

GloEn-Patrol™

TRAINING MATERIAL 2

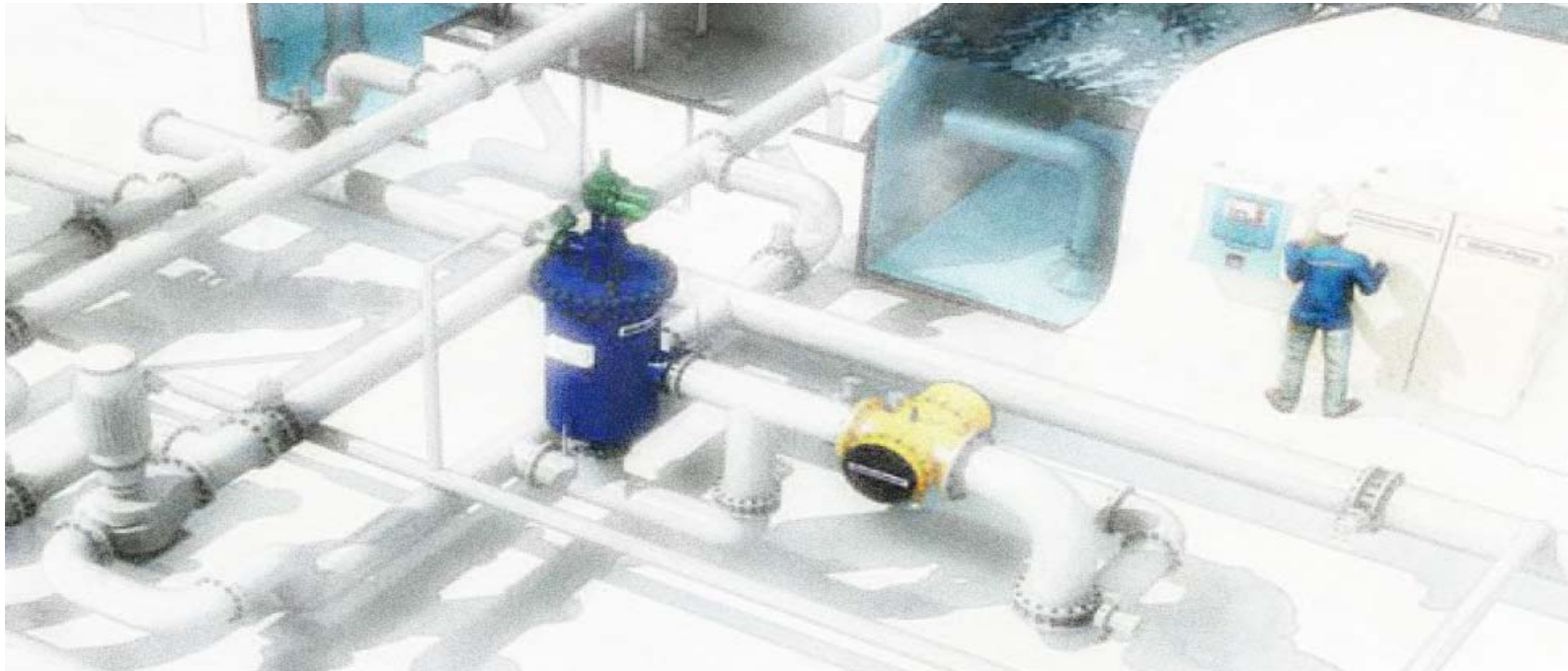
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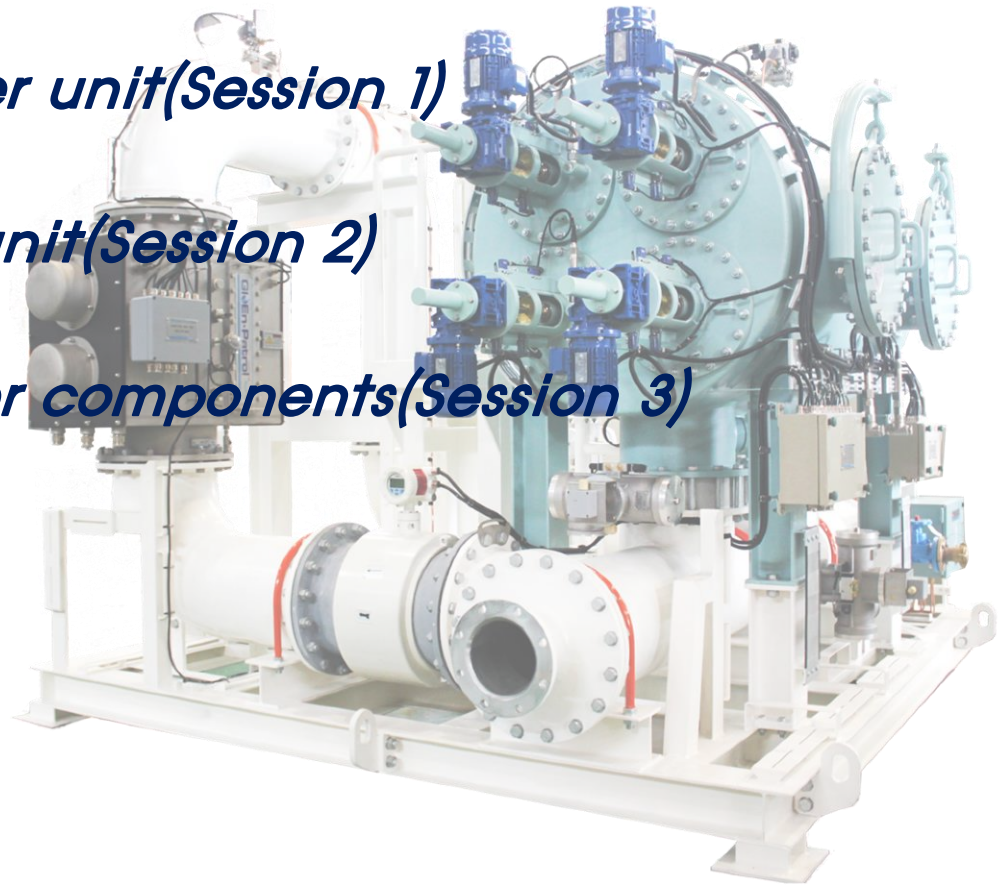
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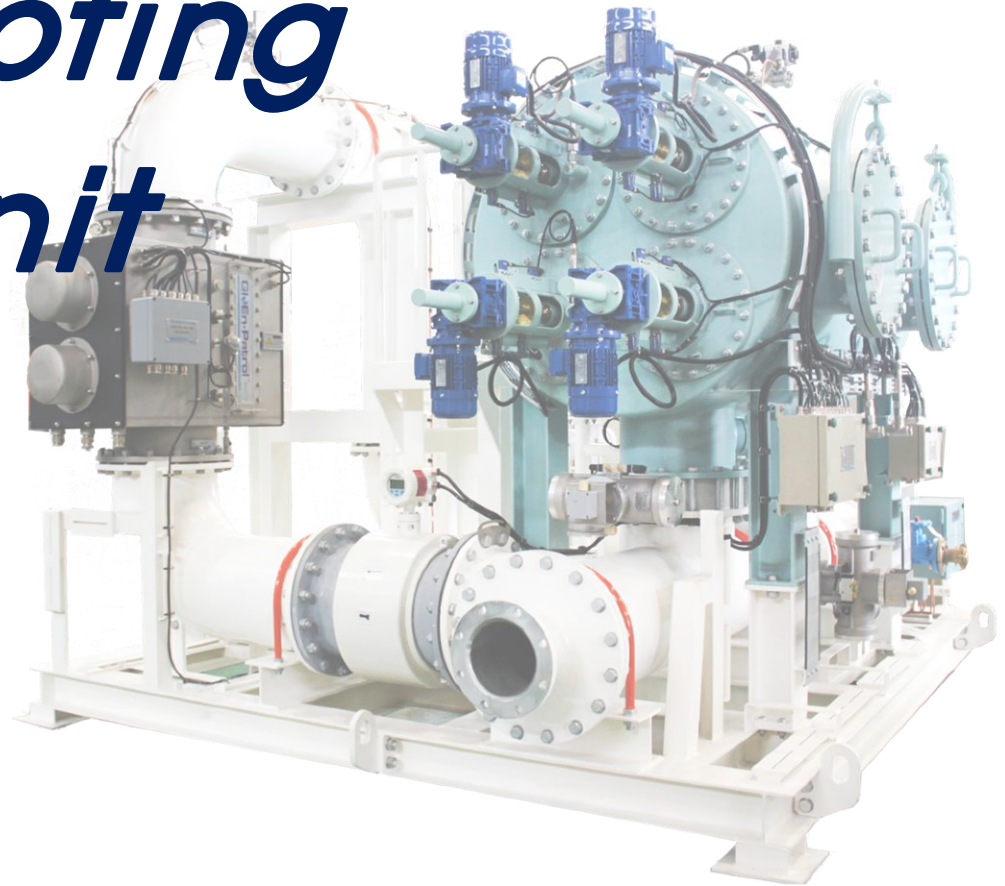
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Contents

- 1. Troubleshooting for Filter unit(Session 1)*
- 2. Troubleshooting for UV unit(Session 2)*
- 3. Troubleshooting for other components(Session 3)*



Troubleshooting for Filter unit



Chapter / Part / Section

Troubleshooting for Filter unit

Part I . How to reset the alarm

Part II . How to change the setting value

No.	Description	No.	Description	No.	Description
1	TIMER MODE FLUSHING INTERVAL	3	FILTER VENT VALVE OPEN DURATION	5	OPERATING TIME OVER ALARM SET
2	DP MODE OPERATING SET VALUE	4	CYCLE TIME OVER ALARM SET	6	INLET PRESS. LOW ALARM SET

Part III. Table for alarm/trip conditions

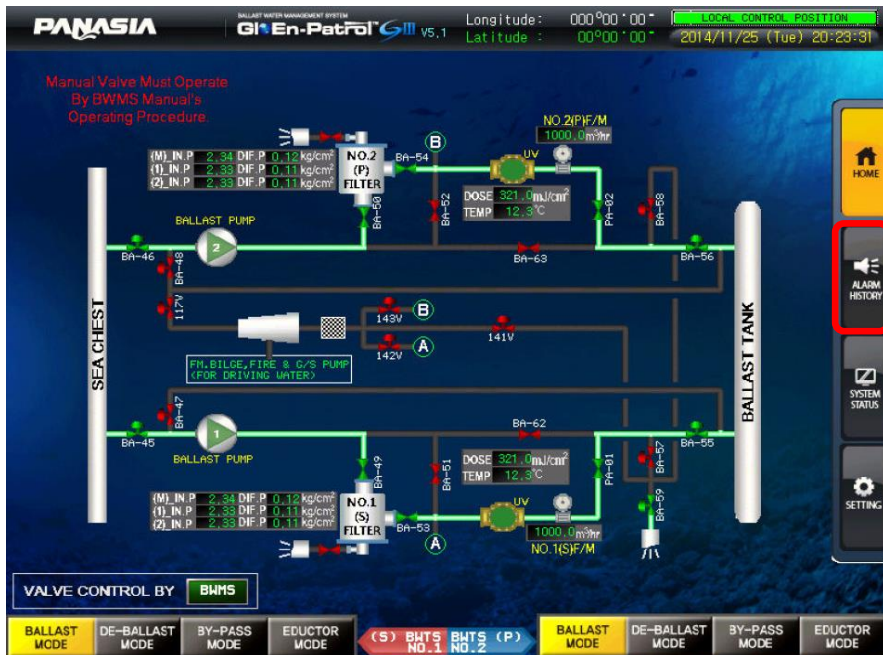
No.	Description	Set Point	Delay time (In seconds)	Remark	No.	Description	Set Point	Delay time (In seconds)	Remark
1	FILTER DP HIGH / HIGH HIGH	0.6kg/cm ²	60	Alarm	5	FILTER INLET PRESSURE SENSOR FAIL	-	2	Alarm
		1.2kg/cm ²	10 ~ 20	Trip					
2	FILTER INLET LOW PRESSURE	1kg/cm ²	40 ~ 60	Alarm	6	FILTER OUTLET PRESSURE SENSOR FAIL	-	2	Alarm
3	FILTER OPERATING TIME OVER	0.45kg/cm ²	600	Alarm	7	FILTER FLUSHING MOTOR TRIP	-	Immediately	Trip
4	FILTER CYCLE TIME OVER	-	53	Alarm	8	FILTER FINAL LIMIT SWITCH	-	-	Trip

Chapter / Part / Section
Part IV. Cause and action for alarm/trip relating to Filter unit
Section a. Filter DP high / high high
Section b. Filter inlet low pressure
Section c. Filter operating time over
Section d. Filter cycle time over
Section e-f Filter inlet / outlet pressure sensor fail
Section g. Filter flushing motor trip
Section h. Filter final limit switch
Part V. Filter clogging solution
Section a. Manual cleaning by using "Filter clogging solution" program
Section b. Physical cleaning of the filter element with De-scaling liquid

Trouble shooting for Filter unit

| How to reset the alarm

a. Touch the [ALARM HISTORY] and [BUZZER STOP] button



① Touch the [ALARM HISTORY] button



② Touch the [BUZZER STOP] button

Trouble shooting for Filter unit

| How to reset the alarm

b. Touch the [ALARM ACK.] and [ALARM RESET] button



③ Touch the [ALARM ACK.] button

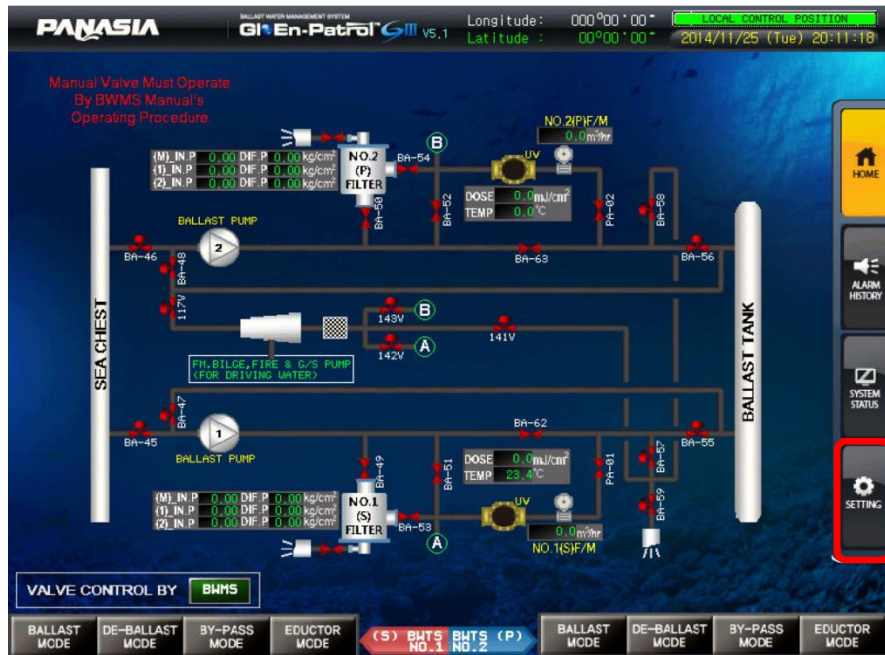


④ Touch the [ALARM RESET] button

Trouble shooting for Filter unit

|| How to change the setting value

a. Touch the [SETTING] button and Enter the password(1111111)



① Touch the [SETTING] button



② Input the password (1111111)

Trouble shooting for Filter unit

|| How to change the setting value

b. Touch the setting value



Trouble shooting for Filter unit

|| How to change the setting value

c. Confirm the changed value



Alarm & Trip conditions for Filter unit

III Table for alarm/trip conditions

NUMBER	Alarm	Set Point	Delay Time (seconds)
1	FILTER DP HIGH / HIGH HIGH	0.6kg/cm ²	60
		1.2kg/cm ²	10 ~ 20
2	FILTER INLET LOW PRESSURE	1kg/cm ²	40 ~ 60
3	FILTER OPERATING TIME OVER	0.45kg/cm ²	600
4	FILTER CYCLE TIME OVER	-	53
5	FILTER INLET PRESSURE SENSOR FAIL	-	2
6	FILTER OUTLET PRESSURE SENSOR FAIL	-	2
7	FILTER FLUSHING MOTOR TRIP	-	Immediately
8	FILTER FINAL LIMIT SWITCH	-	-

Trouble shooting for Filter unit

IV Cause and action for alarm/trip relating to Filter unit

A. FILTER DP HIGH / HIGH HIGH

Alarm indicates that differential pressure is over 0.6kg/cm² for longer than 60 seconds.

Trip indicates that differential pressure is over 1.2kg/cm² longer than 10~20 seconds and at which point, By pass Mode automatically activates.

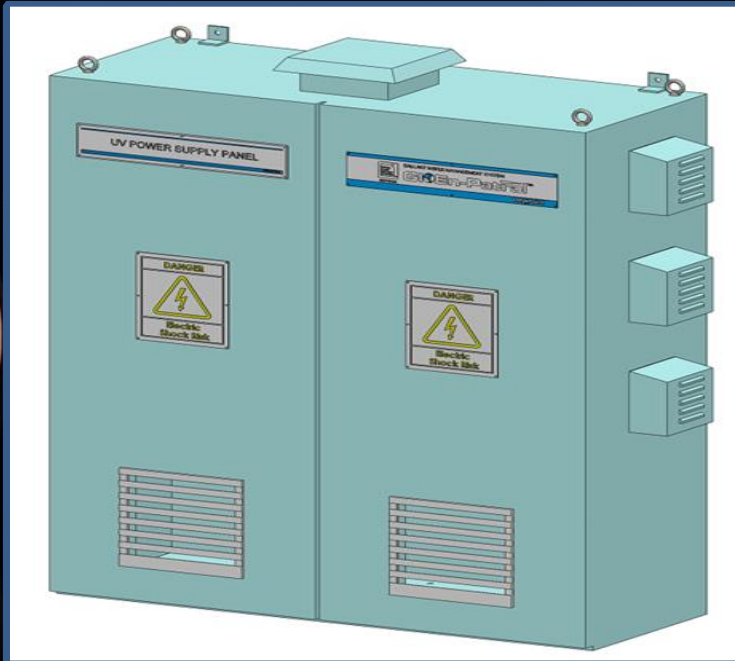
Cause	Description	Action
1	Loss of power for 'Pressure Transmitter/Motor/Solenoid	5
2	Malfunctioning Inlet Pressure Transmitter	2
3	Clogged Inlet Pressure Nozzle	2
4	Malfunctioning Back-flushing Valve	5
5	Faulty Limit Switches in the Limit Switch Box	2
6	Closed Local valve(s) in the Overboard pipe line	2
7	Clogged Filter Element	7
8	DP Set Value	1

Trouble shooting for Filter unit

IV Cause and action for alarm/trip relating to filter unit

A. FILTER DP HIGH / HIGH HIGH

Cause ①: Loss of power for 'Pressure Transmitter / Motor / Solenoid



● ACTION 1

Check if the circuit breaker switches in the UV power supply panel are turned on.

● ACTION 2

Measure if power supply voltage (440V) of the circuit breaker switch is properly supplied.

Trouble shooting for Filter unit

IV Cause and action for alarm/trip relating to filter unit

A. FILTER DP HIGH / HIGH HIGH

Cause ①: Loss of power for 'Pressure Transmitter / Motor / Solenoid



● ACTION 3

Check power supply to the UV power supply panel from 'MSBD' (Main Switch Board) in the ECR (Engine Control Room).

● ACTION 4

Check if all the electric wires are connected and tightened properly according to the electric drawings.

● ACTION 5

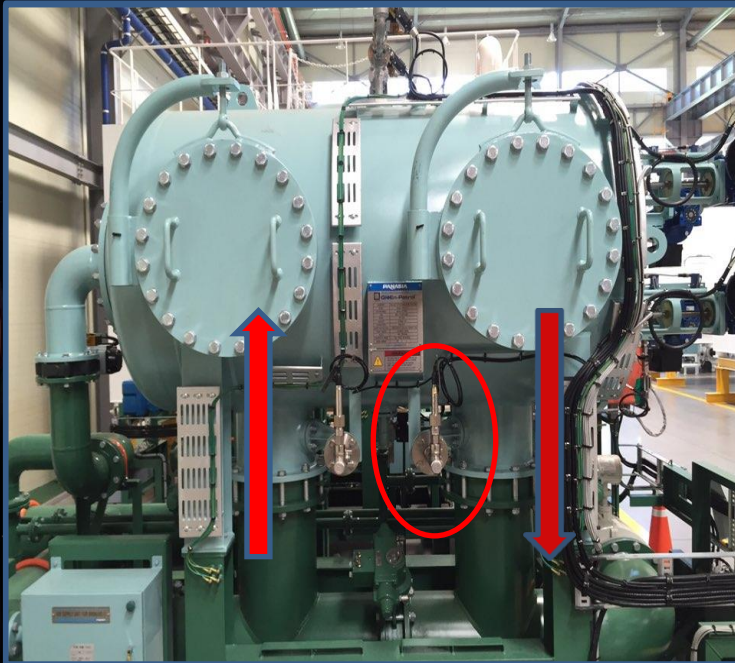
Verify all wires are properly terminated by checking the resistance with a Multi-Tester.

Trouble shooting for Filter unit

IV Cause and action for alarm/trip relating to filter unit

A. FILTER DP HIGH / HIGH HIGH

Cause ②: Malfunction Outlet Pressure Transmitter



● ACTION 1

Check if there is physical damage to the Pressure Transmitter.

● ACTION 2

Dismantle the Pressure Transmitter and check electric current using a Multi-Tester.

Normal range
3.99mA ~ 4.01mA

Trouble shooting for Filter unit

IV Cause and action for alarm/trip relating to filter unit

A. FILTER DP HIGH / HIGH HIGH

Cause ③: Clogged Outlet Pressure Nozzle



● ACTION 1

Check if the valve on the nozzle line of the Inlet Pressure Transmitter is open.

● ACTION 2

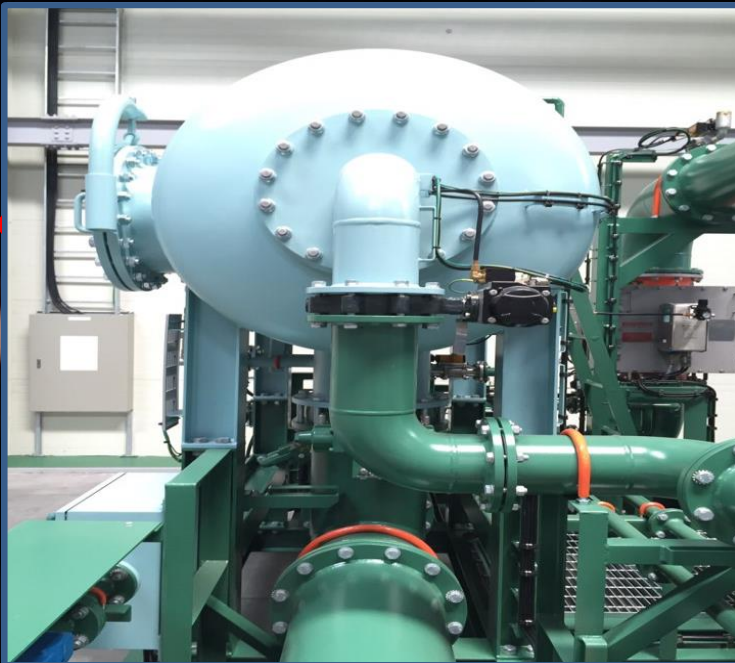
Clear the line if water does not flow out from the nozzle line during operation.

Trouble shooting for Filter unit

IV Cause and action for alarm/trip relating to filter unit

A. FILTER DP HIGH / HIGH HIGH

Cause ④: Malfunction Back-flushing Valve



● ACTION 1

Check if the Back-flushing Valve is open during operating. (Normally open during operation)

● ACTION 2

Check if the compressed air is supplied to the Solenoid Valve on the Actuator and Back-flushing Valve.

● ACTION 3

Check if the Back-flushing Valve is working properly (Open/Close) by pushing the manual operation button on the Solenoid Valve by hand.

Trouble shooting for Filter unit

IV Cause and action for alarm/trip relating to filter unit

A. FILTER DP HIGH / HIGH HIGH

Cause ④: Malfunction Back-flushing Valve



● ACTION 4

Check the function of Back-flushing Valve manually in the 'Check Mode'.

● ACTION 5

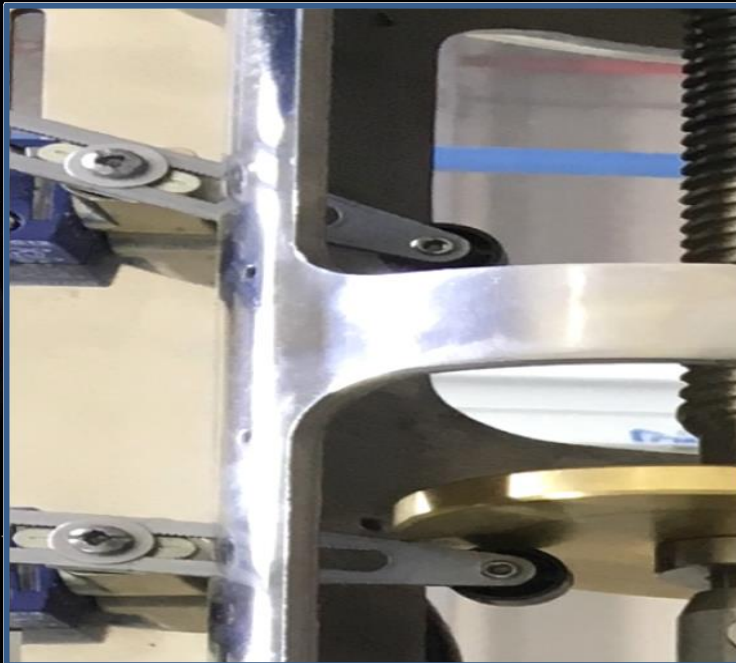
Dismantle the Actuator and Butterfly Valve to check if the disc, seat and/or shaft inside are jammed or damaged.

Trouble shooting for Filter unit

IV Cause and action for alarm/trip relating to filter unit

A. FILTER DP HIGH / HIGH HIGH

Cause ⑤: Faulty Limit Switches in the Limit Switch Box



● ACTION 1

Verify that the installed location of the operating Limit Switch set is lined up with the punched marks and that the switches work properly.

● ACTION 2

Carry out the Back-flushing operation manually after selecting the 'Manual Back-flushing' button and check if the Limit Plate is moving up and down properly.

● ACTION 3

Move Limit Switch reed(s) up and down to verify variability of an electronic contact with a Multi-Tester

Trouble shooting for Filter unit

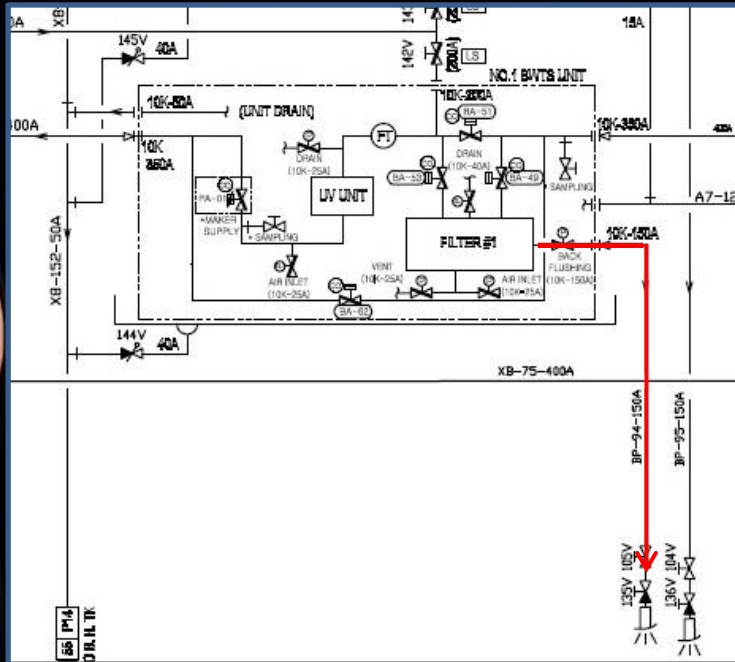
IV Cause and action for alarm/trip relating to filter unit

A. FILTER DP HIGH / HIGH HIGH

Cause ⑥: Closed Local valve(s) in the Overboard pipe line

● ACTION 1

Check and make sure if the other Local valves in the pipe line from the Back – flushing valve to Overboard are open during operation.



Trouble shooting for Filter unit

IV. Cause and action for alarm/trip relating to filter unit

A. FILTER DP HIGH / HIGH HIGH

Cause ⑦: Clogged Filter Element

●● ACTION 1

Manual cleaning by using 'Filter Clogging Solution' program.

●● ACTION 2

Physical cleaning of the filter element with De-scaling liquid.

●● Note

We will take a look at it more closely in Part V. 'Filter Clogging Solution'.



Trouble shooting for Filter unit

IV. Cause and action for alarm/trip relating to filter unit

A. FILTER DP HIGH / HIGH HIGH

Cause ⑧: DP Set Value



● ACTION 1

Select the "DP MODE OPERATING SET VALUE" (Default value = 0.45 kg/cm²) and input desired value (ex. 0.35 kg/cm²)

Trouble shooting for Filter unit

IV. Cause and action for alarm/trip relating to filter unit

B. FILTER INLET LOW PRESSURE

Alarm indicates that Inlet Pressure is lower than set Default value for more than 40 seconds (Default value = 1.0kg/cm2)

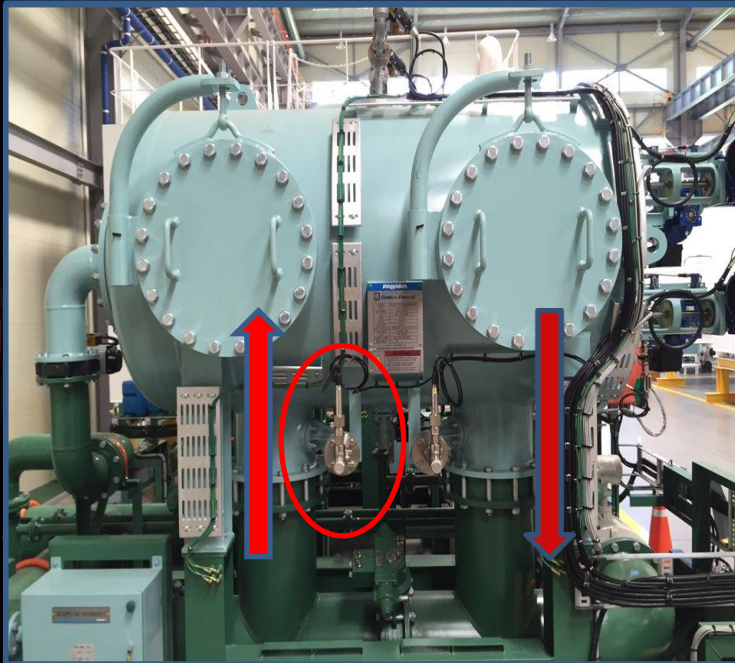
Cause	Description	action
1	Malfunctioning Inlet Pressure Transmitter	2
2	Clogged Inlet Pressure Nozzle	2
3	Ballast Pump Failure	1
4	Filter Inlet Line Valve(s) Failure	1

Trouble shooting for Filter unit

IV. Cause and action for alarm/trip relating to filter unit

B. FILTER INLET LOW PRESSURE

Cause ① : Malfunction Inlet Pressure Transmitter



● ACTION 1

Check if there is physical damage to the Pressure Transmitter.

● ACTION 2

Dismantle the Pressure Transmitter and check the current using a Multi-Tester.

Normal range
3.99mA ~ 4.01mA

Trouble shooting for Filter unit

IV. Cause and action for alarm/trip relating to filter unit

B. FILTER INLET LOW PRESSURE

Cause ②: Clogged Inlet Pressure Nozzle



● ACTION 1

Check if the valve on the nozzle line of the Inlet Pressure Transmitter is open.

● ACTION 2

Clear the nozzle line of the Inlet Pressure Transmitter.

Trouble shooting for Filter unit

IV. Cause and action for alarm/trip relating to filter unit

B. FILTER INLET LOW PRESSURE

Cause ③: Ballast pump failure



● ACTION 1

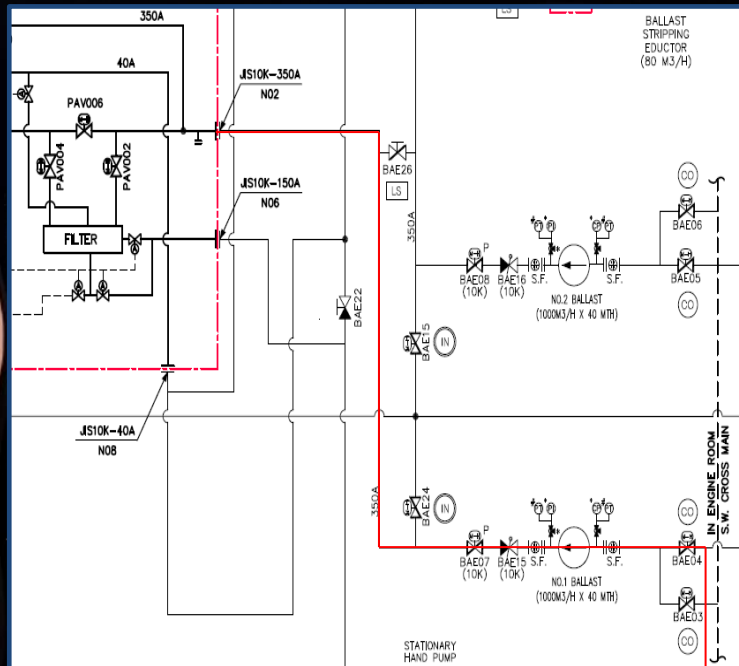
Verify if the Ballast pump is operating properly with sufficient delivery pressure.

Trouble shooting for Filter unit

IV. Cause and action for alarm/trip relating to filter unit

B. FILTER INLET LOW PRESSURE

Cause ④: Filter inlet line valve(s) failure



● ACTION 1

Verify all relevant valves work properly.

Trouble shooting for Filter unit

IV. Cause and action for alarm/trip relating to filter unit

C. FILTER OPERATING TIME OVER

Alarm indicates that the Differential pressure is maintaining between 0.45kg/cm2 and 0.60kg/m2 for over 10mintes despite continuous Back-Flushing.

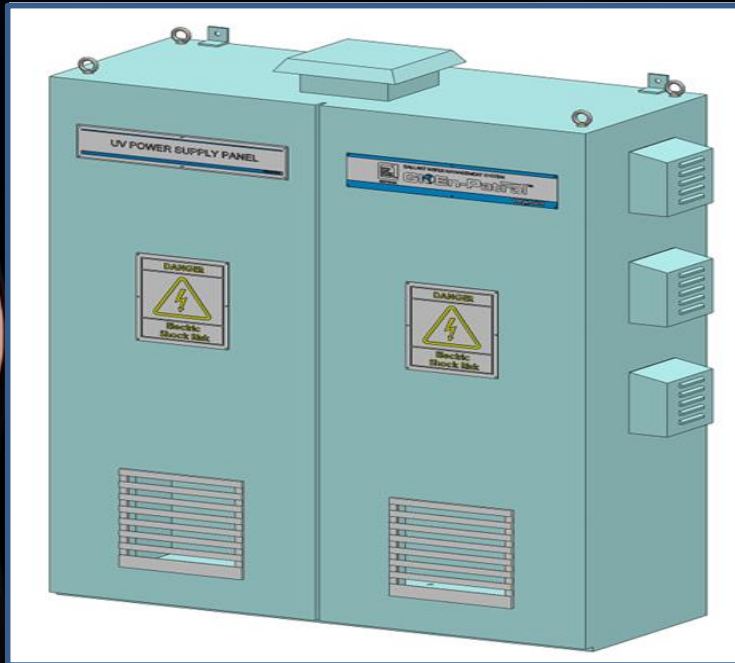
Cause	Description	Action
1	Loss of power for `Pressure Transmitter/Motor/Solenoid	5
2	Malfunctioning Back-Flushing Valve	5
3	Faulty Limit Switches in the Limit Switch Box	3
4	Closed Local valve(s) in the Overboard pipe line	1

Trouble shooting for Filter unit

IV. Cause and action for alarm/trip relating to filter unit

C. FILTER OPERATING TIME OVER

Cause ①: Loss of power for 'Pressure Transmitter / Motor / Solenoid



● ACTION 1

Check if the circuit breaker switches in the UV power supply panel are turned on.

● ACTION 2

Measure if power supply voltage (440V) of the circuit breaker switch is properly supplied.

Trouble shooting for Filter unit

IV. Cause and action for alarm/trip relating to filter unit

C. FILTER OPERATING TIME OVER

Cause ①: Loss of power for 'Pressure Transmitter / Motor / Solenoid'



●● ACTION 3

Check power supply to the UV power supply panel from 'MSBD' (Main Switch Board) in the ECR (Engine Control Room).

●● ACTION 4

Check if all the electric wires are connected and tightened properly according to the electric drawings.

●● ACTION 5

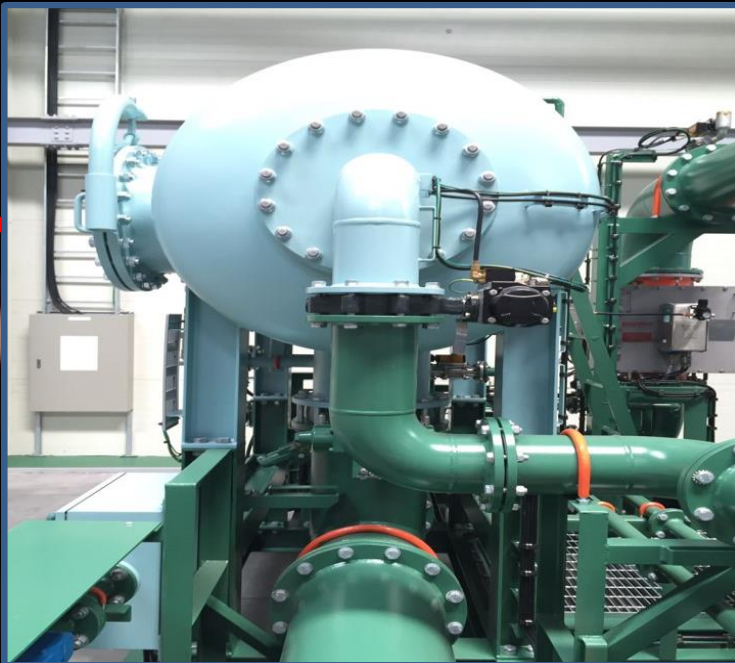
Verify all wires are properly terminated by checking resistance with a Multi-Tester.

Trouble shooting for Filter unit

IV. Cause and action for alarm/trip relating to filter unit

C. FILTER OPERATING TIME OVER

Cause ②: Malfunction Back-flushing Valve



●● ACTION 1

Check if the Back-flushing Valve is open during operation. (Normally open during operation)

●● ACTION 2

Check if the compressed air is supplied to the Solenoid Valve on the Actuator and Back-Flushing Valve.

●● ACTION 3

Check if the Back-flushing Valve is working properly (Open/Close) by pushing the manual operation button on the Solenoid Valve by hand.

Trouble shooting for Filter unit

IV. Cause and action for alarm/trip relating to filter unit

C. FILTER OPERATING TIME OVER

Cause ②: Malfunction Back-flushing Valve



●● ACTION 4

Check the function of Back-flushing Valve manually in the 'Check Mode'.

●● ACTION 5

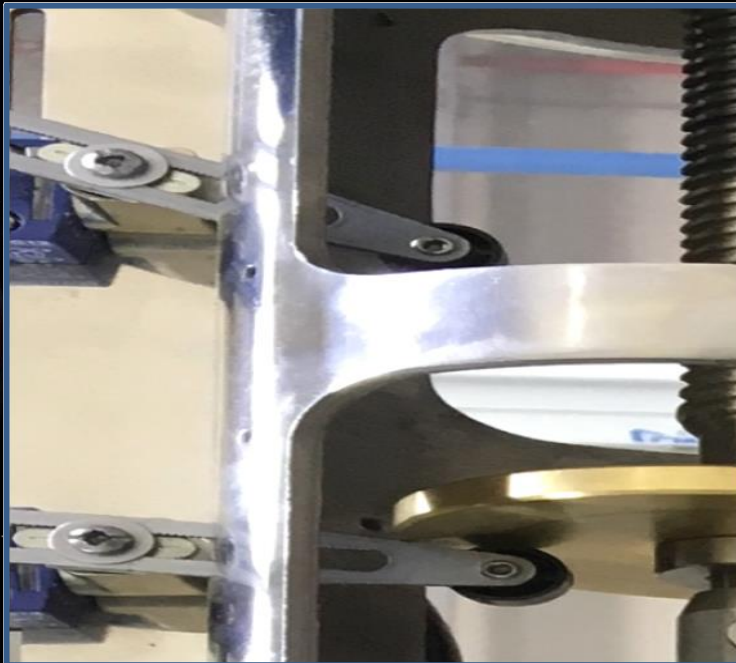
Dismantle the Actuator and Butterfly Valve to check if the disc, seat or shaft inside are jammed or damaged.

Trouble shooting for Filter unit

IV. Cause and action for alarm/trip relating to filter unit

C. FILTER OPERATING TIME OVER

Cause ③: Faulty Limit Switches in the Limit Switch Box



●● ACTION 1

Verify that the installed location of the operating Limit Switch set is lined up with the punched marks and that the switches work properly.

●● ACTION 2

Carry out the Back-flushing operation manually after selecting the 'Manual Back-flushing' button and check if the Limit Plate is moving up and down properly.

●● ACTION 3

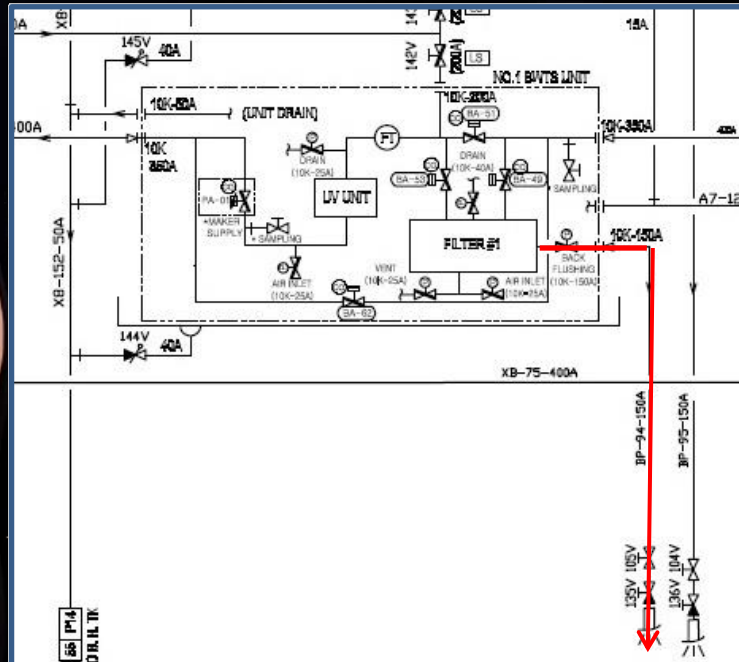
Activating Limit Switch, measure the resistance and verify if limit switch is defective or not.

Trouble shooting for Filter unit

IV. Cause and action for alarm/trip relating to filter unit

C. FILTER OPERATING TIME OVER

Cause ④: Closed Local valve(s) in the Overboard pipe line



● ACTION 1

Check and make sure if the other Local valves in the pipe line from the Back-flushing valve to overboard are open during operation.

Trouble shooting for Filter unit

IV. Cause and action for alarm/trip relating to filter unit

D. FILTER CYCLE TIME OVER

Alarm indicates that forwarding and reversing of the Back-flushing motor are not completed within the set time.
(Set Value : 53 sec)

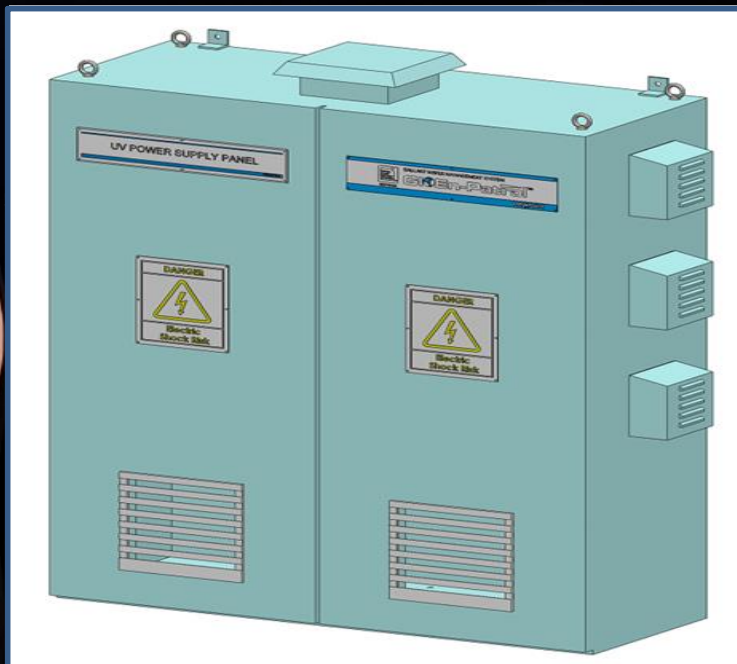
Cause	Description	Action
1	Loss of power for 'Pressure Transmitter/Motor/Solenoid'	5
2	Faulty Limit Switches in the Limit Switch Box	3
3	Back-flushing Motor failure	1

Trouble shooting for Filter unit

IV. Cause and action for alarm/trip relating to filter unit

D. FILTER CYCLE TIME OVER

Cause ① : Loss of power for 'Pressure Transmitter/Motor/Solenoid'



●● ACTION 1

Check if the circuit breaker switches in the UV power supply panel are turned on.

●● ACTION 2

Measure if power supply voltage (440V) of the circuit breaker switch is properly supplied.

Trouble shooting for Filter unit

IV. Cause and action for alarm/trip relating to filter unit

D. FILTER CYCLE TIME OVER

Cause ① : Loss of power for 'Pressure Transmitter/Motor/Solenoid'



●● ACTION 3

Check power supply to the UV power supply panel from 'MSBD' (Main Switch Board) in the ECR (Engine Control Room).

●● ACTION 4

Check if all the electric wires are connected and tightened properly according to the electric drawings.

●● ACTION 5

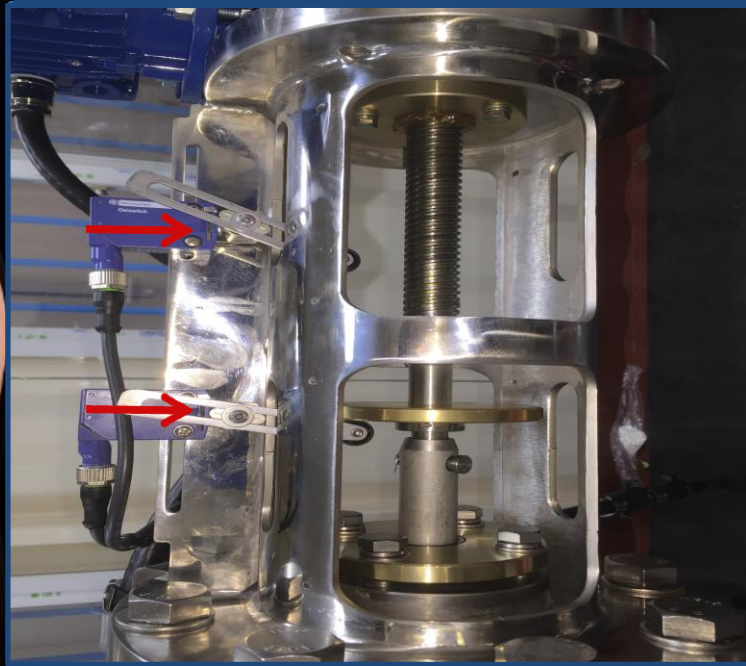
Verify all wires are properly terminated by checking resistance with a Multi-Tester.

Trouble shooting for Filter unit

IV. Cause and action for alarm/trip relating to filter unit

D. FILTER CYCLE TIME OVER

Cause ②: Faulty Limit Switches in the Limit Switch Box



●● ACTION 1

Verify that the installed location of the operating Limit Switch set is lined up with the punched marks and that the switches work properly.

●● ACTION 2

Carry out the Back-flushing operation manually after selecting the 'Manual Back-flushing' button and check if the Limit Plate is moving up and down properly.

●● ACTION 3

Activating Limit Switch, measure the resistance and verify if limit switch is defective or not.

Trouble shooting for Filter unit

IV. Cause and action for alarm/trip relating to filter unit

D. FILTER CYCLE TIME OVER

Cause ③: Motor failure



● ACTION 1

Check the movement of Limit Plate by manually hand using motor fan.

Trouble shooting for Filter unit

IV. Cause and action for alarm/trip relating to filter unit

E-F. FILTER INLET/OUTLET PRESSURE SENSOR FAIL

Alarm indicates a malfunction of the Pressure Transmitters or faulty wiring condition between the PLC and Pressure Transmitter, or the Pressure Transmitters are out of working range or has loss of output signal (4-20mA)

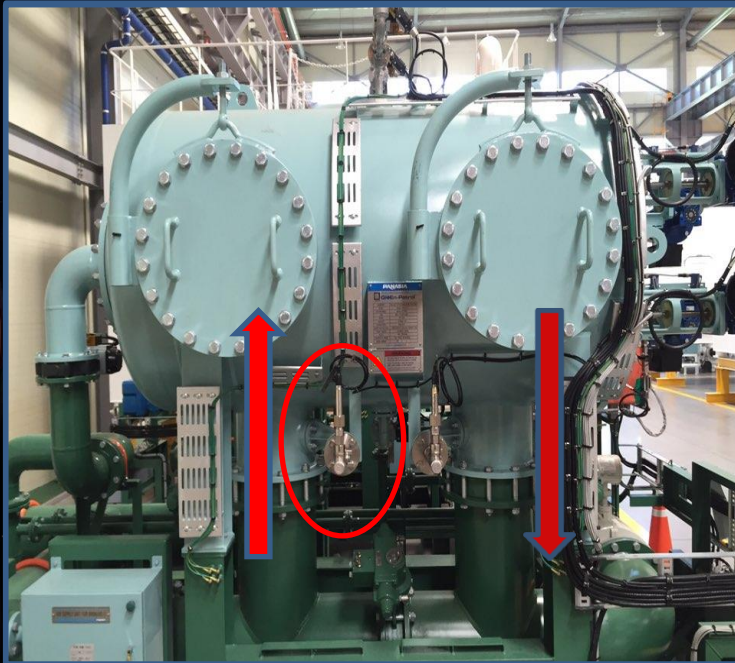
Cause	Description	Action
1	Malfunctioning Inlet Pressure Transmitter	2
2	Poor or no wire connection to the Pressure Transmitter	1
3	PLC AI module or channel failure	2

Trouble shooting for Filter unit

IV. Cause and action for alarm/trip relating to filter unit

E-F. FILTER INLET/OUTLET PRESSURE SENSOR FAIL

Cause ① : Malfunctioning Inlet /Outlet Pressure Transmitter



● ACTION 1

Check if there is physical damage to the Pressure Transmitter.

● ACTION 2

Dismantle the Pressure Transmitter and check the current using a Multi-Tester.

Normal range
3.99mA ~ 4.01mA

Trouble shooting for Filter unit

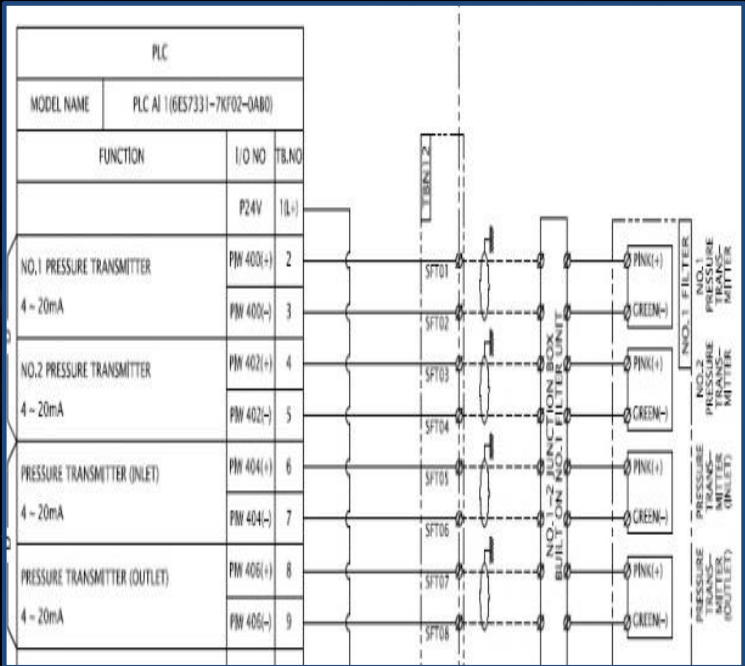
IV. Cause and action for alarm/trip relating to filter unit

E-F. FILTER INLET/OUTLET PRESSURE SENSOR FAIL

Cause ② : Poor or no wire connection to the pressure transmitter

●● ACTION 1

Check if all the electric wires are connected and tightened properly according to the electric drawings.



Trouble shooting for Filter unit

IV. Cause and action for alarm/trip relating to filter unit

E-F. FILTER INLET/OUTLET PRESSURE SENSOR FAIL

Cause ③ : PLC AI module or channel failure



● ACTION 1

Verify that the AI module is working by checking connections.

● ACTION 2

Re-Test if replacing with a new one.

Trouble shooting for Filter unit

IV. Cause and action for alarm/trip relating to filter unit

G. FILTER BACK FLUSHING MOTOR CB TRIP

Trip indicates that an over-current in the filter motor circuit breaker lines or when a short circuit occurs in the cable

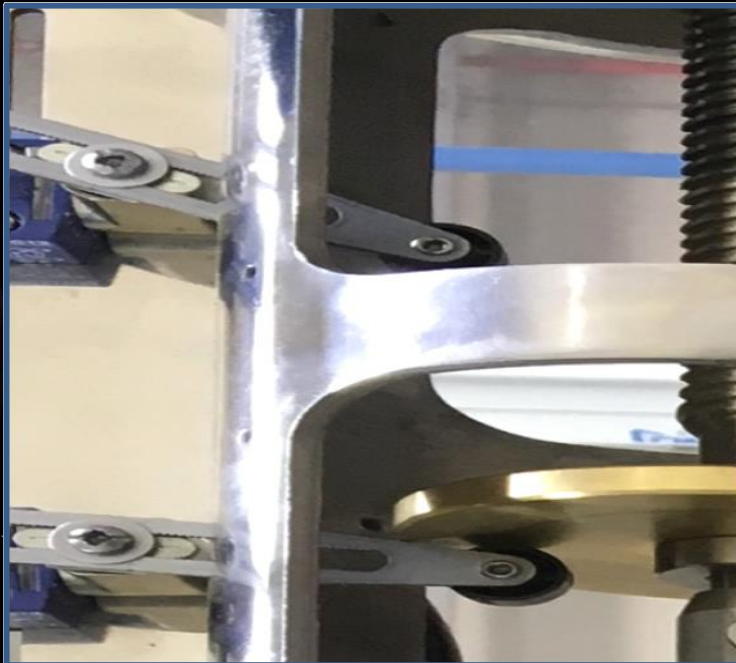
Cause	Description	Action
1	Faulty Limit Switches in the Limit Switch Box	3
2	Short - circuit	2
3	Back-flushing motor failure	1

Trouble shooting for Filter unit

IV. Cause and action for alarm/trip relating to filter unit

G. FILTER BACK FLUSHING MOTOR CB TRIP

Cause ①: Faulty Limit Switches in the Limit Switch Box



● ACTION 1

Verify that the installed location of the operating Limit Switch set is lined up with the punched marks and that the switches work properly.

● ACTION 2

Carry out the Back-flushing operation manually after selecting the 'Manual Back-flushing' button and check if the Limit Plate is moving up and down properly.

● ACTION 3

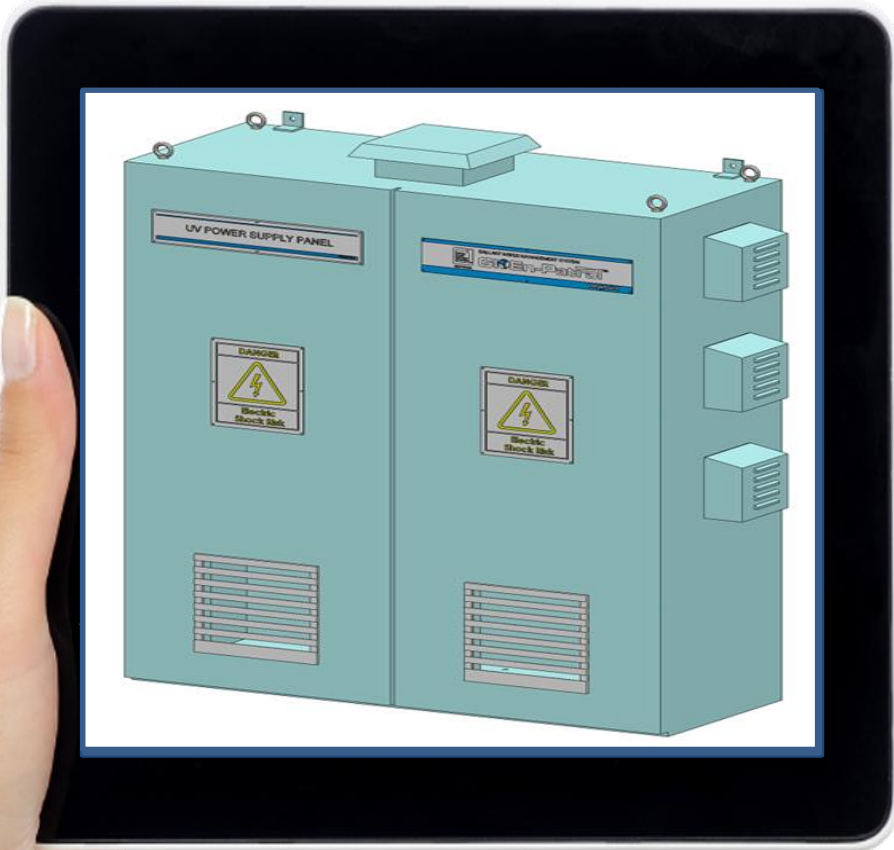
Activating Limit Switch, measure the resistance and verify if limit switch is defective or not.

Trouble shooting for Filter unit

IV. Cause and action for alarm/trip relating to filter unit

G. FILTER BACK FLUSHING MOTOR CB TRIP

Cause ②: Short - circuit



●● ACTION 1

Turn off main 440/220/110VAC circuit breakers in the UV power supply panel.

●● ACTION 2

Ensure a resistance among three wires to supply power to filter flushing motor as follows after disconnecting R, S and T power supply lines in the motor's junction box.

A	B	Ohms (Ω)
R	S	50.7
S	T	50.7
T	R	50.7
R	EARTH	OL(Infinite)
S	EARTH	OL(Infinite)
T	EARTH	OL(Infinite)

Trouble shooting for Filter unit

IV. Cause and action for alarm/trip relating to filter unit

G. FILTER BACK FLUSHING MOTOR CB TRIP

Cause ③: Back-flushing motor failure



● ACTION 1

Open the motor cover and turn the screw manually by hand to check whether the motor is jammed.

Trouble shooting for Filter unit

IV. Cause and action for alarm/trip relating to filter unit

H. FILTER FINAL LIMIT SWITCH

Trip indicates if final Limit Switches are activated by touching of the Limit Plate moving to up and down direction.

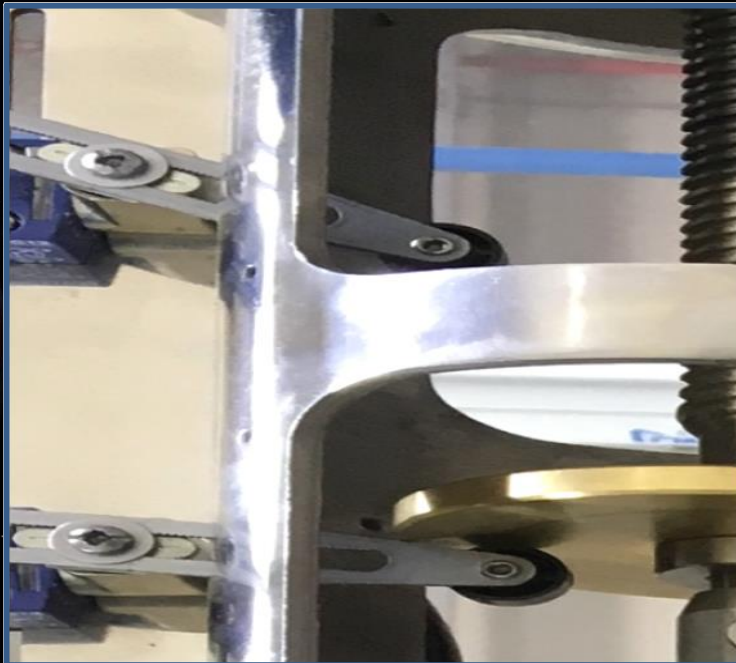
Cause	Description	Action
1	Faulty Limit Switches in the Limit Switch Box	2
2	Faulty connections to the electric cables to the Limit Switches	1
3	Motor failure	1

Trouble shooting for Filter unit

IV. Cause and action for alarm/trip relating to filter unit

H. FILTER FINAL LIMIT SWITCH

Cause ①: Faulty Limit Switches in the Limit Switch Box



●● ACTION 1

Verify that the installed location of the operating Limit Switch set is lined up with the punched marks and that the switches work properly.

●● ACTION 2

Carry out the Back-flushing operation manually after selecting the 'Manual Back-flushing' button and check if the Limit Plate is moving up and down properly.

Trouble shooting for Filter unit

IV. Cause and action for alarm/trip relating to filter unit

H. FILTER FINAL LIMIT SWITCH

Cause ②: Faulty connections to the electric cables to the Limit Switches



● ACTION 1

Activating Limit Switch, measure the resistance and verify if limit switch is defective or not.

Trouble shooting for Filter unit

IV. Cause and action for alarm/trip relating to filter unit

H. FILTER FINAL LIMIT SWITCH

Cause ③: Motor failure



● ACTION 1

Open the motor cover and turn the screw manually by hand to check whether the motor is jammed.

Trouble shooting for Filter unit

V. Filter Clogging Solution

A. MANUAL CLEANING BY USNIG “Filter Clogging Solution” PROGRAM

Alarm indicates that differential pressure is over 0.6kg/cm2 for longer than 60 seconds.
Trip indicates that differential pressure is over 1.2kg/cm2 longer than 10~20 seconds and at which point, By pass Mode automatically activates.

Cause	Description	Action
1	Clogged Filter Element	6

Trouble shooting for Filter unit

V. Filter Clogging Solution

A. MANUAL CLEANING BY USNIG "Filter Clogging Solution" PROGRAM

Cause ①: Clogged Filter Element



●● ACTION 1

Turn switch from "Normal" to "Check" mode on the control panel. Input password '1111111' ('1' seven times). Select the "Clogging Solution" on the "Check Mode" screen.

●● ACTION 2

Press the "Filter Solution Start" button. Related valves will be arranged automatically.

Trouble shooting for Filter unit

V. Filter Clogging Solution

A. MANUAL CLEANING BY USNIG "Filter Clogging Solution" PROGRAM

Cause ①: Clogged Filter Element



●● ACTION 3

Press open or close button to control the outlet valve for keeping inlet pressure between 2.5 ~ 3.0kg/cm².

●● ACTION 4

Press the 'manual' button to start back flushing.

Trouble shooting for Filter unit

V. Filter Clogging Solution

A. MANUAL CLEANING BY USNIG "Filter Clogging Solution" PROGRAM

Cause ①: Clogged Filter Element



ACTION 5

Close the De-ballast valve by pressing close button to check if the element is clean.

ACTION 6

Start back flushing function again by pressing the manual button.

Trouble shooting for Filter unit

V. Filter Clogging Solution

B. PHYSICAL CLEANING OF THE FILTER ELEMENT WITH DE-SCALING LIQUID

Alarm indicates that differential pressure is over 0.6kg/cm2 for longer than 60 seconds.
Trip indicates that differential pressure is over 1.2kg/cm2 longer than 10~20 seconds and at which point, By pass Mode automatically activates.

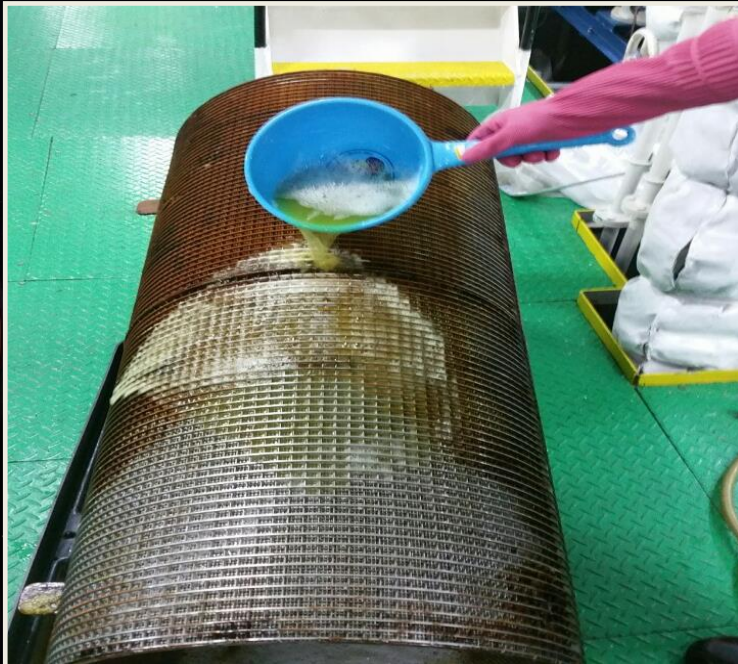
Cause	Description	Action
1	Clogged Filter Element	1

Trouble shooting for Filter unit

V. Filter Clogging Solution

B. PHYSICAL CLEANING OF THE FILTER ELEMENT WITH DE-SCALING LIQUID

Cause ①: Clogged Filter Element



● ACTION 1

Clear the Filter element by using the De-scaling liquid.
Maxing rate is (Water 5: De-scaling liquid 1)

Troubleshooting for UV unit



Chapter / Part / Section

Troubleshooting for UV unit

Part I . How to reset the alarm

Part II . How to change the setting value

No.	Description	No.	Description	No.	Description
1	TIMER MODE CLEANING INTERVAL	3	CYCLE TIME OVER ALARM SET	5	CHAMBER TEMP. TRIP
2	UV COOLING TIME SET(3~5 min)	4	OPERATING TIME OVER ALARM SET	6	-

Part III. Table for alarm/trip conditions

No.	Description	Set Point	Delay time (In seconds)	Remark	No.	Description	Set Point	Delay time (In seconds)	Remark
1	UV WIPER MOTOR CB TRIP	-	-	Alarm	7	UV CHAMBER SURFACE TEMP HIGH	50°C	Immediately	Trip
2	UV POWER SUPPLY PANEL INSIDE TEMP HIGH / HIGH-HIGH	60 °C	-	Alarm	8	UV OPERATING TIME OVER	290 mJ/cm2	1200	Alarm
		70 °C	-	Trip					
3	UV CIRCUIT BREAKER TRIP	-	Immediately	Trip	9	UV LAMP TROUBLE	-	Immediately	Trip
4	UV ELCB TRIP	-	Immediately	Trip	10	UV CHAMBER TEMPERATURE SENSOR FAIL	-	2	Trip
5	UV DOSE LOW / LOW-LOW	250mJ/cm ²	50	Alarm	11	UV INTENSITY SENSOR FAIL	-	2	Trip
		230mJ/cm ²	60	Trip					
6	UV CHAMBER INSIDE TEMP HIGH / HIGH-HIGH	50°C	5	Alarm	12	UV CYCLE TIME OVER	-	60~90	Alarm
		60°C	2	Trip					

INDEX

Chapter / Part / Section

Part IV. Cause and action for alarm/trip relating to UV Power Supply Panel

Section a. UV Wiper Motor C/B Trip

Section b. UV Power Supply Panel Inside Temp. High / High-High

Section c. UV Circuit Breaker Trip

Section d. UV ELCB Trip

Part V. Cause and action for alarm/trip relating to UV Chamber(Unit)

Section a. UV Dose Low / Low-Low

Section b. UV Chamber Inside Temp. High / High-High

Section c. UV Chamber Surface Temp. High

Section d. UV Operating Time Over

Section e. UV Lamp Trouble

Section f. UV Chamber Temp. Sensor Fail

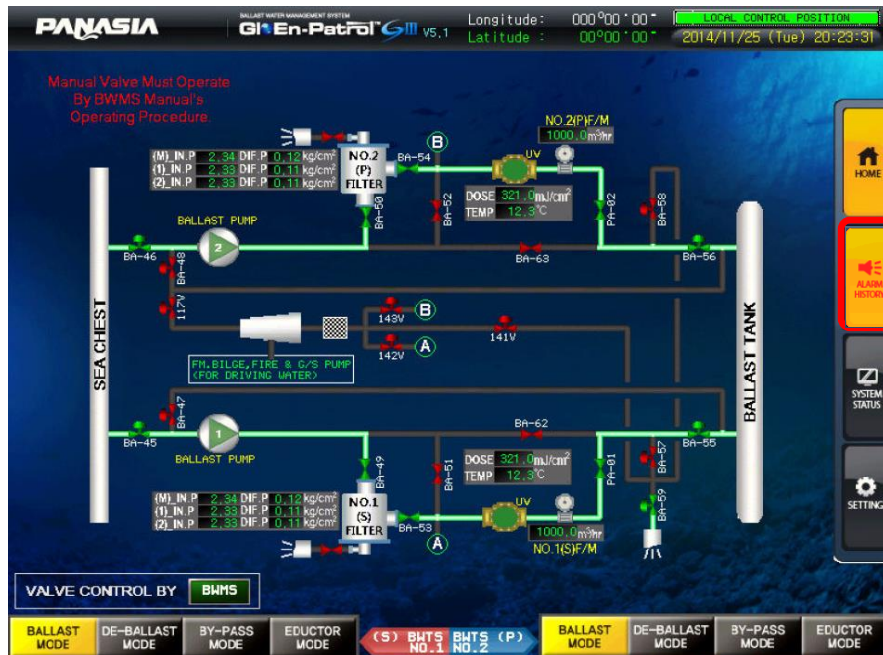
Section g. UV Intensity Sensor Fail

Section h. UV Cycle Time Over

Troubleshooting for UV unit

I . How to reset the alarm

A. Touch the [ALARM HISTORY] and [BUZZER STOP] button



① Touch the [ALARM HISTORY] button

ALARM HISTORY

DATE	TIME	DESCRIPTION	ACK	RECOV.
16/07/06	11:52:01	NO.1-1 UV LAMP TROUBLE 3,4		
16/07/06	11:52:00	NO.1-1 UV LAMP TROUBLE 1,2		11:52:06
16/07/06	11:52:00	NO.1-1 PURGING UNIT LOW PRESSURE		11:52:06
16/07/06	11:51:59	NO.1-1 UV P.S. PANEL TEMP HIGHHIGH(70)(B)		11:52:05
16/07/06	11:51:57	NO.1-1 UV P.S. PANEL TEMP HIGH(60)(B)		11:52:08

BUZZER STOP

ALARM ACK

ALARM RESET

② Touch the [BUZZER STOP] button

Troubleshooting for UV unit

I. How to reset the alarm

B. Touch the [ALARM ACK.] and [ALARM RESET] button



③ Touch the [ALARM ACK.] button

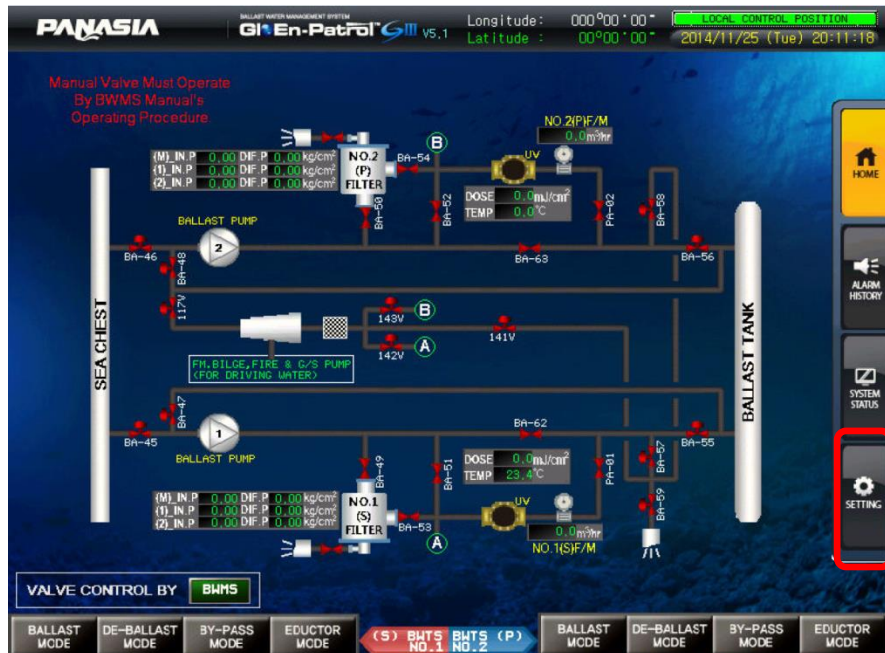


④ Touch the [ALARM RESET] button

Troubleshooting for UV unit

II. How to change the setting value

A. Touch the [SETTING] button and Enter the password(1111111)



① Touch the [SETTING] button



② Input the password (1111111)

Troubleshooting for UV unit

II . How to change the setting value

B. Touch the setting value



③ [SETTING] page is showing



④ Touch the setting value

Troubleshooting for UV unit

II. How to change the setting value

C. Confirm the changed value



⑤ Change the setting value



⑥ Confirm the setting value

Troubleshooting for UV unit

III. Table for alarm/trip conditions

No.	Description	Set Point	Delay time (In seconds)	Remark	No.	Description	Set Point	Delay time (In seconds)	Remark
1	UV WIPER MOTOR CB TRIP	-	-	Alarm	7	UV CHAMBER SURFACE TEMP HIGH	50°C	Immediately	Trip
2	UV POWER SUPPLY PANEL INSIDE TEMP HIGH / HIGH-HIGH	60 °C	-	Alarm	8	UV OPERATING TIME OVER	290mJ/cm2	1200	Alarm
		70 °C	-	Trip					
3	UV CIRCUIT BREAKER TRIP	-	Immediately	Trip	9	UV LAMP TROUBLE	-	Immediately	Trip
4	UV ELCB TRIP	-	Immediately	Trip	10	UV CHAMBER TEMPERATURE SENSOR FAIL	-	2	Trip
5	UV DOSE LOW / LOW-LOW	250mJ/cm ²	50	Alarm	11	UV INTENSITY SENSOR FAIL	-	2	Trip
		230mJ/cm ²	60	Trip					
6	UV CHAMBER INSIDE TEMP HIGH / HIGH-HIGH	50°C	5	Alarm	12	UV CYCLE TIME OVER	-	60~90	Alarm
		60°C	2	Trip					

Troubleshooting for UV unit

IV. Cause and Action for alarm/trip relating to UV Power Supply Panel

Alarm and Trip list

No.	Description	Set Point	Delay time (In seconds)	Remark
1	UV WIPER MOTOR CB TRIP	-	-	Alarm
2	UV POWER SUPPLY PANEL INSIDE TEMP HIGH / HIGH-HIGH	60 °C	-	Alarm
		70 °C	-	Trip
3	UV CIRCUIT BREAKER TRIP	-	Immediately	Trip
4	UV ELCB TRIP	-	Immediately	Trip

Troubleshooting for UV unit

IV. Cause and Action for alarm/trip relating to UV Power Supply Panel

A. UV WIPER MOTOR CIRCUIT BREAKER(C/B) TRIP

Alarm indicates that an over-current occurs in the UV circuit breaker lines or when a short circuit occurs in the lamp cables.

Cause	Description	Action
1	Wiper stopped / jammed (Overload)	3
2	Malfunctioning Reed Switch	3
3	UV Wiper Motor Failure	7
4	Circuit Breaker Failure	1
5	Poor/no wire connection to the Press' Transmitter	1

Troubleshooting for UV unit

IV. Cause and Action for alarm/trip relating to UV Power Supply Panel

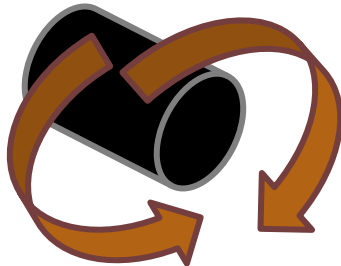
A. UV WIPER MOTOR CIRCUIT BREAKER(C/B) TRIP

Cause 1: Wiper Stopped / Jammed (Overload)

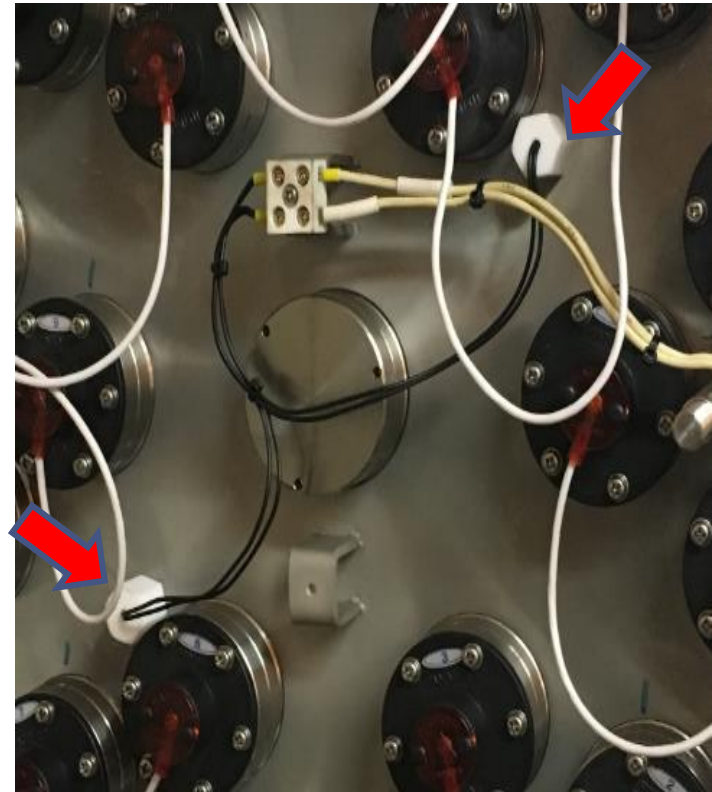
Action 1



Check whether the Coupling is fixed.



Action 2



Ensure proper installation of the Reed Switch

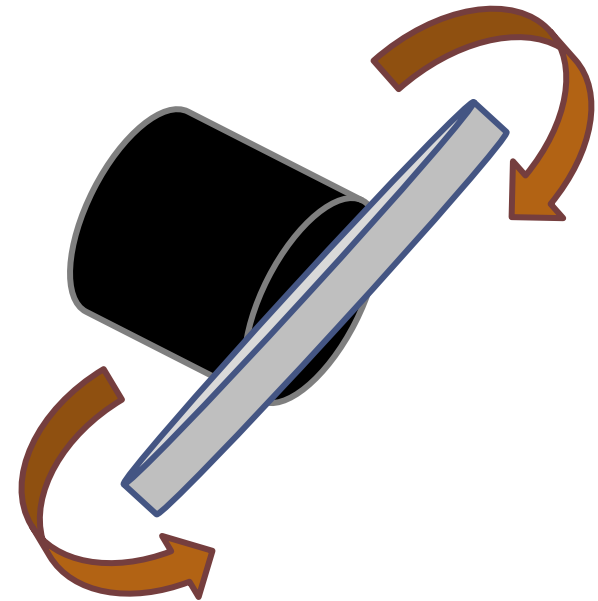
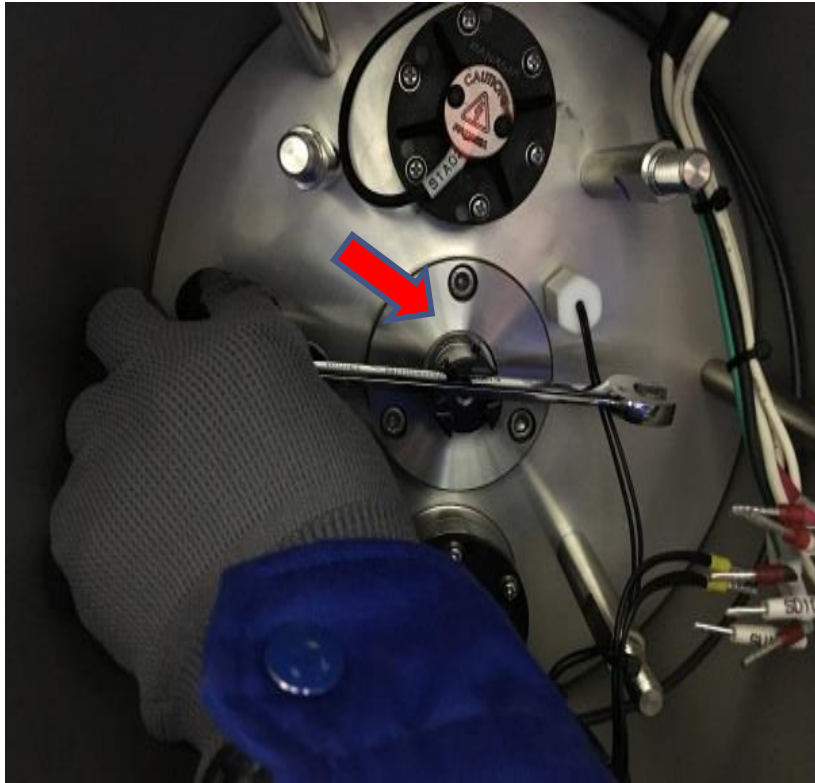
Troubleshooting for UV unit

IV. Cause and Action for alarm/trip relating to UV Power Supply Panel

A. UV WIPER MOTOR CIRCUIT BREAKER(C/B) TRIP

Cause 1: Wiper Stopped / Jammed (Overload)

Action 3



Free up the Coupling by unscrewing with a special tool

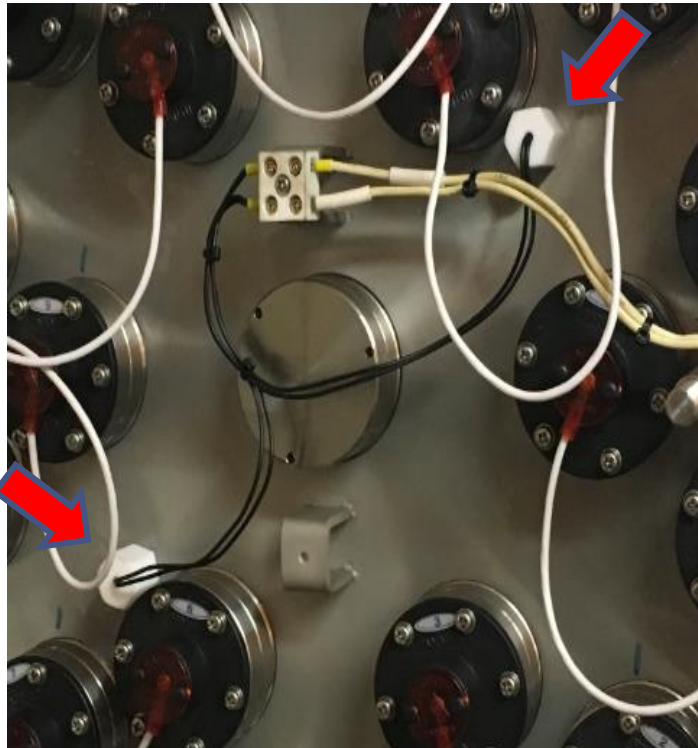
Troubleshooting for UV unit

IV. Cause and Action for alarm/trip relating to UV Power Supply Panel

A. UV WIPER MOTOR CIRCUIT BREAKER(C/B) TRIP

Cause 2: Malfunctioning Reed Switch

Action 1



Ensure proper installation of the Reed Switch

Action 2



CONDITION	Ohms (Ω)
NORMAL	0~3
ABNORMAL	OL

Check the resistance between the two wire for Reed Switch

Troubleshooting for UV unit

IV. Cause and Action for alarm/trip relating to UV Power Supply Panel

A. UV WIPER MOTOR CIRCUIT BREAKER(C/B) TRIP

Cause 2: Malfunctioning Reed Switch

Action 3



If it does not work, replace it with new one

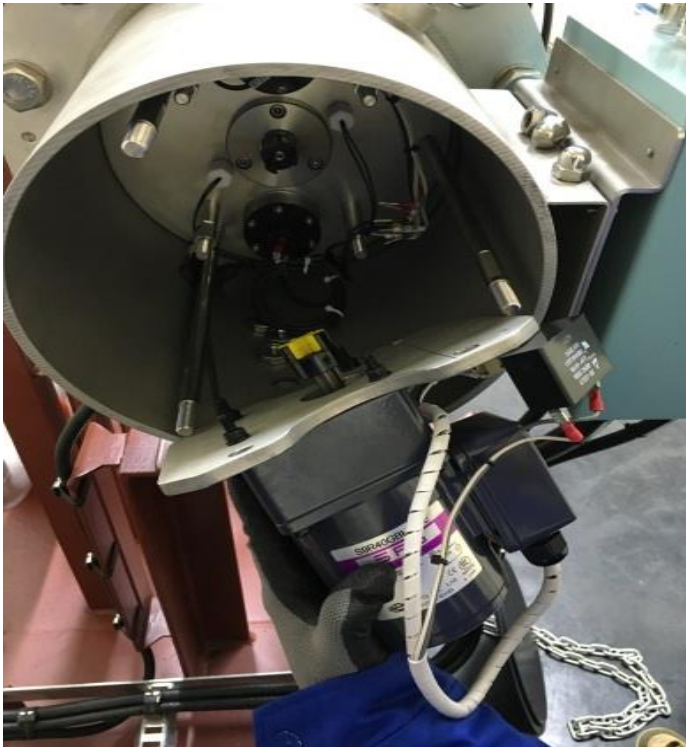
Troubleshooting for UV unit

IV. Cause and Action for alarm/trip relating to UV Power Supply Panel

A. UV WIPER MOTOR CIRCUIT BREAKER(C/B) TRIP

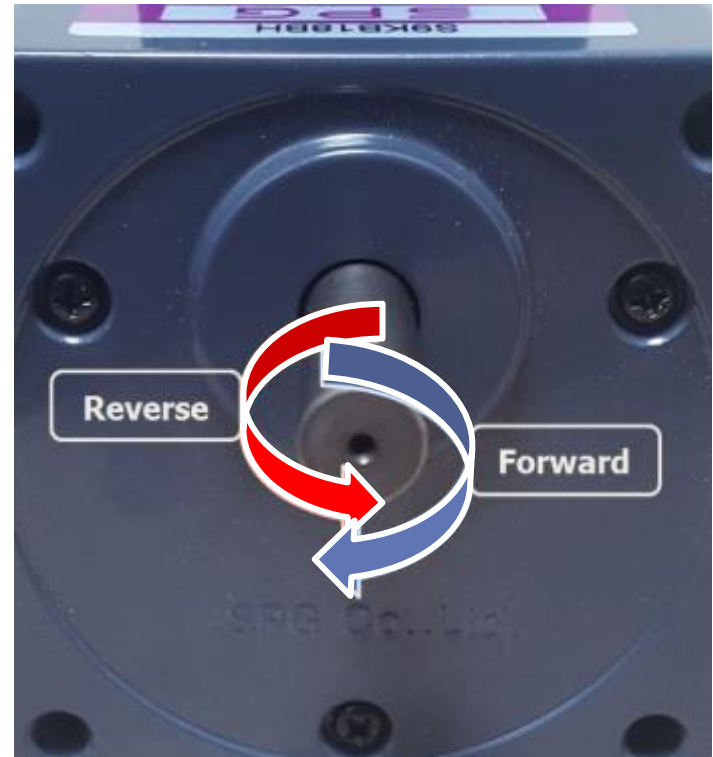
Cause 3: UV Wiper Motor Failure

Action 1



Dismount Wiper Motor and Coupling

Action 2



Turn the Motor Screw by hand

Troubleshooting for UV unit

IV. Cause and Action for alarm/trip relating to UV Power Supply Panel

A. UV WIPER MOTOR CIRCUIT BREAKER(C/B) TRIP

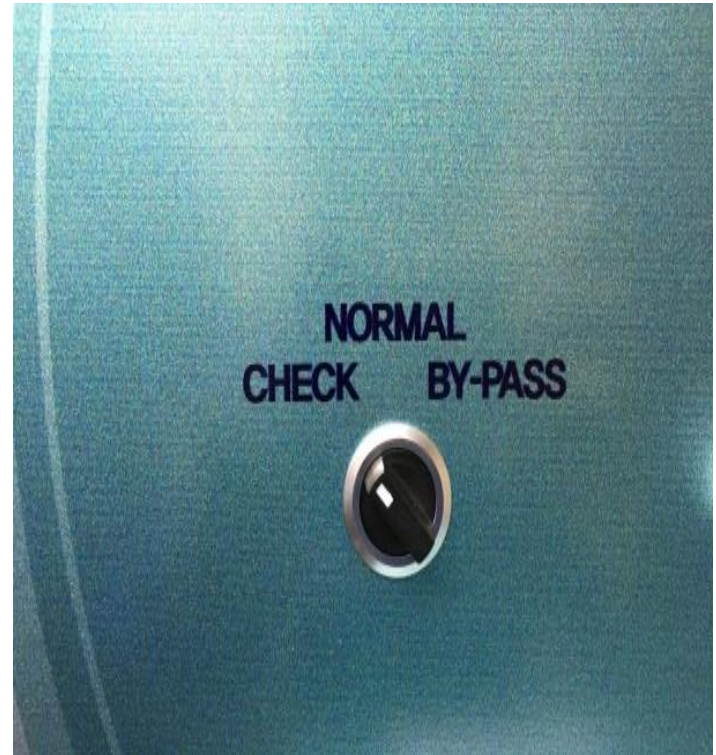
Cause 3: UV Wiper Motor Failure

Action 3



Check the Voltage for Motor

Action 4



Change the Select Switch to "Check"

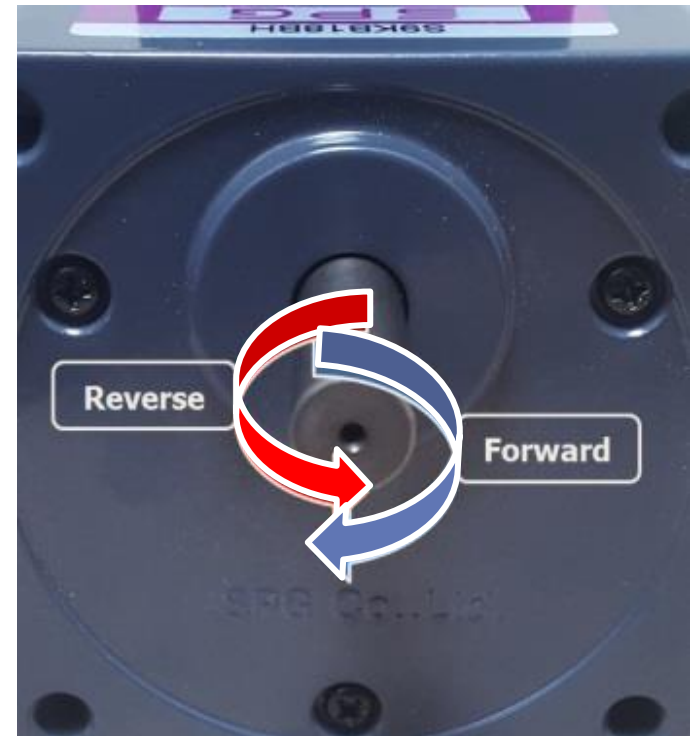
Troubleshooting for UV unit

IV. Cause and Action for alarm/trip relating to UV Power Supply Panel

A. UV WIPER MOTOR CIRCUIT BREAKER(C/B) TRIP

Cause 3: UV Wiper Motor Failure

Action 5



Touch Motor FORWARD or REVERSE button

Troubleshooting for UV unit

IV. Cause and Action for alarm/trip relating to UV Power Supply Panel

A. UV WIPER MOTOR CIRCUIT BREAKER(C/B) TRIP

Cause 3: UV Wiper Motor Failure

Action 5



Touch Motor **FORWARD** or **REVERSE** button

Action 6



A	B	Ohms (Ω)
W	V	16.5
U	V	16.5
W	U	33
W	EARTH	OL
V	EARTH	OL
U	EARTH	OL

Ensure the resistance between the three wires

Troubleshooting for UV unit

IV. Cause and Action for alarm/trip relating to UV Power Supply Panel

A. UV WIPER MOTOR CIRCUIT BREAKER(C/B) TRIP

Cause 3: UV Wiper Motor Failure

Action 7



If it dose not work, replace the motor with new one

Troubleshooting for UV unit

IV. Cause and Action for alarm/trip relating to UV Power Supply Panel

A. UV WIPER MOTOR CIRCUIT BREAKER(C/B) TRIP

Cause 4: Circuit Breaker Failure

Action 1



If necessary, check/replace the circuit breaker in the UV Power Supply Panel

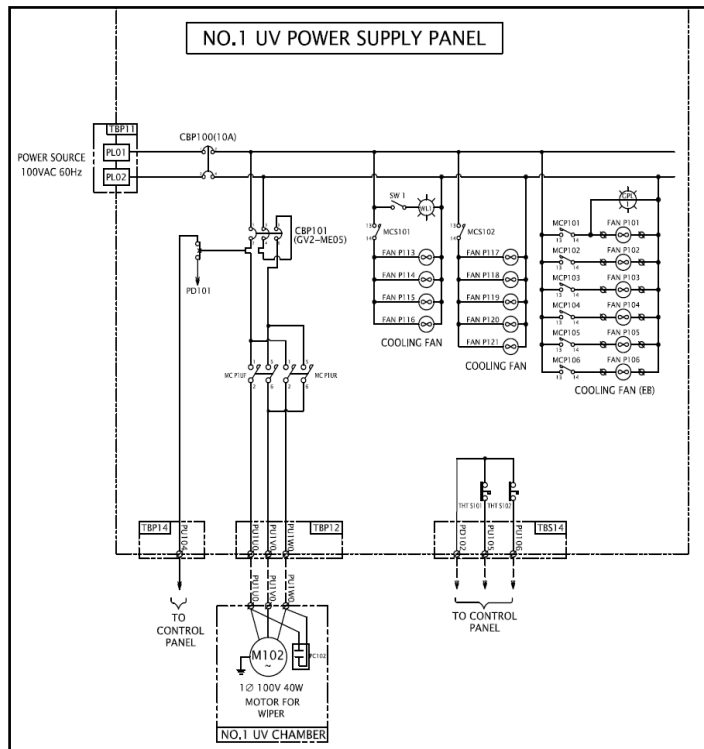
Troubleshooting for UV unit

IV. Cause and Action for alarm/trip relating to UV Power Supply Panel

A. UV WIPER MOTOR CIRCUIT BREAKER(C/B) TRIP

Cause 5: Poor or no wire connection to UV Wiper Motor

Action 1



Check if all the electric wires are connected and tightened properly according to the electric drawings.

Troubleshooting for UV unit

IV. Cause and Action for alarm/trip relating to UV Power Supply Panel

B. UV POWER SUPPLY PANEL TEMPERATURE HIGH / HIGH-HIGH

Alarm indicates that the temperature inside the power supply panel has exceeded 60°C.
Trip indicates that the temperature inside the power supply panel has exceeded 70°C.

Cause	Description	Action
1	Faulty Cooling Fan	4
2	Faulty Electric Cables	1
3	Temperature Switch Failure	3

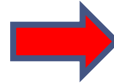
Troubleshooting for UV unit

IV. Cause and Action for alarm/trip relating to UV Power Supply Panel

B. UV POWER SUPPLY PANEL TEMPERATURE HIGH / HIGH-HIGH

Cause 1: Faulty Cooling Fan

Action 1



Action 2



1. Check the Cooling Fan
when the lamps inside UV Unit are on

2. If they do not work, replace with
new one(s)

Action 3

If necessary, clean the fan filters



Action 4

Check the actual temperature
with Temperature Switch

Troubleshooting for UV unit

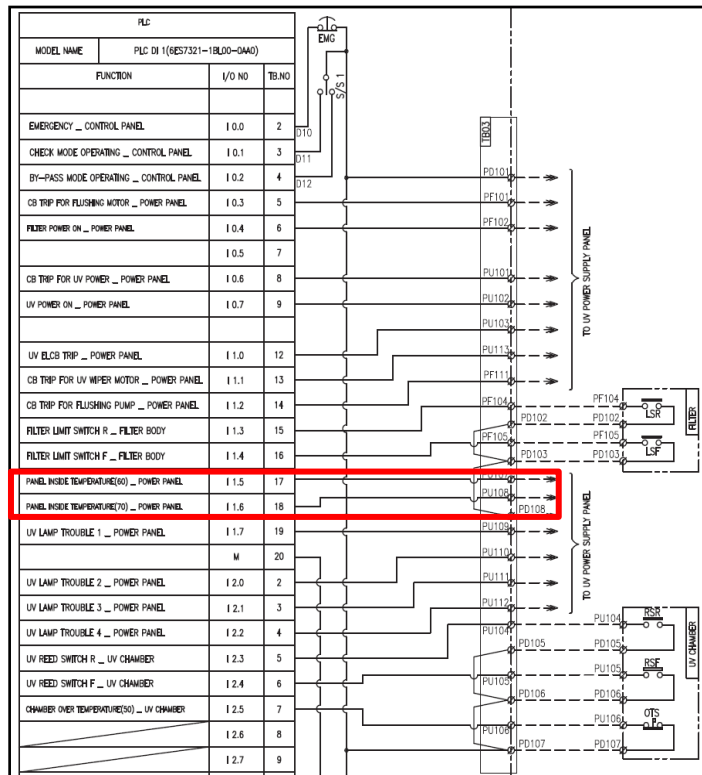
IV. Cause and Action for alarm/trip relating to UV Power Supply Panel

B. UV POWER SUPPLY PANEL TEMPERATURE HIGH / HIGH-HIGH

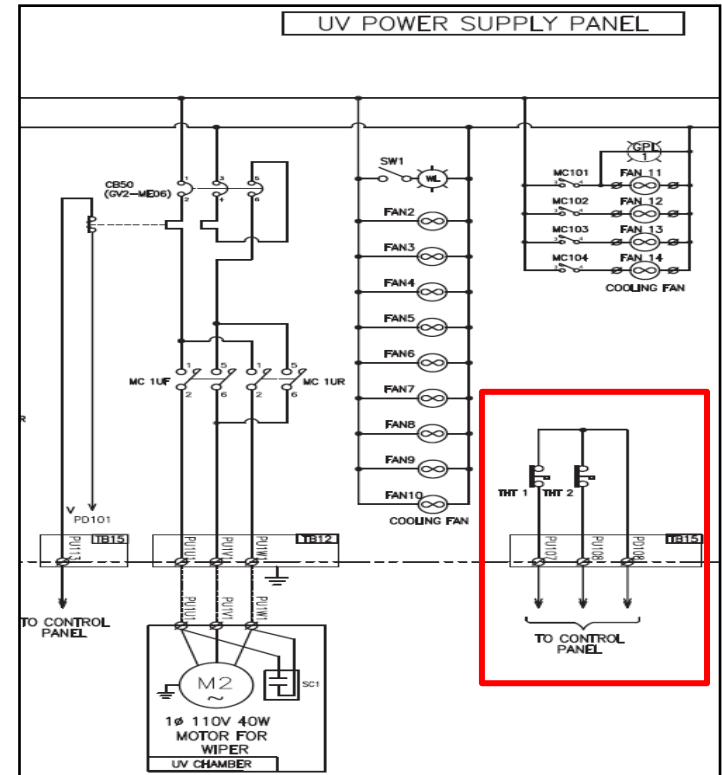
Cause 2: Faulty Electric Cables

Action 1

<BWMS Control Panel>



<UV Power Supply Panel>



Check electric cables between Temperature switch and the main control panel

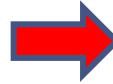
Troubleshooting for UV unit

IV. Cause and Action for alarm/trip relating to UV Power Supply Panel

B. UV POWER SUPPLY PANEL TEMPERATURE HIGH / HIGH-HIGH

Cause 3: Temperature Switch Failure

Action 1

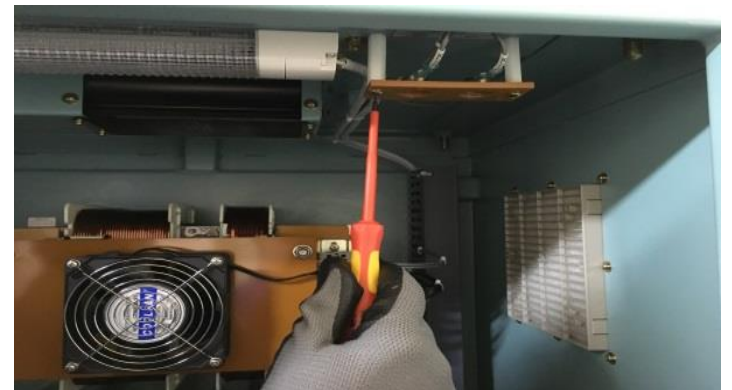


Action 2



1. Check the Cooling Fan(Under 60°C)
when the lamps inside UV Unit are on
2. Replace Temp. Switch with new one
3. Check Temp. Switch and verify any
damaged wiring

Action 3



Troubleshooting for UV unit

IV. Cause and Action for alarm/trip relating to UV Power Supply Panel

C. UV CIRCUIT BREAKER TRIP

Trip indicates that over-current occurs on UV circuit breaker lines or a short circuit happens on lamp cables

Cause	Description	Action
1	Check the wiring connection of UV lamps	3

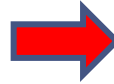
Troubleshooting for UV unit

IV. Cause and Action for alarm/trip relating to UV Power Supply Panel

C. UV CIRCUIT BREAKER TRIP

Cause 1: Check the wiring connection of UV lamps

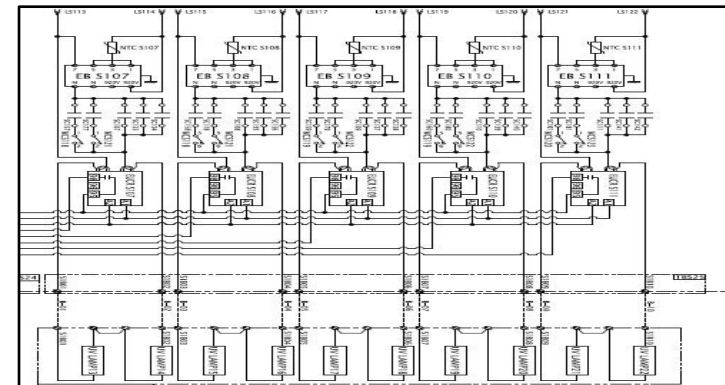
Action 1



Action 2



Action 3



1. Turn off Main CB(440V)

2. Check insulation resistance for UV Cable

3. Check electric wiring DWG

Troubleshooting for UV unit

IV. Cause and Action for alarm/trip relating to UV Power Supply Panel

D. UV EARTH LEAKAGE CIRCUIT BREAKER TRIP

Trip indicates that a problem(s) occurs between electric ballast and ELCB, between electric ballast and UV lamp(s), or relevant connection line(s).

Cause	Description	Action
1	UV Power Cable Insulation	3
2	Water leakage from broken Lamp Sleeve in the UV Chamber	8

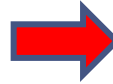
Troubleshooting for UV unit

IV. Cause and Action for alarm/trip relating to UV Power Supply Panel

D. UV EARTH LEAKAGE CIRCUIT BREAKER TRIP

Cause 1: UV Power Cable Insulation

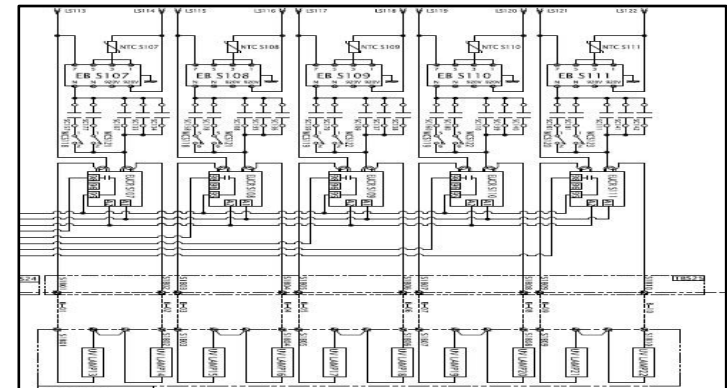
Action 1



Action 2



Action 3



1. Turn off Main CB(440V)

2. Check insulation resistance for UV Cable
(NORMAL Range $\geq 300\text{M}\Omega$)

3. Check electric wiring DWG

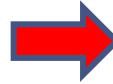
Troubleshooting for UV unit

IV. Cause and Action for alarm/trip relating to UV Power Supply Panel

D. UV EARTH LEAKAGE CIRCUIT BREAKER TRIP

Cause 2: Water leakage from broken Lamp Sleeve in the UV Chamber

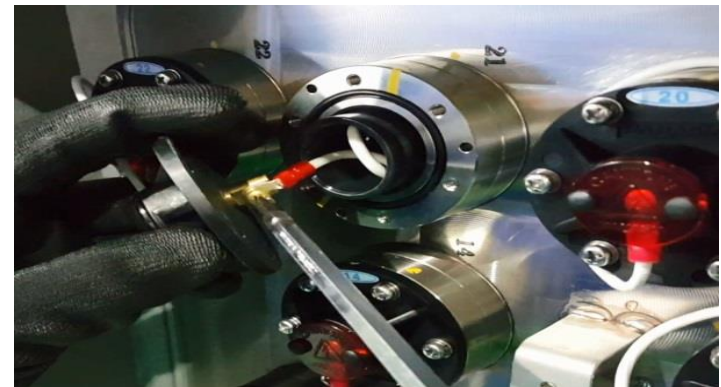
Action 1



Action 2



Action 3



1. Open UV Unit Side Cover and Dry out any moisture in side UV Unit
2. Unscrew bolts from Isolating Plate
3. Unscrew bolts connected with the UV lamp wires

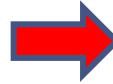
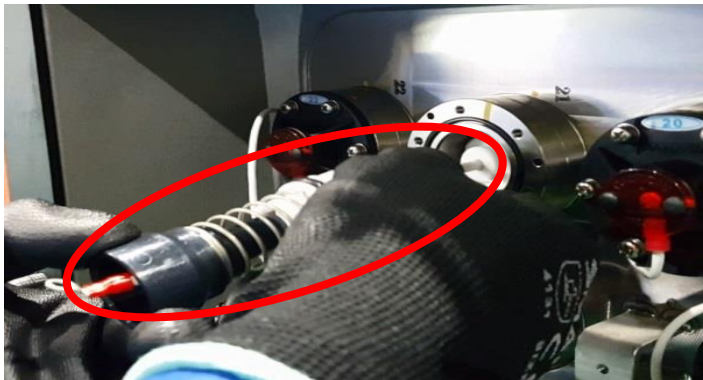
Troubleshooting for UV unit

IV. Cause and Action for alarm/trip relating to UV Power Supply Panel

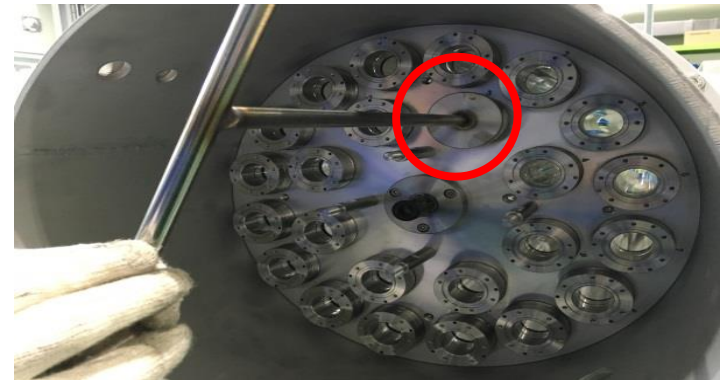
D. UV EARTH LEAKAGE CIRCUIT BREAKER TRIP

Cause 2: Water leakage from broken Lamp Sleeve in the UV Chamber

Action 4



Action 5

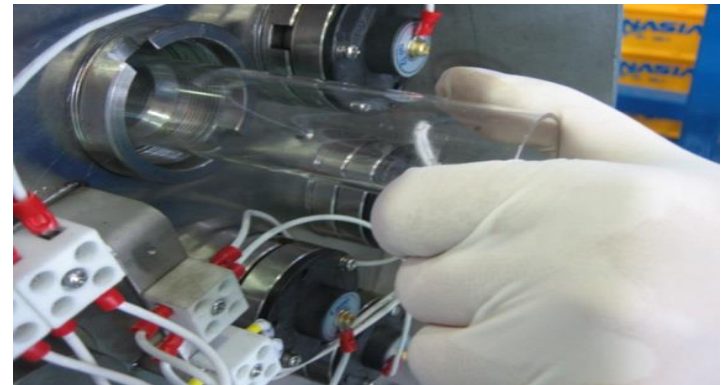


4. Dismantle Anti-Vibration Module and UV Lamps

5. Detach Screw Plug with Special Tool

6. Remove Lamp Sleeve and replace new one

Action 6



Troubleshooting for UV unit

IV. Cause and Action for alarm/trip relating to UV Power Supply Panel

D. UV EARTH LEAKAGE CIRCUIT BREAKER TRIP

Cause 2: Water leakage from broken Lamp Sleeve in the UV Chamber

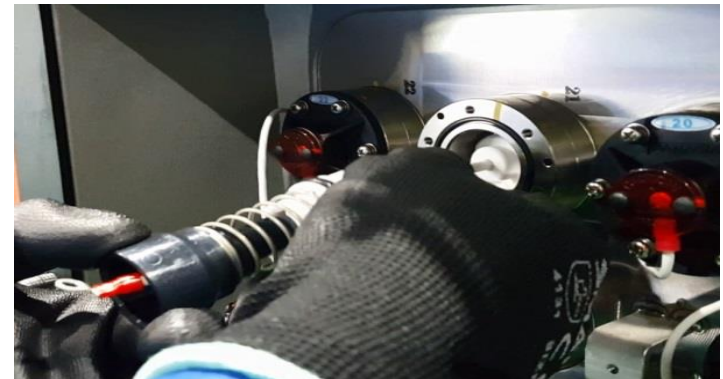
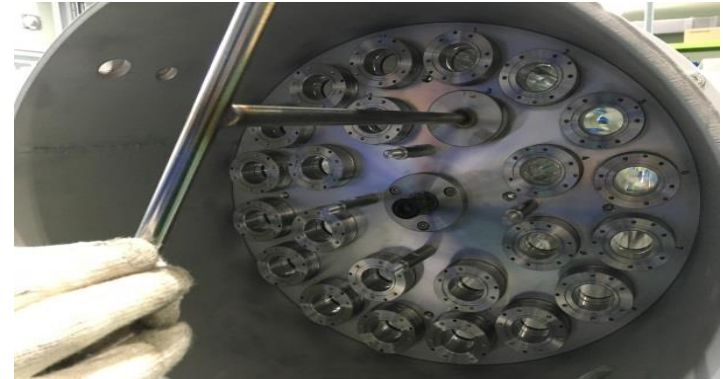
Action 7



7. Check the O-ring and tighten condition

8. Re-assemble all parts in reverse order and re-test

Action 8



Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV chamber(unit)

Alarm and Trip list

No.	Description	Set Point	Delay time (In seconds)	Remark
5	UV DOSE LOW / LOW-LOW	250mJ/cm ²	50	Alarm
		230mJ/cm ²	60	Trip
6	UV CHAMBER INSIDE TEMP HIGH / HIGH-HIGH	50°C	5	Alarm
		60°C	2	Trip
7	UV CHAMBER SURFACE TEMP HIGH	50°C	Immediately	Trip
8	UV OPERATING TIME OVER	290mJ/cm ²	1200	Alarm
9	UV LAMP TROUBLE	-	Immediately	Trip
10	UV CHAMBER TEMPERATURE SENSOR FAIL	-	2	Trip
11	UV INTENSITY SENSOR FAIL	-	2	Trip
12	UV CYCLE TIME OVER	-	60~90	Alarm

Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV chamber(unit)

A. UV DOSE LOW / LOW-LOW

Alarm indicates that the UV dosage is lower than 250mJ/cm² for longer than 50 seconds.
Trip indicates that the UV dosage is lower than 230mJ/cm² for longer than 60 seconds.

Cause	Description	Action
1	Intensity Transmitter Failure	1
2	Intensity Transmitter Fouling	2
3	Lamp Sleeve Fouling	4
4	Worn Wiper(s)	2

Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV chamber(unit)

A. UV DOSE LOW / LOW-LOW

Cause1: Intensity Transmitter Failure

Action 1



Check if the Intensity Transmitter output is normal working range of approximately 4 mA. If abnormal, replace with new one.

Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV chamber(unit)

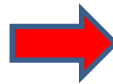
A. UV DOSE LOW / LOW-LOW

Cause2: Intensity Transmitter Fouling

Action 1



**Drain out remaining water and
Unscrew the nut fixing the Transmitter**



Action 2



**Take the Transmitter and clean dirty
parts with ethanol or alcohol**

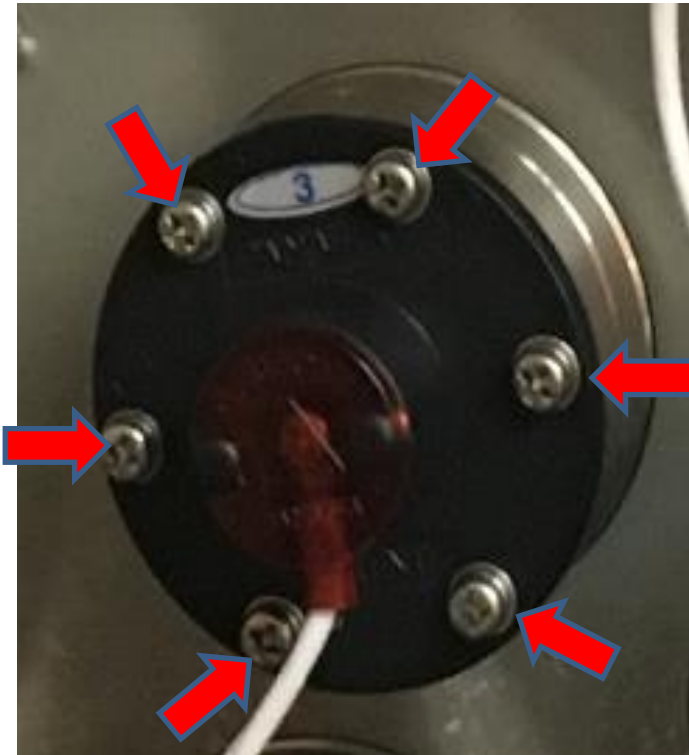
Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV chamber(unit)

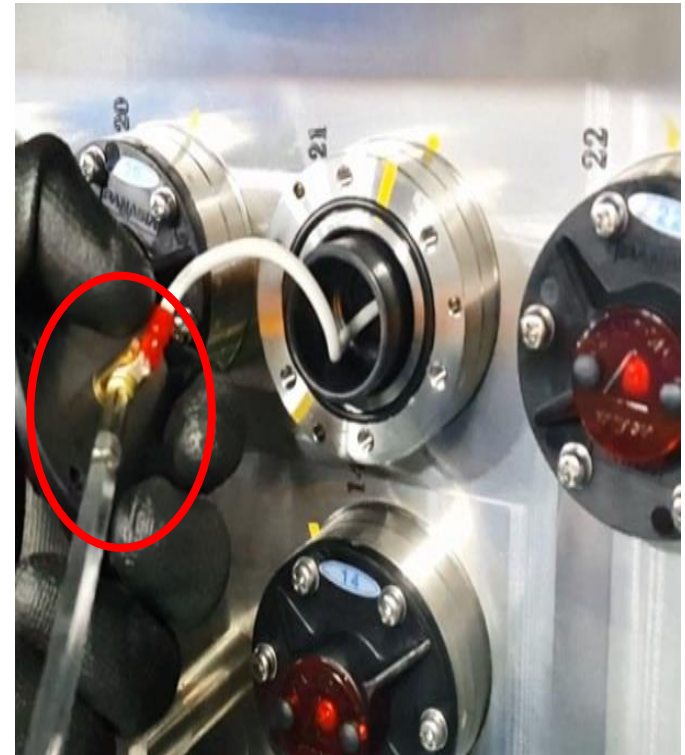
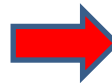
A. UV DOSE LOW / LOW-LOW

Cause3: Lamp Sleeve Fouling

Action 1



Loosen the screws from Isolating Bracket



Loosen the screws connected with the UV lamp wires

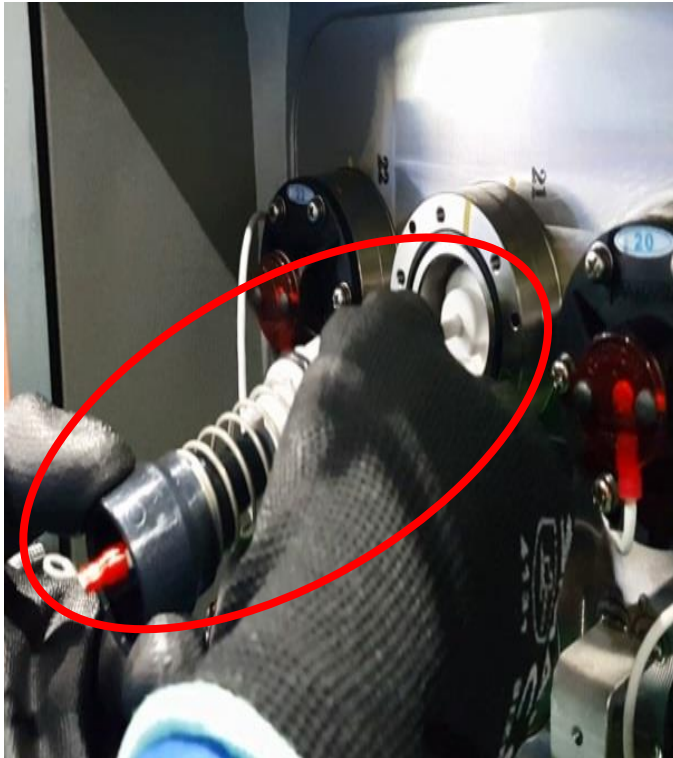
Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV chamber(unit)

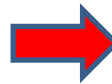
A. UV DOSE LOW / LOW-LOW

Cause3: Lamp Sleeve Fouling

Action 2



Dismantle Anti-Vibration Module and take UV lamps out



Detach Screw Plug with Special Tool

Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV chamber(unit)

A. UV DOSE LOW / LOW-LOW

Cause3: Lamp Sleeve Fouling

Action 3



Remove Lamp Sleeve from UV Chamber and clean with alcohol

Action 4



If necessary, replace Lamp Sleeve(s)

Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV chamber(unit)

A. UV DOSE LOW / LOW-LOW

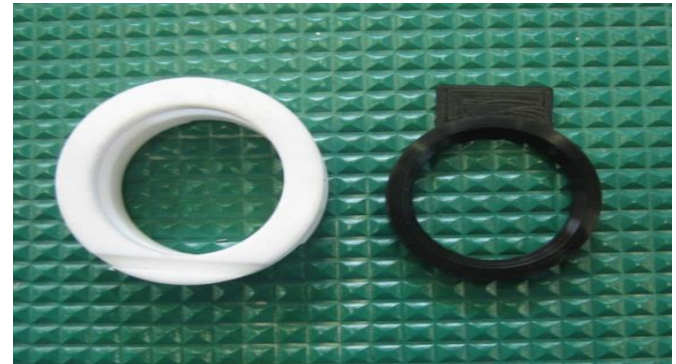
Cause4: Worn Wiper(s)

Action 1



1. Unscrew the bolt on Wiper Housing
2. Dismantle Wiper(s)
3. If necessary, replace the wiper(s)

Action 2



Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV chamber(unit)

B. UV CHAMBER INSIDE TEMP. HIGH/HIGH-HIGH

Alarm indicates that the water temperature inside the UV Chamber has exceeded alarm Set Point. (Default = 50 °C)

Trip indicates that the water temperature inside the UV Chamber has exceeded trip Set Point. (Default = 60 °C)

Cause	Description	Action
1	Malfunctioning Vent Valve (Only for Horizontal Installation of UV Unit)	4
2	Insufficient Flow Rate	3
3	Malfunctioning Temperature Transmitter	1
4	Poor or no wire connection to the Temperature Transmitter	1

Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV chamber(unit)

B. UV CHAMBER INSIDE TEMP. HIGH/HIGH-HIGH

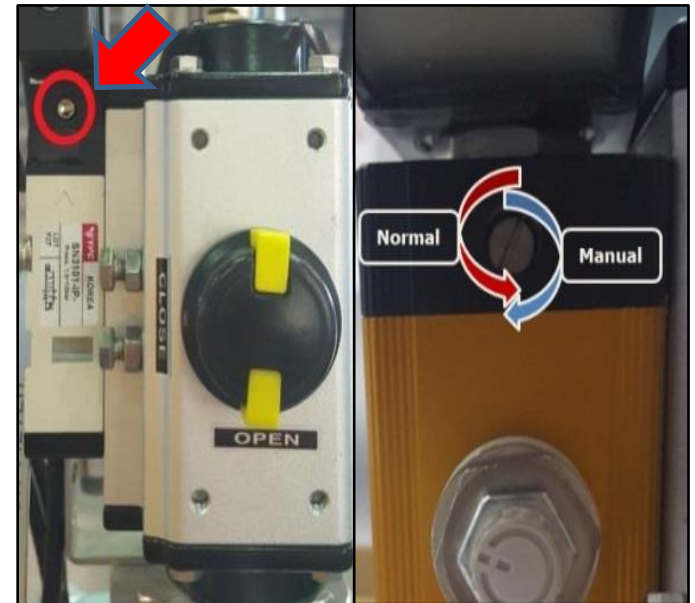
Cause 1: Malfunctioning Vent Valve(Only for Horizontal Installation of UV Unit)

Action 1



Compressed air pressure should be at least 4kg/cm²

Action 2



[NON EX-PROOF TYPE] [EX-PROOF TYPE]

Push the manual operation button by hand

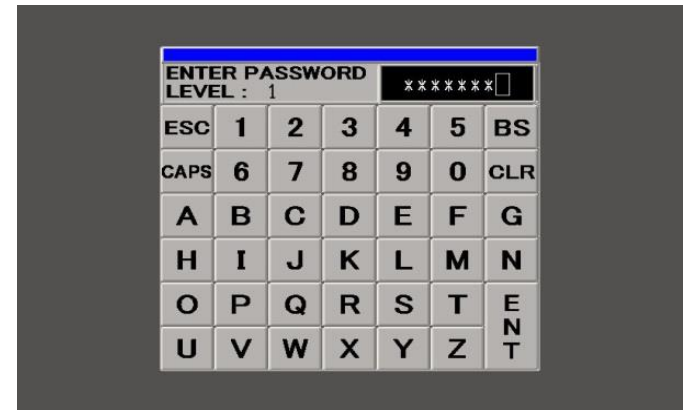
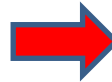
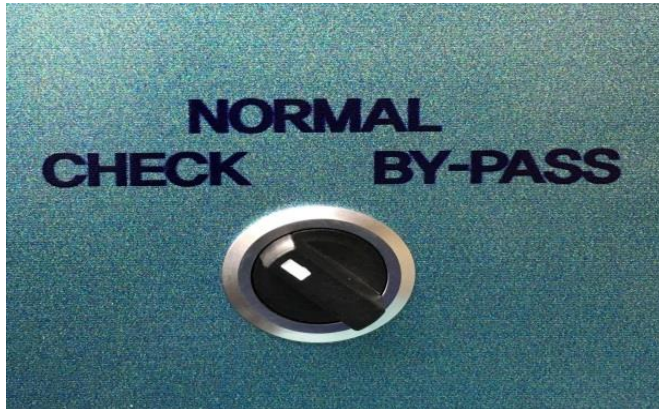
Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV chamber(unit)

B. UV CHAMBER INSIDE TEMP. HIGH/HIGH-HIGH

Cause 1: Malfunctioning Vent Valve(Only for Horizontal Installation of UV Unit)

Action 3



1. Change check mode
2. Input the P/W '1111111' ('1' Seven times)
3. Click the button(Open/Close)



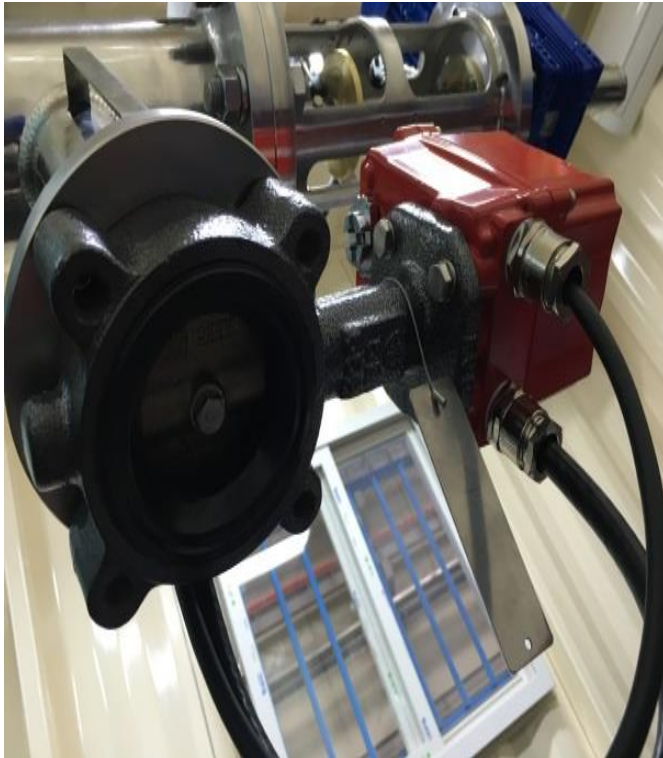
Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV chamber(unit)

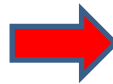
B. UV CHAMBER INSIDE TEMP. HIGH/HIGH-HIGH

Cause 1: Malfunctioning Vent Valve(Only for Horizontal Installation of UV Unit)

Action 4



If the disc, seat and/or shaft inside are jammed or damaged,



Separate the Actuator from Butterfly Valve

Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV chamber(unit)

B. UV CHAMBER INSIDE TEMP. HIGH/HIGH-HIGH

Cause 2: Insufficient flow rate

Action 1



1. Check flow rate during operation (UV lamps are ON)
2. Check flow rate in Flowmeter within specification

Action 2



Action 3



[SEE <Cause and Troubleshooting / Action> of the 'FLOW RATE LOW' alarm].

Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV chamber(unit)

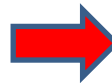
B. UV CHAMBER INSIDE TEMP. HIGH/HIGH-HIGH

Cause 3: Malfunctioning Temperature Transmitter

Action 1



Dismantle Temp. Transmitter and Measure electric current



Signal (4~20mA)	Temperature (0~100°C)	Ohms (Ω)
4	0	100
8	25	109.35
12	50	119.4
16	75	128.99
20	100	138.51

If the current measured does not match the table, transmitter to be replaced.

Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV Chamber(unit)

C. UV CHAMBER SURFACE TEMP. HIGH

Trip indicates that the surface temperature of UV CHAMBER is over 50°C

Cause	Description	Action
1	Insufficient flow rate	3
2	Temperature switch failure	2
3	Poor or no wire connection	1

Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV Chamber(unit)

C. UV CHAMBER SURFACE TEMP. HIGH

Cause 1: Insufficient flow rate

Action 1



1. Check flow rate during operation (UV lamps are ON)
2. Check flow rate in Flow Meter within specification

Action 2



Action 3

[SEE <Cause and Troubleshooting / Action> of the 'FLOW RATE LOW' alarm].

Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV Chamber(unit)

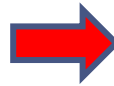
C. UV CHAMBER SURFACE TEMP. HIGH

Cause 2: Temperature switch failure

Action 1



**Check the Cooling Fan(Under 50°C)
when the lamps inside UV Unit are on**



Action 2



**Dismantle the Temperature switch
with a spanner.**

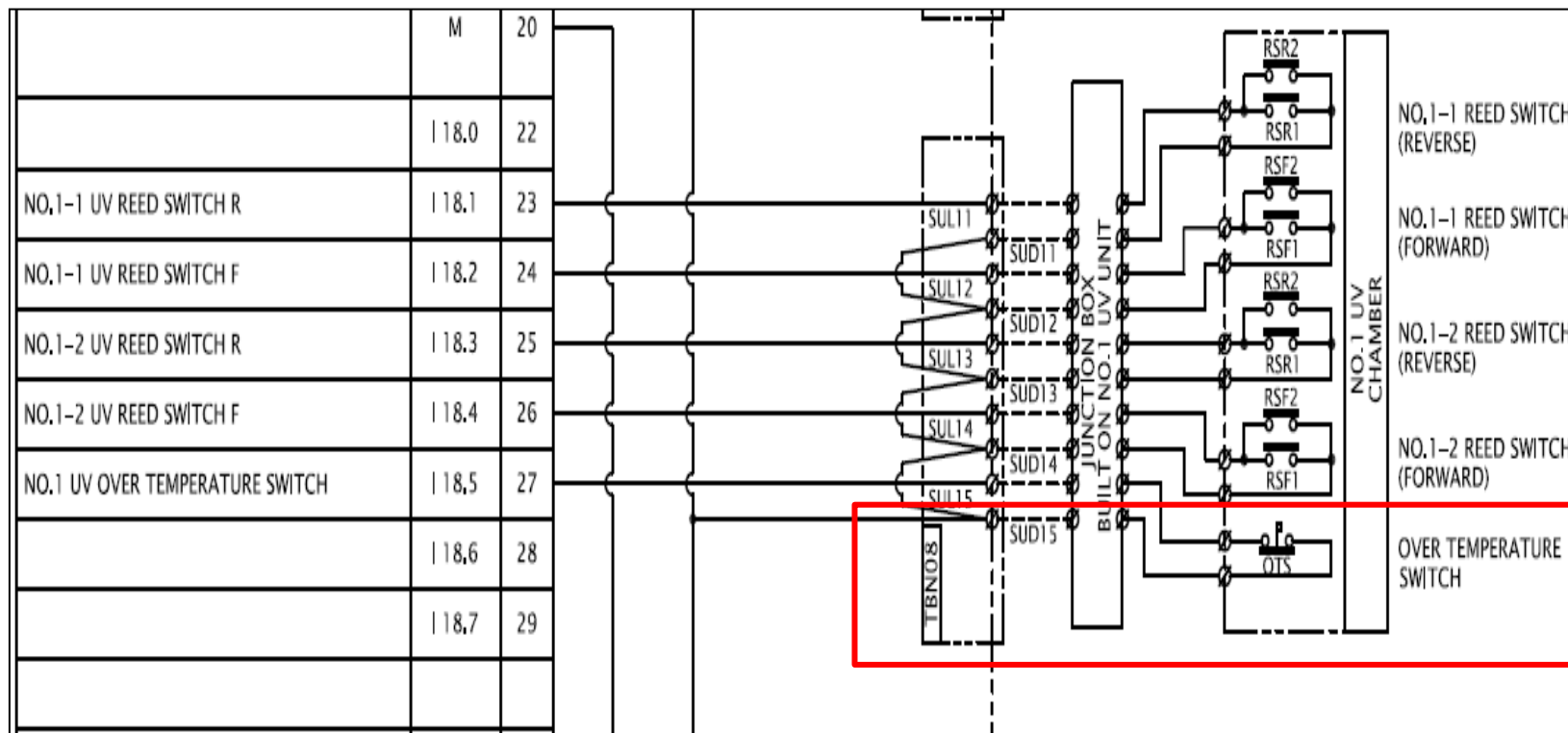
Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV Chamber(unit)

C. UV CHAMBER SURFACE TEMP. HIGH

Cause 3: Poor or no wire connection

Action 1



Check if all the electric wires are connected and tightened properly, according to the electric drawings

Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV Chamber(unit)

D. UV OPERATING TIME OVER

Alarm indicates that UV dosage is below 290mJ/cm² despite of cleaning the Lamp Sleeves for more than 20 minutes.

Cause	Description	Action
1	Wiper Stopped/Jammed (Overload)	1
2	Malfunctioning Reed Switch	3
3	UV Wiper motor failure	7
4	Lamp Sleeve fouling	4
5	Worn Wiper(s)	1

Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV Chamber(unit)

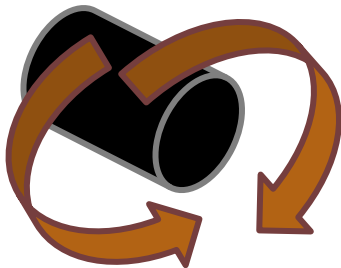
D. UV OPERATING TIME OVER

Cause 1: Wiper Stopped / Jammed (Overload)

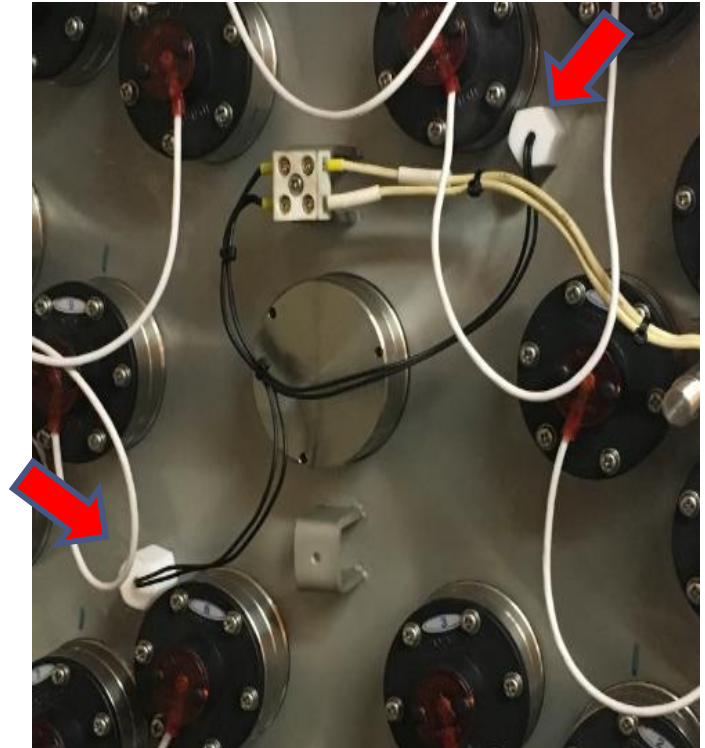
Action 1



Check whether the Coupling is fixed.



Action 2



Ensure proper installation of the Reed Switch

Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV Chamber(unit)

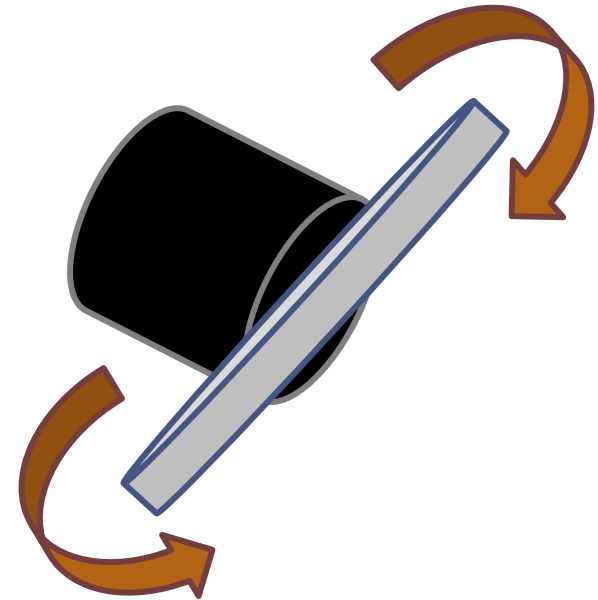
D. UV OPERATING TIME OVER

Cause 1: Wiper Stopped / Jammed (Overload)

Action 3



**Free up the Coupling by unscrewing
with a proper tool**



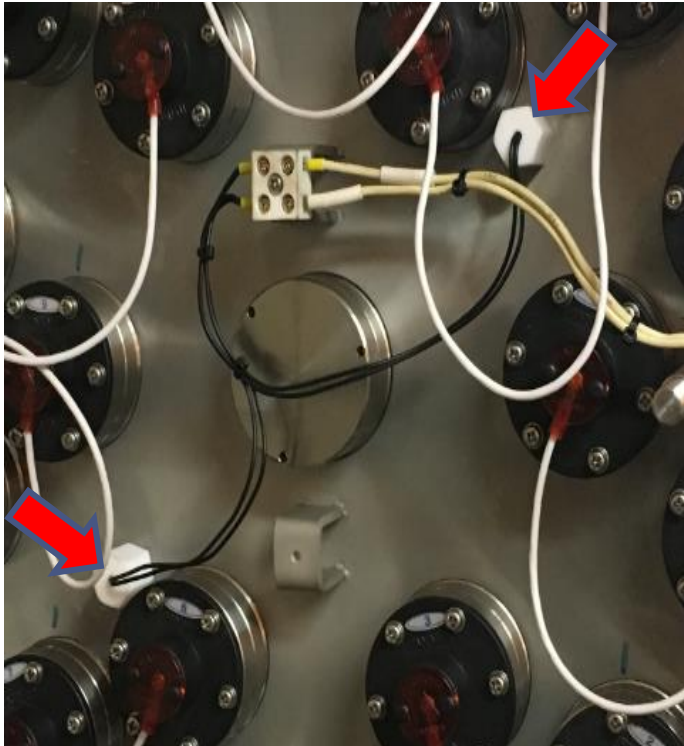
Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV Chamber(unit)

D. UV OPERATING TIME OVER

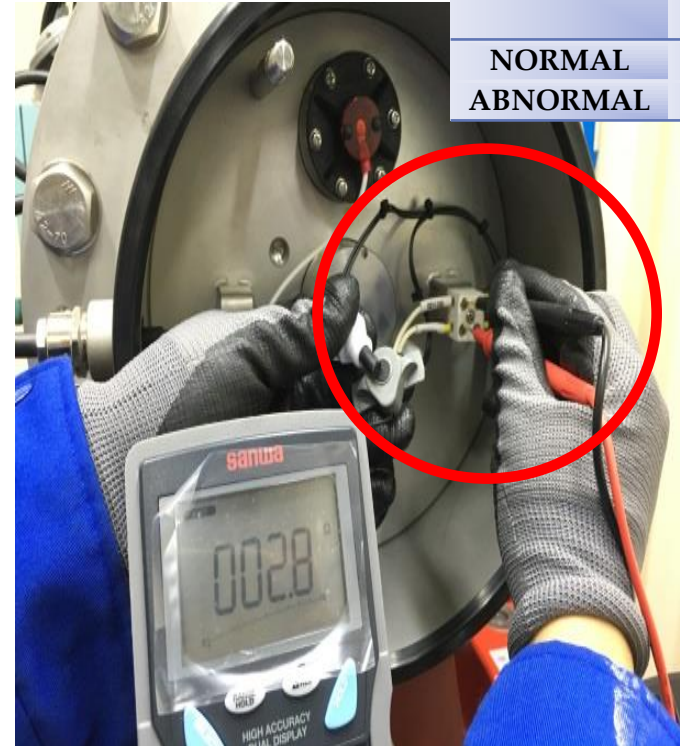
Cause 2: Malfunctioning Reed Switch

Action 1



Ensure proper installation of the Reed Switch

Action 2



CONDITION	Ohms (Ω)
NORMAL	0~3
ABNORMAL	OL

Check the resistance between the two wire for Reed Switch

Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV Chamber(unit)

D. UV OPERATING TIME OVER

Cause 2: Malfunctioning Reed Switch

Action 3



If it does not work, replace it with new one

Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV Chamber(unit)

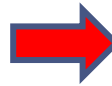
D. UV OPERATING TIME OVER

Cause 3: UV Wiper Motor Failure

Action 1



Dismount Wiper Motor and Coupling



Action 2



Turn the Motor Screw by hand

Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV Chamber(unit)

D. UV OPERATING TIME OVER

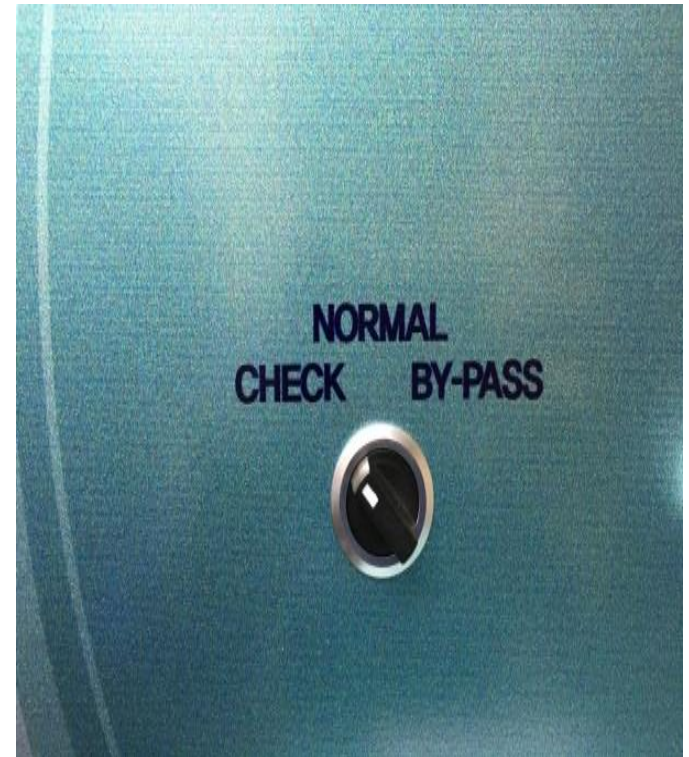
Cause 3: UV Wiper Motor Failure

Action 3



Check the Voltage for Motor

Action 4



Change the Select Switch to "Check"

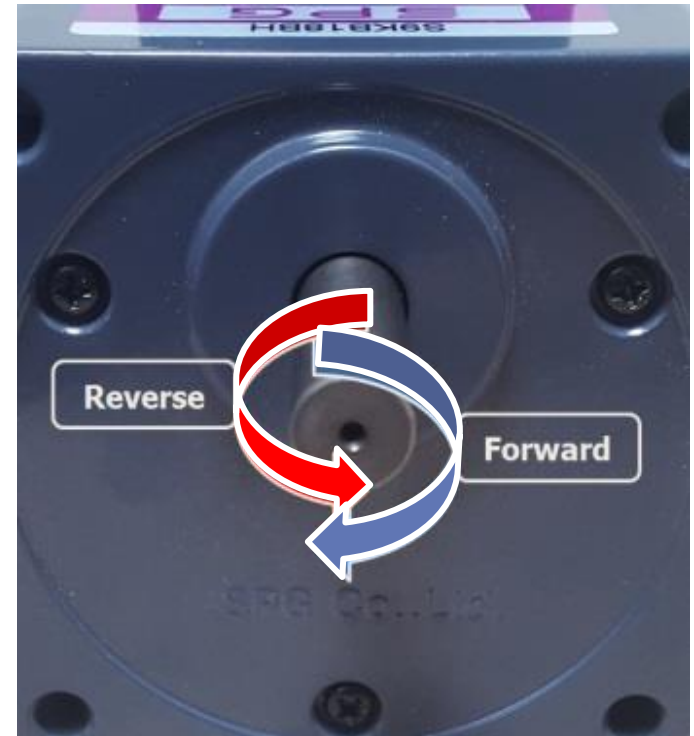
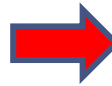
Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV Chamber(unit)

D. UV OPERATING TIME OVER

Cause 3: UV Wiper Motor Failure

Action 5



Touch Motor FORWARD or REVERSE button

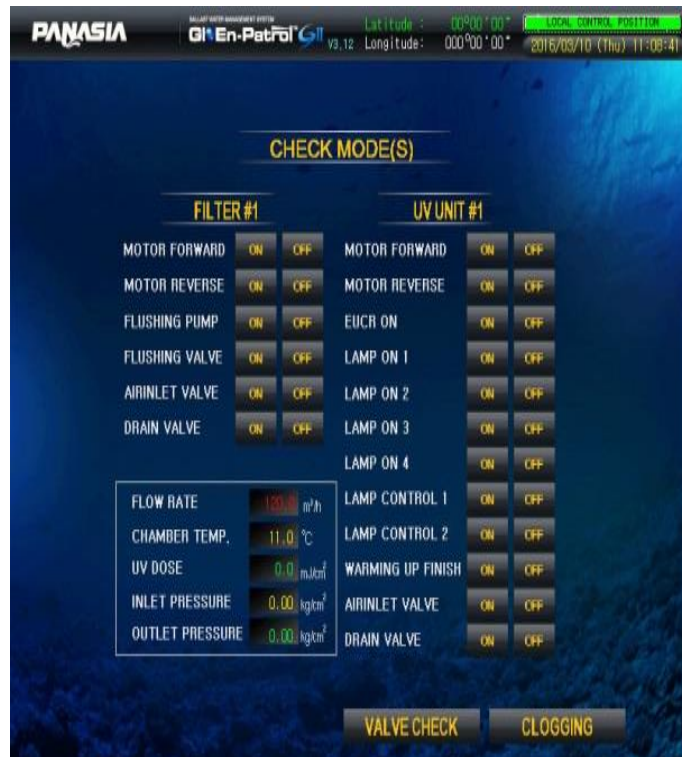
Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV Chamber(unit)

D. UV OPERATING TIME OVER

Cause 3: UV Wiper Motor Failure

Action 5



Touch Motor FORWARD or REVERSE button

Action 6



A	B	Ohms (Ω)
W	V	16.5
U	V	16.5
W	U	33
W	EARTH	OL
V	EARTH	OL
U	EARTH	OL

Ensure the resistance between the three wires

Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV Chamber(unit)

D. UV OPERATING TIME OVER

Cause 3: UV Wiper Motor Failure

Action 7



If it dose not work, replace the motor with new one

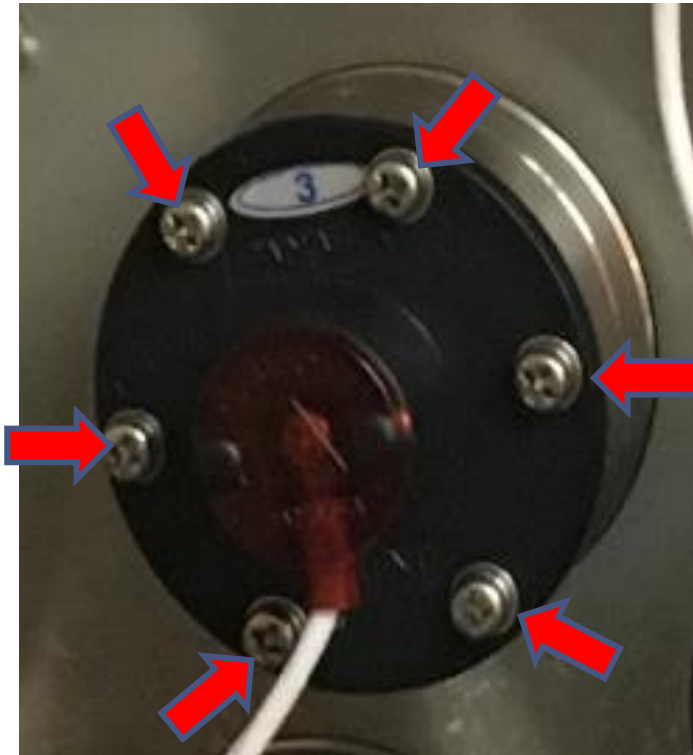
Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV Chamber(unit)

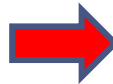
D. UV OPERATING TIME OVER

Cause 4: Lamp Sleeve Fouling

Action 1



Unscrew bolts from Isolating Bracket



Unscrew bolts connected with the UV lamp wires

Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV Chamber(unit)

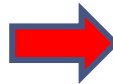
D. UV OPERATING TIME OVER

Cause 4: Lamp Sleeve Fouling

Action 2



Dismantle Anti-Vibration Module and take UV lamps out



Detach Screw Plug with Special Tool

Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV Chamber(unit)

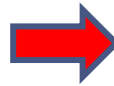
D. UV OPERATING TIME OVER

Cause 4: Lamp Sleeve Fouling

Action 3



Remove Lamp Sleeve for UV Chamber and clean with alcohol



Action 4



If necessary, replace Lamp Sleeve(s)

Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV Chamber(unit)

D. UV OPERATING TIME OVER

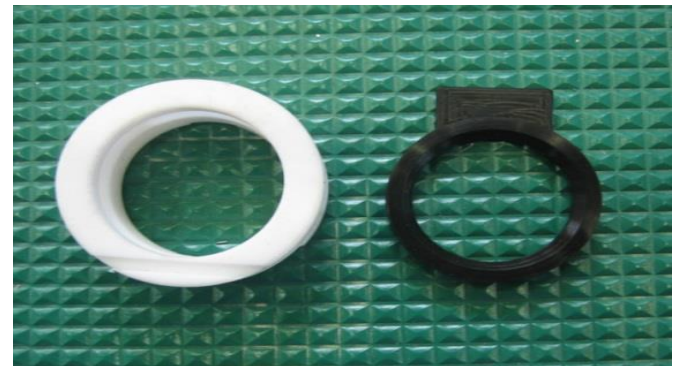
Cause 5: Worn Wiper(s)

Action 1



1. Unscrew the bolt on Wiper Housing
2. Dismantle Wiper(s)
3. If necessary, replace the wiper(s)

Action 2



Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV Chamber(unit)

E. UV LAMP TROUBLE

Trip indicates that a problem(s) occurs between electric ballast and ELCB, between electric ballast and UV lamp(s), or relevant connection line(s).

Cause	Description	Action
1	Abnormal UV lamp	13
2	Abnormal NTC	6
3	Faulty EUCR	6
4	Faulty Electric Ballast	5
5	Circuit breaker failure	1

Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV Chamber(unit)

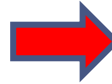
E. UV LAMP TROUBLE

Cause 1 : Abnormal UV lamp

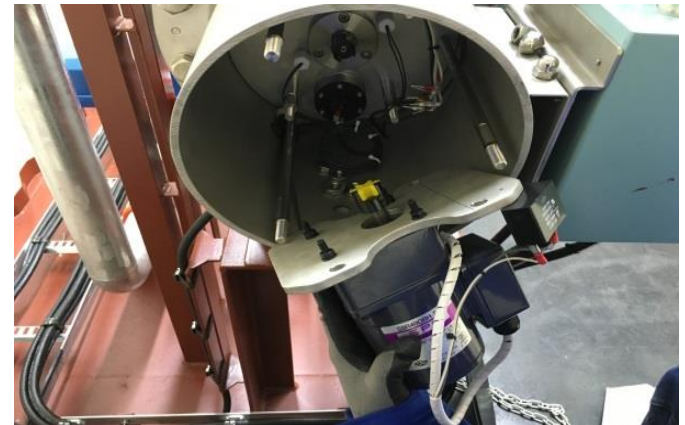
Action 1



1. Turn off Main CB(440V)
2. Remove Wiper Motor
3. Unscrew the **SCREWS**



Action 2



Action 3



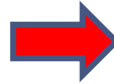
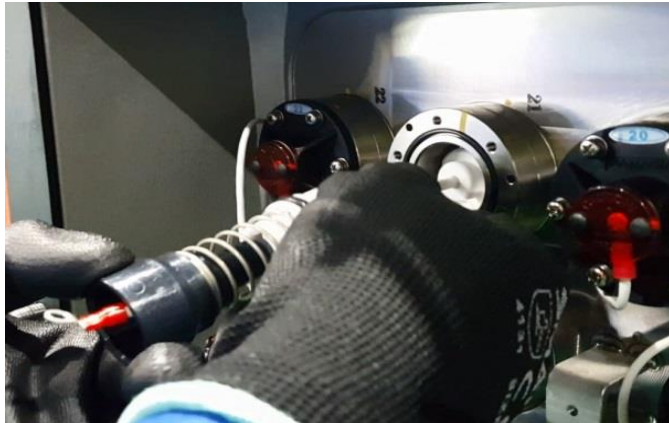
Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV Chamber(unit)

E. UV LAMP TROUBLE

Cause 1 : Abnormal UV lamp

Action 4



Action 5



Action 6



4. Dismantle Anti-Vibration Module and take UV lamps out
5. Check the UV lamps with UV lamp test kit whether it's properly working or not
6. Replace new one, if the lamp is abnormal condition

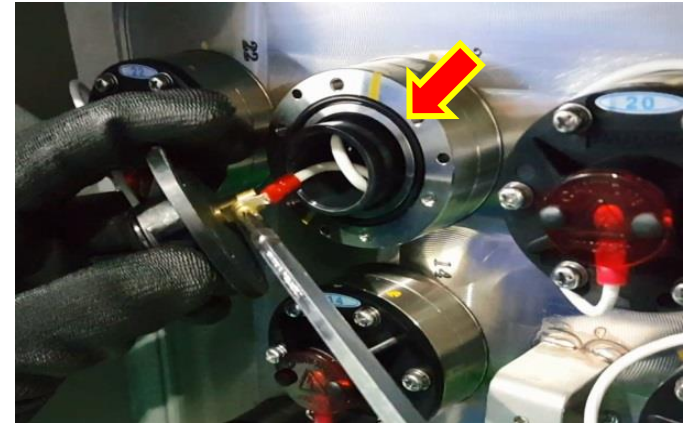
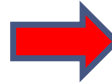
Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV Chamber(unit)

E. UV LAMP TROUBLE

Cause 1 : Abnormal UV lamp

Action 7



7. Assemble UV lamps with Anti-Vibration Module

Screw the **SCREWS**(1 pcs x M4 x 6L)
Before screwing the **SCREWS** up,
make sure O-ring shall be inserted.
Screw the **SCREWS**(6pcs x M4 x 12L)

Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV Chamber(unit)

E. UV LAMP TROUBLE

Cause 1 : Abnormal UV lamp

Action 8



Turn on the main circuit breaker and the relevant circuit breakers for UV lamps in UV Power Supply Panel.

Note: Please refer to below information

- **Lamp replacement Manual**
- **Lamp Test Kit Manual**

Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV Chamber(unit)

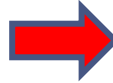
E. UV LAMP TROUBLE

Cause 2 : Abnormal NTC

Action 1



1. Turn off the power supply (440V, 110V or 220V)
2. Loosen the nuts fixing the back plate on the electric ballast.
3. Disconnect power cable for cooling fan from terminal block.



Action 2



Action 3



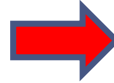
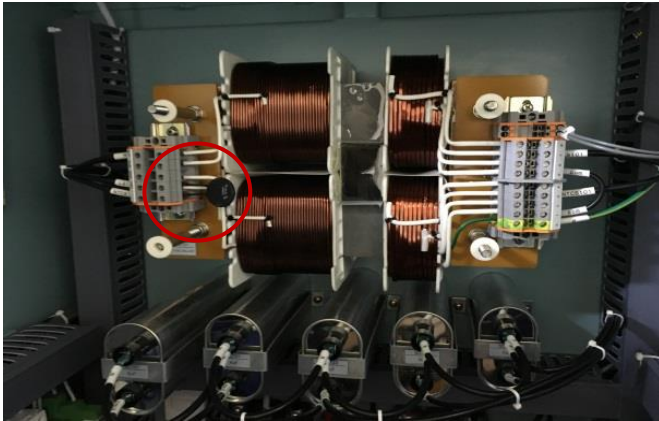
Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV Chamber(unit)

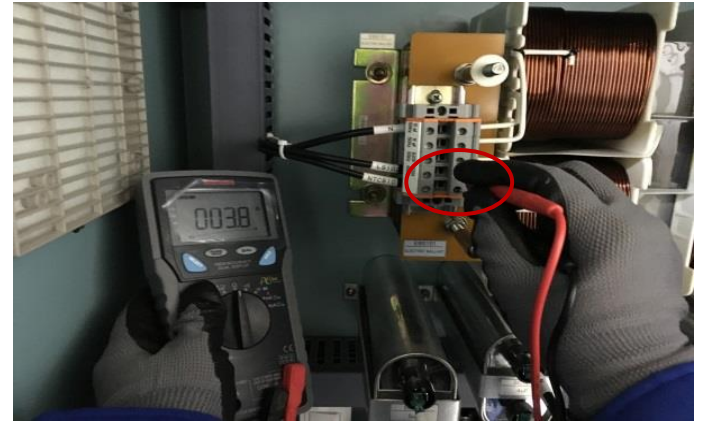
E. UV LAMP TROUBLE

Cause 2 : Abnormal NTC

Action 4

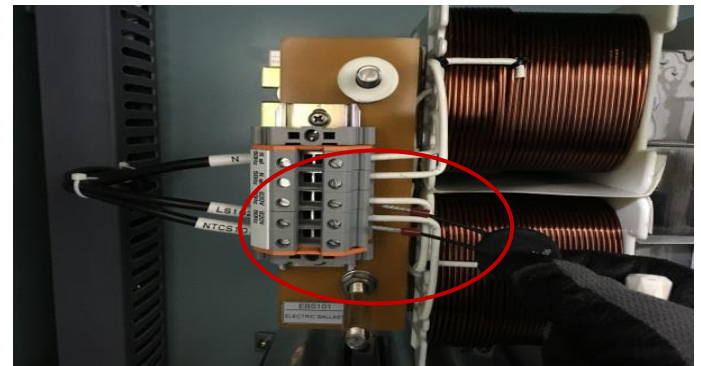


Action 5



4. Remove the back plate and check the connection arrangement of NTC
5. The resistance has to be $2.0 \sim 3.0 \Omega$ (Normal range)
6. Replace new one(NTC), if the resistance is abnormal condition

Action 6



Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV Chamber(unit)

E. UV LAMP TROUBLE

Cause 2 : Abnormal NTC

Action 7



If the resistance is normal, then go for the other check points including changing of UV lamp.

Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV Chamber(unit)

E. UV LAMP TROUBLE

Cause 3 : Faulty EUCR

Action 1



**Verify Ampere range set
(Normal: 3 A and 5 Sec)**

Action 2



**Check EUCR "ON" button is selected
on the GP Screen**

Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV Chamber(unit)

E. UV LAMP TROUBLE

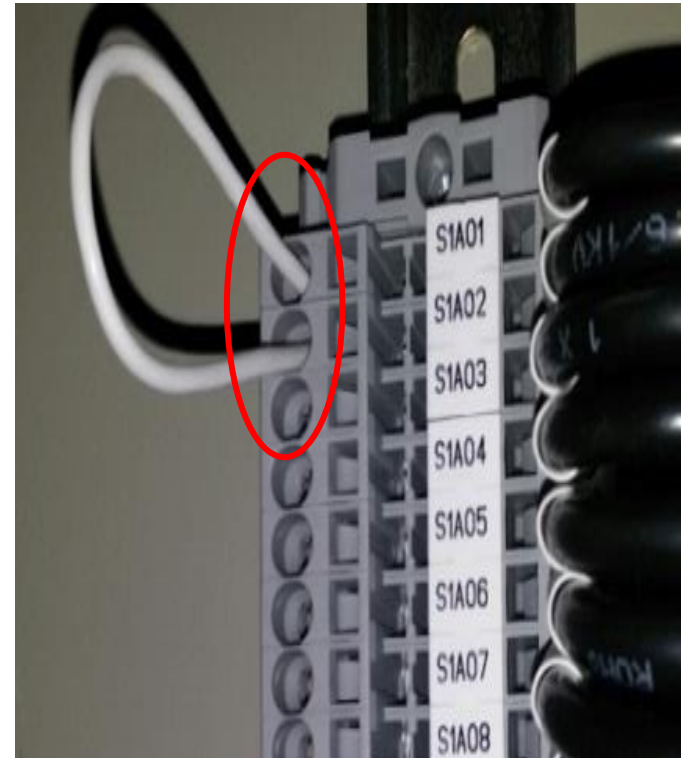
Cause 4 : Faulty Electric Ballast

Action 1



**Turn off all Circuit Breakers
Before removing wiring**

Action 2



**In case of Non-Explosion type, Connect
No.1 to No.2 with cable**

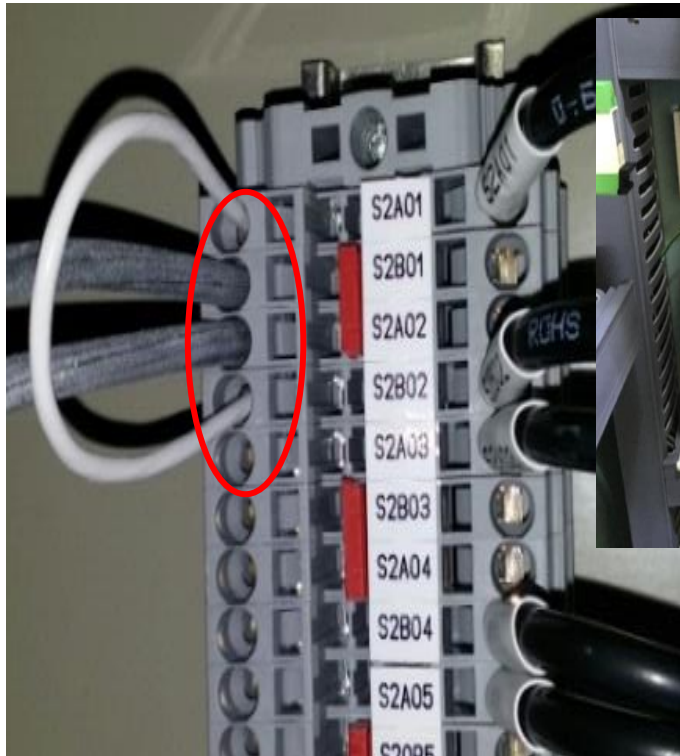
Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV Chamber(unit)

E. UV LAMP TROUBLE

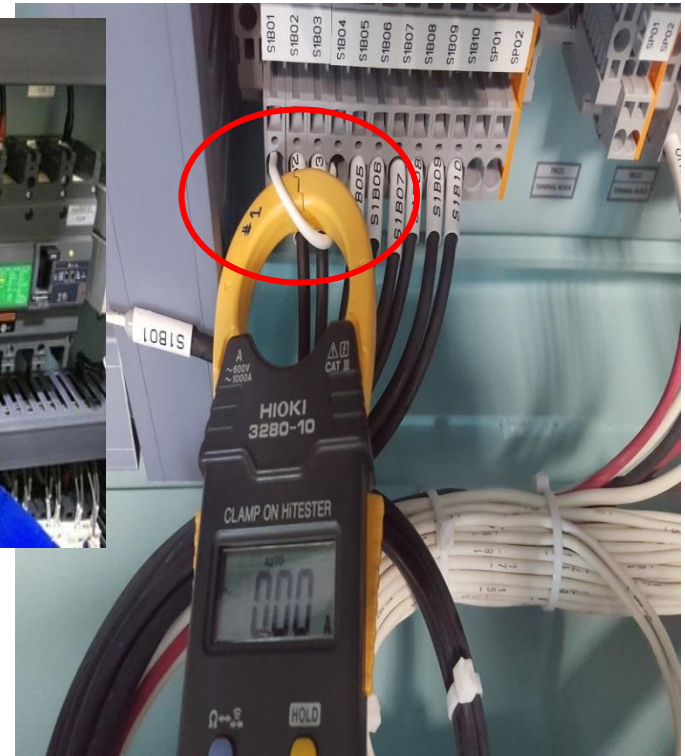
Cause 4 : Faulty Electric Ballast

Action 3



In case of Explosion type, connect No.1 to No.4 with cable

Action 4



Hold a clamp meter on a cable connected directly.

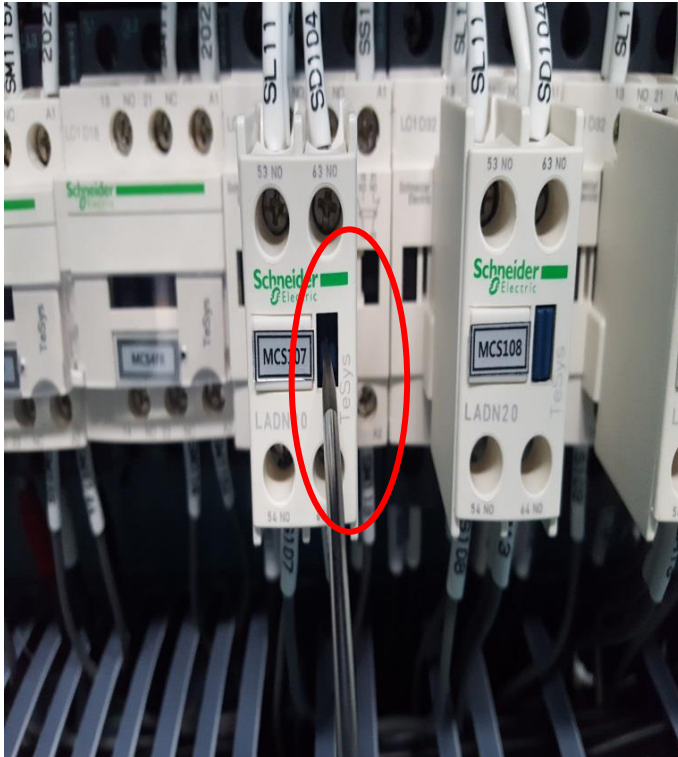
Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV Chamber(unit)

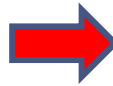
E. UV LAMP TROUBLE

Cause 4 : Faulty Electric Ballast

Action 5



Push a Magnetic switch with a small driver.



Between 10A to 14A of current flows in short-circuit test.

Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV Chamber(unit)

E. UV LAMP TROUBLE

Cause 5 : Circuit breaker failure

Action 1



If necessary, check and replace the circuit breaker in the UV Power Supply Panel

Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV Chamber(unit)

F. UV CHAMBER TEMPERATURE SENSOR FAIL

Trip indicates that the UV temperature sensor output is out of range.

Cause	Description	Action
1	Temperature sensor failure	1
2	Poor or no wire connection	1

Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV Chamber(unit)

F. UV CHAMBER TEMPERATURE SENSOR FAIL

Cause 1: Temperature sensor failure

Action 1



If necessary, replace Temperature Sensor in UV Chamber

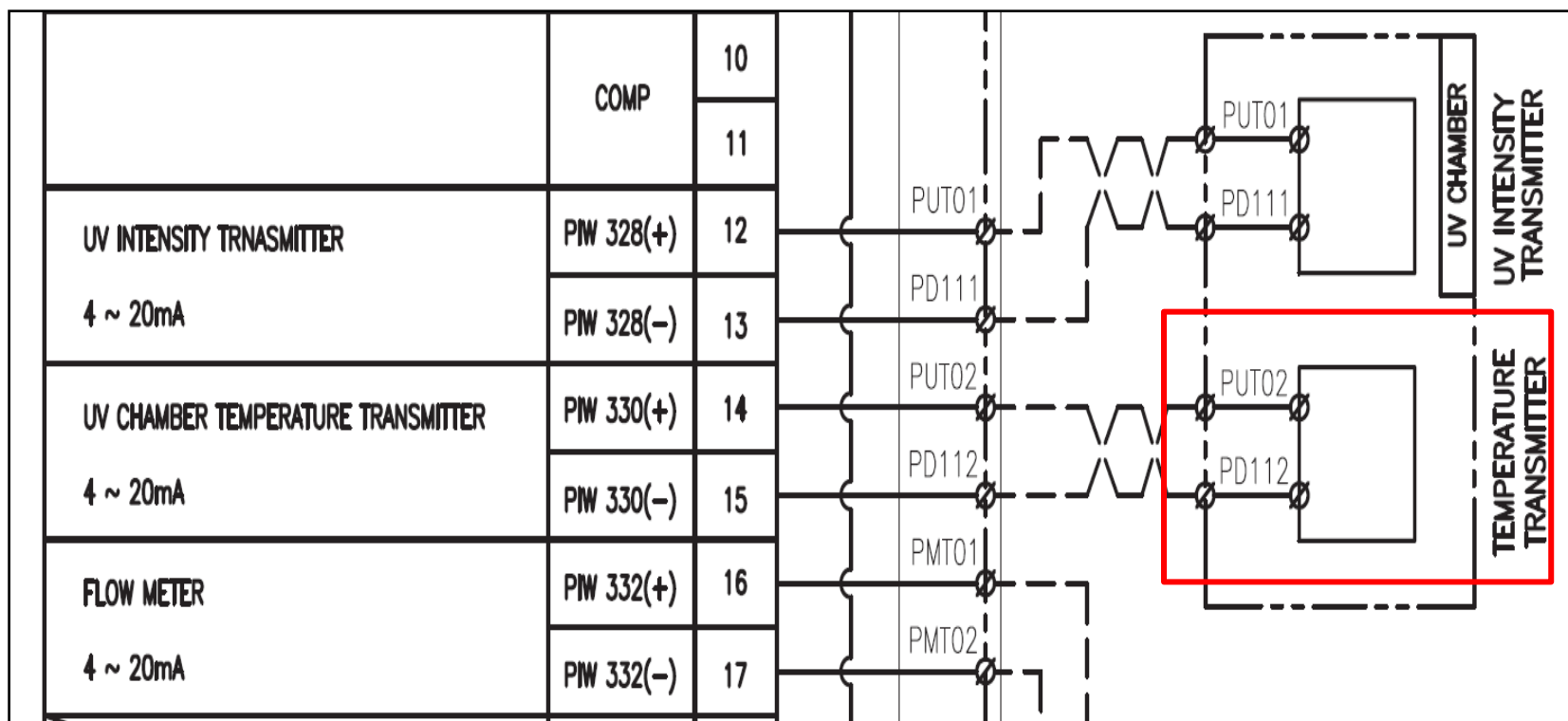
Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV Chamber(unit)

F. UV CHAMBER TEMPERATURE SENSOR FAIL

Cause 2: Poor or wire connection

Action 1



Check if all the electric wires are connected and tightened properly according to the electric drawings.

Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV Chamber(unit)

G. UV intensity sensor fail

Trip indicates that the UV intensity sensor output is out of range

Cause	Description	Action
1	Intensity sensor failure	1
2	Poor or no wire connection	1

Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV Chamber(unit)

F. UV INTENSITY SENSOR FAIL

Cause 1: UV Intensity Sensor Damage

Action 1



Check the Pressure Transmitter.

Action 2



**If it is outside of the range, replace it with new one.
(3.99 mA ≤ NORMAL ≤ 4.01 mA)**

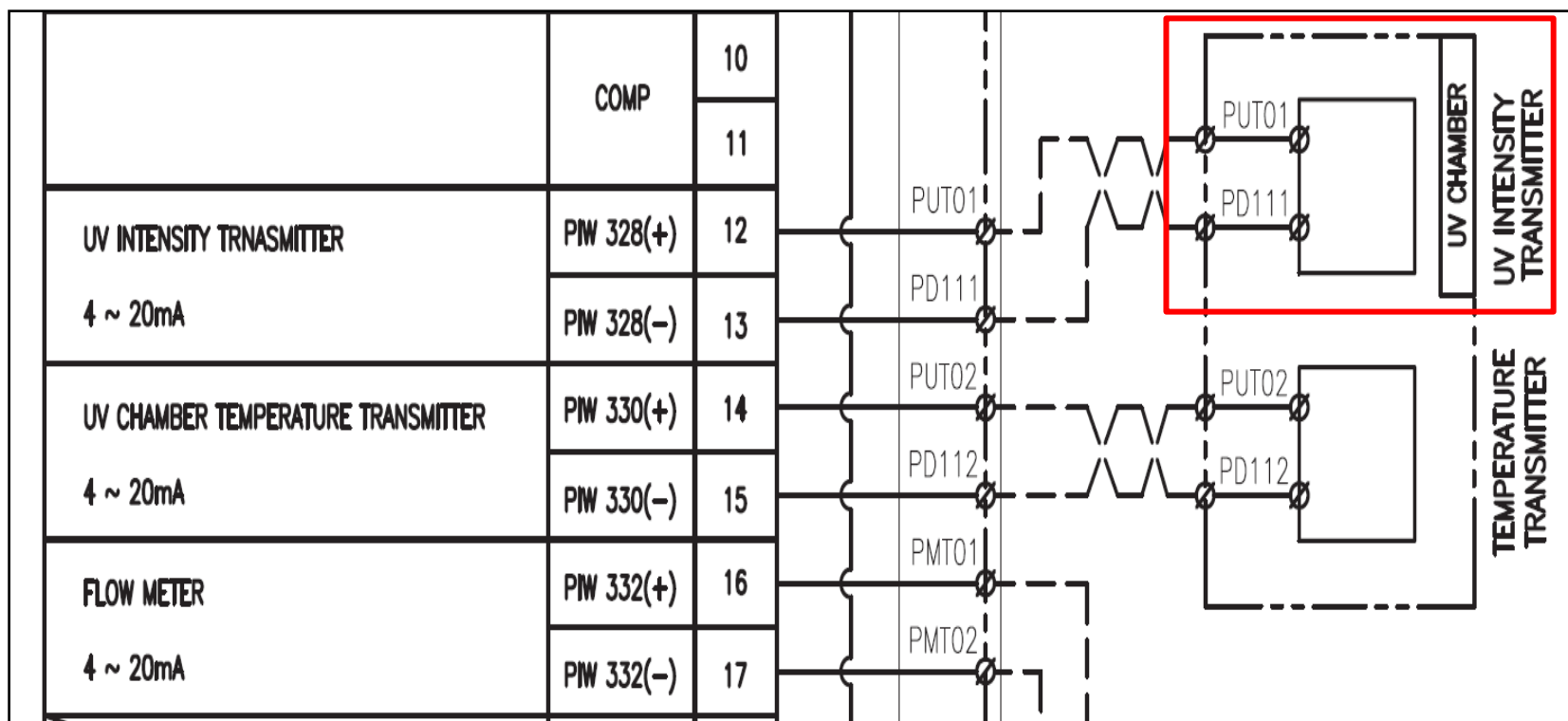
Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV Chamber(unit)

F. UV CHAMBER INTENSITY SENSOR FAIL

Cause 2: Poor or wire connection

Action 1



Check if all the electric wires are connected and tightened properly according to the electric drawings

Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV Chamber(unit)

H. UV CYCLE TIME OVER

Alarm indicates that wiper motor has a current trip or has not completed 1 cleaning cycle within preset time limit (60 to 90 seconds).

Cause	Description	Action
1	Wiper Stopped/Jammed (Overload)	3
2	Malfunctioning Reed Switch	3
3	UV Wiper motor failure	7
4	Loss of power for Wiper Motor power	5
5	Mechanical faults	2

Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV Chamber(unit)

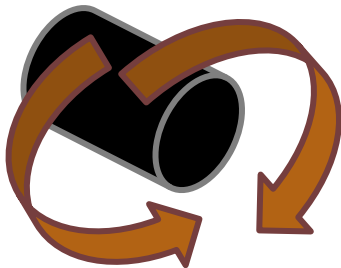
H. UV CYCLE TIME OVER

Cause 1 : Wiper Stopped/Jammed (Overload)

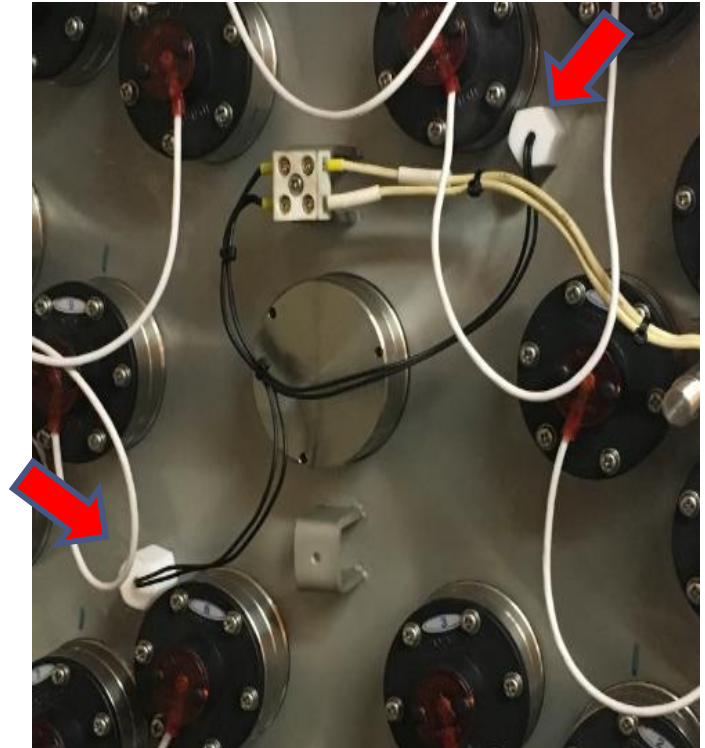
Action 1



Check whether the Coupling is fixed.



Action 2



Ensure proper installation of the Red Switch

Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV Chamber(unit)

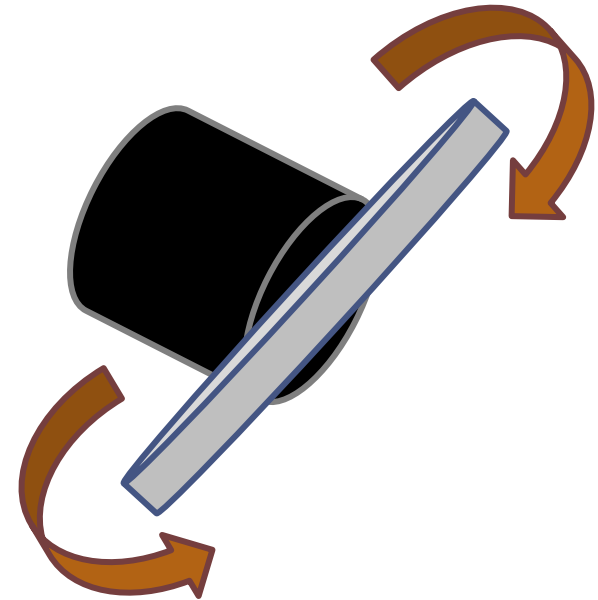
H. UV CYCLE TIME OVER

Cause 1 : Wiper Stopped/Jammed (Overload)

Action 3



Free up the Coupling by unscrewing with a proper tool



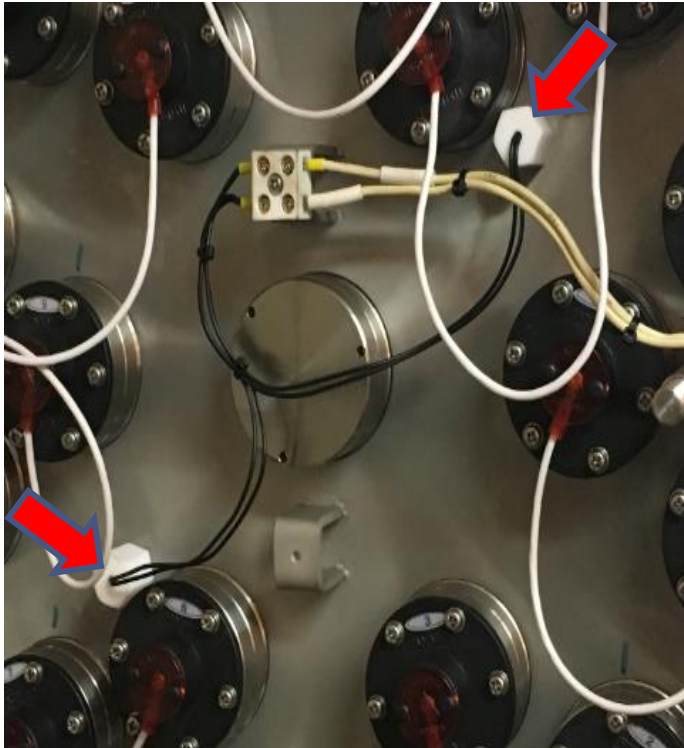
Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV Chamber(unit)

H. UV CYCLE TIME OVER

Cause 2: Malfunctioning Reed Switch

Action 1



Ensure proper installation of the Reed Switch

Action 2



CONDITION	Ohms (Ω)
NORMAL	0~3
ABNORMAL	OL

Check the resistance between the two wire for Reed Switch

Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV Chamber(unit)

H. UV CYCLE TIME OVER

Cause 2: Malfunctioning Reed Switch

Action 3



If it does not work, replace it with new one

Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV Chamber(unit)

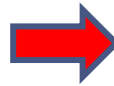
H. UV CYCLE TIME OVER

Cause 3: UV Wiper Motor Failure

Action 1



Dismount Wiper Motor and Coupling



Action 2



Turn the Motor Shaft by hand

Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV Chamber(unit)

H. UV CYCLE TIME OVER

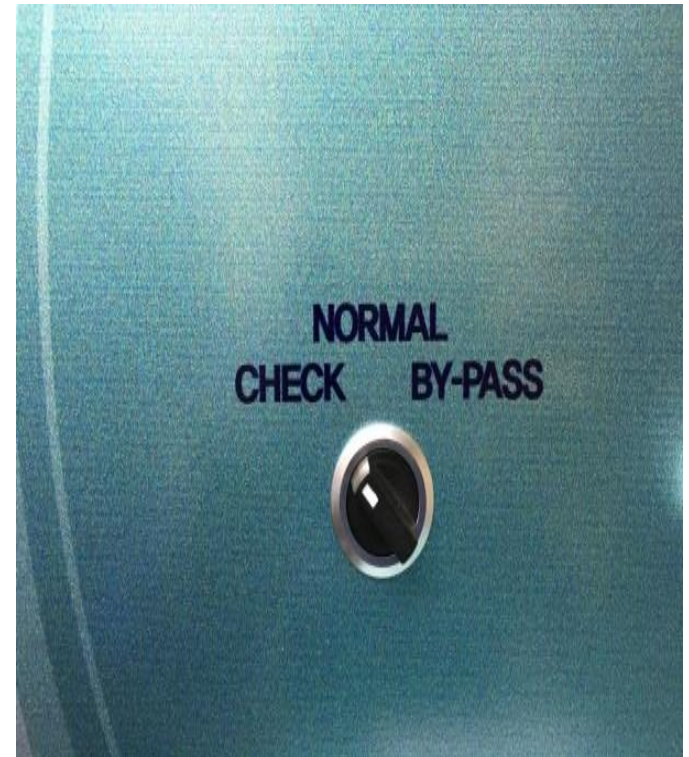
Cause 3: UV Wiper Motor Failure

Action 3



Check the Voltage for Motor

Action 4



Change the Select Switch to "Check"

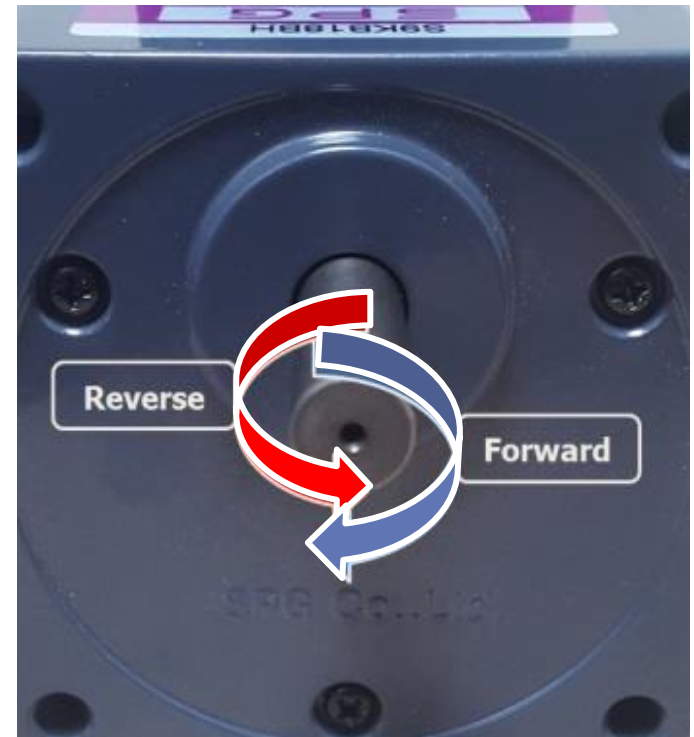
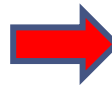
Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV Chamber(unit)

H. UV CYCLE TIME OVER

Cause 3: UV Wiper Motor Failure

Action 5



Touch Motor FORWARD or REVERSE button

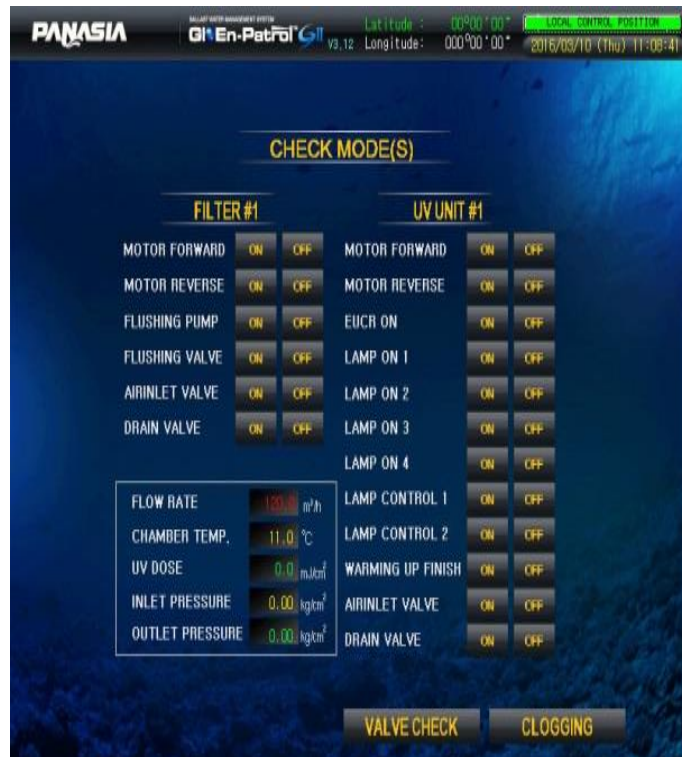
Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV Chamber(unit)

H. UV CYCLE TIME OVER

Cause 3: UV Wiper Motor Failure

Action 5



Touch Motor FORWARD or REVERSE button

Action 6



A	B	Ohms (Ω)
W	V	16.5
U	V	16.5
W	U	33
W	EARTH	OL
V	EARTH	OL
U	EARTH	OL

Ensure the resistance between the three wires

Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV Chamber(unit)

H. UV CYCLE TIME OVER

Cause 3: UV Wiper Motor Failure

Action 7



If it dose not work, replace the motor with n ew one

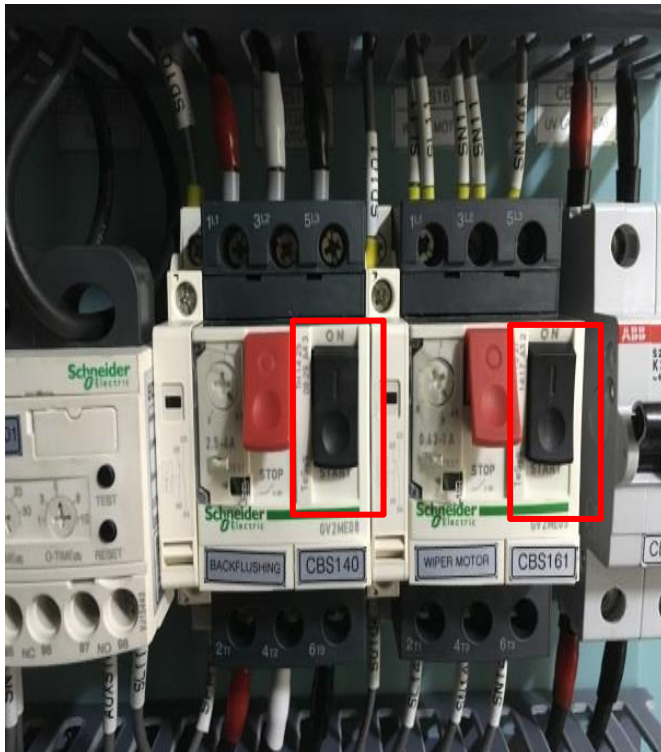
Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV Chamber(unit)

H. UV CYCLE TIME OVER

Cause 4 : Loss of power for Wiper Motor power

Action 1



Check if the circuit breaker switches

Action 2



Power supply voltage (110/220VAC)

Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV Chamber(unit)

H. UV CYCLE TIME OVER

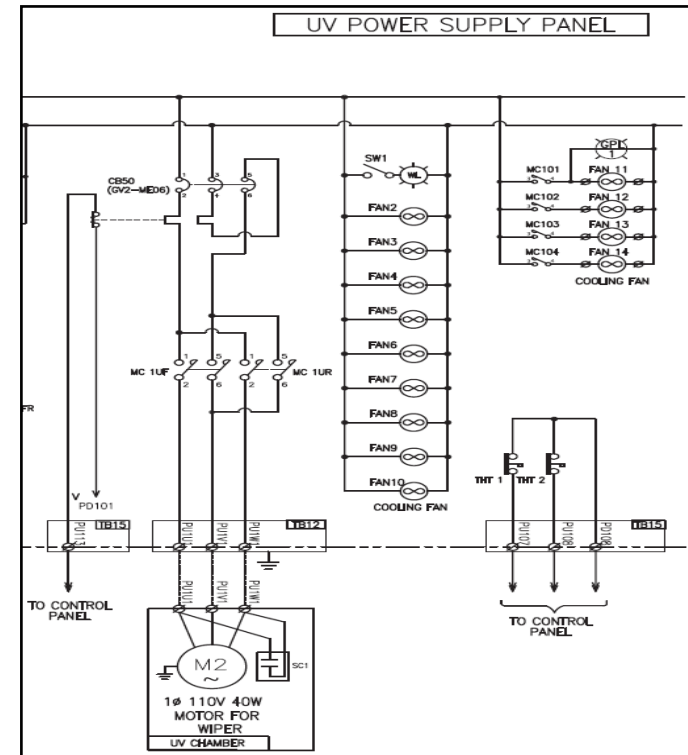
Cause 4 : Loss of power for Wiper Motor power

Action 3



Check if all the electric wires are connected

Action 4



Checking voltage with an multi-meter.

Troubleshooting for UV unit

V. Cause and Action for alarm/trip relating to UV Chamber(unit)

H. UV CYCLE TIME OVER

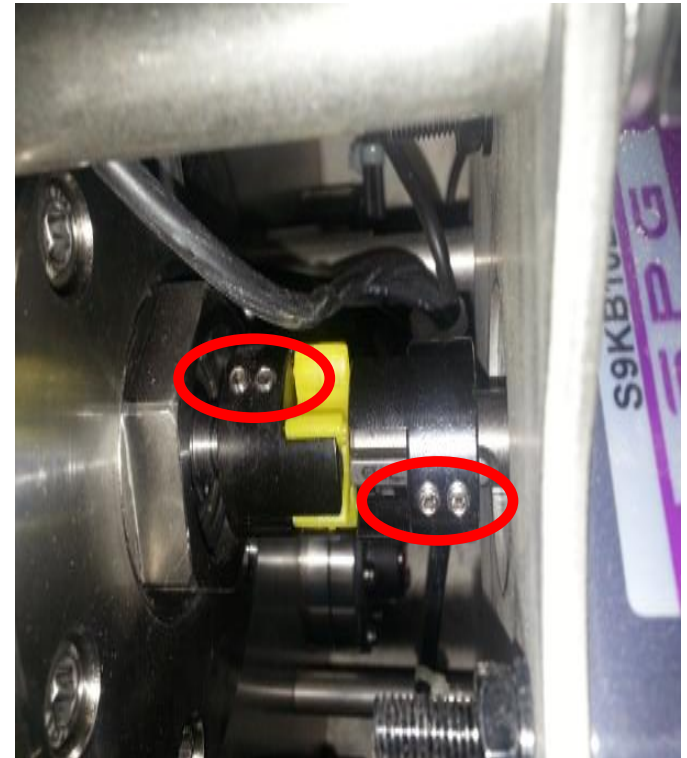
Cause 5 : Mechanical faults

Action 1



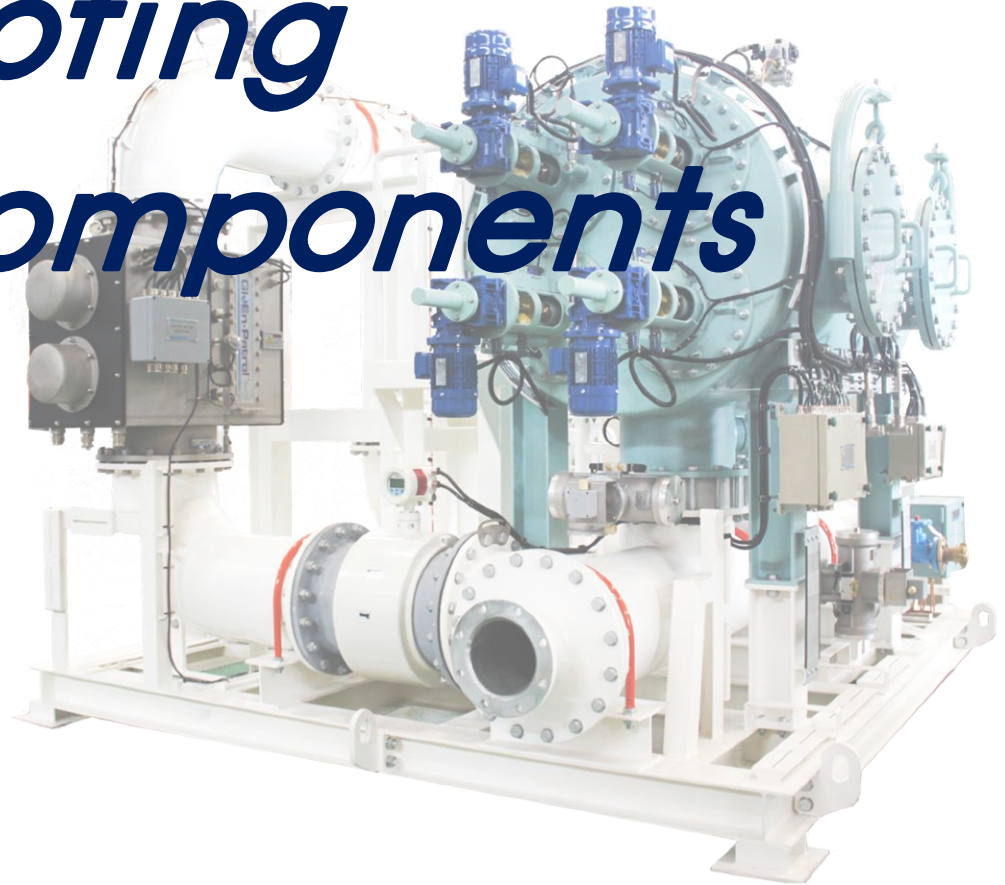
Open UV Side Cover and remove Wiper Motor.

Action 2



Identify and correct the cause of the Coupling and screw jam

Troubleshooting for other components



Chapter / Part / Section

Troubleshooting for other components

Part I . How to reset the alarm

Part II . How to change the setting value

No.	Description	No.	Description	No.	
1	DRAIN START DELAY SET	3	DRAIN VALVE OPEN SET TIME		
2	DRAIN VALVE OPEN RESET TIME	4	OUTLET V/V INITIAL OPEN%		

Part III . Table for alarm/trip conditions

No.	Description	Set Point	Delay Time (in seconds)	Remark	No.	Description	Set Point	Delay Time (in seconds)	Remark
1	VRC communication fail	-	60	Alarm	13	Flow rate vertical low / low low	20~30% of UV capacity	50	Alarm
2	GPS communication fail	-	60	Alarm			10% of UV capacity	50~60	Trip
3	Local/Remote GP response time out	-	30	Alarm		Flow rate Horizontal low / low low	40-50% of UV capacity	50	Alarm
4	PLC response time out	-	30	Trip			20-30% of UV capacity	60	Trip
5	UV lamp Misoperating	-	immediately	Alarm	14	Flow rate high / high high	110% of UV capacity	50	Alarm
6	Bypass opened operating	-	immediately	Alarm			115% of UV capacity	60	Trip
7	Gravity deballast	-	immediately	Alarm	15	EHS valve operating time over	-	immediately	Trip
8	BWMS Misoperating	-	immediately	Trip	16	Pump fail	-	immediately	Trip
9	Eductor misoperating	-	immediately	Trip	17	Power failure	-	60	Trip
10	EHS VCC power fail	-	immediately	Alarm	18	System check	-	immediately	Alarm
11	Flow meter fail	-	2	Alarm	19	Bypass mode switch on	-	immediately	Trip
12	Emergency stop	-	immediately	Trip					

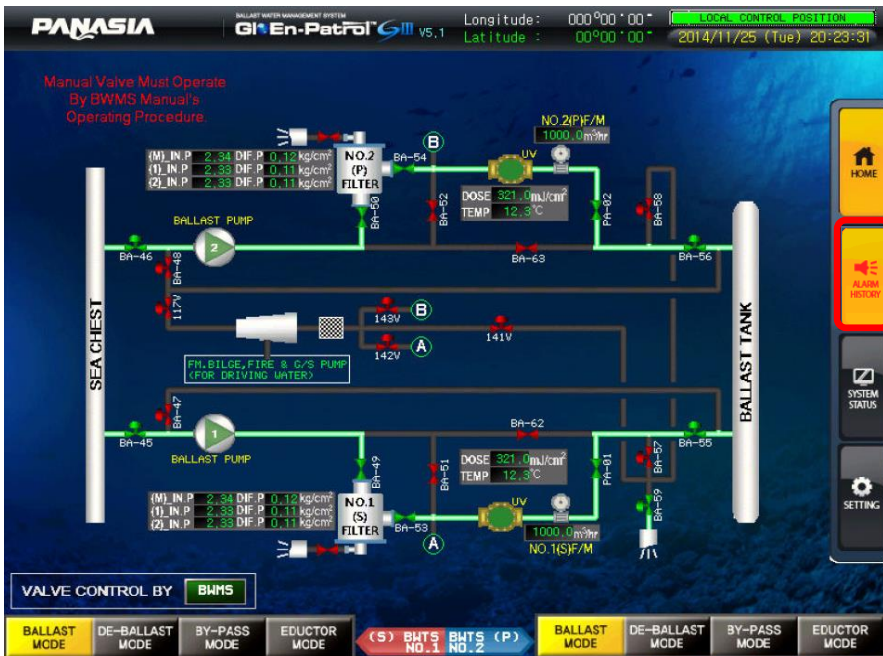
Chapter / Part / Section
Part IV. Cause and action for each alarm/trip relating to software and operating procedure
Section a. VRC Communication Fail
Section b. GPS Communication Fail
Section c. Local/Remote GP Response time out
Section d. PLC Response time out
Section e. UV Lamp mis-operating
Section f. Bypass opened operating
Section g. Gravity Deballast
Section h. BWMS mis-operating
Section i. Eductor mis-operating

Chapter / Part / Section
Part V . Cause and action for each alarm/trip relating to valve, flow meter, etc.
Section a. EHS VCC Power fail
Section b. EHS Valve operating time over
Section c. Flow rate low / low-low
Section d. Flow rate high / high-high
Section e. Flow meter fail
Section f. Emergency stop
Section g. Pump fail
Section h. Power Failure
Section i. System Check
Section j. Bypass mode switch on

Troubleshooting for other components

| How to reset the alarm

a. Touch the [ALARM HISTORY] and [BUZZER STOP] button



① Touch the [ALARM HISTORY] button



② Touch the [BUZZER STOP] button

Troubleshooting for other components

| How to reset the alarm

b. Touch the [ALARM ACK] and [ALARM RESET] button



③ Touch the [ALARM ACK] button



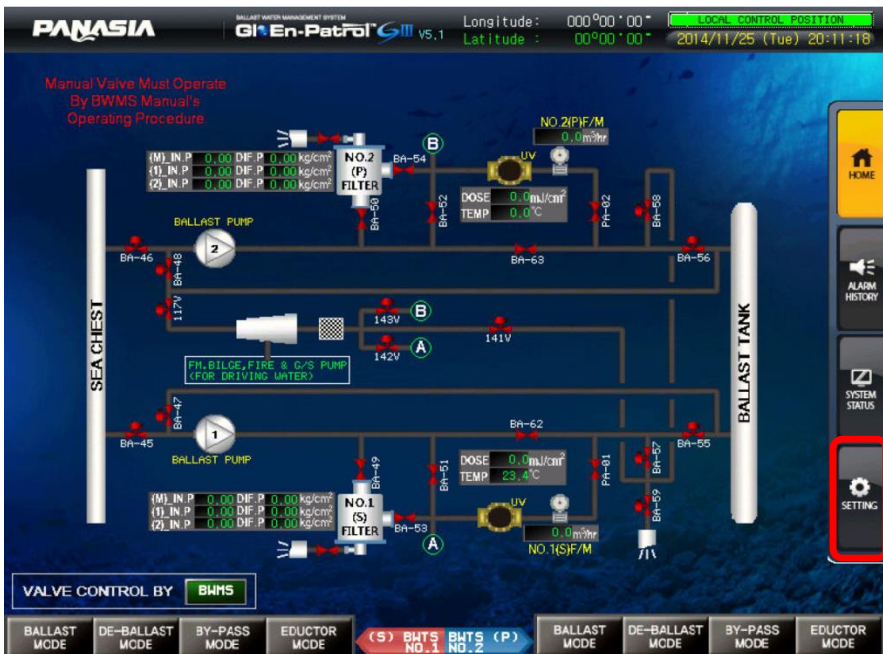
④ Touch the [ALARM RESET] button

Troubleshooting for other components

|| How to change the setting value

a. Touch the [SETTING] button

b. Enter the password (1111111)



① Touch the [SETTING] button



② Input the password (1111111)

Troubleshooting for other components

|| How to change the setting value

c. Touch the setting value



③ [SETTING] page is showing



④ Touch the setting value

Troubleshooting for other components

|| How to change the setting value

d. Confirm the changed value



⑤ Change the setting value



⑥ Confirm the setting value

Troubleshooting for other components

III Table for alarm/trip conditions

No.	Description	Set Point	Delay Time (in seconds)	Remark	No.	Description	Set Point	Delay Time (in seconds)	Remark
1	VRC communication fail	-	60	Alarm	13	Flow rate vertical low / low low	20~30% of UV capacity	50	Alarm
2	GPS communication fail	-	60	Alarm			10% of UV capacity	50~60	Trip
3	Local/Remote GP response time out	-	30	Alarm		Flow rate Horizontal low / low low	40-50% of UV capacity	50	Alarm
4	PLC response time out	-	30	Trip			20-30% of UV capacity	60	Trip
5	UV lamp Misoperating	-	immediately	Alarm	14	Flow rate high / high high	110% of UV capacity	50	Alarm
6	Bypass opened operating	0.45 kg/cm ²	immediately	Alarm			115% of UV capacity	60	Trip
7	Gravity deballast	-	immediately	Alarm	15	EHS valve operating time over	-	immediately	Trip
8	BWMS Misoperating	-	immediately	Trip	16	Pump fail	-	immediately	Trip
9	Eductor misoperating	-	immediately	Trip	17	Power failure	-	60	Trip
10	EHS VCC power fail	-	immediately	Alarm	18	System check	-	immediately	Alarm
11	Flow meter fail	-	2	Alarm	19	Bypass mode switch on	-	immediately	Trip
12	Emergency stop	-	immediately	Trip					

Troubleshooting for other components

IV Cause and Action for alarm/trip relating to Software & operating procedure

Alarm and Trip list

No.	Description	Set Point	Delay Time (in seconds)	Remark
1	VRC communication fail	-	60	Alarm
2	GPS communication fail	-	60	Alarm
3	Local/Remote GP response time out	-	30	Alarm
4	PLC response time out	-	30	Trip
5	UV lamp Misoperating	-	immediately	Alarm
6	Bypass opened operating	-	immediately	Alarm
7	Gravity de-ballast	-	immediately	Alarm
8	BWMS Misoperating	-	immediately	Trip
9	Eductor misoperating	-	immediately	Trip

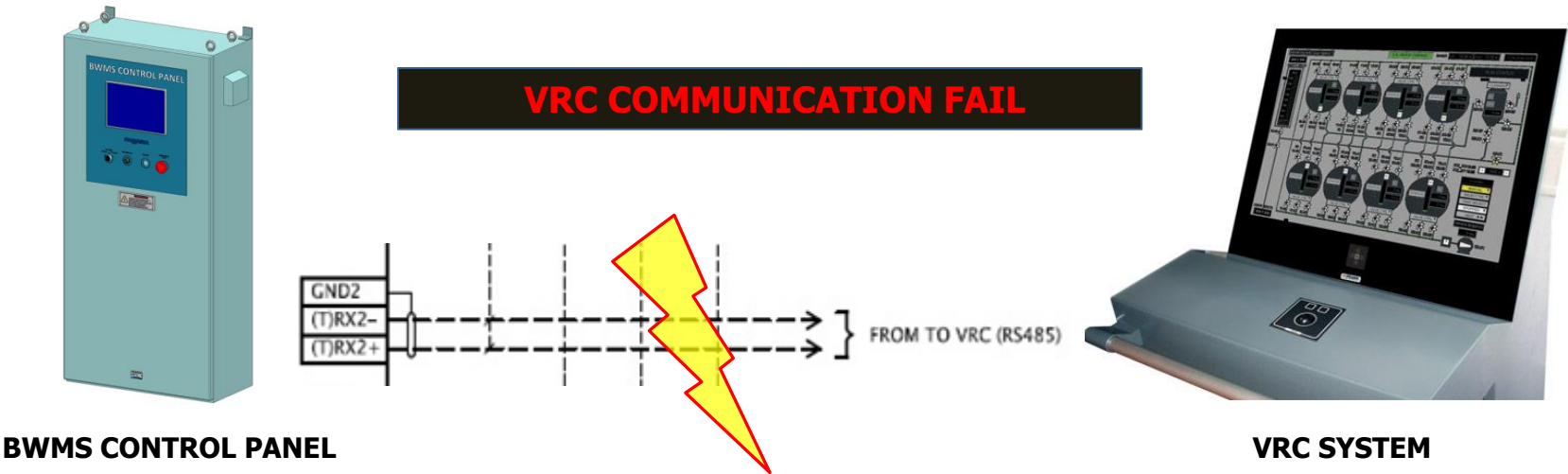
Troubleshooting for other components

IV Cause and Action for alarm/trip relating to Software & operating procedure

a. VRC COMMUNICATION FAIL

Alarm indicates that BWMS(Ballast Water Management System) would not be linked with VRC (Valve Remote Control system)

Cause	Description	Action	Cause	Description	Action
1	Loss of signal	2	2	Failure of the communication module	1



Troubleshooting for other components

IV Cause and Action for alarm/trip relating to Software & operating procedure

a. VRC COMMUNICATION FAIL

Cause ① : Loss of signal

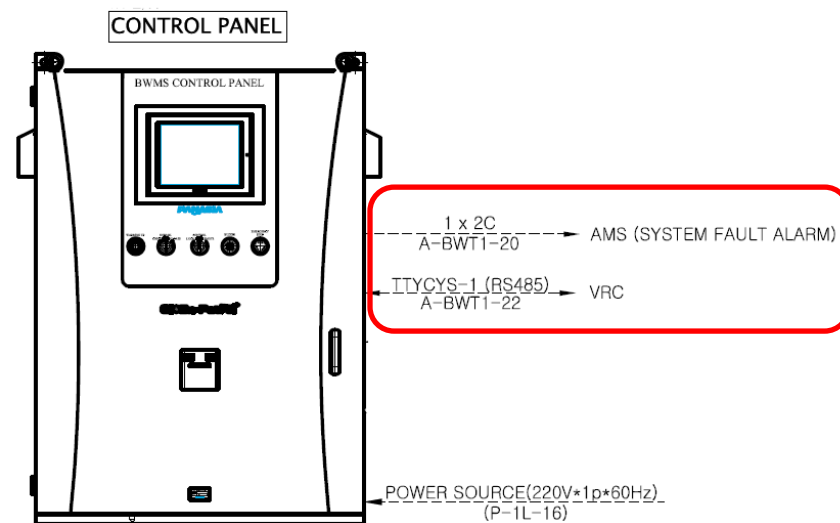
Action 1

VRC SYSTEM



Check VRC or/and AMS turned on

Action 2



Check the all cables securely connected

Troubleshooting for other components

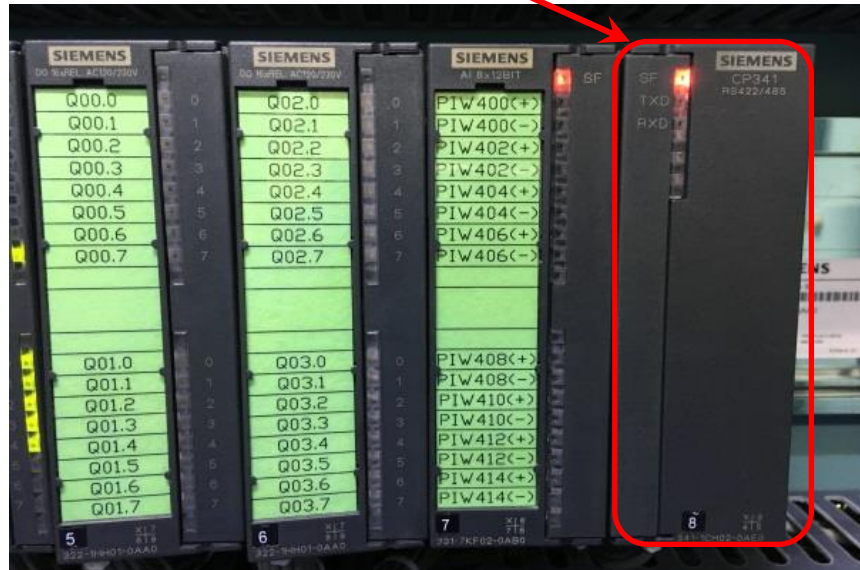
IV Cause and Action for alarm/trip relating to Software & operating procedure

a. VRC COMMUNICATION FAIL

Cause ② : Failure of the communication module



BWMS CONTROL PANEL



VRC communication module (RS422/485)

Action 1

Verify that the working condition of communication module in the BWMS control panel.
If necessary, replace it with new one.

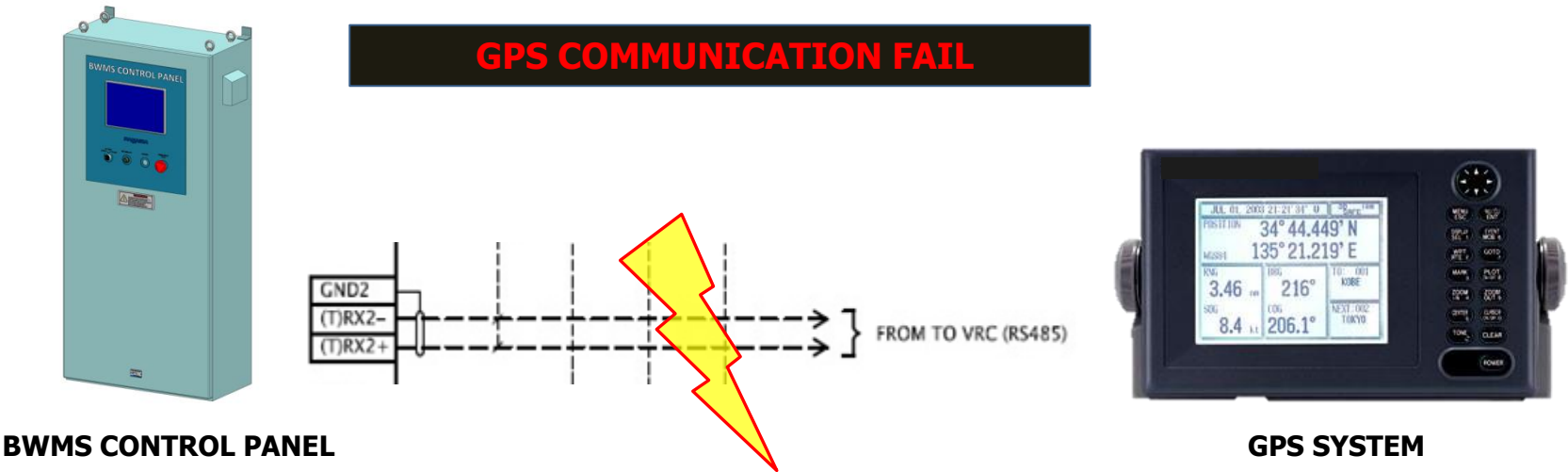
Troubleshooting for other components

IV Cause and Action for alarm/trip relating to Software & operating procedure

b. GPS COMMUNICATION FAIL

Alarm indicates that there is a loss of communication between PLC and GPS module.

Cause	Description	Action	Cause	Description	Action
1	Wrong GPS output signal	2	2	PLC module failure	1



Troubleshooting for other components

IV Cause and Action for alarm/trip relating to Software & operating procedure

b. GPS COMMUNICATION FAIL

Cause ① : Wrong GPS output signal

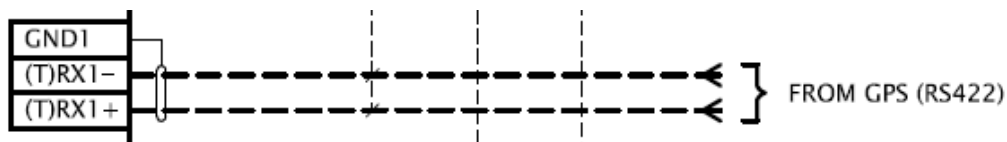
Action 1



GPS SYSTEM

Check ship's GPS is working correctly

Action 2



BWMS control panel <--> GPS system

Check cable connection of the RX+ / RX-

Troubleshooting for other components

IV Cause and Action for alarm/trip relating to Software & operating procedure

b. GPS COMMUNICATION FAIL

Cause ② : PLC module failure

Action 1



Check the color of the green LED lamp of the PLC card

- Green LED Lamp flickering : Normal condition
- Green LED Lamp Off : Cable connection to be checked
- Red LED Lamp On : PLC card problem

Troubleshooting for other components

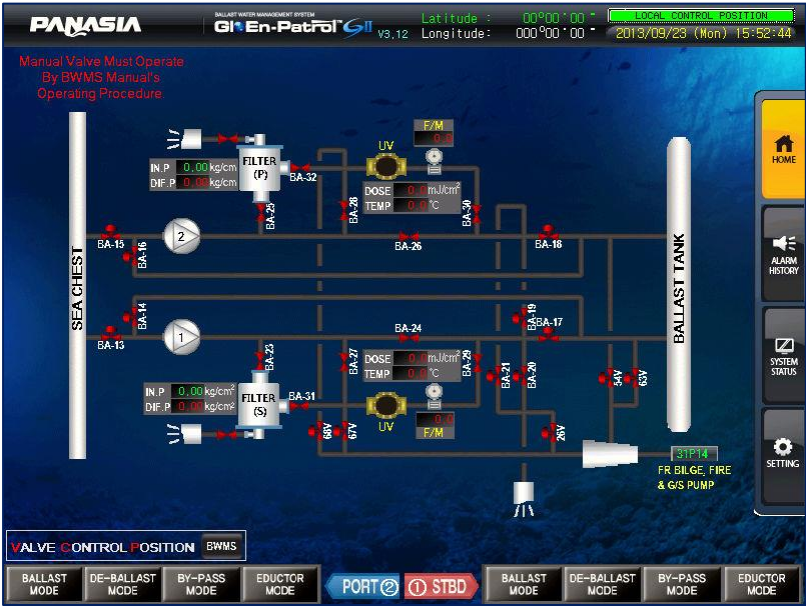
IV Cause and Action for alarm/trip relating to Software & operating procedure

c. LOCAL / REMOTE GP RESPONSE TIME OUT

Alarm indicates that the GP(Graphic Panel) does not work.

Cause	Description	Action	Cause	Description	Action
1	Power Failure	1	2	HUB Port Failure	1

Action 1



Verify the GP monitor (Local & Remote) are turned on

Action 2



Check the connection status of the HUB Port and LAN cables

Troubleshooting for other components

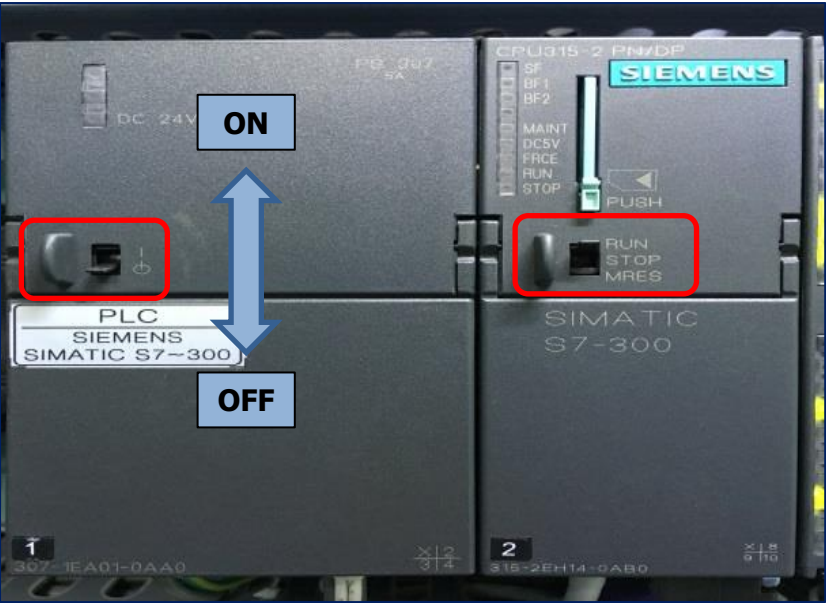
IV Cause and Action for alarm/trip relating to Software & operating procedure

d. PLC RESPONSE TIME OUT

Trip indicates that the PLC does not communicate with GP(Graphic Panel)

Cause	Description	Action	Cause	Description	Action
1	Power failure	1	2	PLC module failure	1

Action 1



Verify the PLC is turned on

Action 2



Check the cable connection of the HUB port.
And replace PLC module if needed.

Troubleshooting for other components

IV Cause and Action for alarm/trip relating to Software & operating procedure

e. UV LAMP MISOPERATING

Alarm indicates that operator intended to turn UV lamp on during unavailable stage.

Cause	Description	Action	Cause	Description	Action
1	Misoperating UV lamps	4	-	-	-

1. UV Lamp start in Ballast/Deballast mode state
without Ballast pump running

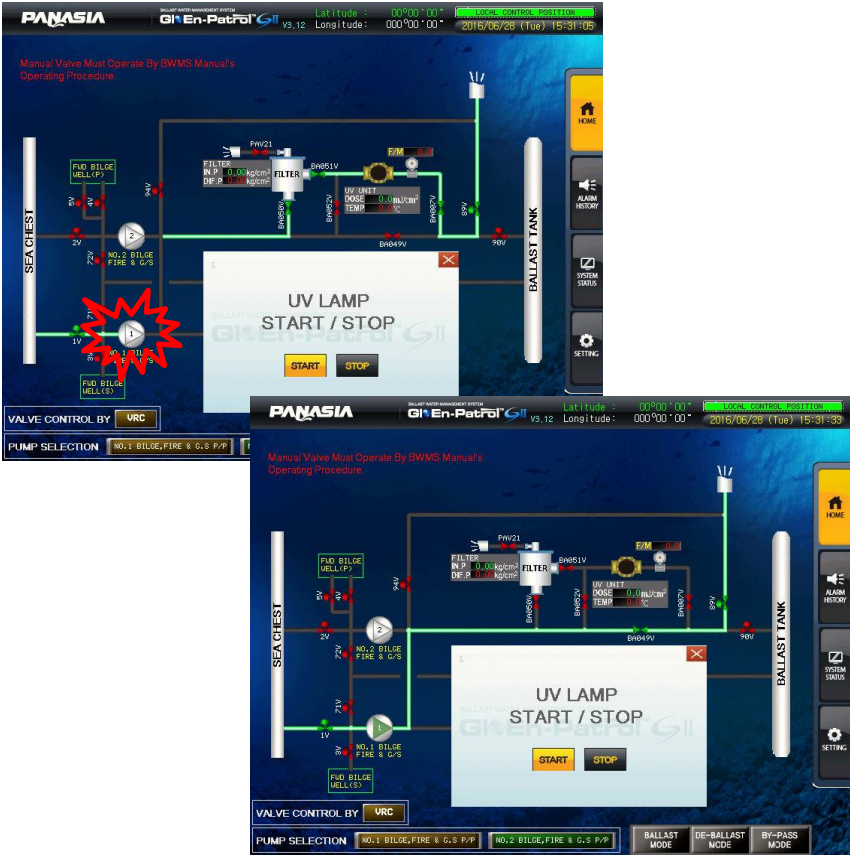
2. Lamp start in By-pass mode state

3. If the REQUEST/AVAILABLE function is existed, UV lamp should be started after checked the turn on the light by pushing the REQUEST/AVAILABLE button.

If not, occurred the "UV LAMP MISOPERATING"



UV LAMP MISOPERATING



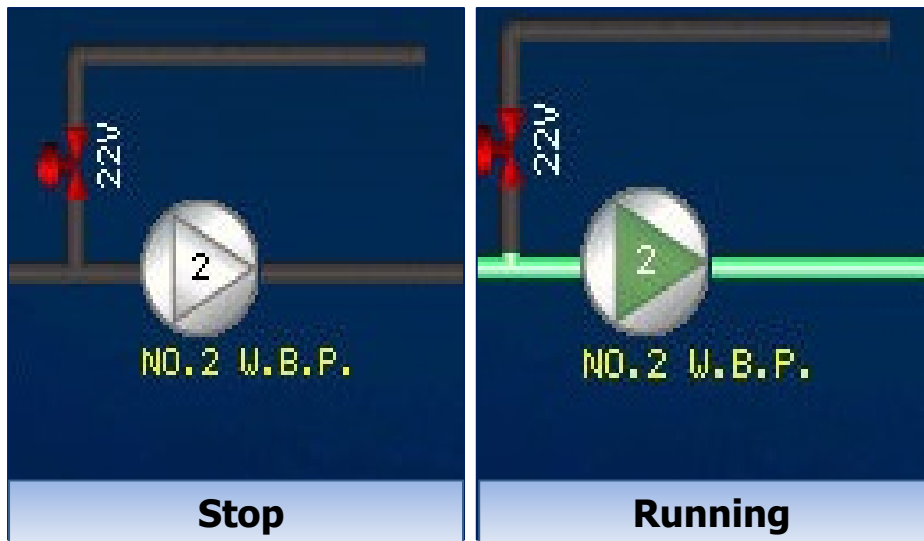
Troubleshooting for other components

IV Cause and Action for alarm/trip relating to Software & operating procedure

e. UV LAMP MISOPERATING

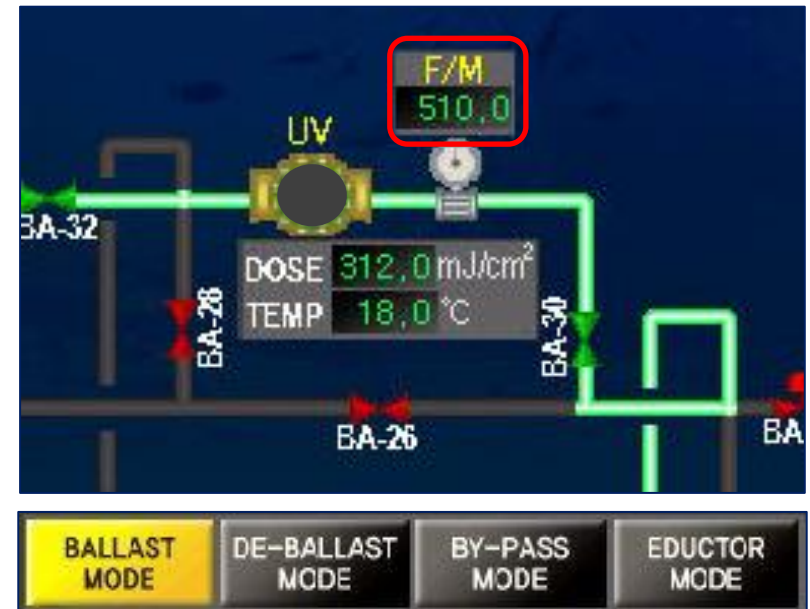
Cause ① : Misoperating UV lamps

Action 1



Check if Ballast pump is running

Action 2



Verify flickering yellow colored each mode button
And rated flow on the BWMS monitor

Troubleshooting for other components

IV Cause and Action for alarm/trip relating to Software & operating procedure

e. UV LAMP MISOPERATING

Cause ① : Misoperating UV lamps

Action 3

ALARM HISTORY

DATE	TIME	DESCRIPTION	ACK	RECOV.
16/07/05	15:20:33	VRC COMMUNICATION WRONG	15:21:57	15:22:47
16/07/05	15:20:19	(P) VALVE MIS-OPERATING	15:20:43	15:20:14
16/07/05	15:19:24	NO.1(S) UV LAMP MIS-OPERATING	15:19:30	15:19:26
16/07/05	15:18:39	NO.1(S) FLOW METER FAIL	15:18:49	15:18:51

ALARM RESET

Verify that all alarms are recovered

Action 4

POWER REQUEST TO PMS BEFORE UV LAMP ON

POWER REQUEST

POWER AVAILABLE

Verify the Power available lamp is turned on

Troubleshooting for other components

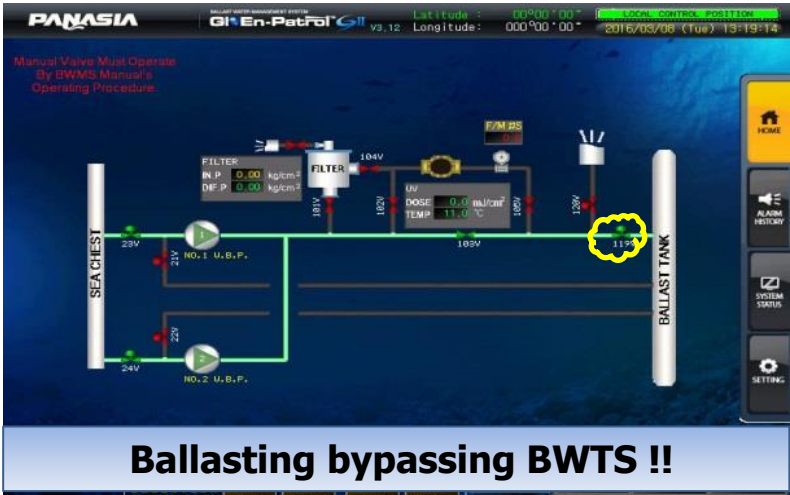
IV Cause and Action for alarm/trip relating to Software & operating procedure

f. BYPASS OPENED OPERATING

Alarm indicates when ballasting or de-ballasting is starting in the Bypass mode without active BWMS(Ballast Water Management System) and either ballast or suction valve(s) are opened during By-Pass operation.

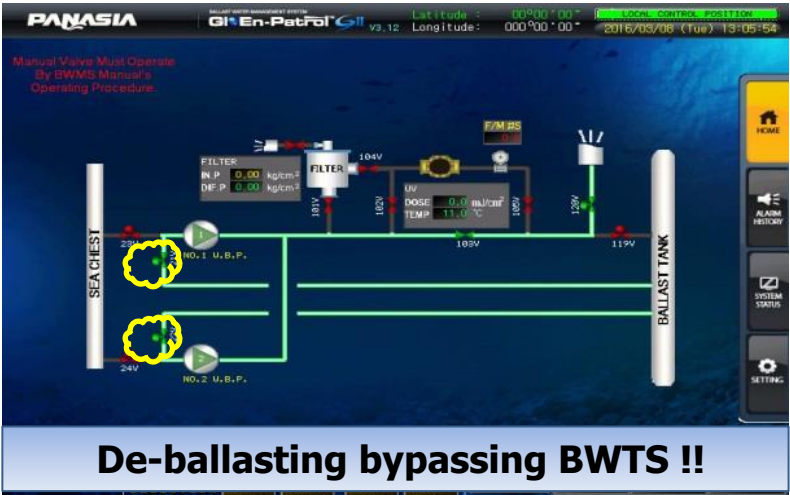
Cause	Description	Action	Cause	Description	Action
1	Ballast valve is opened	1	2	Suction valve is opened	1

Action 1



Verify that the ballast valve is closed
(Check the valve failed to open/close in order)

Action 2



Verify that the ballast suction valve is closed
(Check the valve failed to open/close in order)

BYPASS OPENED OPERATING

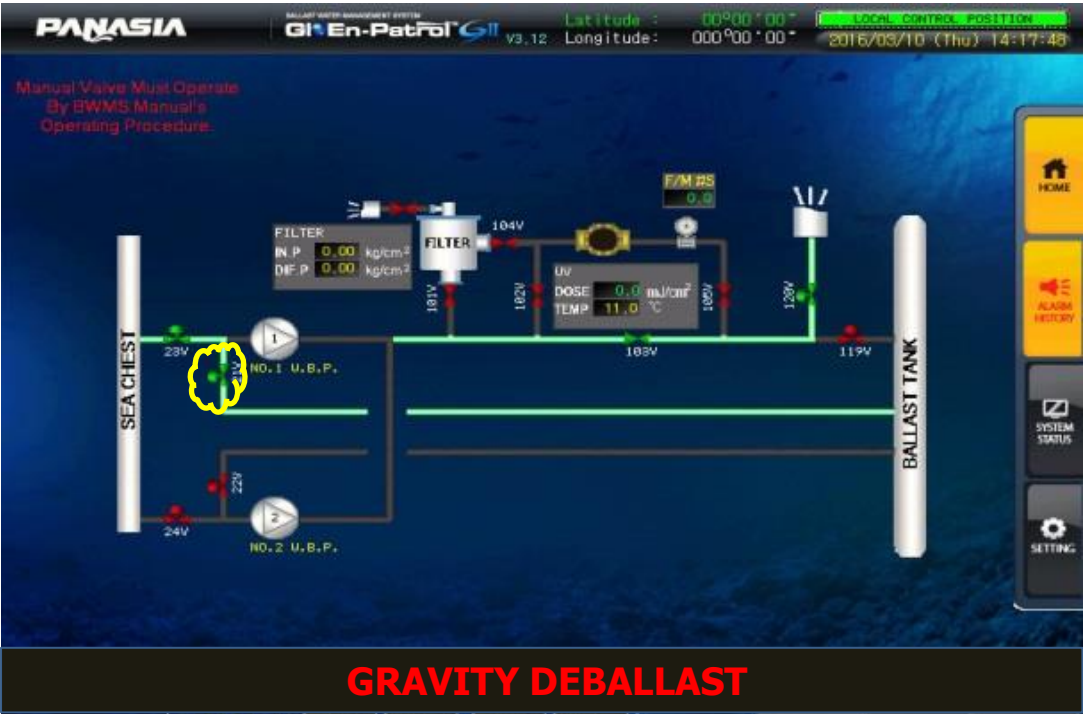
Troubleshooting for other components

IV Cause and Action for alarm/trip relating to Software & operating procedure

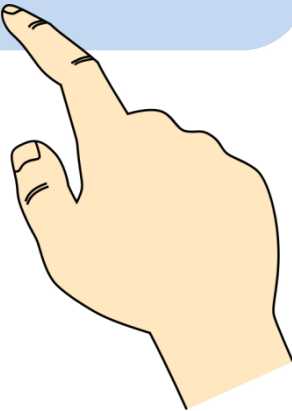
g. GRAVITY DEBALLAST

Alarm indicates that both sea chest and suction valves are opened at the same time if the Ballast pump does not work.

Cause	Description	Action	Cause	Description	Action
1	Misoperation	1	2	Malfunctioning Sea chest valve	2



Ballast water should not be transferred without using BWMS except for the emergency situation stated in the IMO rule.



Troubleshooting for other components

IV Cause and Action for alarm/trip relating to Software & operating procedure

g. GRAVITY DEBALLAST

Cause ① : Misoperation

Action 1

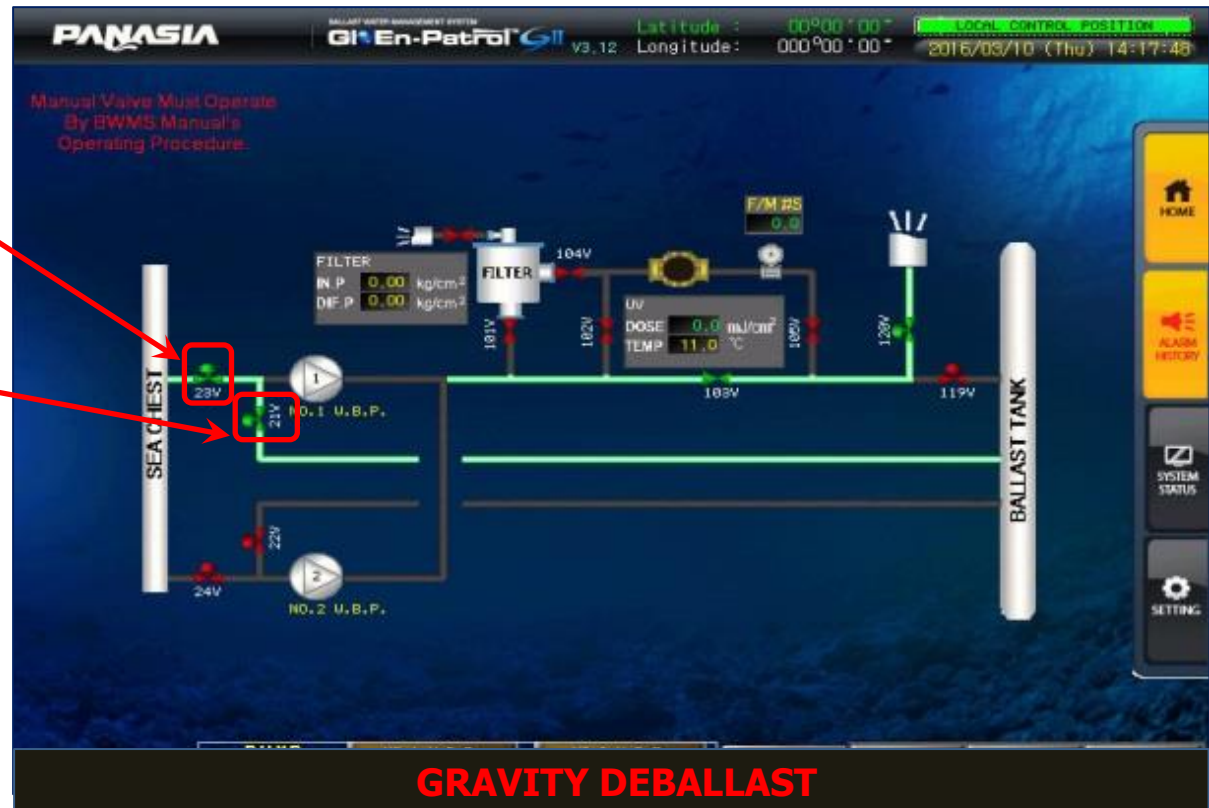
Sea chest valve

Ballast Suction valve

When Ballast pump stopped,

both Sea-chest valve and Ballast suction valve

ballast tank should not be opened at the same time.



Troubleshooting for other components

IV Cause and Action for alarm/trip relating to Software & operating procedure

g. GRAVITY DEBALLAST

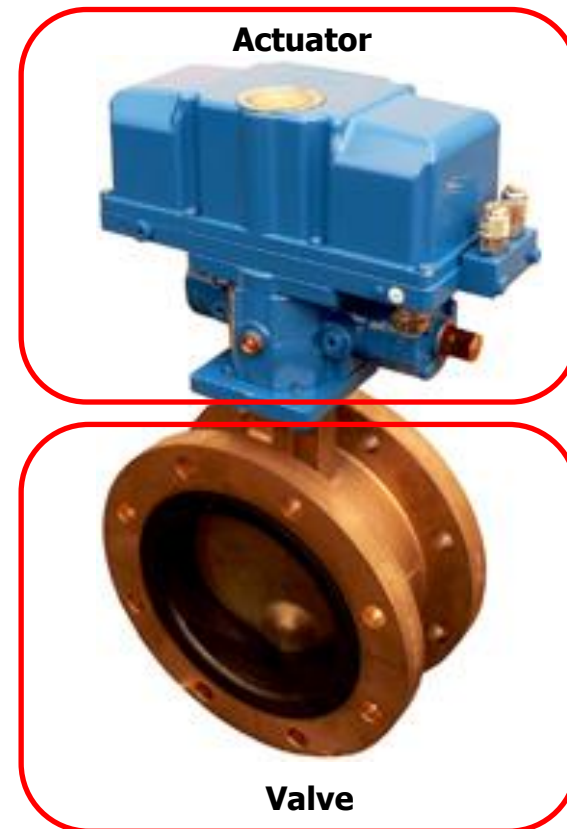
Cause ② : Malfunctioning Sea chest valve or Ballast Suction valve

Action 1



Check each valve status and output signal of the VRC system.

Action 2



Check the condition of actuator and valve

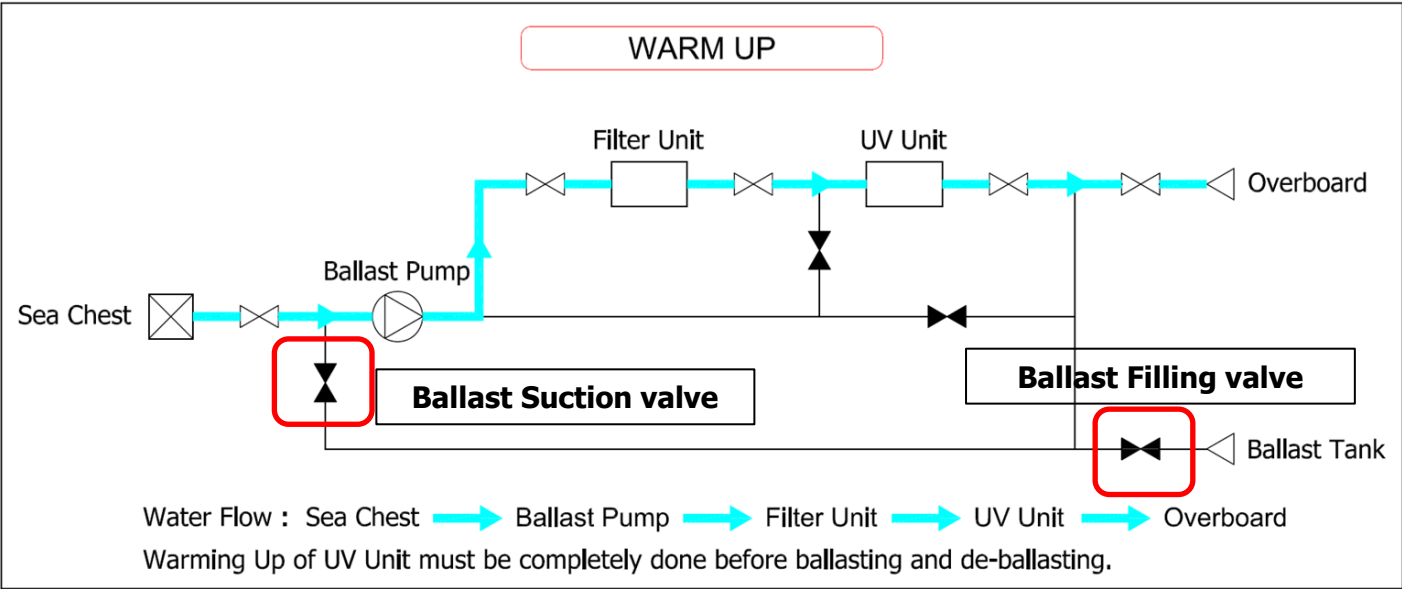
Troubleshooting for other components

IV Cause and Action for alarm/trip relating to Software & operating procedure

h. BWMS MISOPERATING

Trip indicates that Ballast filling valve or suction valve are opened before completion of Warming up process

Cause	Description	Action	Cause	Description	Action
1	Malfunction Valve	1	2	Misoperation	1



**Verify that the Ballast & Suction valves are closed
(Check the valve failed to open/close in order)**

Troubleshooting for other components

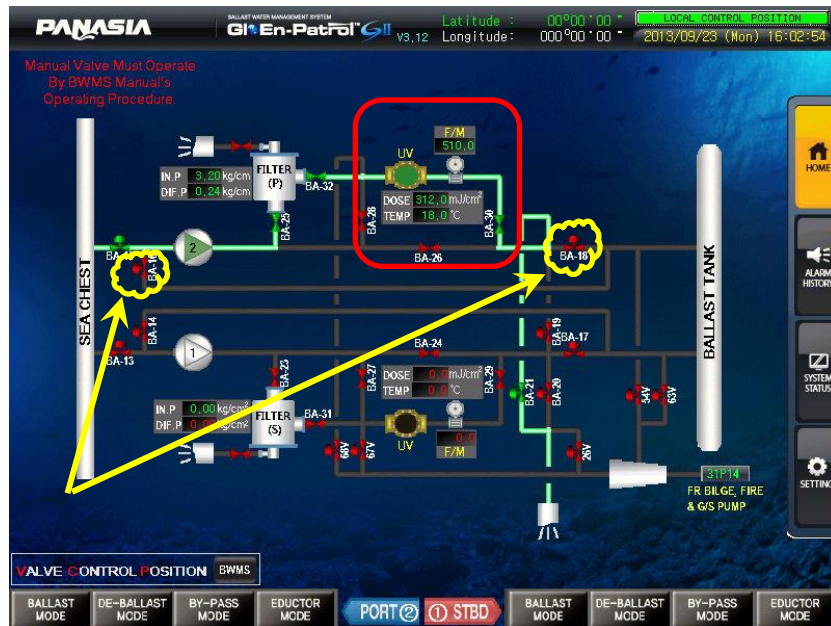
IV Cause and Action for alarm/trip relating to Software & operating procedure

h. BWMS MISOPERATING

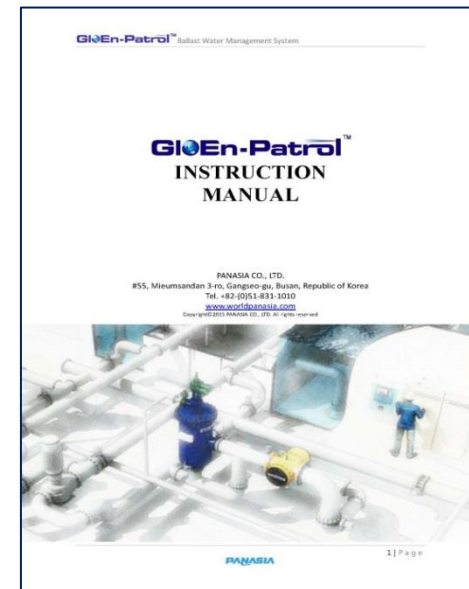
Cause ① : Malfunction Valve

Cause ② : Misoperation

Action 1



Action 2



Check valve condition for Ballast filling valve or ballast Suction valve during Ballast, De-ballast mode

Operate BWMS according to instruction manual

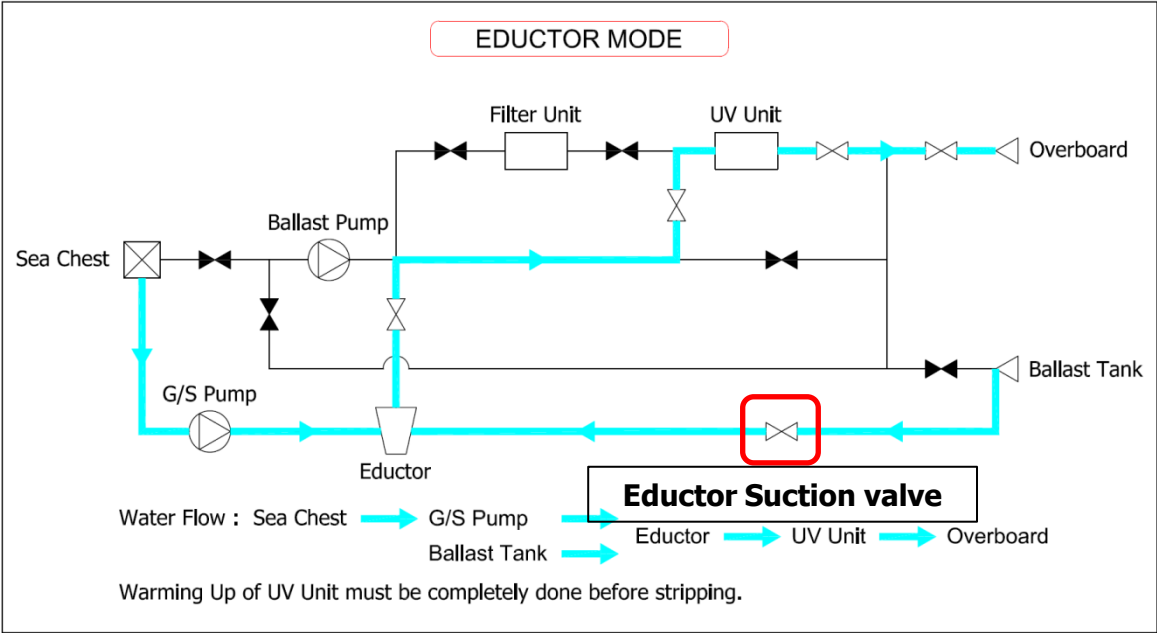
Troubleshooting for other components

IV Cause and Action for alarm/trip relating to Software & operating procedure

i. EDUCTOR MISOPERATING

Trip indicates that Eductor suction valve is opened before completion of Warming up process during Eductor mode operation.

Cause	Description	Step	Cause	Description	Step
1	Eductor Suction Valve is opened	1	2	Misoperation	1



Action 1

Check valve condition of Eductor suction valve

Action 2

Operate Eductor(Stripping) mode in accordance with instruction manual

Troubleshooting for other components

▼ Cause and Action for alarm/trip relating to Valve, Flow meter, etc.

Alarm and Trip list

No.	Description	Set Point	Delay Time (in seconds)	Remark
1	EHS VCC power fail	-	immediately	Alarm
2	EHS valve operating time over	-	immediately	Trip
3	Flowrate vertical low / low low	20~30% of UV capacity	50	Alarm
		10% of UV capacity	50~60	Trip
	Flowrate Horizontal low / low low	40-50% of UV capacity	50	Alarm
		20-30% of UV capacity	60	Trip
4	Flowrate high / high high	110% of UV capacity	50	Alarm
		115% of UV capacity	60	Trip
5	Flow meter fail	-	2	Alarm
6	Emergency stop	-	immediately	Trip
7	Pump fail	-	immediately	Trip
8	Power failure	-	60	Trip
9	System check	-	immediately	Alarm
10	Bypass mode switch on	-	immediately	Trip

Troubleshooting for other components

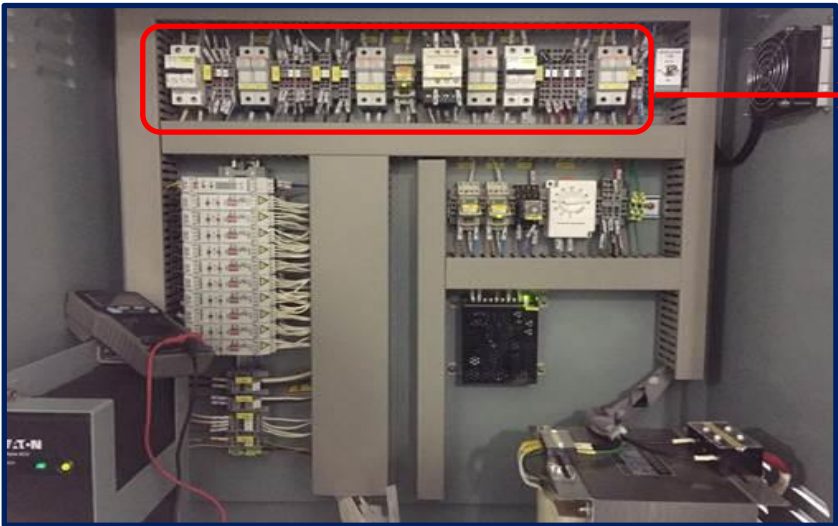
▼ Cause and Action for alarm/trip relating to Valve, Flow meter, etc.

a. EHS VCC POWER FAIL

Alarm indicates that BWMS is not linked with the EHS(Electro-Hydraulic System)

Cause	Description	Action	Cause	Description	Action
1	Disconnection of the power cable	1	2	Circuit Breaker off or Fuse off	1

Action 1



Action 2

MOLDED CIRCUIT BREAKER C60N (24339)	2P 25A	
FUSE WITH BASE (10X38) MSC.10	10A	
FUSE WITH BASE (10X38) MSC.10	2A	

Check the cable connection inside Valve control cabinet.

Check the condition of MCB and Fuse.
And (If, needed) replace the fuse with new one.

Troubleshooting for other components

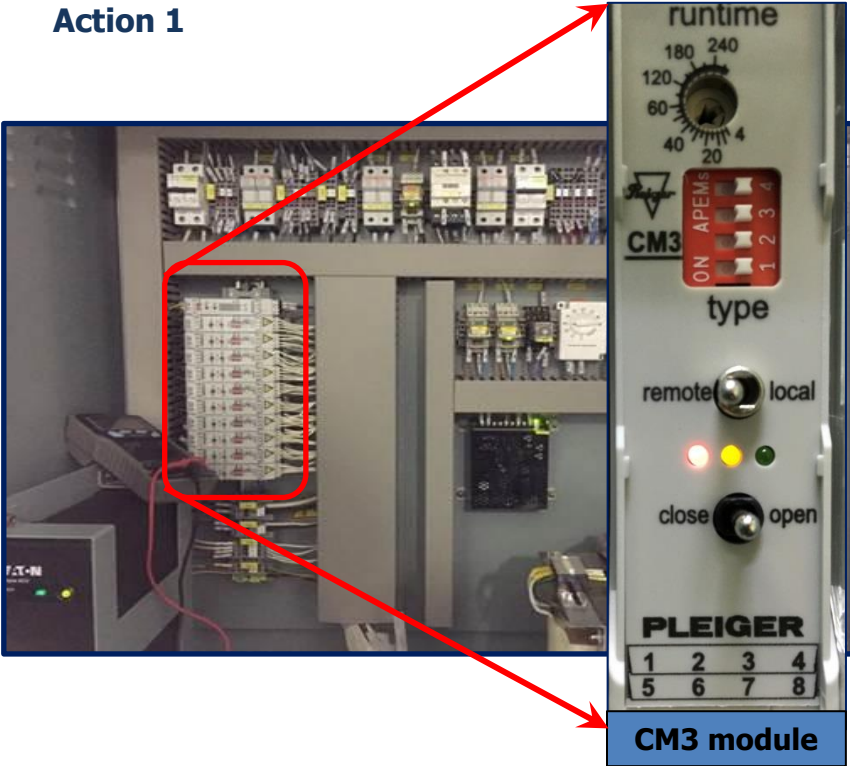
V. Cause and Action for alarm/trip relating to Valve, Flowmeter, etc.

b. EHS VALVE OPERATING TIME OUT (In case EHS valve applied to BWTS only)

Trip indicates that operating time over of EHS (Electro-Hydraulic System) valve occurs or Communication cable has a problem.

Cause	Description	Action	Cause	Description	Action
1	EHS valve operating Time out	1	-	-	-

Action 1



CM3 Module Switch has two functions that you can select to 'Remote' or 'Local' position.

- 1) Remote
 - EHS valve is controlled by the BWMS Control Panel
- 2) Local
 - EHS valve is controlled manually by CM3 Module

Switch CM3 in Local position and operate valve from CM3.
And then, check the voltage(230V) between CM3 Module and controlled valve.
If 230V is detected, CM3 Module is good. If not, check the CM3 module in question and replace it.

Troubleshooting for other components

V. Cause and Action for alarm/trip relating to Valve, Flowmeter, etc.

c. FLOW RATE LOW / LOW-LOW

FOR VERTICAL INSTALLATION :

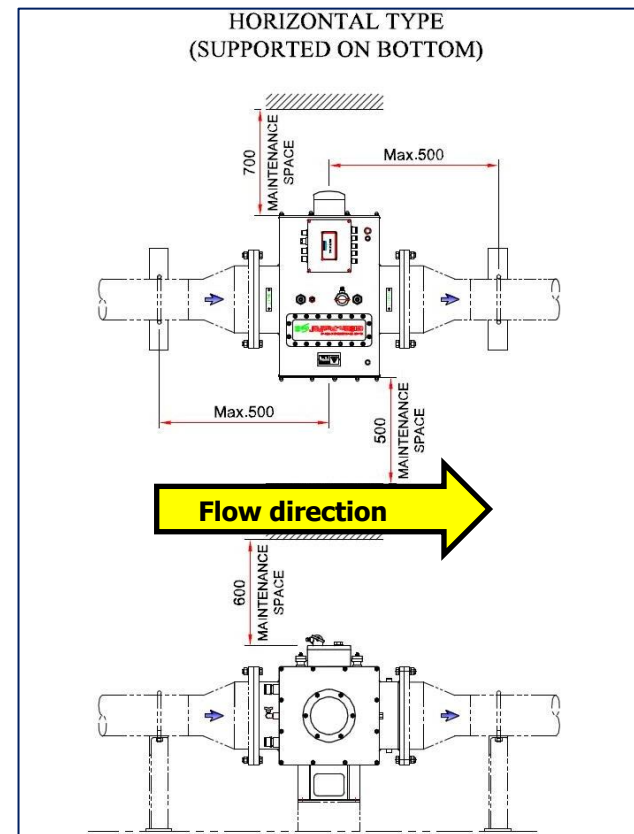
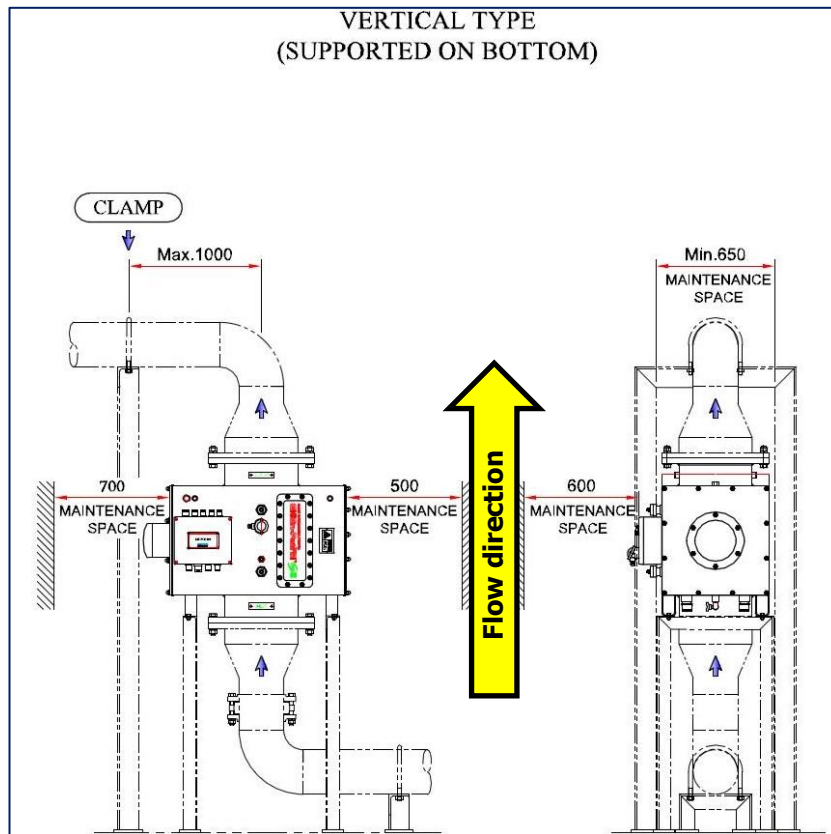
Alarm indicates that flow is below 20~30% of UV unit capacity for longer than 50 seconds.

Trip indicates that flow is below 10% of pump UV unit for longer than 50~60 seconds.

FOR HORIZONTAL INSTALLATION :

Alarm indicates that flow is below 40~50% of UV unit capacity for longer than 50 seconds.

Trip indicates that flow is below 20~30% of UV unit capacity for longer than 60 seconds.



Troubleshooting for other components

V. Cause and Action for alarm/trip relating to Valve, Flowmeter, etc.

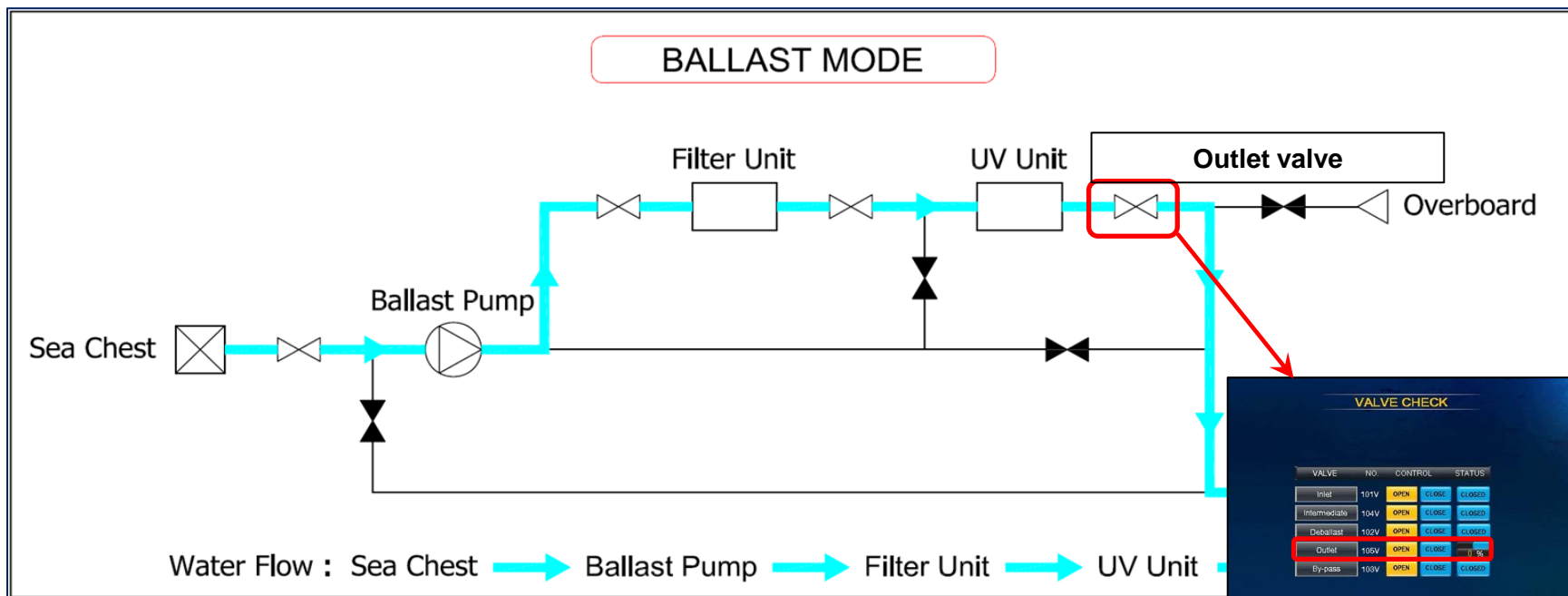
c. FLOW RATE LOW / LOW-LOW

Cause ① : Wrong position of Outlet valve

/ Cause ② : Malfunctioning Outlet valve

Action 1

Action 2



Check the position of Outlet valve

Check the function of the outlet valve manually in the 'Check Mode' by changing the Select Switch from 'Normal' to 'Check' on the BWMS control panel.

Troubleshooting for other components

V. Cause and Action for alarm/trip relating to Valve, Flowmeter, etc.

c. FLOW RATE LOW / LOW-LOW

Cause ① : Wrong position of Outlet valve

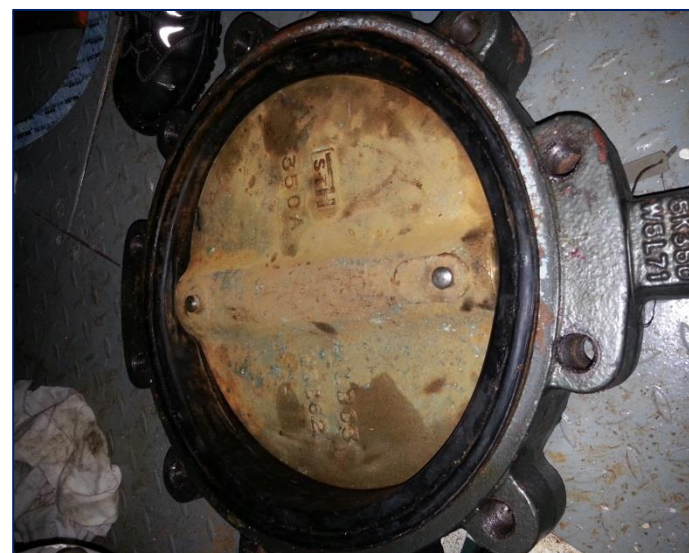
/ Cause ② : Malfunctioning Outlet valve

Action 3

Actuator



Valve



Check the condition of Actuator and Valve

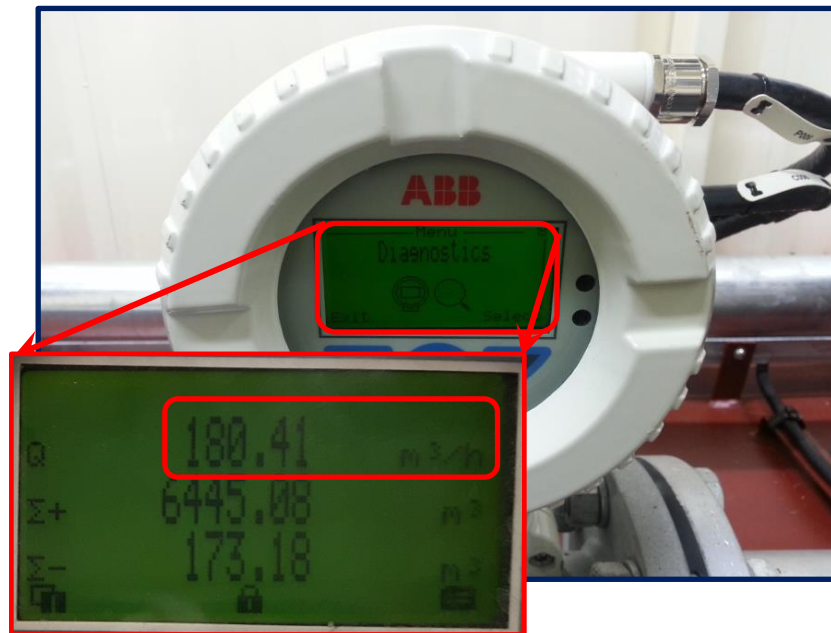
Troubleshooting for other components

V. Cause and Action for alarm/trip relating to Valve, Flowmeter, etc.

c. FLOW RATE LOW / LOW-LOW

Cause ③ : Malfunctioning of the Flowmeter

Action 1



Check if the Flowrate are the same between Flowmeter display and the BWMS Monitor.

Action 2



Check the electric current in the stopped state using Multi-meter.

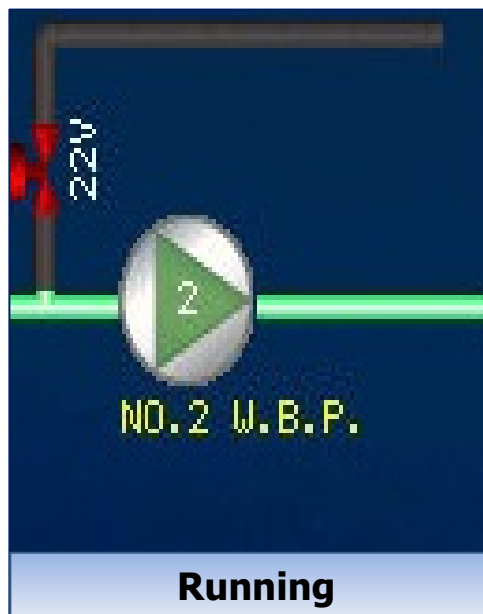
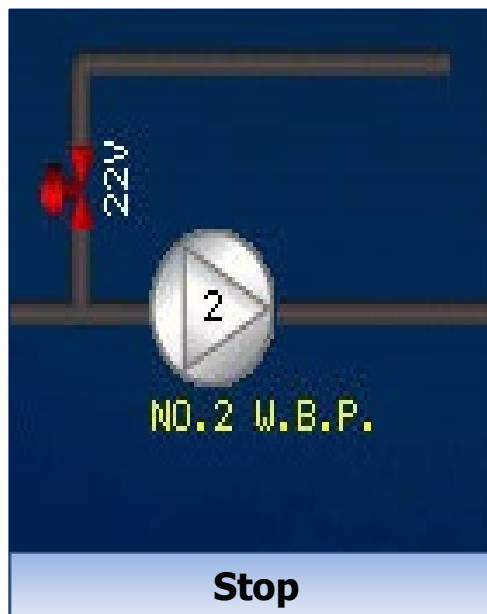
Troubleshooting for other components

V. Cause and Action for alarm/trip relating to Valve, Flowmeter, etc.

c. FLOW RATE LOW / LOW-LOW

Cause ④ : Ballast pump failure

Action 1



Verify the Pump is working properly and check the flow rate

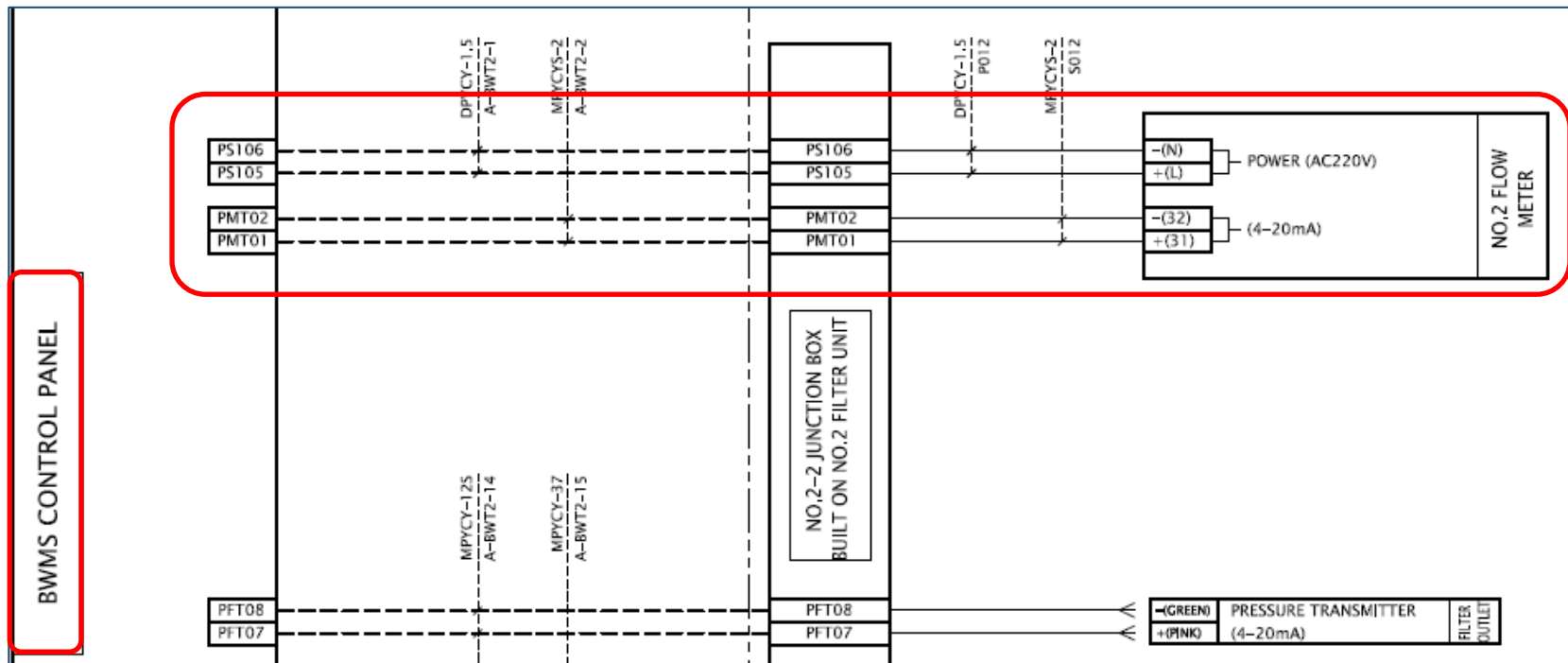
Troubleshooting for other components

V. Cause and Action for alarm/trip relating to Valve, Flowmeter, etc.

c. FLOW RATE LOW / LOW-LOW

Cause ⑤ : Poor or no wire connection

Action 1



Check if all the electric wires are connected and tightened properly according to the electric drawings.

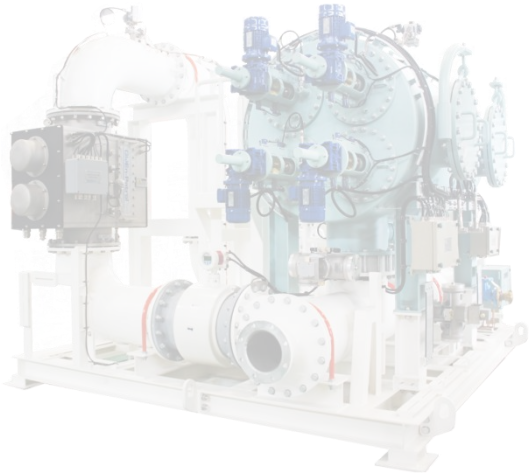
Troubleshooting for other components

V. Cause and Action for alarm/trip relating to Valve, Flowmeter, etc.

d. FLOW RATE HIGH / HIGH-HIGH

Alarm indicates that flow has exceeded 110% of UV unit capacity for longer than 50 seconds.
Trip indicates that flow has exceeded 115% of UV unit capacity for longer than 60 seconds.

Cause	Description	Action	Cause	Description	Action
1	Malfunctioning Outlet valve	3	3	Poor or no wire connection	1
2	Malfunctioning of the flowmeter	2	-	-	-



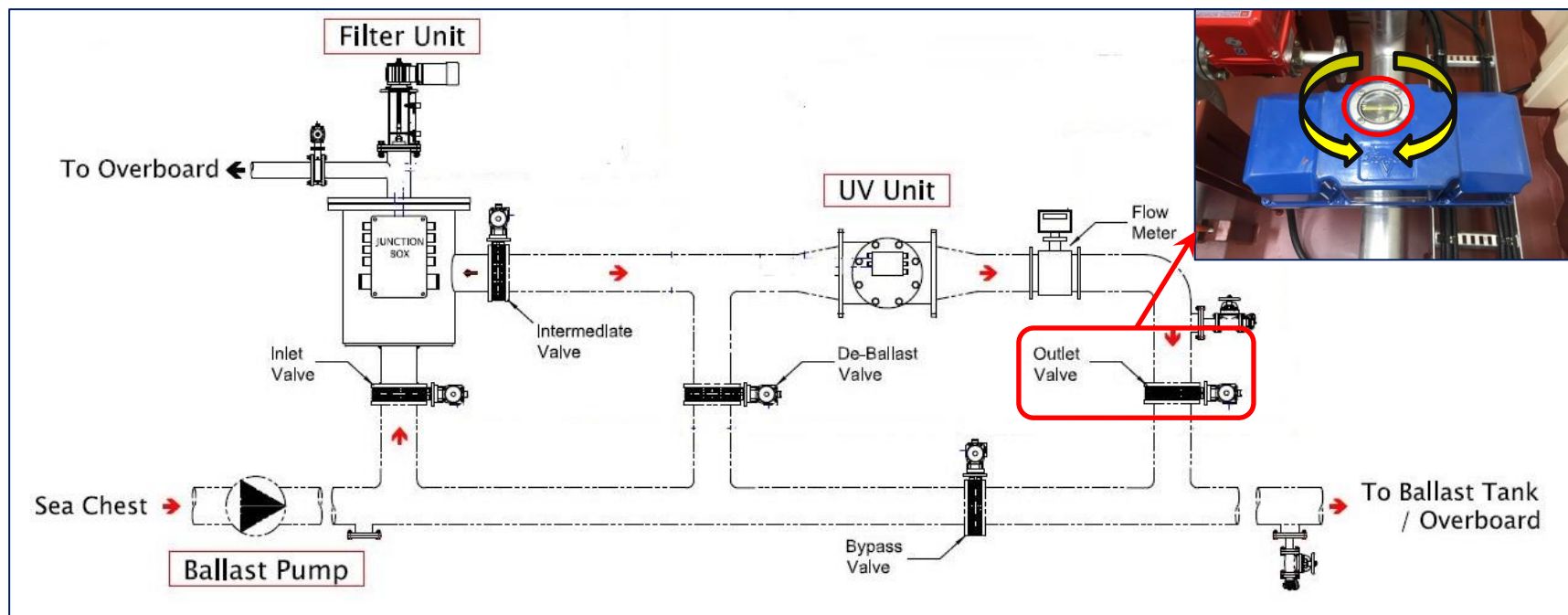
Troubleshooting for other components

V. Cause and Action for alarm/trip relating to Valve, Flowmeter, etc.

d. FLOW RATE HIGH / HIGH HIGH

Cause ① : Malfunctioning Outlet valve

Action 1



Check the working condition of the Outlet valve

Troubleshooting for other components

V. Cause and Action for alarm/trip relating to Valve, Flowmeter, etc.

d. FLOW RATE HIGH / HIGH HIGH

Cause ① : Malfunctioning Outlet valve

Action 2



Check the function of the outlet valve manually in the 'Check Mode' by changing the Select Switch from 'Normal' to 'Check' on the main control panel.

Action 3



Check the Actuator and valve

Troubleshooting for other components

V. Cause and Action for alarm/trip relating to Valve, Flowmeter, etc.

d. FLOW RATE HIGH / HIGH HIGH

Cause ② : Malfunctioning of the Flowmeter

Action 1



Check if the Flowrate are the same between Flowmeter display and the BWMS Monitor.

Action 2



Check the electric current in the stopped state using Multi-meter.

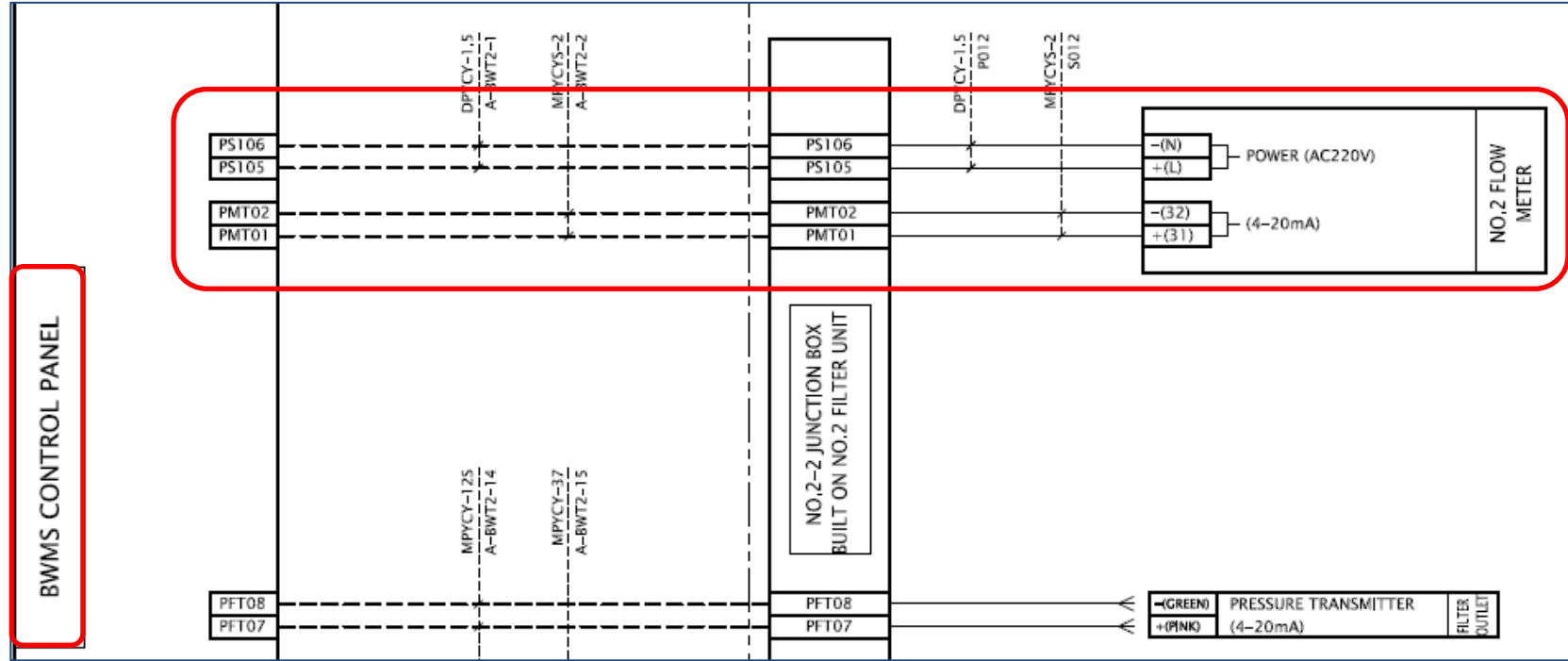
Troubleshooting for other components

V. Cause and Action for alarm/trip relating to Valve, Flowmeter, etc.

d. FLOW RATE HIGH / HIGH HIGH

Cause ③ : Poor or no wire connection

Action 1



Check if all the electric wires are connected and tightened properly according to the electric drawings.

Troubleshooting for other components

V. Cause and Action for alarm/trip relating to Valve, Flowmeter, etc.

e. FLOWMETER FAIL

Alarm indicates that the Flowmeter does not work properly

Cause	Description	Action	Cause	Description	Action
1	Flowmeter Power Failure	1	4	Faulty Flowmeter Cartridge	1
2	Abnormal Fuse of Flowmeter	1	5	PLC AI Module failure	1
3	Faulty Back-plate	1	-	-	-

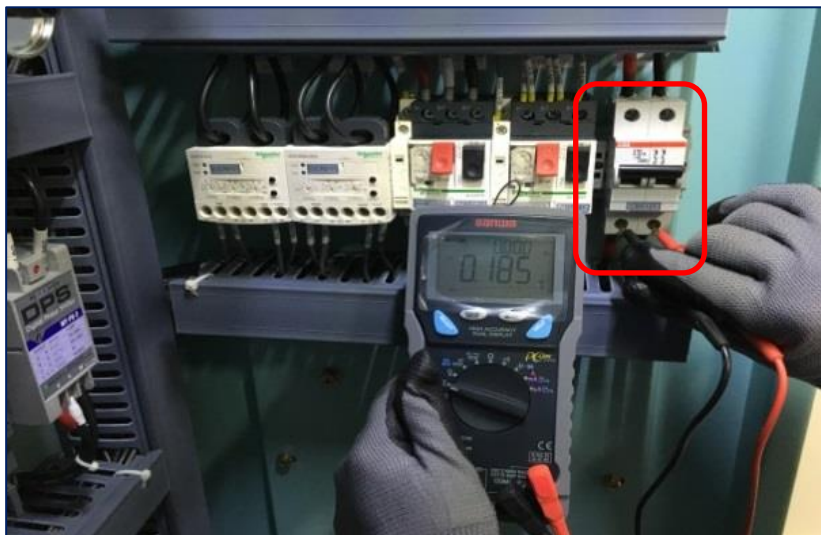
Troubleshooting for other components

V. Cause and Action for alarm/trip relating to Valve, Flowmeter, etc.

e. FLOWMETER FAIL

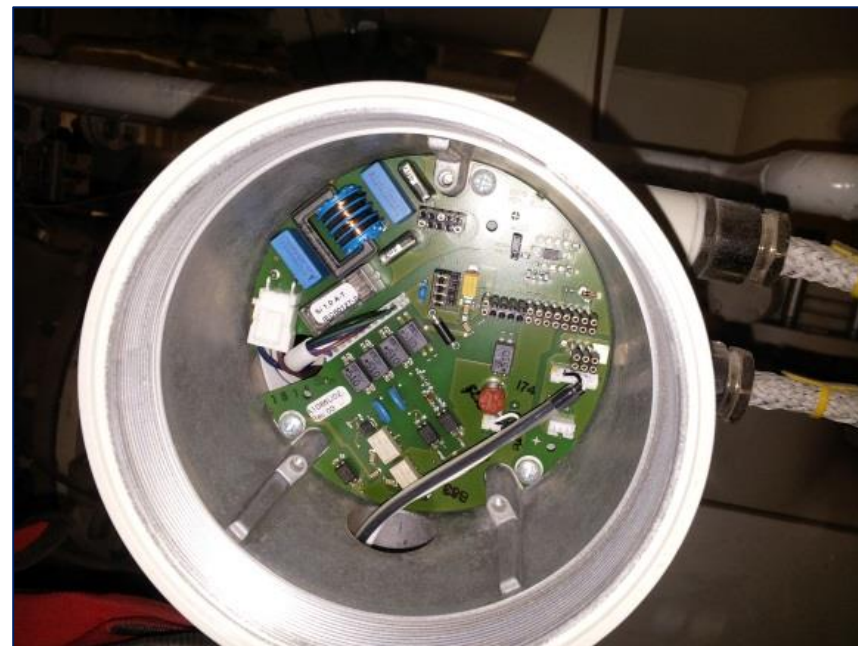
Cause ① : Flowmeter Power Failure / ② Abnormal Fuse of Flowmeter

Action 1



Check the Power switch and cable connection in the BWMS Control Panel.

Action 1



Check the Fuse of Flowmeter and replace it with new one

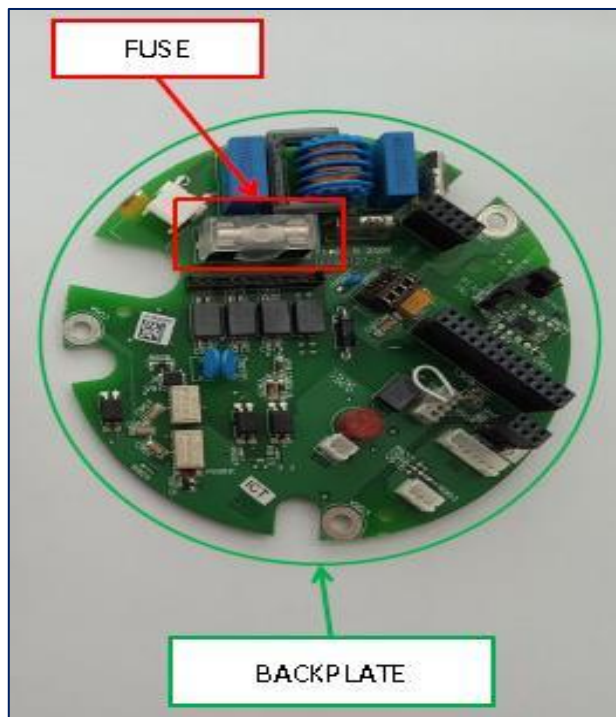
Troubleshooting for other components

V. Cause and Action for alarm/trip relating to Valve, Flowmeter, etc.

e. FLOWMETER FAIL

Cause ③ : Faulty Back-Plate / ④ Faulty Cartridge

Action 1



Replace the Back Plate with new one

Action 1



Replace the Cartridge with new one

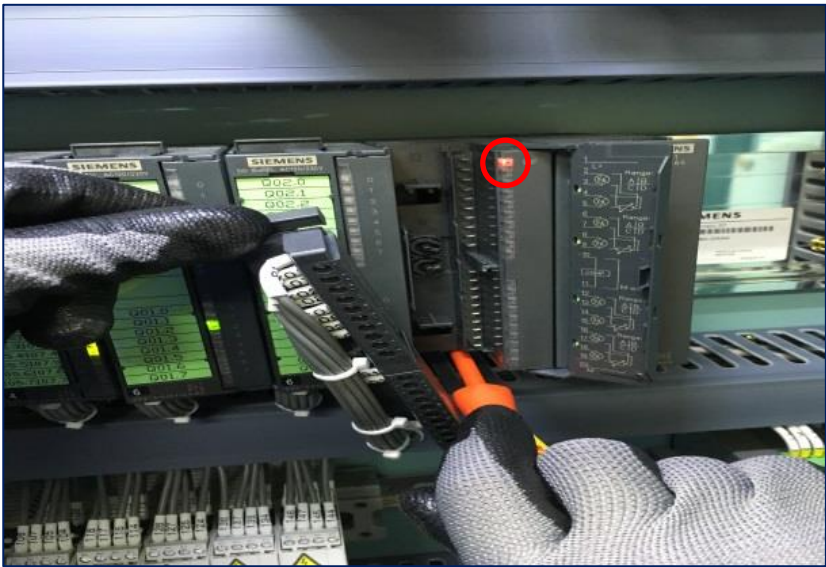
Troubleshooting for other components

V. Cause and Action for alarm/trip relating to Valve, Flowmeter, etc.

e. FLOWMETER FAIL

Cause ⑤ : PLC AI Module Failure

Action 1



Verify that the AI Module is working normally

PLC			
MODEL NAME	PLC AI 1(6ES7331-7KF02-0AB0)		
FUNCTION		I/O NO	TB,NO
		P24V	1(L+)
FILTER INLET PRESSURE TRANSMITTER 4 ~ 20mA	PW 400(+)	2	
	PW 400(-)	3	
FILTER OUTLET PRESSURE TRANSMITTER 4 ~ 20mA	PW 402(+)	4	
	PW 402(-)	5	
#1 UV INTENSITY TRNASMITTER 4 ~ 20mA	PW 404(+)	6	
	PW 404(-)	7	
#1 UV CHAMBER TEMPERATURE TRANSMITTER 4 ~ 20mA	PW 406(+)	8	
	PW 406(-)	9	
		COMP	10
			11
#2 UV INTENSITY TRNASMITTER 4 ~ 20mA	PW 408(+)	12	
	PW 408(-)	13	
#2 UV CHAMBER TEMPERATURE TRANSMITTER 4 ~ 20mA	PW 410(+)	14	
	PW 410(-)	15	
	PW 412(+)	16	
	PW 412(-)	17	
FLOW METER 4 ~ 20mA	PW 414(+)	18	
	PW 414(-)	19	
		N24V	20(M)

Troubleshooting for other components

V. Cause and Action for alarm/trip relating to Valve, Flowmeter, etc.

f. EMERGENCY STOP

Trip indicates that the 'Emergency stop' button was pushed

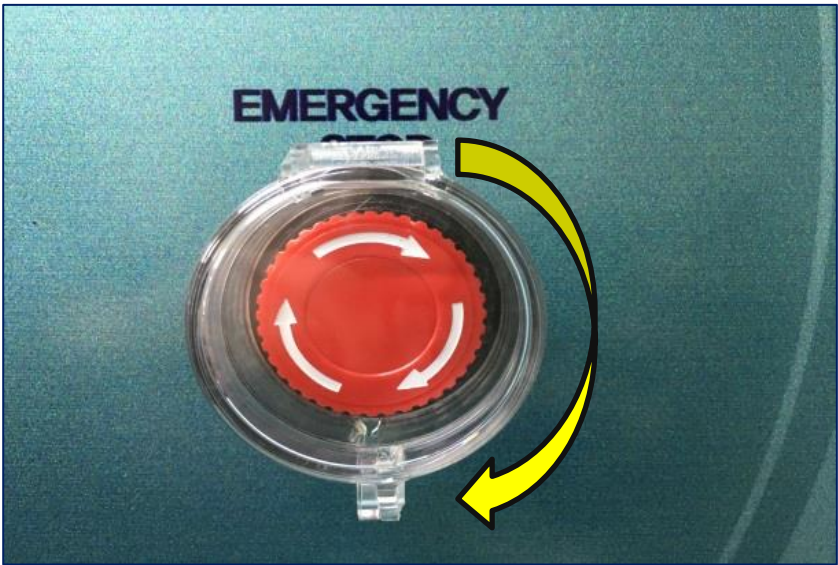
Cause	Description	Action	Cause	Description	Action
1	Pressed Emergency stop button	2	-	-	-

Action 1



Check all the system and verify and make sure that all the systems are 'OK'

Action 2



Release the Emergency stop push button

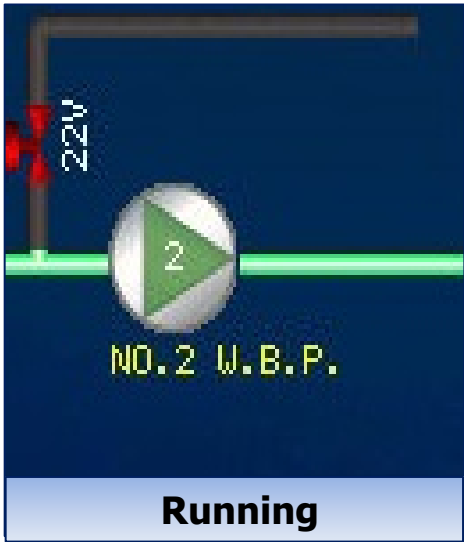
Troubleshooting for other components

V. Cause and Action for alarm/trip relating to Valve, Flowmeter, etc.

g. PUMP FAIL

Trip indicates that the Ballast pump is shut down while UV lamps are operating / turning on

Cause	Description	Action	Cause	Description	Action
1	Misoperation	1	2	Ballast pump failure	1



Action 1

Verify that the Ballast pump is working properly

NOTE : Do not stop operating the Ballast pump while the BWMS is running

Action 2

Check operating condition of the Ballast pump. Select "Alarm Reset" button and retest the system.

Troubleshooting for other components

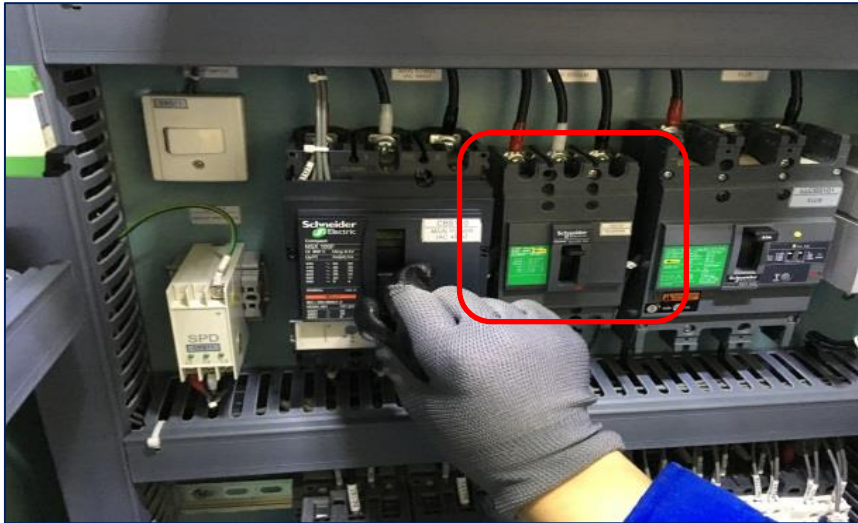
V. Cause and Action for alarm/trip relating to Valve, Flowmeter, etc.

h. POWER FAILURE

Trip indicates that power is not supplied to the to the Circuit breaker for the UV lamp or electric power line into the UV lamp has a problem.

Cause	Description	Action	Cause	Description	Action
1	Power source failure	2	-	-	-

Action 1



Check if the power voltage 440V is being supplied to the UV Power Supply Panel .
(Please turn on the breakers and switches.)

Action 2



Verify the cable connections.

Troubleshooting for other components

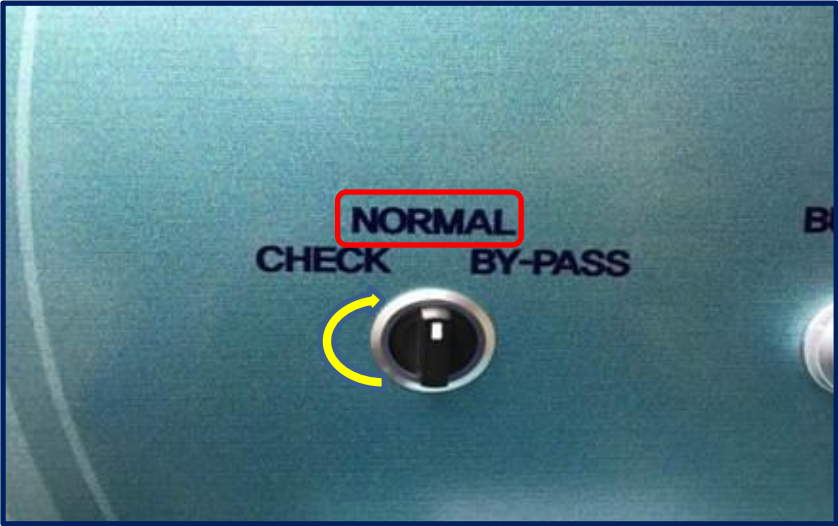
V. Cause and Action for alarm/trip relating to Valve, Flowmeter, etc.

i. SYSTEM CHECK

Alarm indicates when the Select Switch on the Control Panel is positioned to "CHECK"

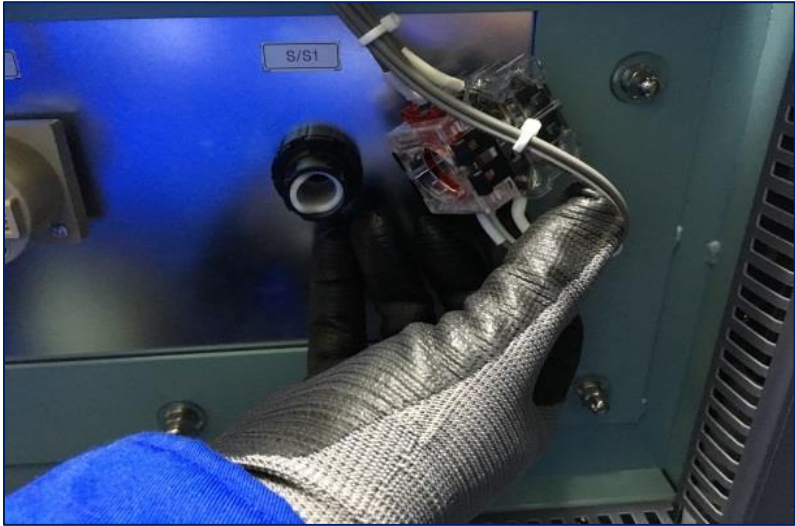
Cause	Description	Action	Cause	Description	Action
1	Select Switch position	1	2	Select Switch failure	1

Action 1



Confirm the Select switch to "NORMAL" position

Action 2



Check and replace the Select Switch

Troubleshooting for other components

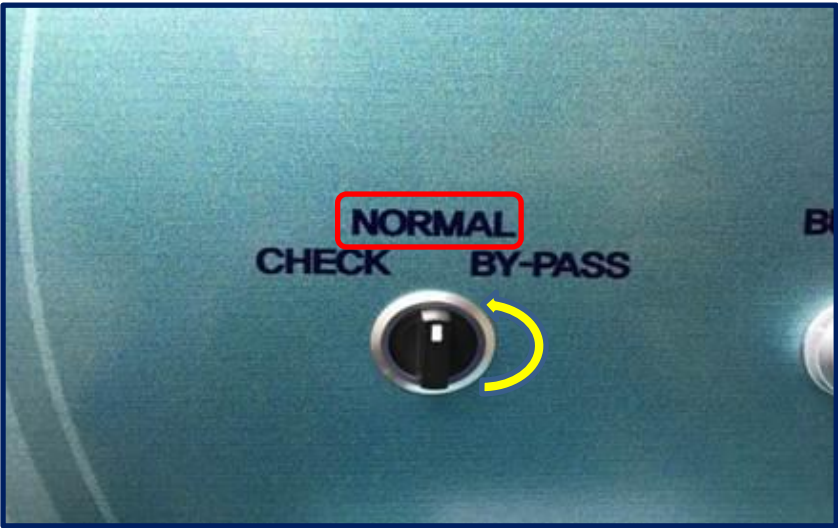
V. Cause and Action for alarm/trip relating to Valve, Flowmeter, etc.

j. BYPASS MODE SWITCH ON

Trip indicates when the Select Switch on the Control Panel is positioned to "BY PASS"

Cause	Description	Action	Cause	Description	Action
1	Select Switch position	1	2	Select Switch failure	1

Action 1



Confirm the Select switch to "NORMAL" position

Action 2



Check and replace the Select Switch