

Service Guide

Washing Machine

Asko WL6511XXLW
WL6511XXLT

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■ What is Drum Washing Machine?

1. Drum Washing Machine

Water consumption is reduced by using the power of the laundry falling (free-fall) created when rotating the drum resembling a sieve net. With temperature control system, this drum washing machine saves energy and improves washing performance at the same time.

2. Key Features

◆ Simultaneous supply of cold · hot water

As cold and hot water is supplied at the same time, heating time and energy is saved.

◆ Top-quality popup dial

The top-quality popup dial is used only during washing process.

◆ Dust filter

Filter to remove foreign substances, such as naps generated during washing, etc., is installed inside the drum.

◆ DD inverter motor

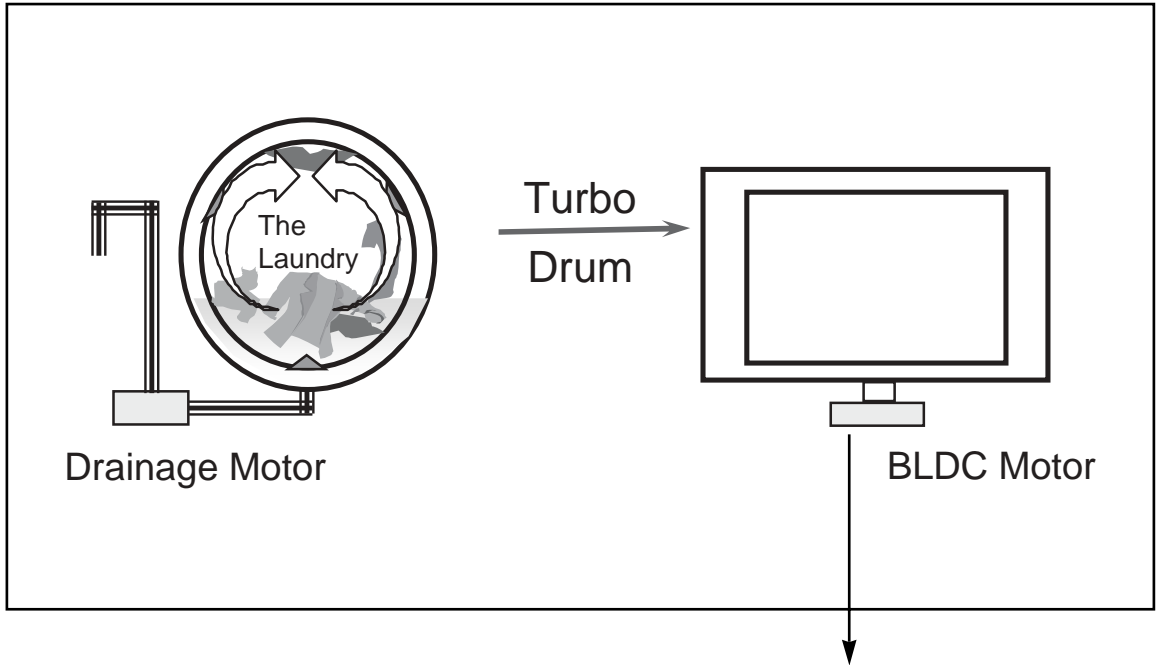
The direct-drive type, of which motor is directly connected to drum without an interim clutch, significantly reduces noise and vibration.

◆ Heating device is installed to enable boiling of the laundry.

◆ Large door creates grand appearance and makes it easy to put in and out the laundry.

◆ For pump drainage, the powerful pump speeds up drainage process.

3. Power System



- DD Control: Direct drive type of direct connection between drum and motor
- Rotation by powerful high-performance BLDC motor
- Pump drainage type for built-in installation

4. Major Functions

① Washing

When rotating drum after putting in the laundry and detergent into the drum, the laundry are rotated by protrusions (lifters) attached inside the drum.

Washing is carried out with bending and impact actions generated by falling of the laundry to the top part of drum.

② Rinsing

Rinsing cleanly washes out detergent and dirt removed from the laundry after washing cycle.

③ Spin-drying

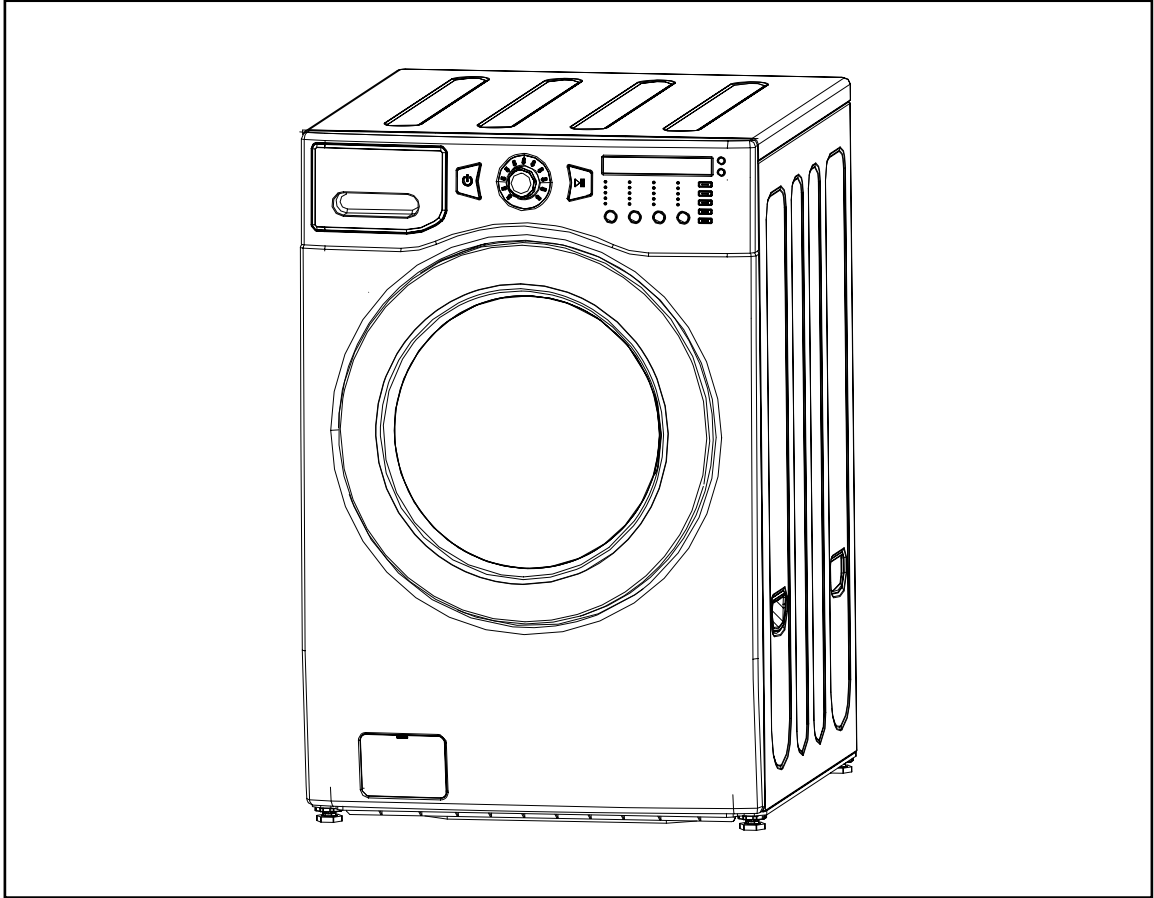
Weak, standard and strong cycles can be selected according to types of fabrics to be washed. Spin-drying is carried out by rotation (the centrifugal force) of drum according to the designated speed.

④ Drainage

Pump Drainage: Powerful pump for built-in installation and application of filter to remove foreign substances

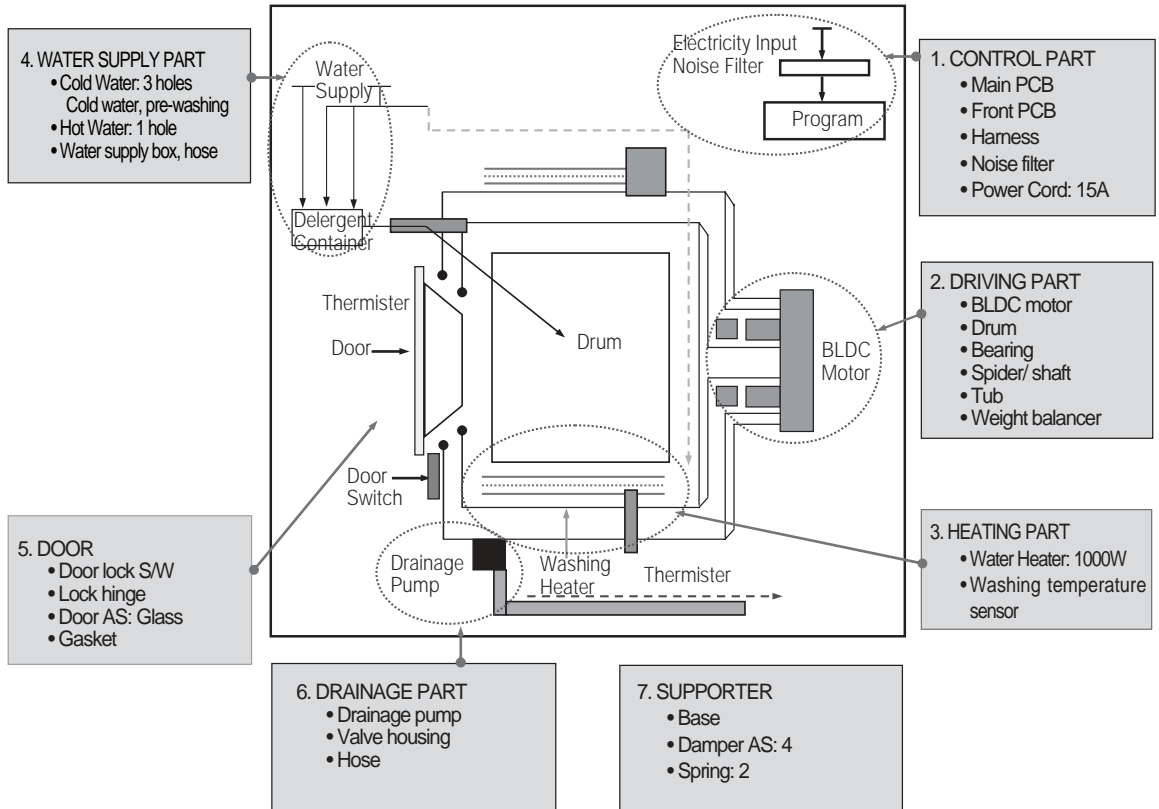
■ Washer Specification

1. Product Specification



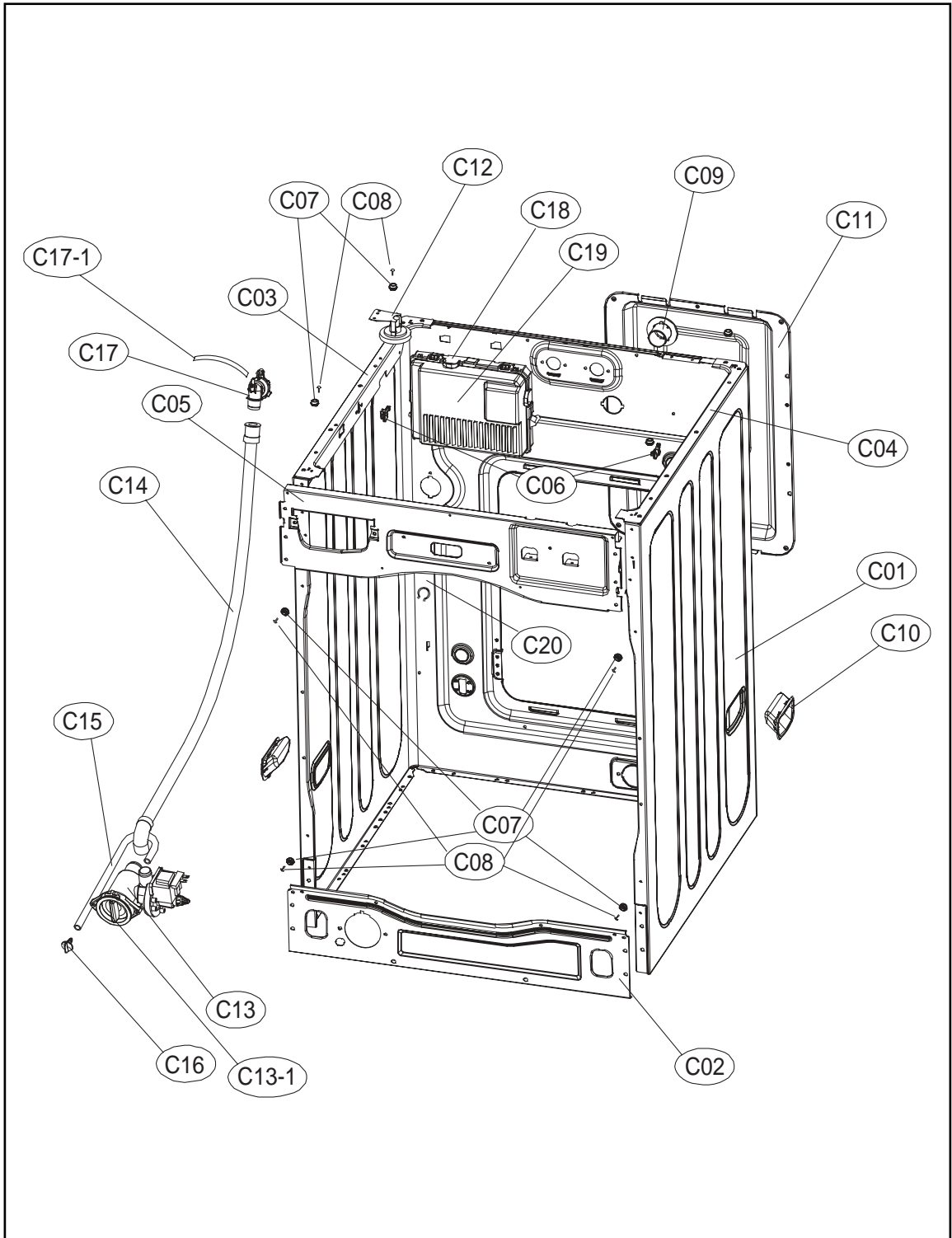
External Measurements (inches)		27"(width) x 31.8"(depth) x 40.1"(height)
Weight		198.4lbm
Rated Supply Power		120V 60Hz
Rated Consumption Power	Washing	200W (1100W during heating)
Washing Method		Drum type
Water Pressure		Water Pressure 29kPa ~ 784kPa(0.3kgf/kg~8kgf/kg)

Operating Mechanism Diagram



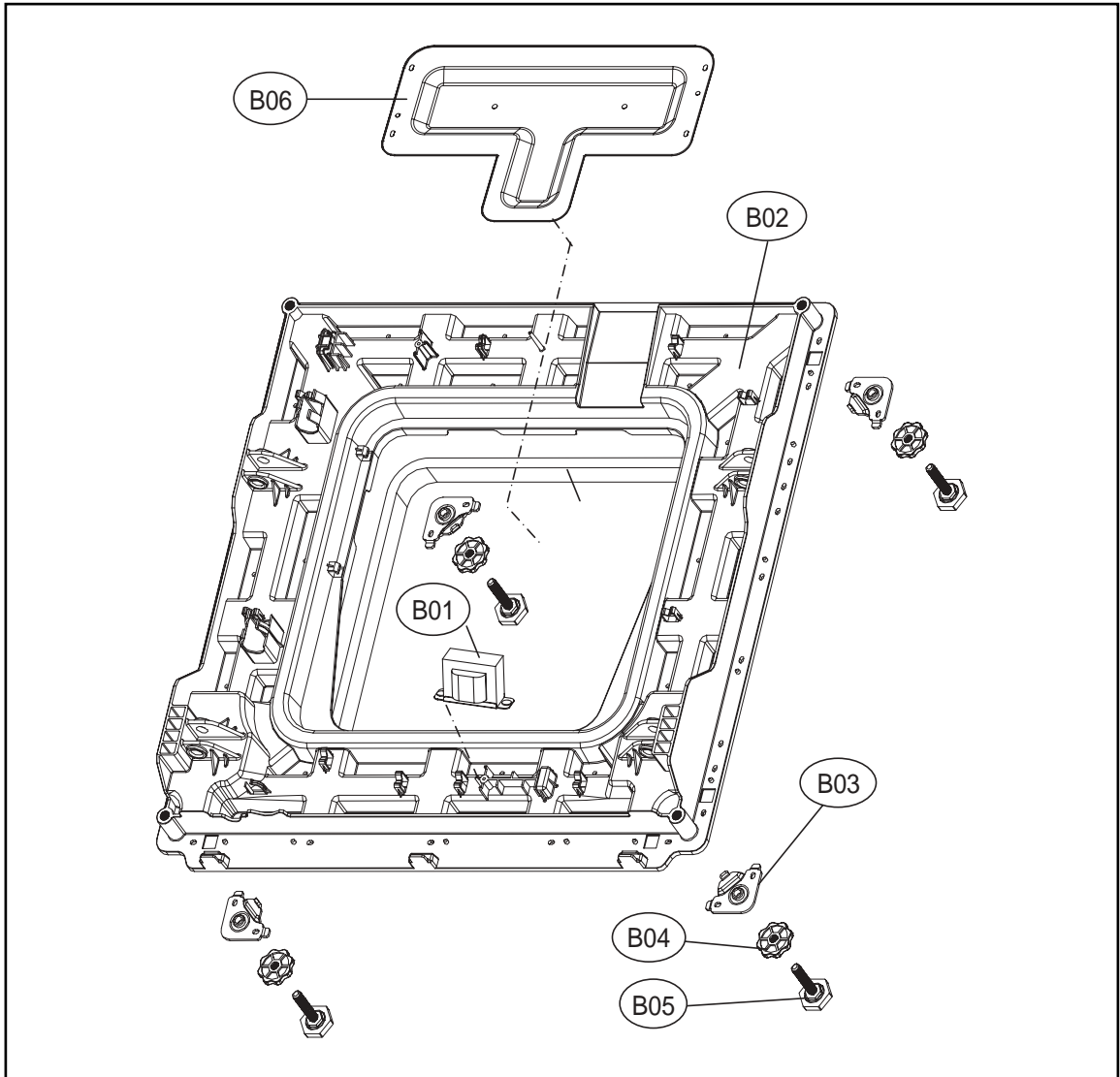
■ PARTS LIST BY ASS'Y

1. CABINET AS



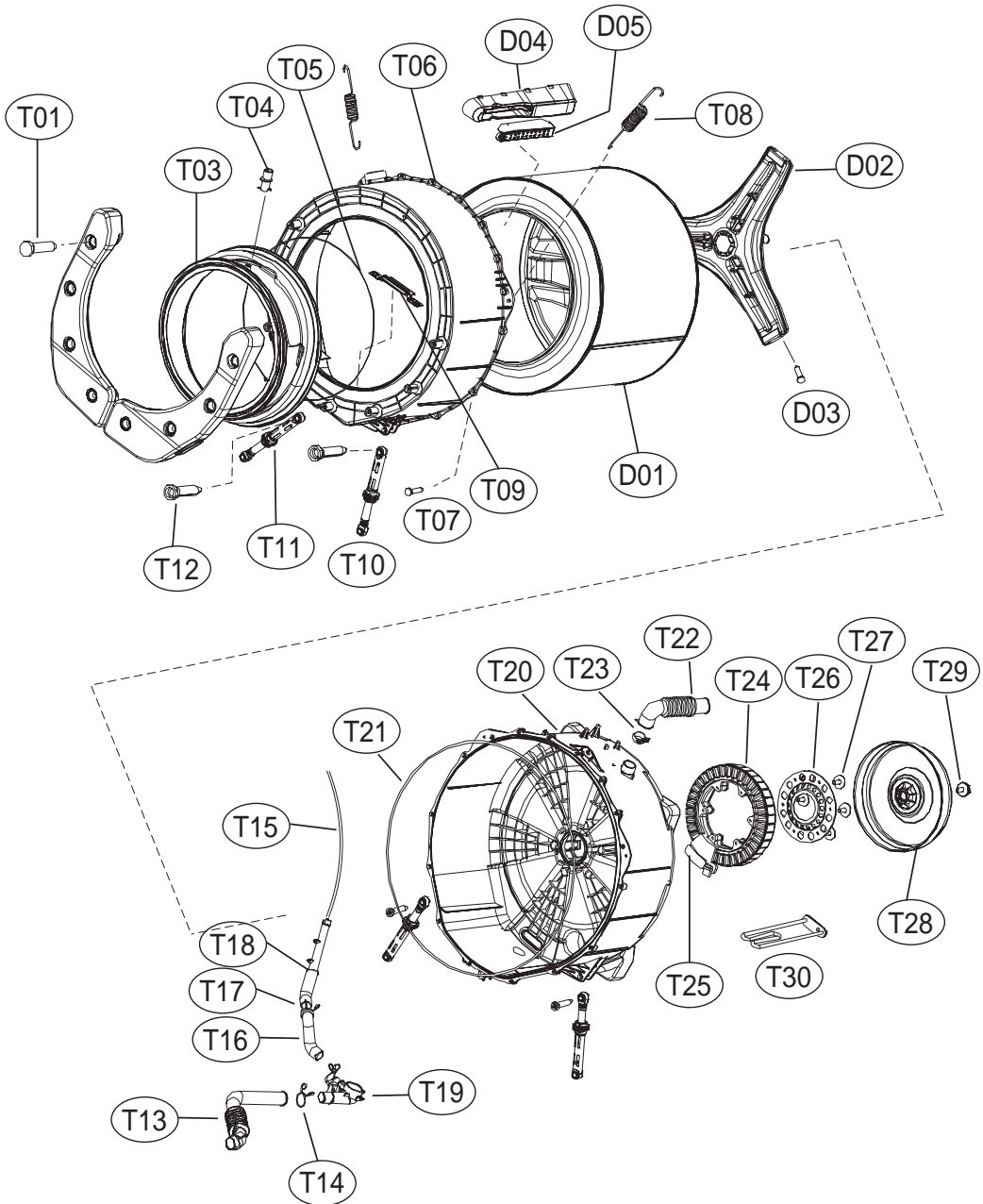
No.	Part Name	Part Code	Qty	Specification	Remark
-	CABINET SUB AS	3610811950	1	13KG, PUMP, WHITE	WL6511 XXLW, XXLW RH
		3610811955	1	13KG, PUMP, PLATINUM	WL6511 XXLPP
		3610811956	1	13KG, PUMP, ROSE RED	WL6511 XXLRR
C01	CABINET	3610811740	1	SGCC 0.8T PUMP WASHER	• 1PIECE SVC PART => CABINET SUB AS
C02	FRAME LOWER	3612206700	1	SBHG 1.2T	
C03	FRAME TOP L	3612206500	1	SGCC 1.6T	
C04	FRAME TOP R	3612206600	1	SGCC 1.6T	
C05	FRAME UPPER	3612208200	1	SGCC 1.2T	
-	SCREW TAPPING	7122401411	6	T2S TRS 4 x 14 MFZN	Fix Frame Upper to Cabinet
C06	STOPPER SPRING	3615202200	2	POM	
C07	FIXTURE PLATE	3612008000	8	POM	
C08	SCREW TAPPING	7121401211	8	T2S PAN 4 x 12 MFZN	
C09	NOZZLE AIR	3618103110	1	PP	
C10	HANDLE CABINET	3612608100	2	PP, WHITE	WL6511 XXLW, XXLW RH
			2	PP, PLATINUM, RED	WL6511 XXLPP, XXLRR
C11	COVER BACK AS	3611425530	1	COVER B + PAD + LABEL	
-	SCREW TAPPING	7122401411	4	T2S TRS 4 x 14 MFZN	Fix Cober Back to Cabinet
C12	SENSOR PRESSURE	3614825220	1	DWD-130RP	
-	SCREW TAPPING	7122401411	2	T2S TRS 4 x 14 MFZN	Fix Sensor Pressure to Cabinet
C13	UNIT DRAIN PUMP AS	36189L5600	1	UL.PLASET + HANYU AS 80W	
C13-1	FILTER PUMP	3611910200	1	HANYU FILTER	
-	SCREW TAPPING	7122401411	2	T2S TRS 4 x 14 MFZN	Fix Drain Pump to Frame Lower
C14	HOSE DRAIN I	3613271300	1	ST+EL, 1010MM	
-	ABSORBER HOSE DRAIN	3610115600	1	T10, 60 x 130	
-	CLAMP HOSE	3611203900	2	SK5 D=26	Fix Drain I
C15	HOSE WATER REMAIN	3613272210	1	EPDM, UL 3T Round Bending	
C16	CAP WATER REMAIN	3610916800	1	PP	
C17	CUFF DRAIN HOSE	3616802600	1	PP, PUMP	
C17-1	HOSE SIPHON	3613272210	1	EPDM, UL 3T L=270	
-	SCREW TAPPING	7122401411	1	T2S TRS 4 x 14 MFZN	Fix Drain Hose to Cabinet
C18	PCB INVERTER AS	PRPSSWAD09	1	ASKO 13K Washer Pair main	
C19	COVER PCB M	3611427700	1	UL,ABS VE-0856, MAIN PCB	
C20	HARNESS AS	3612796T00	1	UL, 13K Washer, Non-bubble	
-	SCREW TAPPING	7122401411	1	T2S TRS 4 x 14 MFZN	Fix PCB Main to Cabinet
-	LOCK HARNESS M	3613802300	6	M Type(18 x 18), Nylon66	Cabinet rear
-	LOCK HARNESS	3613802100	2	DASTL-20NA	Frame Top right
-	LABEL WIRING UL	3613557100	1	UL Only, Wiring diagram+Warning	English&French

2. BASE U ASS'Y



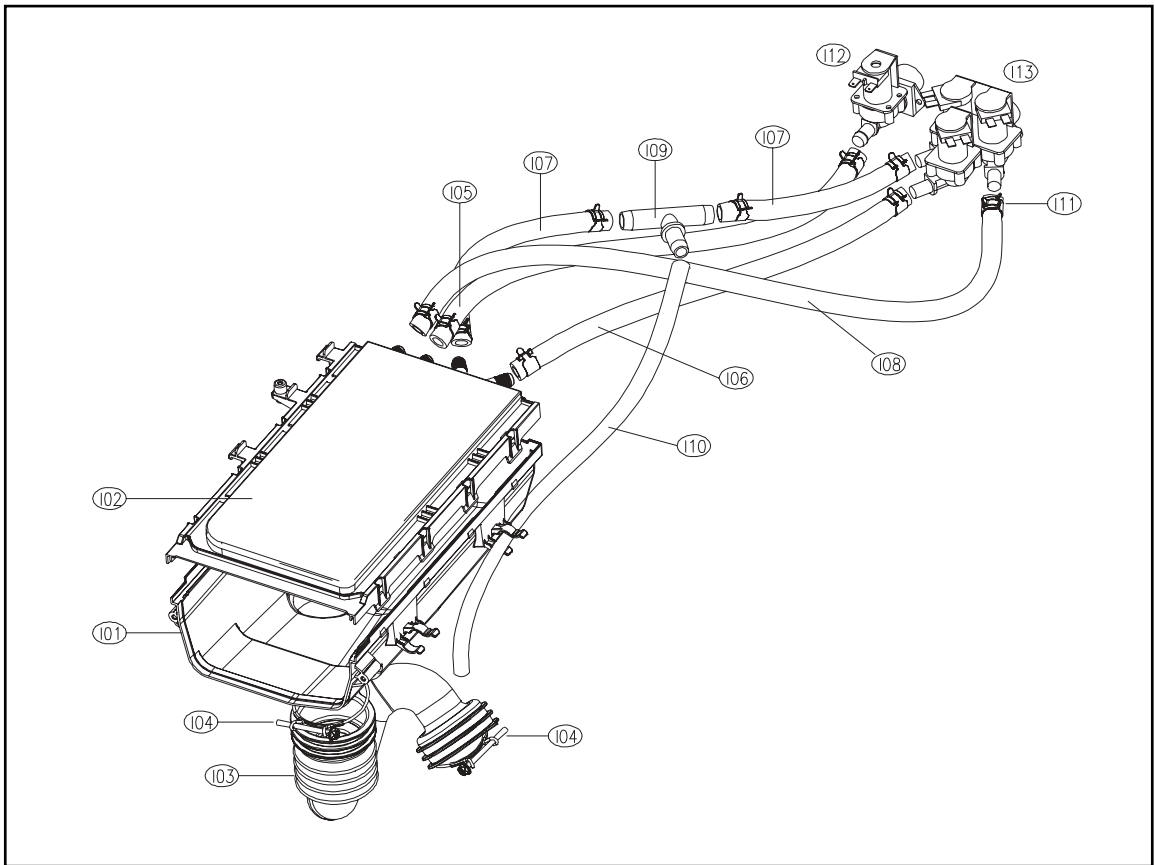
No.	Part Name	Part Code	Qty	Specification	Remark
B01	REACTOR	52G043A110	1	RT-047K L=150	
B02	BASE U	3610392700	1	PP	
B03	SUPPORTER LEG	3615303600	4	PO+Coating 3.0T	
B04	FIXTURE LEG	3612006400	4	ABS, DWD-100DR	
B05	FOOT AS	3612100700	4	Foot+Special bolt, Double insert type Hybra-Nylon66	
B06	PROTECTOR HEATER	3618304600	1	SECC 0.35T	
-	SCREW TAPPING	7122401411	4	T2S TRS 4x14 MFZN	Fix Protector Heater to Base U
-	SCREW TAPPING	7122401411	20	T2S TRS 4x14 MFZN	Fix Base U to Cabinet

3. SUPPORT DRUM REAR ASS'Y



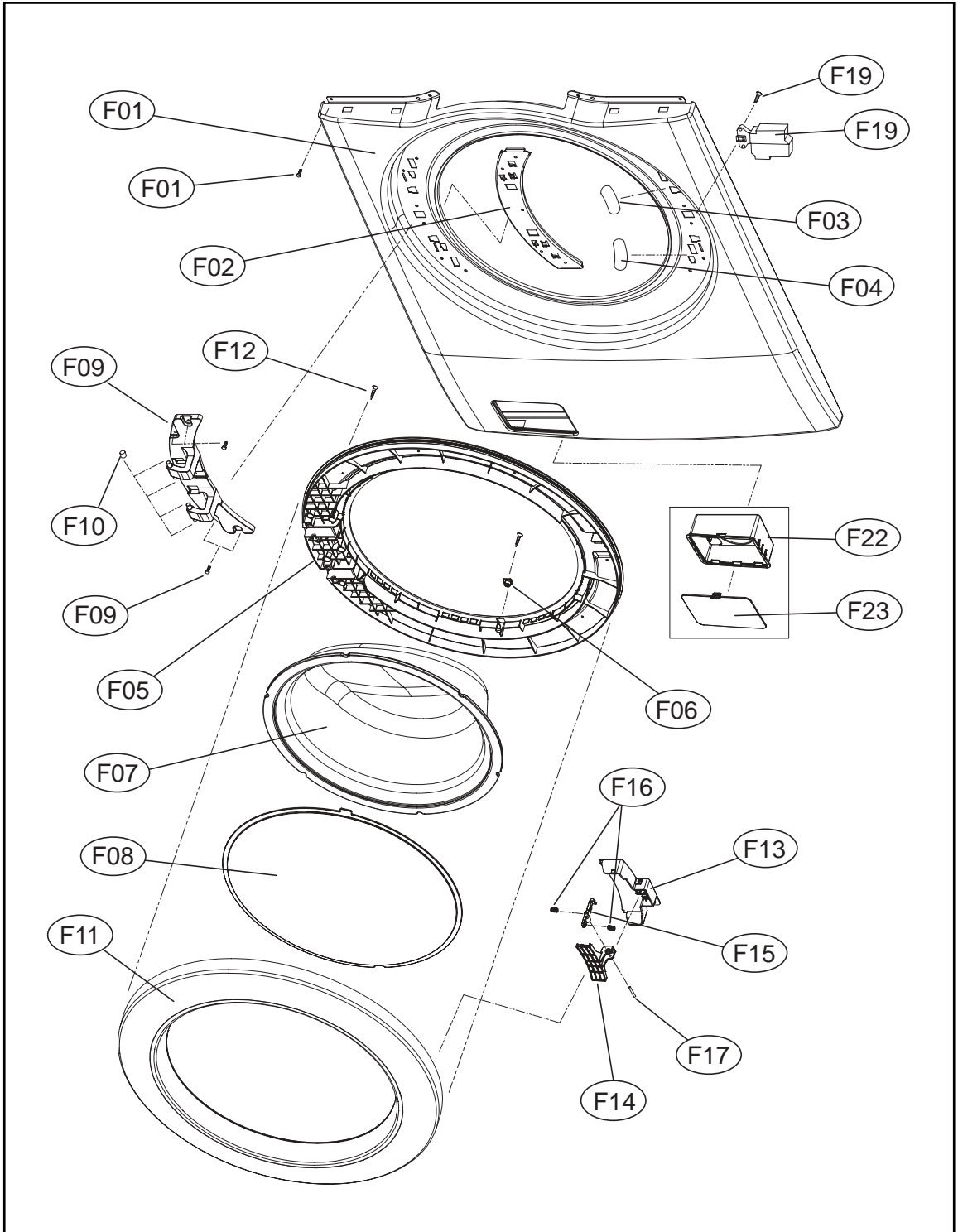
No.	Part Name	Part Code	Qty	Specification	Remark
T01	SPECIAL SCREW	3616029400	8	SWCH 8.5 x 30	Fix Balancer W. to Tub F
T02	BALANCER WEIGHT AS(L)	3616106900	1	13kg DRUM	
	BALANCER WEIGHT AS(R)	3616106800	1	13kg DRUM	
T03	GASKET	3612322000	1	EPDM, Wash-only, Nozzle shower	
T04	NOZZLE SHOWER	3618104000	1	PP	
T05	CLAMP GASKET AS	3611205300	1	Gasket, 13kg Drum	
T06	TUB FRONT	3618828Y00	1	FRPP, 13kg Drum	
T07	SPECIAL SCREW(TUB)	3616029800	15	SWCH 6.5 x 30	Fix Tub F & R
T08	SPRING SUSPENSION	3615114800	2	13kg DRUM	
T09	FIXTURE HEATER	3612006700	1	STS 430	
T10	DAMPER FRICTION	361A700300	2	AWECO, HP3 60N/9MM BUFFER 4,0	Tub F & R right
T11	DAMPER FRICTION	361A700110	2	70N AKS ST=170-260 DL=197.5 LOW NOISE	Tub F & R left
T12	DAMPER PIN	361A700200	8	AKS D=14.5	Tub & Base U
T13	HOSE DRAIN	3613269000	1	EPDM,PUMP	
T14	CLAMP HOSE	3611203410	2	SK5, D=33	
T15	HOSE AIR PRESSURE	3613270600	1	ID=4,OD=8,L=1000MM	
T16	HOSE AIR TRAP	3613269700	1	EPDM, 13kg Drum	
T17	CLAMP HOSE	3611204700	2	D26	
T18	AIR TRAP	361A500101	1	PP	
T19	DRAIN HOUSING I	36196TAM00	1	PP,PUMP	1 PIECE SVC PART
T20	TUB REAR AS	36100E2W00	1	13kg DRUM	
T21	GASKET TUB	3612322100	1	EPDM FORM, 13KG DRUM	
T22	HOSE AIR	3613266300	1	EPDM, DWD-100DR	
T23	CLAMP HOSE	3611203400	2	SK5, MFZN,D=35	
T24	UNIT STATOR BLDC	36189L4840	1	30T,36SLOT,2SENSOR,WS2A30G011	1 PIECE SVC PART
T25	BLDC HALL IC	3626D01002	1	STATOR PCB HOLDER AS(SVC)	
T26	BRACKET HOUSING	3610609700	1	GI 2.3T	
T27	SPECIAL BOLT AS	3616063400	6	SWCH M8+SILOCK, 58MM	Fix Stator & Tub R
T28	UNIT ROTOR BLDC	36189L4900	1	MAGNET24,SERRATION,WR1238F001	
T29	SPECIAL BOLT AS	3616029600	1	SWCH 10*30,F/L BOLT S.P/W SEAL LOCK	
T30	HEATER WASH	3612801740	1	UL120V1.0KW6.7W/SQ.SUS.1R3A515003.L/W.	
D01	DRUM SUB AS	3617008X00	1	SUS, 13kg	1 PIECE SVC PART
D02	SPIDER AS	361A300600	1	13kg, ALDC+S45C	
D03	SPECIAL SCREW(SPIDER)	3616029500	6	STS 430, 8 x 25	
D04	LIFTER BODY	361A400700	3	PP, 13kg Drum	
D05	CAP FILTER	3610917310	3	ABS, NON-NANO, 13kg	1 PIECE SVC PART
	FILTER	3611908410	3	ABS, NON-NANO, 13kg	
	FILTER NET	3611908500	3	SUS, FILTER	

4. INLET BOX AS



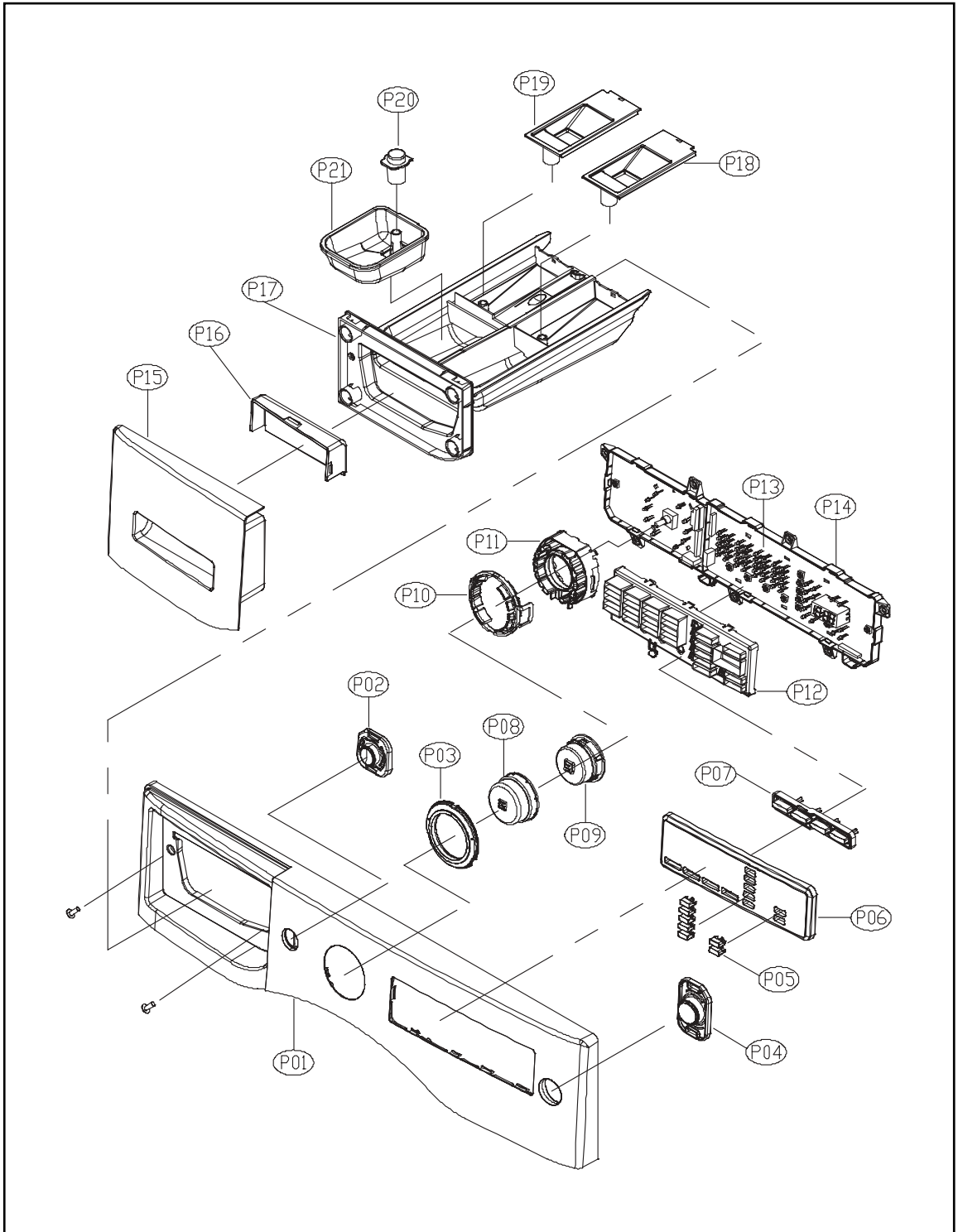
No.	Part Name	Part Code	Qty	Specification	Remark
I01	INLETBOX	3617510800	1	PP	
I02	NOZZLE AS	3618104800	1	WD1131'S, Top+Under	
I03	HOSE INLET	3613270300	1	EPDM	
I04	CLAMP AS	3611203200	2	ID=60, WIRE+GUIDE+BOLT+NUT	
I05	HOSE WATER SUPPLY	3613270920	1	EPDM ID=9.5 OD=15.5 L=410mm	
I06	HOSE WATER SUPPLY	3613270920	1	EPDM ID=9.5 OD=15.5 L=380mm	
I07	HOSE WATER SUPPLY	3613270920	2	EPDM ID=9.5 OD=15.5 L=230mm	
I08	HOSE WATER SUPPLY	3613270920	1	EPDM ID=9.5 OD=15.5 L=530mm	
I09	PIPE JOINT HOSE INLET	3614413300	1	PP	
I10	HOSE SHOWER	3613270130	1	EPDM ID=8.5 L=550mm	
I11	CLAMP HOSE	3611205810	1	D-WD113'S ID14.3 W10 0.9T WH	
I12	VALVE INLET	3615416700	1	UL.120V60HZ.BITRON.1WAY	HOT
I13	VALVE INLET	3615416930	1	UL.120V60HZ.BITRON.3WAY	COLD
-	SCREW TAPPING	7002400811	4	TRS 4X8 MFZN	Fix Valve Inlet to Cabinet
-	SCREW TAPPING	7122401411	1	T2S TRS 4X14 MFZN	Fix Inletbox to Frame T(Side)

5. CABINET FRONT ASS'Y



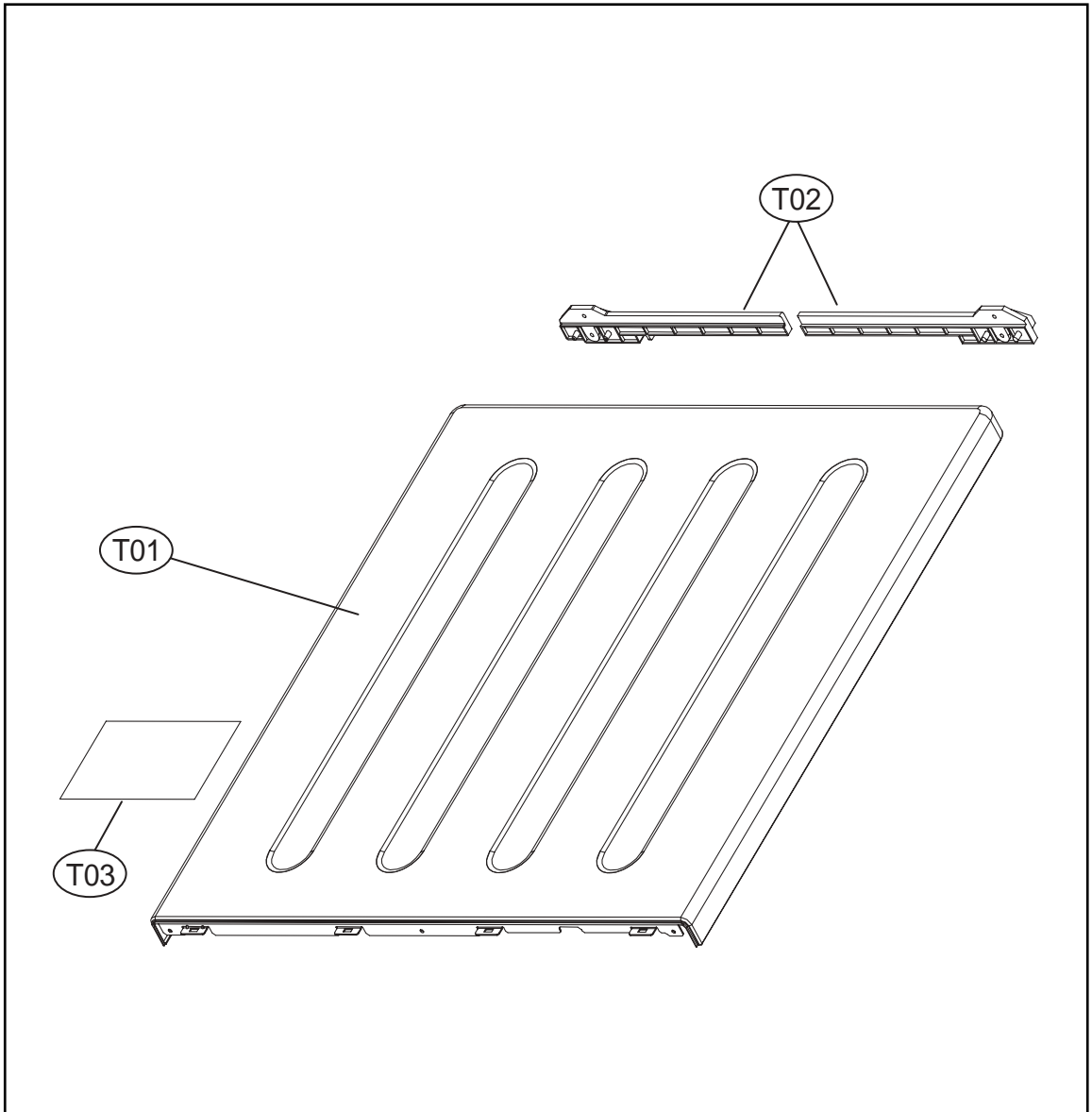
No.	Part Name	Part Code	Qty	Specification	Remark
F01	CABINET F SUB AS	3610811310	1	13KG, PUMP, WHITE	WL6511 XXLW, XXLW RH
		3610811321	1	13KG, PUMP, PLATINUM	WL6511 XXLPP
		3610811322	1	13KG, PUMP, ROSE RED	WL6511 XXLRR
F02	SUPPORTER HINGE	3615304001	1	SGCC 1.2T	
F03	LABEL SAFETY R	3613555800	1	PET, DOOR SAFETY,UL	WL6511 XXLW, XXLPP, XXLRR
			1	PET, DOOR SAFETY,UL, RH	XXLW RH
F04	LABEL WARNING	3613558500	1	PET,SILVER,DOOR WARNING,UL	WL6511 XXLW, XXLPP, XXLRR
			1	PET, DOOR WARNING,UL, RH	XXLW RH
F05	FRAME DOOR IN	3612206800	1	PP(Heat resisting)	
F06	STOPPER DOOR	3615202300	1	PP(Heat resisting)	
F07	DOOR GLASS	361A110600	1	GLASS	
F08	PROTECTOR GLASS	3618304300	1	ABS(Transparent)	
F09	HINGE DOOR	3612902910	1	13K WASHER,ALDC	WL6511 XXLW, XXLW RH
			1	13K WASHER,ALDC	WL6511 XXLPP, XXLRR
F10	CAP HINGE DOOR	3610916500	4	POM	
F11	FRAME DOOR OUT	3612206910	1	13K WASHER,ALDC	WL6511 XXLW, XXLW RH
			1	13K WASHER,ALDC	WL6511 XXLPP, XXLRR
F12	SCREW TAPPING	7115402029	16	T1S FLT 4*20 STS430 NATURAL	
F13	COVER HANDLE	3611426720	1	ABS, SPRAY_BASE	WL6511 XXLW, XXLW RH
			1	ABS	WL6511 XXLPP, XXLRR
F14	HANDLE DOOR	3612609000	1	ABS	
F15	HOOK DOOR	3613100800	1	ZNDC	
F16	SPRING HOOK	3615113700	2	SUS ID=4.3,NI=7,D=Ø 0.9	
F17	PIN HANDLE	3618200100	1	SUS, D3.0	
F18	SCREW TAPPING	3616051229	4	STS430 F/L BOLT(SE) 5*12	
F19	SWITCH DOOR LOCK	3619046410	1	DF F11 110 125V 16A PTC-SOLENOID	
F19a	SCREW TAPPING	7122401608	2	T2S TRS 4 x 16 SUS 430	For fixing Door S/W to Cabinet F
F01a	SCREW TAPPING	7122401411	4	T2S TRS 4 x 14 MFZN	For fixing Cabinet F to Cabinet
F22	CASE PUMP	3611141400	1	PP	
F23	COVER PUMP	3611426800	1	ABS, WHITE	WL6511 XXLW, XXLW RH
			1	ABS, PLATINUM	WL6511 XXLPP
			1	ABS, RED	WL6511 XXLRR

6. PANEL F ASS'Y



No.	Part Name	Part Code	Qty	Specification	Remark
P01	PANEL F	3614288800	1	ABS, WASHER(ASKO), WHITE	WL6511 XXLW, XXLW RH
			1	ABS, WASHER(ASKO), PLATINUM	WL6511 XXLPP
			1	ABS, WASHER(ASKO), RED	WL6511 XXLRR
P02	BUTTON POWER	3616637800	1	ABS, WHITE	WL6511 XXLW, XXLW RH
			1	ABS, PLATINUM	WL6511 XXLPP
			1	ABS, RED	WL6511 XXLRR
P03	WINDOW COURSE	3615506300	1	ABS(Transparent) + Film, WHITE	WL6511 XXLW, XXLW RH
			1	ABS(Transparent) + Film, PLATINUM	WL6511 XXLPP
			1	ABS(Transparent) + Film, RED	WL6511 XXLRR
P04	BUTTON START	3616637900	1	ABS, WHITE	WL6511 XXLW, XXLW RH
			1	ABS, PLATINUM	WL6511 XXLPP
			1	ABS, RED	WL6511 XXLRR
P05	BUTTON OPTION	3616638100	7	ABS, WHITE	WL6511 XXLW, XXLW RH
			7	ABS, PLATINUM	WL6511 XXLPP
			7	ABS, RED	WL6511 XXLRR
P06	WINDOW DISPLAY	3615506400	1	ABS(Transparent) + Film, WHITE	WL6511 XXLW, XXLW RH
			1	ABS(Transparent) + Film, PLATINUM	WL6511 XXLPP
			1	ABS(Transparent) + Film, RED	WL6511 XXLRR
P07	BUTTON FUNCTION	3616638000	1	ABS, WHITE	WL6511 XXLW, XXLW RH
			1	ABS, PLATINUM	WL6511 XXLPP
			1	ABS, RED	WL6511 XXLRR
P08	DIAL KNOB OUTER	3616638200	1	ABS, WHITE	1 PIECE SVC PART
			1	ABS, PLATINUM, RED	
P09	DIAL KNOB INNER	3616638300	1	ABS, WHITE	
			1	ABS, PLATINUM	
			1	ABS, RED	
P10	LED COURSE	3613054700	1	ABS(Transparent)	
P11	HOLDER COURSE	3613054500	1	ABS	
P12	HOLDER FUNCTION	3613054600	1	ABS	
P13	PCB AS	PRPSSWAD29	1	ASKO Washer Front PCB As	
P14	CASE PCB FRONT	3611147600	1	ABS	
-	SCREW TAPPING	7122401829	2	T2S TRS 4x18 STS	For fixing Panel F to Frame Upper
-	SCREW TAPPING	7122401411	7	T2S TRS 4x12 MFZN	For fixing PCB AS to Panel F
P15	CASE HANDLE	3611147700	1	ABS, Silk print, WHITE	WL6511 XXLW, XXLW RH
			1	ABS, Silk print, PLATINUM	WL6511 XXLPP
			1	ABS, Silk print, RED	WL6511 XXLRR
P16	HANDLE CAP	3612611400	1	ABS, WHITE	WL6511 XXLW, XXLW RH
			1	ABS, PLATINUM	WL6511 XXLPP
			1	ABS, RED	WL6511 XXLRR
P17	CASE DETERGENT	3611145600	1	PP	
P18	CAP SOFTENER	3610917800	1	PP	
P19	CAP BLEACH	3610917900	1	PP	
P20	CAP LIQUID	3610918000	1	PP	
P21	CASE LIQUID	3611145700	1	PP	

7. PLATE T ASS'Y



No.	Part Name	Part Code	Qty	Specification	Remark
T01	PLATE TOP AS	PRMACA3R00	1	SECD 1.2T + SPRAY	
T02	HANDLE REAR (PLATE SUPPOTER)	3615304100	2	ABS	
-	SCREW TAPPING	7122401411	4	T2S TRS 4x14 MFZN	

8. ACCESSORY

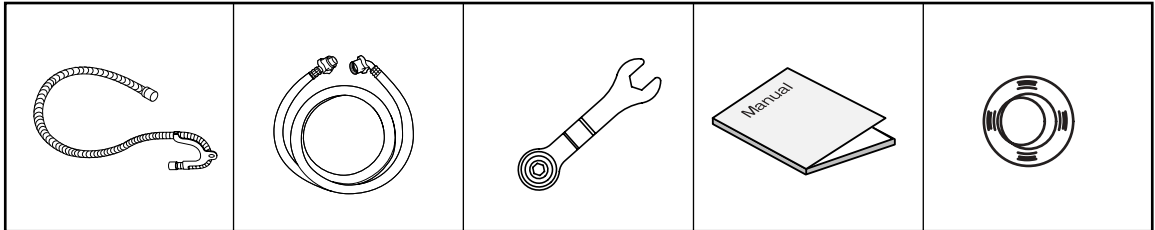
A01

A02

A03

A04

A05



No.	Part Name	Part Code	Qt'y	Specifications	Color	Cost in USD(\$)	Remarks
A01	HOSE DRAIN O AS	3613268500	1	DWD-800W, L=1,500	NA		
	GUIDE DRAIN HOSE	3612502300	1	PP	NA		
A02	HOSE INLET AS	3613271500	1	REFLEX, PVC 1.3M	NA		Cold
	HOSE INLET AS	3613271510	1	REFLEX, PVC 1.3M	NA		Hot
A03	UNIT SVC WRENCH	36189L3X00	1	PO+Coating, 2.3T DWD-110RP	NA		
A04	MANUAL OWNERS	4589A61600	1	ASKO Manual	NA		English & French
A05	CAP HOLDER	3610916400	4	PP, DWD-10RP	White		

Control Part Function Spec

1. SEQUENCE CHART

Classification	Processing Time	Everyday Wear		Towel/Bedding		Sanitary		Bulky Items	Synthetics	
		Small	Low	Small	Low	Small	Low			
Pre Wash	Sensing	10sec								
	Water Supply	2min								
	Prewash	10min								
		8min								
	Drain	1min								
	Balancing Spin	2min								
Meduim Spin	3min									
Wash	Sensing	20sec								
	Water Supply	2min								
	Washing1 (Heating)	50min					53min	57min		
		45min							37min	
		30min	28min	32min					20min	
25min				16min	17min					
15min										
Rinse	Drain	1min								
	Balancing Spin	2min								
	Meduim Spin	3min								
	Water Supply	2min								
	Rinsing 1	3min								
	Drain	1min								
	Balancing Spin	2min								
	Meduim Spin	3min								
	Water Supply	2min								
	Rinsing 2	3min								
	Drain	1min								
	Balancing Spin	2min								
	Meduim Spin	3min								
	Water Supply	2min								
Rinsing 3	3min									
Spin	Drain	1min								
	Balancing Spin	2min								
	Main Spin	9min								
		7min								
6min										
End	Cloths Release	60sec								
	END	10sec								
Remain Time Display			1:05	1:09	53	54	1:30	1:34	1:14	1:02
NOTE		1. Everyday wear : Warm + Wash + Soil Normal + Rinse 2 + Medium Spin 2. Towel/Bedding : Warm + Wash + Soil Normal + Rinse 2 +High Spin 3. Sanitary : Extra hot + Wash + Soil Normal + Rinse 2 + Medium Spin 4. Bulky Item : Warm + Wash + Soil Normal + Rinse 2 + Mediuem Spin 5. Synthetics : Warm + Wash + Soil Normal + Rinse 2 + Mediuem Spin								

Classification		Processing Time	Heavily/Soiled	Silk/Gentle	Wool/Hend wash	Whites	Quick Wash	
Pre Wash	Sensing	10sec						
	Water Supply	2min						
	Pre Wash	10min						
		8min						
	Drain	1min						
	Balancing Spin	2min						
Meduim Spin	3min							
Wash	Sensing	20sec						
	Water Supply	2min						
	Washing1 (Heating)	50min						
		45min	37min					
		30min						
25min						27min		
15min		13min	6min	27min	8min			
Rinse	Drain	1min						
	Balancing Spin	2min						
	Meduim Spin	3min						
	Water Supply	2min						
	Rinse 1	3min						
	Drain	1min						
	Balancing Spin	2min						
	Meduim Spin	3min						
	Water Supply	2min						
	Rinse 2	3min						
Spin	Drain	1min						
	Balancing Spin	2min						
	Main Spin	9min						
7min								
End	5min							
	Cloths Release	60sec						
	END	10sec						
Remain Time Display			1:44	37	30	1:04	33	
NOTE		1. Heavily Soiled : Warm + Pre Wash + Wash + Soil Normal + Rinse 3 + High Spin 2. Silk / Gentle : Cold + Wash + Soil Normal + Rinse 1 + Low Spin 3. Wool / HandWash : Cold + Wash + Soil Normal + Rinse 1 + Low Spin 4. Whites : Warm + Wash + Soil Normal + Rinse 2 + Low Spin 5. Quik Wash : Cold + Wash + Soil Normal + Rinse 1 + Low Spin						

2. Composition per Function

2-1. Water Supply

1) Water Temperature Selection

Water supply algorithm differs according to water temperature selected among 5 levels.

In other temperatures, with the exception of cold water, constant temperature control is executed.

Cold water and hot water operation is carried out in turn according to the target temperature.

Water Temp.	Target Temp.	Target 1	Target 2
Extra Hot	67°C	67°C	70°C
Hot	41°C	40°C	42°C
Warm	31°C	30°C	32°C
Warm	31°C	30°C	32°C
Cold	-	-	-

2) For Cold, valve operation does not change according to temperature and only the time unit of cold on for 7sec and off for 9sec is set to supply cold water per each unit of 16sec.

3) How to Insert Bleach

- During Washing

Operation for 12sec after 3-minute washing in Wool, Silk and Quick wash courses

Operation for 12sec after 5-minute washing in Towel course

Operation for 12sec after 9-minute washing in other courses

2-2. Drainage

1) Pump Operation - Washing cycle

- ① Before Drainage Completion: Pump continuously on
- ② Spin-drying Cycle after Drainage Completion
: On for 18sec and off for 3sec

2-3. Sensor Detection

1) Water Level Sensor Data

Classification Water Level	Height (mm)	Frequency (KHz)	Remarks
Spec. Small	130	24.62	
Spec. Low	130	24.62	
Washing Small	130	24.12	
Washing Low	130	23.84	
Standard Rinsing	160	24.17	
Rinsing	160	23.3	
Additional Rinsing	175	23.92	
Tub Washing	195	23.77	
Overflow	260	22.6	
Safety	125	24.7	
Reset	125	24.68	

2) Temperature Sensor Data

Temp.	Resistance(Ω)	Voltage	Remarks
0	35.97	0.58	
10	22.76	0.86	
20	14.77	1.21	
22	13.57	1.29	
24	12.48	1.37	
25	11.98	1.41	
27	11.04	1.49	
29	10.18	1.58	
30	9.78	1.62	
32	9.04	1.71	
34	8.36	1.80	
36	7.74	1.89	
38	7.17	1.98	
40	6.65	2.07	
49	4.7	2.50	
55	3.85	2.75	
60	3.24	2.96	
65	2.74	3.16	
75	1.99	3.51	

2-4. How to Control Voltage (during abnormal operation)

1) Voltage Control

① Normal Voltage

DC-link voltage after wave rectification is directly impressed to IPM as 310 ~ 330V.

When motor starts operation, DC voltage changes with energy consumed by motor and/or counter electromotive force of motor.

② Identifying Abnormal Voltage

A. Occurrence of counter electromotive force

☞ In case of 450V or higher

B. Instant power failure and excessive energy consumption

☞ In case of 185V or lower

2-5. How to Control Current (during abnormal operation+B227)

1) Current Abnormality Detection

① Abnormal if DC current flowing through IPM measured during high-speed motor rotation is 10A~12A or higher

② Detection of abnormal current to be carried out by saving higher value among instant current values and updating the data

2-6. Door S/W

1) Door S/W Operation

① Door Locking

3sec after bi-metal operation of door S/W, pulse of 20msec duty on solenoid is impressed twice until door is locked. Bi-metal begins operation simultaneously as power button is pressed.

② Door Unlocking

Bi-metal plate of door S/W is turned off and pulse of 20msec duty on solenoid is impressed until door is unlocked.

③ Motor or other electronic parts begin operation to execute normal cycles only when door is locked.

④ Door is closed if temperature measured by washing temperature sensor after turning on power button is 55°C or higher or if water level is higher than safety level.

⑤ Door is opened immediately when cycle is finished.

⑥ During cycle suspension, door is opened anytime if allowable by conditions.

2) Door Open System

① To forcefully open door in order to additionally insert the laundry during washing, door can be opened by pressing unlock clear button.

② Door open system by unlock clear button is to forcefully open door when not in conditions for door opening. It begins the sequence to satisfy conditions for door opening.

2-7. Load Sensing

1) Load Sensing to Determine Water Level

- ① Load sensing is carried out when selecting standard, boiling and thrifty boiling courses.
- ② Sensing is administered in the dry laundry state before starting of washing cycle.
- ③ After motor operation at 75 r.p.m for 10sec, load is judged with motor output measured.

2) Load Sensing for B Spin-drying

- ① Sensing is administered with the laundry wet during the first interim spin-drying after completion of washing cycle.
- ② After motor operation at 75 r.p.m for 10sec, load is judged with motor output measured.
- ③ Base values for B spin-drying unbalance of interim and main spin-drying are selected according to load measured by sensing.

2-8. Child Lock

- ① Child lock mode begins by pressing 'Beeper' button during cycle.
- ② In child lock mode, all buttons, with the exception of power button, are not operated.
- ③ In child lock mode, cycle display window is lit to show that child lock has been applied. Also, the remaining time is displayed in '18:88' window.
- ④ Lock mode is cleared by pressing 'Beeper' button as was done when starting child lock mode.

3. Functions per Cycle

3-1. Washing Cycle

1) Classification of Washing

- ① Pre-washing and soaking are carried out before main washing cycle.
- ② Decided value refers to water level and time decided by load sensing in standard, boiling and thrifty boiling courses. In other sources, it means the pre-set time according to the designated water level.
- ③ Soaking is the cycle consisted with water supply and washing only. Main washing begins immediately after this cycle without drainage.
- ④ In pre-washing and soaking cycles, only cold water is used and heating is not administered.

2) Heater Operation

- ① Washing heater does not re-operate once turned off after reaching the set temperature.
- ② Even when target water temperature is not reached, washing cycle is finished when washing time expires.

3) Re-supply of water

- ① Re-supply is carried out in case water level detected per 2 minute after water supply completion is lower than the set water level.
- ② Motor is stopped during re-supply.
- ③ During washing, re-supply is carried out up to 10 times. After the 10th time, re-supply is not administered even if water level drops.
- ④ Re-supply is not carried out if more than half of washing time has passed and heater is turned off.

3-2. Rinsing Cycle

1) Water Supply Cycle

- ① When selecting 'add water for rinsing', water is supplied to the water level of additional rinsing.
- ② Only cold water is supplied in rinsing cycle.
- ③ In the last rinsing, fabric softener is inserted by opening both cold water V/V and pre-washing V/V at the same time.

2) Re-supply of Water

- ① Water level is checked 1 minute after starting of rinsing cycle. Then, water is re-supplied up to the designated water level.

3) Drainage

- ① To administer drainage after completing washing at water temperature of 55°C or higher, drainage is carried out after dropping water temperature by supplying cold water to high level.
- ② When drainage cycle begins, drainage motor is continuously kept on.

4) Interim Spin-drying

- ① Interim spin-drying is administered up to the r.p.m designated per each course.
The following cycle begins if R spin-drying is not reached after 20 times of balance spin-drying.
- ② After completion of washing cycle, load sensing is carried out before the first interim spin-drying to detect load. Then, the cycle proceeds to main spin-drying by differing standard unbalance values according to the load.

3-3. Spin-drying Cycle

1) Drainage

- ① Drainage set time is 1min.
- ② When drainage is completed, 1 minute is reduced from the overall cycle.

2) Balance Spin-drying

- ① Spreading the laundry : Rotating the same 45rpm with left and right direction alternately.
- ② Attaching stop : Attaching the laundry to drum inside with constant speed.
- ③ Unbalance checking point : First step, check the U.B at 95 rpm, 160rpm
 Second step, check the U.B at 95 rpm, 350rpm
 Third step, at 300rpm. if the unbalance data is over the criterion
 This process will be repeated
- ④ Drain step : Drain at water around 160rpm
- ⑤ After drain, check the unbalance data again. This is so-called balance spin step.

3) R (Real) Spin-drying

- ① 'R spin-drying' refers to the process until completion of spin-drying after B spin-drying.
- ② The r.p.m reached differs according to the spin-drying cycle selected.
- ③ When acceleration ends during spin-drying, constant-speed operation is carried out at the r.p.m set in the selected cycle. Breaking is carried out after deceleration to app. 450 r.p.m.
- ④ When stopping cycle by pressing temporary stop button during spin-drying, breaking is carried out to stop motor.
- ⑤ Max. r.p.m operation time according to spin-drying selection

Spin-Drying Classification	Max. r.p.m	Time of Max. r.p.m Maintenance	Remarks
Low	550 r.p.m	330sec	
Medium	790 r.p.m	270sec	
High	990 r.p.m	40sec	
Extra High	1050 r.p.m	10sec	

4) No Drainage

- ① Cycle is completed without drainage after rinsing is finished

3-4. Ending

1) Untwisting

- ① This cycle aims to prevent creasing by loosening the laundry attached to the inner wall of drum after completion of spin-drying. Untwisting is carried out for 30sec.
- ② Motor is operated according to the water stream of untwisting.

2) Ending

- ① After completion of untwisting, buzzer is sounded for 10sec and power is turned off.
- ② In case additional drying cycle has been set, drying cycle is carried out after untwisting.
- ③ After ending process begins, door lock is cleared.

4. Button Functions

4-1. Power

- 1) This electronic power switch turns on/ off display.
- 2) Automatic Power Switch Off
 - ① Power is turned off immediately after completion of entire cycles or the selected cycle.
 - ② Power is automatically turned off in 10 minutes if no button control is made after power on.
- 3) Initial Display for Power Only
 - ① Course LED is turned on for 1sec.
 - ② 18:88 LED displays '---'.

4-2. Start / Stop

- 1) Normal course begins when pressing button after turning on power S/W.
- 2) Operation begins by pressing button after setting a program course or automatic course of 10 varieties.
- 3) If button is pressed during operation, blinking of cycle lamp changes to lighting only and operation stops. When button is pressed again, operation restarts from the point of temporary suspension.
- 4) If cycle is changed by controlling button or encoder switch in temporary suspension state, the mode is changed to the initial mode.
- 5) Lock is cleared if in the corresponding conditions by judging values of washing temperature sensor or water level during temporary suspension.

4-3. Wash

- 1) Range of temp. selection differs according to the course selected. If you select Cold, the washing temperature will be the same as that of the machine's water supply.
Each program the temperature it will be able to select is restricted.
(Refer to Washer Program Default Data and Select Option.)
- 2) The text displayed indicates water temperature for washing. "Cold water is used for rinsing.
When 'Warm*' is selected, warm temperature is maintained for both washing and rinsing."
- 3) Cold water and hot water supply method differs according to water temperature selection.
Heating temperature also differs.
- 4) For sanitary course, water temperature is fixed at 'Extra Hot'.

Wash	Temperature	Wash / Rinse
Extra Hot	67 °C	Extra. Hot / Cold
Hot	41 °C	Hot / Cold
Warm*	31 °C	Warm / Warm
Warm	31 °C	Warm / Cold
Cold	-	NO Heating

4-4. Soil Level

- 1) When pressing button, LED is repetitively lit in the order of 'Normal _ Heavy _ Extra Heavy _ Off _ Extra Light _ light'
- 2) Soil level can be selected only when washing cycle is set.
- 3) Soil level is operated in courses other than 'Wool/Handwash' and 'Quick Wash'.
- 4) Washing time changes according to the selected soil level.
- 5) Selection can be changed during cycle after temporary suspension.
- 6) Overall cycle time is shown in 18:88 display.

4-5. Spin Speed

- 1) When pressing button, LED is repetitively lit in the order of " Medium→ High→ Extra High → Off→ No Spin→ Low'.
- 2) 18:88 display shows the remaining time.
- 3) During cycle, selection change is possible after temporary suspension.

4-6. Signal

- 1) Signal button operates in 5 steps.
Press Signal to adjust the sound level or turn off the signal.
- 2) After change, it is saved in EEPRPM.

4-7. Pre-Wash

- 1) Button is operated only when washing is selected.
- 2) Pre-wash is not available in Wool/Handwash, Quick Wash courses.
- 3) When pressing button, pre-wash is added and LED is lit. LED is turned off when pressing the button again.
- 4) Pre-wash LED is turned off when pre-wash is completed.

4-8. Extend Wash

- 1) When button is pressed, washing time increases per washing course, such as by 6 minutes for 'heavily', 8 minutes for 'sanitary', 5 minutes for 'everyday wear' and 'towel' and 4 minutes in other cases.
- 2) Extra wash is not available in Silk/Gentle, Quick Wash, Wool/Handwash courses.
- 3) Extra wash LED is turned off when washing is completed.

4-9. Extra Rinse

- 1) Extra rinse is not available in Quick wash courses.
- 2) When pressing button rinsing cycle is added by once and LED is lit. When pressing button again, rinsing cycle decreases by once and LED is turned off.
- 3) Extra rinse LED is turned off when rinsing is completed.

4-9. Rinse+Spin

- 1) When pressing button, rinsing once + spin medium is selected.
- 2) Operation does not return to previous cycle even when pressing the button again.
The cycle set in the corresponding course is displayed by rotating course dial.
Then, rinse spin LED is turned off.
- 4) Water temperature can be selected with Temp. button after rinse + spin is set.
Selection can be made from Cold to Warm.
- 5) Even after rinse + spin is selected, water temperature selection can not be made in Wool/Handwash courses.
- 6) When cycle is completed, LED is turned off.

4-10. Night Time

- 1) When pressing button, spin speed is set as low and interim spin-drying changes from 790 r.p.m. to 550 r.p.m.
- 2) When pressing button again, set values of interim spin-drying and main spin-drying mode courses are resumed.
- 3) LED is turned off when the cycle is completed.

4-11. Delay Start

- 1) Preset time indicates starting time of the entire cycle.
- 2) When pressing preset button, time changes in the order of 1→2→3→4 ...→12→1.
- 3) After selecting preset time, cycle change is possible before entering preset mode by pressing start/stop button. However, cycle cannot be changed after entering preset mode.
- 4) To preset operation, select cycle→select preset time→press start/stop button.
- 5) The selected cycle is displayed for 3 seconds when pressing start/stop button after entering preset mode to check the selected cycle.

4-12. Child Lock**

- 1) During an operation of washer, press 'Child Lock' button simultaneously during 3 second.
- 2) If this mode will be set successfully, Child Lock Lamp will be burn out. In Child Lock mode, no button functions except Power button.
- 3) if you want to release this mode, press 'Child Lock' button simultaneously again during 3 second.

4-13. Course Selection Switch

- 1) Everyday Wear course selected by clicking switch once after power is turned on.
- 2) Per each click after the first, course is selected in the direction of CW or CCW.
- 3) 18:88 display indicates cycle time of each course.

4-14. Washer Program Default Data and Select Option

		Temp	Soil	Spin	Pre Wash	Extended Wash	Extra Rinse	Rinse+Spin, Delay start, Night time
Heavily	default	Warm*	Normal	High	O	O	O	O
	selection	Cold~Hot	Ex.light~Ex.heavy	no spin~Ex.high				
Sanitary	default	Ex.hot	Normal	Medium	O	O	O	O
	selection	X	Ex.light~Ex.heavy	no spin~Ex.high				
Bulky	default	Warm	Normal	Medium	O	O	O	O
	selection	Cold~Warm*	Ex.light~Ex.heavy	no spin~High				
Everyday	default	Warm	Normal	Medium	O	O	O	O
	selection	Cold~Hot	Ex.light~Ex.heavy	no spin~Ex.high				
White	default	Warm	Normal	Medium	O	O	O	O
	selection	Cold~Hot	Ex.light~Ex.heavy	no spin~Ex.high				
Synthetic	default	Warm	Normal	Low	O	O	O	O
	selection	Cold~Hot	Ex.light~Ex.heavy	no spin~Ex.high				
Towel	default	Warm	Normal	Ex.High	O	O	O	O
	selection	Cold~Hot	Ex.light~Ex.heavy	no spin~Ex.high				
Silk	default	Cold	Normal	Low	O	X	O	O
	selection	X	Ex.light~Ex.heavy	no spin~Medium				
Quick	default	Cold	Ex.light	Low	X	X	X	O
	selection	Cold~Warm*	X	no spin~Medium				
Wool	default	Cold	Ex.Light	Low	X	X	O	O
	selection	X	X	no spin~Low				

5. PCB Manual Test Mode

- PCB and other electronic parts will be tested without water supply whether they are normal or not.

1) Process

: Press power button -> Press "SPIN" button 3 times with pressing "WASH" button -> "X X X" will be shown on LED display-> Whenever pressing "Signal" button 1 time, below process will be occurred.

- "X X X' : Program version display

Step	Display		Details
1	L_C		Door Lock Close
2	run	001	Running times count
3	E5	0	E5 Error count
4	E6	0	E6 Error count
5	E7	0	E7 Error count
6	E8	0	E8 Error count
7	F		Do not use
8	H		Hot Valve on
9	C		Cold Valve on
10	P		Pre Wash Valve on
11	d		Do not use
12	b		Bleach Valve
13	dr		Drainage pump on
14	L_O		Door Lock Open

2) More details

- When turn on 'LOCK' signal, all process is conducting normally.
- In this case, BLDC Motor is not tested. In order to test it, select spin or rinse.

6-1. IE (Input Error) - Error in water supply

6-1. IE (Input Error) - Error in water supply

1) Conditions of Occurrence

- ① In case the designated water level is not reached in 5 minutes during water supply or re-supply

2) All LEDs are turned off and 'IE' blinks in 18:88 display.

3) Error buzzer alarm is sounded for 10 seconds per every 10 minutes.

4) Error display is cleared when turning off/ on power.

6-2. OE (Output Error) - Error in drainage

1) Conditions of Occurrence

- ① In case water level does not reach reset point in 10 minutes after drainage starts

2) All LEDs are turned off and 'OE' blinks in 18:88 display.

3) Error buzzer alarm is sounded for 10 seconds per every 10 minutes.

4) Error display is cleared when turning off/ on power.

6-3. UE (Unbalance Error)

1) Conditions of Occurrence

- ① In case main spin-drying is not reached within 20 cycles of balance spin-drying
- ② In case balance spin-drying fails during interim spin-drying, UE occurs as the cycle moves to the next process.

2) All LEDs are turned off and 'UE' blinks in 18:88 display.

3) Error buzzer alarm is sounded for 10 seconds per every 10 minutes.

4) Error mode is cleared by opening door and organizing the laundry in spin-dry chamber, closing door and pressing start/ temporary stop button. Then, spin-drying begins again.

6-4. LE (Lock Error) - Door opening error

1) Conditions of Occurrence

- ① When intending to begin cycle by pressing start/ temporary stop button while door is opened
- 2) All LEDs are turned off and 'LE' blinks in 18:88 display.
- 3) Error buzzer alarm is sounded for 10 seconds per every 10 minutes.
- 4) Error display is cleared when turning off/ on power.

6-5. E1 - Water level detection error

1) Conditions of Occurrence

- ① In case water level is below reset or overflow is detected in line test mode
- 2) Water supply motor is kept on until water level falls below reset.
- 3) All LEDs are turned off and 'E1' blinks in 18:88 display.
- 4) Error buzzer alarm is sounded for 10 seconds per every 10 minutes.
- 5) Error display is cleared when turning off/ on power.

6-6. E2 - Overflow error

1) Conditions of Occurrence

- ① In case water level in water tank is above overflow level due to continuous operation of water supply valve
- 2) Water supply motor is kept on until water level falls below reset.
- 3) All LEDs are turned off and 'E2' blinks in 18:88 display.
- 4) Error buzzer alarm is sounded for 10 seconds per every 10 minutes.
- 5) Error display is cleared when turning off/ on power.

6-7. E4 - Water leakage during washing

1) Conditions of Occurrence

- ① In case water level falls below re-supply even after 15 times of re-supply prior to finishing of water heating

2) All LEDs are turned off and 'E4' blinks in 18:88 display.

3) Error buzzer alarm is sounded for 10 seconds per every 10 minutes.

4) Error display is cleared when turning off/ on power.

6-8. E9 - Abnormalities in water level sensor

1) Conditions of Occurrence

- ① In case water level frequency is of 15KHz or lower and 30KHz or higher during cycle due to abnormalities in water level sensor, etc.

2) All LEDs are turned off and 'E9' blinks in 18:88 display.

3) Error buzzer alarm is sounded for 10 seconds per every 10 minutes.

4) Error display is cleared when turning off/ on power.

6-9. Motor-related Error

1) E5 (DC-Link High Voltage) Error

- ① In case DC-link voltage to IPM increases to 450V or higher
- ② Motor operation is stopped and 'E5' is shown in display window.
- ③ Error buzzer alarm is sounded for 10 seconds per every 10 minutes.
- ④ Error display is cleared when turning off/ on power.

2) E6 (EMG) Error

- ① In case current detected with EMG port is of 20A or higher
- ② Motor operation is stopped and 'E6' is shown in display window.
- ③ Error buzzer alarm is sounded for 10 seconds per every 10 minutes.
- ④ Error display is cleared when turning off/ on power.

3) E7 (Direction) Error

- ① In case signal of Hall IC is different from the predicted signal according to direction of rotation
- ② Motor operation is stopped and 'E7' is shown in display window.
- ③ Error buzzer alarm is sounded for 10 seconds per every 10 minutes.
- ④ Error display is cleared when turning off/ on power.

4) E8 (Initial Operation Fail) Error

- ① In case input signal of Hall IC is abnormal due to problems in motor connection, etc.
- ② Motor operation is stopped and 'E8' is shown in display window.
- ③ Error buzzer alarm is sounded for 10 seconds per every 10 minutes.
- ④ Error display is cleared when turning off/ on power.

6-10. Error in Temperature Sensor

1) H2 Error - Washing temperature sensor open/ short

- ① In case washing temperature sensor is defective or not connected
- ② Error buzzer alarm is sounded for 10 seconds per every 10 minutes.
- ③ Error display is cleared when turning off/ on power.

2) H4 Error - Washing temperature sensor overheating

- ① In case temperature detected by washing temperature sensor is 95℃ or higher
- ② Error buzzer alarm is sounded for 10 seconds per every 10 minutes.
- ③ Error display is cleared when turning off/ on power.

3) H5 Error - Water temperature error in wool/ delicate course

- ① In case water temperature in wool/ delicate course is 45°C or higher
- ② Error buzzer alarm is sounded for 10 seconds per every 10 minutes.
- ③ Error display is cleared when turning off/ on power.

4) H6 Error - Abnormality in washing heater

- ① Within 15 minutes after heater operation begins;
In case standard temperature is of 42°C or lower: If temperature does not increase by 2°C or more In case standard temperature is higher than 42°C: If temperature does not increase by 1°C or more
- ② If temperature falls below standard temperature by 2°C or more due to re-supply of water, etc., standard temperature is reset as the current temperature and error check time of 15 minutes is reset.
- ③ Error buzzer alarm is sounded for 10 seconds per every 10 minutes.
- ④ Error display is cleared when turning off/ on power.

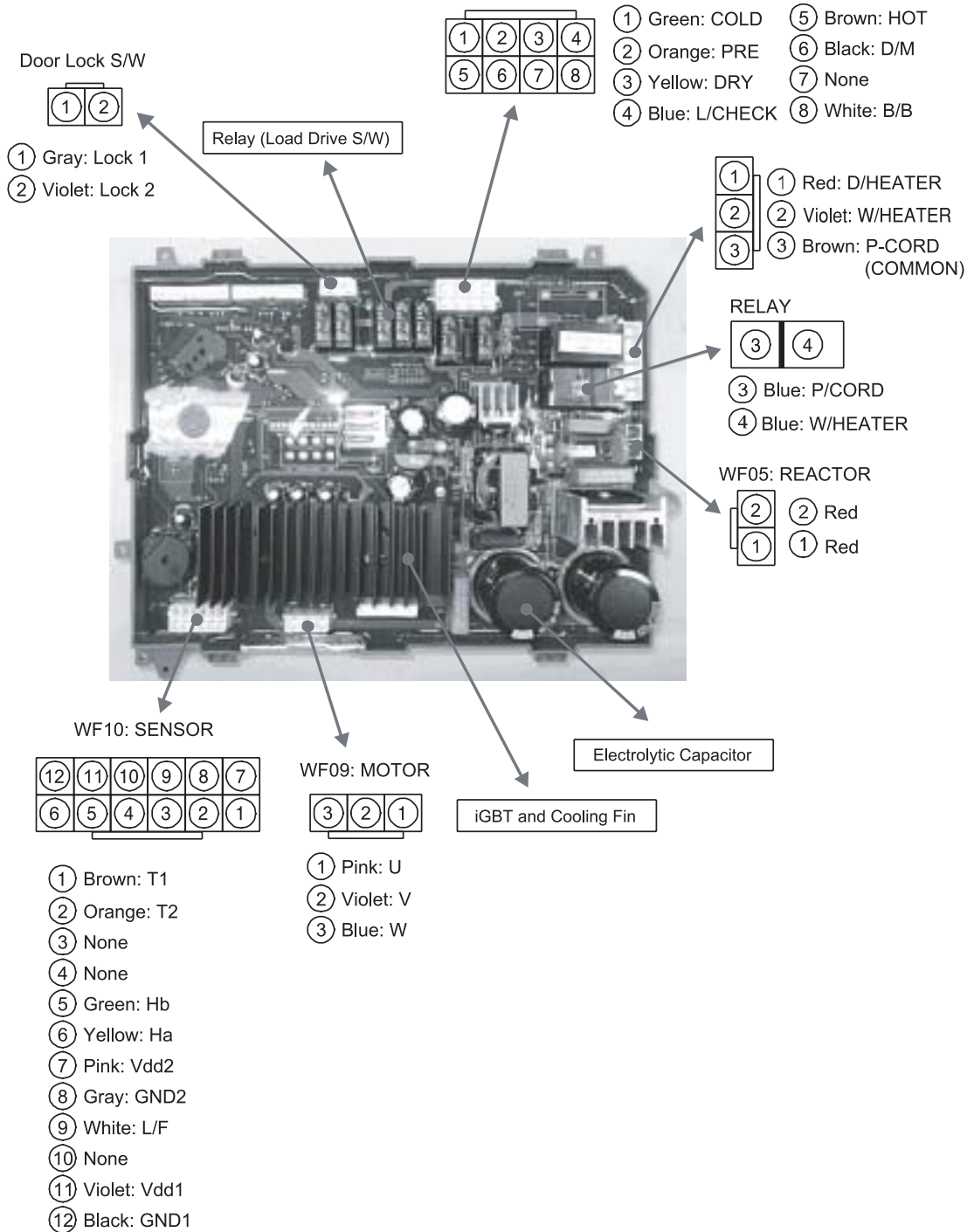
5) H8 Error - Washing heater overheating

- ① In case washing heater temperature increases by 5°C or more within 30 seconds when there is no water in tank, etc.
- ② Error buzzer alarm is sounded for 10 seconds per every 10 minutes.
- ③ Error display is cleared when turning off/ on power.

6-11. PFE (Pump Filter Error)


- ① Cycle is skipped to the next when the current r.p.m. is different from the target r.p.m by 70 during interim spin-drying.
- ② Cycle is skilled to balance spin-drying when the current r.p.m is different from the target r.p.m by 70 during main spin-drying.
- ③ 'PFE' error is caused if main spin-drying skip of ② above occurs 10 times.
- ④ Error display is cleared when turning off/ on power.

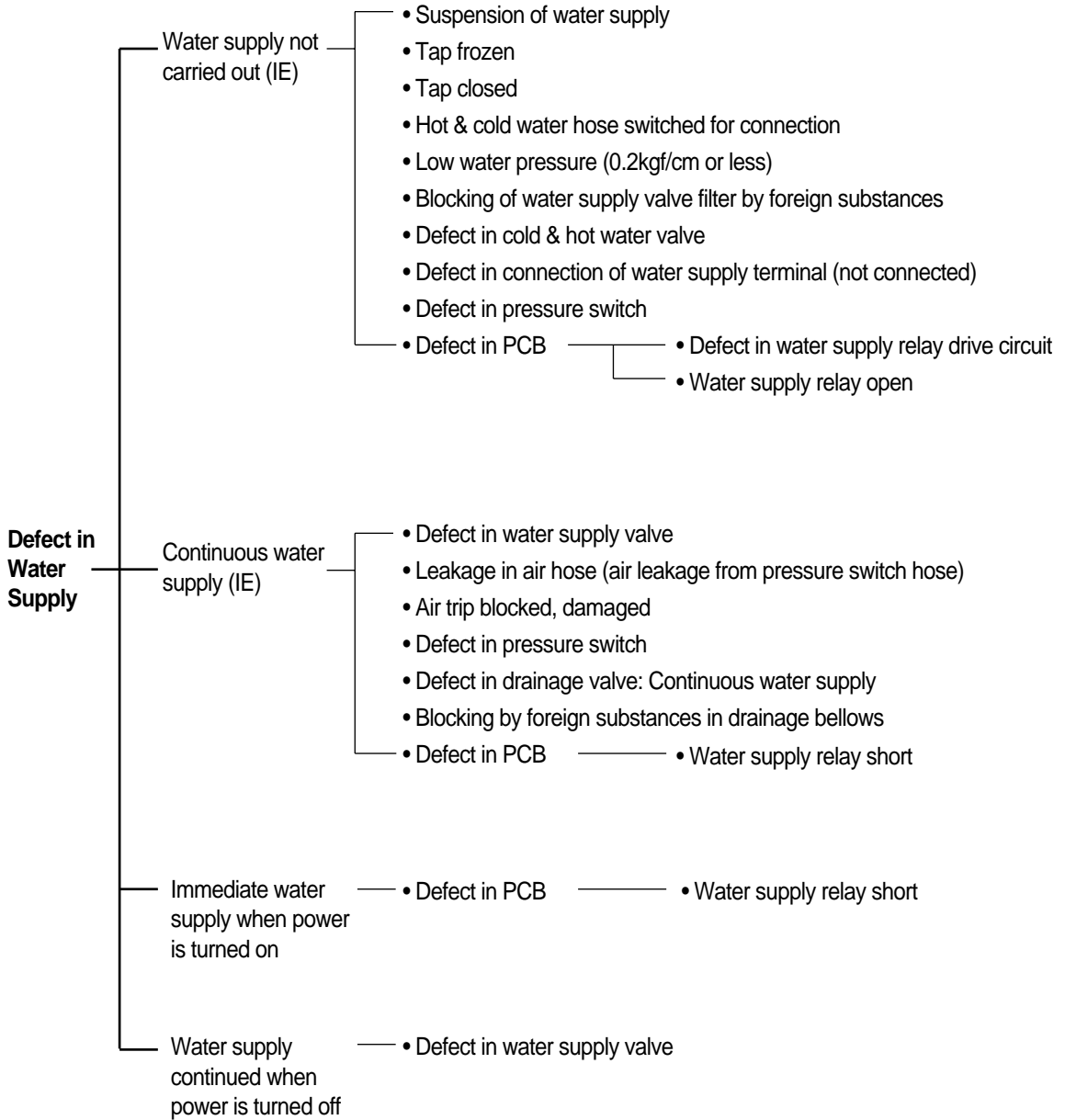
PCB PIN ARRANGEMENT



■ Detailed Spec, Principles and Breakdown Diagnosis/ Service of Electronic parts

1. VALVE INLET

Classification		3-hole Valve and Hot Water Valve				
Code	3-hole: 3615416940, Hot Water: 3615416700					
Color	Gray					
Coil Resistance	4320 ~ 5280 Ω					
Use	Supplying water for washing/ pre-washing and bleach					
Appearance Structure	<p style="text-align: center;">Bleach Input Valve</p> 					
Symptoms of Breakdown	Detailed Symptoms	Cause	Diagnosis of Defect	Solution	PCB Error Mode	
Water not supplied	Water supply not carried, only noise is heard	Water tap not opened	Check for tap opening.	Open water tap.	"IE"	
		Coil short	Check if resistance between water supply valve terminals is within 4320-5280Ω.		"IE"	
		Excessive foreign substances in SUS filter	Remove water supply hose and check for foreign substances in filter.	Clean out foreign substances from inside the filter.	"IE"	
	Water supply not carried out without noise	Foreign substances in valve	-		Replace water supply valve.	"IE"
		Connector loosened	Visually check connector connection status.		Administer re-insertion.	"IE"
		Coil short	Check if resistance between water supply valve terminals is within 4320-5280Ω.		Replace water supply valve.	"IE"
Water is continuously supplied (inside tub)	Continuous water supply in power 'on' state	Wiring short	Wiring short → Conduction test		"IE"	
		Defect in water level sensor	Refer to water level sensor defect check method.	Replace water level sensor.	"E2"	
	Defect in pressure hose	Check for blocking of holes in pressure hose.	Replace defect parts.	"E2"		
Water supply to tank	Continuous water supply in power 'off' state	Defect in water supply valve	-	Replace water supply valve.	-	
		Water not supplied to inside of tank	Blocking of electro-analysed water inlet hose	Dismantle hose and check for blocking.	Remove foreign substances, etc.	"IE"
			Excessive inflow to residual water removal hose	Check if water is not being discharged through residual water removal hose as there is low inflow of water.	Tie residual water removal hose.	"IE"
	TANK DOWN S/W		Check for connector loosening and S/W defect.	Insert connector/ replace S/W.	"IE"	
	Continuous water supply to inside of tank	Check tank up S/W connector, PCB and water supply valve		Insert connector/ replace defect parts.	"E2"	
	Others	Floater	Floater restraint, loosening → S/W not working	Clean and check floater part.	"IE, E2"	
Others	Water leakage through sides	Defect in water supply valve assembly, etc.	Check for leakage through the sides of water supply valve.	Replace water supply valve.	-	



Symptoms of Breakdown	Inspection Spot	Inspection Method	Inspection Result	Problem Identified	Repair Method
Water supply not carried out		1) Suspension of water supply 2) Water tap locked 3) Cold-hot water hose incorrectly connected 4) If no defect is found, dismantle water supply hose and check water supply valve filter.	- Cold/ hot water hose switched -Large amount of rust, sand and dust, etc.	-Defect in cold/ hot water hose assembly -Defect in cleaning of water supply filter (blocked)	-Assemble cold/ hot water hose correctly. -Clean water supply filter.
	Water supply valve	1) Measure coil resistance in water supply valve. 2) Remove top cover and visually check for separation of water supply valve terminal connector and wiring short/ connection status. 3) In case water valve operation sound is heard, but water supply is not carried out, check for blocking of water supply valve or restraint on plunger.	-5.3kW or higher -Connector loosened/ not inserted -Electric wire short -Sound and defect in water supply due to foreign substances in bellows	-Coil short -Connection defect -Electric wire short -Structural defect in water supply valve	-Replace water supply valve. -Try reconnection or remove elements of connection defect. -Try reconnection or remove elements of connection defect. -Replace water supply valve.
	Pressure Switch	1) Check for 'E9' in display window.	-E9	-Loosening of pressure S/W terminal or electric wire short -Defect in pressure S/W	-Connect terminal of pressure S/W. -Connect terminal of PCB. -Replace pressure S/W.
Water supply not carried out	PCB	1. Check PCB pin connector insertion status. 2. Power is supplied to water supply valve terminal, but water supply is not administered.	Electric wire easily loosened when tugged PCB water supply circuit open, damaged (water supply relay operation not carried out)	Pin connector housing not inserted Defect in water supply circuit	Completely insert connector housing. Replace PCB.
Continuous water supply	PCB	1. Immediate supply when power is turned on	PCB water supply circuit or relay short (continuous conduction to valve)	Water supply relay short	Replace PCB.
	Water supply valve	1. Check if water supply is continuously carried out even if power is not on.	Water supply bellows blocked/ deformed	Defect in water supply valve	Replace water supply valve.
	Drainage drive motor (valve housing)	1. Check for normal operation of water supply valve/ water supply status. 2. Check if water is drained through drainage hose. 3. Check for foreign substances inside valve housing. 4. Check for foreign substances in drive motor wire. 5. Forcefully restore SUS wire.	-Not closed due to foreign substances inside drainage housing -Wire caught by foreign substances outside drive motor -Forced restoration not possible	-Foreign substances in valve housing -Foreign substances -Defect in drive motor restoration	-Remove foreign substances. -Remove foreign substance. -Replace drive motor.

2. Water Level Sensor

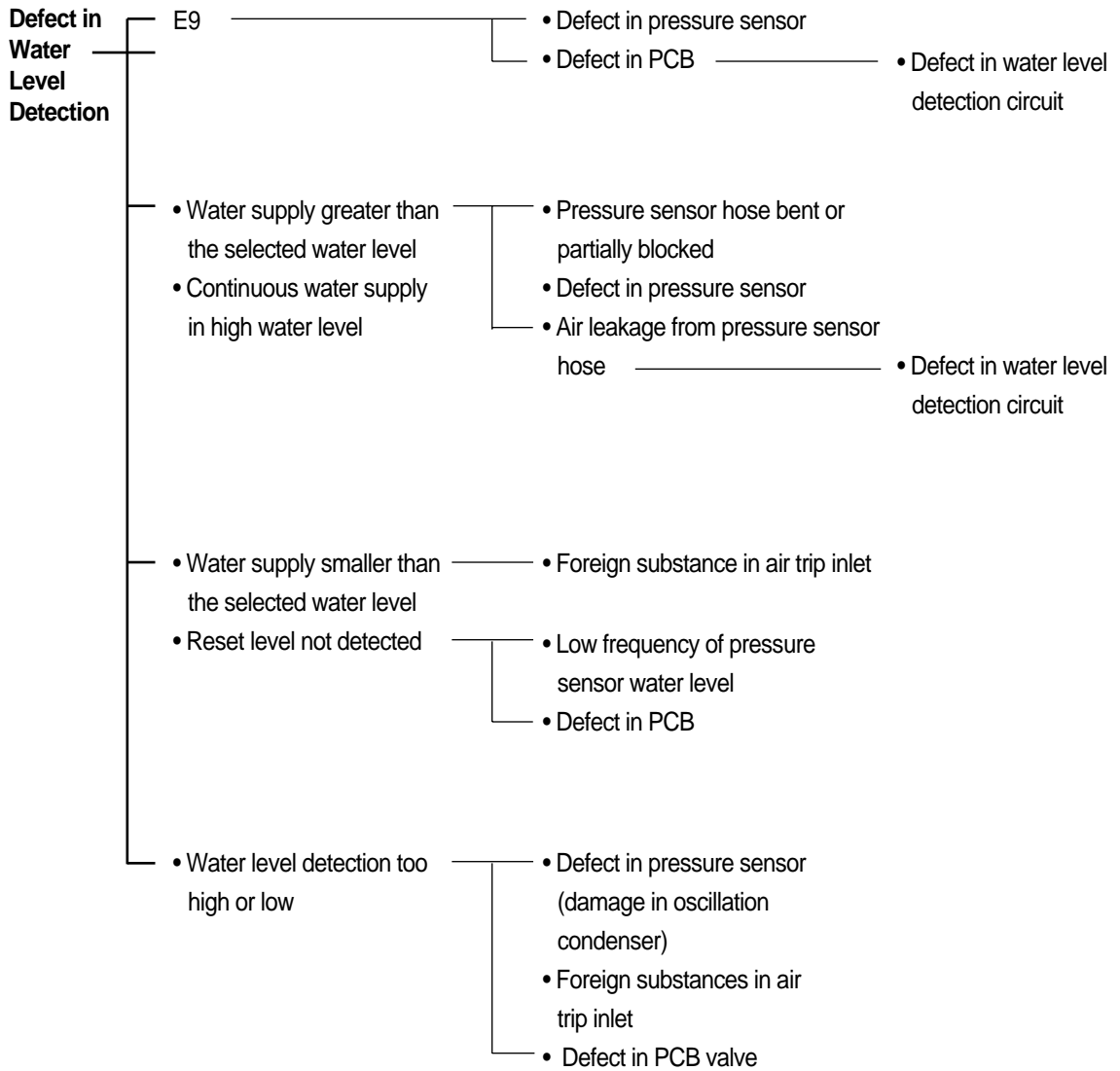
1) Spec. of Water Level Sensor

<p>O/F: Forced drainage is necessary as water level is high. When this level is reached, water supply must be stopped and drainage must be forcefully administered.</p>	<p>RESET :</p> <ol style="list-style-type: none"> 1. Spin-drying begins 30sec after drainage level reset is reached. 2. Heater operation level 	<p>Low: Small load of laundry, therefore considered to be water level of 'low'</p>
		<p>Medium: Large load of laundry</p>
		<p>Medium High: Water level for rinsing</p>
		<p>Safety: Door open possible Door opened only when water level is below safety level</p>

Model	Code	Classification	O/F	Medium High	Medium	Low	Safety	Reset	Initial(Defect)	Inlet Angle
WD1132	3614825220	Frequency	22.60kHz	23.10kHz	23.20kHz	24.00kHz	24.40kHz	24.70kHz	25.80kHz	90°
	DN-DD03, DL-DW03	Water level (mm)	260 ± 15	225 ± 15	220 ± 7	170 ± 15	140 ± 15	120 ± 20	0	

2) Breakdown Analysis

Symptoms	Detailed Symptoms	Cause	Diagnosis	Solution	PCB Error Mode
Continuous water supply	Water valve normal	Defect in pressure sensor hose	Check for holes.	Replace hose.	"E2"
		Blocking of pressure sensor hose	Visual checking	Remove foreign substances.	"E2"
"E9"	Occurrence in water level sensor 30kHz or higher	Connector loosened	Visually check connector connection status.	Administer re-insertion.	"E9"
		Wiring short	Wiring short -> conduction test		"E9"



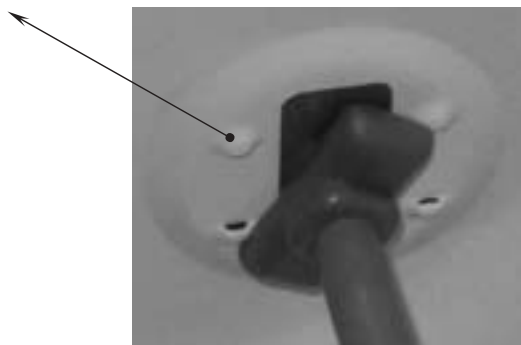
3. POWER CORD

Classification	Rated	Cord Thickness	Color	Code	Type	Length	Remarks
DEC	250V/15A	1.5sq	Gray	3611340430	LP-31 SJT	2.3m	-

1) Assembly

4 embossed parts in cabinet

- > To prevent loosening after assembly
- > SS: 2 special screws
- > LG: Forced indentation



[Before]




[After]

. CONNECTOR

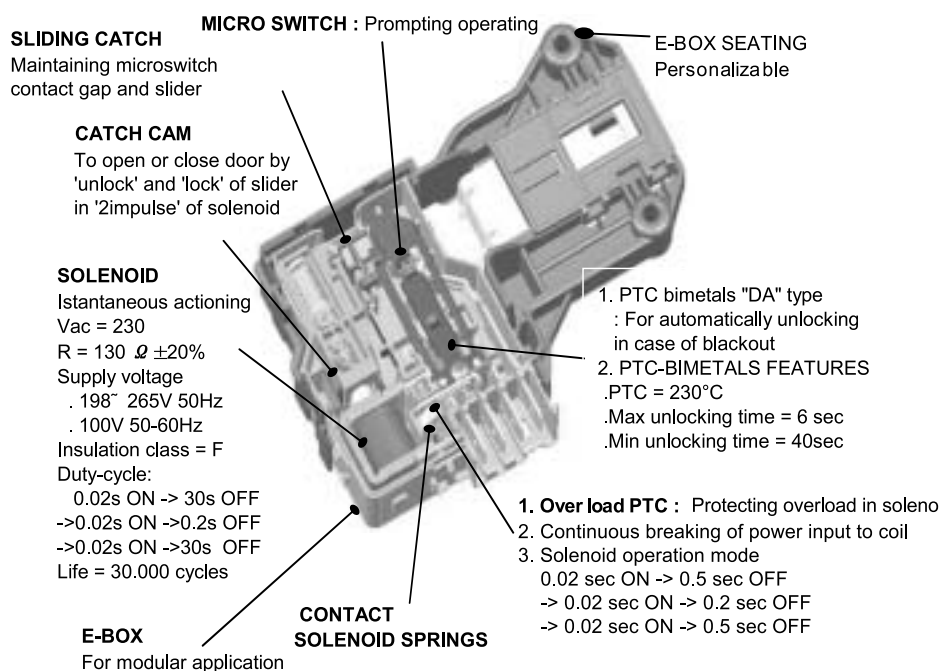
- > #1806 Housing 3P Used: Using both ends only and not the hole in the middle (materials highly resistant to flame)
- > To prevent fire caused by high current

4. DOOR LOCK S/W

1) Comparison of Door Lock S/W Spec.

TYPE	CODE	MODEL	RATED	LOCK ON PRINCIPLE	LOCK 'ON'/OFF TIME	LOCK OFF TYPE	EXTERNAL APPEARANCE
DF F01 007	3619046410	WD1132	125V 16A	Bimetal operation by PTC heating	-ON : Min. of 6sec -OFF after Cooling in Air: 40sec ~ 5min -Forced OFF: Immediate OFF (door opening) bimetal	1. Forced OFF by solenoid 2. Natural OFF by cool down of	

2) Structure and Spec. of Door Lock S/W: DF SERIES



1. MICROSWITCH DA TYPE

- Breaking capacity = 16(6)Amp 250Vac OPENING - CLOSING, Contact gap < 3 mm

2. Temp. for Use

- Min. Ambient Temp. = -15° C, Max. Ambient Temp. = 85° C

3. Protection against Power Failure: PTC-BIMETAL

- Contact 'on' status maintained for the min. of 40sec./ max. of 5min by PTC-bimetal operation (Ambient Temp.: 5° C ~ 50° C)

4. Mechanical - electrical lifespan

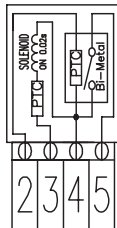
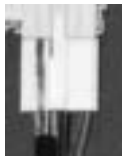
- Number of operating cycles at nominal voltage and nominal current = 10,000

*** How to Replace Door Lock Switch**

- 1) Open door and dismantle clamp spring for gasket.
- 2) Dismantle gasket.
- 3) Loosen 2 screws for door lock S/W.
- 4) Remove door lock S/W.
- 5) Administer assembly in reverse order.

*** Checking Solenoid Wiring of Door Lock Switch**

PIN
Arrangement



2 3 4 5
(1 does not exist.)

Terminal 3 and 4:
Normal if 156 ~ 234

3) STRUCTURE AND SPEC OF DOOR LOCK S/W : DA SERIES

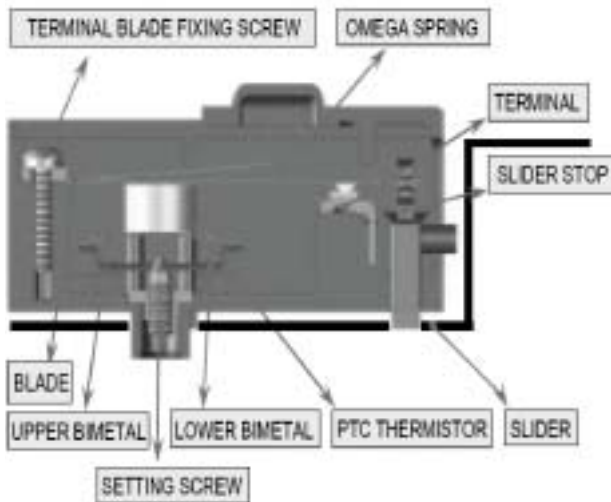


FIG 1 [INTERNAL STRUCTURE OF DA TYPE DOOR LOCK S/W]

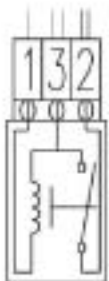


FIG 2 [INTERNAL CIRCUIT]

[Operation Procedures] : When door is closed

1. Initial Status: Door opened [FIG 3]
2. Door Closed: Slider moving by door hook as shown in [FIG 4]
3. Turn PCB power button on to enter power and push start button.
4. PTC begins heating as power is entered to No. 1 and 3 in [FIG 2].
5. Deformation of [UPPER BIMETAL] begins due to PTC heating.
6. Deformation of upper bimetal moves PTC and PTC moves blade. Here, 'omega spring' moved 'contact blade' so that terminal contact point and blade contact point are turned on (6sec after power impression) [FIG 2]. Current flows in output terminal 2. Also, 'slider stop' built in with blade enters the holde of slider and 'restrains slider while current is flowing'. So door cannot be opened.
7. Door opening
 - ① When power is turned off, power of terminal 1~3 in [FIG 2] is turned off. As current impressed to PTC is removed, 'bimetal' is cooled.
 - ② With cooling of bimetal, PTC is returned to the original position. Also, restoration of omega spring blade contact point is turned off. Therefore, 'slider stop restoration (40sec ~ 5min after power off)' occurs.
 - ③ As slider restraint is cleared, door can be opened.

Fig.3



Fig.4

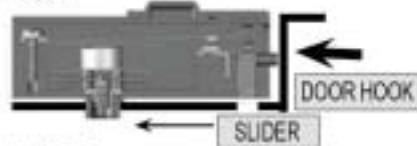
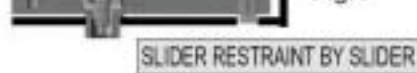


Fig.5



Fig.6



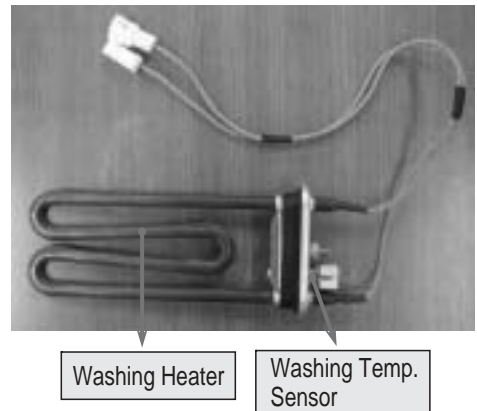
4) Diagnosis of Defect

Symptoms	Detailed Symptoms	Cause	Diagnosis of Defect	Solution	Error Mode
Ticking noise	'Tick' during initial operation and 'tick-tick' during temporary suspension: 'DF' type only	Normal noise	Normal sound generated during solenoid operation when 'sliding CAM' is locked/ unlocked to close or open door.		—
LE'	Continuous occurrence of 'tick' noise and 'LE': 'DF' type only	Connector loosened	Visually checking connector connection status	Insert connector.	"LE"
		Terminal loosened from connector	Referring to door lock S/W dismantling and checking methods below	Insert connector. S/W 4 or 5 terminal	"LE"
		Door not completed closed	-	Completely close door.	"LE"
		Abnormality in hook of door	-	Replace door AS.	"LE"
		Defect in catch CAM operation	Occurrence of continuous 'tick' noise unlike normal sound	Replace door S/W.	"LE"
	1. 'LE' occurrence without 'tick' noise in 'DF' type	Connector loosened	Visually checking connector connection status	Insert connector.	"LE"
		Terminal loosened from connector	Referring to door lock S/W dismantling and checking methods below	Insert terminal. S/W 2 or 3 terminal	"LE"
		Breaking of solenoid coil	Referring to picture below	Replace door S/W.	"LE"
	2. 'LE' in 'DA' type	Connector loosened	Visually checking connector connection status	Insert connector.	"LE"
		Terminal loosened from connector	Referring to door lock S/W dismantling and checking methods below	Insert terminal. S/W 2 or 3 terminal	"LE"
Door does not open.	Power failure, forced power off during operation	PCB MICOM' cannot open door in case of power failure or forced power S/W off during operation. Door can be opened in the max. of 5min.			
	No power failure and power on	Water in drum	Checking if water level is higher than safety level	Door opens after drainage.	—
		Inside the drum hot	Prevention of door opening to prevent burn caused by hot laundry after drying		
	Others	Door does not open normally in case of loosening of connector/ terminal and breaking of solenoid coil during operation. Administer measures after test according to the following method.			

5. HEATER

1) Spec of Heater of Washing Machine

Classification	Wahing
Maker	IRCA
Rated	120V
Consumption Power	1000W ± 5%
Resistance	25.47ohm
Current Density	8.9
Temp. Fuse	184 °C
Thermister	Heater built-in
Material	SUS430
Max. Temp.	Water
Part Code	3612801740



Temp. Fuse of Washing Heater (184°C CUTOFF TYPE)

: Located inside heater to prevent fire, etc. caused by heating without water due to breakdown of water level sensor, etc.

: Cut-off in app. 1min in case of overheating, heater temp. of app. 270°C

: Washing heater must be used under water.

2) Breakdown Diagnosis

Breakdown Symptoms	Cause	Diagnosis	Solution	PCB Error Mode
Washing water not heated (common for drum)	Wiring short	Check for short: DWD-11'S, no detergent, 800W common	Connect the cut-off part.	"H6"
	Washing heater or temp. fuse short	Check for short: Normal if 23.3~25.7Ω between both terminals of washing heater -> Common for drum	Replace washing heater.	"H6"
	Connector/ terminal loosening	Check for loosening: Common for drum	Insert terminal.	"H6"
	Defect in washing heater temp. sensor	Measuring resistance between both terminals of sensor: Referring to the attached temp./ resistance table	Replace temp. sensor.	"H2"
Overheating of washing water	Defect in washing heater temp. sensor	Measuring resistance between both terminals of sensor: Referring to the attached temp./ resistance table	Replace temp. sensor.	"H2" or "H4"

Heater Replacement

* How to Replace Washing Heater and Temp. Sensor

1. Dismantling Connector



2. Loosening Earth and Heater Nuts



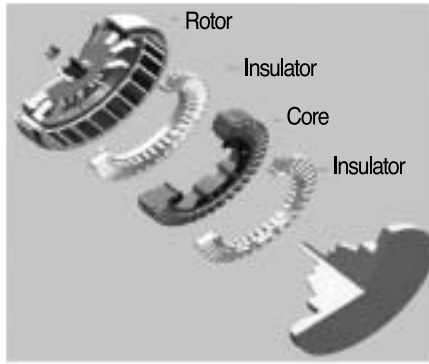
3. Replacing Heater and Temp. Sensor



4. Administer assembly in reverse order and make sure to fasten heater nuts first before the earth nuts.

6. BLDC Motor

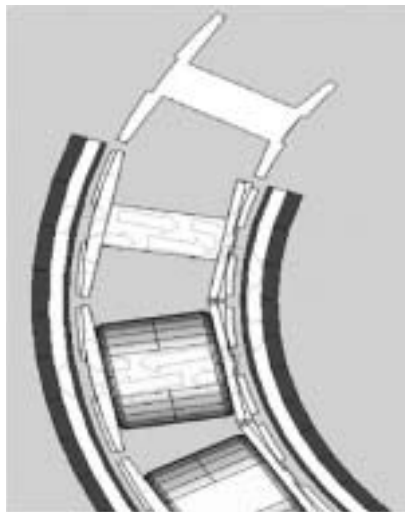
6-1. Structure of BLDC Motor



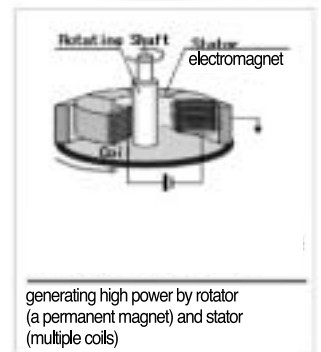
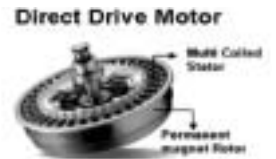
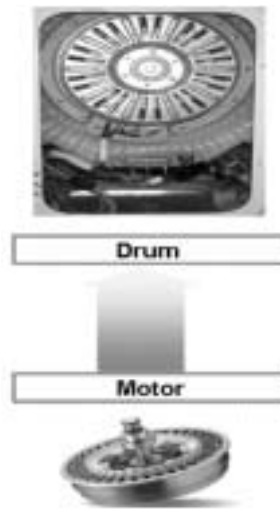
BLDC MOTOR

6-2. Power Transmission System of BLDC Motor

Magnetic density flow of BLDC Motor



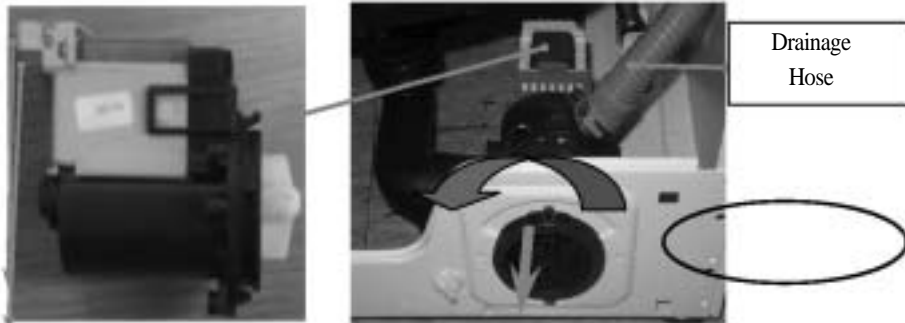
Sequence diagram of BLDC MOTOR



6-3. Specification

Classification	Item	BLDC : DD Motor
1. General	Rated Voltage	$V_m = 310$ [Vdc], Hall IC Voltage 5 [Vdc]
	Insulating Structure	Type B, insulator method
	External Appearance	Shaft connection and stator connection structure, Air-gap : 1mm
	No. of Poles	24 poles, Core: 36 slots, Layer: [30mm]
2. Performance	Consumption Power	390[W] \pm 10[%], during washing (picked value)
	RPM	During Washing: 45RPM, During Spin-drying:1300RPM
	Output Characteristics	Torque: 300Kgf.cm (washing: 45rpm) Current: 1.5A (washing: 45rpm), 2.5A (spin-drying: 800rpm) AC Input Terminal - Washing: 250Wo, Spin-drying: 380Wo
3. Structure	Stator Resistance	$\phi 265 \times 30H$
		U(blue) - V(purple) : 13.8 Ω [at 75°C] V(purple) - W(pink) : 13.8 Ω [at 75°C] W(pink) - U(blue) : 13.8 Ω [at 75°C] cf) Motor resistance at ambient temp. of 0 ~ 35°C 7.04 ~ 8.1 Ω
	Rotor	Magnet : 24 segments, bracket, serration
	Hall IC	2-sensor Control Type, Top Central Angle: 7.5 degrees Signal Error Angle (phase difference): 90 \pm 5 degrees (based on electric angle)

7. Pump Drainage System



Wire connection terminal Pump filter

Direction of pump filter cap opening

Defect in Drainage

Drainage not carried out (OE)

- Pump case blocked (coin, foreign substances, memory wire)
- Pump case frozen
- Defect in pump operation
- Drainage hose pressed down or position changed
- Ends of drainage hose blocked (built-in installation)
- High edge of drainage way: Natural drainage/
- Product frozen (drainage way frozen)
- Loosening of drainage motor connection terminal, inferior connection
- TP operation of drainage pump
- Defect in PCB
 - Defect in drainage relay drive circuit
 - Drainage relay short

Drainage normally carried out, but OE displayed

- Defect in pressure switch (oscillation frequency low)
- Defect in controller
 - Defect in oscillation circuit (high oscillation frequency)

Power Part

Problem in indoor wiring

- Breakdown of power lead-in switch
- Indoor wiring fuse short
- Aging of power outlet, defect in contact
- Extension cord short or too thin

Problem in wiring of washing machin

- Power cord short (defect in contact)
- Lead wire short
- Controller terminal segments and connector loosened
- Defect in contact of electric wire connector (power switch, reactor)
- Breaking of insulated wire in lead wire terminal compression part

Defect in electric parts

- Fuse short: In noise filter
- PCB transformer short

Erroneous voltage impression

- Check 120V

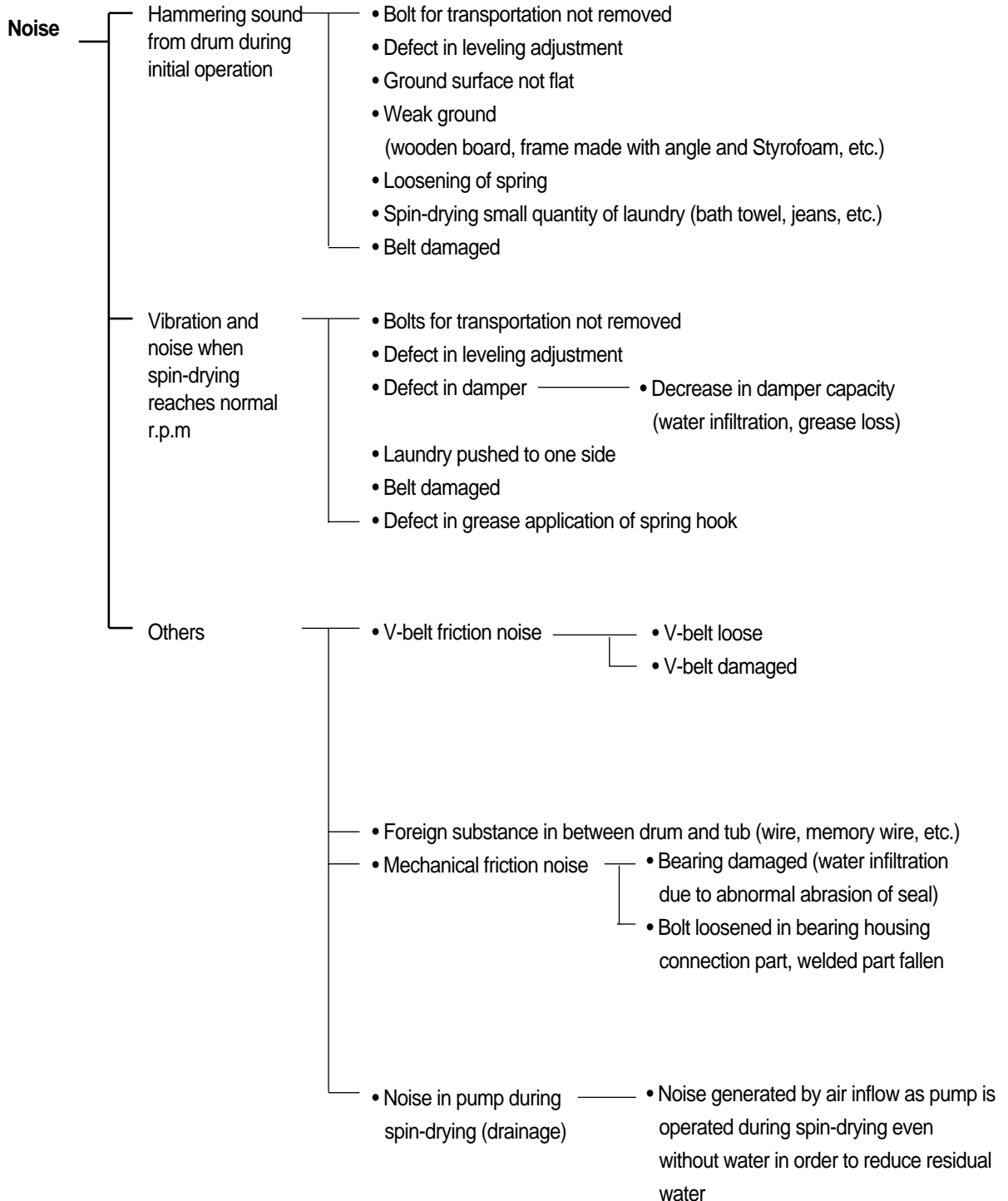
Defect in separately purchased step-up transformer

- Defect in contact of lead wire inside transformer
- Transformer fuse short
- Low-capacity transformer of other company used

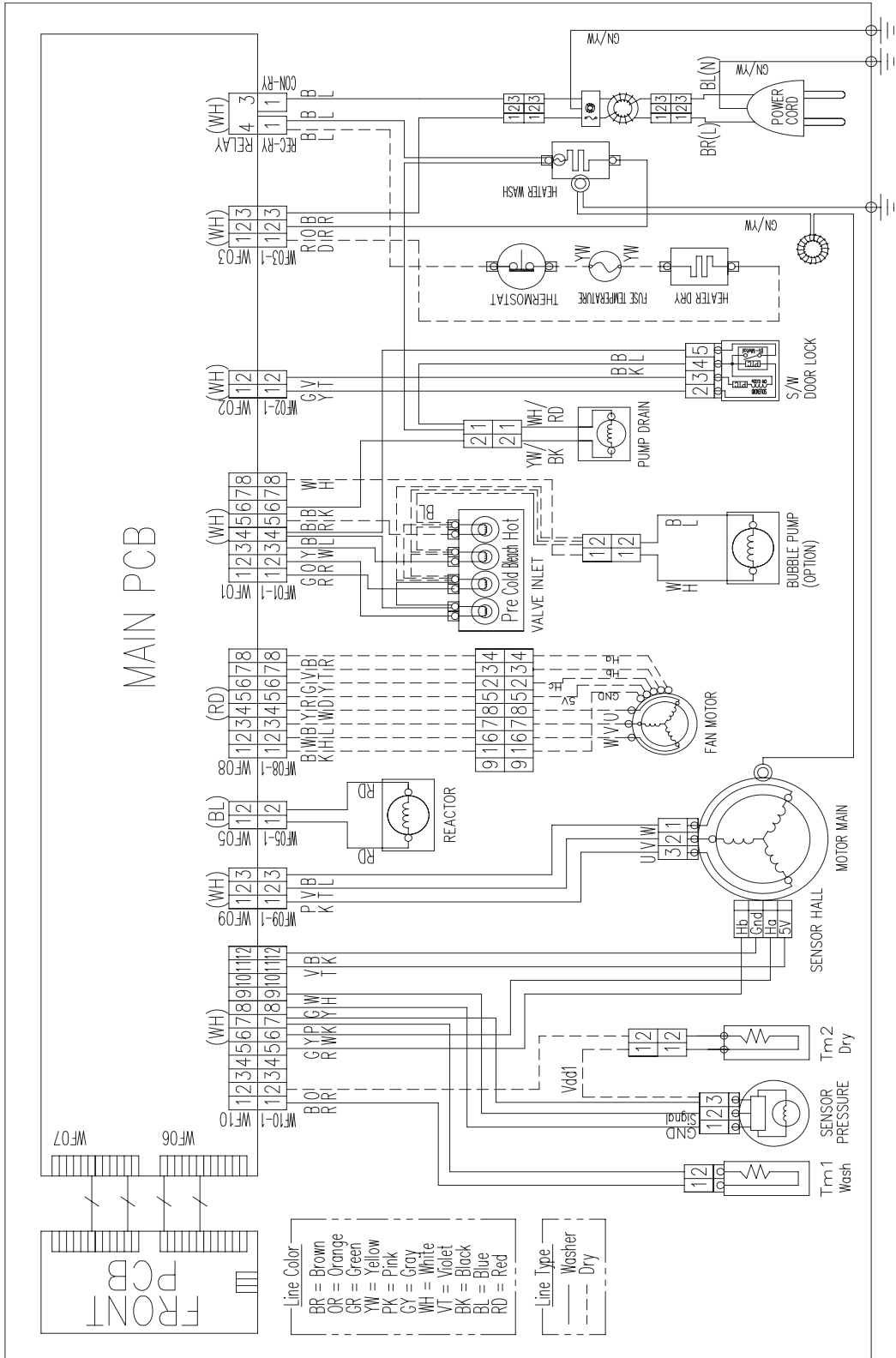
Defect in PCB

- Defect in pin connector contact
- Defect in power circuit
- Defect in reset circuit
- Defect in interrupt circuit
- Defect in oscillation circuit
- Defect in water level detection circuit
- Defect in MICOM
- Board damaged

8. Noise Defect

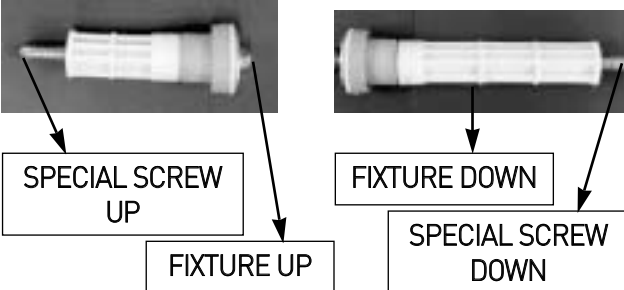
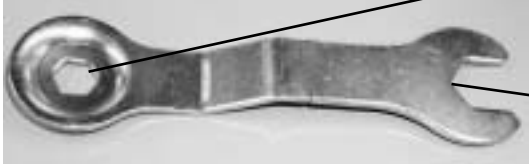
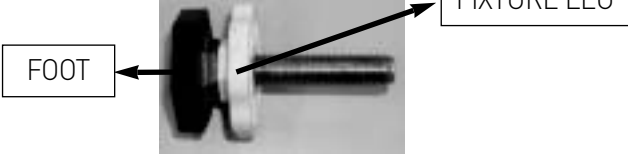


■ Wiring Diagram



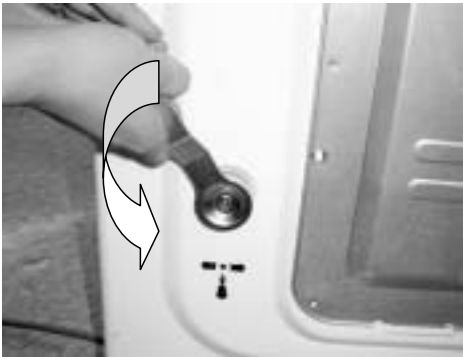
■ Installation

1) Related Parts and Configuration

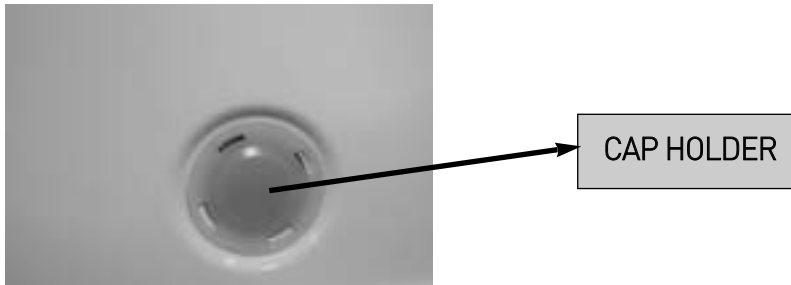
Item	Configuration	Remarks
FIXTURE UP / DOWN AS		SPECIAL SCREW UP : L= 109mm SPECIAL SCREW DOWN :L=160mm
UNIT SERVICE WRENCH		① REMOVE FIXTURE UP/DOWN AS ② ADJUST LEG
LEG ADJUST AS		

2) Installation Procedures

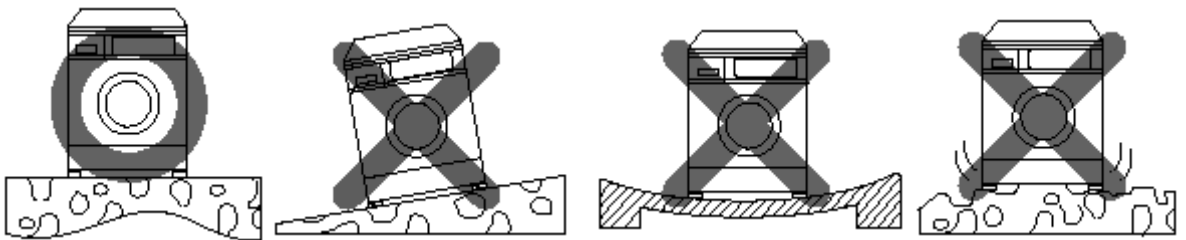
① Remove fixture up/ down AS.

Removal	Remarks
	<ul style="list-style-type: none"> ☞ Remove fixture up/down AS by rotating it in anti-clockwise direction. ☞ Store fixture up/down for use later on. ☞ To assemble fixture up/down AS, rotate it in clockwise direction.

② Insert cap holder (4) into holes created after removing fixture up/down AS as shown in the picture.



③ Install drum washing machine on flat and solid ground.



④ Adjust leveling with led adjust AS.

Adjustment	Remarks
	<ul style="list-style-type: none"> ☞ Washing machine is moved upwards by rotating foot of leg adjust AS in clockwise direction. ☞ Washing machine is moved downwards by rotating foot of leg adjust AS in anti-clockwise direction

⑤ Adjust fixture leg to fasten special bolt.

Adjustment	Remarks
	<ul style="list-style-type: none"> ☞ Vibration of washing machine is suppressed by rotating fixture leg in anti-clockwise direction as it fastens special bolt.



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ABOUT THIS MANUAL

VISION CREATIVE, INC.

서울 종로구 통의동 6번지 이룸빌딩 4층

담 당	황의근님	TEL	
Model	WL6511XXLW / WL6511XXLT		
접 수	(S/G) 영문		
일 정	1차		6차
	2차		7차
	3차		8차
	4차		9차
	5차		10차
제 판		인쇄	
규 격			
MEMO 08.02.04-(신규_47p) 08.11.14-8p, 9p, 10p, 11p, 12p, 13p, 14p, 15p, 16p, 17p, 18p 수정_신규 11p 08.12.04-9p, 10p, 12p, 13p, 15p, 17p, 18p 수정_신규 7p			

연락처

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