

Section 5

Trouble Shooting Guide, Wiring Schematics,

Symptom	Probable Cause	Suggested Remedy
Machine does not start	Power Supply	Check these areas: Circuit breakers, Voltage, Power leads, Power connections
	Door Switch	Check for continuity through door switch when door closed. If no continuity, adjust or replace door switch.
	Control Breaker	Check 1.5 amp breaker for continuity. If no continuity, replace breaker.
	Control Transformer	Check voltage output from control transformer for 120VAC. If voltage is incorrect, replace transformer.
	Coin Acceptor	Check coin switch to make sure coins trip switch and give continuity across switch when closed. If no continuity, adjust or replace switch.
	Accumulator Transformer	Check accumulator transformer for 12VAC output to accumulator. If no voltage, replace transformer.
	Coin Accumulator	Check accumulator to see that display is showing correct number of coins to start. Check accumulator for short 120VAC output signal at orange/white wire when preset number of coins is reached. If no display or output signal, replace coin accumulator.
	Timer	Check to insure that the timer is in the "off" position to supply 120VAC through the "Start" cam to the coin accumulator board.
Machine will not accept and count coins	Timer, Rapid Advance Motor	Check the rapid advance motor for continuity and replace if no continuity.
	Coin Acceptor	Check coin acceptor for any type of blockage or damage. Clean, adjust or replace the acceptor as necessary.
	Power Supply	Check these areas: Circuit breakers, Voltage, Power leads, Power connections
	Coin Accumulator	Check accumulator to see that display is showing correct number of coins to start. If no display, replace coin accumulator.
	Timer	Timer must be in off position, machine had to finish previous cycle to reset coin accumulator board.

Symptom	Probable Cause	Suggested Remedy	
Machine will not accept and count coins (continued)	Control Breaker	Check 1.5 amp breaker for continuity. If no continuity, replace breaker.	
Door does not lock	Timer Position	The following sequence must have taken place to advance the timer before the door locks. -Loading door closed -Proper number of coins inserted to start machine -Accumulator counted and credited coins to advance timer into cycle closing "on-off" timer contact.	
	Door locking solenoid	Check to insure that solenoid is receiving 120VAC from S1 door switch. If it is, replace solenoid.	
	Door Switch	Check for continuity through door latch switch when door is closed. If no continuity, adjust or replace door switch.	
Door will not open	Thermoactuator	Check to see if thermoactuator(s) and/or its mechanism is stuck or binding and not allowing the door lock solenoid to open. Check to be sure that the locking thermoactuator is not receiving 120VAC during the last 1 1/2 minutes of the cycle. Also check to see that the unlocking thermoactuator is receiving 120VAC during the last minute of the cycle. If the thermoactuators do not receive voltage at the correct times, change the timer. If the timing and voltage are correct, replace the thermoactuator.	
	Door Rod	Check to see that door rod from solenoid to lock ass'y is long enough to allow lock ass'y to disengage. If not, adjust rod.	
	Door Lock Solenoid	Check that door lock solenoid is not stuck closed. If stuck, replace solenoid.	
	Timer	Make sure machine is in "off" position allowing Timer to authorize door unlock.	
	Machine starts but timer will not advance	Water Valves	Check to insure that water valves are operating. If not, check for 120VAC to water valve from timer. If 120VAC, clean screens. If still no operation, change water valve. If no voltage check pressure switch then change timer.
		Drain Valve	Check to insure that drain valve is closing. If not, check for 120VAC to drain valve from timer. If 120VAC, change or clean drain valve. If no voltage, change timer.

Symptom	Probable Cause	Suggested Remedy
Machine starts but will not advance through cycle (continued)	Filt Hose Screens & Water Valve Screens	Check all screens for obstructions and clean.
	Water	Check to insure that water is turned on and operating.
	Pressure Switch Hose	Check hose for holes. Be sure the inlet end of the large part of the hose is lower than the rest of the hose and is free of debris.
	Pressure Switch	Check to insure that pressure switch has continuity between #11 & #12. If no continuity, check pressure switch hose for obstruction. If hose okay, change pressure switch.
Hot water does enter tub in wash	Main Timer Drive Motor	If power is available to main timer drive motor but it doesn't run, replace timer motor.
	Water Valve Coil	Check coil continuity at terminals and replace if not no continuity.
	Water Inlet Screens	Check water inlet screens for blockage and clean if necessary.
	Water	Check to insure that water is turned on and operating.
	Timer	Advance machine into wash cycle and check for 120VAC at red/blue wire coming from timer.
	Water Temperature Selector Switch	Check switch for continuity between red/blue wire and red/yellow wire when Hot is selected. If no continuity, change switch.
No cold water to tub in wash	Pressure Switch	Check pressure switch continuity between terminals #11 & #12. If no continuity, check pressure switch hose for obstruction. If hose okay, change pressure switch.
	Water Valve Coil	Check coil continuity at terminals and replace if no continuity.
	Water Inlet Screens	Check water inlet screens for blockage and clean if necessary.
	Water	Check to insure that water is turned on and operating.
	Pressure Switch	Check pressure switch continuity between terminals #11 & #12. If no continuity, check pressure switch hose for obstruction. If hose okay, change pressure switch.

Symptom	Probable Cause	Suggested Remedy
No cold water tub in wash (continued)	Timer	Choose cold cycle, advance to wash, check for to voltage on white/black from timer. If no voltage, replace timer.
	Water Temperature Selector Switch	Choose cold cycle, advance to wash and check wht/org wire from selector switch for 120VAC. If no voltage, change switch.
No hot water in detergent dispenser	Water Valve Coil	Check coil continuity at terminals and replace if no continuity.
	Water Inlet Screens	Check water inlet screens for blockage and clean if necessary.
	Water	Check to insure that water is turned on and operating.
	Timer	Advance to wash, check for voltage on red/org from timer. If no voltage, replace timer.
Water does not flush softener compartment.	Water Valve Coil	Check coil continuity at terminals and replace if no continuity.
	Water Inlet Screens	Check water inlet screens for blockage and clean if necessary.
	Water	Check to insure that water is turned on and operating.
	Pressure Switch	Check pressure switch continuity between terminals #11 & #12. If no continuity, check pressure switch hose for obstruction. If hose okay, change pressure switch.
	Timer	Advance machine to final rinse and check for voltage at wht/blue wire coming from timer. If no voltage, replace timer.
Water comes in but level does not rise	Drain Valve (open)	Check these areas - Drain valve blockage - Drain valve motor and gear train. If power but drain valve does not close, replace valve. - Power to the drain valve. If no power to drain valve, check (brn/yel) circuit for power.
Water level too high	Pressure Switch	Check for blockage in pressure switch hose. Check for pressure switch opening circuit across terminals #11 & #12. Replace switch if contacts do not open.
Water drains slowly	Drain System	Check hoses and drain valve for blockage. Clean if necessary. Check building drains for blockage or inadequate size.

Symptom	Probable Cause	Suggested Remedy
Machine tumbles in only one direction	Reversing Timer	Check to see that reversing timer is running. Check for alternating 24VDC at blue and at orange from reversing timer to signal reversing operation to drive. If not running or no voltage, replace reversing timer.
	Variable Frequency Drive	Check blue and orange wires on variable frequency drive for alternating 24VDC for forward and reverse direction from the reversing timer. If no voltage, see reversing timer above. Be sure to check wire connections at drive. If 24VDC at drive, replace drive.
Does not give intermediate spin	Pressure Switch	Check pressure switch for continuity across terminals #11 & #12 indicating pressure switch has reset to the empty position. If no continuity, change pressure switch.
	Reversing Timer	Check to see if running. Check for 24VDC output on blue/wht wire. If not running or no output, change reversing timer.
	Spin Relay R2	Check spin relay coil for continuity, replace if shorted. Check for 24VDC input to spin relay contacts. Check for 24VDC out of relay on red & black wires. If input voltage is okay and there is no output voltage, change relay.
	Timer	Advance to spin cycle, check for 120VAC on red/blk from main timer. If no voltage, change timer.
Machine starts and advances through cycle but motor does not operate	Variable Frequency Drive	<p>Check Variable frequency drive Green light on back illuminated, Okay. Red light on back illuminated, do the following:</p> <ol style="list-style-type: none"> 1. Disconnect power to washer for two minutes to reset variable frequency drive. Reconnect to power and check for 13.5 reading on digital readout . 2. Check incoming power to washer for correct voltage. Line voltage out of the specified operating range will cause the drive to fault. 3. Check motor. Disconnect from power. Push tab on bottom of drive and remove lower cover. (Do not remove complete cover as it will damage the drive) <p>Disconnect the three gray wires that operate the motor from terminals "U", "V", and "W" in the drive. Reconnect power to the washer and check digital readout for 13.5</p>

Symptom	Probable Cause	Suggested Remedy
Machine starts and advances through cycle but motor does not operate (continued)	R1 Relay	Start machine to verify that door locks and check for 120VAC to R1 (run relay) coil. Check for continuity across relay coil. Check for 24VDC input on white wire and 24VDC output on blk/red wire. If no output, replace relay.
	Reversing Timer	Check to see that reversing timer is running. Check for alternating 24VDC at blue and at orange from reversing timer to signal reversing operation to drive. If not running or no output voltage, replace reversing timer.
Intermediate spin speed works-no high extract	Program Timer	Advance to final extract, check red/green wire from timer for 120VAC to extract relay. If no voltage, replace timer.
	Extract Relay (R3)	Check relay for continuity through coil. Check output on green wire from extract relay for 24VDC. If no continuity or no 24VDC, replace relay.
Machine does not stop at end of cycle	Coin accumulator	Check for continuous output from terminal where orange-white wire connects to accumulator. If so replace accumulator.
Water leakage around loading door	Door Adjustment	Door may need adjustment due to abuse or wear. Check tightness around perimeter using a dollar bill. Adjust left to right tightness by shims at door lock or hinge side. It is important to center gasket to tub opening before tightening door to hinge bolts. Chalk may be used on tub front to show point of contact with tub. If gasket is deformed, worn, or damaged, replace. Refer to parts section for door gasket expander kit.
Excessive vibration	Mounting System	Check these areas: - Strength of mounting structure, concrete or base. - Mounting bolts may be loose and need tightening.
	Drive Belt	- Worn drive belt can cause vibration and noise.
	Pulleys	- Damaged pulleys.

DELTA VFD-A (55#) VARIABLE FREQUENCY DRIVE TROUBLESHOOTING

MACHINE OPERATION:

The Delta drive, in the 55# washer, will operate the same way as the previous Square D drive. There are three individual speeds, tumble, intermediate extract, and extract. The extract speed will depend on the individual type of 55# washer (100G, 120G, or 140G).

DELTA DRIVE CONTROL:

The Delta drive has two terminal strips that control the overall operation of the drive. We currently are using only six terminals on these two terminal strips, all of which are inputs to the drive. By using these six inputs, the speed and direction of the washer can be controlled.

The control terminal strips, and all the connection terminals, can be accessed by removing the lower front cover, which is snapped into place. It may take a great deal of pressure, either on the bottom and/or sides of the cover, to remove it from the drive.

Either a micro controller or relays supply the correct inputs to the drive. The drive will operate as it is commanded by the washer controls.

Zero volts are present on a drive control terminal when it is active. Pages 6 through 18 will show the voltages present on the control terminals, the drive display L.E.D. status, and the number displayed on the drive keypad, for each part of the 55# washer cycle.

DELTA DRIVE DISPLAY/KEYPAD:

The drive display/keypad is present on each Delta drive that is installed. While the keypad is not functional, the display is. There are two parts to the display, the seven segment area (shows actual digits) and the L.E.D. area (five red light emitting diodes).

The seven segment display area will show fault codes associated with a drive problem. These are shown on pages 4 and 5. The drive can store up to three fault codes that occur when there is a problem. Only one at a time can be displayed. As a fault is cleared, the next fault code that is stored will appear, unless it was cleared when the previous fault code was cleared.

To clear faults on the Delta drive, you must first find and correct the problem causing the fault and then cycle power to the washer. If there is another fault that still exists, you must repeat the process.

The L.E.D.s will show the present status of the drive. They indicate when a RUN, STOP, JOG, FWD (forward), and REV (reverse) control input is present.

DELTA DRIVE POWER:

Mains power is connected to terminals R, S, and T on the Delta drive. If the washer is connected to a three phase source, there should be voltage present on all three terminals. If the washer is connected to single phase power, there should be voltage present on terminals R and S.

The voltage should measure 208 Volts to 240 Volts A.C. between phases (R to S, R to T, or S to T if connected to three phase). There is a tolerance of + 10% on the mains voltage (187 Volts to

DELTA DRIVE DYNAMIC BRAKING RESISTORS:

Two, 160 Ohm braking resistors, are connected in parallel and attached to the drive at terminals B1 and B2. These resistors allow the voltage, which is generated by the motor when decelerating, to be dissipated. They will become hot while the motor is slowing down, so care should be taken so as not to come in contact with them. This will prevent an electrical shock and/or a physical burn.

DELTA DRIVE COOLING FAN:

There is a cooling fan attached to the bottom of the Delta drive. This fan will operate when the internal temperature of the drive reaches a predetermined level, the same way the radiator fan in a

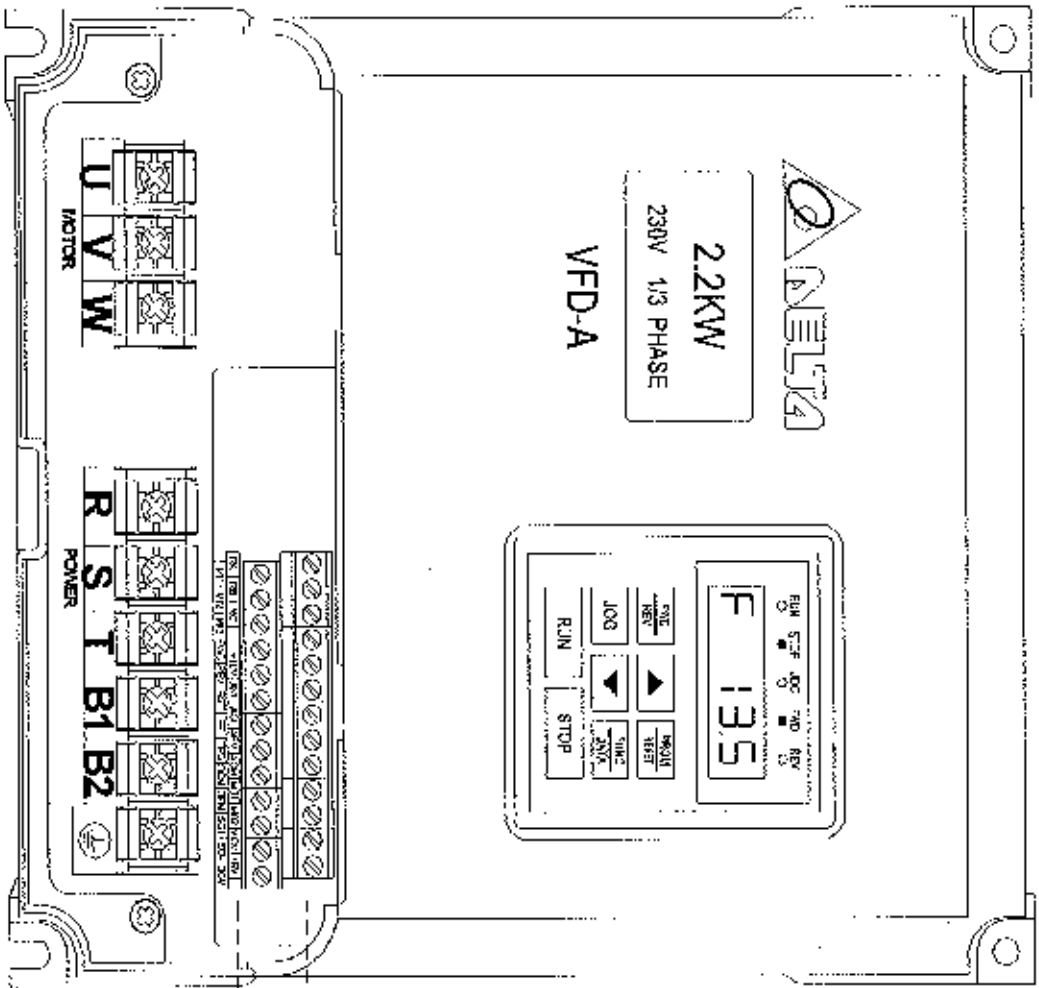
SAFETY PRECAUTION:

There is a red CHARGE L.E.D. inside the lower front cover of the drive. It is located above and to the left of the MOTOR connection terminals. This L.E.D. is on anytime dangerous voltage levels exist within the drive. Any time this L.E.D. is illuminated, dangerous voltage levels exist within the drive. **NO WORK, RELATED TO THE DELTA DRIVE, SHOULD BE PERFORMED WHEN THIS L.E.D. IS ILLUMINATED!**

Even if this CHARGE L.E.D. is not illuminated, a voltmeter should be used to check for voltage on the drive POWER, MOTOR and BRAKING RESISTOR terminals. There is always a possibility that the L.E.D. may be bad.

FAULT NAME	FAULT DESCRIPTIONS	CORRECTIVE ACTIONS
o.c.	The over-current hardware trip circuit detects an abnormal increase in current.	1) Check the wiring connections between the drive and motor for possible short circuits. 2) Check for possible excessive loading conditions at the motor - belt, bearings, cylinder or pulley obstruction, etc.....
o.u.	The drive detects that the DC bus voltage has exceeded its maximum allowable value.	1) Check the mains power to the drive to make sure it is within the correct voltage level. 2) Check for possible mains power voltage transients (spikes). 3) Check the value of the braking resistors. 4) Check the braking resistor wiring.
o.H.	The drive temperature sensor detects excessive heat.	1) Check the drive cooling fan for blade obstructions (free to spin). 2) Check drive ventilation holes for obstructions 3) Check heatsink fins for foreign objects or dirt.
L.u.	The drive detects that the D.C. bus voltage has fallen below its minimum value.	Check the incoming mains power to drive to make sure it is within the correct voltage limit.
o.L.	The drive detects excessive drive output current.	1) Check wiring between drive and motor. 2) Check for possible excessive loading conditions at the motor - belt, bearings, cylinder or pulley obstruction, etc..... 3) Check winding resistance of motor.
o.L. 1	Internal electronic overload trip-is overloaded	1) Check wiring between drive and motor. 2) Check for possible excessive loading conditions at the motor - belt, bearings, cylinder or pulley obstruction, etc..... 3) Check winding resistance of motor.

FAULT NAME	FAULT DESCRIPTIONS	CORRECTIVE ACTIONS
o.L. 2	Motor overload.	1) Check wiring between drive and motor. 2) Check for possible excessive loading conditions at the motor - belt, bearings, cylinder or pulley obstruction, etc.... 3) Check winding resistance of motor.
o.c.A.	Over-current during acceleration.	Check motor and motor wiring for possible short circuits.
o.c.d	Over-current during deceleration.	Check motor and motor wiring for possible short circuits.
o.c.n.	Over-current during steady state operation (tumble) - short circuit at motor output, or sudden increase in motor loading.	1) Check motor and motor wiring for short circuits. 2) Check for possible excessive loading conditions at the motor - belt, bearings, cylinder or pulley obstruction, etc....
c.F. 1	Drive internal circuitry failure.	Check the incoming mains power to drive to make sure it is within the correct voltage limits.
c.F.2	Drive program has invalid data.	Check the incoming mains power to drive to make sure it is within the correct voltage limits.
G.F.F.	Ground or fuse failure.	Check motor and motor wiring for possible grounds or short circuits.
c.F.3	Drive internal circuitry is abnormal.	Measure input mains voltage to drive. If voltage is within limits, cycle power to drive and check for fault.
H.P.F.	Protection circuitry of hardware detected abnormal operation.	Cycle power to drive and check for fault.



DRIVE STATUS, AFTER POWER APPLIED WITH NO CONTROL SIGNAL FROM WASHER CONTROLS.

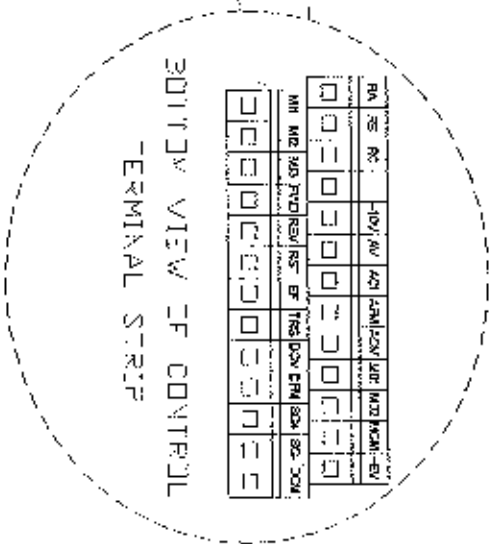
56# WASHER CONTROL TYPE: MICRO or RELAY

All control terminals, voltages will be D.C. If negative lead of the voltmeter should be placed on terminal 20V. The D.C. supply of 108.4Vdc will vary from +20 to +24 Volts.

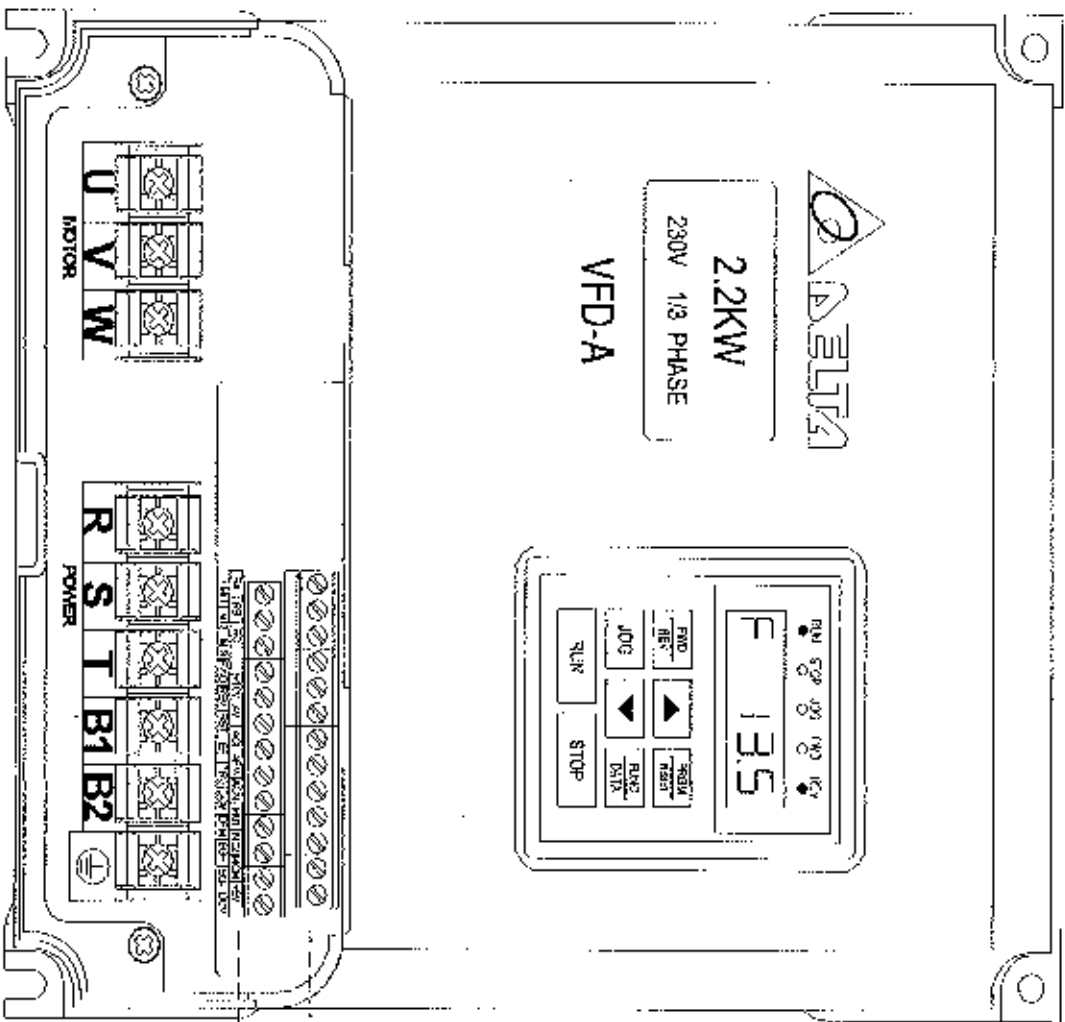
Solid circles, on drive display LEDs, indicate that the LED is illuminated. Circles with four lines protruding at 45, 135, 225, and 315 degrees (X) indicate that the LED is blinking.

VOLTAGE READING:

- V11 (GRND) TO ECV (W-T) = 24 VOLTS
- V12 (BLK) TO COM (WHT) = 24 VOLTS
- V13 (RED) TO COM (WHT) = 24 VOLTS
- FWD (BLD) TO COM (WHT) = 24 VOLTS
- REV (BRN) TO COM (WHT) = 24 VOLTS



30112V VIEW OF CONTROL TERMINAL STRIP



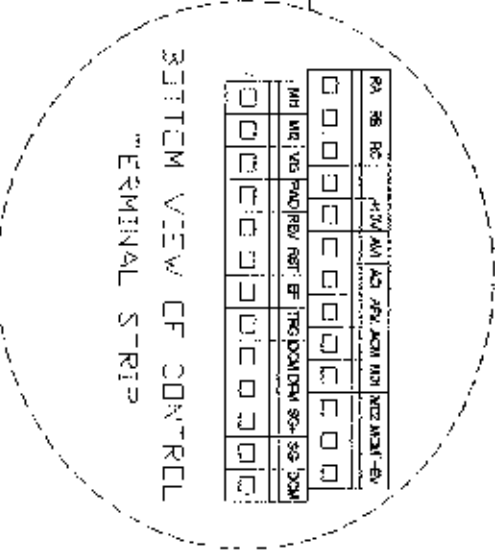
DRIVE STATUS WITH REVERSE TUMBLE SIGNAL FROM WASHER CONTROLS.

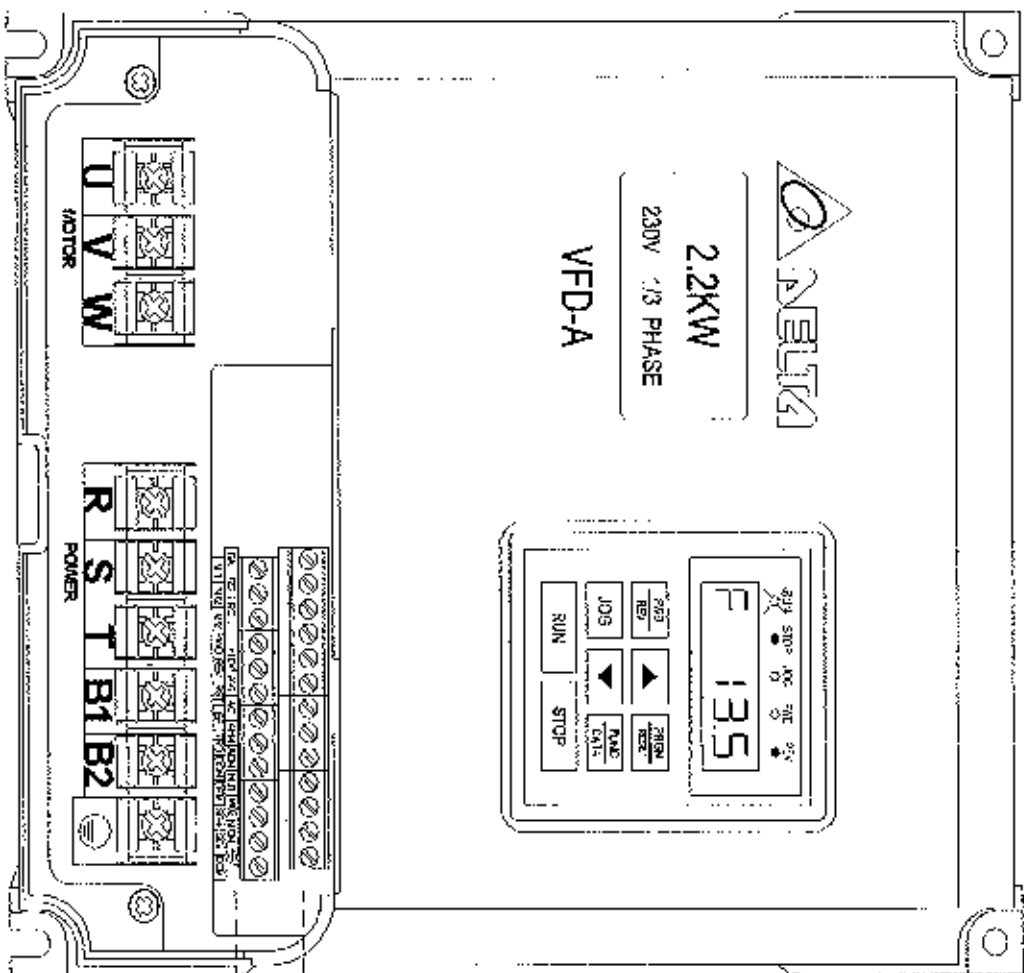
55# WASHER CONTROL TYPE: MICRO or NON-MICRO

All control terminal voltages will be DC. The negative ends of the voltmeter should be placed on terminal DCM. The LED display of the driver will vary from 480 to 24 VOLTS. Solid circles on drive display LEDs indicate that the LED is illuminated. Circles with four lines protruding at 45, 135, 225, and 315 degrees indicate that the LED is blinking.

VOLTAGE READINGS:

- H3 (GRND) TO DCM (WHT) = 24 VOLTS
- H2 (BLK) TO DCM (WHT) = 24 VOLTS
- H3 (RED) TO DCM (WHT) = 24 VOLTS
- H4S (BLU) TO DCM (WHT) = 24 VOLTS
- REV (GRND) TO DCM (WHT) = 3 VOLTS





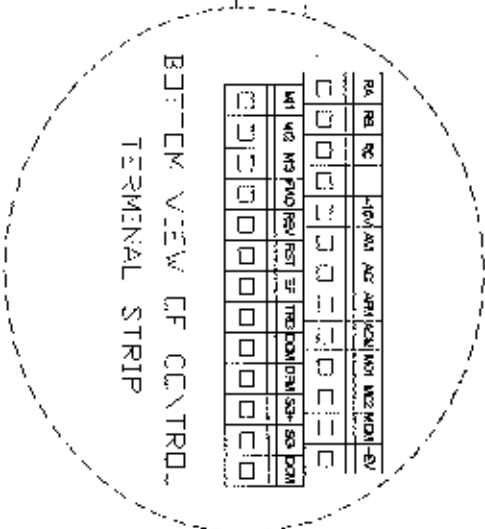
DRIVE STATUS WHILE DECELERATING FROM REVERSE TUBE SIGNAL FROM WASHER CONTROLS.

SS# WASHER CONTROL TYPE MICRO or NON-MICRO

All control terminal voltages will be DC. The negative lead of the voltmeter should be placed on terminal DCM. The DC supply = the drive, etc. VDC over 220 to 224 Volts. Solid circles or drive 0.50/0.4V - E.D.S. indicate that the LED is illuminated. Dashes with four lines protruding at 45, 95, 225, and 315 degrees (X) indicate that the LED is blinking.

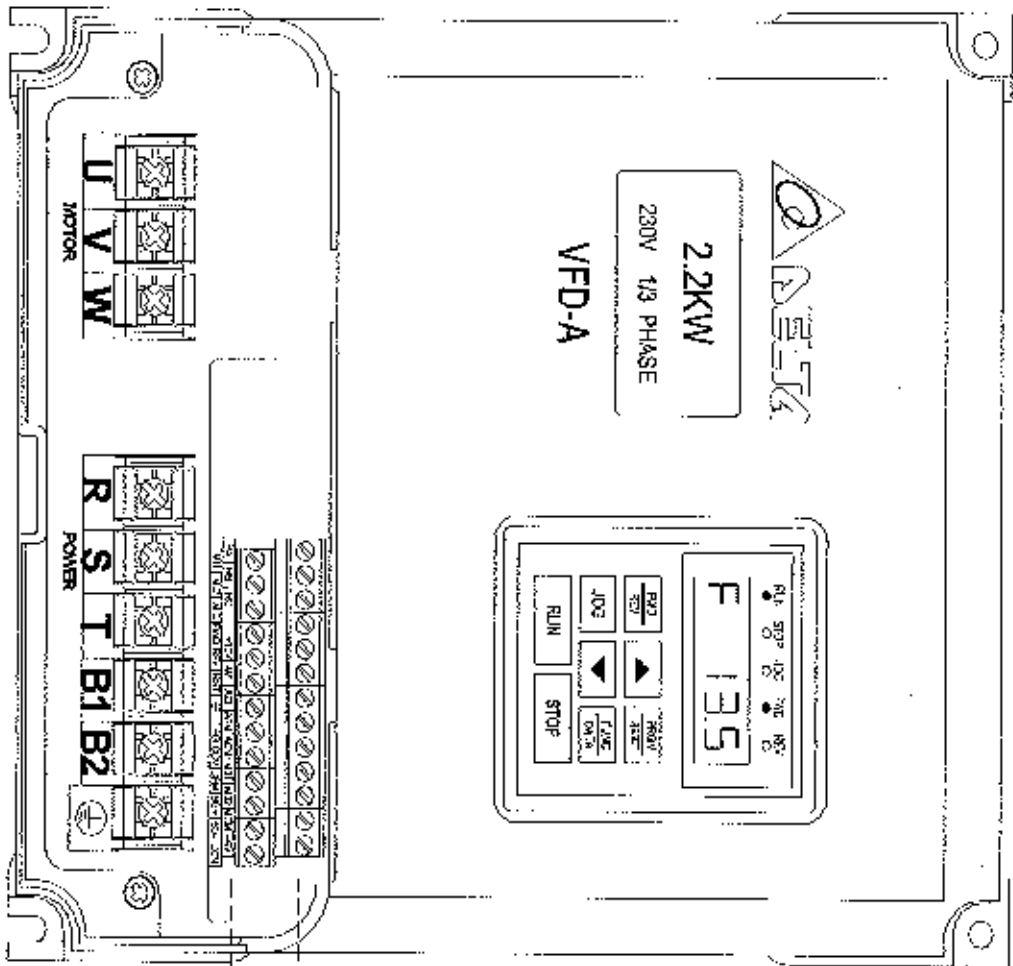
VOLTAGE READINGS:

- H1 (GRN) TO DCM (WHT) = 24 VOLTS
- M2 (BLK) TO DCM (WHT) = 24 VOLTS
- M3 (RED) TO DCM (WHT) = 24 VOLTS
- FWT (BLU) TO DCM (WHT) = 24 VOLTS
- REV (DRN) TO DCM (WHT) = 24 VOLTS



BOTTOM VIEW OF CONTROL TERMINAL STRIP

RA	RB	RC	RD	RE	RF	RG	RH	RI	RJ	RK	RL	RM	RN	RO	RP	RQ	RR	RS	RT	RU	RV	RW	RX	RY	RZ



DRIVE STATUS WITH FORWARD TUMBLE SIGNAL FROM WASHER CONTROLS

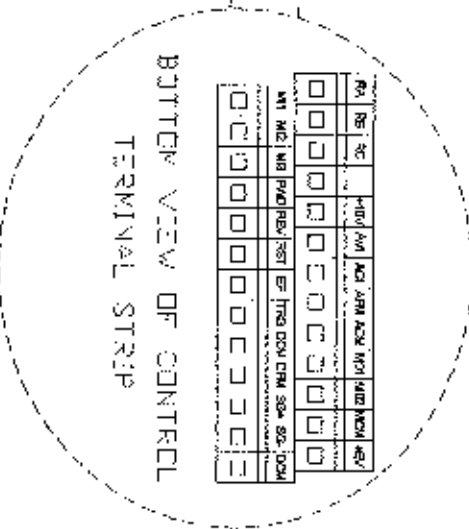
66# WASHER CONTROL TYPE: MICRO or NON-MICRO

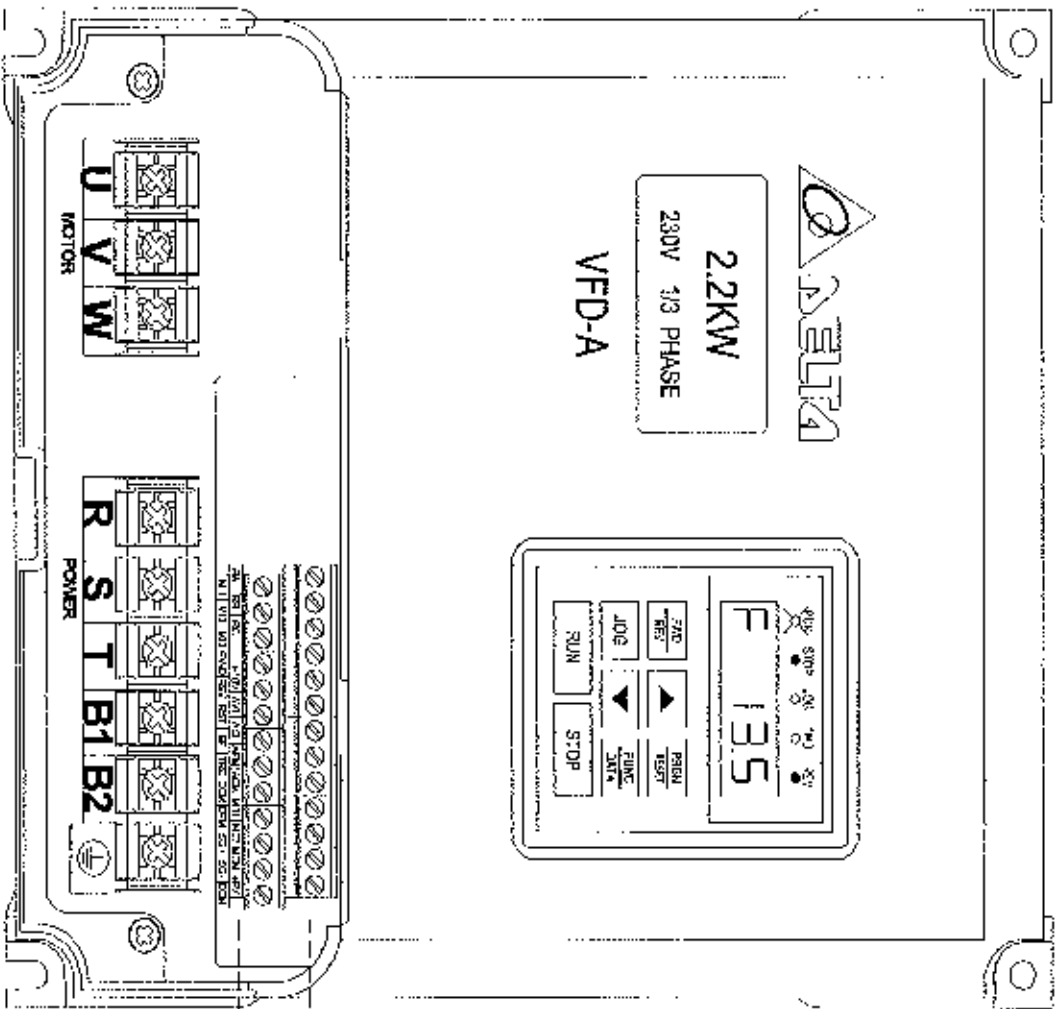
All control terminal voltages will be 0V. The negative end of the voltage for signals should be placed on terminal COM. The DC supply of the drive will vary from 120 to 424 Volts.

Drive direction on drive display LEDs indicate two: the LED is illuminated. Drives with four lines providing at 45, 135, 225, and 315 degrees (°) indicate that the LED is glowing.

VOLTAGE READINGS:

- W1 (GRND) TO COM (WHT) = 24 VOLTS
- W2 (BLK) TO COM (WHT) = 24 VOLTS
- W3 (RED) TO COM (WHT) = 24 VOLTS
- FWD (BLU) TO COM (WHT) = 0 VOLTS
- REV (GRN) TO COM (WHT) = 24 VOLTS





DRIVE STATUS WHILE DECELERATING FROM INTERMEDIATE EXTRACT SIGNAL FROM WASHER CONTROLS.

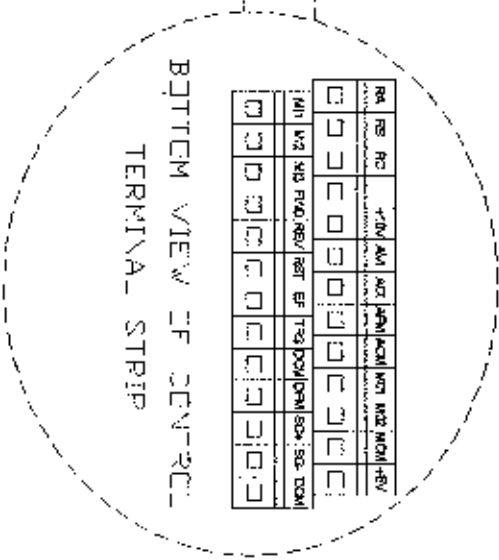
55# WASHER CONTROL TYPE: MICRO or NONMICRO

41. Control terminal voltages will be 24. The negative lead of the voltmeter should be placed on terminal DCM. The DC supply of the drive will vary from 420 to 426 Volts.

Solid circles on drive display LEDs indicate that the LED's illuminated. Circles with four lines circling at 45, 135, 225, and 315 degrees indicate that the LED is blinking.

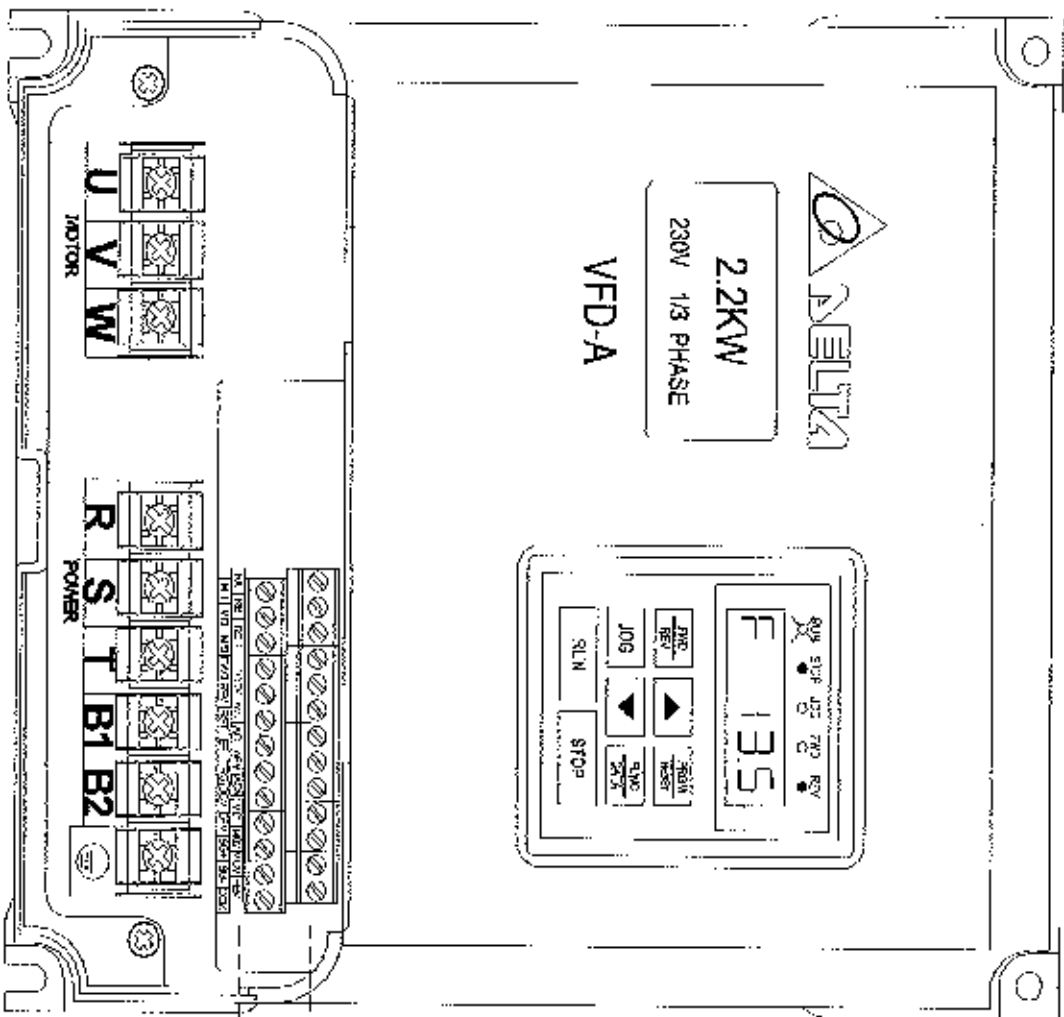
VOLTAGEREADINGS:

- VEL (GRN) TO DCM (WHT) = 24 VOLTS
- VEE (BLK) TO DCM (W-T) = 24 VOLTS
- W13 (RED) TO DCM (W-T) = 24 VOLTS
- SWD (BLU) TO DCM (W-T) = 24 VOLTS
- REV (GRN) TO DCM (W-T) = 24 VOLTS



RA	RS	RC	4-DM	AM	ACT	SPN	AKM	NOT	AK2	NON	REV
□	□	□	□	□	□	□	□	□	□	□	□
MIN	AK2	AK3	REV	REV	REV	REV	REV	REV	REV	REV	REV
□	□	□	□	□	□	□	□	□	□	□	□

BOTTOM VIEW OF CONTROL TERMINAL STRIP



DRIVE STATUS WHILE DECELERATING FROM EXTRACT SIGNAL FROM WASHER CONTROLS.

55# WASHER CONTROL TYPE: MICRO or NON-MICRO

All control terminals voltages will be in. The negative lead of the voltmeter should be placed on terminal DCV. The DC supply of the drive will vary from +20 to +24 volts.

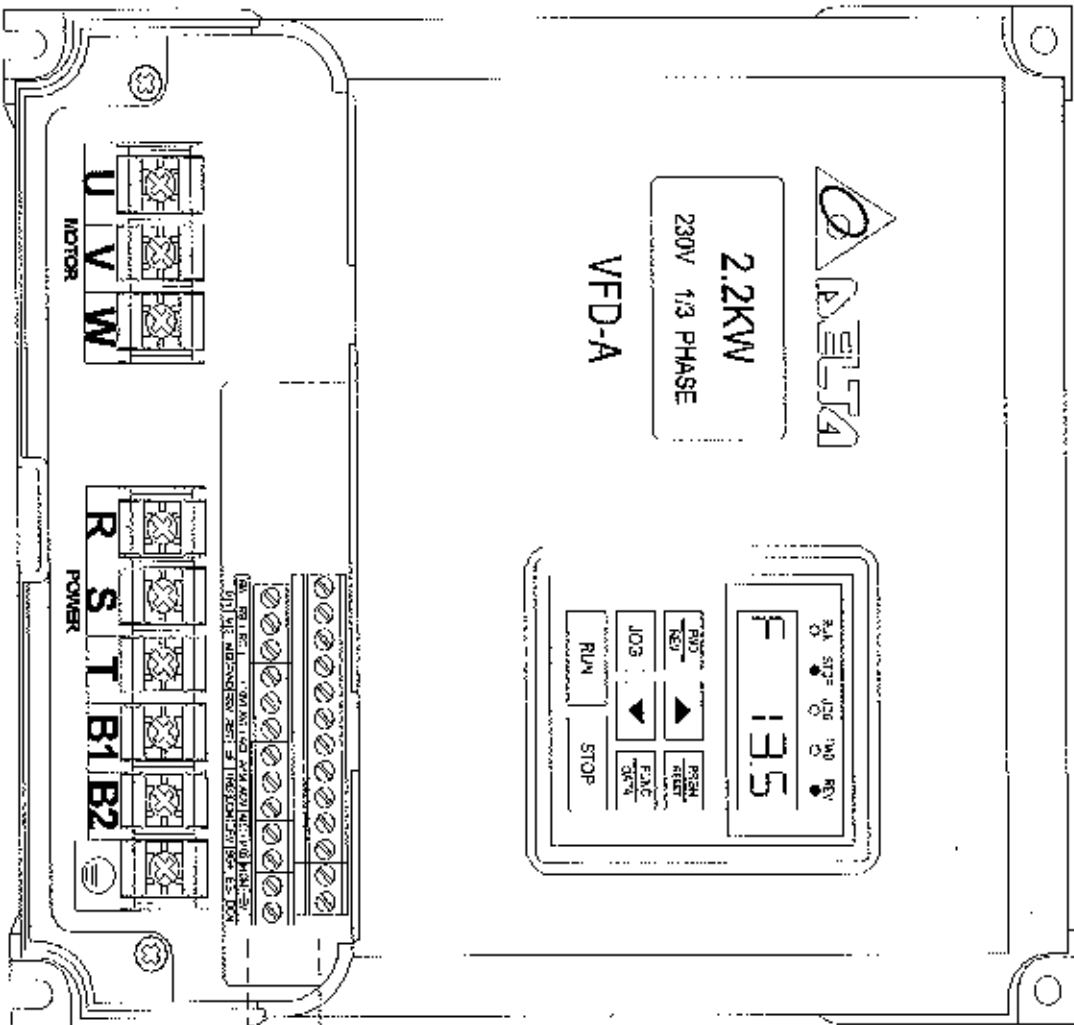
Solid circles on drive display LEDs indicate that the LED is illuminated. Circles with four lines surrounding it are lit. 225, and 215 degrees (°K) indicate that the LED is dimming.

VOLTAGE READINGS

PH (GND) TO DCV (WHT) = 24 VOLTS
 MIE (BLU) TO DCV (WHT) = 24 VOLTS
 M13 (RED) TO DCV (WHT) = 24 VOLTS
 FV1 (GRN) TO DCV (WHT) = 24 VOLTS
 REV (GRN) TO DCV (WHT) = 24 VOLTS

PA	RS	RC	*DN/AM	AD	APN/KN	NOI	MC	AKN/HE/
0	0	0	0	0	0	0	0	0
4	1	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0

SYSTEM VIEW OF CONTROL TERMINAL STRIP



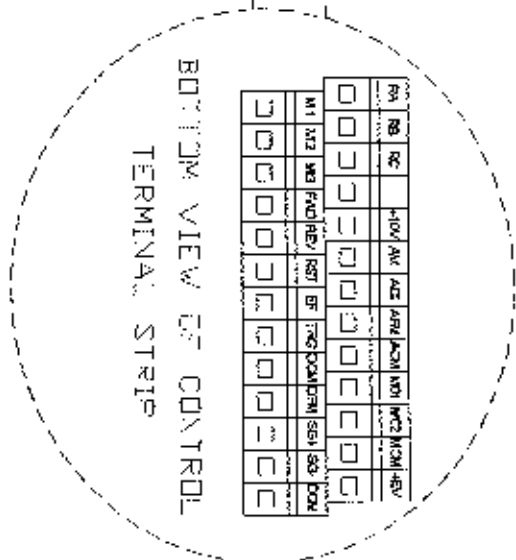
DRIVE STATUS. AFTER WASHER CYCLE COMPLETE WITH NO CONTROL SIGNAL FROM WASHER CONTROLS

55# WASHER CONTROL TYPE: MICRO or RELAY

All control terminal voltages will be 24V. The negative end of the voltmeter should be placed on terminal COM. The DC supply of the driver will vary from +24V to +24V. Solid circles on drive display LEDs indicate that the LED is illuminated. Circles with four dots surrounding it (45, 135, 225, and 315 degrees) indicate that the LED is blinking.

VOLTAGG READINGS:

- K1 (GRN) TO J1P (WHT) = 24 VOLTS
- M12 (BLU) TO COM (WHT) = 24 VOLTS
- M13 (RED) TO COM (WHT) = 24 VOLTS
- FWD (BLU) TO COM (WHT) = 24 VOLTS
- REV (GRN) TO COM (WHT) = 24 VOLTS



55lb. Coin Timer Washer Schematic WCN55AEK

Start Circuit

Power travels into the control trough on L1 & L2. 240VAC goes to a Control Transformer that steps the voltage down to 120VAC

for the controls. 120VAC then travels thru the 1.5 amp Circuit Breaker and travels on the white/red wire to the Coin Accumulator Transformer where it is stepped down to 12VAC. This 12VAC powers the Coin Accumulator Board via the gray wire. With the board now powered up, the insert coins light will be illuminated and it's ready to count coins. 120VAC is also supplied to the Main Timer Start and On-Off Contacts on the white/red wire. The Start Contact is closed before the machine has been started so 120VAC travels through the Start Contact and is supplied to the Coin Accumulator Board Start Relay. The S4 Coin Switch counts the quarters and sends a signal to the Coin Accumulator Board. When the coin count is satisfied, the Coin Accumulator Board closes the Start Relay and sends a short 120VAC signal on the orange/white wire to the Rapid Advance Timer Motor. This timer motor starts advancing the Main Timer to the preselected starting position. A few seconds after the Coin Accumulator Board sends the start signal to the Rapid Advance Timer Motor, the Coin Accumulator Start Relay opens, the display goes blank and the On-Off Contact in the Main Timer closes to insure that the S1 Door Switch is closed (showing that the door is locked). The On-Off Contact also provides 120VAC to the On Light on the red wire. With the S1 Switch closed the Door Lock Solenoid is now powered with 120VAC via the white/red wire. The Door Lock Solenoid pulls in, locking the door and closing the S2 and S3 Switches. The S2 Switch is a backup to the S1 Switch so that the adjustment on S1 isn't as critical. The S3 Switch provides 120VAC to Timer Contact RA-3 to power the Rapid Advance Motor again and the Main Timer is allowed to advance on to the preselected start position. The blue wire furnishes the neutral for the controls.

Fill Circuit-Warm

120VAC is supplied to the controls through the S1, S2, and S3 Door Switches. The On Light and the Door Lock Solenoid (discussed in Start Circuit) will remain on throughout the cycle. The Lock Thermoactuator Contact in the Main Timer is closed and provides the neutral side to operate the Thermoactuator. 120VAC is provided to the Lock Thermoactuator on the orange wire from the S3 Door Switch. The Drain Contact in the Main Timer is closed and provides 120VAC to the Drain Valve on the brown/yellow wire which closes the valve. The Wash Contact in the Main Timer is closed and provides 120VAC to the Reversing Timer and the Reversing Timer Motor on the blue/black wire. This will start the Reversing Timer operating which will alternately open and close the Micro Switches that provide the direction of tumble for the wash basket. The Wash Light Contact in the Main Timer is closed and provides 120VAC to the Wash Light. The orange wire coming from the S3 Door Switch provides power to the Wash Water Contact in the Main Timer. 120VAC connects from the Wash Water Contact to the Wash Temperature Contact via an internal timer connection. With 120VAC on the orange wire & neutral on the orange/yellow wire, the Coin Accumulator Board turns on the Time Remaining Light & starts counting down in minutes. (If delay fill kit is installed, time count down is stopped during fill.)

Now a cycle must be selected with the Selector Switch. We'll use Normal Wash. The washer fills the tub through the back of the machine with either one or both the C1 Cold and H1 Hot Water Valves. At the beginning of the cycle, the detergent dispenser flushes the detergent into the tub. This is accomplished with the Wash Dispenser Contact in the Main Timer. 120VAC travels through the closed Wash dispenser Contact and is supplied to the H2 Hot Water Valve Solenoid by the red/orange wire. As the washer fills with water, the Wash Basket will tumble one direction for 19 seconds, pause, and then reverse direction for 19 seconds. 120VAC travels from the Wash Water Timer Contact to the Heavy Duty Contact in the Selector Switch via the white/black wire. 120VAC goes through the closed Heavy Duty Contact in the Selector Switch and energizes the C1 Cold Water Valve Solenoid via the white/orange wire. 120VAC also travels to the closed Wool/Delicate Contact in the Selector Switch. This closed contact provides power to the H1 Hot Water Valve Solenoid via the red/yellow wire. When the water reaches the predetermined level the Pressure Switch moves to the full position and opens the neutral side of the line to the Water Valves. This shuts the Water Valves off. The neutral for the Water Valves & Main Timer Motor is provided through the Pressure Switch. The Main Timer is stopped until the Pressure Switch provides neutral when full level is reached. Neutral for the Main Timer Motor during drain and spin is provided through the Delay Fill Timer Contact.

Wash Circuit

As the washer fills the tub through the back of the machine with either one or both the C1 Cold and H1 Hot Water Valves, the Wash Basket will tumble one direction for 19 seconds, pause, and then reverse direction for 19 seconds. This is accomplished through the use of a Reversing Timer. 120VAC is supplied to the Reversing Timer Motor on the blue/black wire from the Wash Motor Timer Contact in the Main Timer and 120VAC is supplied to the R1 Run Relay any time the door is locked. This R1 Relay closes & provides 24VDC thru the Reversing Timer Wash Micro Switches. The Reversing Timer will alternately open and close the two Wash Micro Switches and provide 24VDC to the FW (forward) or RV (reverse) terminals on the Variable Frequency Drive.

As discussed in Start and Fill, the Lock Thermoactuator, Drain Valve, On Light, and Main Timer Motor (except in fill) are all operating throughout the Wash Cycle.

Drain, Rinse 1 & 2, & Final Rinse Circuit

The Drain Contact on the Main Timer opens removing power to the Drain Valve. The normally-open spring-loaded Drain Valve opens and empties the tub.

For Rinse 1 & 2, the Rinse Light Contact in the Main Timer closes and provides 120VAC to the Rinse Light. The Rinse Water Contact in the Main Timer also closes and provides 120VAC to the C1 Cold Water Solenoid. The tub will fill until the predetermined level is achieved at which time the Pressure Switch Contact will open the neutral side of the line shutting off the C1 Cold Water Solenoid. When the tub is full, the pressure switch also closes a neutral circuit to the M1 Timer Motor and to the orange/yellow wire on the Coin Accumulator Board. This allows the Main Timer to advance only after the tub is full and stalls the time count down on the Coin Accumulator Board during fills.

For the Final Rinse, the Final Rinse Light Contact in the Main Timer closes and provides 120VAC to the Final Rinse Light. Rinse water is the same as in Rinses above.

As discussed in Start and Fill, the Lock Thermoactuator, Drain Valve, On Light, and Main Timer Motor (except in fill) are all operating throughout the Wash Cycle.

Intermediate Extract Circuit

The Wash Contact remains closed and provides 24VDC to the closed Clockwise Micro Switch on the Reversing Timer. 24VDC is then fed to the Counter Clockwise Micro Switch via a jumper wire. 120VAC is then sent to the Delay Spin Micro Switch. The Delay Spin Micro Switch provides 120VAC to the Spin Motor Contact in the Main Timer on the blue/white wire. The Spin Motor Contact is closed for spin and the voltage continues on to the R2 Spin Motor Relay Coil on the red/black wire. With 120VAC to the R2 Spin Motor Relay Coil two things happen. 120VAC is now provided from the orange wire directly to the Relay eliminating the Reversing Timer and the Micro Switches from the circuit.

The second thing that happens when the R2 Relay is closed is that 24VDC is provided from the DCM terminal of the Variable Frequency Drive through the R1 Run Relay through the R2 Spin Relay to terminals MI1 & MI3 on the Drive and the washer spins at intermediate speed.

Final Extract Circuit

Same as Intermediate Extract but adds the R3 Extract Relay. The Main Timer provides 120VAC to the Extract Relay Coil. When this relay closes it provides 24VDC to the MI2 terminal on the Variable Frequency Drive. This means that all 3 terminals MI1, MI2 & MI3 are powered for high spin.

Thermoactuator and Shake Out Circuit

The Lock Thermoactuator Contact in the Main Timer opens removing the neutral to the Thermoactuator approximately 3 minutes before the end of the cycle. This allows the Thermoactuator time to retract by the end of the cycle.

To insure that the Lock Thermoactuator has retracted by the end of the cycle, one minute prior to the end of the cycle, the Unlock Thermoactuator is powered with 120VAC through the Unlock Thermoactuator Contact in the Main Timer.

The Spin Motor Contact in the Main Timer opens, stopping voltage to the R2 Spin Motor Relay & the motor. The basket will coast to a stop. The Wash Motor Contact in the Main Timer closes providing power to the Reversing Timer once again (discussed in Wash Cycle). The washer will tumble for approximately 30 seconds to let the clothes shake loose and then stop. The neutral for the Main Timer Motor is provided through the Delay Fill Timer Contact.

End of Cycle Circuit

The On-Off Contact in the Main Timer opens removing power to the Door Lock Switches and Contactors. The machine is now stopped. The Start Contact on the Main Timer is closed providing 120VAC to the Coin Accumulator Board on the white/green wire. The End Of Cycle Contact in the Main Timer is closed sending a 120 volt signal to the Coin Accumulator Board on the white/yellow wire telling it that the cycle is over. This does 2 things:

1. The beeper will signal for 3 seconds letting the user know that it is the end of the cycle.
2. It resets the Coin Accumulator Board and it is now ready to count coins again.