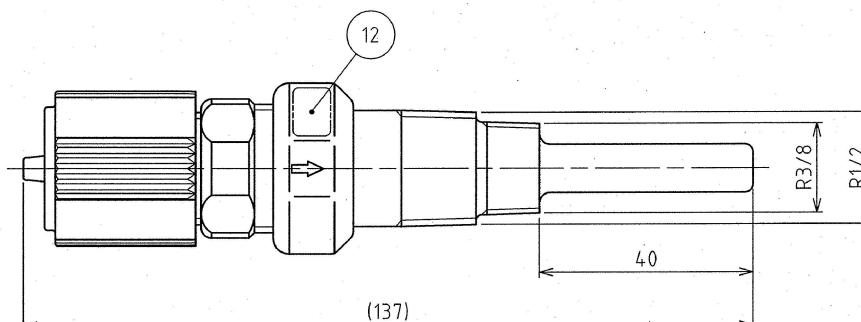
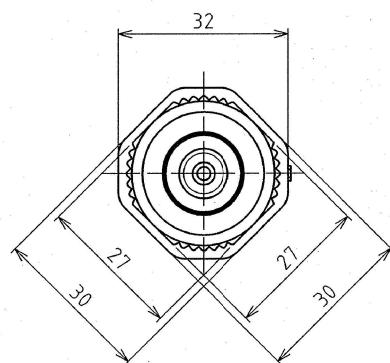
承認 APPROVED BY <i>Y.Yamada</i>	設計 DESIGNED BY <i>K.Umemoto</i>	尺度 SCALE N T S	単位 UNIT mm	名称 電磁定量ポンプ ポンプ部 構造図 TITLE Construction Drawing
検図 CHECKED BY <i>T.Oshida</i>	製図 DRAWN BY <i>S.Wakayama</i>	質量 MASS kg	寸法 DIM mm	型式 MODEL EHN-B(11/16/21)(PC/PH) □ M
REV. No. REVISION	DATE 日 付	APPROVED BY 承 認	DESIGNED BY 設計 担 当	DWG No. 図 番 1A353038
DEC. 11, 2015	IWAKI CO.,LTD.			

マーク MARK	改訂事項 REVISION	改訂 No. REV. No.	日付 DATE	承認 APPROVED BY	設計担当 DESIGNED BY
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1 2 3 4 5 6 7 8

1 2 3 4 5 6 7 8

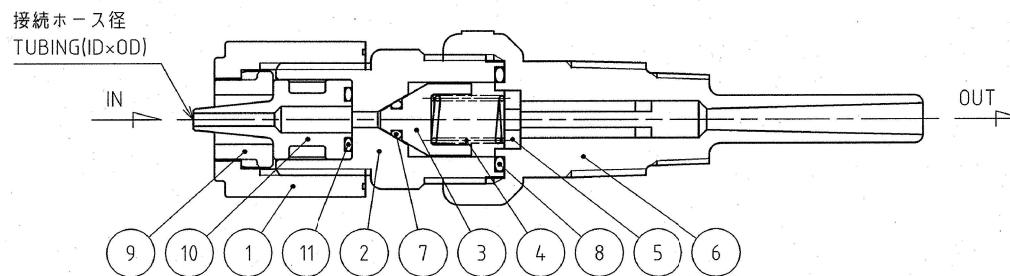
A



No.	名 称 PARTS NAME	数 QTY	材 質 MATERIALS	備 考 REMARKS
1	フィッティングナット FITTING NUT	1	GFRPP	
2	バルブケース CHECK VALVE BODY	1	GFRPP	
3	ポベット POPPET VALVE	1	CFRPP	
4	スプリング SPRING	1	ハステロイ C276 HASTELLOY C276	
5	スペーサー SPACER	1	CFRPP	
6	バルブフィッティングA VALVE FITTING A	1	CFRPP	
7	Oリング O RING	1	*	P4
8	Oリング O RING	1	*	P14
9	ホースストップバー HOSE STOPPER	1	PPS	
10	ホースアダプタ HOSE ADAPTOR	1	GFRPP	
11	Oリング O RING	1	*	P9
12	仕様銘板 NAME PLATE	1	ポリエステル POLYESTER	

* 型式 MODEL 名称 PARTS NAME	V	E
Oリング O RING	FKM	EPDM

D



適応ポンプ機種 FOR MODEL

EWN/EHN - B11/B16/B21

EWN/EHN - C16/C21

型式 MODEL	接続ホース径 TUBING (ID×OD)	設定圧力 SET PRESSURE
CAN-1(V/E)-1	Φ4×Φ9	0.17 +0.05 -0.04 MPa
CAN-1(V/E)-2	Φ4×Φ6	
CAN-1(V/E)-3	Φ6×Φ8	
CAN-1(V/E)-7	Φ1/4"×Φ3/8"	
CAN-1(V/E)-M	Φ4×Φ9/Φ4×Φ6	

E

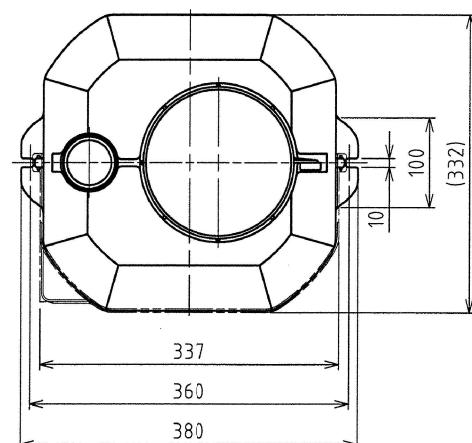
△	Correction	EH-2285	DEC. 2, 2015	Y. Yamada	T. Oshida
マーク	改訂事項	改訂No.	日付	承認 APPROVED BY	設計 DESIGNED BY
MARK	REVISION	REV. No.	DATE	Y. Ogawa	N T S

承認 APPROVED BY M.Kurita	設計 DESIGNED BY Y.Ogawa	尺度 SCALE N T S	単位 UNIT mm	名称 チャッキバルブ 外形構造図 TITLE IWAKI CHECK VALVE
検査 CHECKED BY Y.Ogawa	製図 DRAWN BY F.Tsuneki	質量 MASS kg	寸法 DIMENSION	型式 MODEL CAN-1(V/E)-□
MAR. 27, 2009	IWAKI CO., LTD.			図番 DWG No. 1A350566

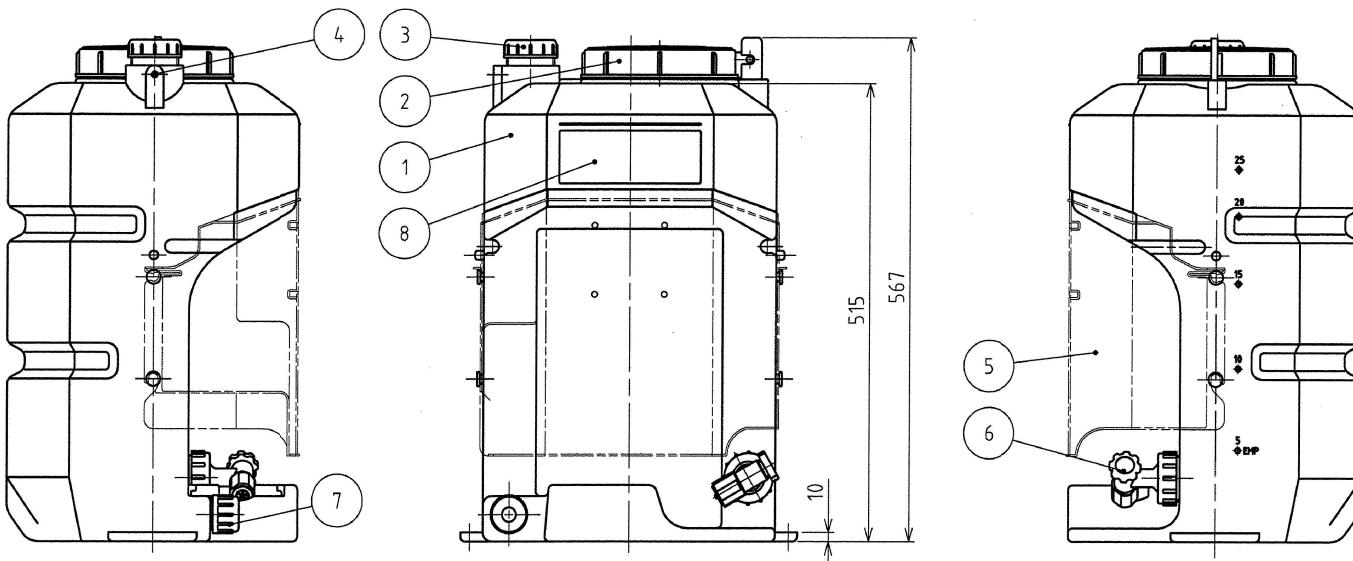
1 2 3 4 5 6 7 8

1 2 3 4 5 6 7 8

A



B



C

D

E

F

A

B

C

D

E

F

No.	名 称 Parts Name	数 Qty	材 質 Material	備 考 Remarks
1	25L タンク 25L TANK	1	PE	
2	投入口蓋 MAIN CAP	1	PE	φ170
3	キャップB CAP B	1	PE	φ60
4	PEキャップ PE CAP	1	PE	φ9.5
5	ポンプカバー PUMP COVER	1	ABS	t=2.0
6	注入口 PUMP INJECTION PORT	1	PVC/PE	Oリング O RING : FEPM
7	ドレン口 DRAIN	1	PE	Oリング O RING : FEPM
8	仕様銘板 NAME PLATE	1	ポリエスチル POLYESTER	

* O リングサイズ / O-RING SIZE

注入口 PUMP INJECTION PORT	P-9 , P-11 , P-34
ドレン口 DRAIN	P-26

型 式 MODEL	接続口径 TUBING
CT-U25NR-1	φ4×φ9
CT-U25NR-2	φ4×φ6
CT-U25NR-4	φ8×φ13

* アンカーは現品をご確認の上、設置下さい。
(成形品のため多少寸法のバラツキがあります)

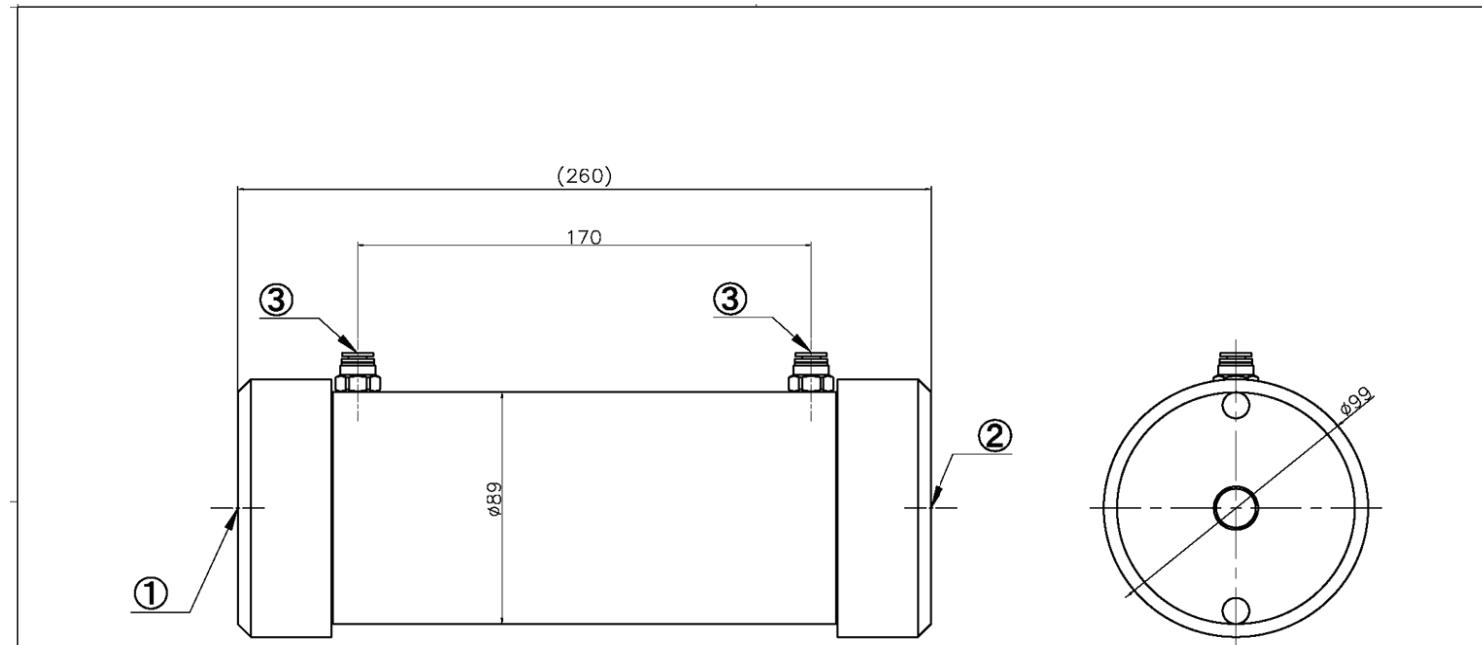
* Confirm the mounting dimensions with actual tank.
(The mounting dimensions may slightly differ with each one because the tank is made by injection molding.)

△				
△				
△				
△	Correction	EH-1989 Jun. 2010 M. Kurita		
マーク MARK	改訂事項 REVISION	改訂 No. REV.No.	日付 DATE	承認 APPROVED BY

承認 APPROVED BY	設計 DESIGNED BY	尺度 SCALE	単位 UNIT	質量 MASS	名称 TITLE
M.Kurita	Y.Ogawa	NTS	mm	kg	IWAKI CHEMICAL TANK
検査 CHECKED BY	製図 DRAWN BY	NOV. 24, 2009			型式 MODEL
Y.Ogawa	M.Sekiguchi				CT-U25NR
IWAKI CO.,LTD.	TOKYO JAPAN	図番 DWG No.	1A350789	1	

1 2 3 4 5 6 7 8

Defoaming Chamber Dimensions
脱気装置外形図



③ Vacuum port	φ6×2	Tube fitting
② In or Out Port	Rc3/8	
① In or Out Port	Rc3/8	
No. Name	Standard Thread	Remarks

DATE	SYMBOL	DESCRIPTION		NAME
BLOCK FOR REVISION DESCRIPTION				
NAME OF PRODUCT		NAME OF PART		SHEET No.
		Assembly Drawing		
Outside Drawing		MATERIAL	SCALE	DRAWING NUMBER
				MG205-DF01
APPROVAL	CHECK	DESIGN	DRAWING	RELEASE
SUGANUMA	001	****	FUJIEDA	1998. 12.03
				DIC Corporation

Document Number 弊社書類番号	S-LW-13721-29	Rev.
Our Order No. 弊社工事番号		
A3006715-1000		
A3006716-1000		
A3006717-1000		

CUSTOMER MESSRS

顧客

NAMURA SHIPBUILDING CO.,LTD.

SHIP No.

船番

487/489/490

MODEL No.

型式

SJ35HWT

TOOL LIST

要具リスト

	Q'TY 数量	Mass 質量	No. of list リスト枚数	REMARKS 備考
TOOL 要具	1 set	13.52 kg	2 Sheet/s	

Marine Machinery Design Dept.
MITSUBISHI KAKOKI KAISHA, LTD.

三菱化工機株式会社
舶用機械技術部

Document Number 弊社書類番号	S-LW-13721-13	Rev.

Our Order No.
弊社工事番号

A3006715-1000
A3006716-1000
A3006717-1000

Tool 工具						PAGE ページ	
				Ship No. 船番			
				BOX No. 箱番号			
No.	Name 名称	Sketch 略図	Material 材質	Supply per ship 供給数/船		Parts No. 部品番号	Remarks 備考
				Working 常用	Spare 予備		
801	dismantling stand 分解台	<p>A= 190 B= 190 mass kg/pc 3.85</p>	structural steel 圧延鋼	1	-	253419102	
802	bowl nut handle 回転体ナットハンドル	<p>A= 360 B= 2.6 mass kg/pc 2.6</p>	carbon steel casting 炭素鋼鑄鋼	1	-	254289001	with socket cap screw F3008025G
803	jack (1) 回転体蓋ジャッキ	<p>A= 113 B= 1.03 mass kg/pc 1.03</p>	carbon steel casting 炭素鋼鑄鋼	1	-	363888001	with socket cap screw F3008070G
804	disc nut handle ディスクナットハンドル	<p>A= 230 B= 0.682 mass kg/pc 0.682</p>	carbon steel casting 炭素鋼鑄鋼	1	-	363886001	
807	disc clamp plate 分離板押え	<p>A= 108 B= 85 mass kg/pc 1.18</p>	structural steel 圧延鋼	1	-	463967103	
808	cap nut spanner 袋ナットスパナ	<p>A= 150 B= 197 mass kg/pc 0.487</p>	structural steel 圧延鋼	1	-	362156103	
809	jack (3) バルブジャッキ	<p>A= 38 B= 98 mass kg/pc 0.123</p>	carbon steel 炭素鋼	1	-	451096103	
810	main seal ring cutter 弁パッキン抜き	<p>A= 153 B= 0.05 mass kg/pc 0.05</p>	-	1	-	450522001	
811	bolt 六角ボルト	<p>A= 130 B= 8 mass kg/pc 0.056</p>	chromium molybdenum steel 合金鋼	2	-	436193001	
812	protective plate 当て板	<p>A= 38 B= 6 mass kg/pc 0.036</p>	carbon steel 炭素鋼	1	-	463968001	

MFR' S NAME ADDRESS 会社名及び住所	IMITSUBISHI KAKOKI KAISHA, LTD. HEAD OFFICE: 2-1 OHKAWA-CHO, KAWASAKI-KU, KAWASAKI-CITY, KANAGAWA JAPAN 三菱重工機株式会社 本社事務所: 神奈川県川崎市川崎区大川町2-1	TEL: +81-44-333-5364 mail: mkkkikai@kakoki.co.jp TEL: 044-333-5364	FAX: +81-44-355-4579 FAX: 044-355-4579
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Tool 工具						PAGE ページ	
						Ship No. 船番	
		MODEL 型番 SJ35HWT				BOX No. 箱番号	
No.	Name 名 称	Sketch 略 図	Material 材 質	Supply per ship 供給数/船		Parts No. 部品番号	Remarks 備考
				Working 常用	Spare 予備		
813	jack (5) 分解ジャッキ		structural steel 圧延鋼	1	-	463969001	
815	jack (7) 軸受ジャッキ		structural steel 圧延鋼	1	-	463970001	
817	jack (10) 回転体ブッシュ ジャッキ		structural steel 圧延鋼	1	-	468204001	
818	hook spanner フックスパナ		carbon steel 炭素鋼鍛鋼	1	-	450760003	52-60
819	push bolt 押しボルト		structural steel 圧延鋼	1	-	463962001	
820	socket set screw 六角穴付き止めねじ		chromium molybdenum steel 合金鋼	2	-	E400630G4	
821	jack (4) 回転体 吊り上げジャッキ		structural steel 圧延鋼	1	-	362157102	
823	handle (1) ハンドル(1)		structural steel 圧延鋼	1	-	436176001	
824	shackle シャックル		structural steel 圧延鋼	2	-	NS12	

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CUSTOMER MESSRS

顧客

NAMURA SHIPBUILDING CO.,LTD.

SHIP No.

船番

487/489/490

MODEL No.

型式

SJ35HWT

ACCESSORIES & SPARE PARTS LIST

付属品 & 予備品リスト

	Q'TY 数量	Mass 質量	No. of list リスト枚数	REMARKS 備考
Accessories 付属品	1 set	0.02 kg	1 Sheet/s	
Spare Parts 予備品	1 set	11.25 kg	6 Sheet/s	SV Volt./Freq
				DC24V 60Hz

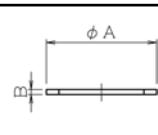
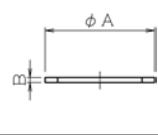
Marine Machinery Design Dept.
MITSUBISHI KAKOKI KAISHA, LTD.

三菱化工機株式会社
舶用機械技術部

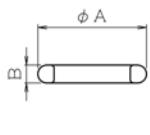
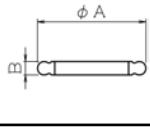
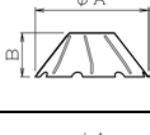
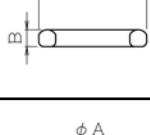
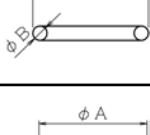
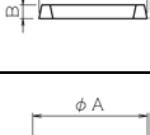
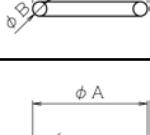
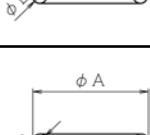
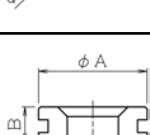
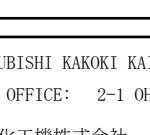
Document Number 弊社書類番号	S-LW-13721-19	Rev.
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弊社工事番号

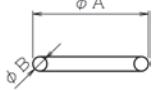
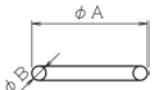
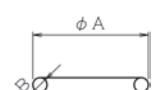
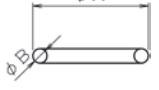
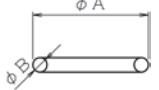
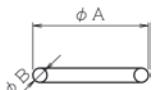
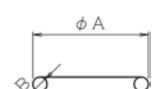
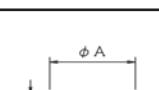
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A3006716-1000
A3006717-1000

Spacer スペーサ						PAGE ページ	
						Ship No. 船番	
						BOX No. 箱番号	
No.	Name 名 称	Sketch 略 図	Material 材 質	Supply per ship 供給数/船	Parts No. 部品番号	Remarks 備考	
				Working 常用	Spare 予備		
521-1	spacer (1) スペーサ(1)		A= 85 B= 0.5 mass kg/pc 0.006	structural steel 圧延鋼	1	-	463618001 0.5t
521-2	spacer (1) スペーサ(1)		A= 85 B= 1 0.012	structural steel 圧延鋼	1	-	463618002 1t
			A= B=				
			A= B=				
			A= B=				
			A= B=				
			A= B=				
			A= B=				
			A= B=				
			A= B=				

MFR' S NAME ADDRESS 会社名及び住所	IMITSUBISHI KAKOKI KAISHA, LTD. HEAD OFFICE: 2-1 OHKAWA-CHO, KAWASAKI-KU, KAWASAKI-CITY, KANAGAWA JAPAN 三菱化工機株式会社 本社事務所: 神奈川県川崎市川崎区大川町2-1	TEL: +81-44-333-5364 mail: mkkkikai@kakoki.co.jp TEL: 044-333-5364	FAX: +81-44-355-4579 FAX: 044-355-4579
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Spare Parts 予備品						PAGE ページ	
WTS SEPARATOR						Ship No. 船番	
MODEL 型番 SJ35HWT						BOX No. 箱番号	
No.	Name 名 称	Sketch 略 図	Material 材 質	Supply per ship 供給数/船		Parts No. 部品番号	Remarks 備考
				Working 常用	Spare 予備		
102	0 ring 0リング		NBR N B R	1	1	465264001	
107	0 ring 0リング		NBR N B R	1	1	463599002	
111	disc (1) 分離板		stainless steel ステンレス鋼	1set	1	254182102	
116	0 ring 0リング		NBR N B R	1	1	465267001	
117	0 ring 0リング		NBR N B R	1	1	465272001	
118	main seal ring 弁パッキン		nylon ナイロン	1	1	463601001	
126	0 ring 0リング		FKM F K M	4	4	A10011F	
127	0 ring 0リング		FKM F K M	4	4	A42017F	
129	0 ring 0リング		FKM F K M	2	2	A42017F	
130	valve sheet バルブシート		nylon ナイロン	2	2	436000001	

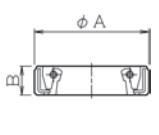
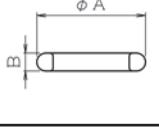
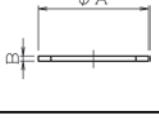
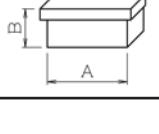
MFR' S NAME ADDRESS 会社名及び住所	MITSUBISHI KAKOKI KAISHA, LTD. HEAD OFFICE: 2-1 OHKAWA-CHO, KAWASAKI-KU, KAWASAKI-CITY, KANAGAWA JAPAN 三菱重工機株式会社 mail: mkkkikai@kakoki.co.jp 本社事務所: 神奈川県川崎市川崎区大川町2-1	TEL: +81-44-333-5364 FAX: +81-44-355-4579
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Spare Parts 予備品						PAGE ページ	
WTS SEPARATOR						Ship No. 船番	
MODEL 型番 SJ35HWT						BOX No. 箱番号	
No.	Name 名 称	Sketch 略 図	Material 材 質	Supply per ship 供給数/船		Parts No. 部品番号	Remarks 備考
				Working 常用	Spare 予備		
131	0 ring 0リング	 <p>A= 16.8 B= 1.9 0.001</p>	FKM F K M	2	2	A41013F	
142	0 ring 0リング	 <p>A= 20.7 B= 1.8 0.001</p>	NBR N B R	1	1	A80017A	
220	0 ring 0リング	 <p>A= 38.7 B= 3.5 0.002</p>	NBR N B R	1	1	A10032A	
252	gasket シートパッキン	 <p>A= 45 B= 1.5 0.002</p>	non-asbestos fiber ノンアスジョイントシート	1	1	L04503515	
303	0 ring 0リング	 <p>A= 465.7 B= 5.7 0.038</p>	NBR N B R	1	1	A20455A	
318	0 ring 0リング	 <p>A= 20.6 B= 2.4 0.001</p>	NBR N B R	1	1	A10016A	
323	0 ring 0リング	 <p>A= 37.7 B= 3.5 0.002</p>	NBR N B R	1	1	A10031A	
352	0 ring 0リング	 <p>A= 24.6 B= 2.4 0.001</p>	NBR N B R	1	1	A10020A	
360	0 ring 0リング	 <p>A= 38 B= 3.8 0.003</p>	NBR N B R	1	1	420856001	
453	gasket シートパッキン	 <p>A= 38 B= 1.5 0.005</p>	non-asbestos fiber ノンアスジョイントシート	2	2	LB0382815	

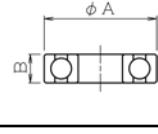
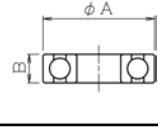
MFR' S NAME ADDRESS 会社名及び住所	MITSUBISHI KAKOKI KAISHA, LTD. HEAD OFFICE: 2-1 OHKAWA-CHO, KAWASAKI-KU, KAWASAKI-CITY, KANAGAWA JAPAN 三菱重工機株式会社 mail: mkkkikai@kakoki.co.jp 本社事務所: 神奈川県川崎市川崎区大川町2-1	TEL: +81-44-333-5364 FAX: +81-44-355-4579
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Spare Parts 予備品						PAGE ページ	
WTS SEPARATOR						Ship No. 船番	
MODEL 型番 SJ35HWT						BOX No. 箱番号	
No.	Name 名 称	Sketch 略 図	Material 材 質	Supply per ship 供給数/船		Parts No. 部品番号	Remarks 備考
				Working 常用	Spare 予備		
505	0 ring 0リング		NBR N B R	2	2	A20130A	
511	ball bearing (1) 深溝玉軸受		bearing steel ベアリング鋼	1	1	I16207J8	
517	0 ring 0リング		NBR N B R	1	1	A20030A	
519	0 ring 0リング		NBR N B R	1	1	A20030A	
529	bearing (2) 円筒ころ軸受		bearing steel ベアリング鋼	1	1	I42304J1	
532	ball bearing (3) アンギュラ玉軸受		bearing steel ベアリング鋼	1	1	I27304J2	
602	ball bearing (1) 深溝玉軸受		bearing steel ベアリング鋼	2	2	I16306J1	
609	oil seal オイルシール		NBR N B R	1	1	K1406211A	
610	0 ring 0リング		NBR N B R	1	1	A20275A	
621	friction clutch フリクションクラッチ		copper-alloy 銅合金	4	4	362591105	

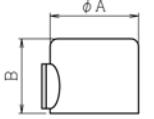
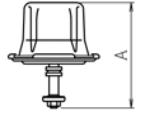
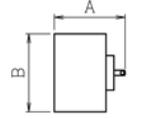
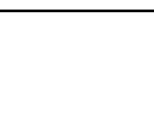
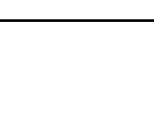
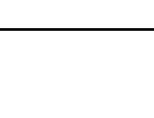
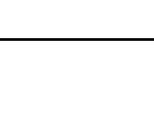
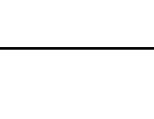
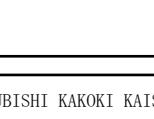
MFR' S NAME ADDRESS 会社名及び住所	MITSUBISHI KAKOKI KAISHA, LTD. HEAD OFFICE: 2-1 OHKAWA-CHO, KAWASAKI-KU, KAWASAKI-CITY, KANAGAWA JAPAN 三菱重工機株式会社 本社事務所: 神奈川県川崎市川崎区大川町2-1	TEL: +81-44-333-5364 mail: mkkkikai@kakoki.co.jp TEL: 044-333-5364	FAX: +81-44-355-4579 FAX: 044-355-4579
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Spare Parts 予備品						PAGE ページ	
WTS SEPARATOR						Ship No. 船番	
MODEL 型番 SJ35HWT						BOX No. 箱番号	
No.	Name 名 称	Sketch 略 図	Material 材 質	Supply per ship 供給数/船	Parts No. 部品番号	Remarks 備考	
				Working 常用	Spare 予備		
625	oil seal オイルシール		A= 62 B= 11 mass kg/pc 0.03	NBR N B R	1	1	K1406211A
708	0 ring Oリング		A= 87 B= 5 mass kg/pc 0.006	NBR N B R	2	2	464854001
711	packing パッキン		A= 52.5 B= 1 mass kg/pc 0.002	non-asbestos fiber ノンアスジョイ ントシート	1	1	463626001
999	tool box 予備品箱		A= 400 B= 300 mass kg/pc 7.25	structural steel 圧延鋼	0	1	257643001
			A=				
			B=				
			A=				
			B=				
			A=				
			B=				
			A=				
			B=				
			A=				
			B=				

MFR' S NAME ADDRESS 会社名及び住所	IMITSUBISHI KAKOKI KAISHA, LTD. HEAD OFFICE: 2-1 OHKAWA-CHO, KAWASAKI-KU, KAWASAKI-CITY, KANAGAWA JAPAN 三菱化工機株式会社 mail: mkkkikai@kakoki.co.jp TEL: 044-333-5364 FAX: 044-355-4579 本社事務所: 神奈川県川崎市川崎区大川町2-1
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Spare Parts 予備品						PAGE ページ	
Induction Motor						Ship No. 船番	
MODEL 型番 SJ35HWT						BOX No. 箱番号	
No.	Name 名 称	Sketch 略 図	Material 材 質	Supply per ship 供給数/船	Parts No. 部品番号	Remarks 備考	
				Working 常用	Spare 予備		
55	ball bearing (4) for load side 深みぞ玉軸受		A= 90 B= 23 0.636	bearing steel ベアリング鋼	1	1	I16308J5
56	ball bearing (4) for unload side 深みぞ玉軸受		A= 72 B= 19 0.345	bearing steel ベアリング鋼	1	1	I16306J9
			A= B=				
			A= B=				
			A= B=				
			A= B=				
			A= B=				
			A= B=				
			A= B=				
			A= B=				

MFR' S NAME ADDRESS 会社名及び住所	IMITSUBISHI KAKOKI KAISHA, LTD. HEAD OFFICE: 2-1 OHKAWA-CHO, KAWASAKI-KU, KAWASAKI-CITY, KANAGAWA JAPAN 三菱化工機株式会社 本社事務所: 神奈川県川崎市川崎区大川町2-1	TEL: +81-44-333-5364 mail: mkkkikai@kakoki.co.jp TEL: 044-333-5364	FAX: +81-44-355-4579 FAX: 044-355-4579
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Spare Parts 予備品						PAGE ページ	
Control Devices						Ship No. 船番	
MODEL 型番						BOX No. 箱番号	
No.	Name 名 称	Sketch 略 図	Material 材 質	Supply per ship 供給数/船	Parts No. 部品番号	Remarks 備考	
				Working 常用	Spare 予備		
V08	coil assembly コイルアセンブリ		-	3	1	JDSPE8008 DC24V	
V22	diaphragm assembly ダイヤフラムアセンブリ		stainless steel ステンレス鋼	1	1	RU1542106 HBC/MAN 300kPa with O-ring	
V51	pilot valve パイロット弁		-	8	2	PMS23501 DC24V	
							
							
							
							
							
							
							
							

MFR' S NAME ADDRESS 会社名及び住所	IMITSUBISHI KAKOKI KAISHA, LTD. HEAD OFFICE: 2-1 OHKAWA-CHO, KAWASAKI-KU, KAWASAKI-CITY, KANAGAWA JAPAN 三菱化工機株式会社 mail: mkkkikai@kakoki.co.jp TEL: 044-333-5364 FAX: 044-355-4579 本社事務所: 神奈川県川崎市川崎区大川町2-1
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CUSTOMER MESSRS

顧 客

NAMURA SHIPBUILDING CO.,LTD.

SHIP No.

船 番

487/489/490

MODEL No.

型 式

ONZ16-PN35E

TOOL LIST

要具リスト

	Q'TY 数量	Mass 質量	No. of list リスト枚数	REMARKS 備考
TOOL 要具	1 set	1.2 kg	1 Sheet/s	

Marine Machinery Design Dept.
MITSUBISHI KAKOKI KAISHA, LTD.

三菱化工機株式会社
舶用機械技術部

Document Number 弊社書類番号	S-LW-13721-24	Rev.

Our Order No. A3006715-1000
弊社工事番号 A3006716-1000
A3006717-1000

MFR'S NAME ADDRESS	MITSUBISHI KAKOKI KAISHA, LTD. TEL: +81-44-333-5364 FAX: +81-44-355-4579 HEAD OFFICE: 2-1 OHKAWA-CHO, KAWASAKI-KU, KAWASAKI-CITY, KANAGAWA JAPAN
会社名及び住所	三菱化工機株式会社 mail: mkkkikai@akokoki.co.jp TEL: 044-333-5364 FAX: 044-355-4579 本社事務所: 神奈川県川崎市川崎区大川町2-1 GL0101S6LTIA

CUSTOMER MESSRS

顧客

NAMURA SHIPBUILDING CO.,LTD.

SHIP No.

船番

487/489/490

MODEL No.

型式

ONZ16-PN35E/SU20L

ACCESSORIES & SPARE PARTS LIST

付属品 & 予備品リスト

	Q'TY 数量	Mass 質量	No. of list リスト枚数	REMARKS 備考
Accessories 付属品	1 set	1.3 kg	1 Sheet/s	
Spare Parts 予備品	1 set	1.9 kg	8 Sheet/s	
Additional Spare Parts 追加予備品	1 set	25 kg	1 Sheet/s	

Marine Machinery Design Dept.
MITSUBISHI KAKOKI KAISHA, LTD.

三菱化工機株式会社
船用機械技術部

Document Number 弊社書類番号	S-LW-13721-25	Rev. B
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Our Order No.
弊社工事番号

A3006715-1000
A3006716-1000
A3006717-1000

MFR'S NAME ADDRESS 会社名及び住所	MITSUBISHI KAKOKI KAISHA, LTD. TEL: +81-44-333-5364 FAX: +81-44-355-4579 HEAD OFFICE: 2-1 OHKAWA-CHO, KAWASAKI-KU, KAWASAKI-CITY, KANAGAWA JAPAN 三菱化工機株式会社 mail: mkkkikai@akokoki.co.jp TEL: 044-333-5364 FAX: 044-355-4579 本社事務所: 神奈川県川崎市川崎区大川町2-1
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Spare parts	model:FOCAS-2000						item							
oil concentration detector FOCAS-2000							Hull No.							
Spare Parts Table							Case No.							
No	Part name	Part No.	Sketch	Material	Work-ing	backup	mass(kg)	remarks						
1	Fuse for three-way Valve	2000-020		Glass tube	2	2	0.00075	Normal Meltdown type 2A						
2	Fuse for the equipment	2000-010		Ceramic tube	1	1	0.00075	Fast-blow type 3.15A						
3	Upper lid O-ring	2000-060		FKM	1	1	0.002	4DP-31						
4	Drain seal W	2000-070		SUS/NBR	1	1	0.0006	M5						
5	Washing brush	2000-030				1	0.01							
6	Washing liquid	2000-040				1	0.15	125mL						
7	Operational log memory card	2000-250		Glass epoxy	1	5	0.0032							
CHECK Kanbayasi	DESIGN Okumura	DRAWIN Okumura	DATE MAR. 12. 2019 APPOINT	TITLE FOCAS-2000 Spare Parts Table										
FELLOW KOGYO CO.,LTD.			SCALE	DRAWING NO	8960-55									

MFR'S NAME ADDRESS 会社名及び住所	MITSUBISHI KAKOKI KAISHA, LTD. TEL: +81-44-333-5364 FAX: +81-44-355-4579 HEAD OFFICE: 2-1 OHKAWA-CHO, KAWASAKI-KU, KAWASAKI-CITY, KANAGAWA JAPAN 三菱化工機株式会社 mail: mkkkikai@akokki.co.jp TEL: 044-333-5364 FAX: 044-355-4579 本社事務所: 神奈川県川崎市川崎区大川町2-1
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SHIP NO. 船番		SPARE PARTS LIST FOR 予備品表		U S E 用途				SET PER SHIP 台数				
		STARTER PANEL 始動器盤		WTS STARTER PANEL				1				
		7.5kW AC440V										
ITEM NO. 項目	NAME OF PARTS 名称	OUTLINE 外 形 図				QUANTITY 數量		REMARKS 備考				
					WORKING 常 用 数		SPARE 予 備		SPECIFICATION 仕 様			
					PER SET 1 セット	PER SHIP 1 船			MASS(g) 質 量			
301	FUSE ヒューズ					3	3	3	10A	MFR'S : FUJI ELECTRIC CO., LTD. TYPE : FCF2 20		
302	ELECTRO MAGNETIC CONTACTOR 電磁接触器					1	1	1	100V 110V 60Hz	MFR'S : FUJI ELECTRIC CO., LTD. TYPE : SC-4-1 360		
303	AUXILIARY RELAY 補助繼電器					1	1	1	24V	MFR'S : FUJI ELECTRIC CO., LTD. TYPE : HH54P 30		
304	FUSE ヒューズ					2	2	2	1A	MFR'S : FUJI TERMINAL INDUSTRY CO., LTD. TYPE : GLASS TUBE 1		
MFR'S NAME 製造社名		MITSUBISHI KAKOKI KAISHA, LTD. 三菱化工機株式会社				DWG. NO. 図 番	470507A					

SHIP NO. 船番		SPARE PARTS LIST FOR 予備品表		U S E 用途			SET PER SHIP 台数	
		STARTER PANEL		WTS PUMP STARTER PANEL			1	
ITEM NO. 項目	NAME OF PARTS 名 称	OUTLINE 外 形 図	QUANTITY 數量		REMARKS 備考			
			WORKING 常 用 数 PER SET 1セット	SPARE 予 備 PER SHIP 1 艦	SPECIFICATION 仕 様		MASS(g) 質 量	
301	GLOBE FOR SIGNAL LAMP 表示灯用グローブ		1	1	1	WHITE	TYPE: DR9C001-W	3
			1	1	1	ORANGE	TYPE: DR9C001-A	
302	GLOBE FOR SIGNAL LAMP 表示灯用グローブ		1	1	1	GREEN	TYPE: AR9C012-G	1
303	BULB FOR SIGNAL LAMP 表示灯用電球		3	3	3		TYPE : 30V 1W BA9S/13	2
304	FUSE ヒューズ		2	2	2	5A	MFR'S : FUJI ELECTRIC CO., LTD. TYPE : FCF2	20
			1	1	1	3A		
			1	1	1	1A		
305	ELECTRO MAGNETIC CONTACTOR 電磁接触器		1	1	1	100V 110V 60Hz	MFR'S : FUJI ELECTRIC CO., LTD. TYPE : SC-03	320
306	AUXILIARY RELAY 補助繼電器		9	9	1	100V	MFR'S : FUJI ELECTRIC CO., LTD. TYPE : HH54P	30
MFR'S NAME 製造社名		MITSUBISHI KAKOKI KAISHA, LTD. 三菱化工機株式会社		DWG. NO. 図 番	470565			

SHIP NO. 船番		SPARE PARTS LIST FOR 予備品表		U S E 用途			SET PER SHIP 台数			
		SUPPLY UNIT CONT PANEL					1			
ITEM NO. 項目	NAME OF PARTS 名 称	OUTLINE 外 形 図	QUANTITY 数 量			REMARKS 備 考				
			WORKING 常 用 数	SPARE 予 備	SPECIFICATION 仕 样	MFR'S : FUJI ELECTRIC CO., LTD. TYPE : FCF2	20	30		
301	FUSE ヒューズ		2	2	5A	MFR'S : FUJI ELECTRIC CO., LTD. TYPE : HH54P				
			1	1	3A					
			1	1	1A					
302	AUXILIARY RELAY 補助継電器		6	6	100V	MFR'S : FUJI ELECTRIC CO., LTD. TYPE : HH54P				
			1	1	24V					
MFR'S NAME 製造社名		MITSUBISHI KAKOKI KAISHA, LTD. 三菱化工機株式会社			DWG. NO. 図 番	470365A				

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SHIP NO.	SPARE PARTS LIST FOR 予備品表		USE 用途			SETS PER VESS 台数			
SNO.489						1SET			
項目 NO.	名 称 NAME OF PART	外 形 図 OUTLINE	QUANTITY		CODE NO.		BOX NO.		
			WORKING	SPARE	TYPE	MAKER			
			PER SET	PER VESS					
1	筒型ヒューズ CARTRIDGE FUSE		1	1	1	1220121 UC0 1A UTSUNOMIYA			
2	筒型ヒューズ CARTRIDGE FUSE		10	10	10	1220122 UC0 3A UTSUNOMIYA			
3	筒型ヒューズ CARTRIDGE FUSE		1	1	1	1220123 UC0 5A UTSUNOMIYA			
4	筒型ヒューズ CARTRIDGE FUSE		2	2	2	1220124 UC0 10A UTSUNOMIYA			
5	筒型ヒューズ CARTRIDGE FUSE		2	2	2	1220125 UC0 15A UTSUNOMIYA			
6	補助リレー AUX. RELAY		1	1	1	1211874 RJ2S-C-A100 AC100/110V IDEC			
7	補助リレー AUX. RELAY		16	16	2	1211876 RJ2S-CD-D24 DC24V IDEC			
8									
9	表示灯 INDICAT. LAMP		1	1	1	1165123 DR30D0L-H3P (AC100~110V) WHITE FUJI			
10	照光式押釦スイッチ ILLUMI. PUSH BUTTON SWITCH		1	1	1	1174541 AR30G4L-11H3G FUJI			
改定 CHANGE			SCALE	/ NTS	森	白方	松井		
			DATE	2022/7/22					
BEMAC株式会社		予 備 品 表			図番 DRW. NO.	SA22472-		SP1	
BEMAC Corporation		SPARE PARTS LIST							

予備品リスト
SPARE PARTS LIST

NO.1R-3530 △1

受注先名
PURCHASER

三菱化工機株式会社 殿

最終納入先名
USER

機器番号
ITEM NO

機器名称
EQUIPMENT NAME

NaOH pump

工事番号
JOB NO

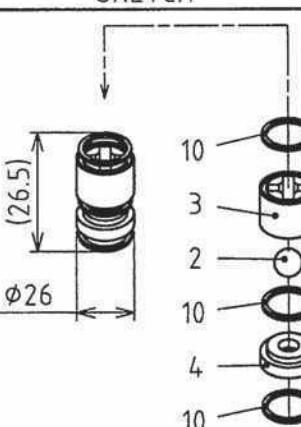
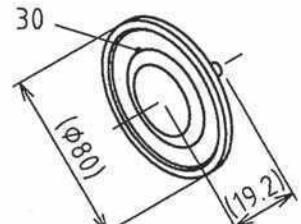
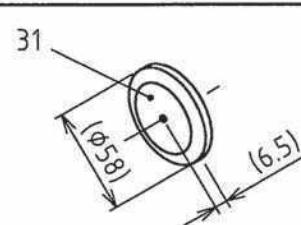
ポンプ
MODEL

IX-C060S6R-RF1-16

仕様書番号
SPEC NO

台数
QUANTITY REQ'D

1台

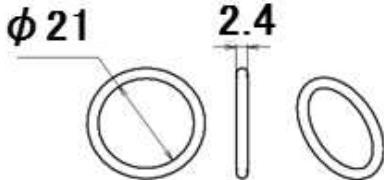
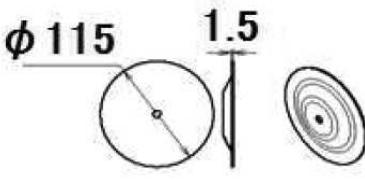
NO.	名称 NAME	略図 SKETCH	数/台 Q'TY/EACH	総数 TOTAL Q'TY	備考 REMARKS
1	バルブセット VALVE SET 2. バルブ VALVE SUS316 3. バルブガイド VALVE GUIDE SUS316 4. バルブシート VALVE SEAT SUS316 10. バルブガスケット VALVE GASKET PTFE		2SET/1台	2SET	選定コード Selection code IX0082 重量: 90g
2	30. ダイヤフラム DIAPHRAGM PTFE+EPDM		1/1台	1個	選定コード Selection code IX0061 重量: 75g
3	31. リテナ RETAINER PLATE SUS304		1/1台	1個	選定コード Selection code IX0062 重量: 65g

DATE JUN. 13, 2011

△			
△			
▲	Correction	IX-046	DEC.17.'13 y.Tamada
マーク MARK	改訂事項 REVISION	改訂NO REV NO	日付 DATE

承認 APPROVED BY	検図 CHECKED BY	製図 DRAWN BY
S.Tomita	Y.Matsumoto	M.Sekiguchi

IWAKI CO.,LTD.

No.	名称・材質・部品番号 Parts name/Material/Parts No.	略図 Picture	員数	数量	備考 Note
			Q'ty	Note	
1	Oリング P-21 O RING P-21 NBR 9S1BP0021		8	8	
2	ダイヤフラム DIAPHRAGM NBR 1D20018BB		2	2	

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IMITSUI E&S CO.,LTD.

VOL.5: COMPONENT NO.3(OTHERS)

WATER TREATMENT SYSTEM INSTRUCTION MANUAL

MITSUBISHI

**Water Treatment System
ONZ Series (MKK2)**

Instruction Manual

M3-MKWTS2-OMM-006E



MITSUBISHI KAKOKI KAISHA, LTD.

4Y-02240



CAUTION

Do not make any modifications to the separator and the auxiliary equipment without obtaining approval from us.

If you have any questions or problems when using, please contact the section in charge of service as described below.

Marine Machinery After-Service Department,

Kawasaki Works, Mitsubishi Kakoki Kaisha, Ltd.

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E-Mail: mkkparts@kakoki.co.jp



CAUTION

Please be sure to use genuine parts for the separator and the auxiliary equipment.

Do not use parts other than genuine parts as we will not take any responsibilities for a failure arising from the use of non-genuine parts.



WARNING

This Instruction Manual is a guidebook to use the EGR Scrubber Water Treatment System ONZ Series (hereafter "WTS") MKK2.

Please be sure to refer to this book along with the separate complete book.

Please handle the WTS to make the WTS fulfill the functions safely and sufficiently.



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1 Safety Instructions

Please read the "Safety Instructions" thoroughly before using and use properly.

The Safety Instructions described in this Manual are to ensure proper use of the product and prevent harms and damages to users. Until the Safety instructions are sufficiently read and understood, do not carry out any work and operation for the Water Treatment System (hereafter "WTS") such as running and maintenance works.

1.1 Safety symbols

In this Manual, instructions are presented under the following titles. As all of them are important safety descriptions, please be sure to observe them.



DANGER: Non-observance will result in death or serious diseases.



WARNING: Non-observance can result in death or serious injuries.



CAUTION: Non-observance can lead to minor injuries, moderate disability, or damage / malfunction of machine or facilities.



NOTE: Matters that you must carry out and convenient matters to be kept in mind during operation and work are described.

1.2 Cautions for safety



CAUTION

- Do not disassemble or modify the WTS without obtaining approval from us.
- Before performing any wiring work, be sure to check that the supply power is switched to OFF. There is a risk of electric shock.
- Wiring work must be done by an electric work expert.



WARNING

- Be sure to use genuine parts for the separator and its accessories.
- We are not responsible for any problems caused by using non-genuine parts, so please do not use them.

2 Overview

2.1 Overall Processing Flow

The new design EGR exhaust gas cleaning water system is divided into EGR Water Handling System (WHS), and Water Treatment System (WTS).

In the EGR unit of the engine that uses low sulfur fuel oil, the soot concentration of the Water Handling System is maintained at a safe level that does not cause damage to the engine by overflowing the excess water containing soot from the buffer tank to the EGR drain water tank.

In the Water Treatment System, it is necessary to install water treatment equipment that conforms to the IMO Maritime Environment Protection Committee MEPC73 Guideline to discharge the scrub water overboard.

Figure 2.1 shows the EGR exhaust gas cleaning water system diagram (including EGR unit).

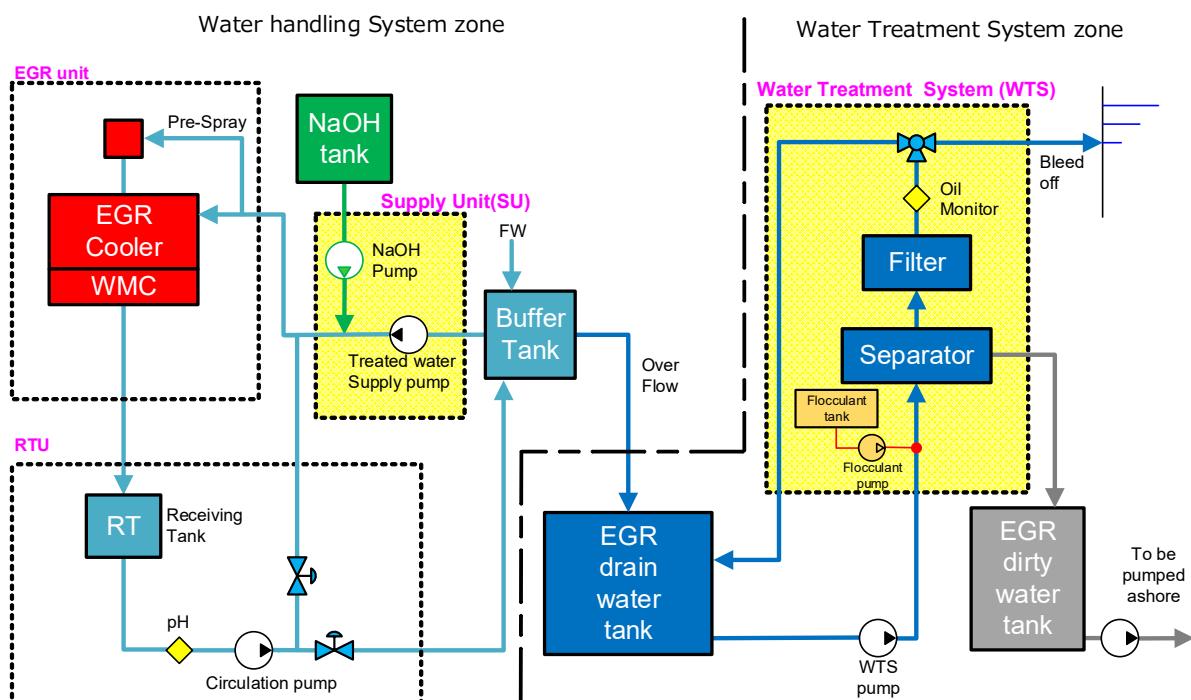


Figure 2-1 EGR exhaust gas cleaning water system diagram

The EGR Drain water from the EGR unit is discharged to RTU (Receiving Tank Unit) and then recirculated to the EGR unit by the circulation pump. A part of the recirculated water is directed to the buffer tank and returned to the EGR unit by the treated water supply pump. The circulation water that absorbed the sulfur in the exhaust gas becomes acidic and is neutralized by adding NaOH in the Supply Unit (SU).

The circulation water increases by the combustion process and the excess water is stored in the buffer tank and the liquid level in the buffer tank rises. When the liquid level in the buffer tank exceeds the height of the overflow pipe installed in the buffer tank, the excess water is directed toward the EGR drain water tank by gravity flow.

The EGR drain water stored in the EGR drain water tank is sent to the Water Treatment System, WTS, by the WTS pump. The water is treated in WTS so that it conforms to the quality level required by the "Guideline for IMO MEPC73 Exhaust Gas Recycle System Drainage" and discharged overboard.

When the discharge of the EGR Drain water is not possible due to inappropriate water quality level or sea area or regional regulations prescribed by guidelines, it can be stored in the EGR drain water tank and discharged by WTS outside the regulated sea areas.

The waste water discharged from the Separator such as the dirty water is stored in the EGR dirty water tank. The dirty water needs to be pumped ashore at a port and processed at an appropriate receiving facility.

2.2 Unit Configuration

This section explains the service of the equipment installed in the EGR Water Treatment System.

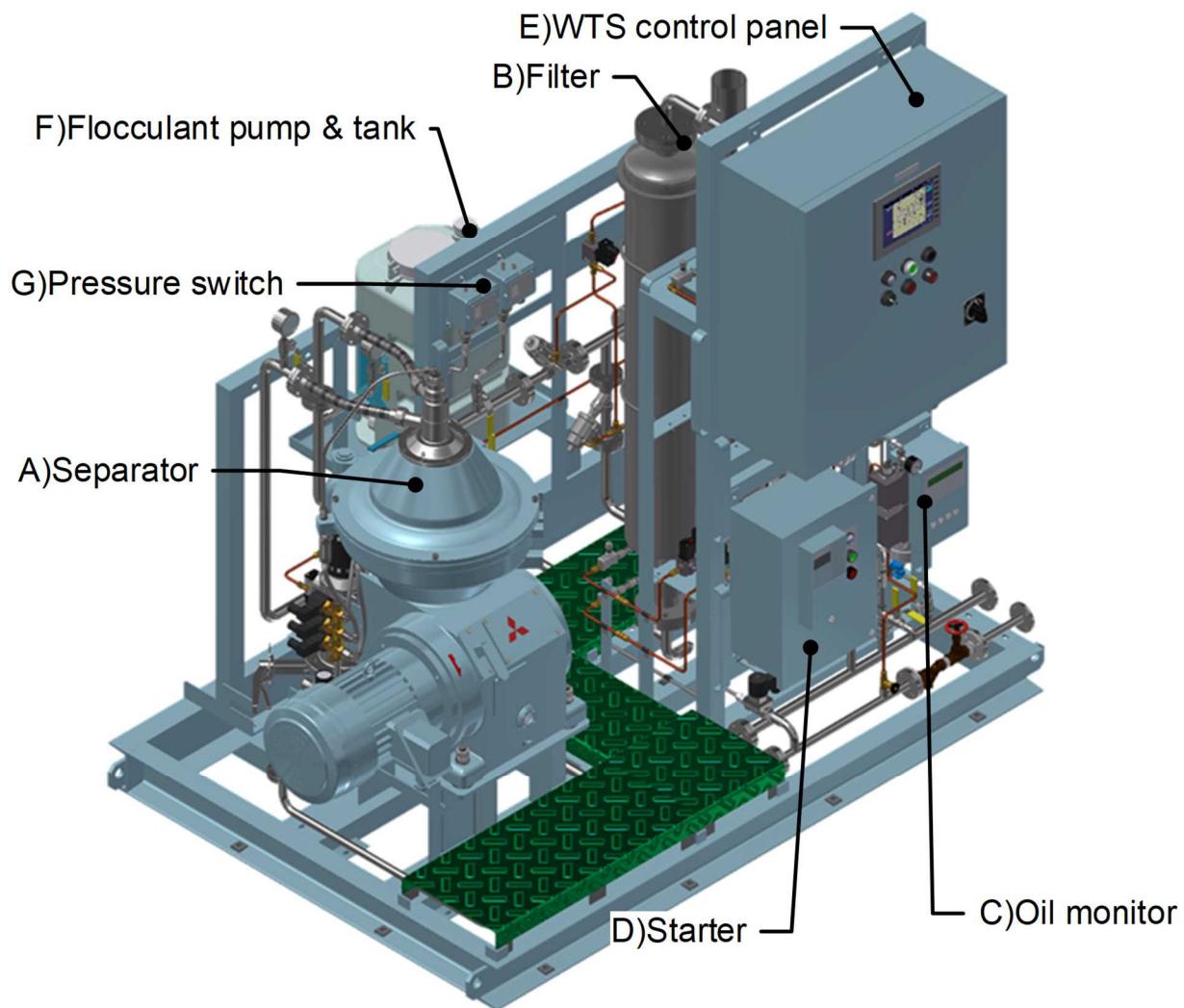


Figure 2-2 Water Treatment System External view (Standard)

A) Separator

- ◆ Utilizes separation disk type separator to clean the EGR drain water. It is different from the oil purifier in the wetted part material “stainless steel” and structure.
- ◆ The separation method is Clarifier operation (2-phase separation of solid-liquid).
- ◆ The separator is equipped with large diameter discharge impellers specialized for Clarifier machine and the discharge pressure from the separator can reach up to 0.5MPa.
- ◆ The “Float type Leakage Detector FLD” is included as the leak detector. (See **Figure 2-3**). The back pressure of discharge side is not allowed to high value, the EGR Drain water leakage has to be detected directly at discharge side by FLD.
- ◆ Refer to **Figure 2-3** and the explanation regarding the separation theory.

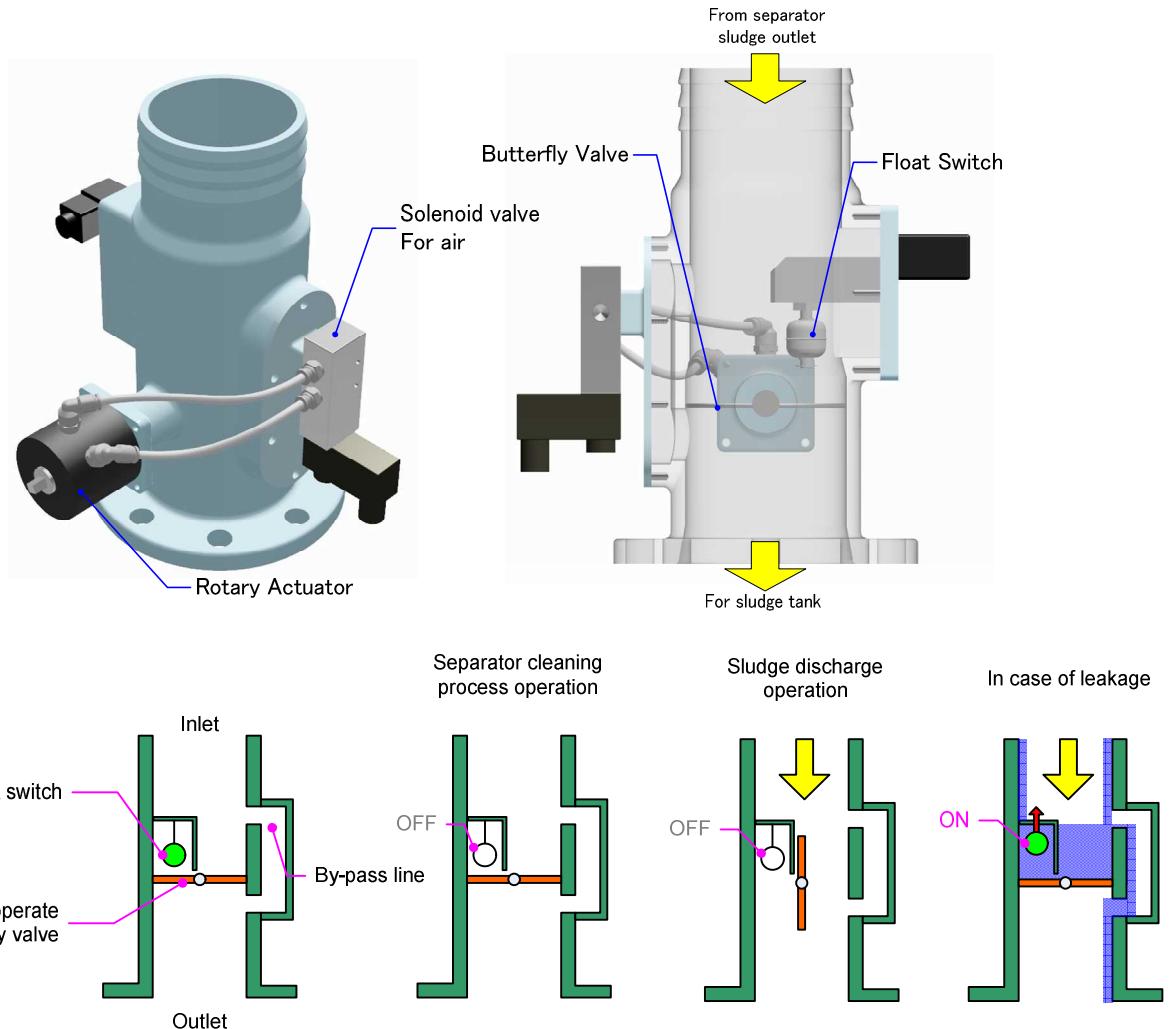


Figure 2-3 FLD (Float type Leakage Detector)

B) Filter

- Because microscopic soot smaller than $2\mu\text{m}$ that could not be removed by Separator has an impact on the Oil monitor measurement it is removed completely by the filter.
- The filter can be backwashed / bubbling washed with EGR drain water and compressed air inside the casing. Since the treated EGR drain water and fresh water are not used during the backwashing, the discharged backwashing drainage amount is that of the casing volume only.
- The filter has a long service life because high recovery effect can be obtained by the washing process with the accompanying detergent and automated air bubbling during the downtime.

C) Oil monitor

- Under the guideline about MEPC73 EGR Drain water, monitoring, recording and, drainage control of the oil concentration in the EGR Drain water are obligated by a bilge alarm conforming to IMO resolution MEPC.107 (49).
- The oil concentration less than 15 ppm EGR Drain water can be drained.
- Unlike the standard bilge alarm, this bilge alarm adopts the revised specification that parts and built-in solenoid valves connected to EGR Drain water were made from stainless steels.
- The oil concentration value is shown on the WTS control panel, and the records linked to the GPS location information and the time based on UTC.

D) Starter

- IP44 Separator starter. In the standard specification, this starter starts the Separator motor and the operation is started by pushing the automatic operation button on the WTS control panel after confirming with an ammeter that the rated speed has been reached. (This is the same method to start the Separator.)

E) WTS (Automatic) Control panel

- The control panel has the functions such as the control of the Separator main unit and filter, recording / display of oil concentration, operation time meter, etc.
- According to the MEPC73 Guideline, it is necessary to link the oil concentration with the location information and the time obtained from GNSS (Global Navigation Satellite System) and record them in the data logger inside the control panel. In addition, events such as the WTS start/stop time and bleed-off start/stop time and the like are also recorded likewise. The records can be confirmed with the control panel display.

F) Flocculant pump & tank



Figure 2-4 Flocculant pump & Tank

- Flocculant is added to improve the separation performance of suspended materials contained in EGR Drain water. The flocculants pump is an electromagnetic metering pump, which is added in a fixed amount relative to the throughput of the separator.
- Pump start/stop is controlled by signals from the WTS control panel.
- The flocculant pump and tank have an integrated structure and are mounted on the WTS.

【About a flocculant】

- The flocculant is a yellowish liquid mainly composed of polyaluminum chloride.
- During the separator and filter processing, the flocculant pump is started supply and a fixed amount is added.
- Please refer to **Table 2-1** and the attached TDS for the specifications of the coagulant. In addition, please be sure to refer to SDS for handling.

Table 2-1: Flocculant spec.

Product specification		Typical analysis	
Product name	KEMIRA PAX-MP3103M	Active substance	Approx. 2.0 mol/kg
Aluminium(Al^{3+})	$5.5 \pm 0.3\%$	Iron (Fe_{tot})	$< 0.01\%$
Al_2O_3	$10.4 \pm 0.6\%$	Viscosity (20°C)	$350 \pm 100 \text{ mPas}$
Basicity	$40 \pm 5\%$	pH (20°C)	< 2
Density (20°C)	$1.29 \pm 0.05 \text{ g/cm}^3$	Start of crystallization	-10°C

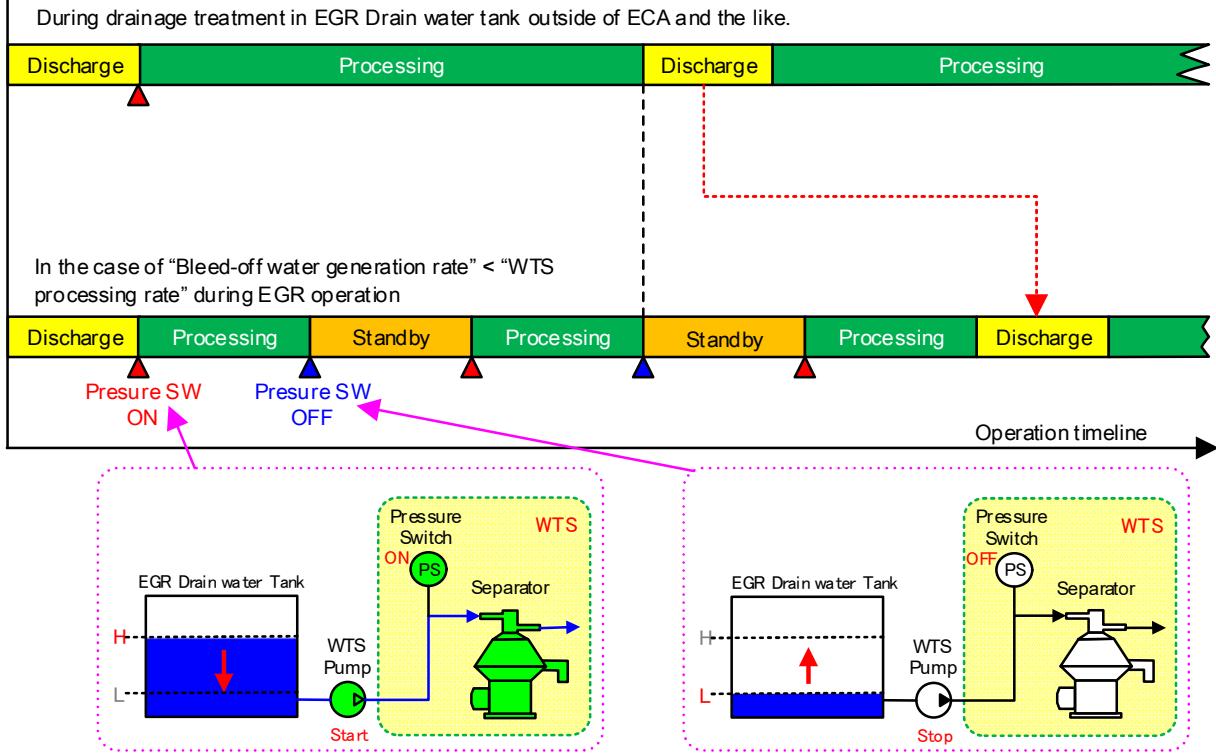
[Warning]



- ◆ The flocculant is an acidic liquid. Please wear protective equipment when handling by refilling the tank.
- ◆ A worker who engage in repairing of leakage portions or other workers should wear required protective equipment such as glasses, graves, shoes, clothes, a hat or a helmet.
- ◆ Refer to SDS about the handling.

G) Pressure switch

- Two pressure switches are installed to monitor the clogging of the filter and inlet pressure of the Separator.
- The filter is backwashed with air during the operation, but the clogging occurs slowly and the filter inlet pressure increases. When the pressure exceeds the setting, an alarm is activated and the filter is cleaned with a detergent and the filter element is replaced.



- The EGR operation enters a "Standby mode" when it is detected via the Separator inlet pressure that the WTS pump has stopped due to a low liquid level in the EGR drain water tank. The operation is restarted when it is detected that the "Discharge time setting timer" or the "Filter backwash schedule timer" has stopped its count temporarily and the WTS pump is restarted and the pressure switch has detected the pressure change. (The Separator continues to rotate during standby.)
- This function automatically extends the discharge interval depending on the EGR Drain water generation rate.

2.3 Option Specification

The following extension options can be added to WTS.

2.3.1 [OPT1] Dirty water transfer kit

- ♦ Option symbol: P
- ♦ Dirty water discharged from the WTS Separator is received by the temporary tank in the unit first and is transferred by the air operated diaphragm pump to the EGR dirty water tank installed at a level equal to WTS or higher.

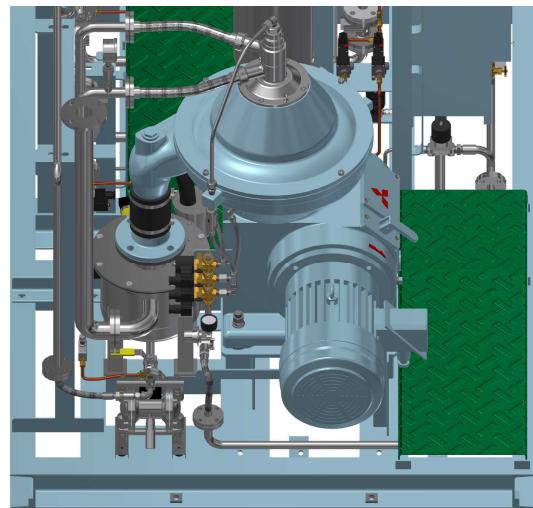
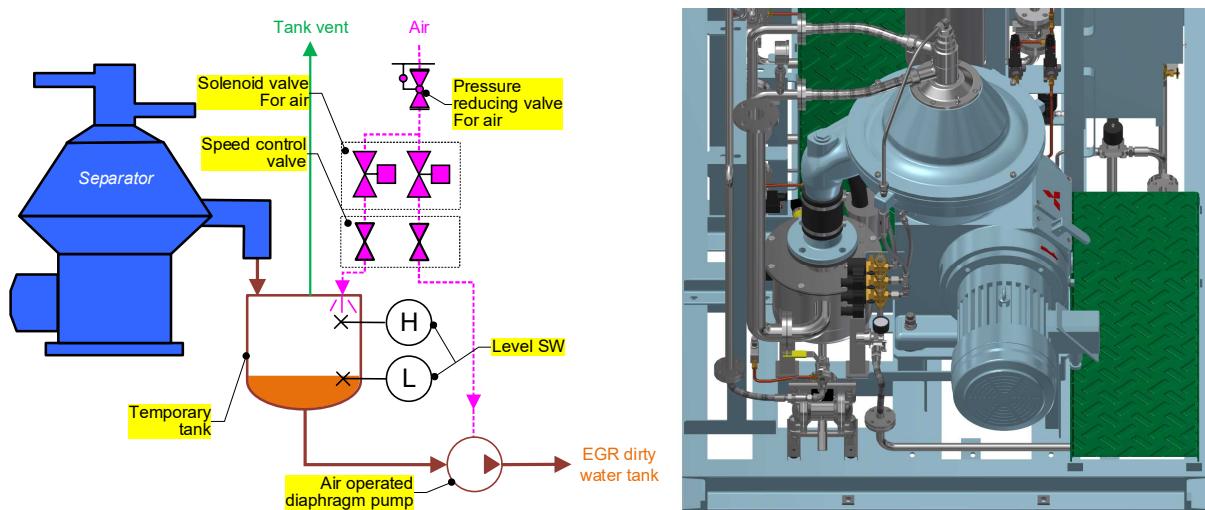


Figure 2-6 OPT1 Dirty water transfer kit outline system diagram

Table 2-2: OPT1 Additional items

【Additional Equipment】

Equipment Name	Remarks
Temporary tank	<ul style="list-style-type: none"> ♦ Small-sized stainless tank with a capacity of 1 batch +α of total discharge from the Separator
Air operated diaphragm pump	<ul style="list-style-type: none"> ♦ A pump to transfer from the temporary tank to the EGR dirty water tank
Solenoid valve for air	<ul style="list-style-type: none"> ♦ Used to operate the diaphragm pump and level switch air blow
Pressure reducing valve for air	<ul style="list-style-type: none"> ♦ Used to adjust the diaphragm pump discharge pressure / flow rate
Level SW	<ul style="list-style-type: none"> ♦ Tuning fork type level switch ♦ 2 points installed for leakage detection (H) and diaphragm pump stop (L) ♦ Air blow nozzle is installed in the tank to prevent malfunction due to dirty detector part.

【Notes / Remarks】

- ♦ A vent pipe needs to be added to the temporary tank in order to release the level switch air blow exhaust and the sudden change in air pressure generated at the time of the Separator discharge operation.
- ♦ The standard equipment Float-type Leakage Detector (FLD) is replaced by the liquid level switch for the high level side in the temporary tank.



2.3.2 [OPT2] WTS pump main unit / startup control panel

- Option symbol: N●● (● is an abbreviation of the pump model) 6 models of pump are lined up to match the WTS processing capacity and the required discharge pressure.
- A set of a WTS pump main unit, WTS pump starter control panel and level meter is provided to supply EGR Drain water from EGR drain water tank to WTS.

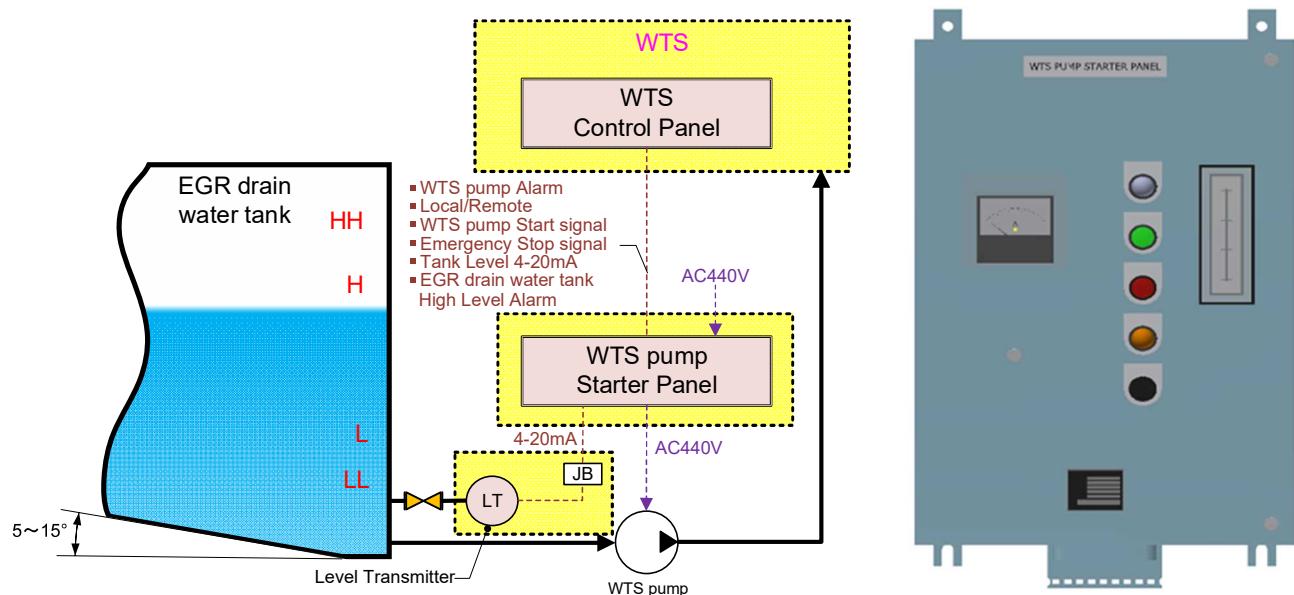


Figure 2-7 OPT2 WTS pump main unit / starter control panel

Table 2-3: OPT2 Additional items

[Additional Equipment / Supplied Parts]

Equipment Name	Remarks
WTS pump main unit / spare	<ul style="list-style-type: none"> • Grundfos vertical multistage stainless centrifugal pump
WTS pump starter control panel	<ul style="list-style-type: none"> • WTS pump machine side starter control panel • Local/Remote switch enables remote start/stop from WTS control panel. • Level meter with a built-in bar graph meter will be delivered.
Pressure type level meter Bar graph meter Junction Box (JB)	<ul style="list-style-type: none"> • Secom pressure type level meter P Series main unit and a Junction Box • Level meter main unit is a flange type that can be installed on the outside nozzle of a tank • WTS pump starter control panel and level meter main unit's junction box. • Bar graph meter is delivered as built-in / wired in the WTS pump starter control panel.
WTS control panel WTS pump Remote start/stop control circuit	<ul style="list-style-type: none"> • The WTS control panel side specification includes the added circuit to link with the WTS pump. • The liquid level of the EGR drain water tank can be confirmed through a display.

2.3.3 [OPT3] EGR-CS Linkage

- ◆ The system is designed so that when EGR starts up the external input from EGR-CS (EGR Control System) startup/automatically starts operation of WTS. OPT2 WTS pump is also included in the linked control.
- ◆ Various detectors needed for the remote start/stop is added to the Separator.

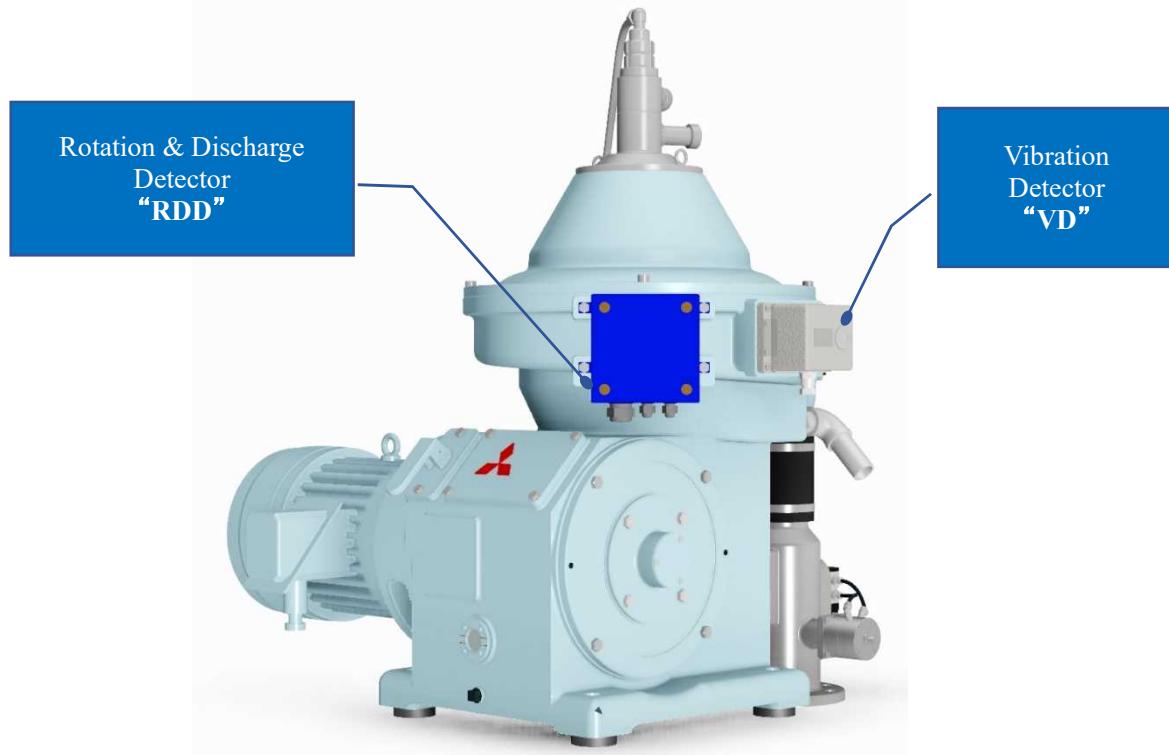


Figure 2-8 OPT3 Additional Detector of Separator

Table 2-4: OPT3 Additional items

【Additional Equipment / Supplied Parts】

Equipment Name	Remarks
OPT2 WTS pump main unit / starter control panel	<ul style="list-style-type: none"> ◆ The WTS pump that supplies the EGR Drain water to WTS is also included in the linkage and it is included in the OPT2 set.
WTS Control panel Additional circuit for EGR-CS linkage Additional circuit for detector power/control	<ul style="list-style-type: none"> ◆ Additional input output circuit and PLC unit for various signals (operational commands, answer back, etc.) from EGR-CS ◆ Additional circuit and PLC unit for the Separator detector control
Rotation Detector (RDD)	<ul style="list-style-type: none"> ◆ Used for detecting that the electric motor rotation has reached the rated speed after starting it. When it is detected that the rated speed has been reached, automatic liquid passing operation starts. ◆ When the set start rotational speed is not reached in the prescribed time, an alarm is generated for “start failure”. ◆ Detection of discharge failure
Vibration Detector (VD)	<ul style="list-style-type: none"> ◆ Used for detecting abnormal vibration during starting and in normal operation. When abnormal vibration is detected, an emergency stop and alarm are issued.

2.3.4 [OPT4] QC Monitor specification

- Drainage monitoring equipment is installed satisfying the requirements of the MEPC.259(68) "Guidelines for Exhaust Gas Cleaning Systems".
- There is no change to the scrubber water processing flow.
- The remote monitoring / control of WTS and WTS-HMI (Water Treatment System Human Machine Interface) having the bleed-off drainage report creation function are added.

Table 2-4: OPT4 Additional items

[Additional Equipment / Supplied Parts]

Equipment Name	Remarks
Drainage Monitor QC Monitor	<ul style="list-style-type: none"> • Drainage monitor equipped with turbidity/pH/PAH sensors that conforms to the MEPC.259(68) Guidelines. • Equipped with deaerating tank to prevent measurement error due to bubbles and flowmeter for monitoring sample water inflow.
WTS Control Panel Drainage Monitor Additional Circuit for Control	<ul style="list-style-type: none"> • Additional analog input channel for recording the measured values. • Deals with process controls such as measurement start/stop, sensor cleaning, etc.
WTS-HMI	<ul style="list-style-type: none"> • Remote WTS monitor/operation panel installed inside the control room in the engine room • It is possible to create the EGR Drain water drainage report image data and download to USB flash memory in PDF format.

2.3.5 [OPT5] JIS10K Flange specification

- EGR drain water piping's standard specification is JIS5K.
- When the WTS pump applies high pump head specification (shut-off pressure of 0.5 MPa or more) and the like, the flanges and flexible pipes of the EGR drain water piping in the unit are changed to JIS10K. (Option symbol: F1)
- The standard specification of the operating water piping is also JIS5K. When the operating water supply basic pressure is high in the giant container ship and the like, the fresh water piping connection is to be JIS10K and pressure reducing valves are added. (Option symbol: F2)
- The specifications are a combination of option symbols F1 and F2. (Option symbol: F3).

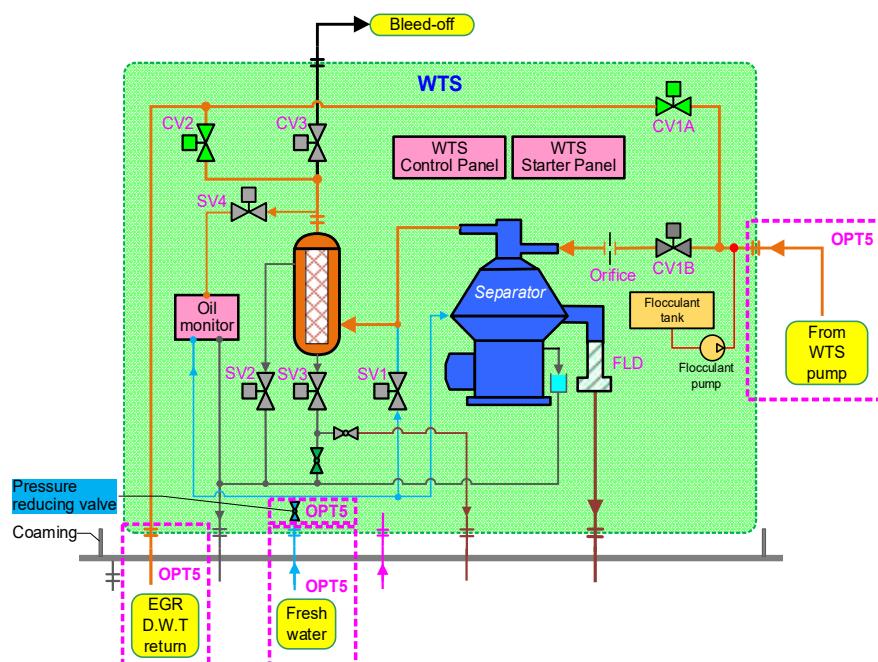


Figure 2-8 OPT5 Changed points

3 Operation

3.1 Start and Stop of operation

- The WTS of this specification starts and stops the equipment on the machine side.
- The basic start and stop timings of the WTS are as follows.

[EGR Tier III operation]

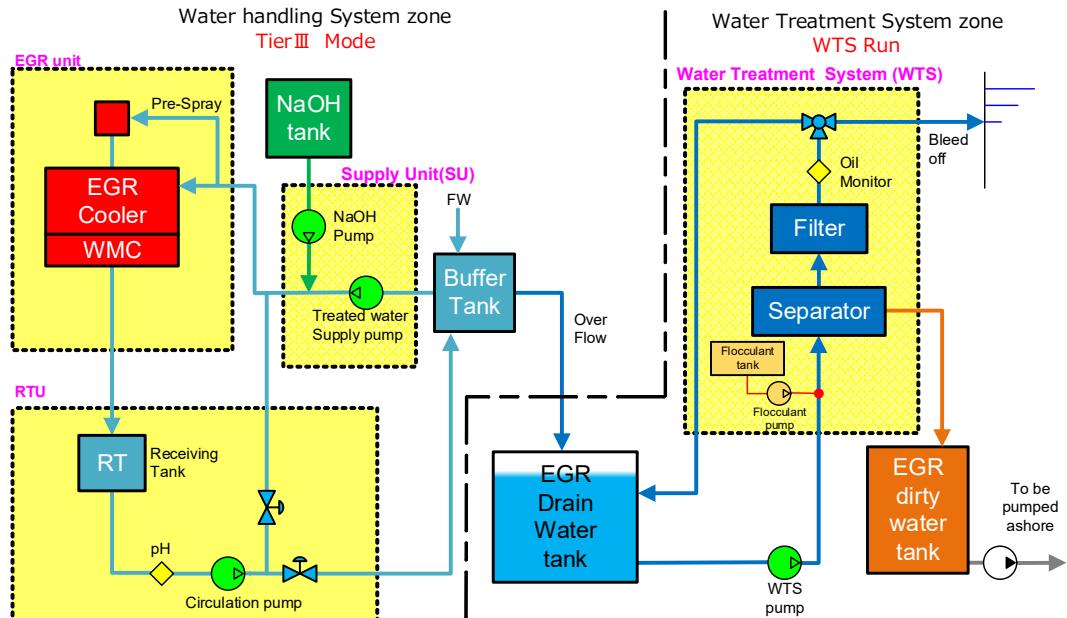


Figure 3-1 Tier III operation

- When entering NOx ECA, the main engine switches to EGR Tier III mode, and the excess circulating water (EGR Drain water) from the Buffer Tank overflows into the EGR Drain water tank.
- Start the WTS operation at the switching timing of EGR Tier III mode in order to appropriately treat the EGR Drain water that has occurred and discharge it to the outside of the ship.

[Bleed-off water drainage prohibited sea area operation]

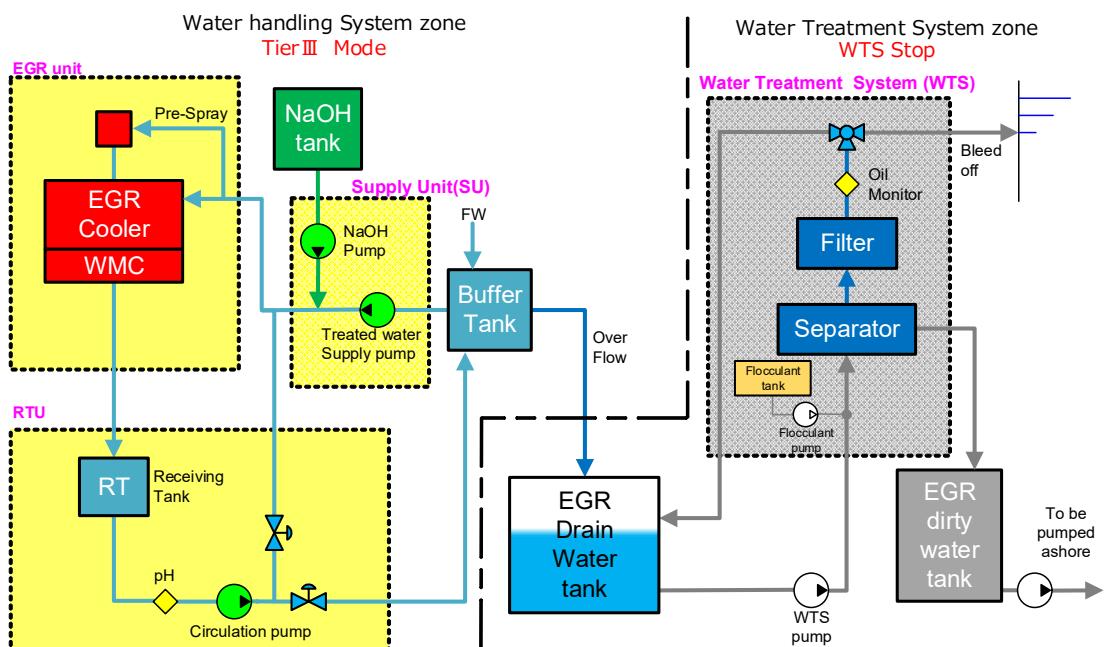
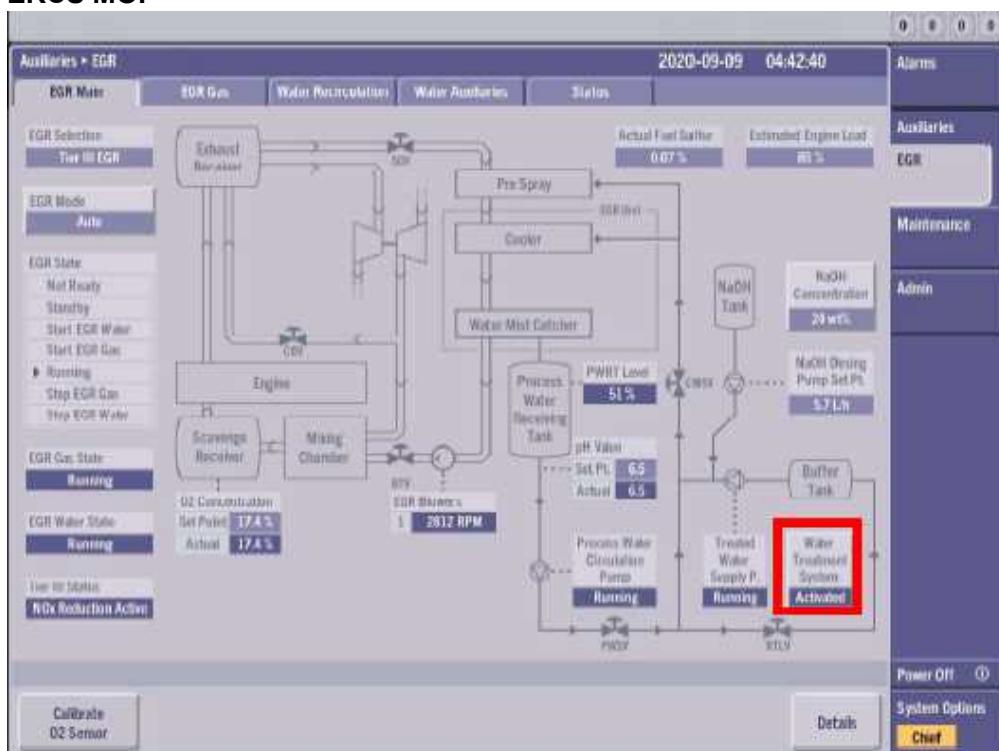


Figure 3-2 Tier III operation under Non-discharge area

- MEPC Guidelines MEPC.307(70) "2018 GUIDELINES FOR THE DISCHARGE OF EXHAUST GAS RECIRCULATION (EGR) BLEED-OFF WATER" Section 3.2.1 prohibits drainage in polar seas, ports, ports or estuaries It has been.
- In other areas, drainage of bleed-off water is prohibited by national or regional regulations.
- It is necessary to stop the operation of WTS Pump and WTS in the drainage prohibited water area and store the EGR Drain water generated in the EGR Drain water tank.
- The vessels that enter within 3 miles of the U.S. territorial water, same as in the drainage prohibited sea area, stop the operation of WTS pump and WTS as the drainage regulation is enforced there.
- In the drainage prohibited and regulated sea areas, stop the operation of WTS pump and WTS, and storage the EGR Drain water generated to the EGR Drain tank.
- If [OPT3] EGR-CS interlocking is installed, EGR start-up and WTS operation are interlocked. So turn the Local / Remote selector on the control panel to Local in the drainage prohibited sea areas, stop the WTS operation, and storage the EGR Drain water generated to the EGR Drain tank.
- Before above operation, select "Yes" of "Accept to Run EGR without Water Treatment System" tab on ERCS MOP. Then "WTS running deviation", "WTS not ready", "Run EGR without WTS accepted" Alarm appears on **ERCS MOP**. However, EGR operation will continue.

ERCS MOP



Alarms > Alarm List		Date: 2022-02-17	Time: 14:57:59	Alarms	
Ack	Description	Status	ID	Time	Alarm List
!	WTS running deviation	Alarm	EGRCU_SUEWgA	14:57:32	
!	WTS not ready	Alarm	EGRCU_SUEWgbA	14:49:35	
!	Run EGR without WTS accepted	Alarm	EGRCU_SUEWg50	14:46:46	Event Log

The document about **ERCS MOP** was supplied by Mitsui E&S machinery. Refer to the engine's manual about operation method and displayed contents.

**NOTE:**

At the time of the Remote select, a start in the remoteness is possible than EGR Control System(EGR-CS).
On the other hand, in the case of Local select, remoteness cannot start.
Refer to 3.3.2 **Figure 3-8** about location of the Local / Remote selector.

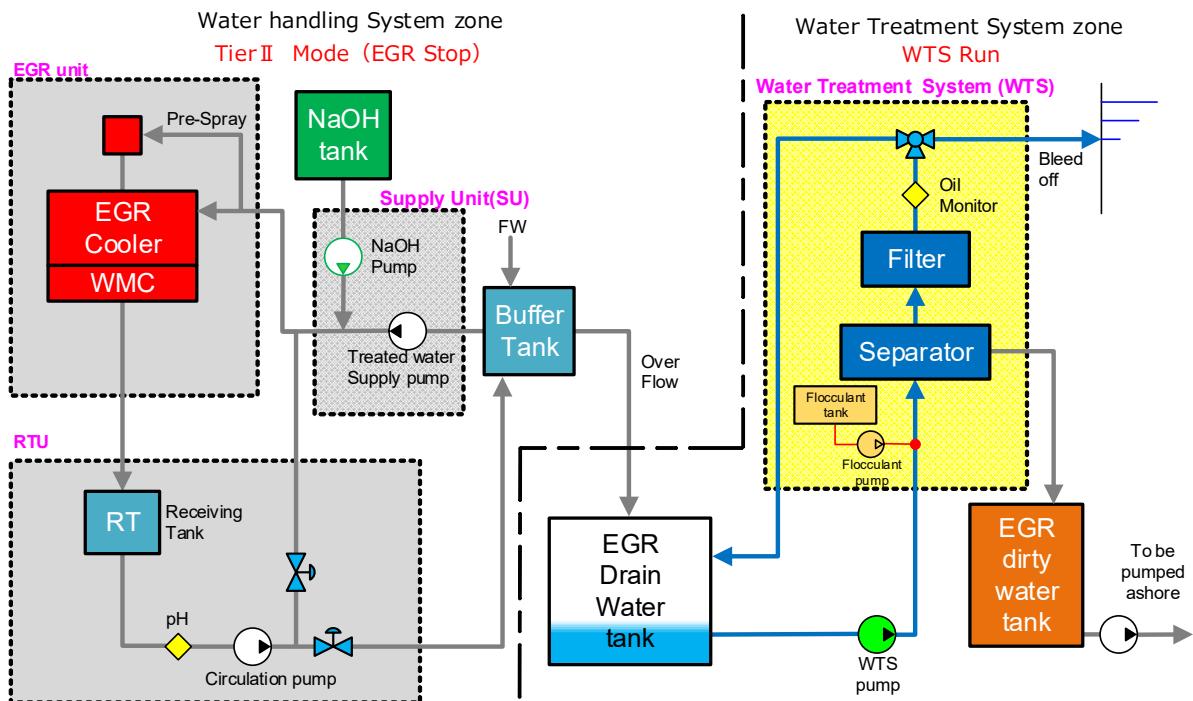
[EGR operation stopped]

Figure 3-3 EGR operation stopped

- Even if the NOx ECA is exited and switched to Tier II mode, the WTS can continue to operate and treat the EGR drain water stored in the drainage prohibited area.
- When the liquid level of the EGR Drain water tank reaches the low level, stop the WTS and WTS Pump.
- However, it is necessary to stop the operation in the drainage prohibited area.

3.2 Preparation before operation

Before starting WTS, check the status and inspect according to the following procedure, and complete the pre-operation preparation.

Procedure 1: Check the Separator state

- ♦ Please implement pre-start inspection on the same manner as Oil purifier, including checking of tightening of covers, gear oil volume, actuating water pressure, and so on.
* Please see the "Separator Operation & Maintenance Manual" for details.

Procedure 2: Check the open / close state of the manual valve

- ♦ Please check that the open / close state of the manual valve installed at the mating section at the end of each unit is set to the operation state. Please check that the faucets and valves for draining, etc. are closed.

Table 3-1: State of valves during operation

[Set to full open]

Section	Tag No.	Remarks
EGR Drain water	V101: EGR Drain water inlet	Also check the valve status of the EGR Drain water line outside the WTS.
Fresh water	VW101: Fresh water inlet VW103: Cleaning water for Oil Monitor VC104: Fresh water for Filter	Adjust the pressure so that the reducing valve attached to the separator indicates 0.3 MPa.
Compressed air	VA101: Air filter regulator	Setting of regulator: 0.5 MPa
Soot clarified water (For EGR Dirty Water Tank)	VD101: Separator discharge outlet	Exclude with [OPT.1]
Drain line (For EGR Drain Water Tank)	VC108: Oil Monitor measuring water VC109: Filter drain V110: Filter vent	
Instruments	VC101: Separator inlet pressure switch VC102: Separator inlet flow indicator pressure gauge VC103: Separator outlet pressure gauge VC105: Filter inlet pressure switch VC106: Filter outlet pressure gauge VC107: Oil Moniter inlet	

[Set to full close]

Section	Tag No.	Remarks
Soot clarified water (For EGR Dirty Water Tank)	V111: Filter drain	
Drain line (For EGR Drain Water Tank)	V109: Filter vent VC110: Sampling valve	Detergent input hopper side
EGR Drain water	VC111: Sampling valve	

[Adjust before operation]

Section	Tag No.	Remarks
Compressed air	VA102: Back wash pressed air VA104: Bubbling air VA106: Bubbling air	Speed control valve VA102 : 4 times in the opening direction from the fully closed state VA104 : 4 times in the opening direction from the fully closed state VA106 : 7 times in the opening direction from the fully closed state

[Confirm at starting treatment]

Section	Tag No.	Remarks
EGR Drain water	RG101 : Deforming chamber inlet	Setting of regulator: 0.1 MPa

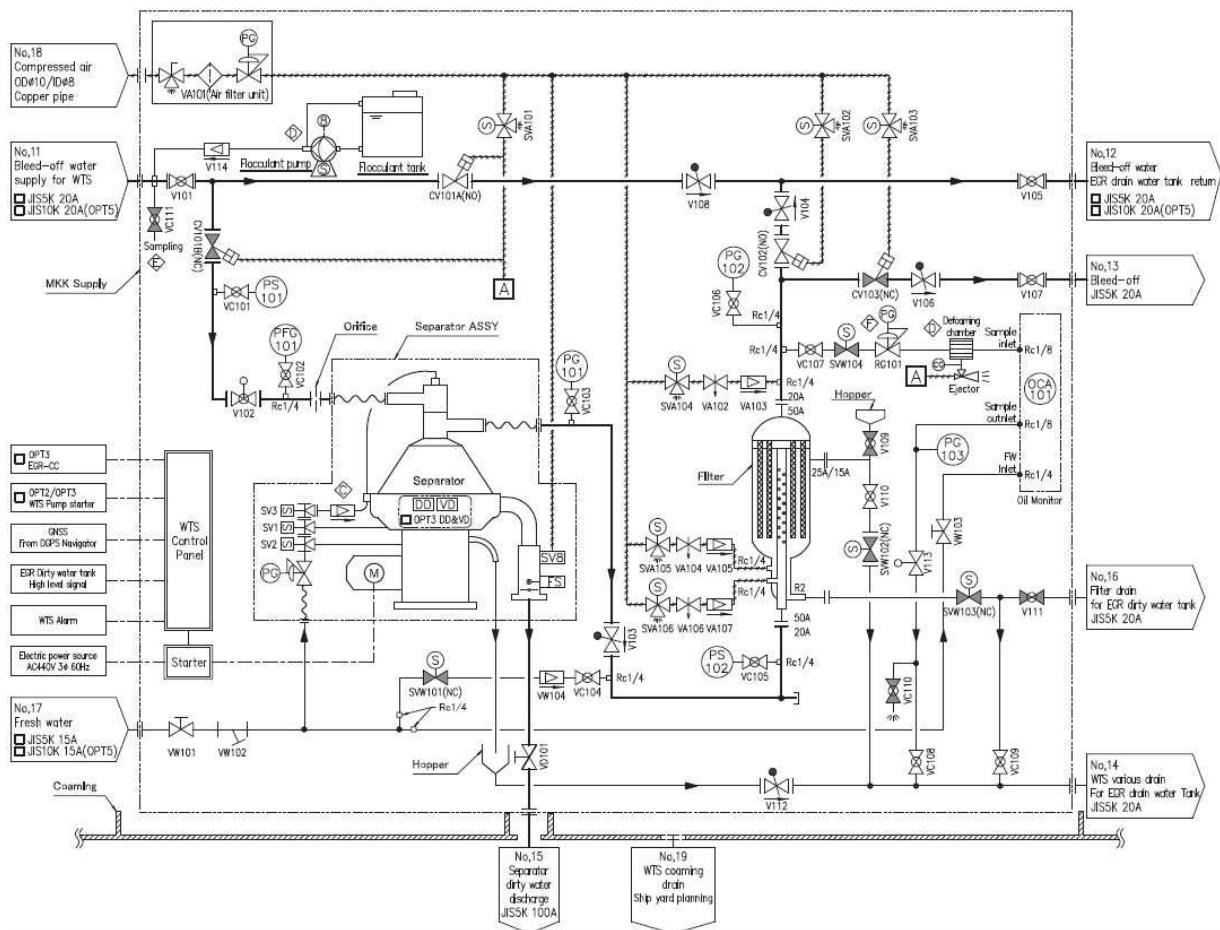


Figure 3-4 ONZ16 Flow Diagram

Option 1: With Soot clarified water transfer kit

- Please check that the open / close state of following table.

Table 3-2: State of valves for OPT.1

Section	Tag No.	Remarks
Soot clarified water (For EGR Dirty Water Tank)	VD102: Temporary Tank outlet VD104: Soot clarified water outlet	Set to full open
Compressed air	VA108: Level sensor air blow	Speed control valve 8 times in the opening direction from the fully closed state
	VA111: Soot clarified water pump operating air	Set to full open
	VA110: Pump speed control	Speed control valve 8 times in the opening direction from the fully closed state

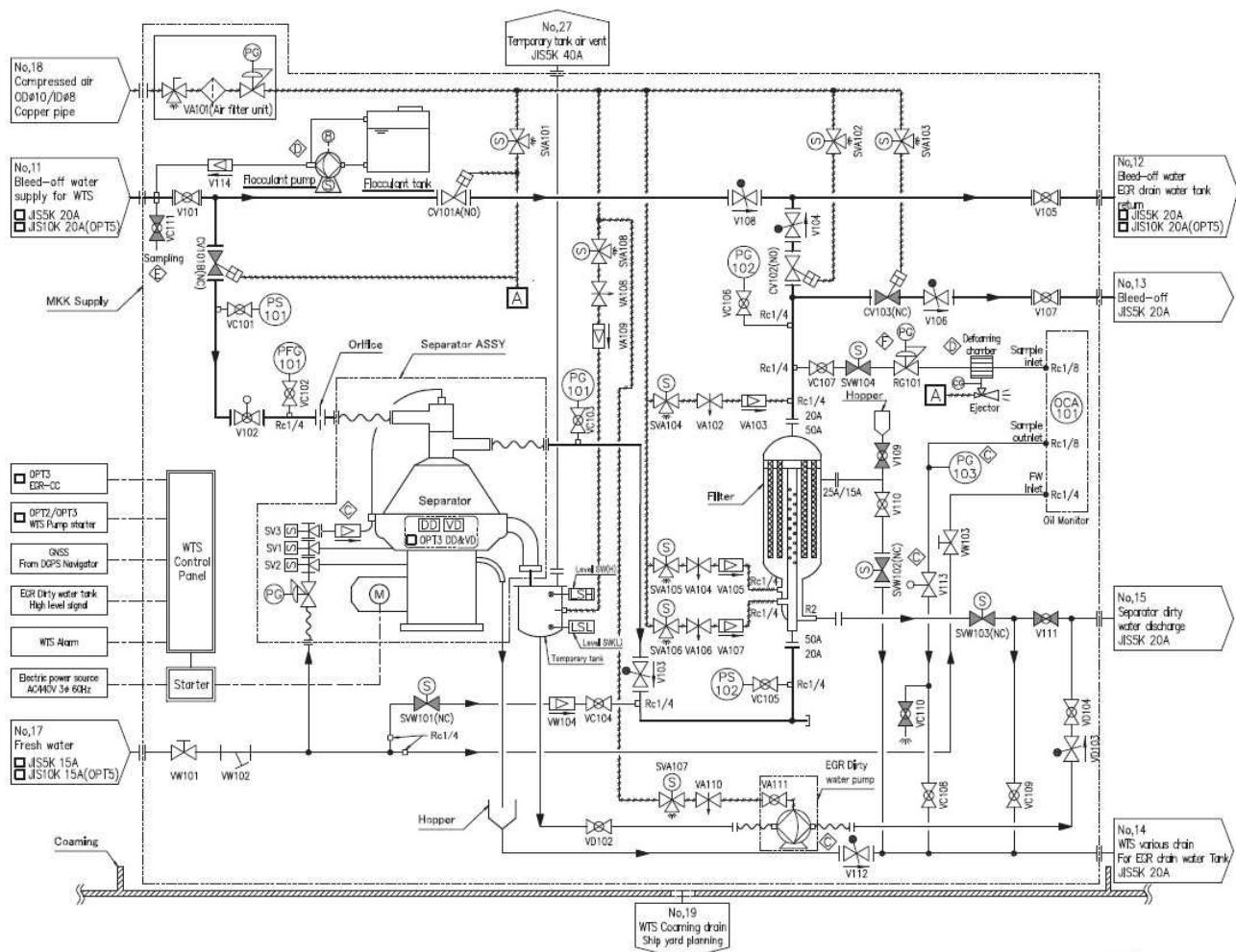


Figure 3-5 ONZ16-P with OPT.1 Flow Diagram

Procedure 3: Check / Adjust the pressure switch setting

- ♦ Please check if the set pressures of PS101 at the separator inlet and PS102 at the filter inlet (purifier outlet) are set as shown in **Table 3-3**.
- ♦ If the set pressure is released, turn the pressure adjustment bolt on the top of the main unit while watching the set pressure scale to adjust.

Table 3-3: Setting pressure of pressure switch

Tag No	Service	Setting pressure
PS101	Separation flow monitoring	0.05 MPa
PS102	Filter pressure monitoring	0.30 MPa

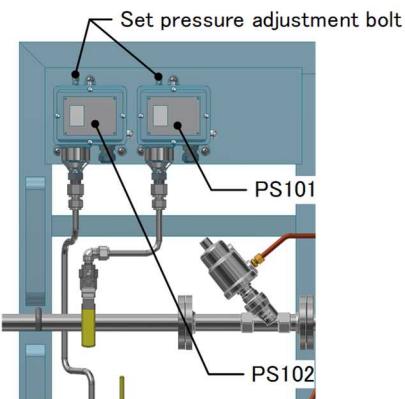


Figure 3-6 Pressure switch

Procedure 4: Power on the Starter / Control Panel

- (1) Turn on the power of the starter and check that the SOURCE lamp lights up.
- (2) Turn on the power to the WTS control panel and check that the control panel monitor screen is displayed. At the same time, check that the display of the oil content meter lights up.
- (3) When [OPT.2] or [OPT.3] is equipped with, the Local/Remote selector switch of the automatic control panel and the WTS pump starter, please confirm that it is chosen by Remote.

Procedure 5: Check the status of the flocculant pump and tank

- ♦ Please check the remaining amount in the flocculant tank. If it is less than 1/3 of the tank capacity, add coagulant.
- ♦ Please check the “STOP” display on the flocculant pump body. When the bar is displayed, it is the manual operation mode in which the pump start/stop signal from the control panel is not accepted.

NOTE: At the time of the Remote select, a start in the remoteness is possible than EGR Control System(EGR-CS).
On the other hand, in the case of Local select, remoteness cannot start.
Refer to 3.3.2 **Figure 3-8** about location of the Local / Remote selector.

Table 3-4: Display on the flocculant pump

Display	Status	Correspondence
STOP	Stopped by stop signal.	No operation required (Controlled operation status.)
-STOP	During manual operation stopped. Not automatically controlled.	Press the start/stop key once to change to the control operation status.

- ♦ Please refer to an attached sheet for the pump supply.

3.3 Automatic Control Panel

3.3.1 Overview of Automatic Control Panel

This control panel automatically performs the clean operation of the EGR Water Treatment System ONZ series and the operation of outboard drainage and measurement records. In addition, it is designed to automatically stop operation when trouble such as operation abnormality occurs.

The automatic operation process is shown in **Fig. 3.7** and **Table 3.4**.

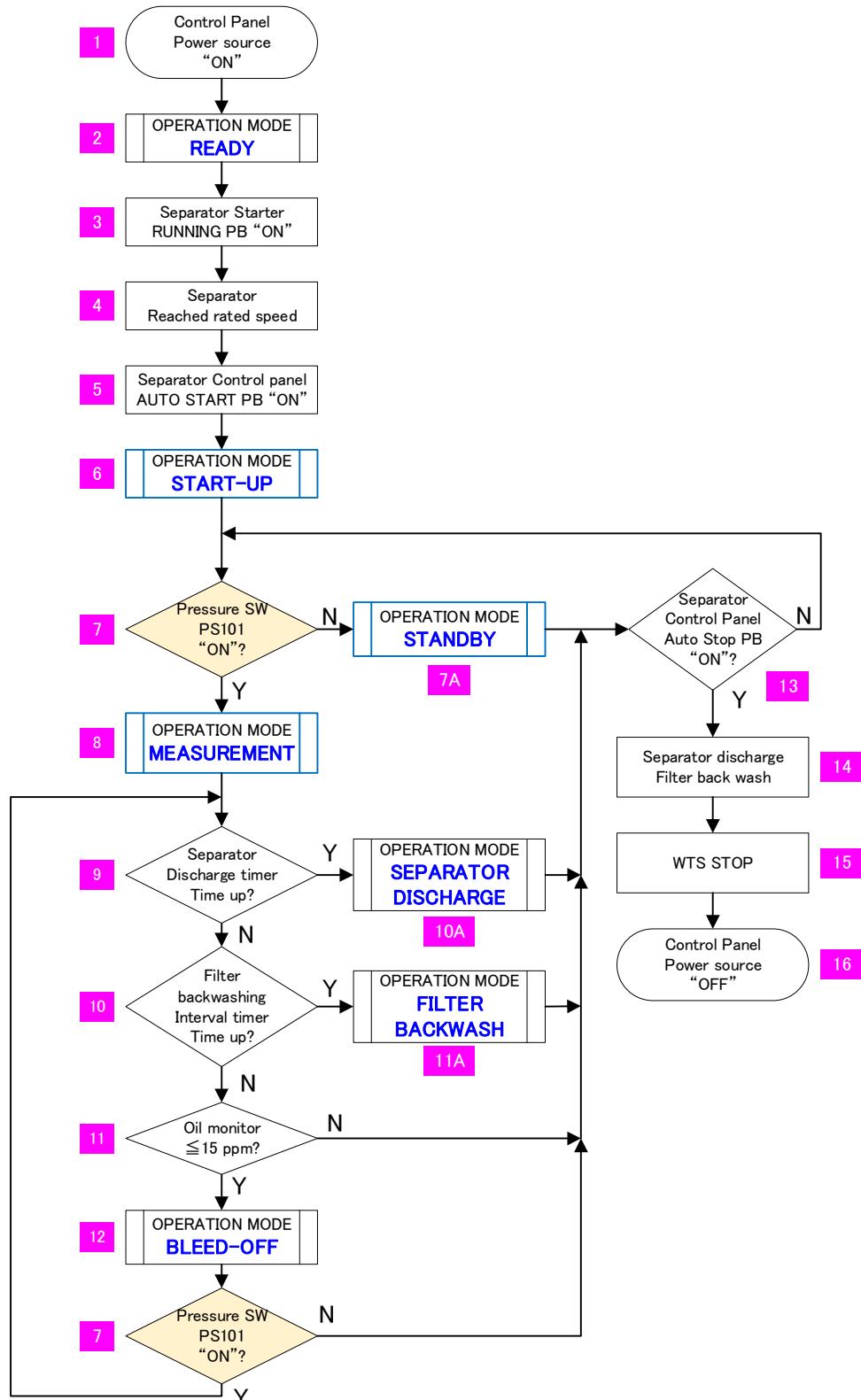


Figure 3-7 Water Treatment System ONZ series process chart (Automatic operation)

Table 3-5: Outline of Automatic operation

Step	Operation
1	<ul style="list-style-type: none"> ◆ Turn power switches ON in order of the starter and WTS control panel.
2	<ul style="list-style-type: none"> ◆ When the power is turned on, the status before startup is "READY". ◆ When [OPT.3] is equipped with, WTS automatically starts by receiving signal ON of "WTS Run Cmd" from EGR Control System(EGR-CS).
3	<ul style="list-style-type: none"> ◆ Start the separator with the starter
4	<ul style="list-style-type: none"> ◆ Check that the rated speed has been reached with the ammeter on the starter.
5	<ul style="list-style-type: none"> ◆ Press "AUTO ATART" on the automatic control panel to start automatic operation
6	<ul style="list-style-type: none"> ◆ The water solenoid valve of the separator operates to close the bowl and prepare for feeding operation.
7	<ul style="list-style-type: none"> ◆ After the separator ready, the bypassed water is switched to the separator. ◆ If treated water is being supplied at this time, the pressure switch at the inlet of the separator is turned on and the process proceeds to Step 8. ◆ If the EGR Drain Water Tank detects a low liquid level and the WTS Pump is stopped and treated water is not supplied to the WTS, the pressure switch is OFF and the process proceeds to Step 7A.
7A	<ul style="list-style-type: none"> ◆ When the EGR Drain Water Tank reaches the low level and the WTS Pump stops, the pressure switch "PS101" at the separator inlet turns off. At this time, the separator shifts to "STANDBY", which waits for the supply of treated water while the operating condition remains. ◆ The counts of the separator discharge interval timer and filter backwash interval timer are suspended.
8	<ul style="list-style-type: none"> ◆ When the treated water is supplied and PS101 is turned on, water starts flowing to the separator and filter. At the same time, the coagulant pump starts. ◆ In the MEASUREMENT process, the filter housing is filled with water and the filter filtrate is supplied to the oil monitor, and a preparatory process is started to start measuring the oil concentration. ◆ Treated water that has passed through the separator and filter during this time is returned to the EGR Drain water tank.
9	<ul style="list-style-type: none"> ◆ When entering the MEASUREMENT process, the separator discharge timer starts counting. ◆ When this timer times out, the process moves to Process 9A: Separator Discharge Process.
9A	<ul style="list-style-type: none"> ◆ Treated water is switched to the bypass side and circulates in the EGR Drain water tank, and the separator discharges soot condensed water.
10	<ul style="list-style-type: none"> ◆ When entering the MEASUREMENT process, the filter backwash interval timer starts counting. ◆ When this timer times out, the process moves to Process 10A: Filter backwash process.
10A	<ul style="list-style-type: none"> ◆ The treated water is switched to the bypass side and circulates in the EGR Drain Water Tank to clean the filter.
11	<ul style="list-style-type: none"> ◆ The oil monitor meter starts measurement, and when the measured value is 15 ppm or less, the process 12: BLEED-OFF is entered. ◆ If the measured value is 15ppm or more, the MEASUREMENT process is continued.

12	♦ When the oil concentration is 15 ppm or less, the treated water is switched from the line to the EGR Drain water tank to the outboard drain line.
13	♦ When you press the "auto stop button" on the automatic control panel, the stop process starts.
14	♦ Discharge soot clarified water and clean the filter.
15	♦ The separator will stop after Process 14.
16	♦ Turn power switches OFF in order of the starter and control panel.

3.3.2 Function of WTS (Automatic) Control Panel

The external view and function of Automatic Control Panel is as described below.

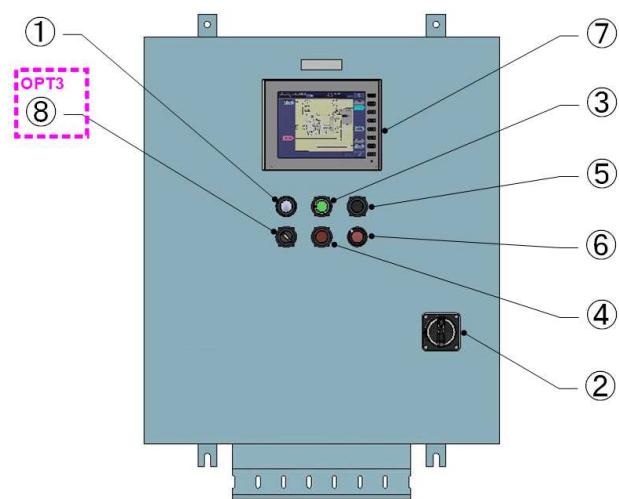


Figure 3-8
External view of Automatic Control Panel

① “Power” (SOURCE)

Power is supplied to the automatic control panel, and it lights when the power switch is turned on.

② Control power ON-OFF switch

③ Automatic operation

A push button switch for starting automatic operation. The automatic operation (AUTO RUN) indicator light turns on during automatic operation and blinks during filter immersion cleaning operation.

④ Automatic stop

If this push button switch is pressed during automatic operation, the Water Treatment System will automatically stop after the shutdown process.

⑤ Discharge Test

When this push button switch is pressed during automatic operation, soot clarified water is discharged with total discharged.

⑥ Emergency stop

Immediately upon pressing this pushbutton switch, each valve will return to its initial position and the WTS will stop.

⑦ Operation display panel

The operation display panel displays the operating status and mode, alarm type, etc. In addition, it is possible to perform operations such as input/change of each set value, linking with GPS, viewing the oil concentration record of EGR Drain water which is recorded with location information and time, and writing data.

⑧ Remote-Local Selector [OPT3]

This selector is for switching Local or Remote, and used for only OPT3.

Only Remote is selected, EGR Control System (EGR-CS) can be remote controlled.

In the drainage prohibited and regulated sea areas, Local must be selected. Refer to **3 operation** about the details.

3.3.3 Function and operation method of Display panel

Described below is the main screen displayed after the control panel power is turned.

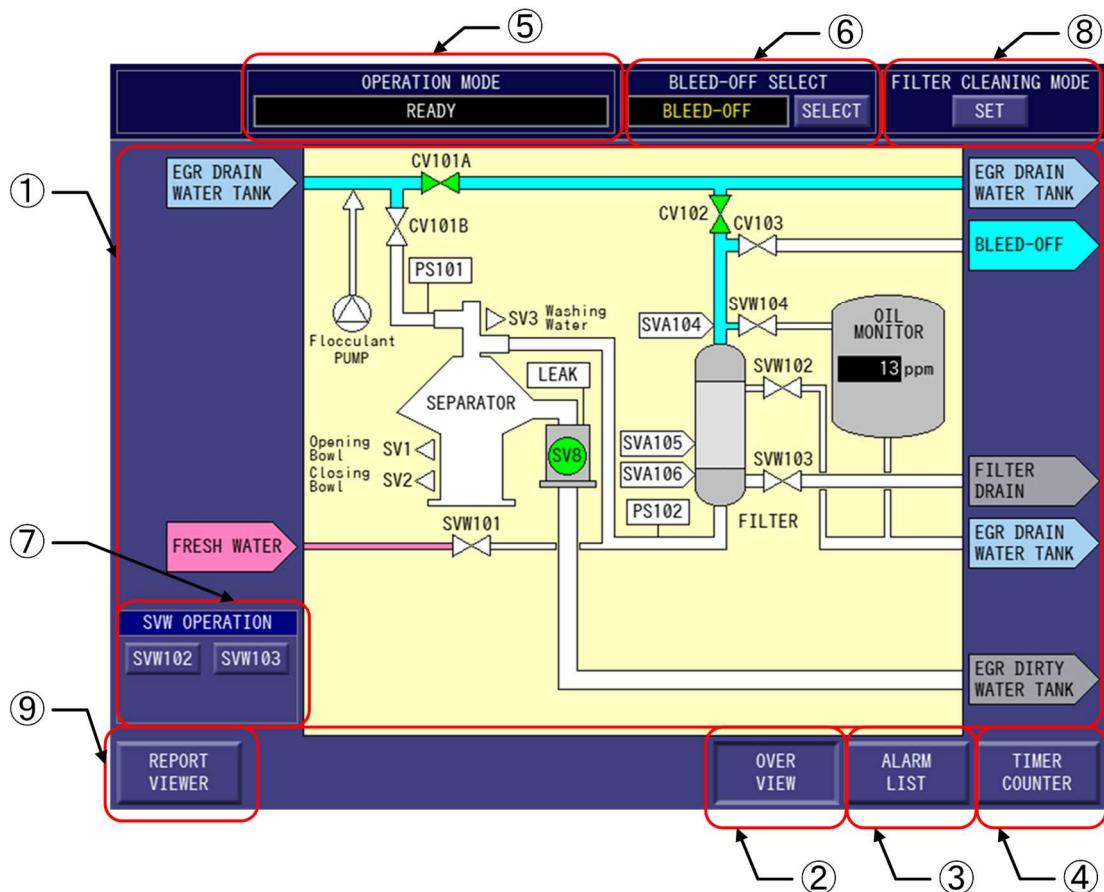


Figure 3-9 Overview of Display Panel

① Overall flow screen

- ◆ Displays the open/close instruction status of the control valve in the WTS unit, the status of the detector, and the measured value of the oil monitor.
- ◆ The display screen varies depending on the specifications. (Figure 3-11 shows the ONZ16-P specification screen with OPT1).

SEPARATOR			
STOP	Startup or stopping	RUNNING	ALARM
Pump		CONTROL VALVES	
STOP	RUN	CLOSE	OPEN
Solenoid valve for Air		Detector	
CLOSE	OPEN	Normal	DETECT
		PS101 PS102 LEAK	PS101 PS102 LEAK

Figure 3-10 Icon display and status

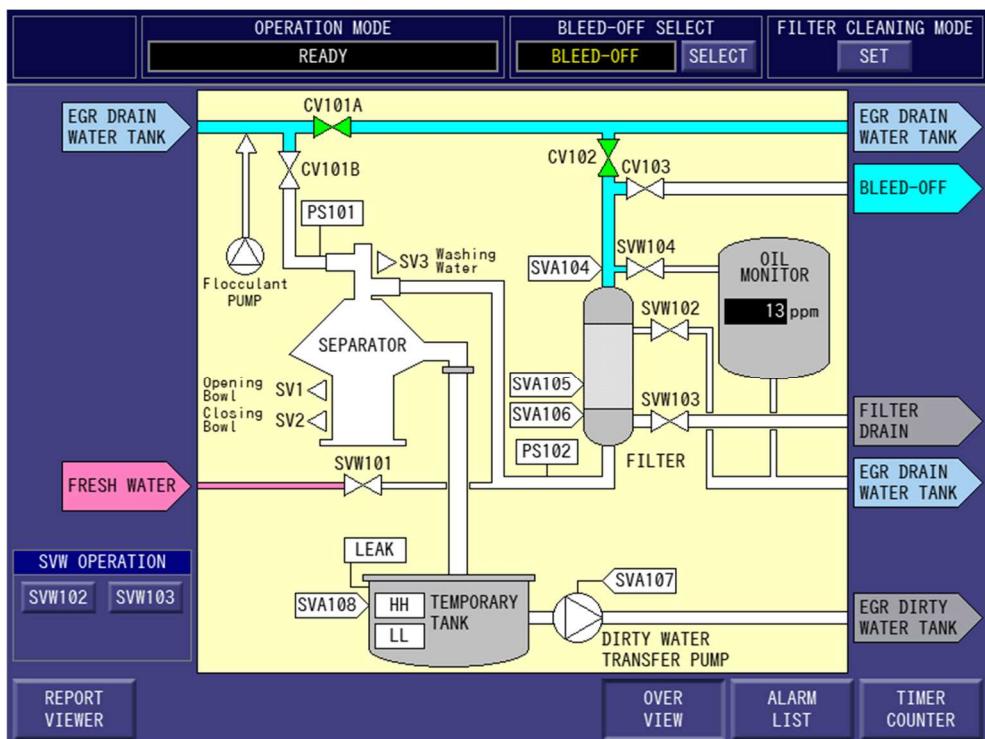


Figure 3-11 Display Panel “OVER VIEW” demo screen (ONZ16-P)

② OVER VIEW button

- Return to the whole display screen of ①.

③ ALARM LIST screen switching button

- The screen switches to the WTS alarm list display screen.
- See Figure 3-12 for the alarm reset method.

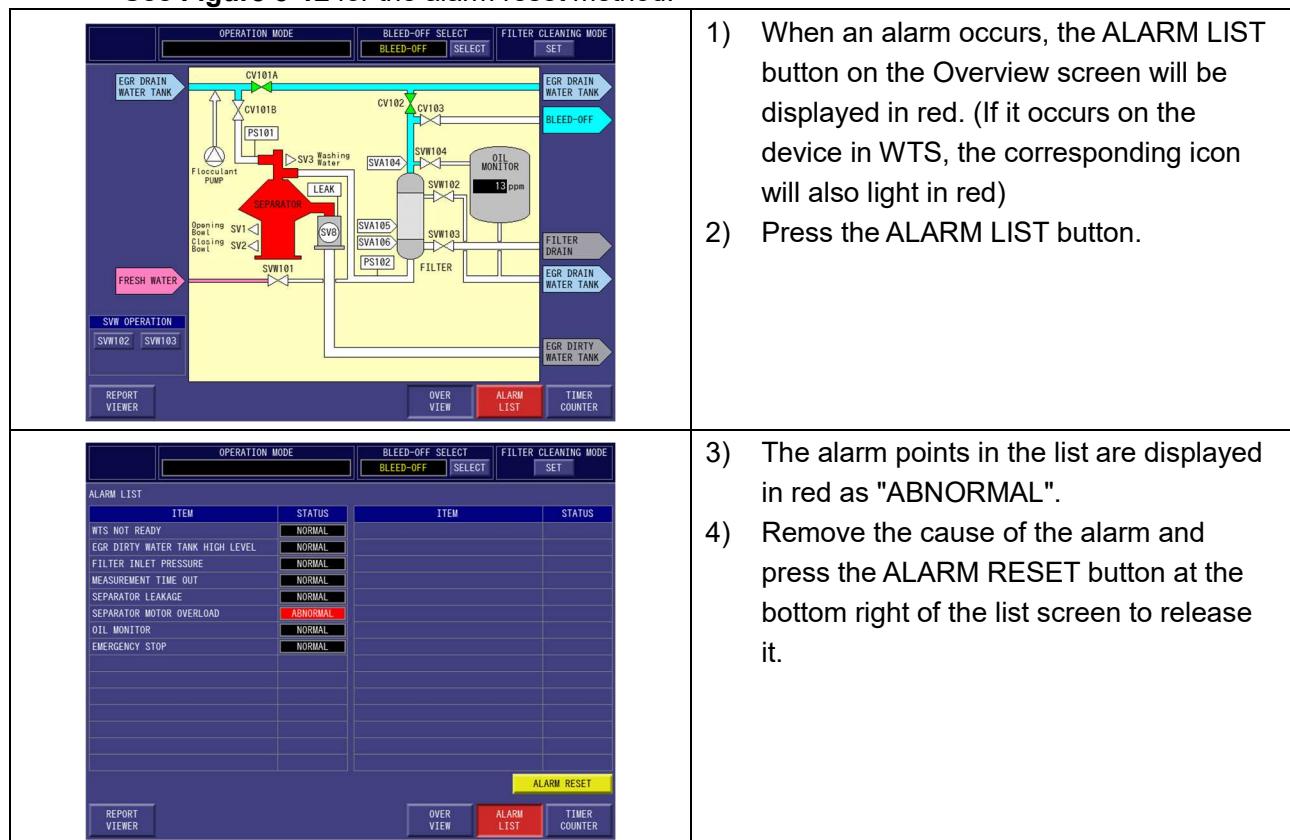


Figure 3-12 Alarm reset (ex. Separator overload)

④ Timer/Counter setting screen display button

- WTS common settings, separator control settings, filter control settings, and current value confirmation screen opens.
- See Figure 3-13 for the alarm reset method.

OPERATION MODE SEPARATOR DISCHARGE PROCESS		BLEED-OFF SELECT BLEED-OFF SELECT		FILTER CLEANING MODE SET																																										
TIMER LIST (COMMON)																																														
ITEM	SV	MIN.	PV																																											
MT001 TOTAL OPERATION TIMER			1 h 51 m 32 s																																											
MT002 TOTAL RUNNING LIQUID TIMER			0 h 26 m 14 s																																											
MT003 PASSING WATER DETECTION TIMER	5	1 sec	0 s																																											
MT004 STANDBY PROCESS PREPARATION TIMER	5	1 sec	0 s																																											
MT005 FILTER PRESSURE DETECTION TIMER	3	1 sec	0 s																																											
MT006 BLEED-OFF WATER MEASUREMENT TIMER	1	1 min	0 m 0 s																																											
MT007 OIL MONITOR FLOW RATE MONITORING TIMER	10	1 sec	0 s																																											
OVERVIEW																																														
COMMON (1/2) COMMON (2/2) SEPARATOR FILTER COUNTER																																														
COMMON (1/2) COMMON (2/2) SEPARATOR FILTER COUNTER																																														
ITEM	SV	MIN.	PV																																											
MT001 TOTAL OPERATION TIMER			1 h 51 m 32 s																																											
MT002 TOTAL RUNNING LIQUID TIMER			0 h 26 m 14 s																																											
MT003 PASSING WATER DETECTION TIMER	5	1 sec	0 s																																											
MT004 STANDBY PROCESS PREPARATION TIMER	5	1 sec	0 s																																											
<table border="1"> <thead> <tr> <th>SV</th> <th>MIN.</th> <th>PV</th> </tr> </thead> <tbody> <tr> <td colspan="3">RANGE 1 ~ 600</td> </tr> <tr> <td>INPUT 0</td> <td>UNIT sec</td> <td></td> </tr> <tr> <td>7</td> <td>8</td> <td>9</td> </tr> <tr> <td>4</td> <td>5</td> <td>6</td> </tr> <tr> <td>1</td> <td>2</td> <td>3</td> </tr> <tr> <td>10</td> <td></td> <td></td> </tr> <tr> <td>10.0</td> <td></td> <td></td> </tr> <tr> <td>30.0</td> <td></td> <td></td> </tr> <tr> <td>20.0</td> <td></td> <td></td> </tr> <tr> <td>5.0</td> <td></td> <td></td> </tr> <tr> <td>30</td> <td></td> <td></td> </tr> <tr> <td>1 sec</td> <td></td> <td>0 s</td> </tr> <tr> <td>CLEAR</td> <td>CANCEL</td> <td>ENTER</td> </tr> </tbody> </table>					SV	MIN.	PV	RANGE 1 ~ 600			INPUT 0	UNIT sec		7	8	9	4	5	6	1	2	3	10			10.0			30.0			20.0			5.0			30			1 sec		0 s	CLEAR	CANCEL	ENTER
SV	MIN.	PV																																												
RANGE 1 ~ 600																																														
INPUT 0	UNIT sec																																													
7	8	9																																												
4	5	6																																												
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5.0																																														
30																																														
1 sec		0 s																																												
CLEAR	CANCEL	ENTER																																												
COMMON (1/2) SEPARATOR FILTER COUNTER																																														

1) Press the TIMER COUNTER button at the bottom right of the screen to open the setting screen.

2) Press the page switching button that includes the item for changing the setting and checking the current value. To check the current value, check the PV on the screen.

Name	Function
COMMON	WTS common
SEPARATOR	Separator settings
FILTER	Filter settings
COUNTER	Counter settings

Name	Function
ITEM	Setting name and No.
SV	Set value “Set Value”
MIN	Setting unit
PV	Present value “Present Value”

- Press the SV which setting change.
- The input screen is displayed on the right side of the screen. Enter the set value so that it is within the range.
- To confirm the input, press the “ENTER” key. To cancel, press the “CANCEL” key.
- Confirm that the SV has been changed.

Figure 3-13 Method of changing and confirming setting value

⑤ Operation mode Display

- ◆ Displays the current operation mode.

Table 3-6: Operation mode display list

MODE	Condition
READY	◆ The power to the starter and WTS control panel is turned on.
START-UP	◆ Automatic operation has started from the control panel, and separator and filter are being prepared for operation.
MEASUREMENT	◆ Flowing of the separator/filter has started and the oil concentration meter is preparing for measurement/recording. ◆ The measured oil concentration exceeds 15ppm.
BLEED-OFF	◆ The oil concentration is measured at 15ppm or less and drained to the outside of the ship.
CIRCULATION	◆ When the operation mode in which the treated water at the WTS outlet is forcibly returned to the EGR Drain water tank is selected even if the oil concentration is measured at 15 ppm or less. (Refer to ⑥)
SEPARATOR DISCHARGE	◆ During the separator discharge process.
FILTER WASHING	◆ During the filter backwash process.
STANDBY	◆ Treated water to WTS is stopped and the system is in a standby state.
FILTER IMMERSION CLEANING	◆ When performing the filter immersion cleaning operation using a cleaning agent.
SHUT DOWN	◆ The automatic stop is started from the control panel and the separator/filter stop process is in progress.

⑥ Bleed-off water drainage destination selection

- ◆ Select the drainage destination of the WTS outlet.
- ◆ BLEED-OFF ··· Select the line that drains to the outside of the vessel when the oil concentration is 15 ppm or less.
- ◆ CIRCULATION ··· Even if the oil concentration is 15ppm or less, it is returned to the EGR Drain water tank.
- ◆ By selecting CIRCULATION even in a sea area where overboard discharging is not allowed, drainage is not carried out to the outside of the ship, so it is possible to check the trial run.
- ◆ Refer to **Figure 3-14** for the operation method.

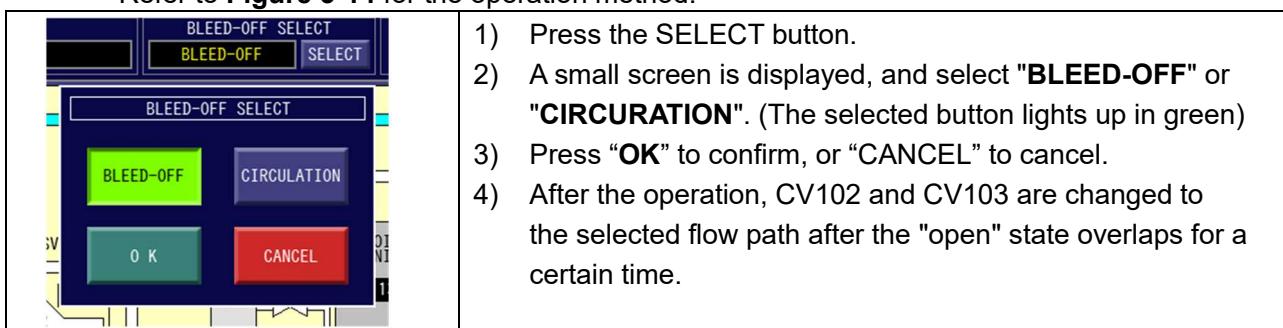


Figure 3-14 Method of BLEED-OFF SELECT



NOTE:

- ◆ In a sea area where overboard discharging is not allowed, basically stop the operation of WTS. For details, refer to **Section 3. Operation**.
- ◆ **When not operate the WTS for a long period of time, operate the WTS in circulation mode at least once a month.** Check the condition of the separator in the circulation mode and replace the fresh water in the filter housing.

⑦ Solenoid valve operation screen

- This button operates directly the opening/closing of the solenoid valve for water from the board. However, it cannot be operated during automatic operation.
- Refer to **Figure 3-15** for the operation method.

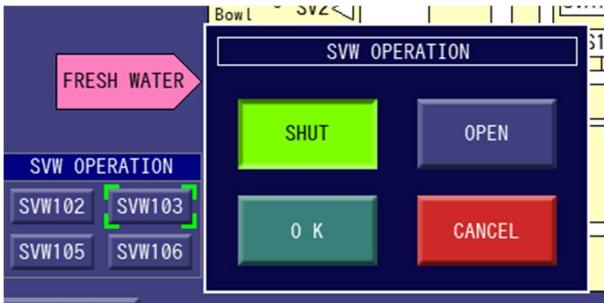
	<ol style="list-style-type: none"> Press the selection button of the solenoid valve for water to perform the operation at the bottom left of OVER VIEW. A small screen opens on the right. To open the valve, press the OPEN selection button and then the OK button to open the valve.
---	--

Figure 3-15 Operation method of solenoid valve



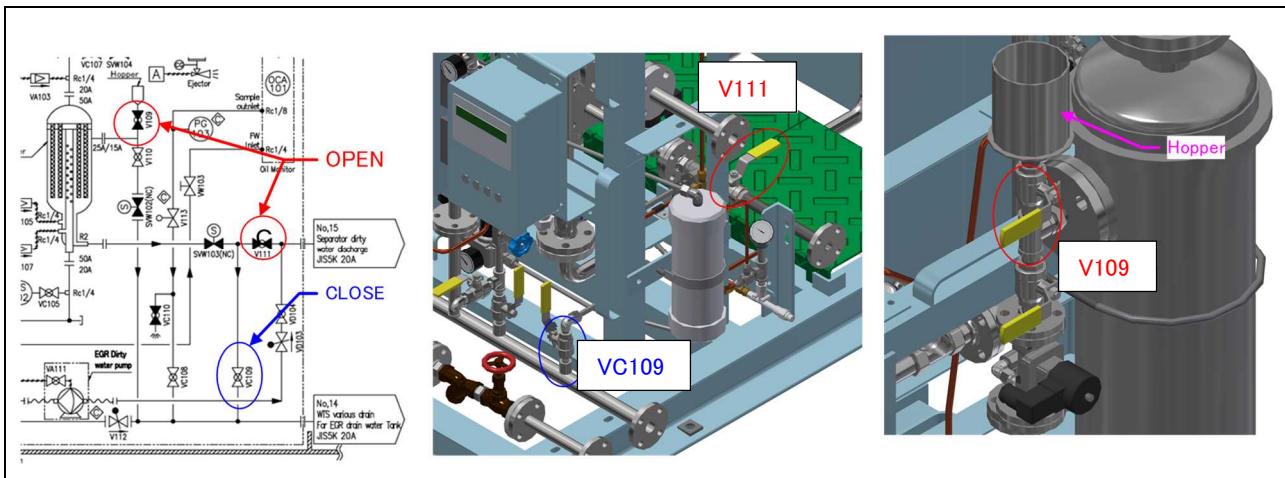
NOTE:

The solenoid valve for air (SVA) can be manually operated by adjusting the red knob on the solenoid valve body.

⑧ Filter immersion cleaning mode operation panel

- Use the cleaning agent (accessory for membrane module detergent MC-01) on a regular basis and use it when performing automatic filter cleaning operation.
- Refer to **Figure 3-16** for the operation method.

	<ol style="list-style-type: none"> Press the "SET" button of "FILTER CLEANING MODE" at the upper right of the OVER VIEW screen. A small screen is displayed, press the "START" button to select it, and then press the "OK" button. The SVW103 opens and the water in the filter housing starts draining. At the same time, the automatic operation lamp blinks.
	<ol style="list-style-type: none"> When the drain is completed, the "RESTART" button will blink and will pause. Confirm that the drain has finished, press the "RESTART" button to select it, and then press the "OK" button. The filter housing starts to be filled with water, and regular bubbling cleaning is performed once automatically.
	<ol style="list-style-type: none"> Confirm that the bubbling automatic backwash is completed by moving the screen to the TIMER COUNTER setting screen→FILTER and confirming that the SV value of "FT209 FILTER IMMERSION TIMER" has started counting.



7) Switch the valve at the filter drain outlet.

Tag No.	Condition	Use
V109	Close→Open	For inlet of cleaning agent input hopper (closed after adding cleaning water)
V111	Close→Open	Filter drain EGR Dirty water tank Drain side
VC109	Open→Close	Filter drain EGR Drain water tank Drain side

- 8) From the hopper on the vent side of the filter, pour the washing water prepared by dissolving one bag of filter detergent into about 10 L of water.
- 9) After adding washing water, add fresh water to collect water in the hopper, fill the filter housing with water, and close V109.
- 10) When the "FT209 FILTER IMMERSION TIMER" times out, bubbling cleaning with cleaning water is performed once, the cleaning water is drained, and then bubbling cleaning (rinsing) with fresh water is performed twice automatically.
- 11) When the bubbling cleaning is completed 3 times in 10), the automatic operation lamp goes off and the process ends.

Figure 3-16 Operation method of the filter immersion cleaning mode

CAUTION:



- Wear protective goggles and gloves when inserting the attached cleaning agent from the hopper.
- Refer to the Safety Data Sheet (SDS) for details.
- This detergent is exclusively for the Mitsubishi EGR scrubber water treatment equipment ONZ series. Do not use this cleaning agent on other products. At the same time, do not use other cleaning agents or chemicals for cleaning this product.

⑨ Oil Monitor recording operation

- The numerical value measured by the oil monitor is recorded in association with the position information of the GPS signal loaded in the control panel and the time (UTC base), and it has a function to create a report.
- Automatically created reports are saved in the SD card built into the control panel and can be viewed and data can be written.
- Refer to 3.3.5 for detailed operation method.

3.3.4 Setting Value

The setting values have been adjusted basically. The setting contents of various timers and counters and factory shipping settings are shown below.

3.3.4.1 Common setting for each models

[Operating time display]

Table 3-7: Operating time display list

Setting No.	Name	Factory value	Remarks
MT001	TOTAL OPERATION TIMER	0 [hr]	Total automatic operation time is displayed. Time measurement starts with Auto start :ON. Stops with Auto stop :ON.
MT002	TOTAL RUNNING LIQUID TIMER	0 [hr]	Total flow time is displayed. Since only the time that actually passed through the separator and the filter is displayed, the timer is not counted during the separator discharge process, filter cleaning process, and STANDBY mode (when the treated water is not supplied to WTS).

- MT001 should be used as a guide when performing WTS and separator maintenance.



- NOTE:**
- MT002 should be used as a guide for filter immersion cleaning operation and replacement.
 - Refer to 4 about the details of maintenance schedule.

[Common setting item 1]

Table 3-8: Common setting item 1 list

Setting No.	Name	Setting range	Factory value	Remarks
MT003	PASSING WATER DETECTION TIMER	5~600 [sec]	5 [sec]	ON delay timer for the pressure switch PS101 installed at the separator inlet. Detects liquid transfer from the WTS Pump and shifts to the MEASUREMENT process.
MT004	STANDBY PROCESS PREPARATION TIMER	5~600 [sec]	5 [sec]	OFF delay timer for the pressure switch PS101 installed at the separator inlet. Detects the stop of liquid delivery from the WTS Pump and shifts to STANDBY mode.
MT005	FILTER PRESSURE DETECTION TIMER	1~120 [sec]	3 [sec]	ON delay timer for pressure switch PS102 installed at the filter inlet (separator outlet). When the set filter pressure upper limit is reached, the alarm "FILTER INLET PRESSURE ABNORMAL" is issued when the delay timer times up.

MT006	BLEED-OFF WATER MEASUREMENT TIMER	1~360 [min]	15 min]	A timer from the measurement start of the oil monitor (MEASUREMENT start) to the measurement of 15ppm or less until the transition to the bleed-off process. If the measured value does not fall below 15ppm until this timer times out, an alarm "MEASUREMENT TIME OUT" is issued. Alternatively, if the measurement of the oil concentration meter does not start, an alarm will be issued when the time is up.
MT900	VALVE OPERATION TIMER	1~120 [sec]	30.0 [sec]	Overlap timer when switching the cleaner inlet CV101A/CV101B and filter outlet CV102/CV103.

[Common setting item 2]

Table 3-9: Common setting item 2 list

Setting No.	Name	Setting range	Factory value	Remarks
MT901	During filter passing process Air bleed interval	1~600 [sec]	230 [sec]	An interval timer that opens the solenoid valve SVW102 in the filter housing vent pipe and bleeds air while the filter is flowing.
MT902	During filter passing process Air bleeding timer	1~600 [sec]	3 [sec]	Open time timer of SVW102 that bleeds air when MT901 time is up.
MT903	SVW104 delay timer	1~600 [sec]	30 [sec]	After shifting to MEASUREMENT, a timer MEASUREMENT, a timer that delays the timing of opening SVW104 of the oil monitor inlet valve until the filtrate flows out from the filter outlet and fills the pipe.
MT904	TK HIGH LEVEL Delay timer	1~600 [sec]	15 [sec]	Dirty Water tank HH, EGR Drain water tank Delay timer from input of HH/LL to liquid level alarm of each tank.

[Separator control item]

Table 3-10: Separator control item list

Setting No.	Name	Setting range	Factory value	Remarks
ST100	INTERVAL	0.1~60.0 [sec]	15.0 [sec]	Operation interval time of each solenoid valve (closed water supply time SV2 operation time)
ST101	DISCHARGE (TOTAL)	0.1~60.0 [sec]	3.0 [sec]	Bowl opening water supply time (total discharge SV1 operating time)
ST102	BOWL WASHING	0.1~600.0 [sec]	15.0 [sec]	Bowl washing water supply time (SV3 operating time)
ST103	INTERMITTENTLY BOWL CLOSING WATER SUPPLY INTERVAL	1~360 [min]	15 [min]	Intermittent closed valve water supply interval

ST104	INTERMITTENTLY BOWL CLOSING WATER SUPPLY TIMER	0.1~60.0 [sec]	5 [sec]	Intermittent closed valve water supply time (SV2 operating time when intermittent closed valve water is supplied)
ST105	DISCHARGE INTERVAL TIMER	1~360 [min]	30 [min]	A timer that sets the interval to shift to the purifier discharge process. Processes that have not been passed through the purifier are not included in the elapsed time.

Opening timer of SVA104 at the filter outlet. By opening the SVA104 during the filter backwashing process, the treated water in the filtrate pipe is pushed out to the filter side and backwashing is performed.

Timer to bleed the supplied air after the FT204 time is up.

Air bubbling cleaning (1) Timer for the process. The SVA105 will activate and bubble the entire filter.

[Control Panel setting item 3···Filter]

Table 3-11: Control Panel setting item 3···Filter

Setting No.	Name	Setting range	Factory value	Remarks
FT200	FILTER OPERATION INTERVAL	1~360 [sec]	5 [sec]	Timer for operation preparation, backwash preparation process, air bleeding process.
FT201	FILTER WATER FILLING TIMER1	1~360 [sec]	60 [s]=1400L/h 90 [s]=1000L/h 120 [s]=700L/h 140 [s]=600L/h	Timer for filling fresh water from empty filter housing.
FT202	FILTER WATER FILLING TIMER2	1~360 [sec]	30 [sec]	Timer for supplying fresh water during the filter cleaning process.
FT203	FILTER BACKWASHING INTERVAL	1~360 [min]	30 [min]	Timer that sets the interval for performing the filter backwash process. (Counting stops in STANDBY mode)
FT204	FILTER BACKWASHING TIMER	1~360 [sec]	15 [sec]	Opening timer of SVA104 at the filter outlet. By opening the SVA104 during the filter backwashing process, the treated water in the filtrate pipe is pushed out to the filter side and backwashing is performed.
FT205	FILTER AIR VENTING TIMER	1~360 [sec]	10 [sec]	Timer to bleed the supplied air after the FT204 time is up.
FT206	FILTER WASHING TIMER1	1~360 [sec]	12 [sec]	Timer for air bubbling cleaning (1) process. The SVA105 will activate and bubble the entire filter.
FT207	FILTER WASHING TIMER2	1~360 [sec]	60 [sec]	Timer for air bubbling cleaning (2) process. SVA106 is activated and mainly bubbling the upper part of the filter.
FT208	FILTER AIR PRESS DRAINAGE TIMER	1~360 [sec]	60 [sec]	Timer for draining process after filter cleaning process.

FT209	FILTER IMMERSION TIMER	1~1440 [min]	60 [min]	Timer for setting immersion time in filter immersion cleaning mode.
FT210	FILTER WASHING TIMER1	1~360 [sec]	30 [sec]	Timer that fills the treated water with the treated water remaining in the filter housing when shifting from STANDBY mode to MEASUREMENT.
FT211	FILTER WASHING TIMER2	1~360 [sec]	90 [sec]	After cleaning the filter, a timer for filling the inside of the filter housing with treated water from when there is no residual water.

[Control Panel setting item 4···Counter setting]

Table 3-12: Control Panel setting item 4···Counter setting

Setting No.	Name	Setting range	Factory value	Remarks
SC101	NUMBER OF WASHING COUNTER	1~100 [times]	100 [times] (No wash)	The number of separator discharges is counted, and after the normal discharge operation in the next discharge step in which the set number is counted up, cleaning water (timer ST103) is supplied and discharged. If it sets to 100, the wash water will not be discharged.
FC201	FILTER BACKWASHING COUNTER	1~10 [times]	3 [times]	Counter that sets the number of bubbling times of "FT206 Filter Cleaning Timer 1" during the filter cleaning process.

3.3.4.2 Setting for optional specification

For OPT1 specification.

[Common setting item for OPT1]

Table 3-13: Common setting item list for OPT1 EGR Dirty Water Transfer kit

Setting No.	Name	Setting range	Factory value	Remarks
MT008	EGR Dirty Water Pump Operation Standby Timer	0.1～600.0 [sec]	10.0 [sec]	The waiting time from the separator discharge (ST101 count start) to the start of EGR DIRTY WATER PUMP.
MT009	EGR Dirty Water Pump Operation Monitoring Timer	0.1～600.0 [sec]	60.0 [sec]	Timer setting until EGR DIRTY WATER PUMP starts and detects low level in temporary tank. If the low level is not detected until this timer times out, "EGR Dirty water transfer failure alarm" will be issued.
MT010	EGR Dirty Water Pump Operation Extra Timer	0.1～600.0 [sec]	20.0 [sec]	Timer that starts the pump by extending it after the temporary tank detects a low level. The EGR DIRTY WATER PUMP stops when this timer times out.
MT011	Temporary Tank Air Blow Timer	0.1～600.0 [sec]	30.0 [sec]	Timer for setting the sensor air blow time of the temporary tank.

For OPT3 specification.

[Common setting item for OPT3]

Table 3-14: Common setting item list for OPT3 EGR-CS Linking

Setting No.	Name	Setting range	Factory value	Remarks
ST106	Separator starting timer	0.1～600.0 [sec]	480.0 [sec]	A monitoring timer before the motor of the separator starting, and detecting the rating number of revolutions of the separator. When it does not arrive at the rating turn within a set point, it becomes the warning.
ST107	Rotary drop detection timer	0.1～120.0 [sec]	5.0 [sec]	When I become under rating number of revolutions, it becomes the warning by this timer time-up at time when a separator permeates it.
ST108	Rated rotational Speed detection timer	0.1～120.0 [sec]	60.0 [sec]	When a separator arrived at the rating number of revolutions, I start. I start automatic driving by this timer time-up.
ST109	Vibration switch Reset timer	0.1～10.0 [sec]	1.0 [sec]	Setting of the time to output a reset signal for vibration detector

3.3.5 Browsing measurement data and acquiring data

【Notes / Remarks】

- The oil concentration value measured by the oil monitor is automatically recorded with the position and time in conjunction with the GPS signal. In addition, the start/stop of outboard drainage is also recorded as an event.
 - Records are automatically generated in PDF format, and 18 months worth of records must be kept on board.
 - This report is subject to PSC inspections, as well as initial, annual, interim and renewal surveys and inspections, and EGR Drain water is discharged in sea areas where location information is checked and drainage is prohibited. It is used to check if there is no drainage, or if drainage exceeds the drainage standard value.



3.3.5.1 Format of report

- The BLEED-OFF report file name is time stamp.

For example, when the created date and time is 06/12/2017 15:59.
File name: *BLEED-OFFREPORT0000_201706121559.pdf*
Folder path: *C:\BLEED-OFFREPORT\LIST\20170612*

- **Figure 3-17** shows the format of the generated report.

No	Item
1	Ship's IMO No. (Manufacturer has been set)
2	Report creation date and time
3	Date and time of event or oil concentration recording (World Standard Time)
4	Position information (latitude/longitude) when an event or oil concentration was recorded
5	Measured oil concentration
6	Event occurrence mark

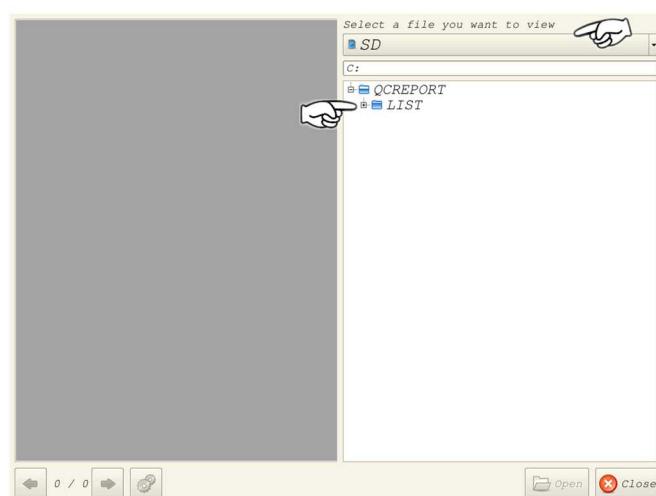
Figure 3-17 Format of BLEED OFF WATER DISCHARGE TO SEA REPORT

3.3.5.2 Report viewing procedure

- 1) Touch the [REPORT VIEWER] button. PDF viewer will shown.
- 2) Touch the [Open] button. "File select" menu is displayed.



- 3) Select "SD". The selected file or folder name(with drive pass) is displayed in the address bar.
- 4) Select file "C:BLEED-OFFREPORT/LIST/filename".



- 5) Touch the [Open] button. Selected PDF file is displayed.

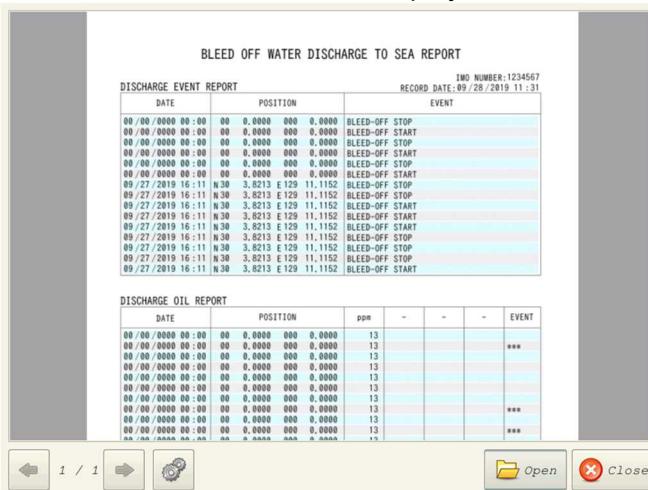


Figure 3-18 Report viewing procedure

3.3.5.3 Procedure for copying/moving report data

- The BLEED-OFF report files are stored in the storage (the SD card) of the LCD.
- This chapter explains on how to copy/move the BLEED-OFF report files to USB flash drive from the SD card.
- Prepare a formatted USB flash drive with the following specifications.

Table 3-15: USB flash drive specifications

TYPE	CAPACITY	FILE SYSTEM	CONNECTION PORT
USB flash drive	Max.32GB	FAT,FAT32	USB-A

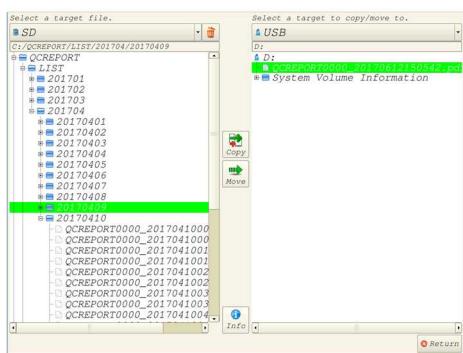
	<ol style="list-style-type: none"> Turn off the power to the control panel, open the panel door, and insert the USB flash drive into ⑯ on the lower back of the operation display panel. Close the panel door and turn on the control panel power.
	<ol style="list-style-type: none"> Touch the [SYSTEM] button on LCD display. The System menu bar is displayed at the top of the LCD screen. Touch the [Storage Viewer] button.
	<ol style="list-style-type: none"> Select file from the left side window (C(SD):BLEED-OFFREPORT/· · · · ·), and select the transfer location from the right window (D(USB):). <p>It is the same way even if want to copy/move in a folder units.</p> <p>The selected items will be highlighted in green color.</p>
	<ol style="list-style-type: none"> Select file from the left side window (C(SD):BLEED-OFFREPORT/· · · · ·), and select the transfer location from the right window (D(USB):). <p>It is the same way even if want to copy/move in a folder units.</p> <p>The selected items will be highlighted in green color.</p>

- 7) Then touch the [Copy]/[Move] button, notice window will popup. Touch the [OK] button.
 8) Show the "In progress... Do not remove the storage device." message.

I) Notice for file move



II) Notice for folder copy



- 9) Confirm that the selected file/folder has been copied to the D:(USB flash) drive.



- 10) Touch the [SYSTEM] button on LCD display and Press the Storage Removal button.
 11) Select the [Remove] button under [USB Storage (D:)].
 12) Turn off the control panel power, open the panel door and remove the USB flash drive.

Figure 3-19 Procedure for copying/moving report data



NOTE:

- Do not turn off the switch of control panel during access to a storage device.
- After moving the file/folder, selected file/folder cannot be moved back to SD card.

3.4 Automatic Operation Sequence

- When pre-operation preparation is completed, WTS can be started.
- After starting the separator with the starter, press the "AUTO START" button on the WTS control panel to start automatic operation.
- Make sure that the Local / Remote selector of the WTS control panel and WTS pump starter is selected as Remote.

Automatic Operation 1 Operation mode [READY]

- (1) Complete the pre-operation preparations. (See 3.2 Preparation before operation)

When [OPT.3] is equipped with, it is an operation mode until I receive signal ON of "WTS Run Cmd" from EGR Control System(EGR-CS).

As WTS starts after "WTS Run Cmd" reception automatically, please refer to after "Automatic Operation 2" Operation mode [START-UP].

- (2) Start the WTS Pump.

- If the EGR Drain water tank level is low, the WTS Pump will not start. After the STARTUP mode ends, the STANDBY mode is set.



- NOTE:**
- It starts when the liquid level in the tank rises. Bypass WTS and return to EGR Drain water tank during READY and STARTUP.
 - When [OPT.2]or[OPT.3] is equipped with, as WTS Pump automatically starts to start of WTS, the start by the manual operation of WTS pump is not necessary.

- (3) Press the "START" button on the starter to start the separator.

[Confirmation items]

- Make sure that the operation noise and vibration during the startup of the separator are normal.

- (4) Check the ammeter and confirm that it stabilizes at 50 to 70% of the rated current value.

[Confirmation items]

- The rated current value is written on the motor nameplate.
- It reaches 100% to 150% of the rated current value while the rotation speed is increasing.
- The rated speed is reached in 5 to 10 minutes after starting normally.

Automatic Operation 2 Operation mode [START-UP]

- (5) Press the "AUTO RUN" button on the WTS control panel.



- NOTE:**
- The separator enters the liquid passage preparation in the process of "close valve → discharge (open valve) → close valve".
 - The filter is filled with fresh water and prepares to supply treated water.

- (6) CV101A: Closed CV101B: Opened, and treated water is supplied to the separator.

- (7) When the pressure switch PS101 detects liquid passage and MT003: liquid passage detection timer times out, it shifts to "MEASUREMENT".

Automatic Operation 3 Operation mode [MEASUREMENT]

- (8) The flocculant pump starts immediately after switching MEASUREMENT.

- (9) Treated water from the separator is supplied to the filter, and when the MT903:SVW104 delay timer times out, SVW104: opens and the treated water is supplied to the oil concentration meter.



- NOTE:** • Treated water is returned to the EGR Drain water tank with CV102: open and CV103: closed during MEASUREMENT.

(10) When the oil monitor starts measurement and the measured value becomes 15 ppm or less, it shifts to BLEED-OFF mode.



- NOTE:** • In case of MEASUREMENT immediately after the automatic operation 5 to 7, the filter vent SVW102 is opened immediately after switching and the filter housing is filled with water.

Automatic Operation 4 Operation mode [BLEED-OFF]

(11) CV102: Closed CV103: Opened, and drainage starts outside the ship.

(12) During bleed-off, MT901: When the air bleeding interval during the filter passing process increases, MT902: SVW102 opens for the time set by the air bleeding timer during the filter passing process, and the air accumulated in the filter housing is released. To do.

Automatic Operation 5 Operation mode [STANDBY]

(13) If the supply of treated water to WTS is stopped during MEASUREMENT and BLEED-OFF modes, pressure switch PS101 turns off and MT004: STANDBY PROCESS PREPARATION TIMER goes up to STANDBY after the time is up.

(14) The coagulant pump stops immediately after switching to STANDBY.



- NOTE:** • The separator does not stop during STANDBY. CV101A: Closed CV101B: Stand by in the open state.

Automatic Operation 6 Operation mode [SEPARATOR DISCHARGE]

(15) ST105: When the discharge interval timer times out, it shifts to SEPARATOR DISCHARGE, CV101A: open CV101B: close, and the treated water is bypassed.

(16) Separator performs the process of "close valve → discharge (open valve) → close valve", and discharges the accumulated soot coagulated water to the EGR Dirty water tank.

(17) After the discharging process is completed, move to MEASUREMENT.

Automatic Operation 7 Operation mode [FILTER BACKWASH]

(18) FT203: When the filter backwash interval is up, it moves to FILTER BACKWASH, CV101A: open CV101B: closed, and the treated water is bypassed.

(19) The filter is SVA104: Open backwash air supply → SVA105: Open Air bubbling ① is supplied a set number of times for FC201 → SVA106: Open air bubbling cleaning ② Supply → SVW103: Open Draining is performed in this order.

(20) After the cleaning process, move to MEASUREMENT.CV102: Closed CV103: Opened, and drainage starts outside the ship.

Automatic Operation 8 Operation mode [SHUT DOWN]

(21) Press the "AUTO STOP" button on the WTS control panel to start the automatic stop process. When [OPT.3] is equipped with, because a rotary detector rating number of revolutions, and "AUTO RUN" holds it automatically, the button operation is unnecessary.

(22) After backwashing the filter, fill it with fresh water, drain the separator, and stop the motor.



3.5 Opreation Adjustment Items

- For stable operation, adjust the following items during automatic operation.
- If it changes from the adjusted state, readjust it. Also, when changing the settings, make the overall operation adjustments.

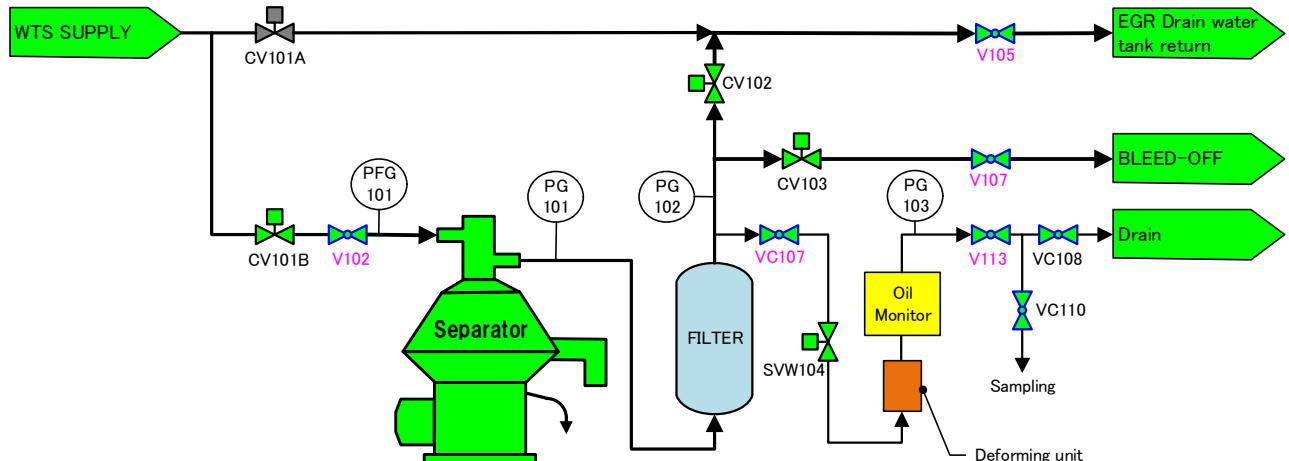


Figure 3-20 Adjustment location schematic

3.5.1 Processing flow rate adjustment

- Adjust V102 while adjusting the V102 while observing the indicated value on the flow rate indicator pressure gauge PFG101. (The flow rate is stated in the completed book)



- NOTE:**
 - When changing the flow rate, also change the discharge rate setting of the coagulant pump. (Refer to section 3.2)

3.5.2 Filter outlet back pressure adjustment

- Adjust V105 and V107 to set PG102: 0.1MPa.
- V105 makes adjustments in MEASUREMENT mode, and V107 makes adjustments in BLEED-OFF mode.



- NOTE:**
 - When BLEED is OFF, the indicated value of PG102 changes slightly due to the change of draft height.
 - Normally, the time is short in MEASUREMENT mode, so switch to CIRCULATION mode for adjustment.

3.5.3 Oil Monitor flow rate/pressure adjustment

- Adjust V107 and V113 so that PG103: 0.05MPa~0.08MPa and measured flow rate: 1L/min.
- Make adjustments when in BLEED-OFF mode or when switching to CIRCULATION mode and SVW104: open.
- Flow rate is VC108: Closed, VC110 is open, and while measuring time, sample water from the sampling cock and measure the amount.



- NOTE:**
 - Mainly adjust the flow rate with VC107 and adjust the PG103 back pressure with V113.
 - The oil concentration meter starts measurement when the inlet pressure is 0.03MPa or more, and stops when 0.03MPa or less continues for a certain time. If the PG103 pressure is 0.03MPa or less during MEASUREMENT, the BLEED-OFF mode will not proceed.

4 Maintenance schedule

Module Name	Maintenance part	Frequency, span, and method
Separator	Bowl cleaning and Exhaustion parts	<p>Faster occasion; total operation time 2,000 hrs or once a year <u>Refer to the displayed the add-up time of MT001 (3.3.4.1 set commonly for each model) about the total operation time.</u></p> <p>Clean and Exchange the exhaustion parts such as O-rings for the bowl, operation water device, and connected portions.</p>
	Exchanging gear oil	<p>First: 300 hrs, Second time: 600h, After this: every 6 months <u>Refer to the displayed the add-up time of MT001 (3.3.4.1 set commonly for each model) about the total operation time.</u></p> <p>At the first and the second maintenance, metal powders might be generated from the spiral gear. When the spiral gear is exchanged, carry out the maintenance from the first.</p>
	Full overhaul	<p>Every 2 years</p> <p>Except for the bowl, Overhaul including exchange of bearings for the horizontal and the vertical shaft</p>
Oil densitometer	Sensor cleaning	<p>Faster occasion; every 2 weeks or 10 times of the oil densitometer's operation</p> <p>Clean the detectable pipe with the attached cleaning liquid and brush.</p> <p>Carry out at any time when the alarm of the detectable pipe's dirt was happened.</p>
	Confirming 0 point	<p>In case that WTS is standstill; every 1 month</p> <p>Use mineral water for confirming 0 point.</p>
	Filter cleaning	<p>Every 3 months</p> <p>Confirm the dirt by secular variation of the detectable pipe, and the dirt of the supply water from the water inlet.</p>
	Check the desiccant	<p>Every 1 month</p> <p>Confirm the indicator of desiccants for inner protection.</p>
	Check the operation	<p>Every 1 year or at exchanging the sensor unit</p> <p>Check the operation state by the manufacturer. (recommendation)</p>
	Check the precision Exchanging the back-up battery	<p>Every 2 years</p> <p>Check the operation state by the manufacturer. (recommendation)</p> <p>The life span of the back-up battery for the watch is about 2 years after the insurance sheet is removed (after starting to use).</p>
	Renewal of precision the certificate	<p>Within 5 years</p> <p>The validity of the precision certificate is 5 years. As MEPC.107(49) describes, the manufacturer or somebody approved by the manufacturer must confirm the precision.</p> <p>Replacing with the calibrated unit is also valid.</p>
Filter	① Operation of filter's dipping cleaning mode (cleaning without opening)	<p>Faster occasion; Every 300 hrs or at happening the alarm of Filter inlet pressure (the pressure difference reaches 0.20 MPa.)</p> <p><u>Refer to the displayed time of MT002 for the add-up feed liquid (3.3.4.1 set commonly for each model) about the total operation time.</u></p> <p>Even if there are no pressure difference of the filter, frequent cleaning the filter by detergent can extend the life span of the filter.</p> <p>Criterion of cleaning is a time when the filter's pressure difference reaches 0.20 MPa, and the alarm of the filter's pressure difference is happened. The filter inlet pressure is monitored by the pressure switch.</p> <p>The criterion of the pressure difference is 0.05 MPa.</p> <p>Auto cleaning is carried out after the detergent is put in from the inlet for it.</p>
	② Hand washing of the filter (Cleaning with opening)	<p>After operation by the filter cleaning mode, in case that the pressure difference becomes above 0.05 MPa.</p> <p>Cleaning criterion; In case that the pressure difference becomes above 0.05 MPa after ① cleaning, take the element out from the filter, and remove the soot by hand washing.</p>

	③ Exchanging		<p>After hand washing the filter, if the pressure difference doesn't recover, or the filter is damaged.</p> <p>Exchange the element if the pressure difference becomes above 0.05 MPa after ② cleaning is carried out.</p> <p>If the filter is damaged, and base water come out to the filter outlet side, it has negative effects on the oil densitometer.</p> <p>Exchange the element if the oil concentration becomes more than 15 ppm.</p>
OPT.4 MEPC.259(68) QC Monitor	PAH sensor	Cleaning	<p>Every 6 months in using span</p> <p>Clean the light source and receiving of the sensor.</p>
		0 point check	<p>Every 12 months in using span</p> <p>0 point check should be carried out the inside of black sealed empty containor, and confirm that PAH is less than 200µg/L</p>
		Exchanging	<p>Every 24 months in using span</p> <p>The sensor main body must be sent the manufacturer in order to carry out the calibration and inspection.</p>
	Turbidity sensor	Checking cleaning and precision	<p>Every 6 months in using span</p> <p>Clean the light source and receiving of the sensor.</p> <p>Use Verification check for confirming the precision.</p>
		Calibration	<p>Every 12 months in using span</p> <p>Clean the light source and receiving of the sensor, and the calibration by the special liquid is requisite. This liquid has an expiration date, so purchase that considering the calibration date.</p>
	pH sensor	Cleaning and calibration	<p>Every 3 months in using span</p> <p>Cleaning the glass electrode and calibration by the pH standard powder are requisite.</p>
		Exchanging	<p>Every 18 months in using span</p> <p>Because of exhausting, exchange the glass electrode and inside liquid.</p>

5 Causes of Failures and Measures

5.1 WTS alarm

- When an alarm occurs in WTS, "WTS ALARM" is output all at once.
- WTS operation when an alarm occurs is as follows.
 - (1) SEPARATOR Normal stop…SEPARATOR stops after the discharging process.
 - (2) SEPARATOR Emergency stop… SEPARATOR stops immediately.
 - (3) FILTER backwashing… Performs the filter backwashing process.

5.2 WTS alarm list

No.	Name (LCD display)	Causes of occurrence	Actions after occurrence		
			Separator		FILTER backwashing
			Normal Stop	Emergency Stop	
1-1	EGR Dirty Water Tank HIGH LEVEL	EGR DIRTY WATER TANK LEVEL reaches setting height.	<input type="radio"/>		
1-2	FILTER INLRT PRESSURE ABNORMAL	FILTER INPUT PRESSURE reaches setting value.			<input type="radio"/>
1-3	MEASUREMEN T TIME OUT	BLEED-OFF WATER MEASUREMENT TIMER (MT006) reaches setting value.	<input type="radio"/>		
1-4	SEPARATOR LEAKAGE	SEPARATOR LEAKAGE is detected by flow switch of FLD.	<input type="radio"/>		
1-5	SEPARATOR MOTOR OVERLOAD	SEPARATOR MOTOR OVERLOAD is detected by thermal (OCR) of Separator Starter.		<input type="radio"/>	
1-6	OIL MONITOR ABNORMAL	Oil contents is detected by OIL MONITOR and becomes 30ppm over.	<input type="radio"/>		
1-7	EMERGECY STOP	SEPARATOR MOTOR OVERLOAD is detected by thermal (OCR) of Separator Starter.		<input type="radio"/>	

[OPT1]

No.	Name (LCD display)	Causes of occurrence	Actions after occurrence		
			Separator		FILTER backwashing
			Normal Stop	Emergency Stop	
A-1	SEPARATOR LEAKAGE	Temporary Tank Level reaches setting height.	<input type="radio"/>		
A-2*	EGR DIRTY WATER TRANSFER FAILURE	EGR dirty water pump Operation monitoring Timer (MT009) reaches setting value.			

*A-2 EGR DIRTY WATER TRANSFER FAILURE is alarm only.

[OPT2]

B-1	WTS PUMP ABNORMAL	WTS PUMP ABNORMAL is detected by thermal (OCR) of Separator Starter.			
B-2*	EGR DRAIN TANK HH LEVEL	EGR Drain Water Tank reaches the high surface level.	<input type="radio"/>		
B-3	EGR DRAIN TANK LL LEVEL	EGR Drain Water Tank becomes the surface height less than low surface level.	<input type="radio"/>		
*B-1 WTS ABNORMAL is only WTS Pump stop.					

[OPT3]

C-1	SEPARATOR ROTATION ABNORMAL	As the signal to detect the number of rotations from the Discharge Detector (DD) attached to the Separator is turned to OFF, the T063 rated number of rotations detection timer times up.	<input type="radio"/>		
C-2*	SEPARATOR NO OPENING OF BOWL	The Separator did not discharge normally during the discharge steps. The Discharge Detector (DD) outputs the discharge error signal to the Separator Control Panel.		<input type="radio"/>	
C-3	SEPARATOR VIBRATION ABNORMAL	The vibration detector attached to the Separator (VS) detected an abnormal vibration.		<input type="radio"/>	
C-4	WTS START UP ABNORMAL (WTSNOT READY)	Either warning occurs during a separator start process.	<input type="radio"/>		

5.3 Countermeasures of occurrence of alarm

The alarms which occur for the WTS and the countermeasures are as described below.

Name (LCD display)	1-1 EGR DIRTY WATER TANK HIGH LEVEL
Countermeasure	<ul style="list-style-type: none"> ♦ Unload the soot clarified water.

Name (LCD display)	1-2 FILTER INLET PRESSURE ABNORMAL
Countermeasure	<ul style="list-style-type: none"> ♦ In the case alarms are output several times in a short period of time, automatically stop the WTS and perform “Cleaner Immersion Operation”. ♦ Replace the filter elements.

Name (LCD display)	1-3 MEASUREMENT TIME OUT
Countermeasure	<ul style="list-style-type: none"> ♦ Check the start of oil monitor measurement. ♦ Clean the measuring part of Oil Monitor sensor. ♦ Perform “Cleaner Immersion Operation”. ♦ Check the flocculant pump and tank.

Name (LCD display)	1-4 SEPARATOR LEAKAGE
Countermeasure	<ul style="list-style-type: none"> ♦ Adjust the flow rate when the supply flow rate is excessive. ♦ Check the state of actuation water supply pressure, etc. ♦ Inspect the electromagnetic valve SV2 (for actuation water to close the valve). ♦ Inspect and replace the rotator parts (pilot valves, valve seals, etc.)

Name (LCD display)	1-5 SEPARATOR MOTOR OVERLOAD
Countermeasure	<ul style="list-style-type: none"> ♦ Check whether the motor has no abnormal condition. ♦ Inspect the gear oil of the Separator. ♦ Remove the cause of overload (implement open inspection to check whether or not the parts have a contact due to assembly failure, etc.) ♦ Inspect the horizontal shaft rotation transmission mechanism (wearing of the friction clutch in particular). ♦ Check whether the spiral gear can be turned manually. ♦ Inspect for any clogging between the rotator and frame due to scaling.

Name (LCD display)	1-6 OIL MONITOR ABNORMAL
Countermeasure	<ul style="list-style-type: none"> ♦ Inspect of OIL MONITOR and clean the measuring part of sensor. ♦ Follow with the OIL MONITOR instruction manual.

Name (LCD display)	(OPT-1) A-1 SEPARATOR LEAKAGE
Countermeasure	<ul style="list-style-type: none"> ♦ Adjust the flow rate when the supply flow rate is excessive. ♦ Check the state of actuation water supply pressure, etc. ♦ Inspect the electromagnetic valve SV2 (for actuation water to close the valve). ♦ Inspect and replace the rotator parts (pilot valves, valve seals, etc.) ♦ Check whether the level sensor of Temporary Tank is working without malfunction.

Name (LCD display)	(OPT-1) A-2 EGR DIRTY WATER TRANSFER FAILURE
Countermeasure	<ul style="list-style-type: none"> ♦ Check whether inside of Temporary Tank or the outlet line of Temporary Tank is not clogged. ♦ Inspect EGR Dirty water Transfer pump.

Name (LCD display)	(OPT.2) B-1 WTS PUMP ABNORMAL
Countermeasure	<ul style="list-style-type: none"> ♦ Remove the cause of over load (implement open inspection to check whether or not the parts have a contact due to assembly failure, etc.). Note: Please see the WTS PUMP Instruction Manual for details. ♦ When restarting the pump, switch the “Local-Remote” selector on the panel to Local and press the “WTS PUMP START” button to restart.

Name (LCD display)	(OPT.2) B-2 EGR DRAIN TANK HH LEVEL
Countermeasure	<ul style="list-style-type: none"> ♦ Please operate WTS, and lower the tank surface level.

Name (LCD display)	(OPT.2) B-3 EGR DRAIN TANK LL LEVEL
Countermeasure	<ul style="list-style-type: none"> ♦ Please stop driving of WTS PUMP. (it causes the trouble of WTS Pump.)

Name (LCD display)	(OPT.3) C-1 SEPARATOR ROTATION ABNORMAL
Countermeasure	<ul style="list-style-type: none"> ♦ Check whether the motor has no abnormal condition. ♦ Inspect the horizontal shaft rotation transmission mechanism (wearing of the friction clutch in particular). ♦ Check the state of mounting of the rotary sensor.

Name (LCD display)	(OPT.3) C-2 SEPARATOR NO OPENING OF BOWL
Countermeasure	<ul style="list-style-type: none"> ♦ Check the state of actuation water supply pressure, etc. ♦ Check that the manual valve of the actuation water supply line is opened. ♦ Inspect the strainer of PG202. ♦ Inspect the electromagnetic valves SV1 and SV9 (for actuation water to open the valve). ♦ Inspect and replace the rotator parts (pilot valves, valve seals, etc.). ♦ Inspect the inside of DD. ♦ Check the state of mounting of the rotary sensor.

Name (LCD display)	(OPT.3) C-3 SEPARATOR VIBRATION ABNORMAL
Countermeasure	<ul style="list-style-type: none"> ♦ Check whether any imbalance occurs in the rotator. ♦ Check whether the vertical shaft mechanism has no failure. ♦ Check whether the horizontal shaft mechanism has no failure. ♦ Check the vibration detection setting value for the VD.

Revision history

Rev	Date	MADE	CHKD.	APPR.	Description
001	24 Aug 2020	K.Onzo	A.Nakamura	T.Arai	1 st Edition
002	14 Sep.2020	K.Onzo	A.Nakamura	T.Arai	Added flocculant specifications (P.7) Addition of note in circulation mode(P.26) Correction of Fig.2-6(P.9) Correction of Table 2-3 (P.10) Correction of Fig.2-8(P.11)
003	30.Oct.2020	N.Abe	A.Nakamura K.Onzo	T.Arai	Added contents about OPT.2, OPT.3.
004	30.Mar.2021	N.Abe	A.Nakamura K.Onzo	T.Arai	Revised a timer initial set point. (3.3.4 Setting value) Revised a flow figure. (Figure 3-4 , 3-5)
005	31.May.2021	T.Ogawa	A.Nakamura K.Onzo	T.Arai	Added Confirmation during running (Table3-1) Revised a flow figure. (Figure 3-4 , 3-5)
006	18.Aug.2022	A.Nakamura	–	T.Nakano	Added maintenance schedule. (Four) Revised the flow chart to the latest. (Fig. 2-1,2-6,2-7,2-8,3-1,3-2,3-3) 3.3.4.1 Revised a part of the contents of common settings. Other corrections.

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Operation & Maintenance Manual

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WTS instruction manual (MKK2)

Confirmation of flocculant addition concentration and WTS operation adjustment

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1 Overview

Flocculant feed rate sometime should be adjusted since property of EGR Drain water in EGR drain water tank might be influenced by the nature of fuel and cylinder oil.

Before starting water treatment, it is highly recommended to decide appropriate flocculant feed rate and flow rate of EGR Drain water to separator and filter in accordance with the following procedure.

2 How to check the flocculant concentration

2.1 Circulation by WTS pump

At the start of WTS operation, if it has been more than one day since the last WTS operation, use the WTS pump to circulate the EGR Drain water between the EGR drain water tank and the WTS in order to agitate the soot that has accumulated at the bottom of the tank. During EGR operation or water treatment (In case EGR drain water in the tank is higher than low level alarm.), WTS pump should be kept running. In case that EGR Drain water is stored in the drain water tank for long term, WTS pump should be run at least circulating 1 time for the amount of EGR Drain water in the drain tank before doing WTS operation.

When doing this operation, EGR Drain water is bypassing the separator and filter.

Note : If the buffer tank has been replaced with fresh water, EGR operation without water treatment should be performed until the fresh water in the buffer tank is replaced with the process water and the EGR drain tank level is higher than the low level alarm.

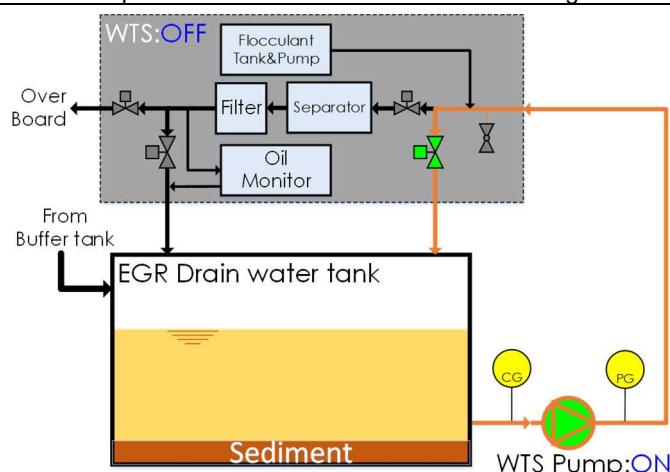


Figure 2-1 WTS Pump circulation flow

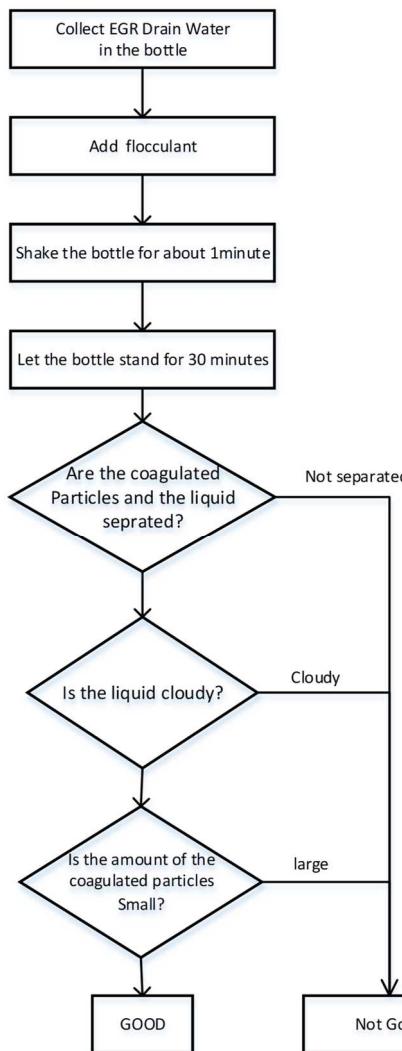
2.2 Bottle test method

- How to determine the concentration of the flocculant
- Check within the concentration range of addition as follows

Conditions to confirm the concentration

Concentration of flocculant to add 0.010 / 0.015 / 0.025 / 0.050 / 0.075 / 0.1 / 0.125 / 0.15 / 0.175 / 0.200 %

[Workflow to confirm the concentration of flocculant]



[Amount of flocculant added]

EGR Drain water	Flocculant	Concentration
1,000 ml	0.10 ml	0.010%
	0.15 ml	0.015%
	0.25 ml	0.025%
	0.50 ml	0.050%
	0.75 ml	0.075%
	1.00 ml	0.100%
	1.25 ml	0.125%
	1.50 ml	0.150%
	1.75ml	0.175%
	2.00ml	0.200%

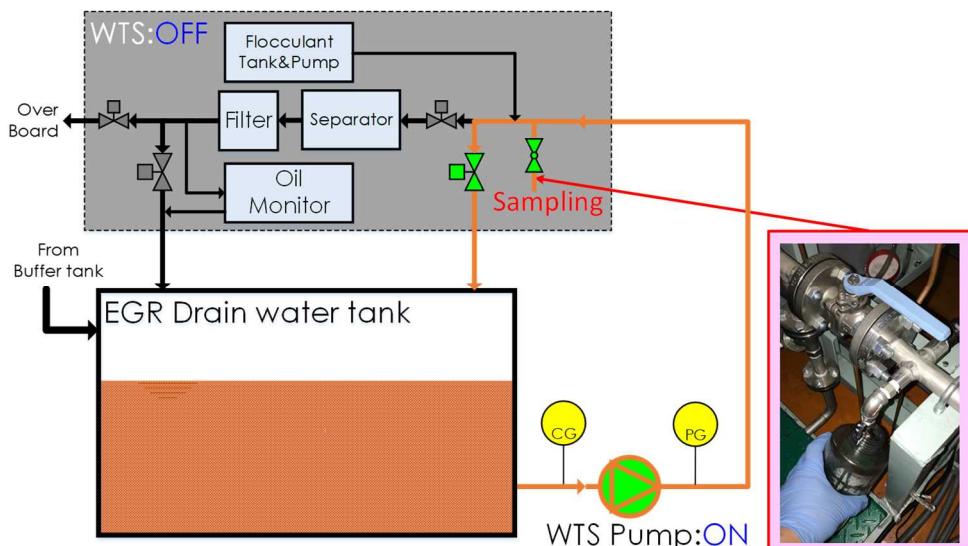


Figure 2-2 EGR Drain water sample point

EGR Drain water	Flocculant	Concentration
1,000 ml	0.10 ml	0.01%
	0.15 ml	0.015%
	0.25 ml	0.025% (highlighted)
	0.50 ml	0.050%
	0.75 ml	0.075%
	1.00 ml	0.100%
	1.25 ml	0.125%
	1.50 ml	0.150%
	1.75ml	0.175%
	2.00ml	0.200%



Figure 2-3 Add flocculant

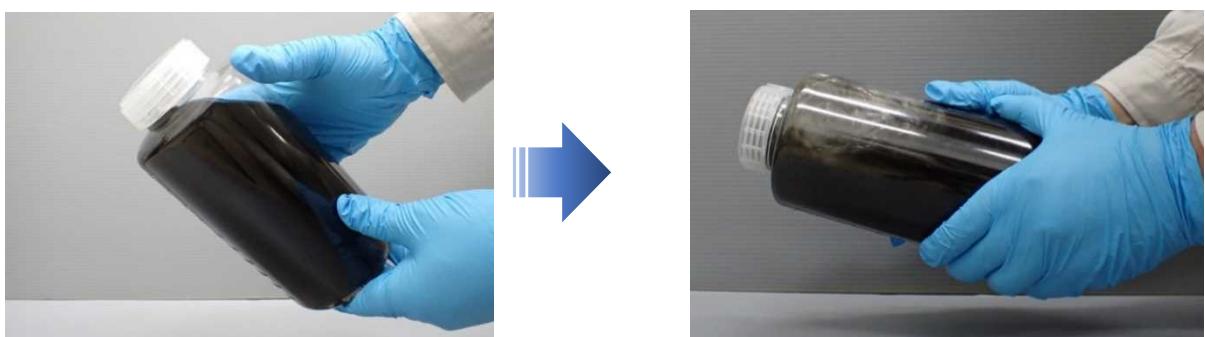


Figure 2-4 Shake the container for about 1 minute

※Dispose of the liquid to the Drain Water Tank.

Figure 2-5 and Figure 2-6 , Figure 2-7are example of bottle test. In the example, 0.015% and 0.300% are cloudy and can judge 0.150% with relatively appropriate quantity from 0.025%. In this case quantity of addition and the sediment choose little one.

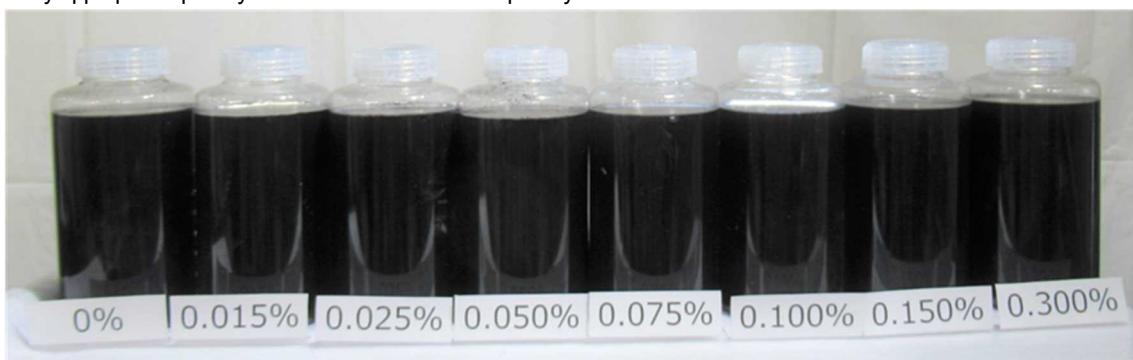


Figure 2-5 Just after adding flocculant into bottles

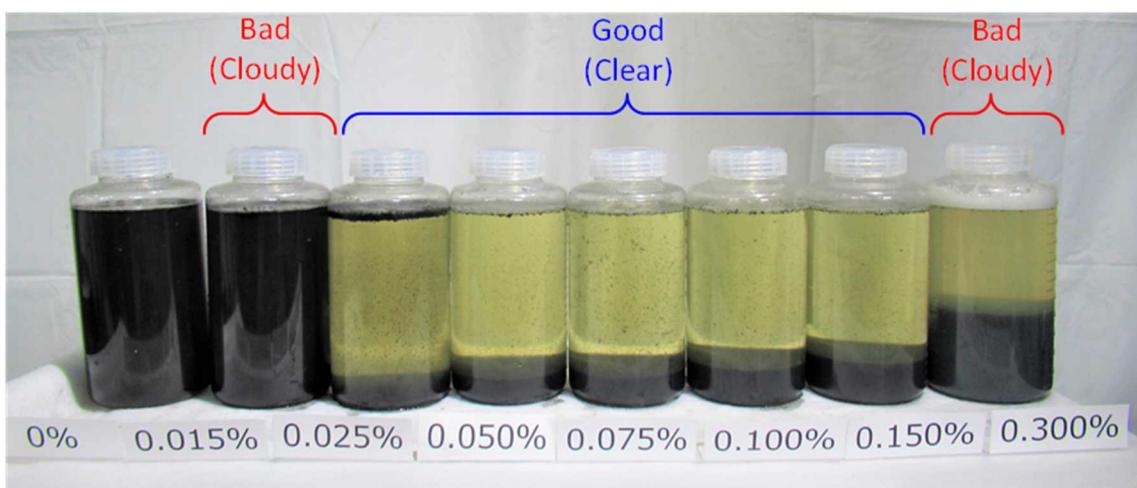


Figure 2-6 30 minutes later after adding

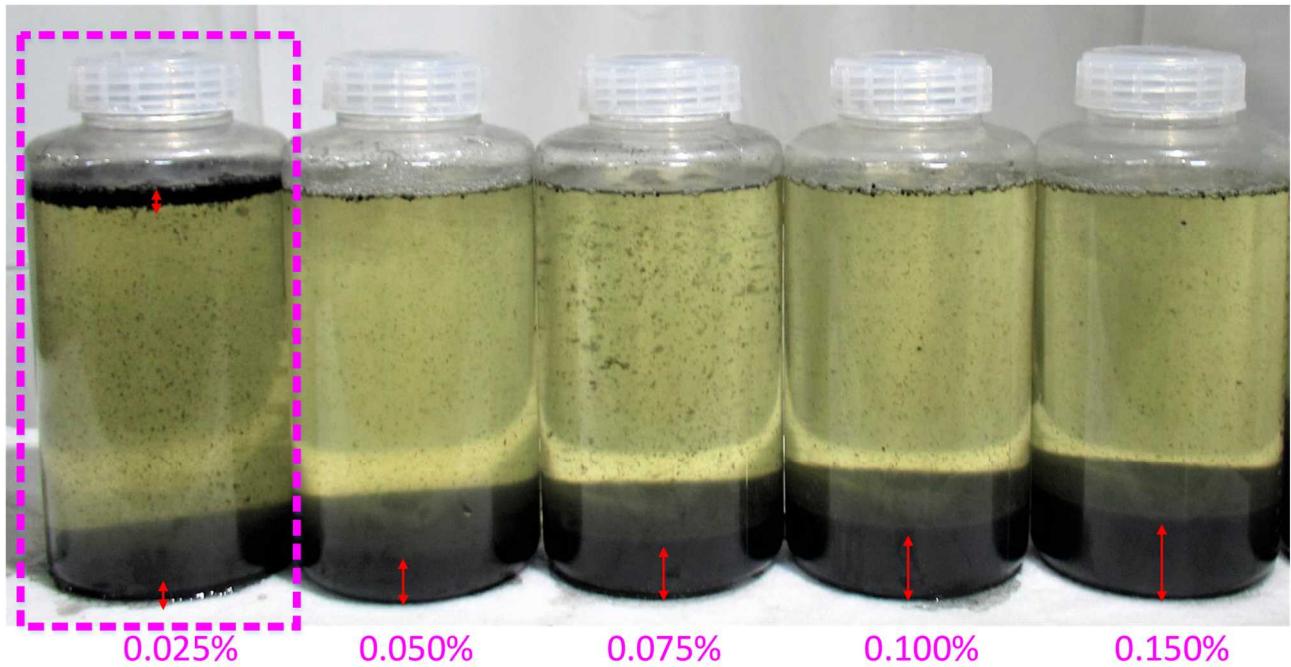


Figure 2-7 Comparison of the deposition amount of sediment

Judging from Figure 2-7, amount of sediment chooses few 0.025%.

3 WTS operation setting

Explains how to adjust the operation of WTS.

3.1 Flocculant pump flow rate setting

- If change the flow rate of WTS, also need to change the flow rate of flocculant addition.
- The flocculant pump is a diaphragm pump. Adjust the stroke length (%) and the stroke rate (Stroke per minute : spm) on the pump body.
- The flow rate setting of the flocculant pump is determined from the WTS flow rate to be set and the amount of flocculant added obtained from the bottle test results. See Table 3-1 for settings.

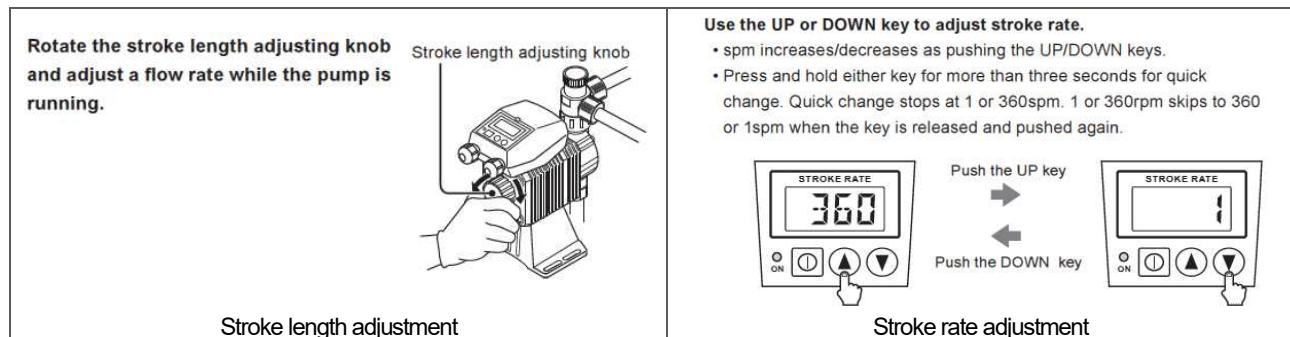


Figure 3-1 Flocculant pump flow rate adjustment method

WTS flow rate	1,400 L/h		1,000 L/h		700 L/h		600 L/h	
Concentration(%)	Stroke length (%)	Stroke rate (spm)	Stroke length (%)	Stroke length (%)	Stroke rate (spm)	Stroke rate (spm)	Stroke length (%)	Stroke rate (spm)
0.010%	50%	53	-	-	-	-	-	-
0.015%	50%	80	-	-	-	-	-	-
0.025%	50%	132	50%	94	50%	66	-	-
0.050%	-	-	50%	188	50%	132	50%	114
0.075%	-	-	-	-	75%	132	50%	170
0.100%	-	-	-	-	-	-	50%	227

Table 3-1 Flocculant pump setting table

- When changing the flow rate setting of the flocculant pump, also change the flow rate of WTS. (Refer to section 3.2 Other adjustment items)



- NOTE:**
- 1,400L/h ⇒ Max. Setting : Concentration 0.025% "Stroke length 50%, Stroke rate 132spm"
 - 1,000L/h ⇒ Max. Setting : Concentration 0.050% "Stroke length 50%, Stroke rate 188spm"
 - 700L/h ⇒ Max. Setting : Concentration 0.075% "Stroke length 75%, Stroke rate 132spm"
 - 600L/h ⇒ Max. Setting : Concentration 0.100% "Stroke length 50%, Stroke rate 227spm"

3.2 Other adjustment items

- Adjusting the WTS flow rate also changes the filter back pressure. Refer to Section 3.5 of the WTS Instruction Manual to operate the valve.

3.5 Operation Adjustment Items

- For stable operation, adjust the following items during automatic operation.
- If it changes from the adjusted state, readjust it. Also, when changing the settings, make the overall operation adjustments.

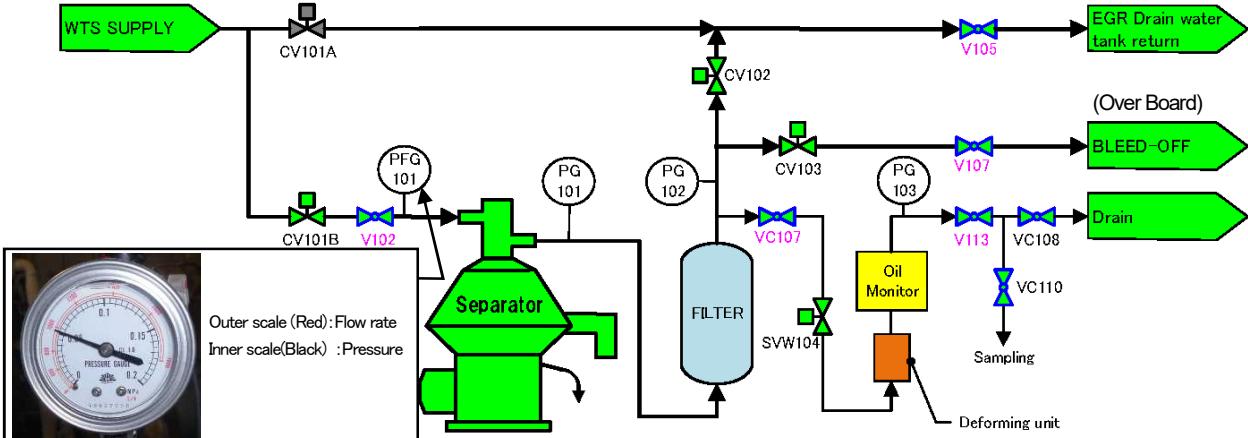


Figure 3-20 Adjustment location schematic

3.5.1 Processing flow rate adjustment

- Adjust V102 while adjusting the V102 while observing the indicated value on the flow rate indicator pressure gauge PFG101. (The flow rate is stated in the completed book)**



- NOTE:** ♦ When changing the flow rate, also change the discharge rate setting of the coagulant pump. (Refer to section 3.2)

3.5.2 Filter outlet back pressure adjustment

- Adjust V105 and V107 to set PG102: 0.1MPa.**
- V105 makes adjustments in MEASUREMENT mode, and V107 makes adjustments in BLEED-OFF mode.



- NOTE:** ♦ When BLEED is OFF, the indicated value of PG102 changes slightly due to the change of draft height.
♦ Normally, the time is short in MEASUREMENT mode, so switch to CIRCULATION mode for adjustment.

3.5.3 Oil Monitor flow rate/pressure adjustment

- Adjust V107 and V113 so that PG103: 0.05MPa and measured flow rate: 1L/min.**
- Make adjustments when in BLEED-OFF mode or when switching to CIRCULATION mode and SVW104: open.
- Flow rate is VC108: Closed, VC110 is open, and while measuring time, sample water from the sampling cock and measure the amount.



- NOTE:** ♦ Mainly adjust the flow rate with V107 and adjust the PG103 back pressure with V113.
♦ The oil concentration meter starts measurement when the inlet pressure is 0.03MPa or more, and stops when 0.03MPa or less continues for a certain time. If the PG103 pressure is 0.03MPa or less during MEASUREMENT, the BLEED-OFF mode will not proceed.

Figure 3-2 WTS Instruction Manual "3.5 Operation adjustment item"

3.5.4 Check and change of Timer values

- If the bottle test before WTS running shows more than 0.075% addition rate of the flocculants, a lot of EGR dirty water with high viscosity will be generated, and the dirty water sticking on the leakage detector will induce a false alarm.
- Therefore set the timer as shown below.
- And, refer to 4.1 how to change the timer values.

- **Normal initial setting value**

ST102“Bowl washing” : 15 seconds, SC101“Number of washing counter” : 100 = invalid

- **In case of more than 0.075% addition rate of the flocculant**

“The amount of washing water for one washing is decreased by shortening the value for ST102 in order to increases the number of washing.”

ST102“Bowl washing” : 7 seconds, SC101“Number of washing counter” : 1 *1

*1 : We recommend to prolong the value of SC101 depends on the state of dirt or alarm.

3.3 Filter cleaning and replacement method

If the differential pressure of the filter becomes high, it is recommended to remove the filter and clean it. Check the differential pressure of the filter by checking the pressure difference between PG101 (filter inlet) and PG102 (filter outlet).

STEP1 WTS Auto stop

- Press the "Automatic stop" button on the WTS control panel to stop automatically. (Please refer to WTS Instruction Manual 3.3.2)

STEP2 Filter housing drain

- After automatic stop, open the air vent solenoid valve (SVW102) and drain solenoid valve (SVW103) of the filter housing.
- The operation is performed on the monitor of the WTS control panel. For the operation method, please refer to WTS Instruction Manual 3.3.3.

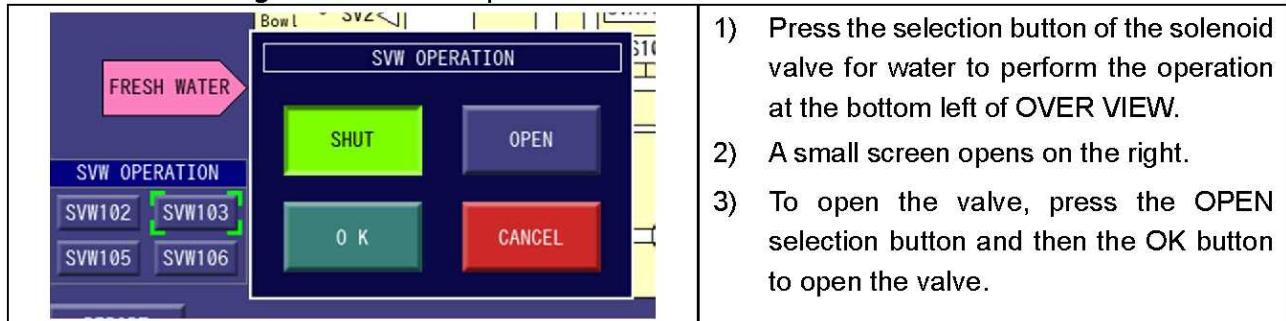


Figure 3-3 SVW Operation (WTS Instruction Manual 3.3.3)

STEP3 Opening the filter housing and removing the filter element

- Please refer to Section 4.3 of the "A-2 Filter Operation Manual" and pull the element out of the filter housing.
- Prepare the attached element retaining band to extract the filter.

STEP4 Filter cleaning

- For filter replacement, proceed to STEP 5.



Figure 3-4 State of filter cleaning

Cleaning procedure

- A) Move the filter into the coaming connected to the EGR drain tank or Dirty water tank.
- B) Slide the net over the filter element to the top.
- C) Rinse with fresh water with the filter body upright.
- D) Flush the center of the filter with fresh water to remove deposits.
- E) Clean until the filter surface is no longer sticky.
- F) Untie the entangled filter tube and arrange it so that the whole is straight.
- G) When storing the filter after cleaning, place it in a plastic bag and seal it to prevent the element from drying out.



CAUTION

Wear protective gloves for cleaning.

STEP5 Set of filter element

- Please refer to Section 4.3 of the "A-2 Filter Operation Manual" and pull the element out of the filter housing.

STEP6 WTS Restart

- Refer to the WTS Instruction Manual and restart WTS.

4 Timer setting of WTS

If WTS alarm's "Filter inlet abnormal" occurs or the inlet pressure of filter increases, the EGR Drain water may include the impurities which a separator cannot separate.

In the case of the above, please change a timer setting of "ST105 DISCHARGE INTERVAL" and "FT203 FILTERBACKWASHING INTERVAL" with reference to the following.

4.1 How to set the timer of WTS

- Refer to Section 3.3.3 Function and operation method of display panel of the WTS Instruction Manual.

④ Timer/Counter setting screen display button

- WTS common settings, separator control settings, filter control settings, and current value confirmation screen opens.
- See Figure 3-12 for the alarm reset method.

ITEM	SV	MIN.	PV
MT001 TOTAL OPERATION TIMER			1 h 51 m 32 s
MT002 TOTAL RUNNING LIQUID TIMER			0 h 26 m 14 s
MT003 PASSING WATER DETECTION TIMER	5	1 sec	0 s
MT004 STANDBY PROCESS PREPARATION TIMER	5	1 sec	0 s
MT005 FILTER PRESSURE DETECTION TIMER	3	1 sec	0 s
MT006 BLEED-OFF WATER MEASUREMENT TIMER	1	1 min	0 m 0 s
MT007 OIL MONITOR FLOW RATE MONITORING TIMER	10	1 sec	0 s

Name	Function
COMMON	WTS common
SEPARATOR	Separator settings
FILTER	Filter settings
COUNTER	Counter settings

Name	Function
ITEM	Setting name and No.
SV	Set value "Set Value"
MIN	Setting unit
PV	Present value "Present Value"

- Press the TIMER COUNTER button at the bottom right of the screen to open the setting screen.
- Press the page switching button that includes the item for changing the setting and checking the current value. To check the current value, check the PV on the screen.
- Press the SV which setting change.
- The input screen is displayed on the right side of the screen. Enter the set value so that it is within the range.
- To confirm the input, press the "ENTER" key. To cancel, press the "CANCEL" key.
- Confirm that the SV has been changed.

Figure 4-1 WTS Instruction Manual "3.3.3 Function and operation method of display panel"

5 Precautions for handling flocculants

Regarding the handling of flocculants, please refer to the attached Safety Data Sheet (SDS) issued by the flocculants manufacturer and follow the usage, storage procedures, and precautions specified by the manufacturer.

mitsubishi

Water Treatment System ONZ Series (MKK2)

Accessories Manual List

付属機器取扱説明書リスト

[OPT.1,2,3]



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