

HA Repair Guide

Front-Load Washer

Potomac-PJT

WF393/WF395/WF405



Potomac-PJT Repair Guide

[WF393/WF395/WF405]

Vibration & Noise

- Vibration
- Noise

Leakage

- Water Leakage

Improper Operation

- Water Supply
- No Power

Error- mode



















- Error-Mode

Appendix

- Test mode / Diagnosis
- Circuit Diagram / PBA

#1. Symptom : Vibration & Noise

1-1. Schematic diagram of Repair

Chassis	Project	Basic Model	Type			
Drum	Potomac	WF393/395/405	Front-Load / Power Foam			
Check-1	Step of Cause	Check-2	Tip Code	Block		
				# 1	# 2	# 3
Set-Vibration	1. Spin-basket defect 	<ul style="list-style-type: none"> Leg condition check Ball-balancer oil-leakage Weight-Balance coupling Spin-Basket concentration 	1-1 	Balancer	Weight	Spin concentration
	2. Damper defect 	<ul style="list-style-type: none"> Diagnosis of Tub movement noise Hanger-Spring separation Damper separation Loosening of Damper coupling 	1-2 	Damper	Hanger	
	3. Unstable place for installation 	<ul style="list-style-type: none"> Floor moisture environment Installation in low-temp environment Dryer Pair installation narrow Rear hose interference Floor shaking 	1-3 	Place of installation	Installation environment	
	4. Installation defect 	<ul style="list-style-type: none"> Leg level installation check Non-Slip Pad Unattached Moving Pad/Pan-Drain 	1-3 	Level installation	Non-Slip Sheet	Installation
Spin-Noise	1. Shaft & Frame 	<ul style="list-style-type: none"> Rotor friction during spinning mode Tub Bearing rust Frame friction 	1-4 	Motor-Rotor	Tub-Bearing	Frame
	2. Motor defect 	<ul style="list-style-type: none"> Spin-mode Stator check Diagnosis of motor Coil Hall sensor check 	1-5 	Motor-Stator	Hall-S/S	
	3. Pump-Drain defect 	<ul style="list-style-type: none"> Pump-Case Damage Fixing bolt loosened Foreign substance in pump Impeller Damage 	1-6 	Pump-Case	Impeller	Foreign Substance
	4. Wrong usage of product 	<ul style="list-style-type: none"> User uses moisture-proof cloth Wash little amount Spin course only 	1-7 	Moisture-proof cloth		
	5. Product inherent characteristics 	<ul style="list-style-type: none"> Resonance RPM band shaking Shaking at the beginning Tub Ball Noise 	1-7 	Resonance phenomenon	Balancer	



Tip 1-1. Frame & Spin-Basket Abnormality



Check Point Spin-Basket / Check the user environment condition.



Step 1

- ① **Check deformation of Leg of Frame bottom.**
 - Leg-bottom Rubber is damaged.
 - Right angle is not maintained due to Leg Bolt deformation.
- ② **Adjust level installation of leg & inspect place of installation.**
 - Refer to Level Product Installation Guide Tip 1-3.



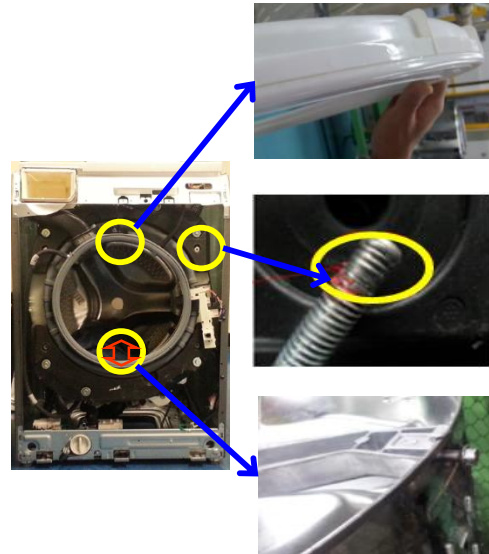
Step 2

- ① **Check Spin mode.**
 - Press Soil+Signal+Power to enter the Test mode.
 - Turn knob and select "SPn" to start.
 - Check if Spin reaches Extra-High LED.
- ② **Check Unbalance Test.**
 - Run Spin Test with 300g placed on one side unbalanced.
 - ※ 300g – 2 Towels OR Jig for this purpose only
 - Check for abnormal noise & Set moving.



Step 3

- ① **Oil leakage of Balancer**
 - Rotate Spin-Basket to check frictional noise between balls.
 - ※ If the frictional noise is dull, it is regarded as OK.
- ② **Abrasion of Weight-Balancer**
 - Check if Weight-Balancer shakes.
 - Gap is created if the screw head of fixing bolt wears out.
 - Couple more OR replace it.
- ③ **Check the concentration of Spin-Basket.**
 - Check if Spin-Basket moves up and down.
 - Check if Spin-Basket vibrates due to broken fixing bolt.



※ After SVC, explain to the customer how to use it.

- ① Check the use condition of Customer.
 - Check if moisture-proof cloth is used.
 - : Water-Proof Sheet, Mats, clothing



Tip 1-2. Damper & Hanger Abnormality



Check Point

Check the operating condition of Damper.



Step 1

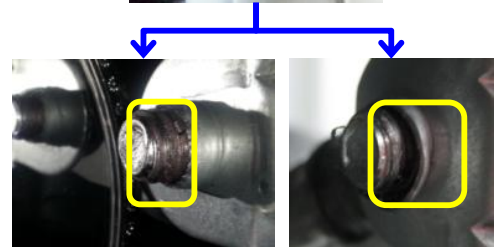
- ① **Check Tub for abnormal noise.**
 - Shake the Tub back and forth to check where the noise is coming from.
- ② **Hanger Spring connection & Grease application condition**
 - Check if grease is properly applied between Hanger Spring and Hanger Guide friction part.



Step 2

- ① **Check if Damper is separated or unassembled.**
 - If the bolts connecting damper
 - If the dampers are rusted or not fastening, replace.
- ② **Check the condition of loosening of Damper connection.**
 - The shape of connected part of Bottom-Plate is defective, and thus it does not rotate properly.
 - It does not rotate properly because it was connected too much in the assembling process.

☞ When it does not rotate properly, "Dda-dda-dda" noise is generated due to friction between Damper & Bottom-Plate. Thus, do as in ③.
- ③ **What to do when Damper connection is loosened.**
 - Add Nut M10.
 - Product Name: Nut-Hexagon (6021-001588)
 - ※ Damper connecting force : 250 ~ 350kgf.cm²



Tip 1-3. Installation Place & Installation Stability Abnormality



Check Point Check the installation place and stability condition.



Step 1

- ① **Check if there are any shipping bolts** on the back of washer.
Shipping bolts should be removed & kept.
- ② **When installing, check the frictional relationship with the surroundings.**
 - Install a pair of dryers together, causing interferential noise when the Frame shakes during spinning mode.
- ③ **Check the installation levelness & Floor-moving phenomenon.**

Case #1 - The levelness, which is measured with levelness-measuring apparatus, is poor.

Case #2 - It shakes due to old floor (lumber) of laundry room.

👉 Re-installation is recommended so that it does not influence on vibration.



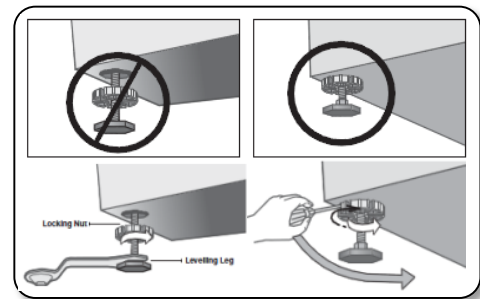
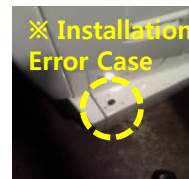
Step 2

- ① **Check if pedestal is installed properly.**
 - In case of old pedestal, check if all bolts connecting washer and pedestal are tightened properly.
- ② **Condition of levelness of Leg installation**
 - If the rubber of legs is damaged, replace it.
 - Lower leg is better for vibration.
 - Shorten the leg height and lock up the legs after adjustment.
 - Check if washer inclines to one side and level washer again with adjustment of legs.
- ③ **Environment with slippery floor (Tile, Moisture)**
- **Attach on-Slip Pad.**
- ④ **Material which is inappropriate for Leg floor according to rules.**

Case#1 Frictional noise of Pan Drain

Case#2 Use floor protection as sub-material for the Leg bottom.

👉 Re-installation is recommended so that it does not influence on vibration.



Tip 1-4. Shafting Abnormality



Check Point

Check the operating condition of shafting.



Step 1

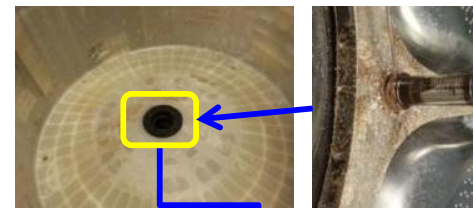
- ① **Assembly Bolt of Washing Motor**
 - Check the assembly status of the bolt.
If the bolt is loose, tighten it.
- ② **When there is abnormal noise, have the Rotor disassembled for checking.**
 - When the weight sensor is operating, check for frictional noise of washing motor while Motor-L / Motor-R is rotating.
 - Remove iron foreign substance, if any, absorbed by Rotor Magnetic.



Step 2

- ① **Jet Engine noise during spinning mode**
 - Push Soil+Signal+Power to enter the Test mode.
 - Turn knob and select "SPn" to start.
 - Check if Extra-High LED of Spin is reached.

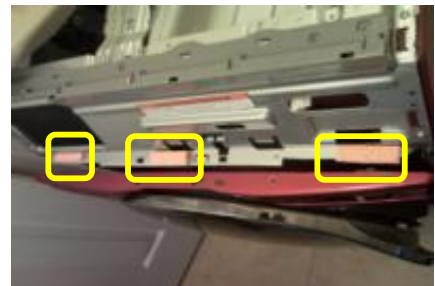
☞ If the tub is rotating empty without load, check the roaring sound during high-speed rotation.
- ② **In the case of abnormal noise or Bearing abnormality, replace Tub-back.**



Step 3

- ① **Check frictional noise between parts of Frame.**
 - Shake the Tub back and forth to check where the noise is coming from.
- ② **Inspect the main parts from which noise is generated.**
 - Add sponge to frictional part of Frame-Front.

☞ Add more sponge to noise-generating part.



Tip 1-5. Motor Abnormality



Check Point

Check the operating condition of Motor.



Step 1

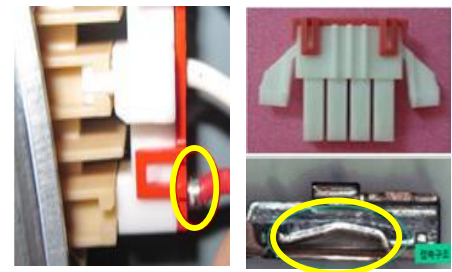
① **Rotor with your hand and check the gap**

- If the gap is not the same as in the photo right,
- it could cause noise during the spin cycle



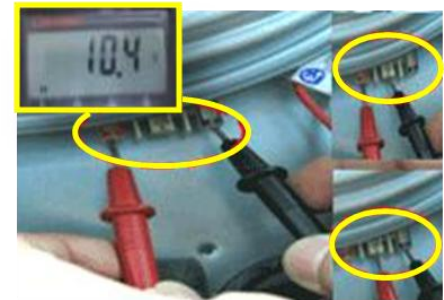
② **Check if Motor Wire Pin fell out**

- photo of pin which had fallen out added
- Must check regarding contact fail caused by the opening of Pin inside the terminal.



Step 2

① Check of Resistance motor (U-V-W).
 ↳ The Resistance : approximately 11Ω



② Check the Hall Sensor.
 - Check of ①-VCC(PNK) and ②-GND(ORG)

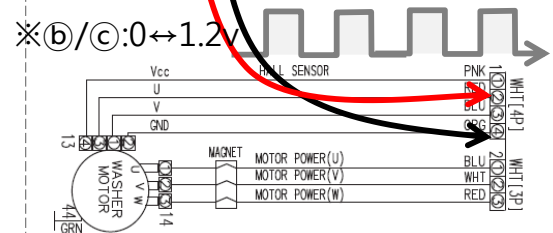
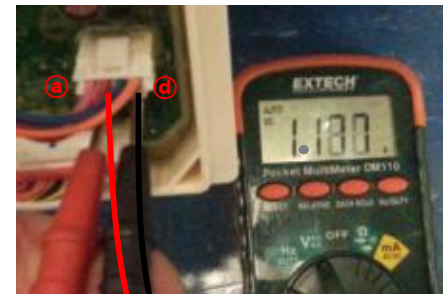
↳ The Voltage : approximately 5.0V

- Check of ③-U(RED)/④-V(BLU) and ⑤-GND(ORG)

↳ The Voltage : approximately 0~1.2v Pulse

※ Rotor the slow turning by manually

↳ Replace the Motor



Tip 1-6. Pump Noise Abnormality



Check Point

Check the condition of Pump-Drain.



Step 1

① Mechanical Friction Noise

- When pump drain is operating, it vibrates a little. If drain parts such as drain hose are near other parts, it may cause mechanical friction noise.



Step 2

① Foreign materials in Pump Drain

- Open debris filter and check there are foreign materials such as coins, pins etc.



② Check pump drain impeller is broken.



Step 3

① Check if the fixing part of Pump-Case is loosened.

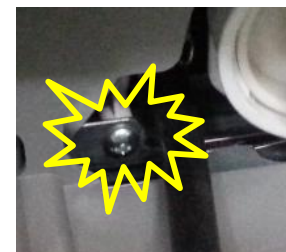
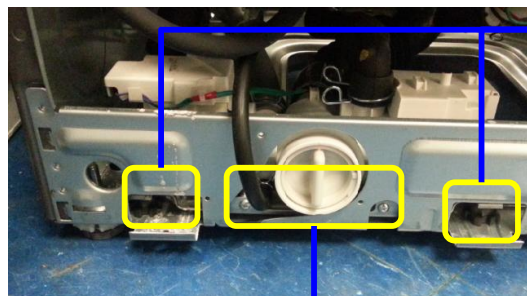
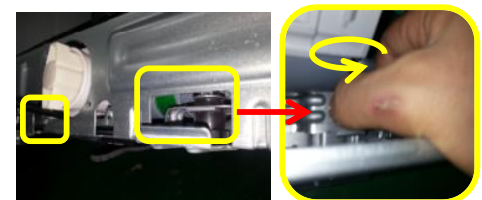
- Check if the two bolts fixing Frame-Plate bottom are loosened.
- Check if the fixing part of Pump-Case front is loosened.

☞ Assemble the Pump-Case again.

② One assembly part of Pump-Case front is loosened.

- Frictional noise is generated due to vibrating up and down.

☞ Assemble Pump-Case again.



Tip 1-7. Explanation of NDF and product characteristics



Check Point

Explain the NDF and product characteristics.



Step 1

※ Explain to NDF customer.

- Check the wrong usage condition of laundry and explain recommended usage.
- Do not use Water-Proof Sheet, Mats and clothing.

Step 1 : Small Loads Case

: If loading the laundry whose weight is 1kg ± 0.5kg, it is easily inclined to one side.

☞ Add more laundry to make it normal.

Step 2 : Unbalance of laundry

: Stop using Water-Proof Sheet, Mats and clothing.

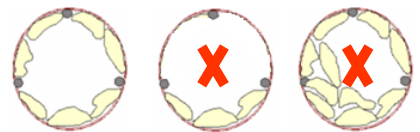
☞ Do not input the laundry listed above, since water does not drain during high-speed spinning mode, causing unbalance problems.

Step 3 : Unbalance of bedding, carpet, and etc.

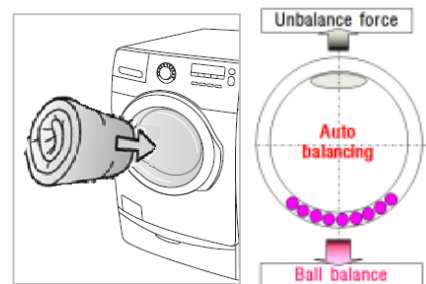
: Bedding should be washed alone less than 3.5kg.

☞ Solution: Roll up the bedding before putting into washer.

※ Do not wash Cotton bedding, wool bedding and mink blanket.



【 Normal 】 【 Small loads 】 【 Over loads 】



Step 2

① Resonance phenomenon occurs in the rising section during spinning mode.

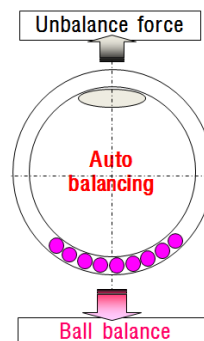
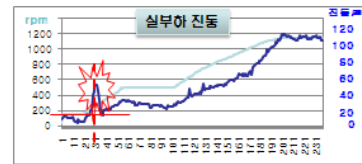
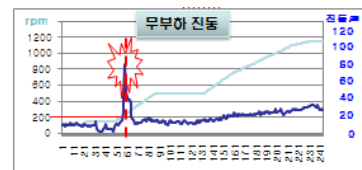
- Resonance Frequency: 200~450rpm section
- In the resonance frequency, Tub moves.

※ It is a resonance phenomenon occurring in the rpm rising section for water extraction at the beginning, which is normal.

② Ball friction occurs when Spin-Basket rotates in low speed.



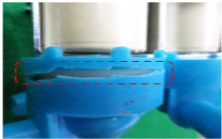









- Explain that the frictional noise from the Ball, which is the center of gravity in the Balancer, is normal.

※ If the Ball in the Balancer makes strong frictional noise while checking Tub, then it means that the oil is leaking. Thus, replace Spin-Basket.



#2. Symptom : Water Leakage

2-1. Schematic Diagram of Repair

Chassis	Project	Basic Model	Type			
Drum	Potomac	WF393/395/405	Front-Load / Power Foam			
Check-1	Cause	Check-2	Tip Code	Block		
				# 1	# 2	# 3
Water Supply	1. Water supply hose connection 	<ul style="list-style-type: none"> ➤ Tool is loose due to over-connection. ➤ Packing omission ➤ Y-Joint Seal leakage ➤ Cold water alone installation ➤ Wall-attached installation 	2-1 	Water supply hose	Water supply valve	Y-Joint
	2. Water-V/V leakage 	<ul style="list-style-type: none"> ➤ Foreign substance enters pipe. ➤ Nozzle-Connector ➤ Body damage ➤ Packing assembly bad ➤ Freezing in the winter 	2-2 	Water supply valve	Water supply hose	Pipe
Water Leakage	1. Detergent drawer leakage 	<ul style="list-style-type: none"> ➤ Wrong powder used ➤ Hose separation/friction ➤ Detergent drawer does not open/close smoothly. 	2-3 	Nozzle	Detergent	
	2. Tub-related leakage 	<ul style="list-style-type: none"> ➤ Heater assembled wrong ➤ Tub damage ➤ Diaphragm leakage ➤ User wrong usage 	2-4 	Tub	Heater	Diaphragm
	3. Pump leakage 	<ul style="list-style-type: none"> ➤ Pump-Drain hose ➤ Pump-Case ➤ Drain hose ➤ Handle-Filter 	2-5 	Pump-Case	Drain-Hose	
Installation/ NDF	1. Install & NDF 	<ul style="list-style-type: none"> ➤ Dirty water flows backward ➤ Continuous drainage 	2-6 	Water supply hose	Clamp	



Tip 2-1. Water-Hose & Connection Abnormality



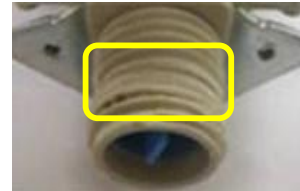
Check Point

Check the condition of Water-Hose.



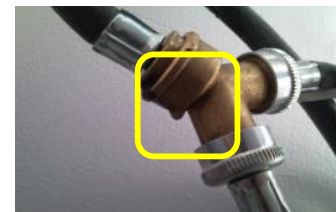
Step 1

- ① **Check the exterior of water supply valve unit.**
 - Check if screw head is worn out due to over-connection using water supply hose tool.
 - Check if the end of water supply valve is scratched in the installation process.



Step 2

- ① **Check the water supply hose unit.**
 - Water leaks due to loose Caulking.
 - Water pressure check: Shall not exceed 8kgf.cm² max.
- ② Check if sub-material unit installed is defective.
 - Check if internal Packing-Seal is omitted or worn out.
 - Check if water leaks from Y-Joint unit.
: Apply more Seal Taping to water-supply parts.
- ③ If water leaks due to installation environment outside the product, check out Step 3.

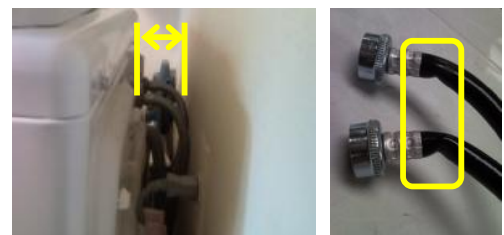


Step 3


- ① **Hose is bent during installation.**
 - Since the product rear is too close to the wall, hose is bent and friction occurs. Thus, water leaks.
 - 6 in(152mm) is recommended for the distance between the product rear and the wall is recommended.

※ Explain to the customer after SVC.

=> Install it again such that it does not influence water leakage and explain how to use it.



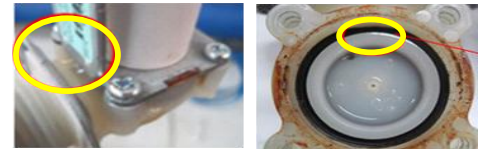
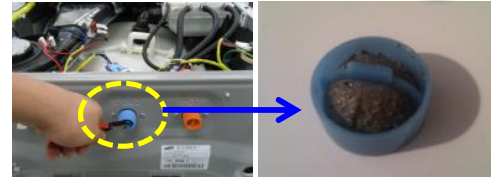
Tip 2-2. Water-V/V & Connection Abnormality

 **Check Point** Check the condition of Water-V/V & connection.



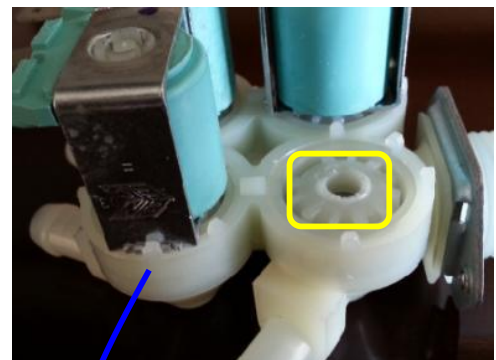
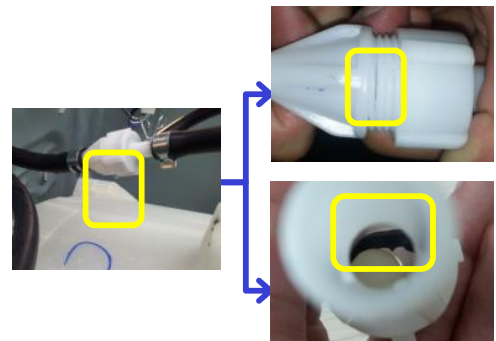
Step 1

- ① **Check if water supply hose filter is clogged.**
 - Separate the filter with a tool.
 - ② **Filter-clogging check & cleaning**
 - Clean it regularly to prevent the accumulation of foreign substance.
 - Prevent the water leakage caused by oil-filled valve.
- ※ When foreign substance enters through pipe, clean the pipe and recommend to the customer that another filter be installed.



Step 2

- ① **Check if water leaks from Nozzle-Connector.**
 - The valve preventing backward-flow is damaged by outside impact. Thus, check the water leakage.
 - Water leaks a little due to separation of internal Packing.
- ② **Check for water-leaking part of water supply valve.**
 - Water leaks due to continuous water supply because foreign substance enters inside.
 - Water supply valve body is damaged; and thus water leaks.
 - Packing is not connected properly, and thus water leaks.
- ③ If the noise or operation is not normal, check step #3.

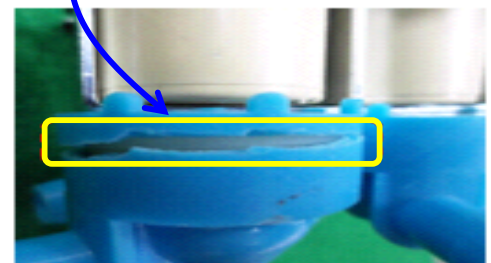


Step 3

- ① **Water supply valve Body Damage**
 - Body of water supply valve is damaged due to outside air in the winter.

※ **Explain to the customer after SVC.**

⇒ Re-install it such that it is not influenced by outside air in the winter and explain to the customer how to use it.



Tip 2-3. Detergent & Bleach Abnormality



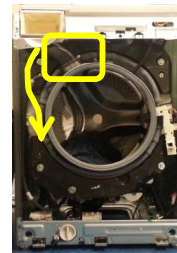
Check Point

Check the condition of Detergent & Bleach.



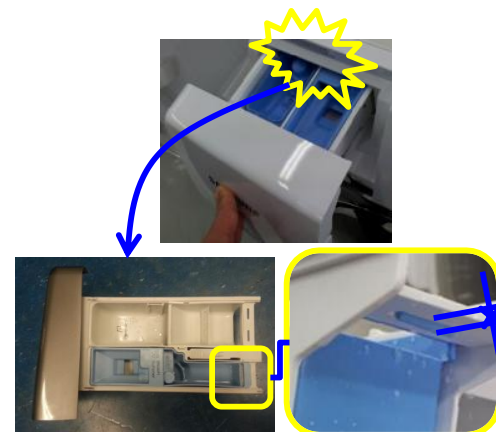
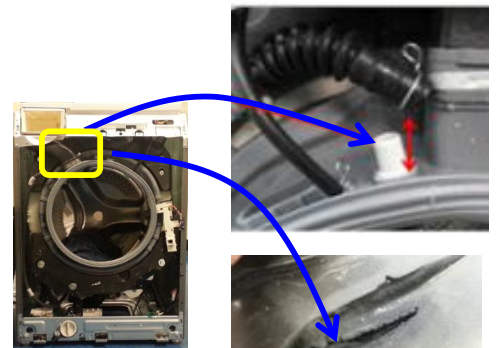
Step 1

- ① **Check if water supply valve filter is clogged.**
 - Reduction in flow velocity results in clogging from detergent residue.
- ② **Detergent Leakage-Point**
 - Check if powder is used in liquid-detergent drawer.
 - Detergent dispenser is clogged due to using too much powder, which causes front water leakage.
- ③ **Explain to the customer regarding detergent.**



Step 2

- ① **Check if hose is separated from Nozzle connecting part.**
 - Check if it is separated when hand-pulled.
 - Make connection after washing the oil substance out the hose.
- ② **Abrasion of detergent U-trap hose**
 - Make the hose ring connecting part located at the end.
- ③ **Check for jamming phenomenon when opening/closing detergent drawer.**
 - When jamming occurs during opening/closing, Siphon phenomenon of fabric softener occurs due to impact.
 - Check if rear projection is separated and insert Hook.



Tip 2-4. Tub Abnormality



Check Point

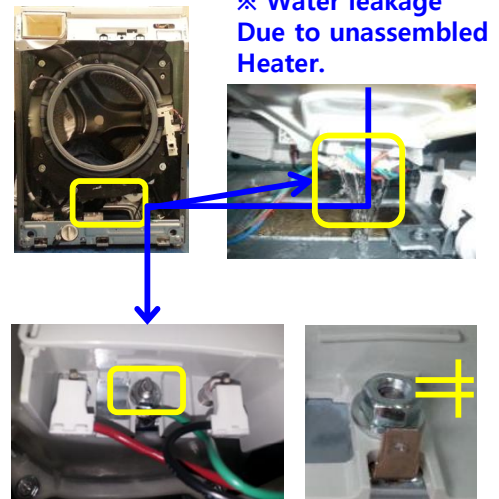
Check the condition of Tub & Diaphragm.



Step 1

- ① **Check if water leaks from the Heater.**
 - Water leakage due to unconnected heater
 - Water leaks a little due to incomplete heater connection.

☞ **Connection Spec : Shall maintain 4~8mm.**
If washing heater is not assembled properly, water leaks from bottom as soon as water is supplied.
Check it and if needed, re-assemble it tightening the nut with M10 tool.
- ② **Check for water leakage due to tub damage.**



※ Water leakage
Due to unassembled
Heater.

Step 2

- ① **Check for the water leakage of Diaphragm.**
 - Adhesion reduces due to one-sided connection of Diaphragm.
- ② **Order of Door water leakage check**
 - . Check if the rear shipping bolts are removed.
 - . Check after running 3 cycles in normal course.
 - . Remove wire from the front Diaphragm and re-assemble.



Step 3

- ① **Water leaks from the Diaphragm of Door bottom.**
 - Case#1 – Water leaks due to hair & lint.
 - Case#2 – Damage due to pet dog & sharp accessories
 - Case#3 – Jamming when laundry is put in.
- ② **Check the customer usage condition and explain how to use it.**



※ Clean hair.

※ Clean Door-Glass.

Tip 2-5. Pump Connection Abnormality



Check Point

Check the condition of Pump & Hose.



Step 1

① Hose Between Tub & Pump Drain

- Check for the connection of hose drain connecting tub and pump drain.
- Check if water leaks due to damaged Hose Drain.



② Pump-Case Damage

- Check for the connection between tub & pump.
- Check if water leaks from pump of Case.
- All hoses connecting to pump should be checked.



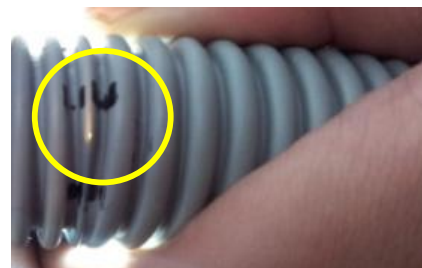
③ Drain-Hose Damage

- Check if there are holes on drain hose.
 - Check for any leaks in the drain hose.
- ☞ Check for the environment which causes drain hose friction due to appliance vibration at the rear.



Step 2

- ① Check if there is leakage at the debris filter and the drain cap.
- ② Check parting lines and crack on pump case.



Tip 2-6. Install & NDF Connection Abnormality



Check Point

Check the condition of Install & NDF.

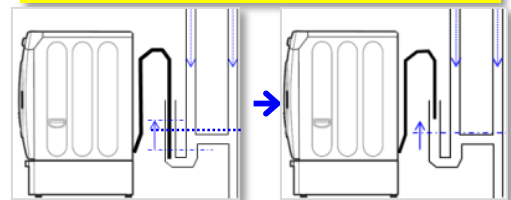


Step 1

- ① **Waste water flows back into the washer.**
- ② Drain hose is installed deep into the pipe of product which is installed in the basement. Thus, waste water discharged from first floor flows back into the product.
- ③ As in photo, distance the drain hose so that drain hose may not go back to the upper part of U-trap.

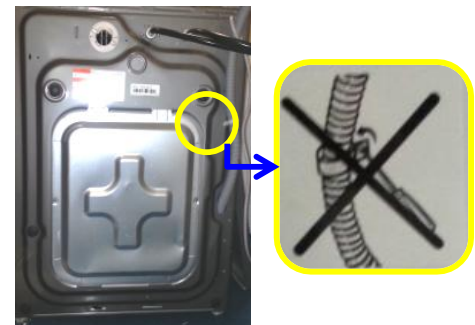


Re-install the drain hose which flows back to the U-Trap pipe.



Step 2

- ① **Water drains during washing mode.**
- ② If drain hose is installed after loosening the fixing part, then water drains continuously.
- ③ As in the warning label, re-install it without disassembling the drain hose fixing part. Then, explain how to use it.



Step 3

- ① **Drain filter is not assembled properly when opening/closing it.**
- ② Sand & tiny foreign substance, etc. in laundry accumulate in drain filter; thus, water is not drained.
- ③ Water leaks when opening/closing the Handle-Filter because it is not assembled properly.

👉 Explain how to assemble filter when opening/closing it for cleaning.



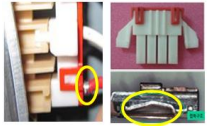









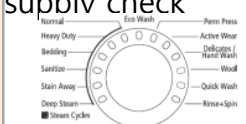



#3. Symptom : Improper Operation

3-1. Schematic Diagram of Repair

Chassis	Project	Basic Model	Type
Drum	Potomac	WF393/395/405	Front-Load / Power Foam



Check-1	Step	Check-2	Tip Code	Block		
				# 1	# 2	# 3
No - Operation	1. No power 	<ul style="list-style-type: none"> ➤ Power-Cord breaks. ➤ Fuse breaks. ➤ EMI-Filter breaks. ➤ Main-Harness defect 	3-1 	Power-Cord	EMI-Filter	Harness
	2. No-Spin 	<ul style="list-style-type: none"> ➤ Moisture-proof cloth usage condition ➤ Laundry recommended use ➤ Loose motor terminal ➤ Hall sensor Pulse check 	3-2 	Laundry	Motor	Hall Sensor
Washing feature	1. No Water supply 	<ul style="list-style-type: none"> ➤ Wall-attached installation ➤ Water supply valve check ➤ Wrong installation of Cold/Hot water ➤ Clean foreign substance in Pipe filter 	3-3 	Water supply hose installation	Filter	Water supply valve
	2. Weight sensing defect 	<ul style="list-style-type: none"> ➤ Weight sensing course ➤ Motor unit constraint ➤ Laundry 	3-4 	Washing motor	Hall센서	PBA
	3. Water level sensing defect 	<ul style="list-style-type: none"> ➤ Water level hose Puncture ➤ Water level hose clogging ➤ Water level sensor breaks. ➤ Water level frequency check 	3-5 	Water level hose	Water level sensor	
Detergent feature	1. Detergent residue 	<ul style="list-style-type: none"> ➤ Water remains. ➤ Detergent residue ➤ Gel, highly-enriched detergent 		Detergent	Rinse	Bleach
	2. Course water supply check 	<ul style="list-style-type: none"> ➤ Detergent, softener, Bleach ➤ Fast time Down check 	3-7 	PBA	Water-V/V	

Tip 3-1. No Power Abnormality



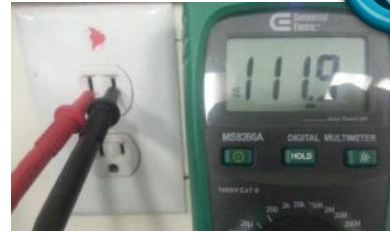
Check Point

Check the condition of Power Cord/Fuse/EMI-Filter.



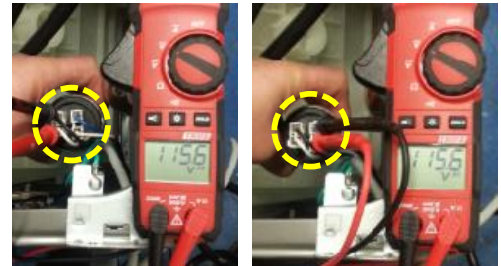
Step 1

- No-Power does not turn on.**
 - Measure the electric power of socket and check if it is the rated one.



Step 2

- Measure the voltages of both ends of EMI-Filter.**
 - Input voltage measurement - AC120V NG : Replace the Power-Cord.
 - Output voltage measurement - AC120V NG : Replace the EMI-Filter.

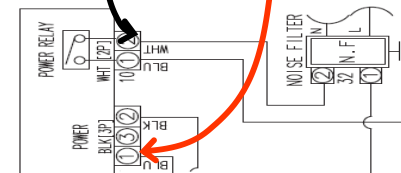
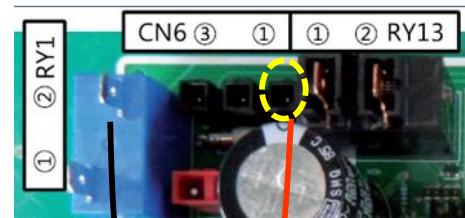
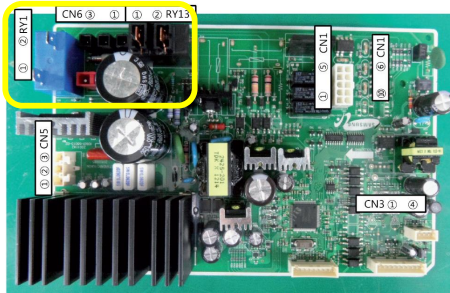


※ Input voltage measurement

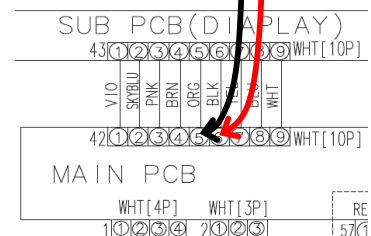
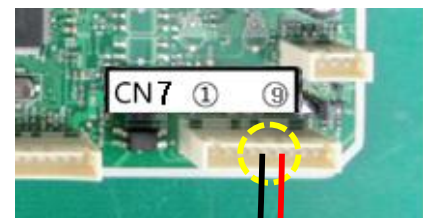
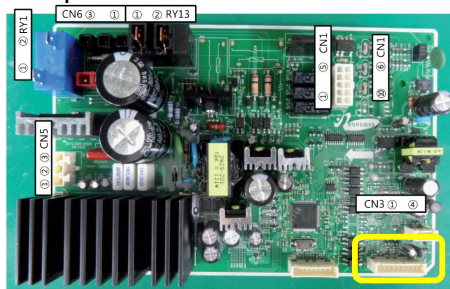
※ Output voltage measurement

Step 3

- Check AC power supplied to Main PBA.**
 - Measure AC voltages of Power Relay#1-d② (WHT) & CN#6-①(BLU) terminals: AC 120V
 - OK -> Replace PBA.
 - NG -> Check the voltage of Sub PBA.



- Check DC power supplied to Sub-PBA.**
 - Measure AC voltages of CN#7-⑤(ORG) & CN#7-⑥(BLK) terminals: AC 120V
 - OK -> Replace the Harness.
 - NG -> Replace the Sub PBA.



Tip 3-2. No-Spin Abnormality



Check Point

Check the user usage/install condition for Unbalance and the motor condition.



Step 1

※ Explain to NDF customers how to use it.

- Check the wrong usage condition of laundry and explain the recommended use.
- Do not use Water-Proof Sheet, Mats, and clothing.

Step 1 : Small Loads Case

: If loading the laundry whose weight is $1\text{kg} \pm 0.5\text{kg}$, it is easily inclined to one side.

☞ Add more laundry to make it normal.

Step 2 : Unbalance of laundry

: Stop using Water-Proof Sheet, Mats and clothing.

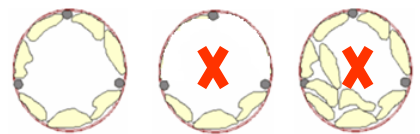
☞ Do not input the laundry listed above, since water does not drain during high-speed spinning mode, causing unbalance problems.

Step 3 : Unbalance of bedding, carpet, and etc.

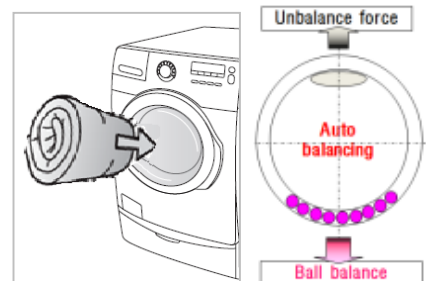
: Bedding should be washed alone less than 3.5kg.

☞ Solution: Roll up the bedding before putting into washer.

※ Do not wash Cotton bedding, wool bedding and mink blanket.



【 Normal 】 【 Small loads 】 【 Over loads 】



Step 2

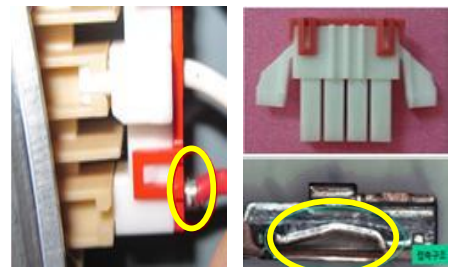
① Check if Motor Wire Pin

- photo of pin which had fallen out added
- Must check for contact fail due to opening of Pin in the terminal.

② Hall sensor check

- Check of ⑥(RE D)/⑦(BLU) and ④-GND(ORG)
- ☞ The Voltage : approximately 0~1.2v Pulse
- ※ Rotor the slow turning by manually

※⑥/⑦:0↔1.2v



Tip 3-3. Water Supply Abnormality



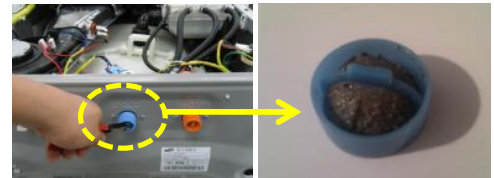
Check Point

Check the condition of Water-Hose.



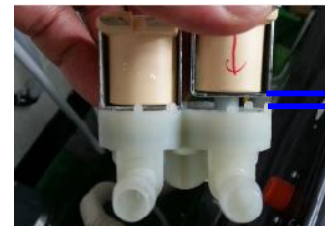
Step 1

- ① **Check for water supply fail due to hose bent during installation.**
 - Water is not supplied due to hose bending and friction, caused by installing the product rear right to the wall.
- ② **If filter is clogged due to pipe & water quality problems,**
 - Separate the filter with a tool.
 - Clean the filter with a brush.



Step 2

- ① **Check the connection of water supply valve.**
 - Check for push-back of pin of terminal.
 - Check if harness wire is broken.
- ② **Check the exterior of valve.**
 - The upper core of water supply valve is heaved.
 - Body Crack
- ③ **Check the resistance of both ends of water supply valve.**
 - ☞ Maintain 1.0kΩ for coil resistance -> If O.L., replace the valve.



Step 3

- ① **Check the power supplied from PBA.**
 - Press the power button while holding Soil+Signal.

=> Test mode

 - Turn knob to enter "tSt" mode.
 - Operate the Temp button to make valve work gradually.
 - Measure the power supply for water supply valve.
- ② **Check the voltage applied to both ends of water supply valve.**
 - Maintain the voltage supplied to valve at 120V.
 - If NG, measure voltage applied to Valve of Tip 4-3.



Tip 3-4. Weight Sensing Abnormality

Check Point Check the condition of Motor weight sensing.



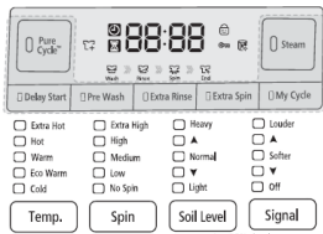
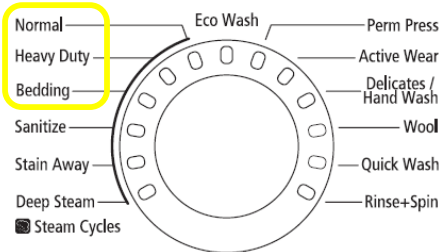
Step 1

- Duration of weight sensing**
 - Weight sensing : Takes 1~2 min.
 - If it takes longer, check the Motor & Hall Sensor of Step #2.
- Weight sensing by Course**
 - Normal / Heavy-Duty / Bedding course
 - Refer : Check factory & Selectable for Other course.

CYCLE CHART

Use this chart to set the best cycle and option for your laundry.

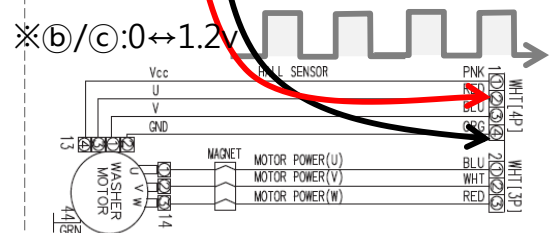
(● : factory setting , ◦ : selectable)




Course	Functions															
	Temp.					Spin					Soil Level					
	EH	H	W	EW	C	EH	H	M	L	NS	H	▲	N	▼	L	
Normal		◦	●	◦	◦	◦	●	◦	◦	◦	◦	◦	◦	◦	◦	
Heavy Duty		●	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	
Bedding			●	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	
Sanitize	●					◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	
Stain Away (WF395BTPA**)		◦	●	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	
Deep steam		●				◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	
Rinse + Spin					●	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	
Quick Wash		◦	●	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	
Wool			●	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	
Delicates/Hand Wash			◦	◦	●	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	
Active Wear (WF395BTPA**)			●	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	
Perm Press			●	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	
Eco Wash			◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	
Pure Cycle	●					◦	◦	◦	◦	◦	◦	◦	◦	◦	◦	

Step 2

- Incorrect weight is sensed due to Hall Sensor feature defect.**
 - Check of ①-VCC(PNK) and ②-GND(ORG)
 - ☞ The Voltage : approximately 5.0V
 - Check of ③-U(RED)/④-V(BLU) and ⑤-GND(ORG)
 - ☞ The Voltage : approximately 0~1.2v Pulse
- ※ Rotor the slow turning by manually
- ☞ Replace the Motor.



Tip 3-5. Water Level Abnormality

 **Check Point** Check the water level sensor and the connection.

Step 1

① **Measure the frequency of water level sensor during stand-by.**

- Measure the water level sensor during stand-by when the power is on.
- Press and hold Signal + Extra Rinse for about 10 sec.
- Press Extra Rinse to select Board Input(in) mode.
- Turn knob to counter-clockwise to select 5th LED.

※ How to read: 2601 => 26.01kHz

☞ Frequency during stand-by 26.4kHz : 25.9kHz or less – Replace.



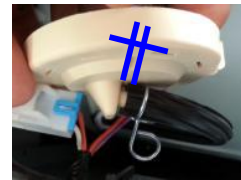
Step 2

① **Check the water level sensor sensing.**

- Air leaks a little because water level hose is not inserted completely.
- If the frequency measurement malfunctions due to incomplete insertion of water level sensor terminal

② **Check the water level hose sensing.**

- Water level hose is punctured due to outside damage.
- The frequency does not rise during water supply, which is mistakenly considered as water leakage due to Tub damage. Thus, water supply stops.



※ SVC Rules

- ① Do not adjust the bolt at the top of water level sensor.
 - ② Do not adjust the top part of water level sensor by applying Bond after the setup at the time of factory shipment.
- ※ The Reset frequency changes during adjustment, and thus spinning mode is not activated.

※ **Not Adjust Bolt**



Tip 3-6. Detergent Residue Abnormality



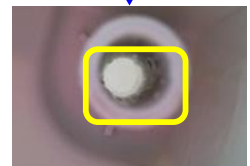
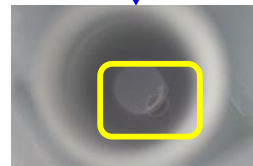
Check Point

Check the condition of Detergent & Bleach.



Step 1

- ① If water remains,
- ② Open the Siphon-Cap of detergent drawer and fabric softener drawer to check the Burr which occurs during injection.
- ③ Case of Burr – see phenomenon in the photo

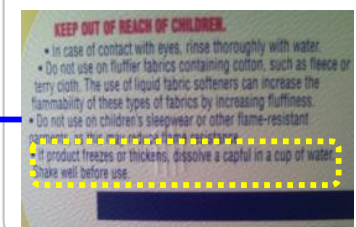


Step 2

- ① If detergent remains,
- ② the detergent either thickens or the viscosity thereof increases. Thus, explain to the customer the caution phrase of detergent manufacturer how to dissolve it in water.

※ Guide phrase by manufacturer by detergent feature.

※ Caution
: If Product freezes or thickens, dissolve a capful in a cup of water.
Shake well before use.




Step 3

※ Explain to the customer after SVC.

- ① Explain that use of highly-enriched or Gel-type detergent should be limited.

Tip 3-7. Water Supply Program Abnormality

 **Check Point** Check the water supply program.



Step 1

① At the beginning, set test mode.

- Set normal course after turning the power on.
- Press and hold Signal + Extra Rinse for about 5 sec.
- Press the Temp button to enter Fast Time Down Test Mode.

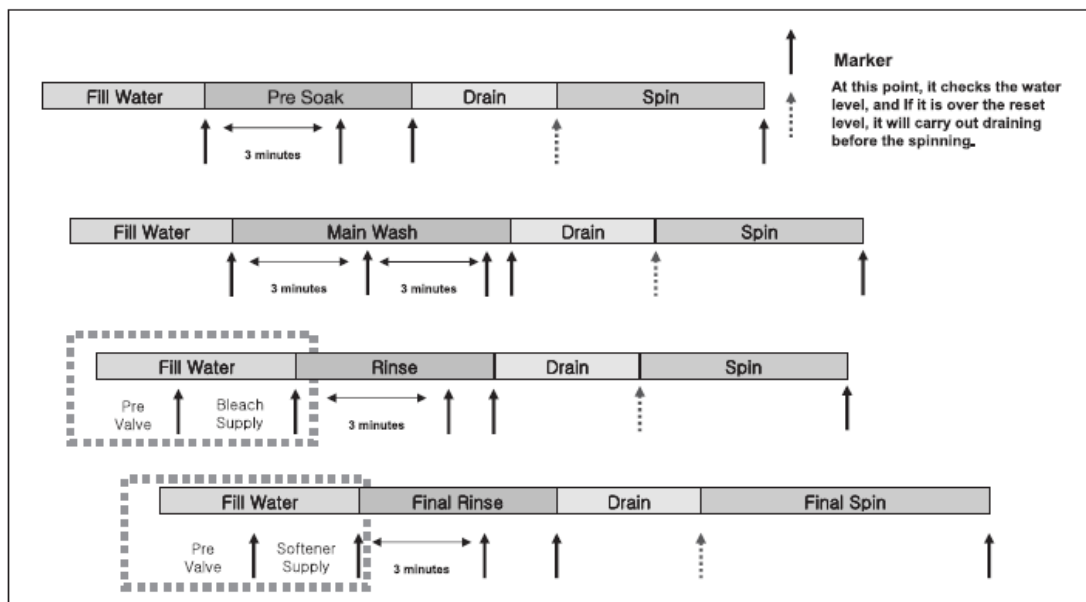
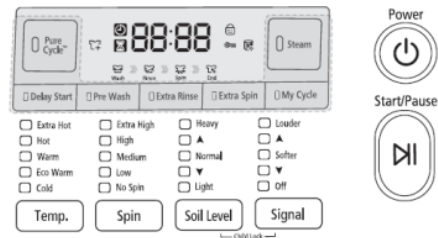
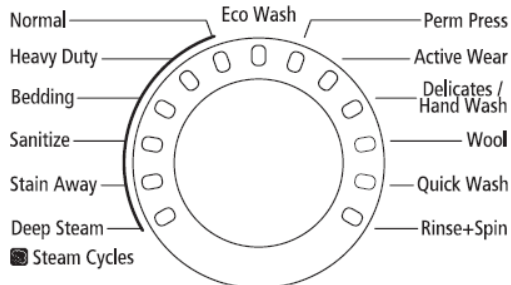
※Fast Time Down Test Mode:

1. Activate the Service Mode in advance.
2. To forward the program to the next cycle stage, press the Temp key.

※Each stage is located at key points of a complete cycle as follows:

- End of Each Fill (Beginning of Wash or Rinse Tumble Session)
 - Caution: Check if the current water level is higher than the Reset water level and then perform the Fast time down test.
- Beginning of Drain Session
- Beginning of Spin Session (Here, it checks the water level. So, if it is over the reset level, it carries out draining before the spinning.)
- Beginning of Fill Session
- Beginning of Bleach Fill
- Beginning of Fabric Softener Fill
- Every 3 minutes during Wash and Rinse Tumble Session

Step 2



#4. Symptom : Error Check



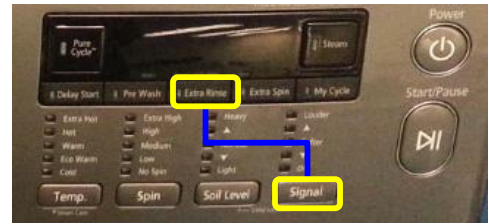
4-1. Schematic Diagram of Repair












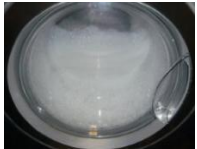




※ Error Mode Check

1. Respond to Error mode displayed on control panel.
2. Check and respond to Service Mode Diagnostic Mode Error.

: Push Signal + Extra Rinse.

: Push the 'Spin' button and, when "d" is displayed, turn knob.



Display (Image)	Error Item	How to	IMAGE
Nf	No Water Fill	<ol style="list-style-type: none"> ① Water supply hose bent ② Check the water supply valve/PBA power supply. 	
Nd	Will not drain	<ol style="list-style-type: none"> ① Check the power of drain pump. ② Clean the filter of drain pump 	
IE	Sensor fail	<ol style="list-style-type: none"> ① Water Sensor ② Measure the water level frequency during stand-by. 	
OE	Water over flow	<ol style="list-style-type: none"> ① Continuous water supply from water supply valve ② Too much foam from normal detergent 	
LE	Water Leakage	<ol style="list-style-type: none"> ① Water level sensor / Water level hose Puck ② Tub Leakage 	
Suds	Suds (Detergent)	<ol style="list-style-type: none"> ① Excessive foam from normal detergent 	
3E	Wash Motor	<ol style="list-style-type: none"> ① Washing Motor Wire Connection ② PBA IPM Output Voltage Check 	
2E	Low / High Volt	<ol style="list-style-type: none"> ① Supply Voltage Check ② PBA IPM Output Voltage Check 	

#4. Symptom : Error Check



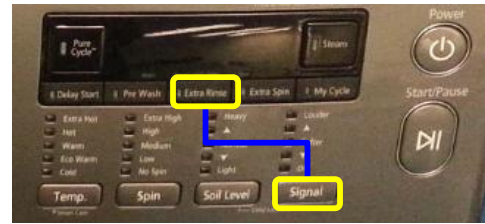
4-1. Schematic Diagram of Repair








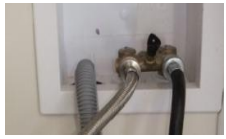










※ Error Mode Check

1. Respond to Error mode displayed on control panel.
2. Check and respond to Service Mode Diagnostic Mode Error.

: Push Signal + Extra Rinse.

: Push the 'Spin' button and, when "d" is displayed, turn knob.



Display (Image)	Error Item	How to	IMAGE
dC	Unbalance	<ol style="list-style-type: none"> ① Check if it is level. ② Check the criteria for recommended use of laundry. 	
tE	Water temp.	<ol style="list-style-type: none"> ① Sensor Wire Connection ② Measure the resistance of sensor temperature. 	
Hr	Not Heater	<ol style="list-style-type: none"> ① Check the PBA working Heater ② Check the voltage supplied to Heater. 	
nf1	Water Hose Connection	<ol style="list-style-type: none"> ① Cold/Hot water supply hoses are not assembled correctly. 	
LO	Door Will nor Unlock	<ol style="list-style-type: none"> ① Check if PBA Door-Lock works. ② Measure the resistance of Door-Lock. 	
FL	Fail to Lock	<ol style="list-style-type: none"> ① Check if PBA Door-Lock works. ② Measure the resistance of Door-Lock. 	
DS	Door is Open	<ol style="list-style-type: none"> ① Door Open Check ② Fabric Jamming 	
AE	PBA Communication	<ol style="list-style-type: none"> ① Sub PBA Wire Connection 	
E2 /SF	Button Pressed	<ol style="list-style-type: none"> ① Tact Button Pressed ② Wire Connection 	

Tip 4-1. nF Error Abnormality



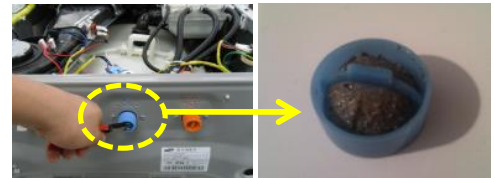
Check Point

Check the condition of Water-Hose / Water supply valve.



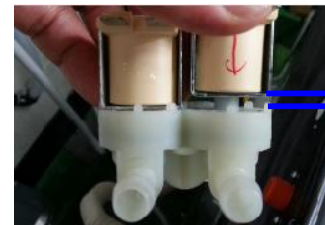
Step 1

- ① **Check for water supply fail due to hose bent during installation.**
 - Water is not supplied due to hose bending and friction, caused by installing the product rear right to the wall.
- ② **If filter is clogged due to pipe & water quality problems,**
 - Separate the filter with a tool.
 - Clean the filter with a brush.



Step 2

- ① **Check the connection of water supply valve.**
 - Check for push-back of pin of terminal.
 - Check if harness wire is broken.
- ② **Check the exterior of valve.**
 - The upper core of water supply valve is heaved.
 - Body Crack
- ③ **Check the resistance of both ends of water supply valve.**
 - ☞ Maintain 1.0kΩ for coil resistance -> If O.L., replace the valve.



Step 3

- ① **Check the power supplied from PBA.**
 - Press the power button while holding Soil+Signal.
 - => Test mode
 - Turn knob to enter "tSt" mode.
 - Operate the Temp button to make valve work gradually.
 - Measure the power supply for water supply valve.
- ② **Check the voltage applied to both ends of water supply valve.**
 - Maintain the voltage supplied to valve at 120V.
 - If NG, measure voltage applied to Valve of Tip 4-3.



Tip 4-2. nd Error Abnormality



Check Point Check the condition of Pump & Hose.



Step 1 nD Error Check

① Drain fail Pump Wire Check

- Check for the pushed-back condition of Wire terminal and Housing.

② Measure the power to see if drain pump wire is broken. (Power Off)

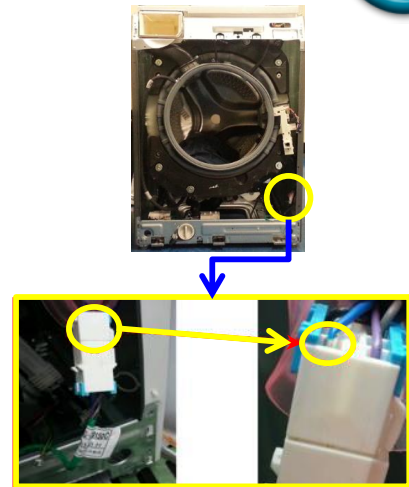
- Check of RY#1-①(BLU) and CN1③(VIO)
- ☞ The Resistance : approximately 15.5Ω
- ☞ Replace the Wire or Pump

③ Measure the power supplied to PBA of drain pump. (Power On)

- Check of RY#1-①(BLU) and CN1③(VIO)
- ☞ The Voltage : approximately AC120v

[CN#1 Reference Table for Load-measuring Point]

CN#1	Color	Load	refer
③	VIO	Pump-Motor	
⑥	BRN	Steam-Valve	
⑦	YEL	Pre-Valve	
⑧	BLU	Main-Valve	
⑨	RED	Hot-Vale	
⑩	PNK	Bleach-Valve	
RY#1-①	BLU	AC	Common



Step 2


① Small foreign materials

- When water is draining through drain hose, small foreign materials could drain with water because there is no filter. So, it can make a little bit of noise but it is not a problem

② Check if pump drain impeller is broken.

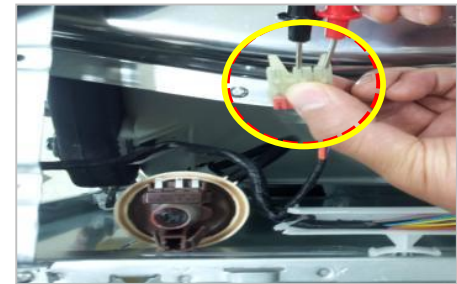


Tip 4-3. IE / OE Abnormality

 **Check Point** Check the water level sensor and the connection.

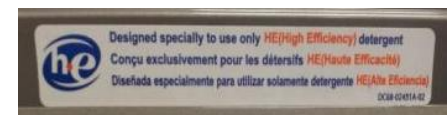
Step 1 IE Check

- ① **Check if Main PBA IE Error occurs.**
- ② **Water level sensor Check**
 - Measure the coil resistance to check for the breakage.
 - ☞ Maintain the coil resistance at 20~24Ω -> If O.L, replace it.
- ③ **Check the condition of contact between water level sensor and terminal.**
 - The terminal is not completely inserted into water level sensor, which is contact fail.
- ④ **Voltage of Water Level Sensor**
 - Power on and separate wire connector from water level sensor.
 - And then check Voltage value between orange and violet wire of water level sensor.
 - ☞ **The Voltage value : 1.6v**
 - If the value is not normal, replace the PBA.



Step 2 OE / SUDS Check

- ① **Customer uses too much of normal detergent.**
 - It is filled with foam inside because the user uses too much of normal detergent for Top-Load washers.
 - Explain the recommended amount of he-mark detergent for front-load washers to be used.
- ② **If water is continuously supplied, due to water supply valve leakage,**
 - Replace the water supply valve.
- ③ The top part of water level sensor shall not be adjusted by applying Bond after the setup at the time of factory shipment.
 - ※ The Reset frequency changes during adjustment; thus, spinning mode is not activated.



Tip 4-4. LE Abnormality



Check Point

Check the water level sensor and water leakage condition.



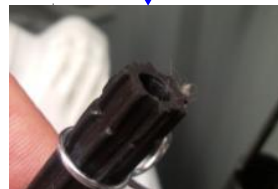
Step 1 LE Error Check

- ① Check for LE error in Main PBA.
 - ② Supply water during Rinse + Spin course to measure the frequency.
 - After Rinse water supply to empty tub, check the bottom.
 - Press Signal+Extra Rinse for 5 sec with the power on.
 - Press Extra Rinse to select Board Input(in) mode.
 - Turn knob counter-clockwise to select 5th LED.
- ※ How-to-read: 2251 => 22.51kHz
- ☞ If the frequency of 22.51kHz is not maintained for 5 min, follow Step #2.
 - ☞ If the frequency of 22.51kHz is maintained, check the drain hose in Step #3.



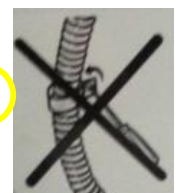
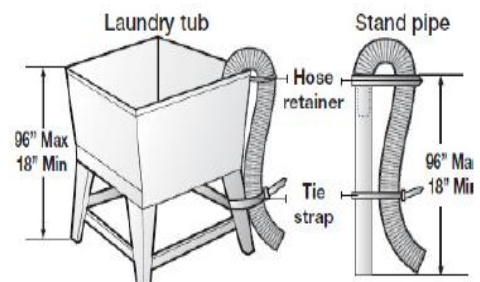
Step 2

- ① If LE error occurs, run check.
 - Leakage of Punk in Water level sensor: Replace the water level sensor.
 - Leakage of Split in Water level sensor: Replace the water level sensor.
 - Air Leakage due to Puntured Water level hose: Replace the water level hose.




Step 3 Drain Hose Install Check

- ① If drain hose is inserted too deeply into drainage adjust it not to sink to water in drainage.
 - ② Don't remove the screw holding drain hose to frame.
 - If it is removed, drain hose is down on floor and water is drained out automatically
- ☞ Check if there are holes on drain hose.



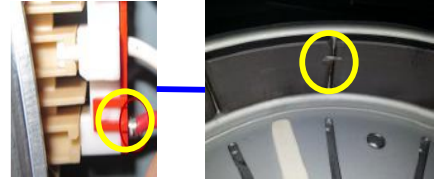
Tip 4-5. 3E / 2E Error Abnormality

 **Check Point** Check the condition of Motor , Hall Sensor and PBA.



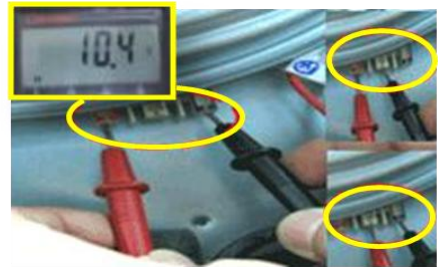
Step 1

- ① **Wire Connection**
 - Check the motor & sensor wire connection
- ② **Magnet in Rotor**
 - There are magnets inside rotor.

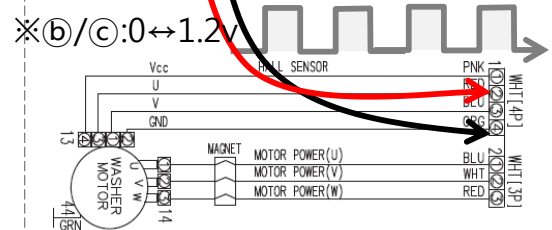


Step 2 3E Check

- ① **Check of Resistance motor (U-V-W).**
 - ☞ The Resistance : approximately 11Ω
 - ② **Weight is sensed wrong due to Hall Sensor feature defect.**
 - Check of ①-VCC(PNK) and ②-GND(ORG)
 - ☞ The Voltage : approximately 5.0V
 - Check of ③-U(RED)/④-V(BLU) and ②-GND(ORG)
 - ☞ The Voltage : approximately 0~1.2v Pulse
- ※ Rotor the slow turning by manually

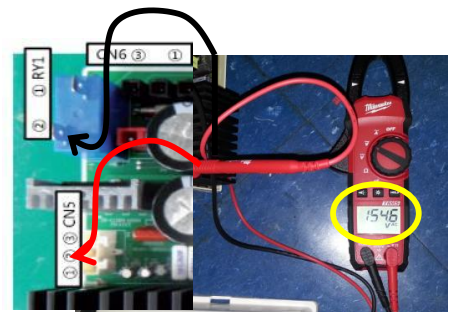


☞ Replace the Motor



Step 3 2E Check

- ① **Check the Motor Supply Voltage of PCB**
 - CN5-#1/#2/#3 and RY1-#2(BLU)
 - ☞ The Voltage : approximately AC152V
 - ☞ Replace the PBA
- ② **Check the Supply Voltage of Power**
 - If the voltage is approximately 120V
 - Check if the reactor wire connection
 - ☞ Replace the Power



Tip 4-6. dC Error Abnormality



Check Point Check the Unbalance customer usage condition/install & the motor condition.



Step 1 dC Error

※ Explain to NDF customers how to use it.

- Check the wrong usage condition of laundry and explain the recommended use.
- Do not use Water-Proof Sheet, Mats, and clothing.

Step 1 : Small Loads Case

: If loading the laundry whose weight is $1\text{kg} \pm 0.5\text{kg}$, it is easily inclined to one side.

☞ Add more laundry to make it normal.

Step 2 : Unbalance of laundry

: Stop using Water-Proof Sheet, Mats and clothing.

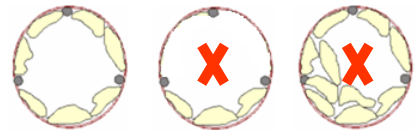
☞ Do not input the laundry listed above, since water does not drain during high-speed spinning mode, causing unbalance problems.

Step 3 : Unbalance of bedding, carpet, and etc.

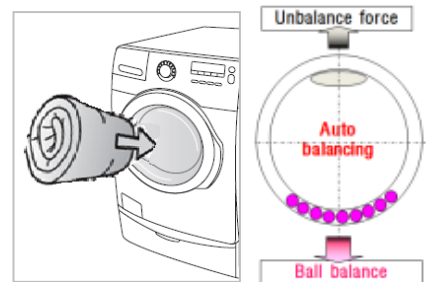
: Bedding should be washed alone less than 3.5kg.

☞ Solution: Roll up the bedding before putting into washer.

※ Do not wash Cotton bedding, wool bedding and mink blanket.



【 Normal 】 【 Small loads 】 【 Over loads 】



Step 2

① Level Installation & Floor Moving Phenomenon Check

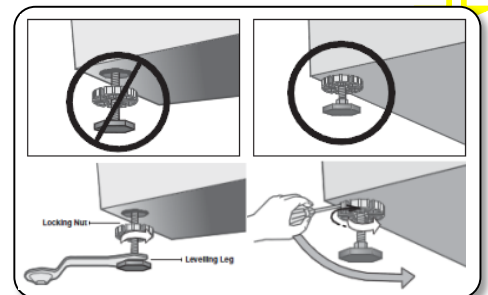
Case#1 - The levelness-measuring apparatus indicates that the level install condition of product is poor.

Case#2 - Shaking due to old floor(lumber) of laundry room.

Case#3 - If the Leg-Ring is not tightened firmly, tighten it completely.

☞ Re-installation is recommended such that it does not influence on vibration.

※ Check the washing motor and the hall sensor. (Tip 4-5)



Tip 4-7. tE , Hr, nF1 Error Abnormality Check



Check Point

Check the operation of Thermistor / Heater.



Step 1 tE

- ① **Wire connection**
 - Check the connection of wire
- ② **Thermistor Measure Mode Check**
 - Press and hold Signal + Extra Rinse for 5 sec.
 - Press Extra Rinse to select the Board Input(in) mode.
 - Turn knob counter-clockwise to select 1st LED.
 - ☞ Compare the Temperature Table & Sensor Resistance.
- ③ **Check the thermistor resistance**
 - ☞ Replace the thermistor

※ Error Refer

tE : Abnormal high/low temperature or resistance

Hr : This error code appears when the heater is 96°C or above.

nF1: This error code appears when the water temperature is 50°C or above for 8 seconds or longer in the Wool and Delicate course.



온도		R_max	R_min
-20°C	-4°F	493.4kΩ	481.3kΩ
-10°C	14°F	279.1kΩ	273.0kΩ
0°C	32°F	163.8kΩ	160.6kΩ
10°C	50°F	99.2kΩ	97.5kΩ
20°C	68°F	61.9kΩ	61.0kΩ
30°C	86°F	39.8kΩ	39.3kΩ
40°C	104°F	26.2kΩ	25.9kΩ
50°C	122°F	17.7kΩ	17.5kΩ
60°C	140°F	12.2kΩ	12.1kΩ
70°C	158°F	8.6kΩ	8.5kΩ
80°C	176°F	6.2kΩ	6.1kΩ
90°C	194°F	4.5kΩ	4.4kΩ
100°C	212°F	3.3kΩ	3.3kΩ

Step 2 Hr


- ① **Heater Supply Voltage Check for Main PBA**
 - Enter test mode to operate heater.
- ② **Heater Test Mode Check**
 - Press and hold the Soil+Signal buttons while pressing the power button => Test Mode
 - Turn Knob, to enter "tSt" Mode.
 - Push the Spin button to work Door-Lock.
 - Push the Soil-level button to work Heater.
- ③ **While heater is working, check the voltage**
 - ☞ The Voltage value : approximately 120V
 - If the value is not normal, replace main PBA



Step 3 nF1

- ① Check if the Cold/Hot water supply valves are switched during installation.

Tip 4-8. dS, FL, LO Error Abnormality

 **Check Point** Check the Door / Door-Lock.



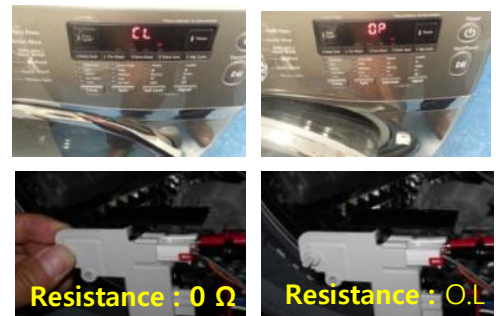
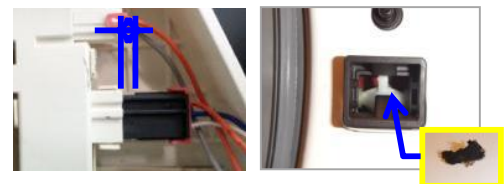
Step 1 dS Error

- ① If "dS" error occurs.
- ② If the Door is open or the laundry is jammed.
 - ☞ Close the Door to its normal position and press Start.
- ③ If the Door does not close due to Cam rotation in the Door lock,
 - ☞ Insert wire and hook it to Cam. Then, pull it.

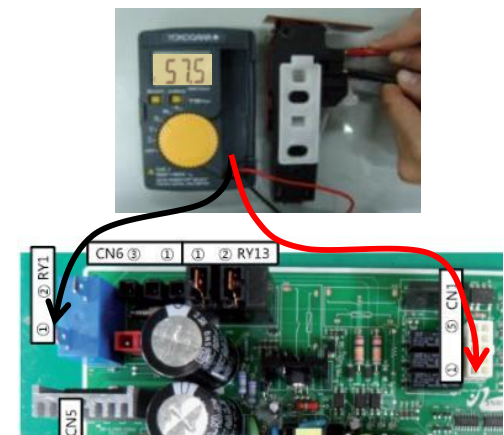


Step 2 FL / LO Error


- ① Door-Lock Exterior Check
 - Terminal for operation incomplete contact
 - Check if there is foreign substance inside the Door-Lock.
- ② Check of door lock
 - With the Power on, press and hold the Signal+Extra Rinse buttons for 5 sec.
 - Press Extra Rinse to select the Board Input(in) Mode.
 - Turn knob counter-clockwise to select 3th LED.
 - ☞ Door-Close : CL (Resistance : 0Ω)
 - ☞ Door-Open : OP (Resistance : O.L)



- ③ Check for door lock .
 - Check Resistance of door lock S/W.
 - CN1#①(BLK)/#②(WHT) and RY1#①(BLU)
 - ☞ The Resistance - 55.8 ~ 68.2Ω
 - ☞ Replace the Door lock
- If the value is not normal, replace door-lock




Tip 4-9. AE, E2, SF Error Abnormality

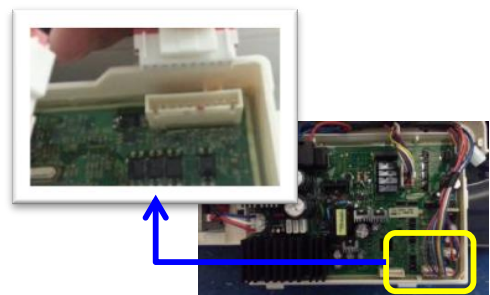
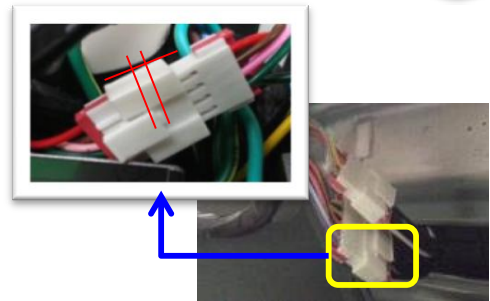
 **Check Point** Check the PBA-communication / Button.



Step 1 AE / SF Error

- ① Disassemble sub PBA .
- ② Check the connector which connects sub PBA and main PBA on sub PBA.

 Replace the Sub-PCB



Step 2 nE Error

- ① If there are no button stuck on control panel, replace sub PBA.


※ This case can be caused when tact switches on sub PBA are defective.

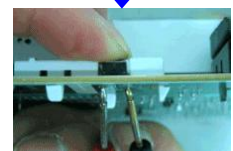
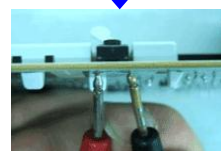
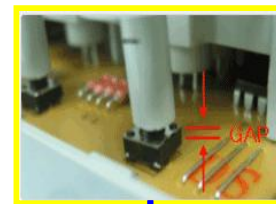
You can see that the resistance of defective tact switches is not normal.

※ If button does not operate smoothly due to constraint, disassemble it and apply grease.

 The Resistance :

- ∞ (when tact switch is not pressed)
- 0 (when tact switch is pressed)

 Replace the Sub-PCB

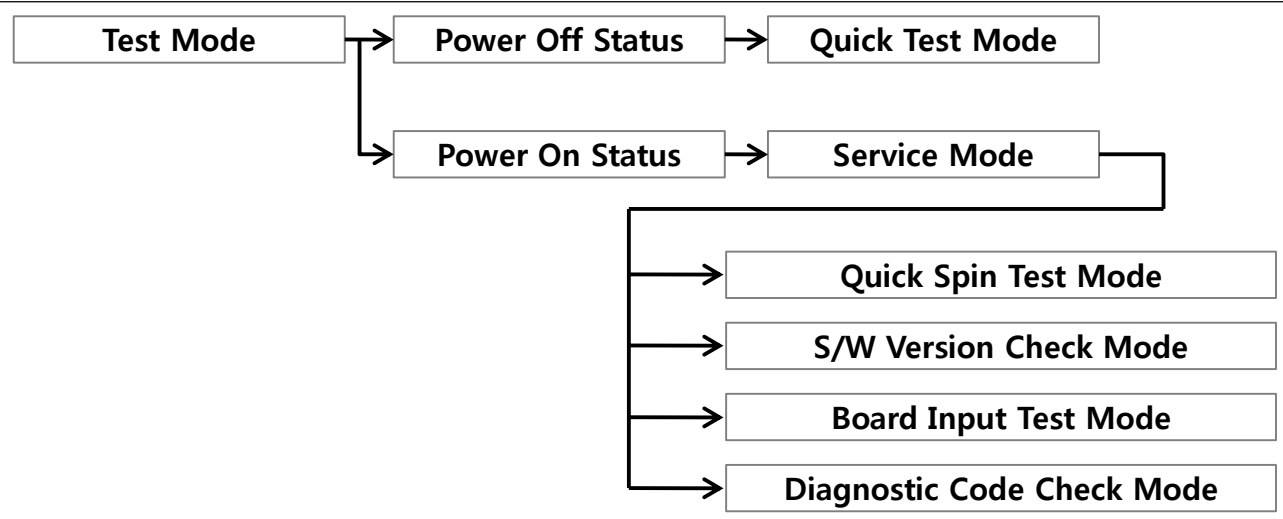


#5. Symptom : Test Mode & Circuit Diagram

5-1. Schematic Diagram of Repair



Check Point Check the Test Mode / Diagnostic Mode.



Model	Quick test mode	Quick spin test mode	Service mode	S/W version check mode	Board input test mode	Diagnostic mode
WF393 WF395 WA405	Soil level + Signal + Power key	Pre Wash + Soil level	Signal +Extra rinse	Soil level	Extra Rinse	Spin

Quick Test Mode

You can check the operation of main electric parts easily on quick test mode. (Water valve, Door lock S/W, Heater, Drain pump)

- ① Enter Quick test mode.
- ② Software version is displayed and turn jog-dial so that the version disappears.
- ③ You can check the operation of water valve, drain pump, circulation pump, heater, door lock S/W by pressing a button.

Model	Key	Check part
WF393 WF395 WA405	Temp	Water valve
	Spin	Door lock / Unlock
	Soil level	Heater

Service Mode

Service mode enables service technicians to verify the operation of washing machine and do troubleshooting.

Service mode can be entered during all washing cycle without interrupting the cycle except some of test modes.

- The washer must be on to go into the Service mode.
- When you enter Service mode, you can see motor spin RPM.

Quick Spin Test Mode

You can check motor spinning on quick spin test mode.

As it enters into quick spin test mode, it starts spinning and reaches to its maximum RPM.

When motor is not spinning, you can enter into quick spin test mode.

Board Input Test Mode

Board input test mode is to display a specified input.

As it enters into board input test mode,

Clockwise direction turn jog-dial so that the LED turns on and press the start / pause button.

Course	Normal LED	2 nd LED	3 rd LED	4 th LED	5 th LED
Display	Water temp. (°C)	Water temp. (°F)	Door status (OP:open, CL:close)	Door lock S/W status (UL:unlock LO:lock)	Water Frequency


Diagnostic Mode

You can check what error codes have occurred through diagnostic mode.

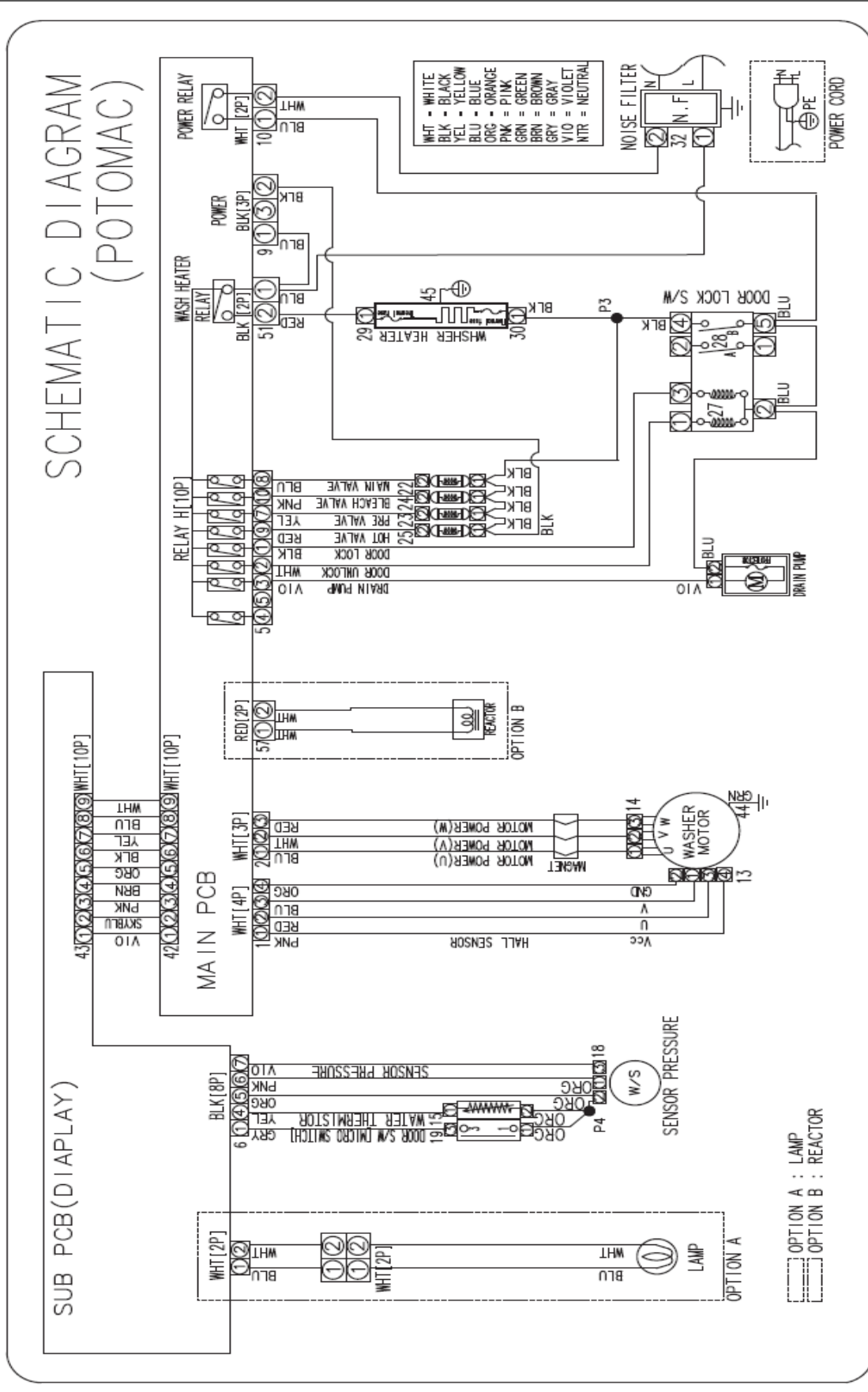
When you enter into diagnostic mode, 'd' is displayed.

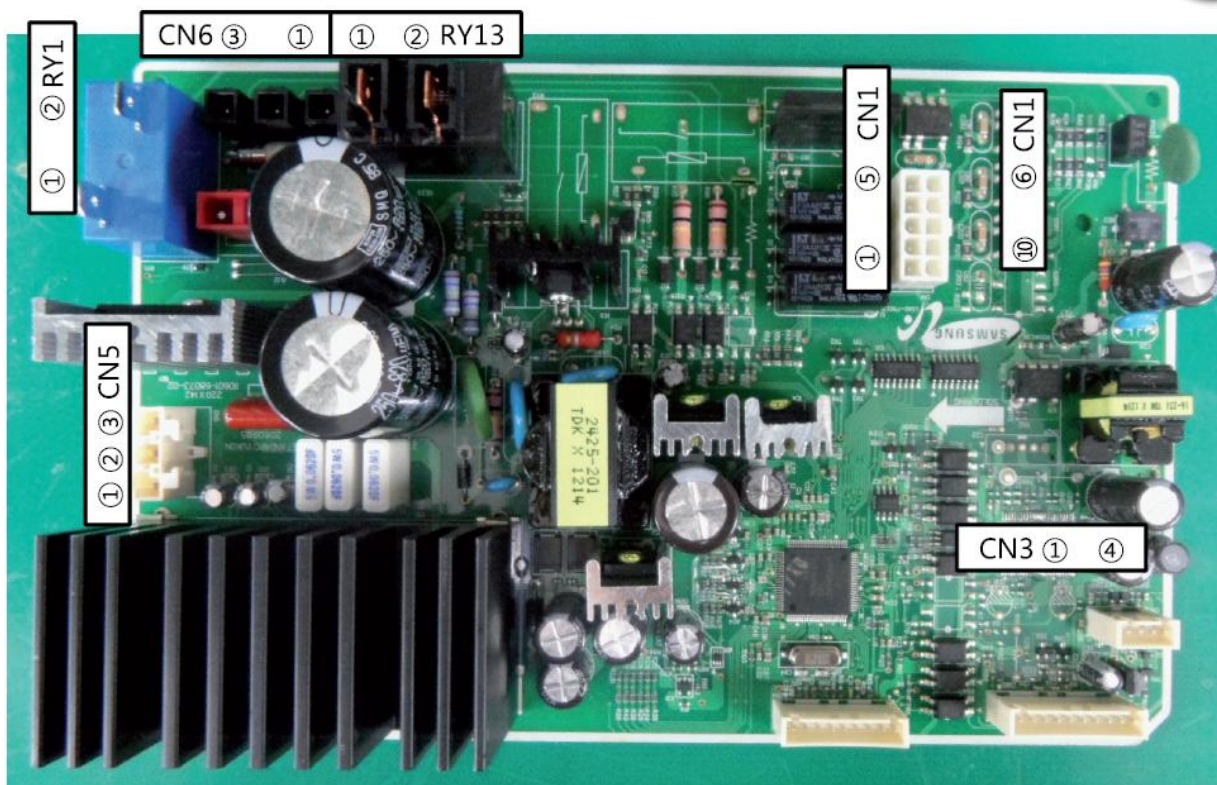
And if you turn jog-dial in a clockwise or counter-clockwise, you can see error codes that have happened recently.

Tip 5-2. Appendix

 **Check Point** Check the Circuit Diagram / PBA.

Model : WF393 / WF395 / WF405





Hall Sensor Check

Check Voltage at Pin #4 and #3 of CN3
Tester Check = DC 0V or 1.3V
Check Voltage at Pin #4 and #2 of CN3
Tester Check = DC 0V or 1.3V

Motor Check

Resistance at Pin #1 of #2 of CN5 = 12 Ω
Resistance at Pin #2 of #3 of CN5 = 12 Ω
Resistance at Pin #3 of #3 of CN5 = 12 Ω

Door Lock Check

Check AC Voltage at Pin #1 of CN6 and
Pin #2 of CN6
When Door Lock = AC 120V

Drain Motor Check

Check Voltage at Pin #1 of RY1 and Pin #3
of CN1
When Drain Pump operates = AC 120V

Water Valve Check

Check Voltage at Pin #1 of RY1 and Pin
#6,7,8,9,10 of CN1
When Each Valve operates = AC 120V

AC Power Check

Check Voltage at Pin #1 of CN6 and #1
of RY1
When Set Power On = AC 120V

WASH Heater Relay Check

Check Voltage at Pin #1 of RY1 and Pin
#2 of RY13
When Wash Heater Relay operates
= AC 120V