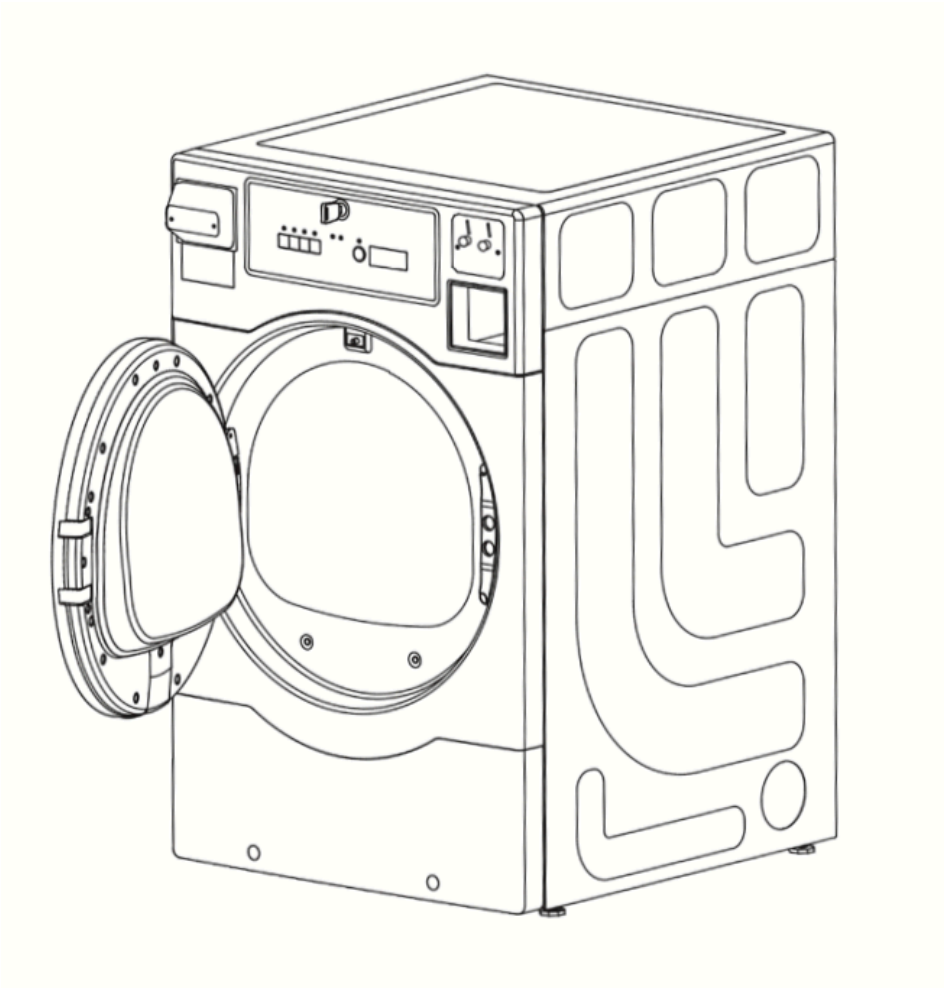
CROSSOVER 2.0

TRAINING MANUAL

CROSSOVER 2.0 SERIES



WASHER SERVICE SCHOOL

DOC. NO. 098017
EDITION 25.2018

Laundrylux

Technical Data

Contents

Technical Data

Crossover 2.0
Technical Data

Inner drum		
volume	liters/ft^3	98/3.5
diameter	mm/inch	554/21 13/16
Drum speed		
wash	rpm	45
extraction	max rpm	1050
G-factor		306
Weight, net	kg/lbs.	136/300

Connections		
Water valves connection		DN20 3/4" Garden Hose via included hoses
Rec. water pressure	psi kPa	30-90 200-600
Functioning limits for water valve	psi kPa	8-145 50-1000
Capacity at 45 psi (300 kPa)	gallon/min liter/min	2.6 10
Drain hose	inch outer Ø mm	1 25
Draining capacity	gallon/min liter/min	5 20

Crossover 2.0

1	Power Line
2	Air Vent for Safety
3	Cold Water
4	Hot Water
5	Drain Outlet
6	Coin Meter (coin operated models only)
7	Control Panel
8	Detergent Dispenser
9	Door

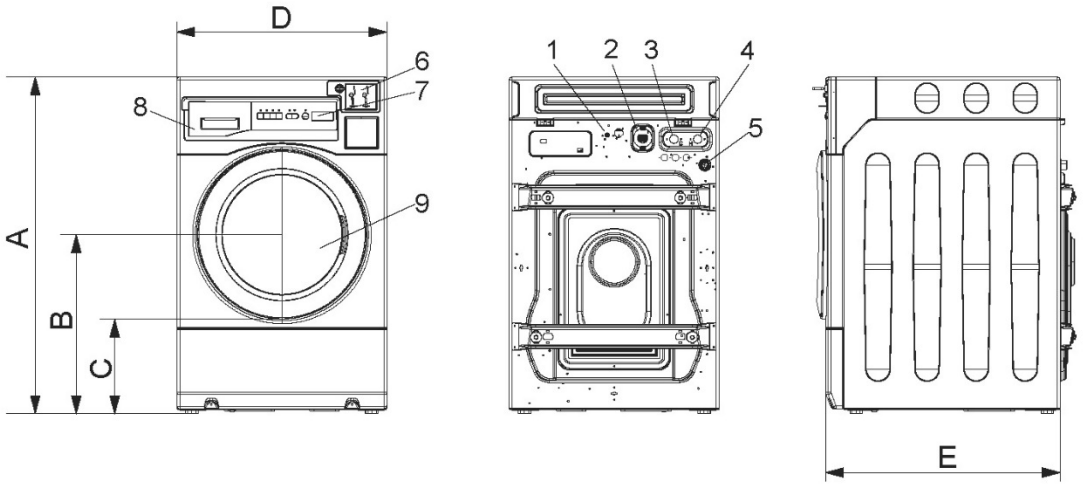


Fig. 2.2

NOTES:

A	1098mm = 43 1/4 inch
B	584mm = 23 inch
C	310mm = 12 3/16 inch
D	686mm = 27 inch
E	765mm = 30 1/8 inch

Machine Overview

General:

The machine features an electronic control unit (CPU) with wash programs and options that can be modified in Service Mode by register programming and augmented with hardware options such as external liquid dosing, “promotion” event discount price programming, or networking.

The drum motor is powered by an inverter that synthesizes three-phase power from a single phase 120 VAC input. The inverter also provides control and power to the water inlet valves, drain pump (or valve), the doorlock controller (signaling lock or unlock), and external chemical injection pumps.

The machine may be set to run for free in OPL mode; or with coin, card, or other central payment systems.

The machine has built-in self-diagnostic functions which aid in troubleshooting machine faults. The most recent fault codes are saved.

The machine is soft mount and should be leveled during installation for proper operation.

Metric fasteners are used throughout the construction.

Function Overview:

The drum/motor assembly is suspended by two top-mounted tension springs at the front of the machine and two bottom-mounted compression springs at the back. Four shock absorbers and two cast iron counterweights mounted on the front and rear of the outer drum dampen excessive vibration for out-of-balance load handling. The inner drum is belt driven by a motor mounted to the rear-outer drum. Belt tension is fixed and does not need to be adjusted.

One hot and two cold water valves flush the detergent, softener, and bleach compartments while filling the machine. Activating the hot water valve (Y21) or the cold water valve (Y11) fills the detergent compartment on the left. The center cold water valve (Y13) fills the bleach compartment on the right. When both cold water valves (Y11 and Y13) are activated the intersecting streams fill the center softener compartment. Water is drained from the machine via a pump. Water levels are monitored by a pressure transducer via a level sensor hose connected to the bottom of the outer drum. Wash cycle temperature setting is enabled by turning on the cold and/or hot water valves. Water temperature is not monitored by the CPU.

The machine is not fuse protected and should be connected to a breaker as specified in the installation manual.

During a wash cycle, INTERLOCK voltage L1' and N' must be asserted at the inverter. The INTERLOCK circuit passes through the doorlock’s door-locked switch (S4) which must be closed AND locked for the machine’s subsystems to receive power.

The machine has an independent door-unlock delay unit, which will unlock the door 180 seconds after power is removed allowing extracting clothes to come to a compete stop. The water level is not monitored. If power is reestablished, the door will relock and the cycle will continue.

IF POWER IS REMOVED WHILE THE MACHINE IS RUNNING A WASH PROGRAM, WHEN POWER IS RESTORED THE MACHINE WILL RESUME AT THE POINT ON THE CYCLE WHERE POWER WAS REMOVED.

On Crossover 2, the controller has a built-in real-time clock which is used for activating price reduction events, time stamping error code logs, and time stamping coin vault access.

On Crossover 1, the top panel is demounted by removing the two T15 Security Torx screws at the rear of the top panel and them pulling the cover back and up.

On Crossover 2, the top panel is demounted by removing the security bolt behind the payment area. A service key is required.

Crossover 2.0

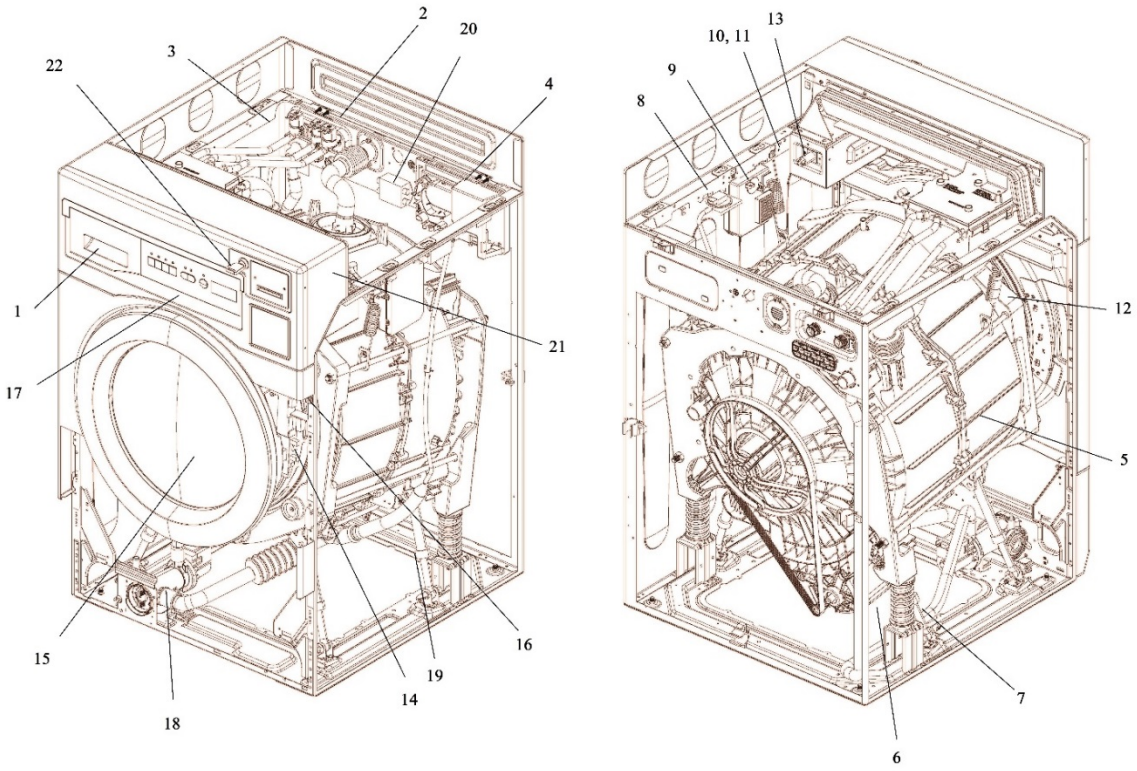


Fig 2.4

Crossover 2.0
Machine Presentation

1	Soap dispenser	14	Doorlock (A111)
2	Water inlet valves (Y11, Y13, Y21)	15	Door
3	Anti-siphon Hose	16	Door Closed Switch (S3)
4	Inverter/Power Controller (U1)	17	Display Controller (A1)
5	Drum	18	Pump (M2)
6	Motor (M1)	19	Shock Absorbers (x4)
7	Compression spring (x2)	20	EMI filter
8	Level Sensor (B1)	21	Security bolt (Service key required)
9	Door Unlock Delay Unit (A31)	22	Service Lock
10	Pump (M2) harness interconnect		
11	Doorlock (A111) harness interconnect		
12	Tension spring (x2)		
13	Service Switch (S2)		

NOTE: Removal of the top cover for component access requires removal of the security bolt #21 behind the Coin/Card faceplate mounting panel.

Component Identification

A1 CPU Circuit Board
A31 Door Unlock Delay Unit
A111 Door Lock
B1 Water Level Sensor
F1 Motor Overheat Switch
M1 Drum Motor
M2 Drain Pump
U1 Power Module / Inverter
S2 Service Switch
S3 Door Closed Switch
S4 Door Locked Switch
Y11 Cold Detergent Valve
Y13 Cold Bleach Valve
Y21 Hot Detergent Valve

Display Panel

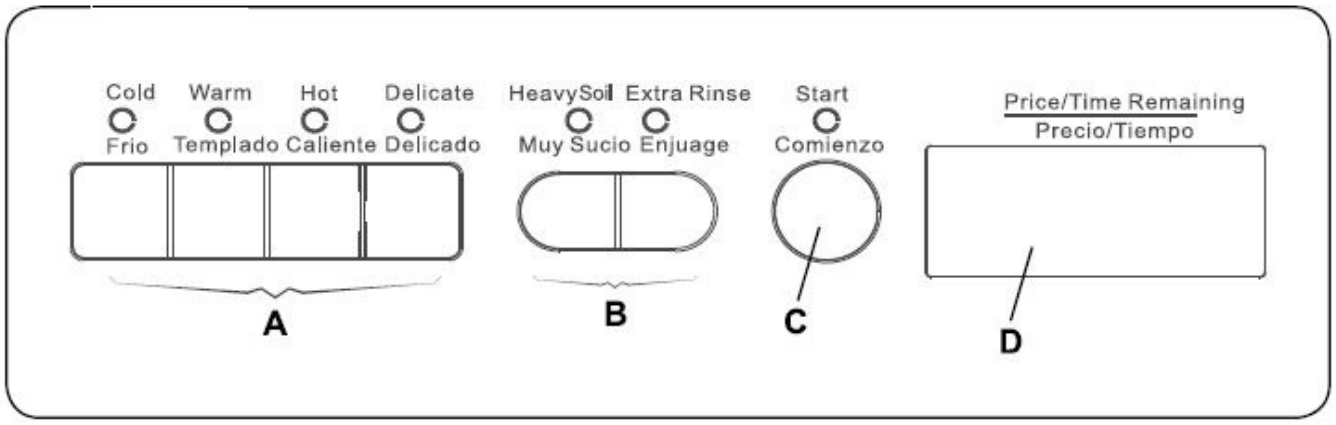


Fig. 2.5 Display Board

The control panel consists of program selection buttons **(A)**, option buttons **(B)**, a start button **(C)**, and a display **(D)** Depending on the mode these have different functions.

	Operating Mode	Service Mode
A	Program selection buttons	Change register parameter
B	Wash program option buttons	Register navigation
C	Wash program start	Save register parameter changes
D	Display indicating price of programs, program time remaining, and cycle completion.	Register parameter values, machine component status, and error code display

OPERATING MODE: The display control panel displays the vend price and allows the selection of the main wash programs. As desired, options can be selected to modify the wash programs to adjust for load type and soiling. After program start, the time remaining is displayed until the cycle complete at which point “done” is displayed.

SERVICE MODE: In service mode the display control panel: enables service mode access via PIN; reading statistics and error coded registers; machine serial/coin mode change; setting prices and program parameters; machine component activation; and Real Time Clock promotion events setup. The control board (A1) retains all register value information. In the event of faults, error codes will be displayed. See the “Error Codes” section of this manual.

Control Board (A1)

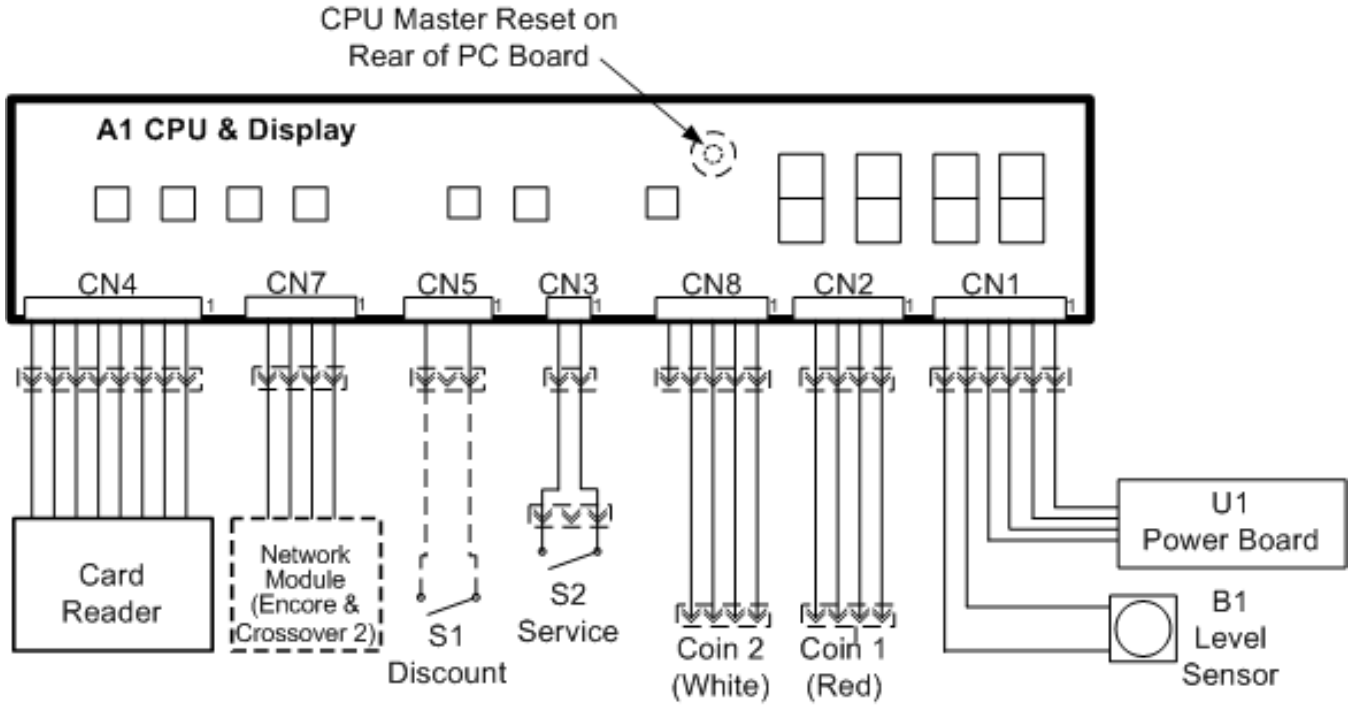


Fig 2.6 Control Board (A1)

The CPU control board (A1) is mounted directly behind the display panel. It has: seven switches activated by the buttons on the display panel; a CPU reset switch on the back; four 7-segment digits; and an audio chime. Crossover 2 also have a real time clock (RTC) chip on the CPU PC board. The CPU has a communication port for connection to an optional network module. All register parameters and machine settings are stored in on-board, non-volatile memory.

The A1 board provides connectivity to the service switch (S2), the optional external price discount switch (S1), Coin1/Coin2 (pulse) and serial connections, input from the level sensor and power from and two-way communication with the power board/Inverter (U1). All connectors have a unique pin count or color to prevent misconnection. The wiring diagram maps the connectors 1-1 with the physical board layout when looking at the front of the board.

Connections (right-to-left). Connections not required are marked “optional”

- **CN1**: Power Board/Inverter (U1) and Level Sensor (B1)
- **CN2**: COIN1 (Default = 0.25) Connector body color is RED, optional.
- **CN8**: COIN2 (Default 1.00), optional.
- **CN3**: Service Switch (S2)
- **CN5**: External Discount promotion, optional. (S1)
- **CN7**: Network module Crossover 2 only, optional.
- **CN4**: Serial connection for payment system, optional.

The A1 board on some models has a 24-hour Real Time Clock/Calendar. The clock is set up by the installer and is synchronized to the start-of-minute when time adjustments are made, allowing all machines to be synchronized. The clock is used to time-stamp error codes, time-stamp coin vault access, and allow up to four day-of-week and time-specific price promotion events.

The A1 board can be reset to factory “default” register settings by pressing and holding the “reset” button on the rear of the control board, accessible through a hole in the rear module cover. The board will give an audible “chime” indicating reset has occurred. Statistics, error logs, and certain other registers are unaffected by CPU reset. The machine will be set to COIN mode, price = $0.00 and all configuration registers are loaded with their factory-default values.

If required, a firmware update is accomplished by replacing the A1 board.

Power Controller/Inverter (U1)

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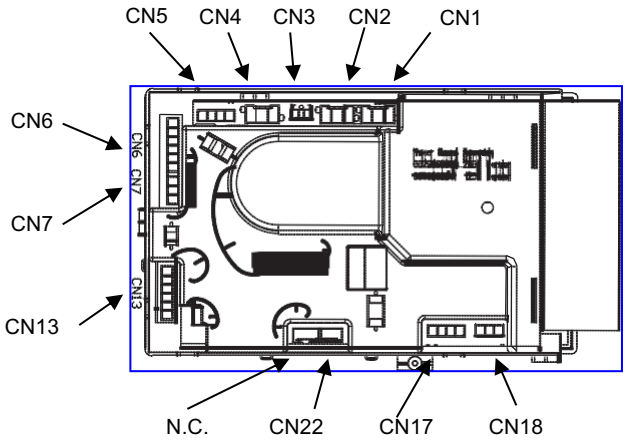


Fig 2.7 U1 Power Controller/Inverter

The power module/inverter U1 is located on the rear wall of the machine. Connections include: power and INTERLOCK, display board, drum motor, water valves, pump, doorlock, and external liquid supply. U1 is secured to the rear of the machine with four screws. U1 is not fuse protected.

Connectors are unique by size, color or terminal count and are listed below counter-clockwise.

CN1: Motor Overheat Switch located on Drum motor M1 (normally closed)
CN2: INTERLOCK, L1', N' (120 vac, when the doorlock is activated)
CN3: Power L1, N (120 vac continuous)
CN4: Cold Detergent Valve Y11 (120 vac, when activated)
CN5: Cold Bleach Valve Y13 and Hot Detergent Valve Y21 (120 vac, when activated)
CN6: External Liquid Supply (120 vac, when activated)
CN7: Pump M2 (120 vac, when activated)
CN13: Door-closed switch S3 and lock and unlock coil all located on doorlock A11
CN22: 12vdc power and communications with CPU Display Board A1
CN17: Tachometer located on Drum Motor M1
CN18: Motor windings (3 phase) drum motor M1 (See wiring diagram for resistance)

INTERLOCK: In order for components (M1, M2, Y11, Y13, Y21, External Liquid Supplies) to receive power, L1',N' INTERLOCK voltage must be present at U1:CN2. This circuit passes through the two S4 doorlock safety switches on the doorlock A111. Thus, the door must be closed locked for the machine to operate.

Circuit GROUND: The "logic" ground on the U1 and A! circuit boards is not at earth ground potential. This means that any machine harness, payment system harness, or component insulation failure leading to a chassis short, including the circuit ground, can potentially damage the U1 and / or A1 circuit boards.

Drum Motor (M1)

The drum motor (M1) is a synchronous 3 phase motor with tachometer and overheat switch (F1) that opens at 150 C. These components connect to the machine's main harness using a single seven position connector that in turn, connects to the U1:CN1, CN17 & CN18 connections on the U1 inverter. The motor connector is physically attached to the motor frame with snap in pins and a cable-tie. Dislodging this connector during machine installation can lead to motor related fault codes.

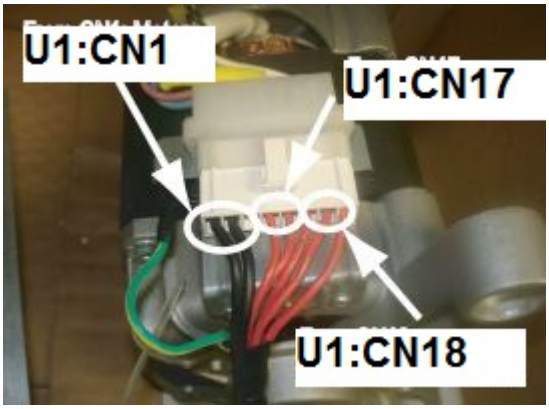


Fig 2.8 (M1) Harness connection

The motor drives the washer's inner a drum via a belt and pulley. The center of the drum and motor shafts are fixed, thus and belt adjustment is not required. The motor is demounted by loosening the two mounting bolts and pulling the motor out of the rear access panel of the machine.

Fig 2.9 Pulley and belt

The inverter monitors motor current and RPM to determine load balance and if required (due to unbalanced loads) reduce extraction speed. There is no unbalance switch.

Doorlock (A111)

The electromechanical doorlock (A111) is secured to the right side of the front panel with three screws.
A111 has a lock and unlock coil sharing a COMMON line and is bi-stable in the unlocked/locked condition when activated with a 24 vdc pulse.

The doorlock engages the door catch to ensure the door is closed AND locked during operation. Two independent circuits routed through A111 to the inverter (U1) ensure these two conditions are met.

1. **S3 Door-Closed switch**: Normally open contact. Closing the loading door depresses the switch plunger and closes the switch contact.
2. **S4 Door-Locked switch**: Normally open 2-pole contact. Locking the loading door closes the switch contact and energizes the “Interlock” signal at U1-CN2 (120 VAC).

The doorlock is the primary safety component of the machine. It MUST always be replaced if defective, and never repaired. In addition, the door-closed and door-locked (INTERLOCK) circuits MUST never be bypassed.

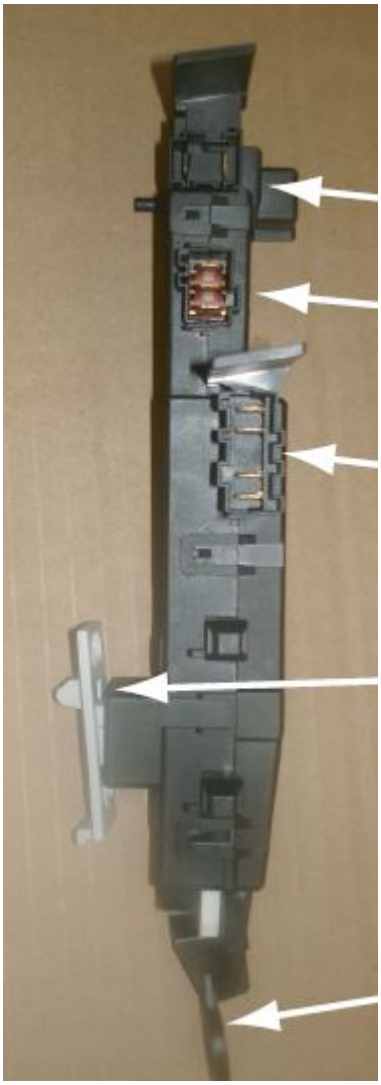


Fig 2.10 (A111) Doorlock

All doorlock signals can be accessed at U1:CN13 and U1:CN2 or at the doorlock interconnect connector located near the service switch (S2)

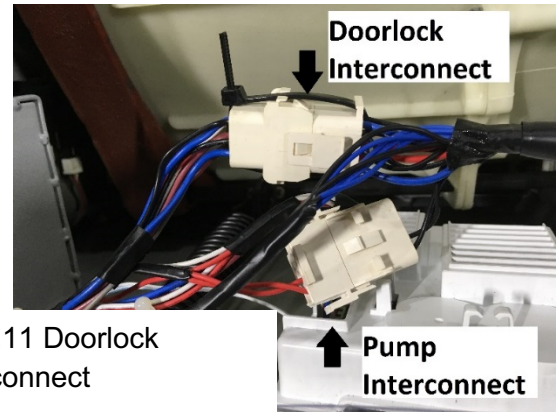


Fig 2.11 Doorlock Interconnect

Fig 2.12 Doorlock Mounting Screws

Doorlock Unlock Delay Unit (A31)

The Door Unlock Delay Unit (A31) will unlock the machine approximately 3 minutes after disconnecting power. A31 has two onboard capacitors that are charged via the A31's direct connection to L1 and N. When power is disconnected from the machine an onboard timer activates. After 180 seconds, the time it required for a full load at maximum extract to come to a stop, the onboard relay discharges the capacitor to the unlock coil on the Doorlock (A111) allowing the door to be opened. Care should be used when opening the door after disconnecting power, as water could spill from the machine.

If the machine is unattended in the event of a power failure lasting longer than approximately 3 minutes followed by power restoration, the CPU will relock the door and continue the cycle.

The A31 has a connectorized harness with 12 VDC, 250 ma available for optional payment systems.

Fig 2.13 (A31) Doorlock Unlock Delay Unit

Inlet Valves (Y11, Y13, & Y21)

There are two water inlets feeding two cold water valves (Y11) and (Y13) and hot water valve (Y21). The valve is METRIC DN20, 20 mm thread. Do not use standard ¾ in G.H thread as this will damage the valve. Use the two provided supply hoses included in the drum kit. The straight end marked “supply” is standard ¾ in Garden Hose thread. The right angle end marked “machine” is DN20mm must be threaded onto the machines’ connections. The cold water inlet feeds cold water valves (Y11) and (Y13) and the hot water inlet feeds (Y21).

Fig 2.14 Inlet Valves

The detergent drawer has three compartments flushed by various combinations of valves.

1) **Detergent: Y11 and/or Y21**
2) **Softener: Y11+Y13 (both valves on)**
3) **Bleach: Y13**

Fig 2.15 Detergent Drawer

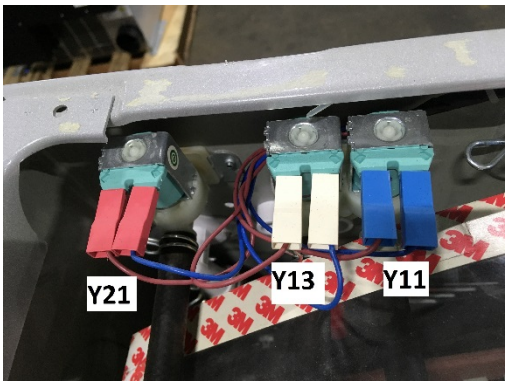


Fig 2.16

Drain Pump (M2)

The drain pump (M2) is a 120-vac electrical pump located on the bottom of the machine at the front-left. The filter basket is accessible from the front of the machine for cleaning either by removing the plastic caps on the left side of the kick panel on or demounting the kick panel depending on model.

The machine can be drained using the bleeder hose to the left of the filter cap.

The pump is connected to the inverter's U1:CN7 connector. The pump's harness has an inline connector located near the Service Switch (S2) at the top of the machine. Voltage and pump-motor winding resistance can be conveniently measured there.

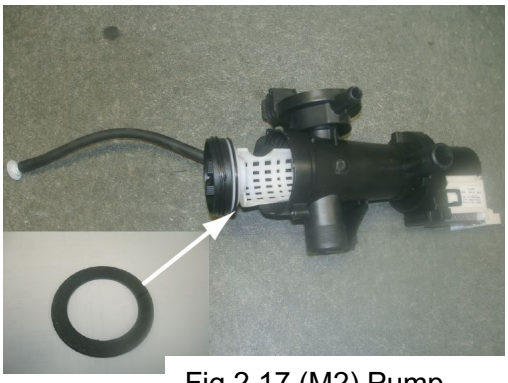


Fig 2.17 (M2) Pump

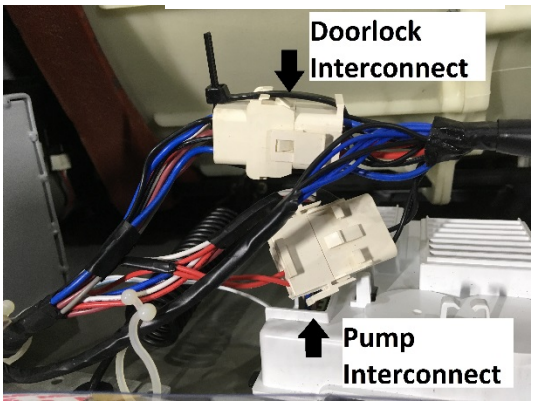


Fig 2.18. Pump Motor Interconnect

Level Sensor (B1)

The level sensor is mounted to the right side of the machine and monitors the water level by measuring the air pressure in the sensor hose connected to the bottom rear of the outer drum. There are no adjustments to be made on this component. Water level adjustments are made through parameter-entry in the A1 PCB's service mode.

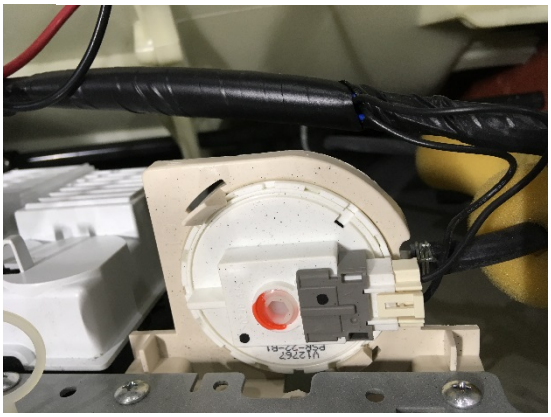


Fig 2.19 (B1) Level Sensor

Anti-siphon hose

The machine has a built-in anti-siphon tube connecting the drum to the drain hose rear-wall elbow connection. The tube allows air to fill the drain hose when the pump is not running, thereby preventing siphoning of water from the drum.

Fig 2.20 Anti-siphon hose

Loading Door

The loading door is demounted by removing four screws and lifting the door up and forward to clear the mounting hooks. The door can be disassembled to correct mis-alignment caused by wear and tear or excessive force applied to the door.

Fig 2.21 Loading Door Mounting

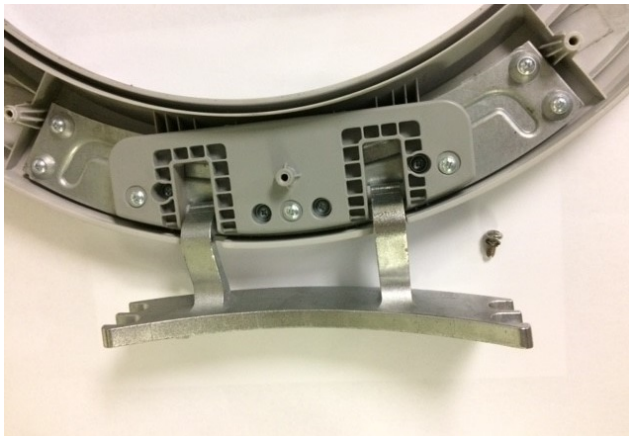


Fig 2.22 Loading Door Hinge Assembly

Door Bellows-gasket

The door bellows is oriented with its drain holes at the bottom. The bellows is secured to the outer drum with a wire ring, tightened by a 7mm hex-head screw.

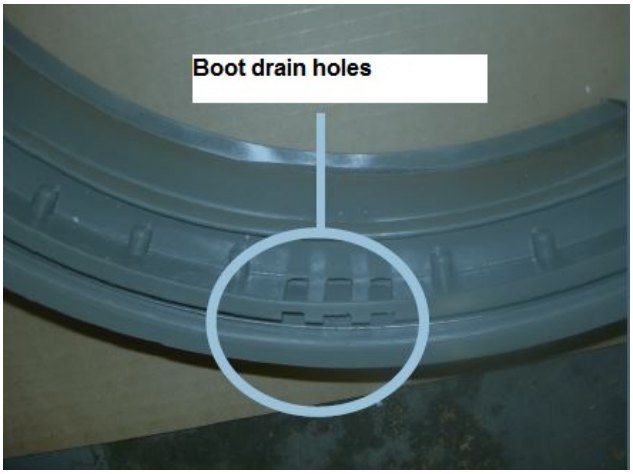


Fig 2.23 Bellows-boot drain holes

The outer, front part of the bellows is secured to the front panel with a clamp spring.

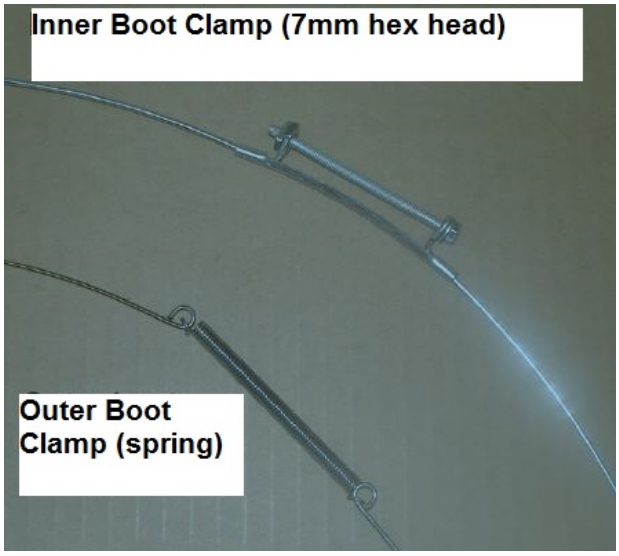


Fig 2.24 Bellows clamps

An outer boot clamp tool is available to assist in remounting the spring.

Fig 2.25 Bellows clamp tool

Front panel

On some models the front panel can be demounted by removing the kick panel, the two lower panel tab screws and the three screws located at the top of the loading door inset. Disconnect the doorlock harness connecters before fully removing the panel.

On other models the Soap tray housing, control panel, payment system must be demounted. Then then remove the top three front panel mounting screws. Lift the panel up then towards you to clear the keyhole slots taking care not to bend the flanges.

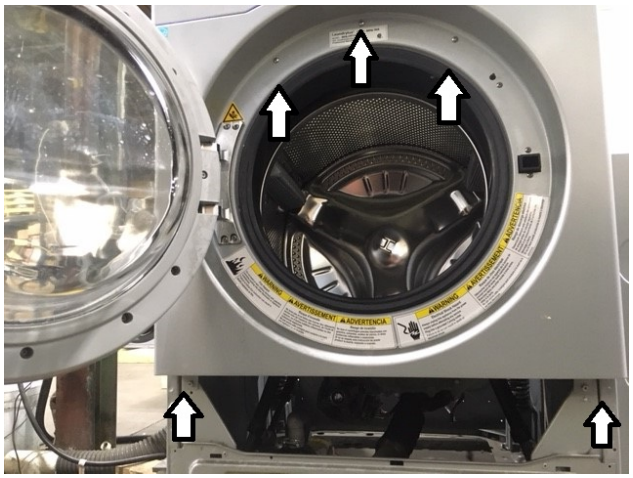


Fig 2.26

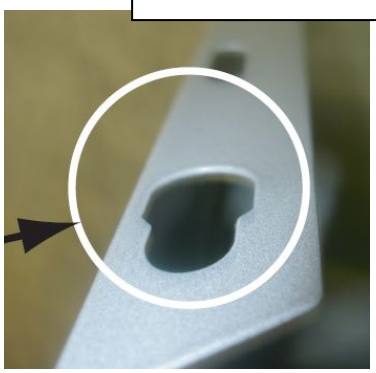


Fig 2.27

Fig 2.8

Wash Program Description

The machine offers four standard wash programs, and two optional features. The basic wash programs are Cold, Warm, Hot, and Delicate. The optional features are Heavy Soil and Extra Rinse. The options can be added to the basic wash programs (except for Delicate), in any combination. On coin-operated models, a different price can be charged for each program, and an additional price can be programmed for each of the two option buttons.

The standard Cold, Warm, and Hot wash programs are comprised of three program segments. These programs begin with the Mainwash which fills to the LOW water level. The duration of the Mainwash can be adjusted using the machine's service mode. The Mainwash water temperature is cold in the COLD program, warm in the WARM program, and hot in the HOT program. The Mainwash fills through the detergent compartment of the dispenser drawer. Approximately half way through the Mainwash, the bleach compartment of the detergent dispenser is flushed for approximately 15 seconds with cold water using valve Y13.

The machine drains following the Mainwash and refills to the HIGH-water level for each of the two cold water Rinses that complete the basic programs. Each rinse is followed by a drain and extraction, the final extraction is six minutes long. The final rinse flushes the softener compartment of the dispenser by activating both valves Y11 and Y13 at the same time. The water streams from these two valves intersect, resulting in the water flowing into the middle compartment of the dispenser.

The Delicate program consists of a four-minute cold water Mainwash and two cold water rinses. Heavy Soil and Extra Rinse options cannot be used with the Delicate program.

Two optional program segments can be added using service mode. The first option is a two-minute Prewash that fills to the LOW water level through the Detergent compartment of the detergent drawer. The water temperature is the same as the Mainwash temperature except in the HOT program, which has a warm prewash. The second option is an extra Rinse that gets inserted between the first and last Rinse and fills to the HIGH-water level. LOW and HIGH-water level can also be adjusted in service mode.

On some models, a Rinse and Spin wash program is available by pressing the EXTRA RINSE button with no wash programs selected. This optional program must be enabled during machine setup. Rinse and Spin is comprised of a two-minute cold water fill to the High-water level followed by a four minute extraction. Pressing the DELICATE button deselects this wash program.

Heavy Soil Option

The Heavy Soil option adds a Prewash to any wash program.
Heavy Soil is not available when the Delicate Program is selected.

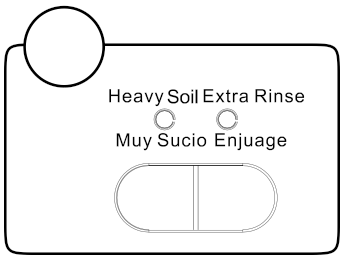


Fig 3.1

Extra Rinse Option

The Extra Rinse option adds one additional cold-water rinse to any wash program except the Delicate cycle. The extra rinse repeats the second-to-last rinse.

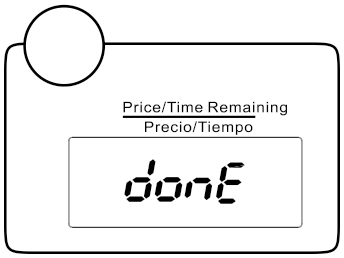


Fig 3.2

Program End

The display will show “donE” when the program ends. Then door can then be opened.

Wash Programs

	Agitation 12 sec on / 3 sec off			
	COLD			
PROGRAM	NO OPTION	HEAVY SOIL	EXTRA RINSE	HEAVY SOIL EXTRA RINSE
PreRinse	- - -	2 min C low	- - -	2 min C low
Drain	- - -	Y	- - -	Y
Prewash	3 min C low	3 min C low	3 min C low	3 min C low
Drain	Y	Y	Y	Y
Mainwash	6 min C low	6 min C low	6 min C low	6 min C low
Drain	Y	Y	Y	Y
Rinse 1	1 min C high	1 min C high	1 min C high	1 min C high
Drain	Y	Y	Y	Y
Spin	30 sec / 400RPM	30 sec / 400RPM	30 sec / 400RPM	30 sec / 400RPM
Rinse 2	1 min C high	1 min C high	1 min C high	1 min C high
Drain	Y	Y	Y	Y
Spin	30 sec / 400RPM	30 sec / 400RPM	30 sec / 400RPM	30 sec / 400RPM
Rinse 3	- - -	- - -	1 min C high	1 min C high
Drain	- - -	- - -	Y	Y
Spin	30 sec / 400RPM	30 sec / 400RPM	30 sec / 400RPM	30 sec / 400RPM
Rinse Soft	2 min C high	2 min C high	2 min C high	2 min C high
Drain	Y	Y	Y	Y
Spin	6 min	6 min	6 min	6 min

NOTES:

All segment times are measured from completion of fill.
C = COLD valve open
H = HOT valve open
CH = COLD and HOT valves open
low = LOW level
high = HIGH level
Y = Yes

Wash Programs

	Agitation 12 sec on / 3 sec off			
	WARM			
PROGRAM	**NO OPTION**	**HEAVY SOIL**	**EXTRA RINSE**	**HEAVY SOIL EXTRA RINSE**
PreRinse	- - -	2 min CH low	- - -	2 min CH low
Drain	- - -	Y	- - -	Y
Prewash	3 min CH low	3 min CH low	3 min CH low	3 min CH low
Drain	Y	Y	Y	Y
Mainwash	6 min CH low	6 min CH low	6 min CH low	6 min CH low
Drain	Y	Y	Y	Y
Rinse 1	1 min C high	1 min C high	1 min C high	1 min C high
Drain	Y	Y	Y	Y
Spin	30 sec / 400RPM	30 sec / 400RPM	30 sec / 400RPM	30 sec / 400RPM
Rinse 2	1 min C high	1 min C high	1 min C high	1 min C high
Drain	Y	Y	Y	Y
Spin	30 sec / 400RPM	30 sec / 400RPM	30 sec / 400RPM	30 sec / 400RPM
Rinse 3	- - -	- - -	1 min C high	1 min C high
Drain	- - -	- - -	Y	Y
Spin	30 sec / 400RPM	30 sec / 400RPM	30 sec / 400RPM	30 sec / 400RPM
Rinse Soft	2 min C high	2 min C high	2 min C high	2 min C high
Drain	Y	Y	Y	Y
Spin	6 min	6 min	6 min	6 min

NOTES:

All segment times are measured from completion of fill.

C = COLD valve open

H = HOT valve open

CH = COLD and HOT valves open

low = LOW level

high = HIGH level

Y = Yes

Wash Programs

	Agitation 12 sec on / 3 sec off			
	HOT			
PROGRAM	**NO OPTION**	**HEAVY SOIL**	**EXTRA RINSE**	**HEAVY SOIL EXTRA RINSE**
PreRinse	- - -	2 min CH low	- - -	2 min CH low
Drain	- - -	Y	- - -	Y
Prewash	3 min CH low	3 min CH low	3 min CH low	3 min CH low
Drain	Y	Y	Y	Y
Mainwash	6 min H low	6 min H low	6 min H low	6 min H low
Drain	Y	Y	Y	Y
Rinse 1	1 min CH high	1 min CH high	1 min CH high	1 min CH high
Drain	Y	Y	Y	Y
Spin	30 sec / 400RPM	30 sec / 400RPM	30 sec / 400RPM	30 sec / 400RPM
Rinse 2	1 min C high	1 min C high	1 min C high	1 min C high
Drain	Y	Y	Y	Y
Spin	30 sec / 400RPM	30 sec / 400RPM	30 sec / 400RPM	30 sec / 400RPM
Rinse 3	- - -	- - -	1 min C high	1 min C high
Drain	- - -	- - -	Y	Y
Spin	30 sec / 400RPM	30 sec / 400RPM	30 sec / 400RPM	30 sec / 400RPM
Rinse Soft	2 min C high	2 min C high	2 min C high	2 min C high
Drain	Y	Y	Y	Y
Spin	6 min	6 min	6 min	6 min

NOTES:

All segment times are measured from completion of fill.

C = COLD valve open

H = HOT valve open

CH = COLD and HOT valves open

low = LOW level

high = HIGH level

Y = Yes

Wash Programs

	Agitation 4 sec on / 12 sec off			
	DELICATE			
PROGRAM	**NO OPTION**	**HEAVY SOIL**	**EXTRA RINSE**	**HEAVY SOIL EXTRA RINSE**
PreRinse	- - -	Not Available (DOUBLE BEEP)	Not Available (DOUBLE BEEP)	Not Available (DOUBLE BEEP)
Drain	- - -			
Prewash	- - -			
Drain	- - -			
Mainwash	4 min C			
Drain	Y			
Rinse 1	1 min C high			
Drain	Y			
Spin	30 sec / 400RPM			
Rinse 2	1 min C high			
Drain	Y			
Spin	30 sec / 400RPM			
Rinse 3	- - -			
Drain	- - -			
Spin	30 sec / 400RPM			
Rinse Soft	2 min C high			
Drain	Y			
Spin	2 min			

NOTES:

All segment times are measured from completion of fill.

C = COLD valve open

H = HOT valve open

CH = COLD and HOT valves open

low = LOW level

high = HIGH level

Y = Yes

Wash Programs

Only some models

	Agitation 12 sec on / 3 sec off			
	RINSE AND SPIN*			
PROGRAM	**NO OPTION**	**HEAVY SOIL**	**EXTRA RINSE**	**HEAVY SOIL EXTRA RINSE**
PreRinse			- - -	
Drain			- - -	
Prewash			- - -	
Drain			- - -	
Mainwash			- - -	
Drain			- - -	
Rinse 1			4 min C	
Drain			Y	
Spin			- - -	
Rinse 2			- - -	
Drain			- - -	
Spin			- - -	
Rinse 3			- - -	
Drain			- - -	
Spin			- - -	
Rinse Soft			- - -	
Drain			- - -	
Spin			6 min	

NOTES:

*To activate set, register 24 = “00”, Select HEAVY SOIL with no wash programs selected and press START.

All segment times are measured from completion of fill.

C = COLD valve open

H = HOT valve open

CH = COLD and HOT valves open

low = LOW level

high = HIGH level

Y = Yes

Coin (Pulse) or Serial Mode Configuration

The washer can accept payment using coins or tokens in COIN MODE or using payment cards in CARD MODE (serial). Setting the machine to COIN MODE and setting all wash program and option prices to “0.00” will allow the machine to operate for free in OPL mode.

1. In Metered machines unlock and remove the coin box. Press and release the Service Switch located in the rear (Crossover 2) of the coin vault to enter service mode.
2. The display will go blank.
3. Press the “HEAVY SOIL” and “EXTRA RINSE” buttons simultaneously. This display shows “0” (Crossover 2) or “0 00” (Crossover 1) if the machine is in COIN MODE or ““1” or 1 00” f the machine is in CARD MODE.
4. Press the START button. The display flashes.
5. Press the COLD program button to change the operating mode. The left-most digit changes 0 → 1 or 1 → 0, indicating the new mode (0 = COIN=default, 1 = CARD).
6. Press the START button. The display stops flashing.
7. Press the service mode button to exit the service mode.
8. Disconnect and reconnect power.

Coin-Operated Machines

In coin-operated machines, prices for programs and options must be programmed during machine setup, and can be modified at any time. The machine must be set to COIN MODE.

Prices can be programmed as dollars and cents or as the number of coins or tokens required to start. There are four wash programs COLD, WARM, HOT, and DELICATE and two options HEAVY SOIL and EXTRA RINSE that can be programmed to the same or different prices. The option prices are added to the base prices of the COLD, WARM, and HOT programs. The options cannot be added to the DELICATE program.

PRICE PROGRAMMING

1. To enter the programming mode unlock and remove the coin box.
2. Press and release the Service Switch located in the rear of the coin vault to enter service mode. The display will go blank.
3. Select one of the six program or option buttons for which the price is to be programmed. The current price for that selection is displayed.
4. Press the START button. The price will blink indicating it can be edited.
5. Use the four program selection buttons; COLD, WARM, HOT, and DELICATE to change each of the four digits in the price display. Each button increments a corresponding digit, left to right, in the price. Each digit rolls over from 9 to 0 without affecting the other digits. The left most digit cannot be programmed to “0” but can be blanked out completely.
6. When the desired price is displayed, press START. The display will stop blinking indicating the new value has been saved.
7. Repeat steps 3 through 6 for each remaining wash program and option. The option buttons only make adjustments to the basic programs and are typically 0.25 or 0.50.
8. When all prices have been entered, press the Service Switch in the vault to exit service mode.
9. Check the newly entered prices by selecting each program without and with the option selections.

Register 26 (“No Decimal in Price”) determines how prices are displayed by the machine. When set to “00” (default), prices are set and displayed with a decimal (e.g. “3.00”). When set to “01”, the decimal point is turned off, and prices are set and displayed as “number of coins or tokens” required (e.g. “12”). In either case, the value of each coin drop is stored in Register 33 “Coin Value 1” and Register 34 “Coin Value 2” and determine how much the remaining price will be reduced each time a coin is deposited. The coin-value registers can be adjusted to accommodate any currency.

Service mode

Crossover 2.0

The machine's software provides a "Service Mode" (SM) to adjust operating parameters and view usage statistics. The service mode also allows a technician to activate individual components of the machine, for troubleshooting. The software also provides a "Limited Service Mode" (LSM) that allows a technician to activate machine components, via PIN entry, without having access to the coin vault service switch. If desired on machine setup, LSM via PIN entry can be disabled or allowed to have full SM functionality without requiring access to the coin vault.

To activate Service Mode for machines with coin meters:

1. Remove the coin box.
2. Press and release the SERVICE MODE plunger switch at the rear of the coin vault. The screen will display "8888".
3. Press the START button. "SE" appears in the display.
4. Use the HEAVY SOIL & EXTRA RINSE buttons to navigate to the desired register.
5. Press START to access the register or activate the function.
6. Use HEAVY SOIL & EXTRA RINSE to change values, as appropriate. Some registers require using the COLD, WARM, and HOT, DELICATE buttons to edit settings.
7. Press START to save new values, as appropriate.
8. Press the SERVICE MODE switch to exit. SM exits automatically after 60 seconds of inactivity with all service functions off.

For Non-Metered machines, the SERVICE MODE plunger switch is located behind the front console locking plate.

To activate Limited Service Mode:

1. Press and hold COLD, DELICATE, and START buttons for three seconds.
2. Use the program buttons to enter the PIN code (default is "1234").
3. Press START. The display shows "011" (the first register available in LSM).
4. Use the HEAVY SOIL & EXTRA RINSE buttons to navigate to the desired register.
5. Press START to access the register or activate the function.
6. Use HEAVY SOIL & EXTRA RINSE to change values, as appropriate.
7. Press START to save new values, as appropriate.
8. LSM exits automatically after 60 seconds of inactivity with all service functions off.

Service Mode Register Groups:

00-19 Statistics: These are non-resettable auditing counters and log registers for tracking machine usage, the four latest errors, and the four latest coinbox opening time stamps.

20-39 Wash Program Parameters: These registers are used to adjust water levels and program structure.

40-59 Activate Machine Functions: In this group, the register address appears in the first two digits of the display, and the current setting appears in the right digit ("0" = deactivated, "1" = activated). Press the START button to toggle the state.

70-79 Real Time Clock, calendar, and time-of-day discount promotion setup: These registers set up the internal clock, calendar, and promotion pricing. Note: This group on some models only.

Service Mode

STATISTICS (NON-RESETTABLE):

000 - Cold program counter. Range: 0000 to F999, (A=10, ... F=15 e.g. “B101” = 11,101)
001 - Warm program counter. Range: 0000 to F999
002 - Hot program counter. Range: 0000 to F999
003 - Delicate program counter. Range: 0000 to F999
004 - Rinse and Spin program counter. Range 0000 to F999
005 - Heavy soil option (only) counter. Range: 0000 to F999
006 - Extra rinse option (only) counter. Range: 0000 to F999
007 - Heavy Soil & Extra Rinse counter both options selected Range: 0000 to F999
008 - Total program counter i.e. 00+01+02+03+04 . Range from 0000 to F999
009 - Coin totalizer - first 4 digits, from 0000 to 9999
010 - Coin totalizer - last 4 digits, from 00.00 - 99.99
*011 - Newest error and time stamp. “011”>E ##>yyyy>mm.dd>hh.mm>(reg 8)>”010”
*012 - 2nd latest error and time stamp.
*013 - 3rd latest error and time stamp.
*014 - Oldest error and time stamp. “014”>E ##>yyyy>mm.dd>hh.mm>(reg 8)>”010”
015 - Coin box access 1-time stamp: (Most recent access)
016 - Coin box access 2-time stamp:
017 - Coin box access 3-time stamp:
018 - Coin box access 4-time stamp: (Oldest access).
*019 - Firmware version.

Statistics (000-010): Program and option counts are updated when the cycle ends. When in coin mode (decimal in price), registers 009-010 shows the value of the amount collected. When in no-decimal mode (token), 009-010 shows the number of coins collected. When both program options have been selected for a program, register 007 is incremented but not registers 005 and 006.

Error Codes (011-014): Selecting an error register displays the error code. Each successive press of the START button (>) advances the display: Year > Month. Day > Hour. Minutes > Total Program Count > Register Exit. As new errors occur, they are saved in register 011 and the older records shift up by one register location. The original contents of register 014 are discarded.

Coin Box Access (015-018): Each successive press of the START button (>) advances the display: Year > Month. Day> Hour. Minutes> Register Exit. With each opening of the coin box, the register time stamps are saved in register 015 and the older records shift up by one register location. The original contents of register 018 are discarded.

Wash Program Parameters:

020 - Low water level (prewash & wash): range 5-32 (Approximate volume in liters, default = 07”).

021 - High water level (rinse): range 5-32 (Approximate volume in liters, default = 10”).

022 - Delete rinse 2: range “00” or “01”, default = “01” (rinse 2 deleted).

023 - Delete prewash: range “00” or “01”, default = “01” (prewash deleted).

024 - Default program selection:

00= No cycle selected (display “----“). Enables RINSE&SPIN program selection.
01= COLD cycle is default (This is the factory default)
02= WARM cycle is default
03= HOT cycle is default
04= DELICATE cycle is default.

Service Mode

025 - Main wash time: from 0-999 seconds, default=”360”, i.e. six minutes.

026 - Decimal in price: “00” = default=decimal displayed, ”01” = no decimal (token).

027 - Silence buzzer: Range: “00” =default=enabled, “01” = disabled.

028 - Regret Time: The allowable time, after program start, that a user can change the wash program/options or add items to the wash. 0000-9999 seconds. “0000” = disabled, Default = 030. “9999” = unrestricted.

Press the START button, to pause the cycle and unlock door. If the new program/option selection has a higher vend value, the user will be prompted to insert additional payment. Upon pressing the start button with the door closed, the door will relock and the cycle resumes.

030 - COLD cycle maximum final extract speed RPM: (“0700” or “1000” = default)

031 - WARM cycle maximum final extract speed RPM: (“0700” or “1000” =default)

032 - HOT cycle maximum final extract speed RPM: (“0700” or “1000” =default)

033 - Coin value 1: “0000-9999”, default = ”0025”

034 - Coin value 2: “0000-9999”, default = ”0100”

035 - Limited Service Mode PIN setting: Default = “1234”. (“0000” disables LSM).

036 - Full-Service Mode via PIN entry setting: Default = ’0000” (Disabled).

037 - Network address: “0000 - 9999”, “0000” = default

Activate Machine Functions (door closed):

*040 - Door lock.

*041 - Cold water - detergent compartment (Y11).

*042 - Warm water - detergent compartment (Y11 + Y13).

*043 - Hot water - detergent compartment (Y13).

*044 - Cold water - bleach compartment (Y21).

*045 - Cold water, softener compartment (Y11 + Y21).

*046 - Drain pump.

*047 - Drum clockwise wash rotation, 50 RPM.

*048 - Drum counter-clockwise wash rotation, 50 RPM.

*049 - Drum clockwise distribution rotation, 95 RPM.

*050 - Drum counter-clockwise distribution rotation, 95 RPM.

*051 - Drum 400 RPM.

*052 - Drum 600 RPM.

*053 - Drum 1000 RPM.

*054 - Display test.

*055 - Buzzer test.

*056 - Detergent pump trigger signal.

*057 - Bleach pump trigger signal.

*058 - Softener pump trigger signal.

*059 - Coin meter test, each dropped coin adds 1 to displayed total. Registers 009 and 010 unaffected.

Real Time Clock (RTC), Calendar and Time-of-day Discount Promotion.

070 - RTC set-up: 24hr format, “070”>yyyy>mm.dd>hh.mm>”070”. During set up, the RTC is stopped. When the “START” button is pressed to save hh.mm and exit register 70, the seconds digits of the RTC is set to “00” without affecting the hours and minutes values, and the RTC re-started.

071 - RTC promotion 1 START: “071”>D>hh.mm>%%>”071”

072 - RTC promotion 1 END: “072”>hh.mm>”072”

073 - RTC promotion 2 START “073”>D>hh.mm>%%>”073”

074 - RTC promotion 2 END “074”>hh.mm>”074”

075 - RTC promotion 3 START “075”>D>hh.mm>%%>”075”

076 - RTC promotion 3 END “076”>hh.mm>”076”

077 - RTC promotion 4 START “077”>D>hh.mm>%%>”077”

078 - RTC promotion 4 END “078”>hh.mm>”078”

079 - Promotion %% for discount input signal (range “00”-”A0”, default=”00”, “A0” = 100%)

Select a value identifying the day(s) “D” for which the promotion will be active, as follows:

- ➢ 00=promotion is inactive.
- ➢ 01=Sunday, 02=Monday, ...07=Saturday.
- ➢ 08=All days, 09=Monday-Friday only, 0A=Saturday and Sunday only.

Use COLD, WARM, HOT, & DELICATE to edit “yyyy”, “mm.dd”, & “hr.min” values. Press START to advance to the next entry within the register.

Use HOT and DELICATE to edit the discount percentage “%%”. If percentage = 90-99 pressing DELICATE will set the percentage to “A0” = 100%.

Note:
* = Registers can be accessed in Limited Service Mode.

Resetting the display controller will restore all applicable firmware settings to factory default. The machine will be set to COIN MODE with all wash program and option prices = 0.00.

Discount price “promotion” programming using the real time clock or external signal.

The washer can apply a “promotion” percentage discount to the vend price of a program selection at specified times and days. Up to four different promotion discount event times and percentages can be selected using the washer’s built-in Real Time Clock (RTC). Events can also be triggered using an optionally-installed, external signal provided by a clock-driven relay or switch. This signal can be used to activate discount on multiple washers. Both options require setup via the service mode registers, access to which is described in the Service Mode section of this manual.

During machine setup, the promotional discount is represented by a two-digit percentage (%%) and can range from 0% (no discount) to “A0” = 100% (free wash). When Promotion pricing is active, the displayed vend price equals the sum of the discounted program price rounded up to the next multiple of register “033” (Coin value 1) and the option price, which is not discounted. For example, if Coin Value 1 = 0.25 and a 50% Promotion discount is applied to a COLD ($1.00) wash program with a HEAVY SOIL (0.25) option selected (1.25 total), the displayed vend price would be rounded up to “0.75.”

To use Promotion percentage discount pricing the washer must be set to “COIN MODE” operation. Promotion pricing can be used with the washer set to either Decimal or No Decimal in price, Reg 26 = “00” or “01”.

PROMOTION PRICING VIA THE REAL TIME CLOCK (RTC)

The RTC and Promotion pricing times are set and displayed in 24hr format. (e.g. 1:15 PM = 13:15). The promotion days of the week are represented by a two-digit number (nn). The RTC’s built in calendar adjusts for leap years. Promotion pricing set up requires setting the RTC and up to four pairs of Promotional start and stop times and percentages.

RTC and Promotional Setup

1. Activate the service mode.
2. Navigate to Register 70 (RTC set-up) as explained in the Service Mode section.
2. Press START, this will stop the clock. The year will be displayed as a four-digit number (yyyy). Edit these values using the COLD, WARM, HOT, and DELICATE buttons.
3. Press START, a two-day digit number “(0d)” for the day of the week will be displayed. (01=Sunday, 02=Monday, ... 07=Saturday.) Edit this value using the DELICATE button.
4. Press START, the Month and Day will be displayed as two-digit numbers (mm.dd). Edit these values using the COLD, WARM, HOT, and DELICATE buttons.
5. Press START, the Hour and Minutes will be displayed in 24 hr. format as two-digit numbers (hh. mm). Edit these values using the COLD, WARM, HOT, and DELICATE buttons.
6. Press START to save the changes and exit register 70. This will reset the clock to the set time, reset the clock’s seconds digit to “00”, and restart the clock. This allows synchronizing the clocks on multiple machines to a master clock such as a wall clock, wristwatch, or cell phone.
7. Navigate to Register “71” (RTC Promotion #1 START) to set the percentage discount, day of the week and start time for promotion #1.

8. Press START, a two-digit day number (“0d”) for which the start day(s) of the week for promotion
   #1 will be displayed. (01=Sunday, 02=Monday, ...07=Saturday, 08=All days, 09=Monday-Friday only, 0A=Saturday and Sunday only, 00=promotion is inactive.) Edit this number using the DELICATE button to cycle through the allowed values.

9. Press START, the Hours and Minutes in 24 hr. format for the start of Promotion #1 will be displayed (hh.mm). Edit these values using the COLD, WARM, HOT, and DELICATE buttons.

10. Press START, the promotion percentage discount will be displayed as two digits (%%). The discount can range from “00” = 0% to “A0” = 100% (e.g. Free Wash). Edit this number using the HOT and DELICATE buttons. Note, pressing the HOT button ten times will cycle the value to “A0”.

11. Press START to save the changes and exit Register “71”

12. Navigate to Register “72” (RTC Promotion #1 END”). This will allow you to set the end time for promotion #1.

13. Press START, the promotion end time in hours and minutes in 24 hr. format will be displayed (hh. min). Edit these values using the COLD, WARM, HOT, and DELICATE buttons.

14. Press START, this will save the changes and exit register 72.

15. Program the three other Promotion times and percentages as desired using register pairs: 073 &
   074 (Promotion #2), 075 & 076 (Promotion #3), and 077 & 078 (Promotion #4). Each promotion can have a different percent reduction. They must not overlap with each other.

16. Exit Service Mode.

PROMOTION PRICING VIA EXTERNAL CLOCK-DRIVEN RELAY OR SWITCH

This washer can apply a Promotion price discount using an external clock-driven relay or manual switch. To use this, feature the washer requires an optional external price reduction harness kit be installed. Refer to the product installation manual for information regarding connecting this signal to the washer to activate discounts.

External Signal and Promotional Firmware Setup

1. Navigate to Register 79 (Promotion %% for discount input signal) as explained in the Service
   Mode section.

2. Press START the promotion percentage discount will be displayed as two digits (%%). The discount can range from “00” = 0% to “A0” = 100% (e.g. Free Wash). Edit this number using the HOT and DELICATE buttons. Note, pressing the HOT button ten times will cycle the value to “A0”.

3. Press START, this will save the changes and exit register 79.

4. Exit Service Mode.

When the external signal is activated, the washer will apply a promotion percentage discount, set in register 79, to the displayed vend price.

Please contact Laundrylux’s Technical Support team at (516) 371-0700 if you have any questions or need assistance with price programming or implementing discount price programming.

Trouble Shooting
Error Codes and Indicators

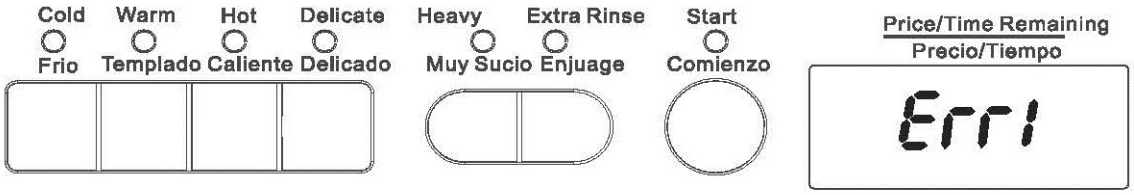


Fig 7.1 Error code display

ERROR CODES

Faults/errors in the program or machine are indicated by a numerical error code on the panel display. Some error codes are cleared automatically when the Start button is pressed to restart the machine and some when the door is opened. For the other error codes the failure condition must be resolved to clear the error code.

Error codes are stored in the lowest register first. As more occur each is moved up and the oldest one discard. Crossover 2 does not store identical consecutive registers. On Crossover 2 if the real time clock has been set, then the errors will be time and date stamped.

INDICTATORS

In service mode, the Cold, Warm, Hot, Delicate, and Heavy Soil LEDs have the following functions:

COLD: Door Closed. Lights when the door-closed switch (S3) contact is closed.

WARM: Door Locked. Lights when the door lock is activated, and INTERLOCK established via the Door-locked (S4) switch.

HOT: Coin 1. Lights for approximately 1 second when a coin is deposited in coin slot 1.

DELICATE: Coin 2. Lights for 1 second when a coin is deposited in (optional) coin slot 2.

HEAVY SOIL: Price Reduction. Lights when the external price reduction signal is activated.

Crossover 2.0
Error Codes

Error Code	Cause
Er1A	Door fails to lock on wash program.
Er1b	Doorlock error during wash program. INTERLOCK lost
Er1C	Door fails to unlock at the end of wash program.
Er1d	Door switch opened during wash program. Make sure machine was not overloaded.
Err2	Drain error. Water is not emptied in 10 minutes
Err5	Water level not reached within 8 minutes.
Er7b	No Tachometer signals. Motor harness disconnected.
Err8	Water Level above parameter set for safety during a wash program. Pump activates automatically.
Er10	Water level sensor error.
EuAr	Communication error between display and power modules.
Unb	Load cannot be balanced during extraction. Open door and manually rebalance clothes and press Start within two minutes
“door”	Door-closed switch (S3) open

Doorlock Operation

When the Start button is pressed, and there is no payment required, the A1 controller checks that the S3 door switch is closed (detected by the U1 power module as a closed circuit between the two wires at U1, CN13 (pins 1 and 2), Fig 7.1.

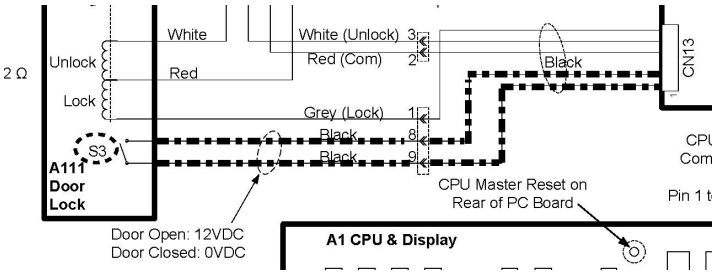


Fig. 7.2

If the S3 switch is detected as closed, U1 Power Module sends a brief 12VDC “lock pulse’ to the A111 doorlock on the CN13-6 (+12VDC) and CN13-4 (COM). The doorlock mechanically snaps to the locked position, locking the loading door and closing the 2-pole S4 interlock switch inside the doorlock assembly, Fig 7.3.

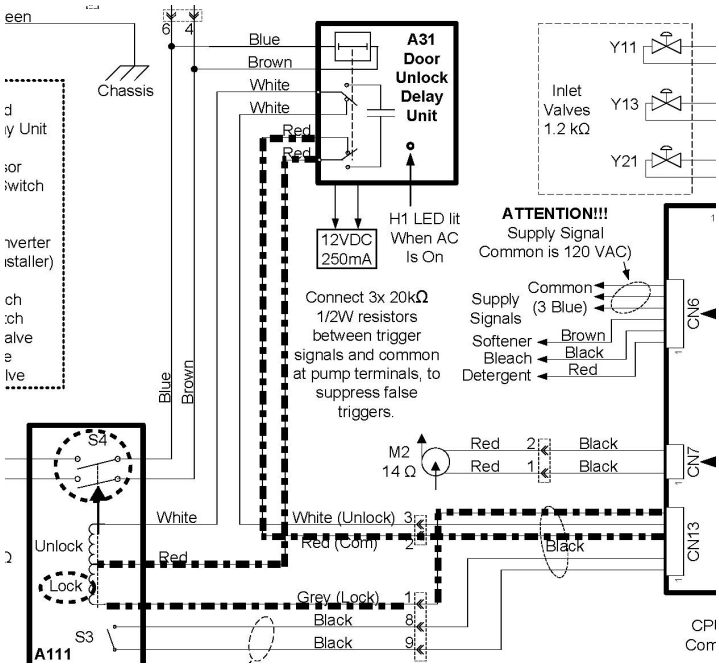


Fig. 7.3

The S4 switch closure in the doorlock sends line Voltage back to the U1 Power module connector CN2 (this is referred to as the “interlock” signal), confirming that the doorlock has activated. The wash program then continues, Fig. 7.4.

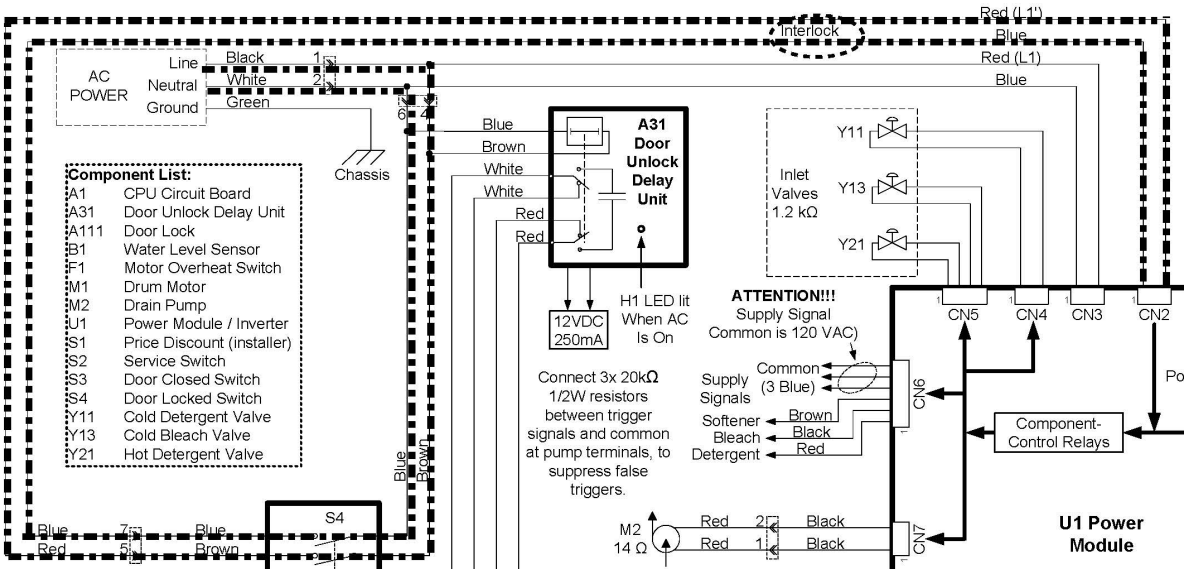


Fig 7.4

At the end of a wash program, an unlock pulse is sent by the U1 power module on the CN13-5 (+12VDC) and CN13-4 (COM). The doorlock mechanically moves (snaps) to the unlocked position, and releases the door catch, allowing the loading door to be opened. The 2-pole S4 switch also opens, removing the line-Voltage “interlock” signal from U1, CN2 to confirm that the door has unlocked, Fig 7.5

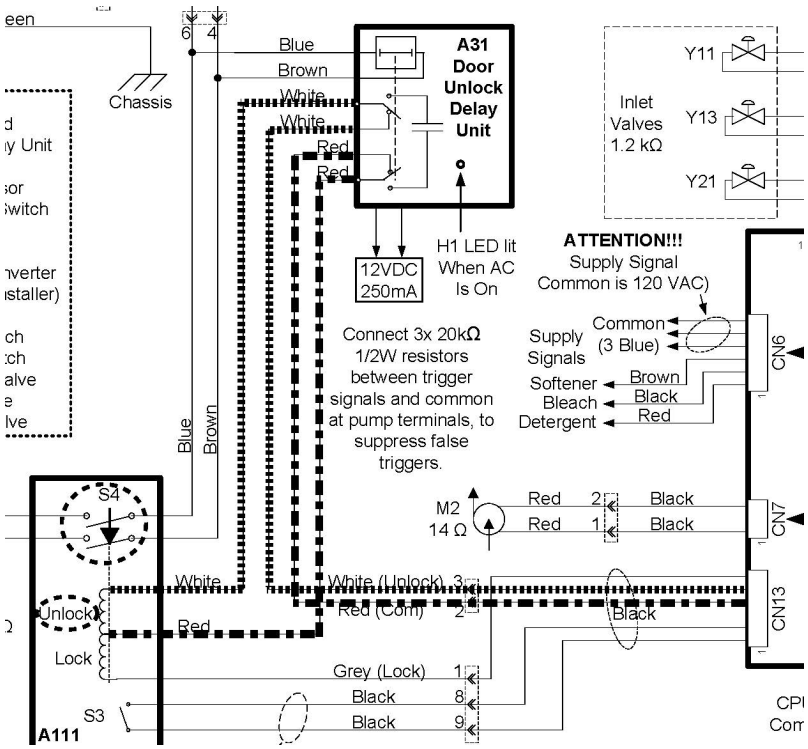


Fig. 7.5

Note that the wires that carry the UNLOCK pulse pass through normally-closed contacts inside the A31 door-unlock delay unit. Under normal circumstances, these contacts inside the A31 delay unit allow the unlock signal from the U1 power module to pass through it, unimpeded. When a power failure occurs, and following a 3-minute safety-delay, the A31 delay module transfers its internal relay contacts to an internal

storage capacitor, sending a 12VDC unlock signal to the doorlock. This allows garments to be removed from the machine approximately three minutes after a power-failure has occurred, Fig 7.6.

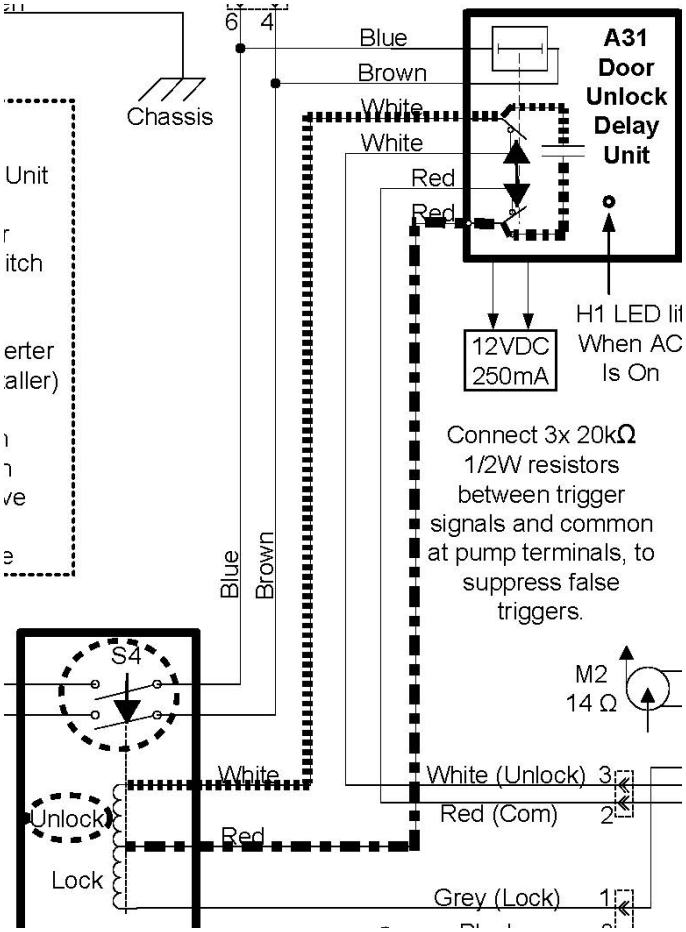


Fig 7.6

DOOR SWITCH AND DOORLOCK DIAGNOSTIC PROCEDURE

Error Codes: 1, 1a, 1b, 1c, and 1d.

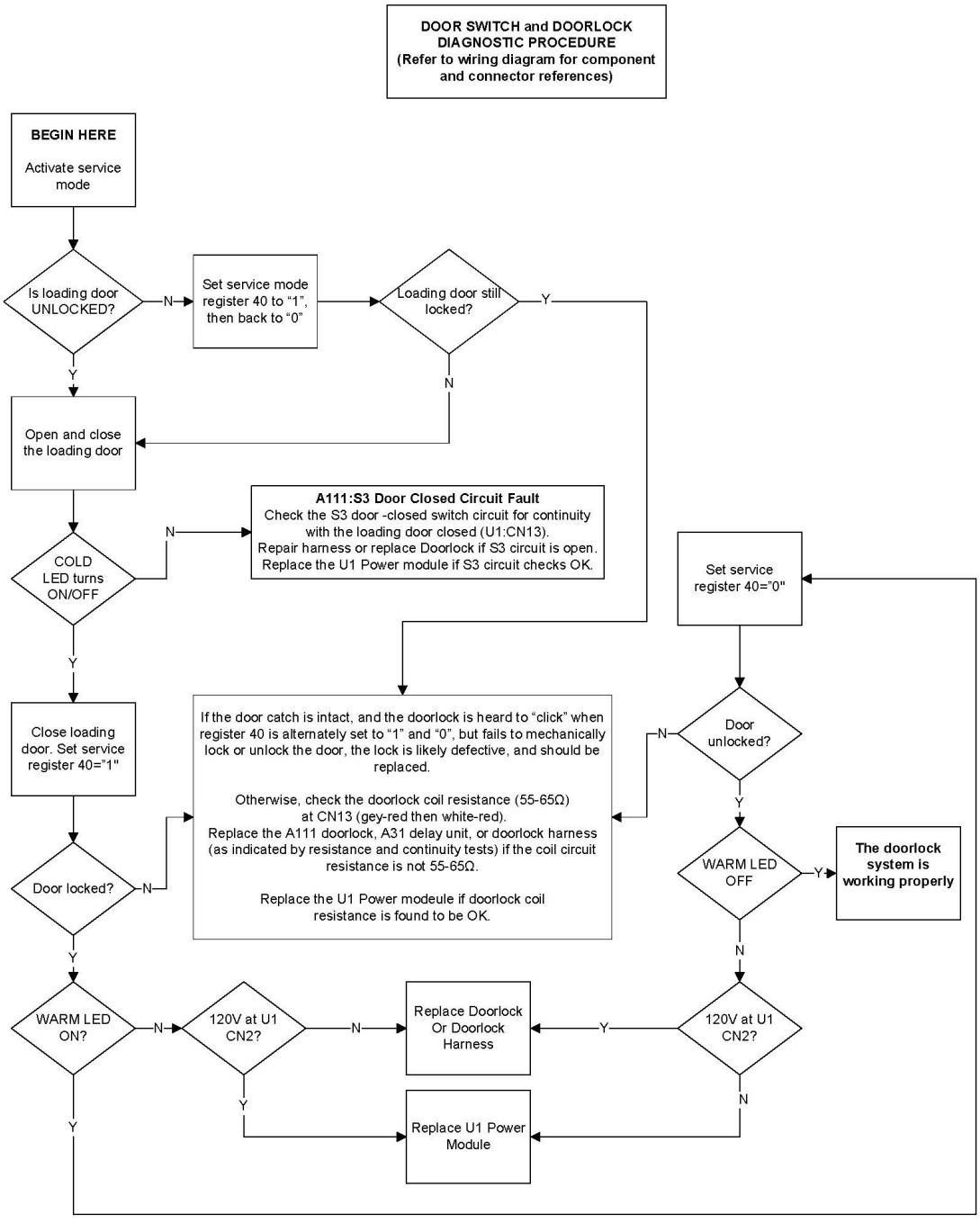


Fig 7.7

Error code “Err1”: Door lock failure

Models: WHWF09810M/NM

Description: One of several conditions related to the doorlock system

Error Trigger Conditions:
1. INTERLOCK voltage not present at U1:CN2 after doorlock pulse sent OR,
2. INTERLOCK voltage established and lost during a wash program OR,
3. INTELOCK voltage present after door unlock pulse sent

Recommend actions:
Use doorlock diagnostic flowchart to determine cause.

Error code “Er1A”: Door lock fail on program start

Models: WHLFP715M/MI/NM/DC
WHLFP817M/MI/NM/DC

Error Trigger Condition:
INTERLOCK voltage not present at U1:CN1 after doorlock pulse sent

Recommend actions:
Use doorlock diagnostic flowchart to determine cause.

Error code “Er1b”: Door lock error during program execution

Models: WHLFP715M/MI/NM/DC
WHLFP817M/MI/NM/DC

Error Trigger Conditions:
1. INTERLOCK voltage present at U1:CN2 after doorlock pulse sent AND,
2. INTERLOCK voltage lost during wash program.

Recommend actions:
Use doorlock diagnostic flowchart to determine cause.

Error code “Er1c”: Door fails to unlock at end of cycle (Display shows “dOnE”)

Models: WHLFP715M/MI/NM/DC
WHLFP817M/MI/NM/DC

Error Trigger
INTELOCK voltage present at U1:CN2 after door unlock pulse sent

Recommend actions:
Use doorlock diagnostic flowchart to determine cause.

Error code Er1d: Door closed switch (S3) opened during wash program

Models: WHLFP715M/MI/NM/DC
WHLFP817M/MI/NM/DC

Error Trigger
Door closed switch (S3) open longer than 60 seconds accumulated time during wash program.

Recommend actions:
1. Use doorlock diagnostic flowchart to determine if fault exists. If OK, then, run cycle with no load. If OK, then
3. Confirm that machine is not being overloaded or that people are not pulling on doors during operation.

Warning code “door”: S3 switch open

Models: WHWF09810M/NM

Trigger
STANDBY: S3 switch open when START pressed with no payment due.
DURING CYCLE: S3 switch open during wash cycle due to overloaded drum or pulling on the door.

Recommended actions: Standby:
1. Close door and retry
2. Use the door lock diagnostic flowchart to determine if fault exists.

Recommended actions: RUN Confirm machine is not overloaded and oversuded
1. Reduce water levels, Registers 20 and 21 to = 25 maximum.
2. Use the door lock diagnostic flow chart.

Error code Err2: Not drained within 10 minutes.

Models: WHWF09810M/NM
WHLFP715M/MI/NM/DC
WHLFP817M/MI/NM/DC

Trigger Condition

Level Sensor (B2) does not indicate drum is empty after 10 minutes of pump operation.

.

Recommended actions

Use Error 2 diagnostic flowchart to determine cause.

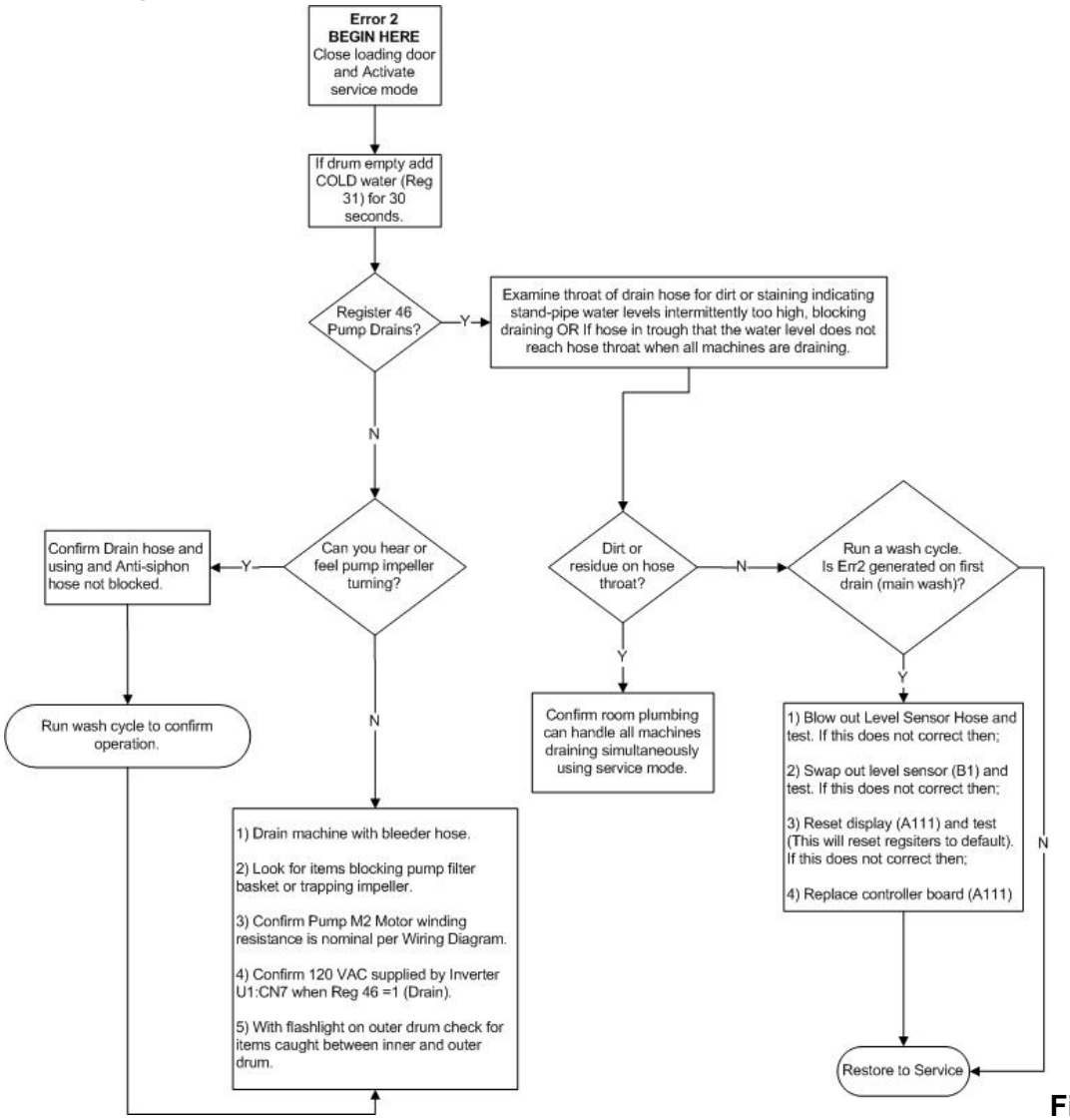


Fig. 7.8

Error code Err5: Water level not reached within 8 minutes.

Models: WHWF09810M/NM
WHLFP715M/MI/NM/DC
WHLFP817M/MI/NM/DC

Trigger Condition

Level Sensor (B2) indicates water is below the programmed level after 8 minutes of filling.

.

Recommended actions

Use Error 5 diagnostic flowchart to determine cause

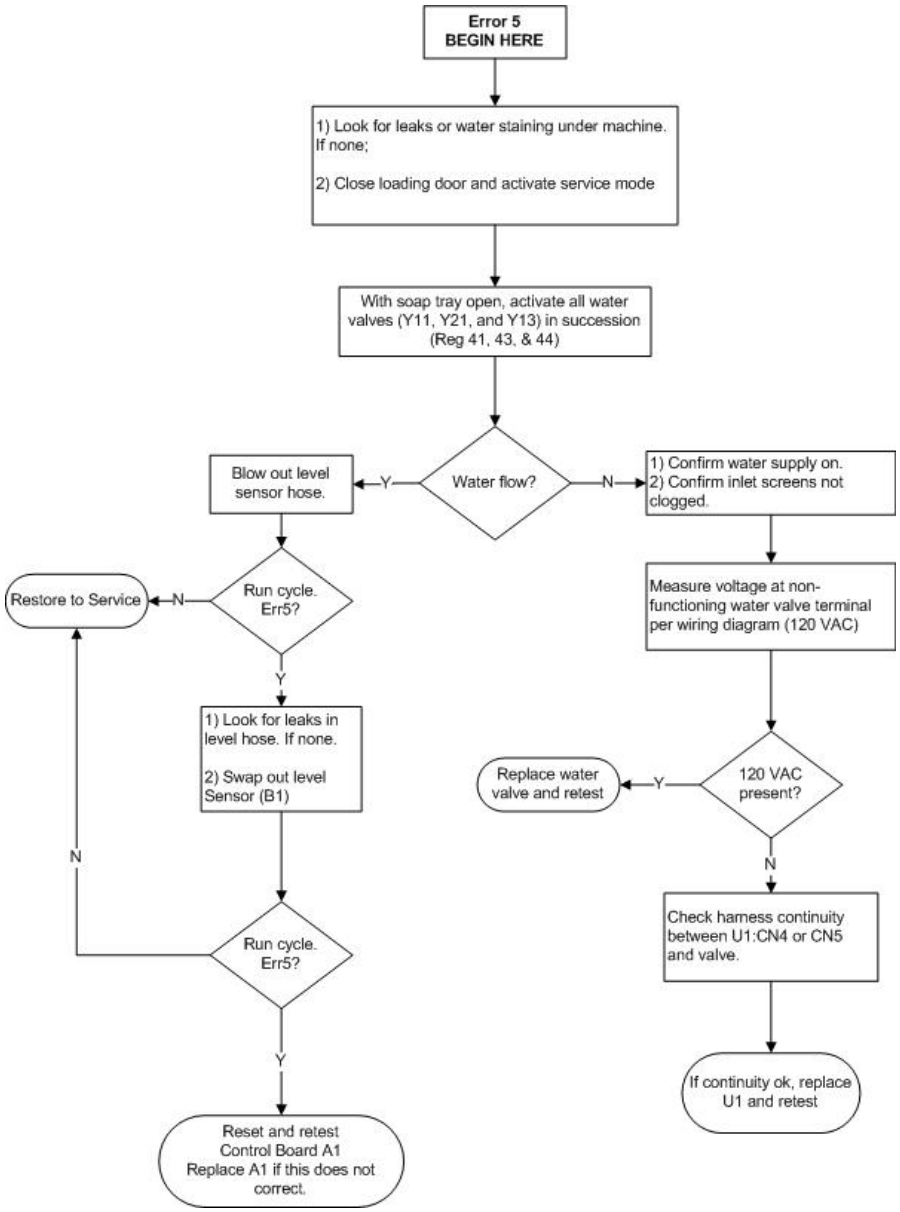


Fig. 7.9

Error code Err7: No Motor Rotation

Models: WHWF09810M/NM

See Err7a

Error code Err7a: No Motor Rotation

Models: WHLFP715M/MI/NM/DC
WHLFP817M/MI/NM/DC

Trigger Conditions

1. Motor thermal protector circuit (F1) is open.
2. No signal from motor tachometer (with or without motor rotation.)

.

Recommended actions

Use Error 7/7a diagnostic flowchart

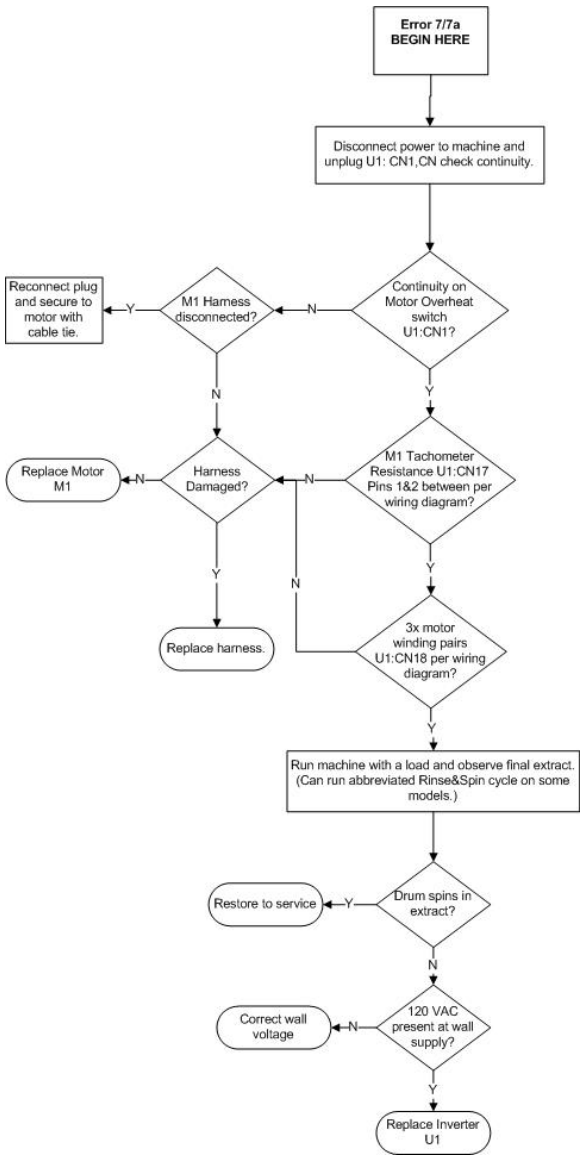


Fig. 7.10

Error code “Err8”: Water level too high.

Models: WHWF09810M/NM
WHLFP715M/MI/NM/DC
WHLFP817M/MI/NM/

Trigger Condition

Level Sensor indicates water level is too high.

Recommended actions

Use Error 8 diagnostic flowchart

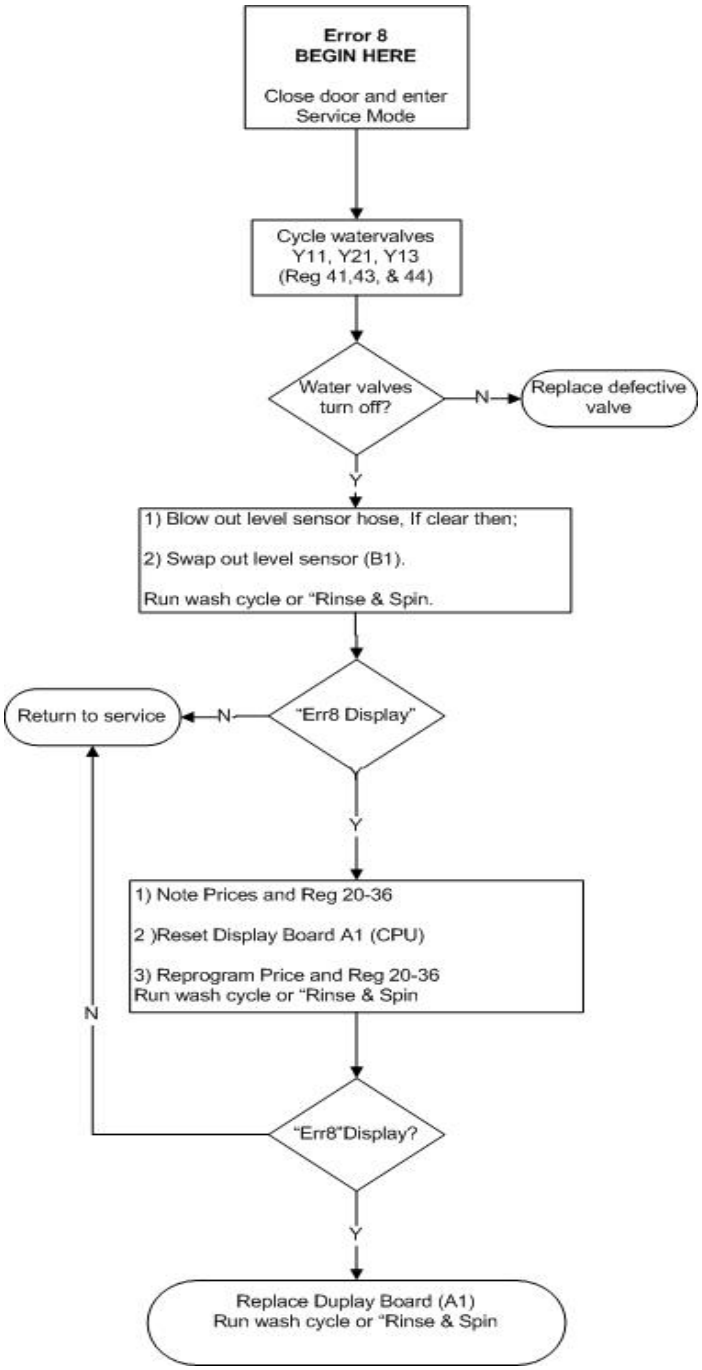


Fig 7.11

Error code Err10: Water level sensor error

Models: WHWF09810M/NM
WHLFP715M/MI/NM/DC
WHLFP817M/MI/NM/

Trigger Condition: Level sensor is outside normal operating range. This condition is tested for in standby and when a cycle is running.

.

Recommended actions

1. Check individual level sensor harness leads for continuity (A1, CN1-5&6)
2. Replace level sensor B1
3. Replace A1 circuit board.

Error code “EuAr”: U1<>A1 communication error

Models: WHWF09810M/NM
WHLFP715M/MI/NM/DC
WHLFP817M/MI/NM/

Description: No communication between CPU and inverter

Trigger Condition: No communication between A1:CN1 to U1:CN22

.

Recommended actions

1. Check circuit-board connections and harness for continuity between A1:CN1 to U1:CN22
2. Replace Control Board (A1)
3. Replace Inverter (U1)

Error code “Unb” Unbalanced load

Models: WHWF09810M/NM
WHLFP715M/MI/NM/DC
WHLFP817M/MI/NM/

Trigger Condition: Load cannot be balanced during final extract, (Display < “7”)

.

Recommended actions:

In final extract if the load cannot be balanced, (e.g. a water pocket in a waterproof table cloth). “Unb” will be displayed. Upon opening the loading door the display will count down from 2 minutes. If the operator redistributes the load, closes the door and presses START a new final extract cycle will commence, display =”7” otherwise the machine resets to standby. “Unb” indicates a malfunction of the machine only when it happens consecutively with different loads.

1. Run cycle load with 1x bath towel.
2. If “UNB” displayed inspect 4x shocks, two top-front tension springs, and two bottom-rear compression springs.

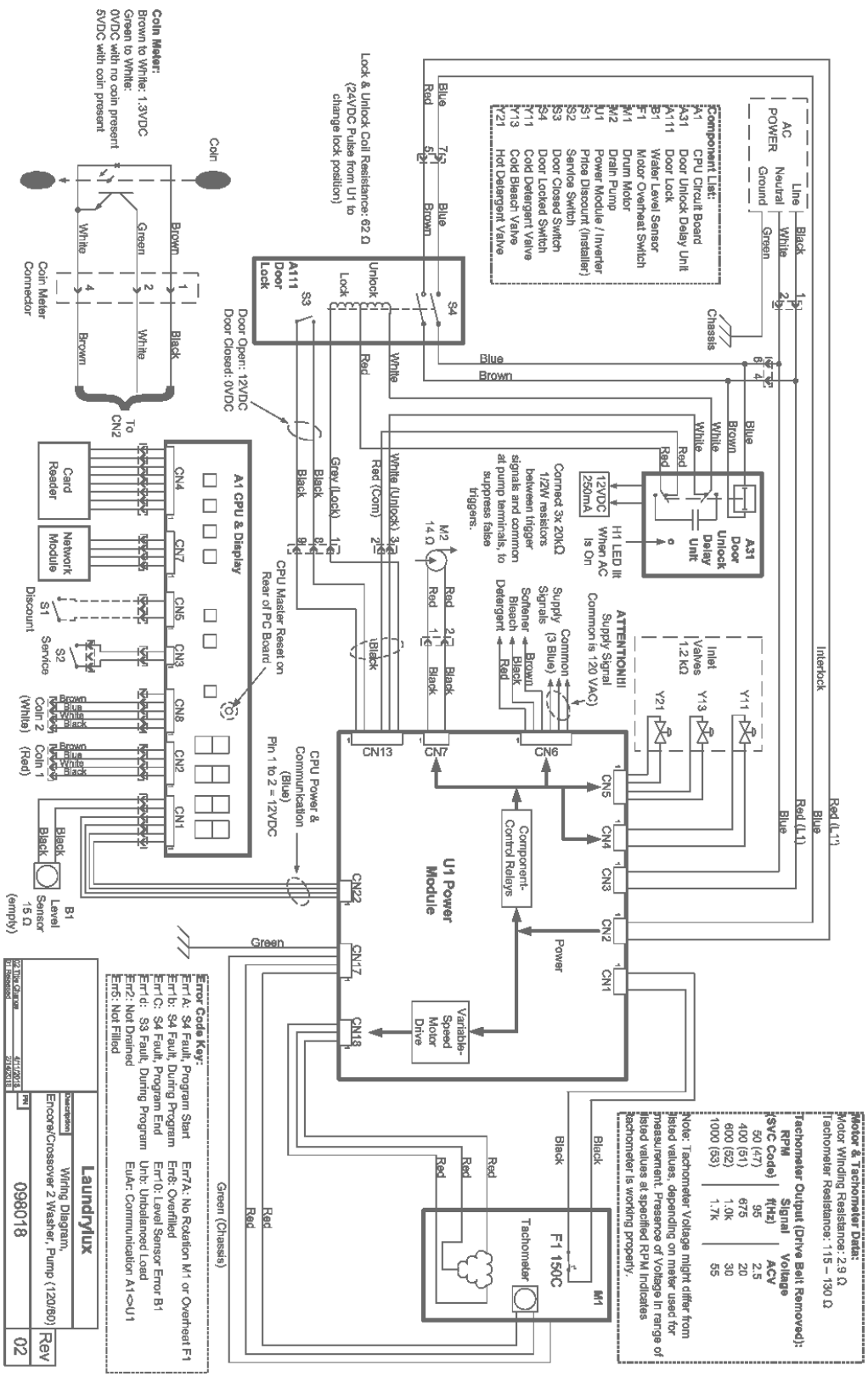


Fig. 7.13 WHLFP715, WHLFP817 Wiring Diagram

Appendix 1

Crossover 1 and 2 Washer Bearing Replacement Instructions

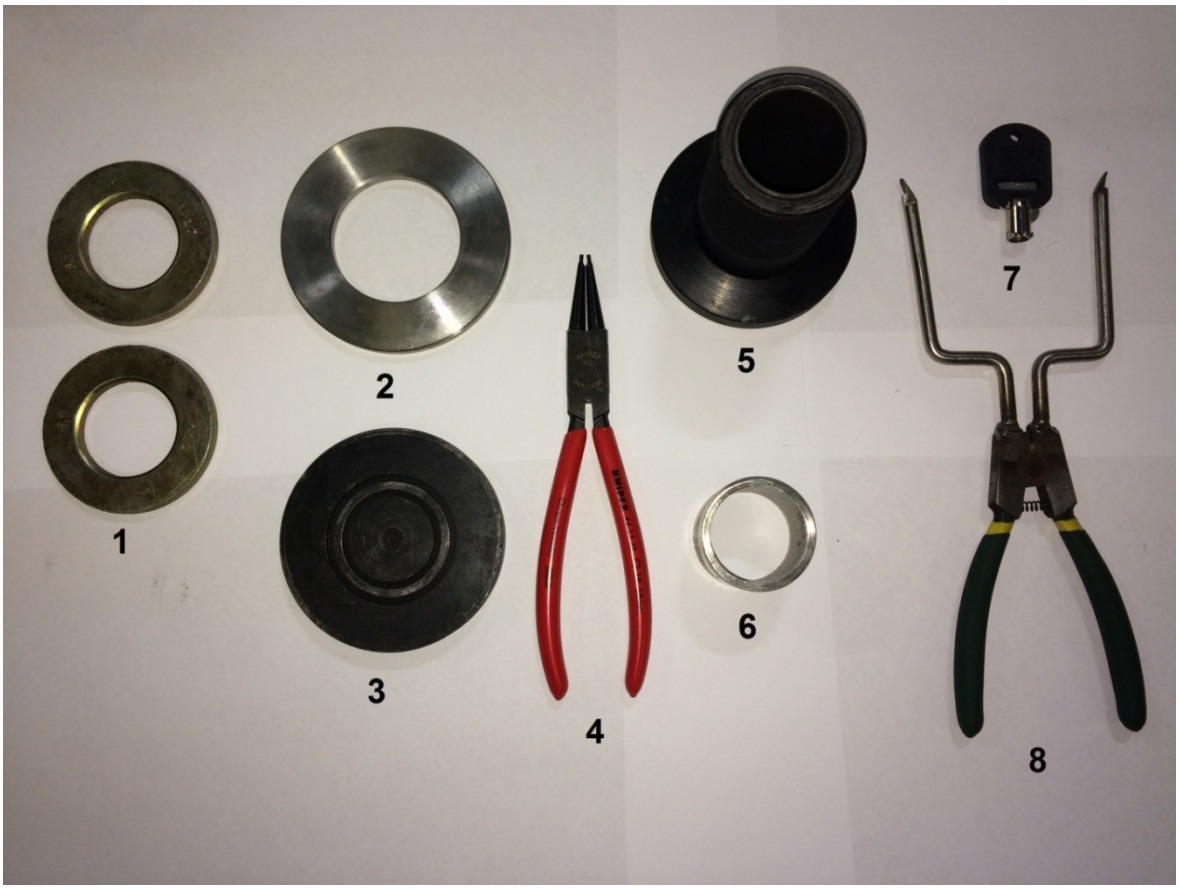


Figure 1: Kit # 098019 Supplied components

098019 KIT,TOOLS BEARING REPLACEMENT CROSSOVER 1 and 2 WASHER

#	Part	Description
1	098021	2x WASHER,ZINC YLW-CHROMATE, 1.572" ID, 2.780" OD, 0.25" THICK
2	098020	1x WASHER,SS 1.125" ID, 3.75" OD,0.250" THICK
3	432172201	1x WASHER
4	098023	1x TOOL,RETAINING RING 19-60 MM (INTERNAL)
5	432171901	1x TOOL,DRIFT FOR LARGE BEARING
6	098022	1x PIPE,SIZE 1 1/4", LENGTH 1 1/2"
7	080049	1x LOCK,W/KEY-CROSSOVER CM HOUSING (KEY# 1700)
8	00096438	1x TOOL,CROSSOVER BOOT SPRING
	098026	1x098026 INSTRUCTIONS,BEARING REPLACEMENT CROSSOVER 1 & 2 WASHER

Other required Parts, Tools and Supplies

Additional required parts

096725 KIT,BEARING REPLACEMENT-XOVER WASHER W/SHAFT SPIDER

Required tools not supplied with the tool kit

Torque wrench
Sledge or heavy duty mallet
T15 tamper-proof security Torx bit (to remove the top cover)
Pinch bar or crowbar
Flexible 1/4 inch socket driver with an 8mm socket (Required to demount coin meter housing Crossover 1)
General hand tools and metric socket set including 7mm, 8mm, 13mm, and 15mm
Bearing puller or heavy duty chisel.

Required supplies -

"Blue" medium strength (removable) thread locking compound. (Loctite 242 or equivalent)
Cable ties
RTV Adhesive
Disposable gloves (for applying Amblygon grease)

Bearing replacement should only be performed by qualified service personnel.

!!! UNPLUG THE MACHINE'S POWER CORD!!!

Disassembly

To replace the bearings, the drum assembly must be removed from the top of the machine. See figure 1. To allow this, remove all top-mounted components including the harnesses and the money box and coin meter housing. Make note of the water valve connector colors. On Crossover 1 the display module is demounted by releasing the softener compartment locking tab, removing the soap tray, removing the two screws on the left side of the display unit, and sliding it 1/2 inch to the left and out. Remove the top console panel. Remove the stiffening channel across the top of the machine. Note there are two, one is spot wielded and must be left in place.

Figure 1: Machine with top components removed

Remove the outer boot clamp leaving the inner clamp in place. Fold the boot into the drum to protect it during drum-assembly removal. Disconnect the doorlock harness connections and remove the center panel. On Crossover 2 washers demount the kick panel; on Crossover 1 washers leave it in place. Disconnect the hoses to the pump or gravity drain which can be left in place if care is taken to not damage it on re-assembly. It is recommended that the level sensor hose be removed as it is easily damaged on re-assembly.

Demount the belt and drum motor. Retain the cable tie that secures the motor's electrical connector to the motor body. Remove the pulley wheel from the shaft. and remove the shaft lock ring using the provided snap ring tool (Item #4.)

Secure strong belts, chains, or ropes to the steel rods at either side of the top of the drum, and lift the drum assembly out of the machine. See figure2. The air-shock absorbers will separate into two pieces when the drum assembly is removed. For field repair, the machine can be laid on the floor on its left (door-hinge) side.

Figure 2: Removing the drum assembly.

Remove the four steel rods and dis-assemble the outer drum halves. The counterweights may be left attached. Support the rear half of the outer drum by its outer rim, so that the front lip of the inner drum is several inches off the floor. Position the provided washer, Item # 3, over the shaft to protect the shaft end from flaring as it is struck and GENTLY drive the shaft out of the bearings using a sledge or mallet. Lay the rear drum assembly on its side. Remove the bearings and seals from the rear half of the outer drum. Use a bearing puller or reach through from the opposite side with a chisel, and tap the parts out of the housing. Take care to avoid damage to the housing. Clean the housing thoroughly.

Bearing and Seal assembly

Prepare a clean surface to lay down the seals and bearings. Make sure all tools, anvils, and washers are cleaned so as to not to contaminate the bearings and seals, reducing bearing life.

Step#1: Water-side bearing (larger)

Apply a thin film of Amblygon grease, provided with the bearing kit, to the outer and inner walls of the larger of the two supplied bearings. Center the bearing on the water side of the bearing housing ensuring that it is level. Center the face of the Drift (Item #5) on the bearing. Place Washer, (Item #3), on top of the drift, see Figure 3. Gradually, tap the bearing evenly into place with a sledge.

Figure 3: Use items #3 and #5 to seat the larger water-side bearing and smallest seal.

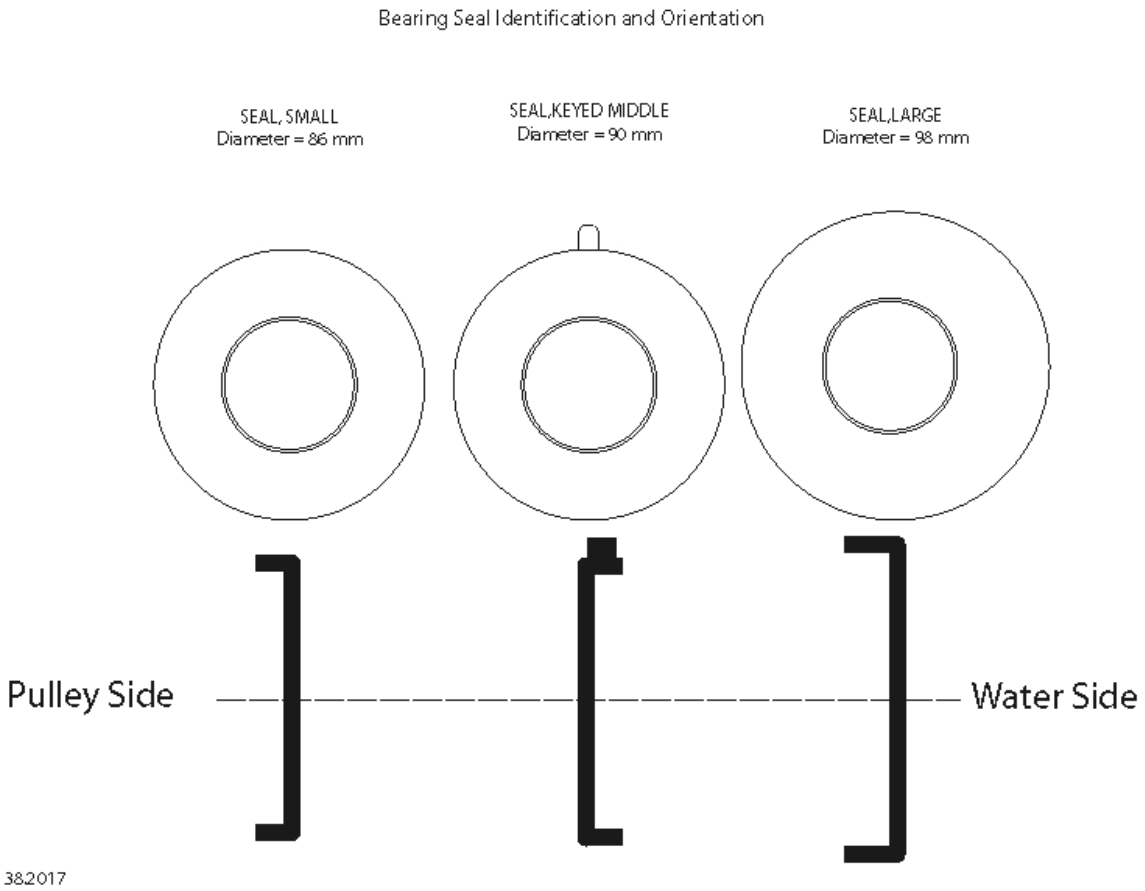


Figure 4: Seal Orientation

Step #2: Pulley Wheel-side seal (smallest)

Apply a thin film of Amblygon grease to the outside wall of the smallest seal. Seat the seal in the bearing housing noting the orientation (Figure 4). Using the same tool set up as Step #1, “GENTLY” tap the seal into place.

Step #3: Middle seal

Apply a thin film of Amblygon grease to the outer wall of the seal noting the orientation is opposite of the two other seals (Figure 4). With the seal edge facing the water side of the machine place a dab of RTV adhesive on the seal's tab-key and carefully feed the seal's tab into the mating slot in the bearing housing. The seal will be slightly askew, but the tab will not be deformed when the whole seal is seated in place. Then using Washer (Item# 3) centered on the seal, tap the seal gently into place starting on the opposite side of the seal tab and then drive the seal gently and evenly until it is seated. (Figure 5). The washer should overlap the seal wall when seating to prevent deformation of the seal.

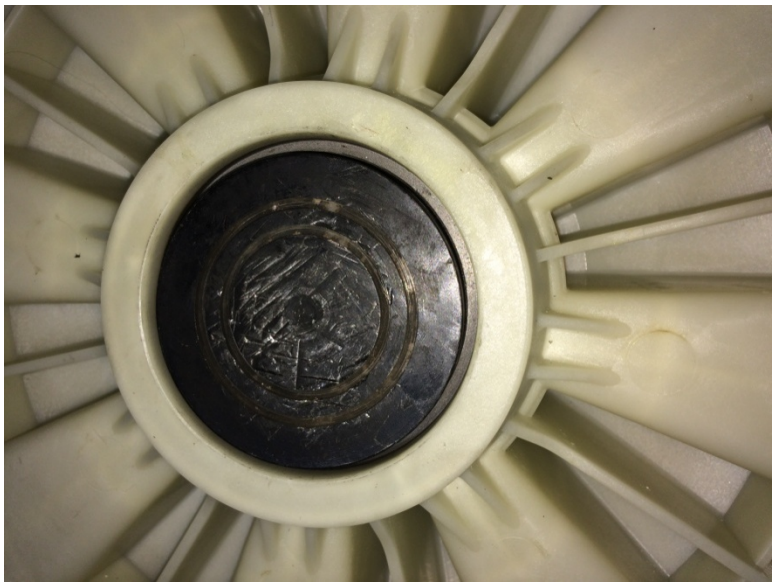


Figure 5: Middle Seal covered by washer (Item #3)

Step #4: Water-side seal (largest)

Apply a thin film of Amblygon grease to the outside wall of the seal. Seat the seal in the bearing housing noting the orientation (Figure 4). Center the 3.75" dia. washer, (item #2) over the seal (figure 6.) Place washer, (Item #3), over washer and gently tap the seal into place. The seal will be flush with the inner drum when seated.

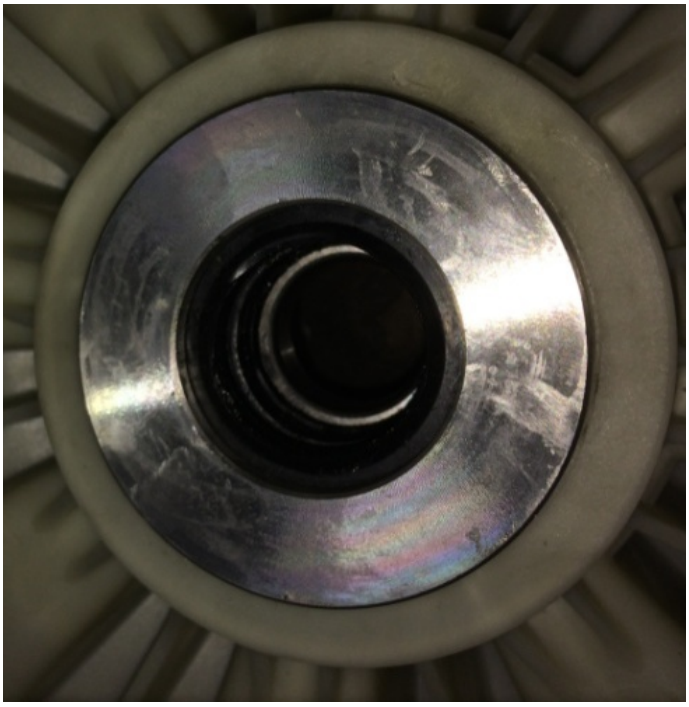


Figure 6. Water side Seal with 3.75" Washer (Item #2) covering.

Step #5: Pulley wheel-side bearing (smaller)

Flip the rear outer drum over (pulley side up). Apply a thin film of Amblygon grease on the outer and inner walls of the smaller bearing and center on the bearing housing. Cover bearing with one of the two 2.75" dia. washers, (Item #1), see Figure 7. Cover with washer (item #3) and gently tap the bearing evenly into place. When flush use the second washer (Item #1) and keep driving until the face of the bearing is below the retaining ring channel. Remount the retaining ring.

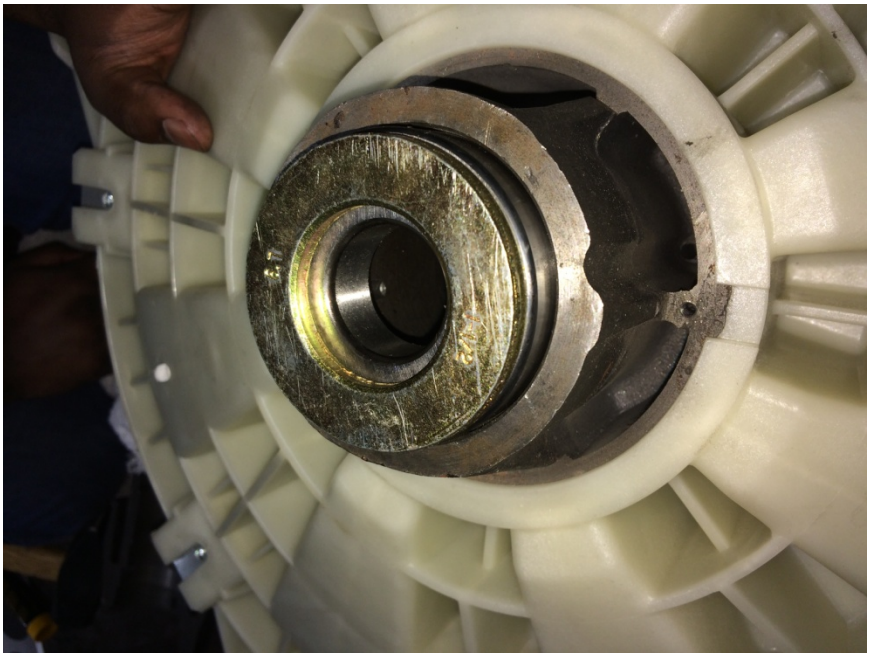


Figure 7. Pulley side bearing with one of the two washers (Item #1) covering.

Step #6: Packing the seals

Pack the Amblygon grease into the space between the seals and generously coat the five seal lips that will contact the shaft. Apply a thin film of Amblygon grease to the Seal Face Bushing (SFB) at the base of the shaft and the shaft-bearing contact areas.

Step #7: Seat the rear drum assembly onto the shaft/mantel assembly

With the inner drum/shaft resting on the floor, carefully align the bearing housing assembly over the shaft and allow gravity to assist seating the assembly onto the shaft making sure to not to damage the seals as the shaft is fed through them. The shaft-bearing interface is a slip fit and it should only require a delicate push to seat into place. When seated, the shaft end will stand 7/16" (1.1 cm) proud of the pulley housing. You can confirm proper assembly by a test fit of the pulley wheel to see if the shaft end is flush with the pulley bolt mounting area, see figure 8. To make insertion of the drum-assembly into the chassis easier, final mounting of the pulley wheel should be done AFTER the reassembled drum is reinstalled in the machine

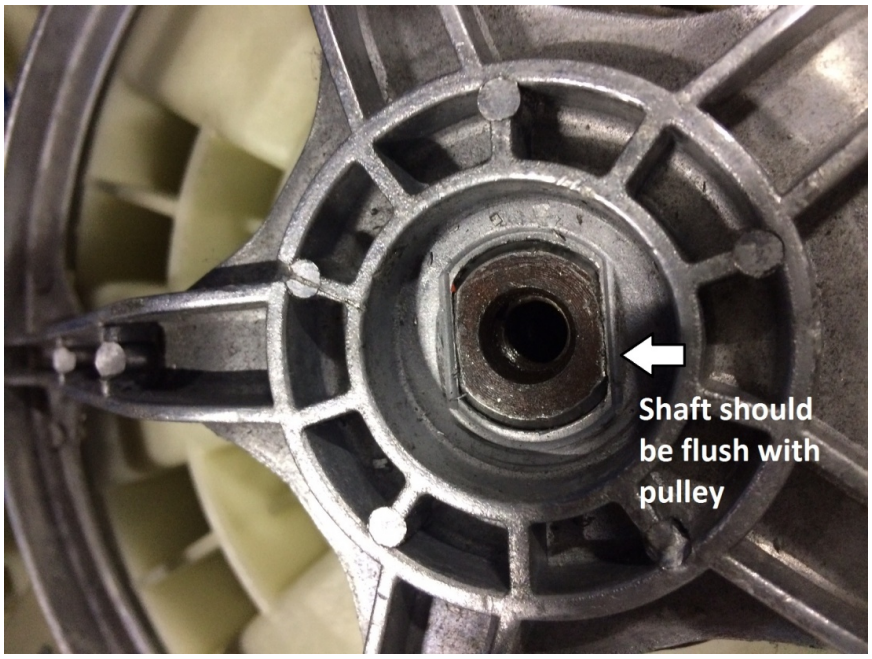


Figure 8. Shaft end should be flush with pulley-wheel bolt mounting surface.

If the bearings were not properly, the shaft assembly may not fit into place easily by gravity alone. In this case, position the supplied pipe, (Item #6), over the inner raceway See figure 9. Cover with Washer (item #3) and *gently* tap the shaft assembly into place.

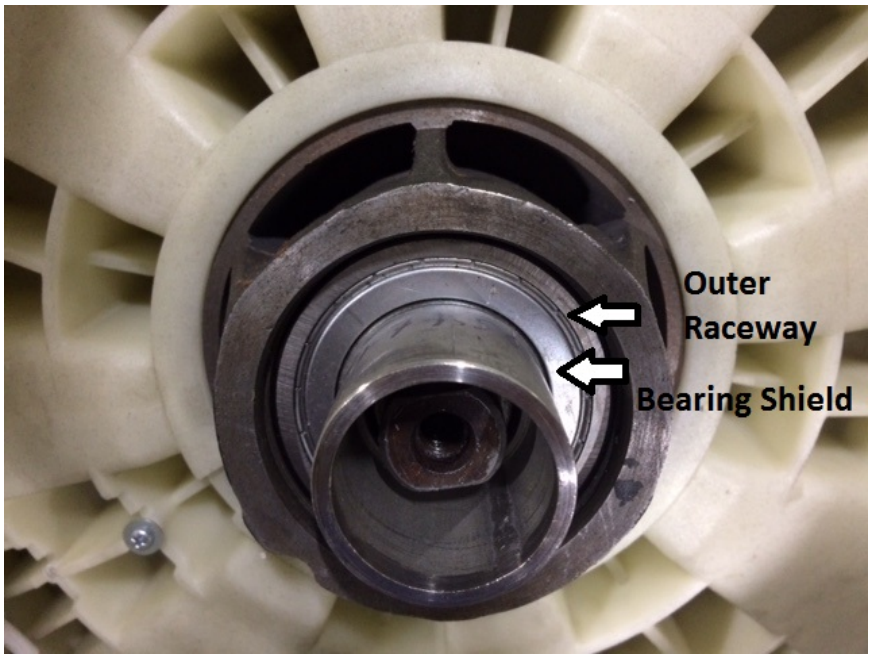


Figure 9. Pulley side bearing and shaft. Pipe (Item #6)
Showing correct positioning over the bearing's inner raceway only.

Machine Reassembly and Test

Replace the outer drum gasket with the one supplied with the bearing kit. Make sure the gasket channel is clean.

Reassemble the machine.

Use the supplied boot tool, (Item #8), to reattach the outer boot clamp.

Make sure the drum motor-machine harness connector is snapped in place and secured to the motor housing with the previously removed cable tie.

Reinstalling the Pulley Wheel:

1. Confirm that the pulley bolt and the threads of the shaft do not have any oil residue. Clean as required.
2. Apply a light bead of medium strength thread locker (Loctite # 242, or equivalent) along the threads, parallel to the bolt axis, and re-install the pulley wheel.
3. Tighten the bolt to 30 ft-lb (40NM), using the pinch bar to apply counter-torque to the pulley. DO NOT OVER TIGHTEN THIS BOLT!
4. Re-install the drive belt and the back panel of the machine, and restore electric power.
5. Allow 15 minutes for the thread locker to cure before operating the washer.

Crossover 2.0 Dryer Stacking Instructions

Applicable Models:

DLHS0817E DLHS0817G

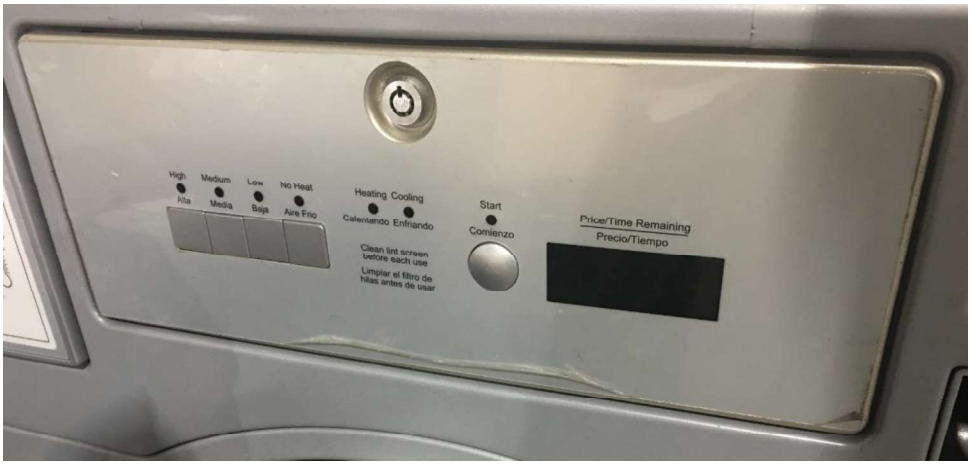
Caution:

Follow the instructions in the Installation and Operating manual to properly install and operate the machines.

When stacked units are installed, it is advised to tether the top machine to the wall behind the units, to avoid tipping over. A tethering kit is available as an optional part. Contact your distributor for more information. Dryer stacking installation is recommended to be done by 2 people.

Stacking an Crossover 2.0 Bottom-Control Dryer (DLHS) over a Crossover 2.0 Top-Control Dryer (DLHF)

Demount the top panel of the Top Control Dryer



1. Demount the control panel by using the provided service key. Disconnect the cables between the control module, and the machine, and set the control module aside.

2. Disassemble the front control panel by removing the four screws shown

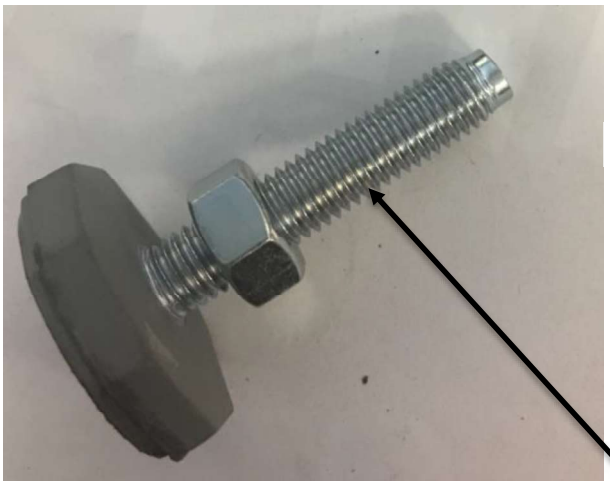
3. Remove 2 screws from the front of the top panel

4. Remove the 2 top panel screws from the tabs in the back of the machine.
5. Slide the top panel rearward and lift to remove the top panel from the machine

6. The disassembly process is similar for the bottom-control machine, except instead of removing the control panel remove the two screws from the front top blank panel and demount the panel
7. Swap the TOP panels between the top-and-bottom-control machines

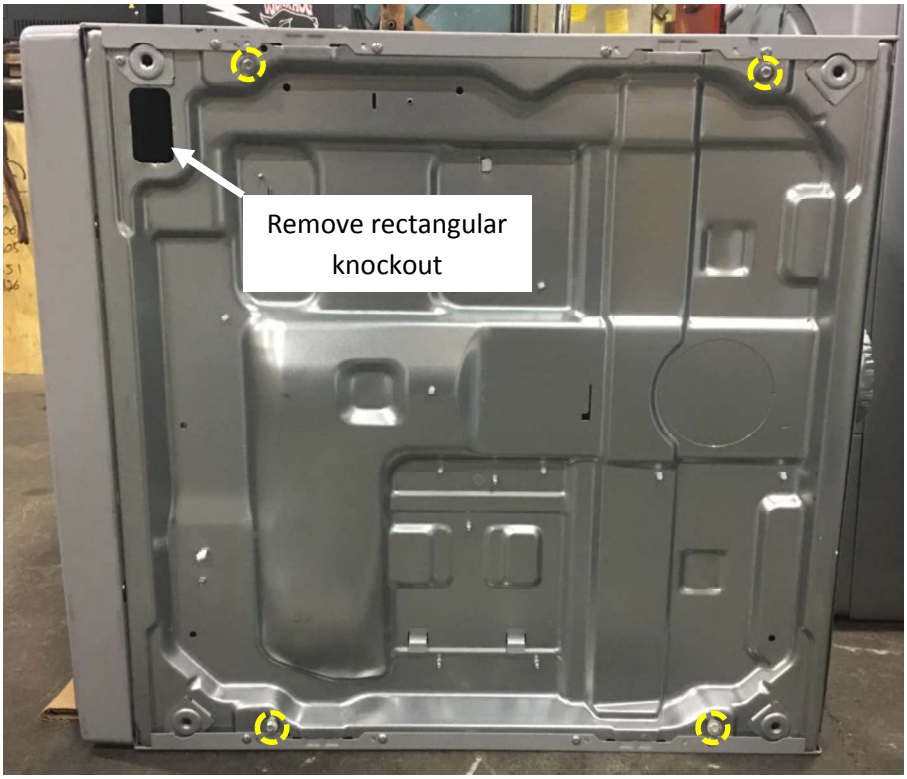
<u>After swapping the TOP panels</u>

8. Adjust the feet on the Top Control machine, to level it according to the intended installation position and remove the drum contents from the bottom-control dryer.
9. Flatten a machine carton, and tilt the bottom-control dryer on one of its sides on the carton



Leveling Legs

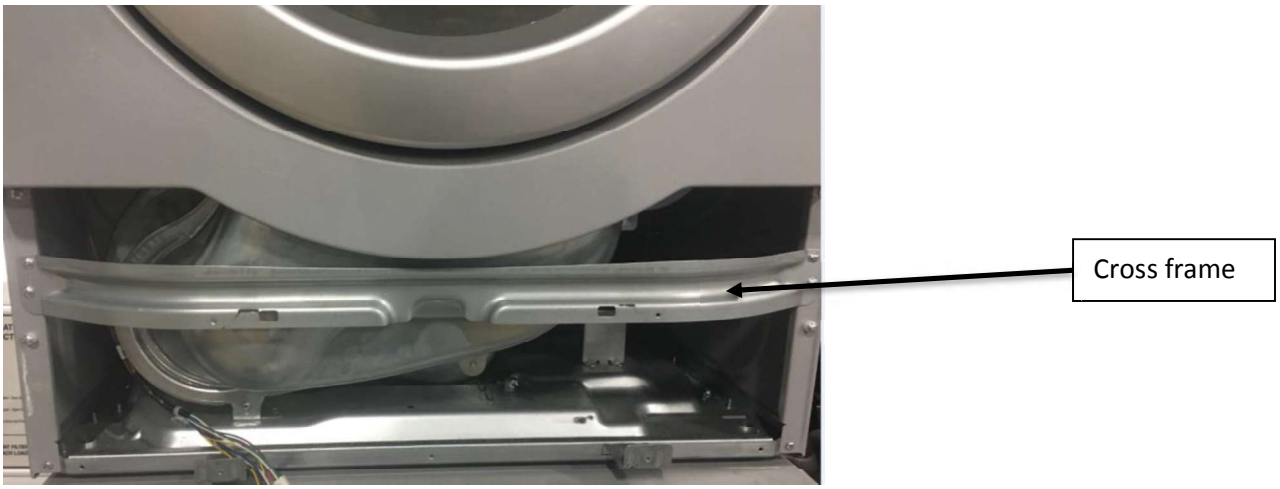
10. From the bottom control machine, remove the rectangular knock-out plate, as indicated in the picture using a hammer and screw driver.
11. Also, remove the four leveling legs from the base panel of the machine.



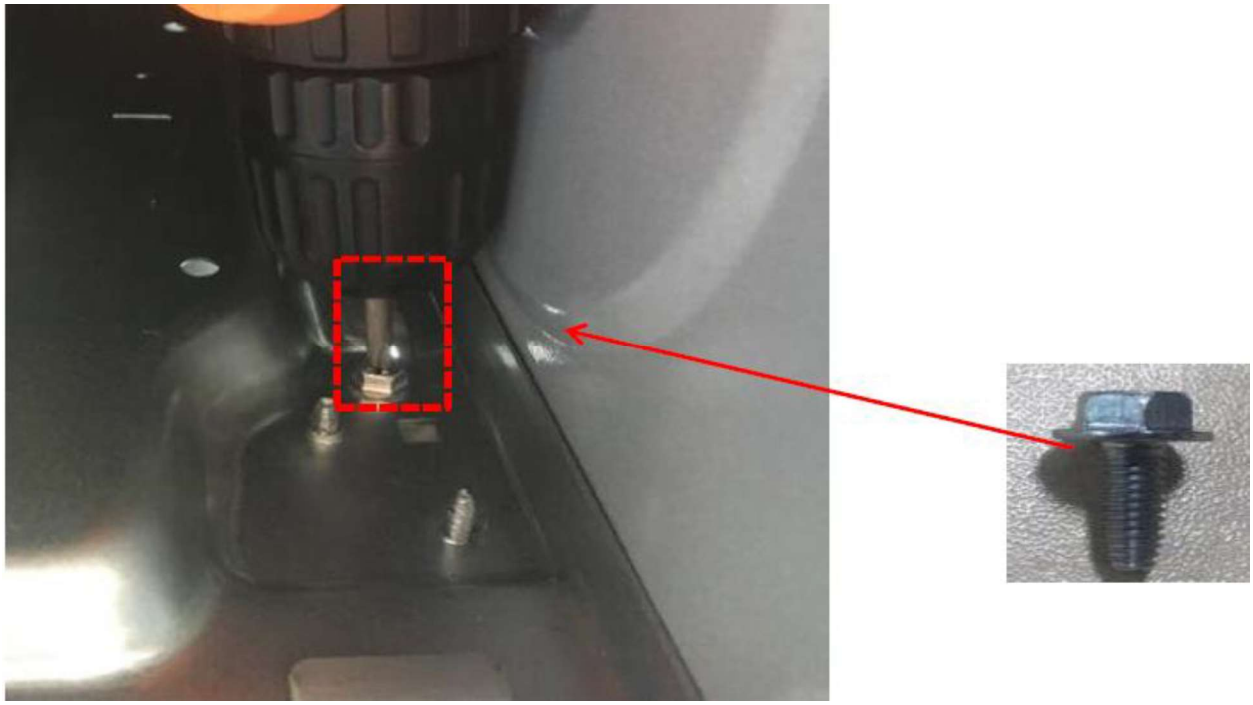
12. Loosen slightly, but do not remove, the 4 shouldered screws that are already attached to the base panel of the top dryer (circled in the photo)

13. Remove the screw (circled in the photo) from the raised part of the right-front stacking bracket on the bottom dryer's top panel, and retain it for later use (Step 15)

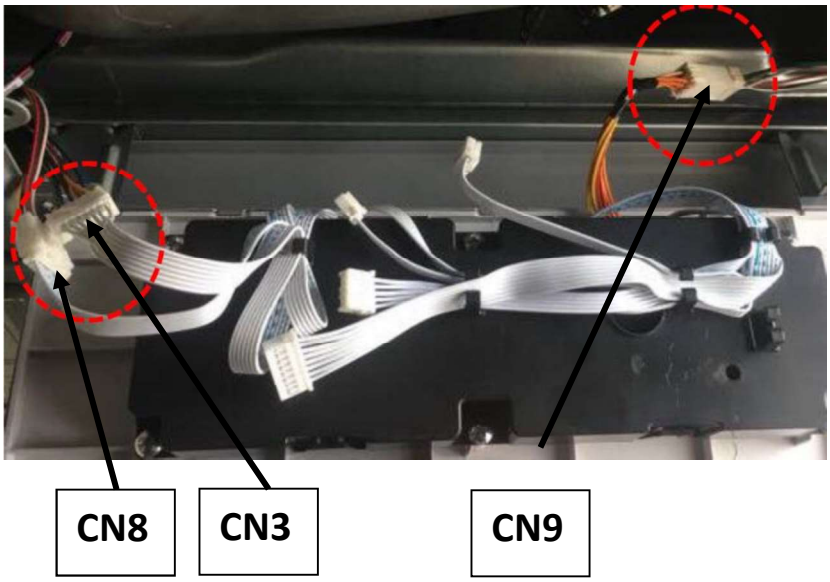
14. Stack the bottom-control machine (DLHS) onto the top-control machine (DLHF). The four shouldered screws in the base panel of the top dryer must slide into the open back side of the stacking-brackets on the top panel of the bottom machine. Apply force to the top machine from the rear until the fronts of the top and bottom machines are aligned. Note: Gently tapping the lower part of the back of the top-mounted dryer with a hammer and block of wood can help to align the machines.
15. Once the machines are securely stacked, open the control panel of the top machine (bottom-control machine) (DLHS) using the provided service key



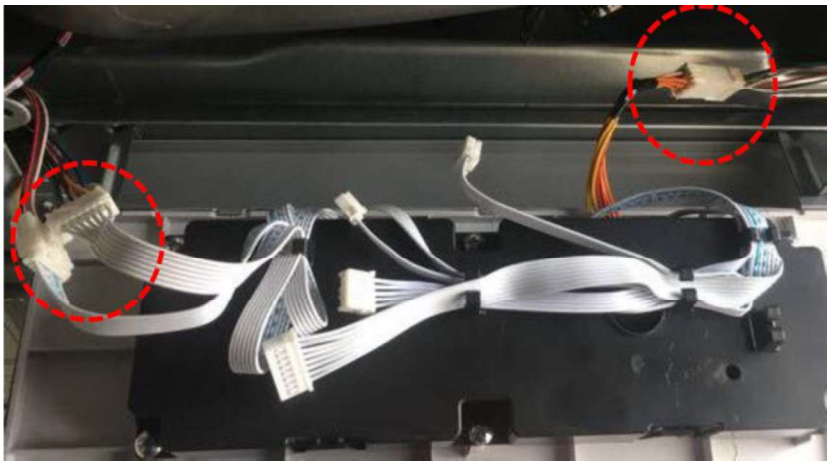
16. Remove the control panel frame and cross frame



17. Install and tighten the locking-screw that was taken from the stacking bracket in step 12 back into the bracket through the clearance hole provided in the base of the top dryer.
18. Re-assemble the control console of the top machine and re-connect the CN8 and CN3 connectors of the control board back to machine.



19. Route the extended wiring harness from the CN 9 connections through the hole in the base panel of the bottom control machine *(see step 9)* and connect the coin meter connector (Red, White and Blue wires) to the “TOP” assigned meter of the dual coin connections of the Top Control Machines.



20. Once the connections are properly made, mount back the control panel frame and the cross frame.
21. Before remounting the control, panel reconnect the harness connections.
22. Lock the controller using the service key.

Stacking a Crossover 2.0bottom control dryer (DLHS) on the Crossover 2.0 washer (WHLFP)

Additional Item Needed: Washer Top Panel for Dryer Mounting (Part Number: 002089423F)

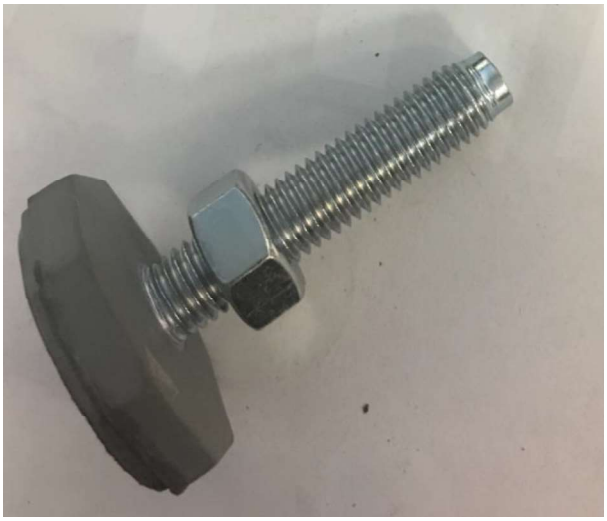
Attaching the brackets to the Washer Top Panel

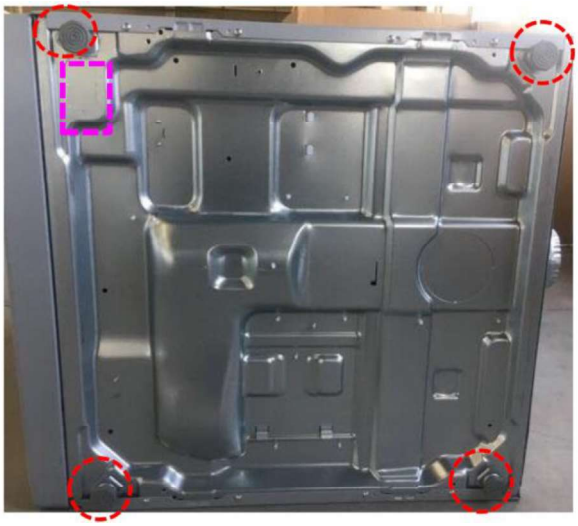
The washer top panel for dryer mounting (**0020809423F)** does not come with the stacking brackets attached. The panel has a total of 12 tapped holes, 3 in every corner for attaching the stacking brackets.

1. Remove the stacking brackets from the top panel of the bottom control dryer (DLHS).
2. Mount the stacking brackets on the new washer top panel (Part Number: **0020809423F).**
3. Then remove the already installed top panel from the washer and replace it with the Top Panel (**0020809423F)** with the attached brackets.

After assembling the Top Panel (0020809423F) on the Washer (WHLFP)

4. After placing the washer in the intended installation position, level the washer as per installation manual.
5. Flatten a machine carton, and tilt the bottom-control dryer on one of its sides on the carton



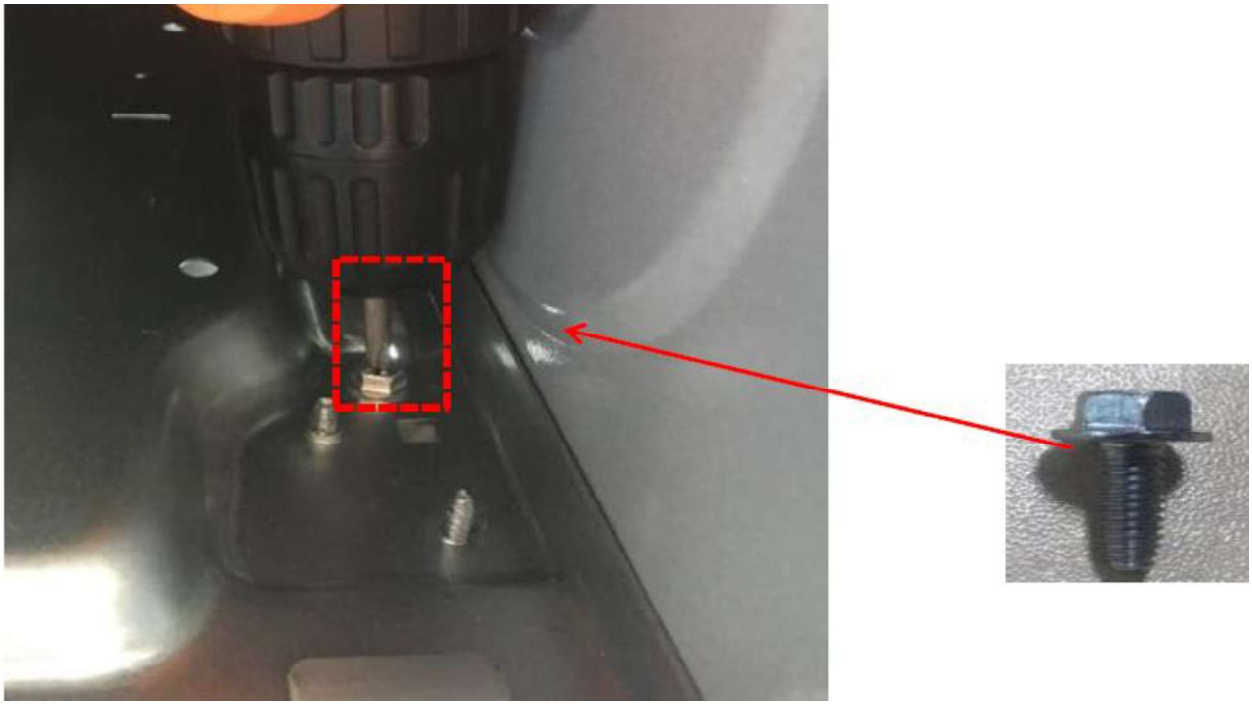


6. From the bottom control machine, remove the rectangular knock-out plate, as indicated in the picture using a hammer and screw driver.
7. Also, remove the four leveling legs from the base panel of the machine.

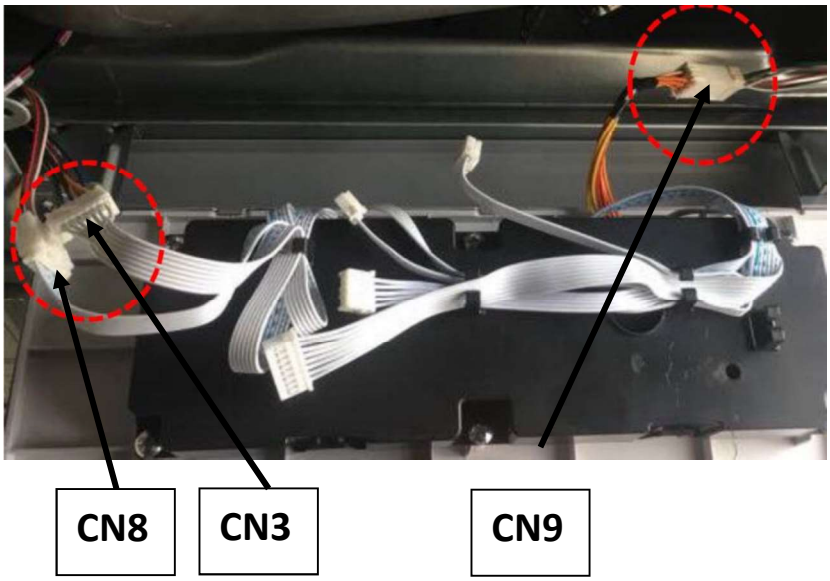
8. Loosen slightly, but do not remove, the 4 shouldered screws that are already attached to the base panel of the top dryer (circled in the photo)

9. Remove the screw (circled in the photo) from the raised part of the right-front stacking bracket on the bottom dryer's top panel, and retain it for later use (Step 15)
23. Stack the bottom-control machine (DLHS) onto the Encore Washer. The four shouldered screws in the base panel of the top dryer must slide into the open back side of the stacking-brackets on the top panel of the bottom machine. Apply force to the top machine from the rear until the fronts of the top and bottom machines are aligned. Note: Gently tapping the lower part of the back of the top-mounted dryer with a hammer and block of wood can help to align the machines.
24. Once the machines are securely stacked, open the control panel of the top machine (bottom-control machine) (DLHS) using the provided service key

25. Remove the control panel frame and cross frame



10. Install and tighten the locking-screw that was taken from the stacking bracket in step 12 back into the bracket through the clearance hole provided in the base of the top dryer.
26. Re-assemble the control console of the top machine and re-connect the CN8 and CN3 connectors of the control board back to machine.



27. Route the extended wiring harness from the CN 9 connections through the hole in the base panel of the bottom control machine *(see step 9)* and connect the coin meter connector (Red,

White and Blue wires) to the “TOP” assigned meter of the dual coin connections of the Top Control Machines.

28. Once the connections are properly made, mount back the control panel frame and the cross frame.
29. Before remounting the control, panel reconnect the harness connections.
30. Lock the controller using the service key.