

ACVV TROUBLE SHOOTING (AC 2SPD MKII)

In order to localize faults with minimum expense;

- 1) Connect 3 x 60w light bulb as a star connected load to u, v, w terminals of the regulator.
- 2) Connect 2 x 60w light bulb in series connected between + and - terminals of the regulator.

These light bulbs will give an instant indication of;

- 1) the magnitude of the driving voltage
- 2) the magnitude of the braking voltage
- 3) the coincidence of the two voltages

See TVLD 213 for additional guidance.

In cases marked * in the following pages the engineer may;

- 1) Link out FDR
- 2) Replace thyristor fuses with cheaper 5 amp HRC fuses
- 3) Disconnect the brake
- 4) Disconnect and isolate the wires from the regulator to the motor windings

This test procedure will enable checks by substitution without blowing expensive thyristor fuses.

Upon finding and repairing the fault the engineer must return the circuitry back to its original condition before running the lift.

<u>SYMPTOM</u>	<u>POSSIBLE CAUSE</u>
1) Amber PTF & PLF LEDs lit	a) Wrong phase sequence or missing phase (check also thyristor fuses HF1 - HF3 and control fuses F1 - F5).
Amber PTF LEDs lit	a) Motor thermistor operated. (Allow machine to cool and check for cause of overheating). b) Thermistor not in circuit (where thermistors are not used link CON8-5 to CON8-6 or TH1 and TH2 on panel terminal rail).
2) LED PATN UP lights and LED TACH DN lights	a) TACHO connections reversed (Interchange Con 9-8 and 9-7) Not applicable on single quadrant digital tach.
3) LED Tacho DN lights and LED TACH UP light	a) TACHO connections reversed (Interchange CON 9-8 and 9-7) LED TACH DN will light regardless of direction.
4)* Thyristor fuse blows immediately lift requested to run	a) Short circuit or earth fault (Disconnect regulator at V, V, W and check wiring and motor for faults) b) HF2 - HF3 blown (suspect diode or thyristor in DC bridge circuit, check for S/C with ohm meter) c) HF1 - HF2 or HF3 blown (suspect faulty thyristor/s between R - U, S - V or T - W. Check for S/C with ohm meter)*
5) Thyristor fuse blows shortly after machine has started	a) Incorrect brake action (brake does not lift or clear brake drum. Adjust as required) b) Excessive DC overlap (check if both brake and drive bulbs are lit simultaneously when motor runs under full load conditions. If so turn potentiometer DC BIAS ACR8/9 B anticlockwise until brake bulbs extinguish. Use a voltmeter to adjust DC output voltage when motor is running at correct speed full load to record approximately 0 - 2V DC. If adjustment of DC BIAS potentiometer has no action check link TL B on card ACR8/9B is fitted. If not fitted fit, if fitted and fault has not cleared suspect ACR6 or ACR 8/9 or thyristor.

SYMPTOMPOSSIBLE CAUSE

- c) Excessive low speed operation
(ensure speed selection circuitry is working correctly and that lift is not running approach or level speed for a excessive at time)
- d) Shut down sequence incorrect
(fuses are ageing because contactors are switching of the supply rather than the thyristor. Adjust potentiometer DLT1 and DLT2 to obtain correct sequence which should be;
1. LEVL LED (ACR3) extinguishes
 2. 0.5 - 1.5 sec. later, adjusted by DLT1 (ACR7) LED IBK will extinguish setting the brake
 3. 0.5 - 1.5 sec. later adjusted by DLT2 (ACR7) LED IMC will extinguish causing main contactors to drop
- e) Defective drive thyristor causing unbalanced drive phase voltages and overloading 2 phases. If unbalanced suspect ACR8/9 and/or O/C thyristor.
- 7) Motor runs noisily
- a) Phases unbalanced
(suspect ACR8/9B or ACR8/9D or ACR6. Check by replacement. Suspect thyristor open circuit. Check gate leads are secure. Determine the faulty phase by monitoring the light bulbs. Change suspect thyristor).
- Excessive DC overlap (check as 5b))
- c) Motor fault
(check line to line voltage at motor terminals. If balanced check line current from regulator to motor. If currents unbalanced suspect motor winding fault).
- 8) DC injection excessively noisy
- a) DC bridge only half wave
(check DC volts at the end of a trip empty car up immediately before IMC (ACR7) extinguishes and ensure with unmodified regulator voltage is > 250V. If not suspect O/C diode or thyristor in DC bridge. Locate and change).

SYMPTOMPOSSIBLE CAUSE

- 9) Excessive noise experienced in lift car when motor runs
- a) Noise isolation pads breached (check no resonating surfaces are mechanically coupled to the motor or bed plate. If so remove or dampen. Ensure no rigid component breaches the isolation pads. Use dampening material on lift car panels).
- 10) Motor does not start although requested
- a) No direction relays operated (check LED FDR (ACR5) if lit press reset button. Check LED PTF & PFL. If lit check as i 1 a), b), c)).
- b) Direction relays operated (check LEDs 100 UP or DN and HS1 (ACR3). If, not illuminated suspect fault on 100Vdc logic voltage. If LED100 (ACR1) extinguished, suspect fuse F1 (ACR2). If 100, BKR, UP, DN (ACR3) lit ensure SW1 (ACR3) is in the down (on) position. If lift still does not run ensure LED HS1 is lit. If not suspect faulty contact between CON 8-8 and CON 8-14.
- 11) Motor does not start although requested with SW1 (ACR3) down and LEDs 100, UP or DN (ACR3) HS1 (ACR3) lit but BKR not lit.
- a) No pattern due to brake lifted signal not being received (check circuit between CON 8-8 & CON 8-16).
- 12) Motor does not start although requested with SW1 (ACR3) down and LEDs 100, UP or DN BKR (ACR3) lit.
- a) Low regulator control voltages (check +15V and -15V on ACR2).
- 13) LED FDR illuminates soon after lift is requested to travel but lift does not move (press FDR reset button)
- a) No output voltage to motor (check using bulbs if motor has voltage at its terminals. If not check BEN LEDs ACR8/9D, ACR 8/9B. If not lit suspect ACR7 card.

<u>SYMPTOM</u>	<u>POSSIBLE CAUSE</u>
14) LED FDR illuminates soon after lift is requested to travel and lift moves (Press FDR reset button)	a) Brake impedes motor speed (check and adjust brake action) b) Tacho voltage missing (allow the motor to run by hand releasing the brake and ensure LED TACHO UP or TACHO DOWN is lit. If not suspect O/C between tacho and regulator or slipping tacho drive or faulty tacho). c) Wrong tacho scaling (check tacho scaling link on ACR6) d) Pattern value too high (potentiometer HS1 (ACR4) mal adjusted. Check if seal is broke if so refer to factory)
15) Nuisance tripping of FDR	a) Too high FDR sensitivity (Adjust potentiometer WINDOWS (ACR5) until 5V measured at the wiper with respect to 0V. Readjust potentiometer FD SENS to eliminate nuisance tripping. b) Gate locks tipping (check gate locks) c) Mal functioning level detectors (check/change detector heads)
16) Motor starts fiercely	a) Too much precondition (turn SS potentiometer (ACR4) to reduce acceleration use sparingly as increasing too much will cause the lift to stall on take off) c) Brake mal adjusted (adjust brake to give gradual smooth lift)
17) Lift slows with a bump LED S > 9V (ACR6) lit	a) Tacho scaling incorrectly set (check as in 13c)) b) Suspect slack or damaged tacho coupling (tighten or replace)

- 18) Lift shoots floor
- a) Too high RND OFF
(Turn potentiometer RND OFF anticlockwise)
 - b) Too slow deceleration rate
(adjust potentiometer DEC (ACR4) such that speed approach 150FPM (0.76m)/sec) and level 15FPM (0.08m/sec) are discernable).
 - c) Too high level speed
(adjust level speed potentiometer to give lift speed of 10FPM-15FPM when LEVL LED (ACR3) is lit).
 - d) Suspect incorrect slowing and stopping sequence
(ensure LED LEVL (ACR3) is extinguished approximately 1" (25mm) from floor level and that the following sequence is adhered to:
 - 1. Loss of LED LEVL (ACR3)
 - 2. 0.5 - 1.5 sec later brake sets
 - 3. 0.5 - 1.5 sec later MC releases
 - 4. See 6d) for adjustment
 - d) Suspect a very free system
(DC injection cannot hold zero. Adjust potentiometer DLT1 (ACR7) anticlockwise to set brake earlier).
 - f) Suspect incorrect distances for slowing and stopping vanes
(check and adjust).
- 19) Lift stalls short of floor
- a) Levelling speed too low
(adjust level speed 10 - 15 FPM)
 - b) Tacho regulator circuit inbalance
(check potentiometer TACH BAL seal (ACR6) is not broken. If broken refer to factory.
 - c) Tacho inbalance
(check voltage/RPM factor with lift running at approach speed. If not constant suspect tacho.
 - d) Suspect stopping signals
(ensure correct levelling relays are invoked ie. LRU the LRD in the up direction or LRD then LRU the down 17) direction).

- 20) Lift exhibits instability on acceleration or deceleration
- a) Incorrect stability pot adjustment (turn 2SP STAB potentiometer (ACR6) clockwise to minimise instability)
 - b) Suspect tacho mounting or coupling (check tacho shaft and motor shaft are aligned Check that tacho coupling is not giving cyclic irregularities. Where tacho drive is by belts ensure belts are correctly tensioned and running true.
 - c) Misalignment of motor to gearbox (re-align).

SEQUENCE FOR UP TRIP

<u>MAIN REGULATOR INDICATORS</u>	<u>TVLC PANEL RELAY</u>	<u>COMMENTS</u>
100,+15,-15,15L lit PAT DISD lit VCONT lit.		<u>LIFT WITH NO DIRECTION</u> Brightness of VCONT drive depends on adjustment of PRECON.
		<u>LIFT WITH DIRECTION</u>
	SRU	Processor requests travel
	HSR	High speed travel selected
HS1, APP lit		
	UP	Direction set
UP, IMC, IBK BEN lit		
	STR	Prepare to travel
	BAR	Prepare brake lift circuit
	BKR	Brake lifts
BKR lit PAT DISD extinguished		
	MC	Regulator connected to line
		Lift starts moving
VPAT lit		LED illumination semi proportional to requested speed ie. pattern
TACH UP, PATN UP lit		Indicates actual direction of lift
VCONT (BRAKE/DRIVE)		Illumination inversely proportional to conduction angle with full car up expect VCONT DRIVE to dim when braking expect VCONT BRAKE to dim

MAIN REGULATOR INDICATORS

TVLC PANEL RELAY

COMMENTS

The lift will initially move under the influence of the SS potentiometer then ramp up at a rate governed by potentiometer ACC to a target speed set by potentiometer HS1

LIFT SLOWING TO APPROACH

Upon the processor detecting the slow down point for the target floor then

HS1 extinguished

Loose SRU and HSR

Request slow down to approach speed

The lift will now ramp down at a rate set by potentiometer DEC to a target speed set by potentiometer APP

LIFT SLOWING TO LEVEL

Approximately 10 inches (250mm) from target floor

LRU

Request to slow to levelling speed

APP extinguished
LEVL lit

MAIN REGULATOR INDICATORS

TVLC PANEL RELAY

COMMENTS

The machine will now ramp down at a rate set by potentiometer DEC to a target speed set by potentiometer LEVL

Approximately 1" (25mm) from target floor level

LIFT PREPARES TO STOP

LRD

Request to slow to zero speed

LEV extinguished

VCONT Brake

Call DC injection

Loose BAR

Prepare brake circuit to drop out

LIFT STOPS

Approximately 0.5 - 1 sec. later

Determined by regulator potentiometer DLT1

IBK extinguished

Brake delay off time times out

Loose BKR

Brake instructed to set

Approximately 0.5 - 1 sec. later

Determined by potentiometer regulator DLT2

IMC extinguished

Thyristors switched off electronically

Loose STR/UP/MC

Regulator disconnected via contacts

MAIN REGULATOR INDICATORS

TVLC PANEL RELAY

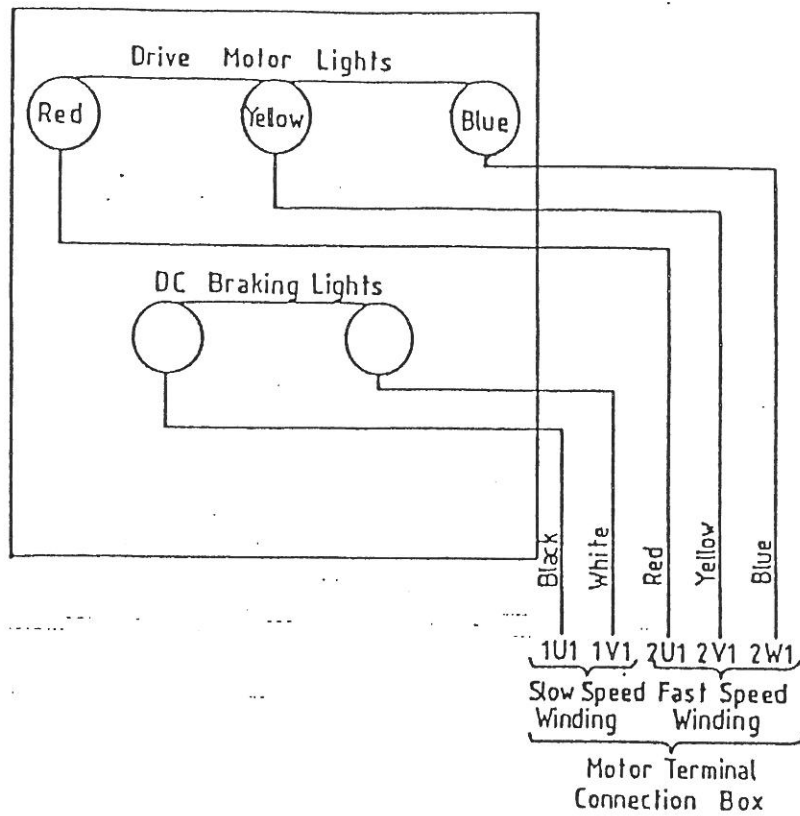
COMMENTS

UP extinguished

The lift has now completed its journey and the regulator is set to standby

Sequence for down is identical but in place of up substitute down, for LRU substitute LRD and for LRD substitute LRU

ACVV TEST LIGHTS
 DATE 6/3/87
 DRAW JG/GM
 TVLD 213



ACVV DRIVE MOTOR & DC BRAKING TEST LIGHTS

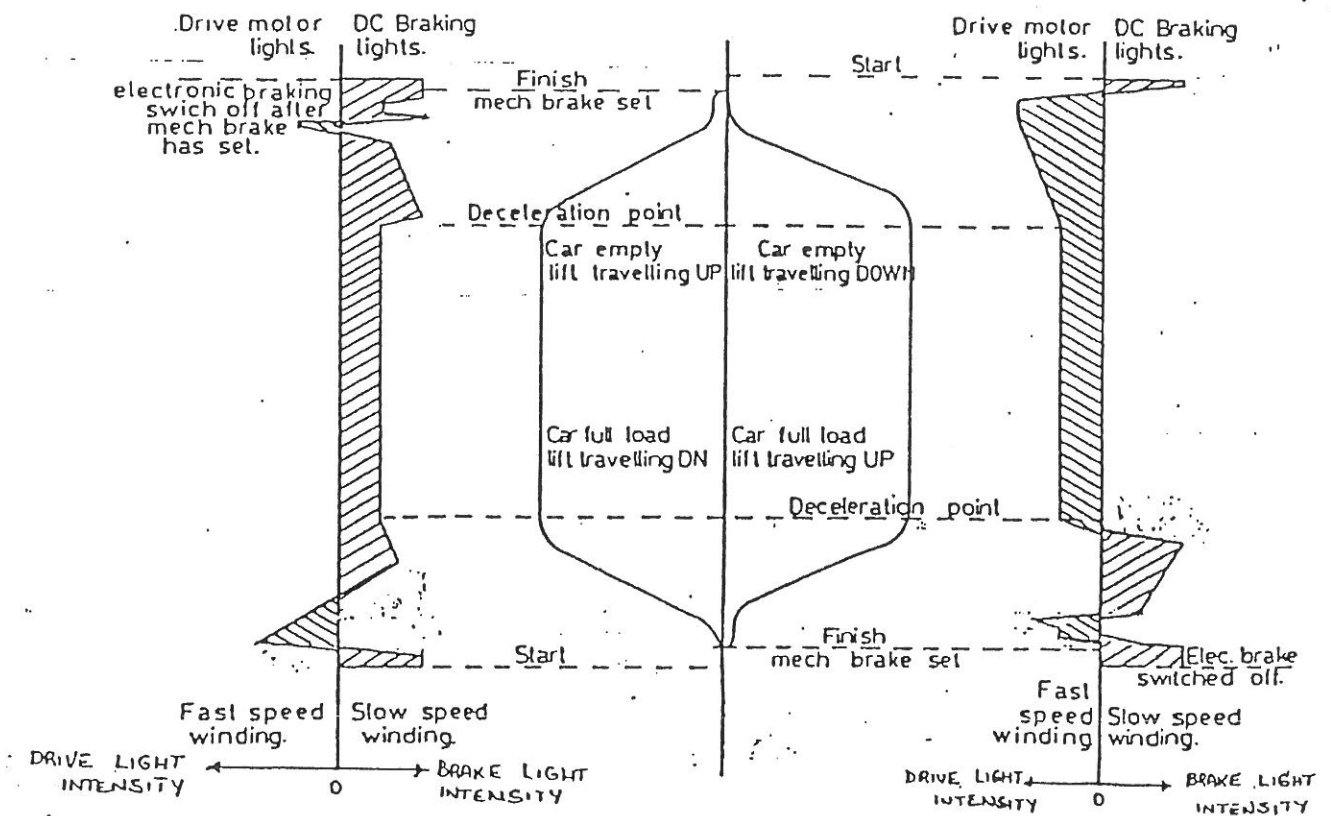


Illustration for guidance only
 (Representation for typical application and is not to scale)