

TB 144

TECHNICAL BULLETIN

IMPORTANT GUIDANCE INFORMATION

For the Attention of : Service Engineers, Trade Customers, Testers, Training Dept
Date : 02-12-2013
Product : Maxilift - Hydraulic Passenger Lift
Subject : **NGV A3 Electronic Valve – Fault finding**
Pages : 11

Originator : Stannah Lifts Ltd, Anton Mill, Andover, Hants SP10 2NX 01264 339090

Introduction:

The NGV A3 electronic valve from GMV was introduced on Maxilift hydraulic passenger lifts in Q4 2011. This bulletin has been produced to give guidance following feedback from numerous installations. It is more detailed in content than previous bulletins but we encourage site engineers to use it as a reference document when fault finding hydraulic lifts with this NGV A3 valve.

This bulletin concentrates on the alarms recorded by the 3 inductive sensors located on the 2 main valves which control the flow of oil and hence movement of the lift car:
Sensor S1 – located on the main check valve VRP (open or close valve)
Sensors S2 and S3 – located on the speed control valve VB. This valve is coupled to a stepper motor which is proportionally controlled to determine the car speed.
The 3 inductive sensors incorporate LED indicators to provide a visual indication of their active state. These sensors will register an alarm if a fault is detected.

If either of the sensors S1, S2 or S3 do not provide the correct signal to the NGV board then the corresponding 'READY' or 'RUN' output signal from the board to the Nexus controller is not seen. If this happens for more than 2 seconds then the lift will be taken out of service and an alarm will be registered on the NGV board and the Nexus controller.

The inductive sensors are factory set by GMV and should not be tampered with unless a specific fault corresponding to the sensor is registered as an alarm and it's setting is seen as the possible fault. The sensors must be aligned accurately with the corresponding valve spool otherwise they will not reflect their true position resulting in alarms being registered.

The following assumptions have been made:

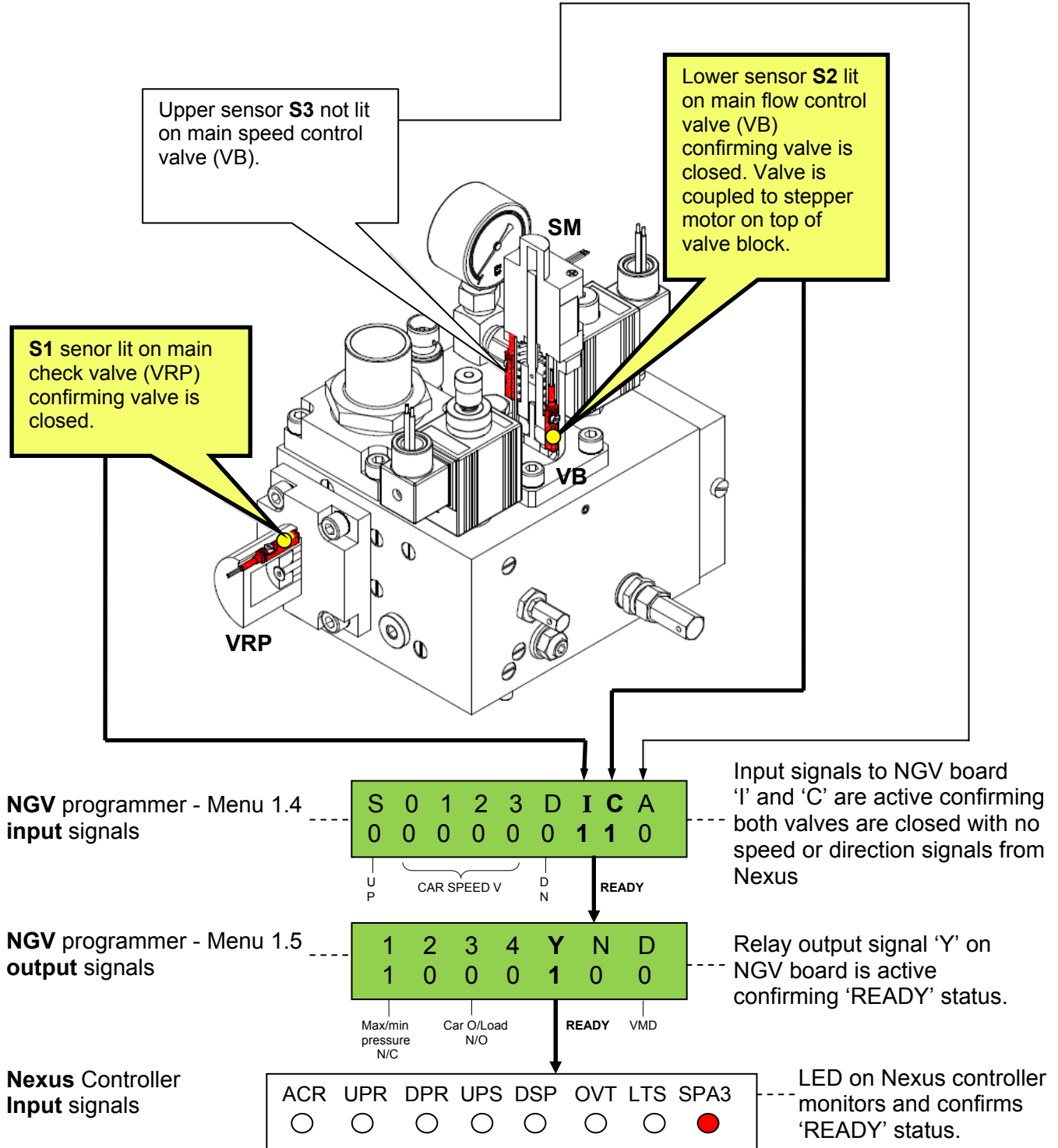
- Site engineers are in possession of a GMV hand-held programmer to interrogate the NGV control board and a dongle to interrogate the Nexus controller.
- The hydraulic specification for the installation has been entered correctly via Menu 5 of the programmer.
- The lift is set to 'normal' mode with rupture valve, pressure relief valve and ram minimum pressure valve set and functioning correctly.

This bulletin should also be read in conjunction with GMV's 'Installation, Use and maintenance Manual'.

Lift Stationary (In correct 'READY' condition):

With the lift in the stationary position S1 and S2 sensor LED's should be lit confirming that both main control valves are in the correct closed position.

If either LED is not lit and/or the red LED on the NGV card is lit or flashing then an alarm will have been registered in Menu 2 of the GMV programmer confirming a fault code and brief description. This will prevent the 'READY' signal being produced and will prevent the lift from running.

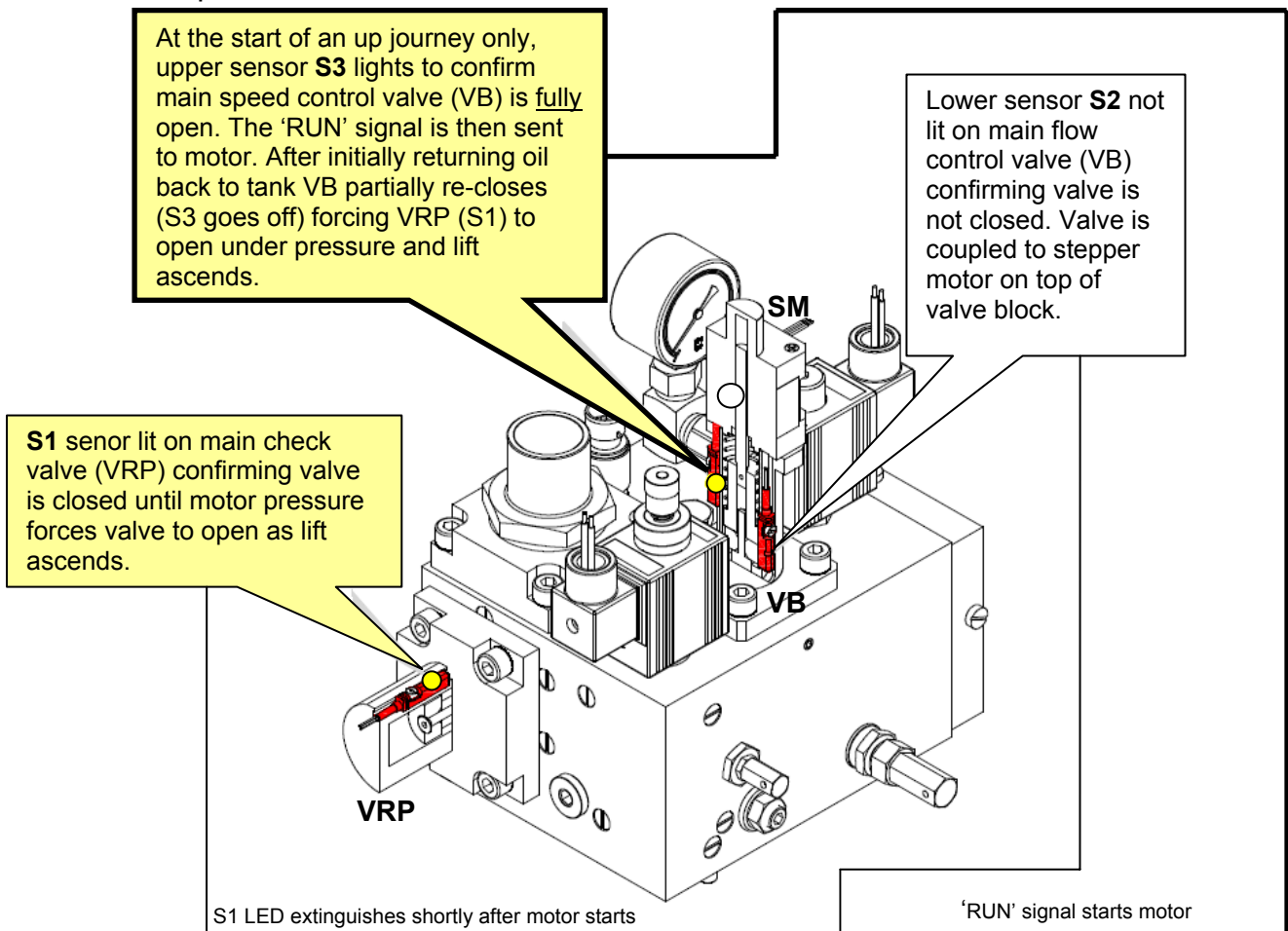


Lift Starting in the UP Direction ('READY' status changes to 'RUN'):

When the lift is about to travel in the up direction, the S2 sensor LED should extinguish and S3 sensor LED should illuminate confirming that the stepper motor/flow control valve (VB) is in the fully open position. This enables the 'RUN' signal to start the motor to initially allow oil to return back to tank. VB then partially re-closes (and S3 extinguishes) to pressurise the system. The main check valve (VRP) is then forced open under pressure and sensor S1 LED extinguishes as lift the car is raised. S3 sensor is only lit at the start of an up journey to provide the 'RUN' signal to the motor.

When the lift is running all 3 sensors are extinguished.

At the start of a down journey sensors S1 and S2 LEDs will extinguish as both the valves open.



NGV programmer - Menu 1.4
input signals

S	0	1	2	3	D	I	C	A
1	1	0	0	0	0	1	0	1

U P CAR SPEED V D N RUN

Input signal A to NGV board confirms that S3 opens at up start after a speed and up direction signal received from Nexus. When running I, C and A = 0.

NGV programmer - Menu 1.5
output signals

1	2	3	4	Y	N	D
1	0	0	0	0	1	0

Max/min pressure N/C Car O/Load N/O RUN

Output signal from NGV board Y is active confirming 'RUN' status.

Nexus Controller
Input signals

UC	DC	HSC	LS	RSD	RSU	ULR	DORX
○	○	○	○	○	○	○	●

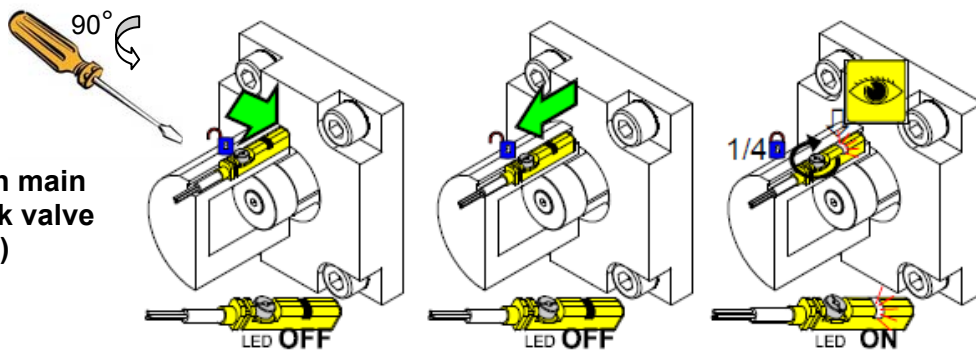
LED on Nexus controller monitors and confirms 'RUN' status.

Sensors S1 and S2 - These need to be set accurately.

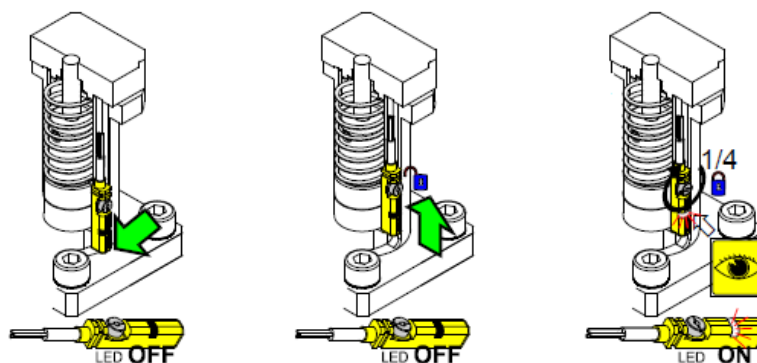
1. Move the sensor towards the valve block until the LED goes out

2. Then move the sensor away from the valve block until the LED permanently lights and then a further 1mm. The LED should be permanently lit when the lift is stationary but positioned as close to the valve block as is practical.

S1 on main check valve (VRP)



S2 lower on stepper motor assy (VB)

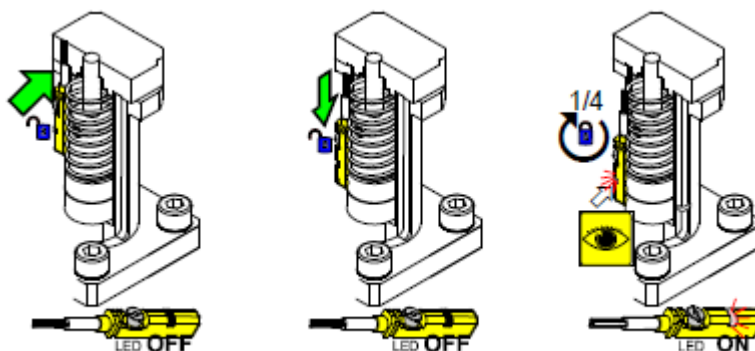


Sensor S3 – This sensor does not need to be set quite so accurately

1. Access Menu 9.8 – S3 tuning on the GMV programmer and press ENT to open the valve. Move the sensor away from the valve block until the LED goes out

2. Then move the sensor towards the valve block until the LED permanently lights and then a further 2-3mm. Press ESC in Menu 9.8 to re-close the valve.

S3 upper on stepper motor assy (VB)



Fault Analysis – General:

It is important to record the alarm *number(s)*, as well as The description(s), in menu 2 of the GMV programmer before investigating the fault. This number gives valuable information on the status of the lift when the fault was registered i.e. stationary, about to run up etc.



Last alarm was
Fault code 06

It should be noted that the fault code and description registered on the NGV programmer gives the *symptom* to the potential fault rather than defining the actual fault itself i.e. Fault 06: S1 (VRP) open does not necessarily mean that the fault is with the S1 sensor. The sensor is communicating that there is something wrong with the sequence of operation of the lift if indeed the sensor is correctly positioned in the first place. The fault causing the alarm to be logged could be incorrect positioning of the sensor, a faulty valve, a wiring fault, a PCB fault etc.

It is also important to clear the alarm codes (via Menu 3) after the fault has been rectified and the lift has been returned to service. This is because they are not date/time stamped and could be confusing on any subsequent fault investigations.

A faulty inductive sensor itself S1, S2 or S3 can be confirmed by passing a magnet in close proximity to the sensor. The magnet should light/ extinguish the LED as the magnet passes. The cables to the sensors should also be looped at the valve block to ensure that any vibration (particularly on motor start) does not inadvertently move the sensor from its set position.

If no fault is registered on the NGV programmer but a fault 'F51 NGV Fault' has been registered on the Nexus microprocessor then this may indicate a false NGV fault. This is covered by a previous Technical Bulletin TB137 whereby an I Smart retrofit kit (part No.1009274) is required.

The following table gives recommended checks to help investigate a specific alarm registered on the NGV programmer. The list does not include for a faulty PCB on the hydraulic tank because this could result in a variety of alarms being registered.

Fault Analysis – Specific Faults:

Fault CODE	Fault Description	When	Nature of fault	Checks/Possible cause
06	S1 (VRP) OPEN	↔ With lift stopped	S1 sensor is communicating that the main check valve (VRP) is not in the corresponding closed position with the lift stationary (see page 2). The valve closes under spring pressure. <i>LED on S1 should be lit when the lift is stationary.</i> The correct signals with lift stationary (see page 2) are: NGV menu1.4 inputs I=1 , C=1, A=0 NGV menu1.5 outputs Y=1 (READY)	<ul style="list-style-type: none"> • Check S1 sensor with a magnet for correct operation. (LED on/off) – possible faulty sensor or plug connection. • Ensure S1 sensor is positioned accurately (as page 4) • Remove VRP valve and inspect for broken stem/spring assembly (see Appendix A) causing erratic behaviour.
07	S1 (VRP) OPEN OBSOLETE	↓ End of down travel	This fault code is not applicable to NGV A3 and although listed will not register as an alarm.	
13	S3 CLOSED	↔ With lift stopped	S3 sensor is the upper sensor on the stepper motor/flow control valve VB. It signals that the valve is fully open. In normal operation S3 should not be lit with the lift stationary otherwise no 'READY' output signal is produced. The correct signals with lift stationary (see page 2) are: NGV menu1.4 inputs I=1, C=1, A=0 NGV menu1.5 outputs Y=1 (READY)	<ul style="list-style-type: none"> • Check S3 sensor with a magnet for correct operation. (LED on/off) – possible faulty sensor or plug connection. • Ensure S3 sensor is positioned correctly (as page 4). This sensor should be positioned with valve fully open in NGV Menu 9.8. Ensure that repeated operation in Menu 9.8 consistently lights the S3 LED. • Check voltage supply to stepper motor – also NGV menu 1.6 to NGV board for 24vdc • Check smooth operation of stepper motor/VB spool assembly in NGV Menu 9.8. Replace complete assembly if sticking – ensure any replacement is for same flow rate of valve block.
14	S2 OPENED	↔ With lift stopped	S2 sensor is communicating that the lower sensor on the stepper motor/flow control valve (VB) is not in the corresponding closed position with the lift stationary. (see page 2). <i>LED on S2 should be lit when lift is stationary.</i> The correct signals with lift stationary (see page 2) are: NGV menu1.4 inputs I=1, C=1 , A=0 NGV menu1.5 outputs Y=1 (READY)	<ul style="list-style-type: none"> • Check S2 sensor with a magnet for correct operation. (LED on/off) – possible faulty sensor or plug connection. • Ensure S2 sensor is positioned accurately (as page 4) • Check voltage supply to stepper motor – also NGV menu 1.6 to NGV board for 24vdc • Check smooth operation of stepper motor/VB spool assembly in NGV Menu 9.8. Replace complete assembly if sticking – ensure any replacement is for same flow rate of valve block.

Fault CODE	Fault Description	When	Nature of fault	Checks/Possible cause
15	S1 NOT OPENED	↓ Start of down travel	S1 sensor is communicating that the main check valve (VRP) is not opening at the start of a down call preventing downwards movement. In the down direction VRP is opened by the pilot operated solenoid valve VMD after receiving speed and down direction signals. The correct signals at the start of a down journey are: NGV menu1.4 input I changes from 1 to 0 (Closed to open). NGV menu1.5 output Y changes from 1 to 0 and N changes from 0 to 1 (READY to RUN).	<ul style="list-style-type: none"> • Check S1 sensor with a magnet for correct operation. (LED on/off) – possible faulty sensor or plug connection. • Ensure S1 sensor is positioned accurately (as page 4). This fault could occur during releveling down. If sensor S1 is incorrectly positioned too far away from the valve block then the small valve movement which occurs during releveling may not be being detected by the S1 sensor. • Check input speed (V0) and direction (D) signals for down direction in NGV Menu 1.4 (from 0 to 1) • Check output signal for VMD in NGV Menu 1.5. and check voltage at VMD pilot solenoid (27vdc) • Remove and inspect VMD pilot valve for correct operation • Check filter on top of valve block (See Appendix B) for contamination. • Remove VRP valve and inspect for broken stem assembly (see Appendix A) causing erratic behaviour.
16	S1 NOT CLOSED	↓ End of down travel	S1 sensor is communicating that the main check valve (VRP) is not closing or is slow to close after a downward travel. The valve closes under spring pressure. The correct signals at the end of a down journey (after losing signal D) are: NGV menu1.4 input I changes from 0 to 1 (open to closed). NGV menu1.5 output N changes from 1 to 0 and Y changes from 0 to 1 (RUN to READY).	<ul style="list-style-type: none"> • Check system pressure in NGV Menu 1.1. ≥ 12 bar. This actual pressure logged in 1.1 should also correspond with that manually entered in Menu 5.5 and 5.6 for empty car and fully loaded car which is site specific. • Check S1 sensor with a magnet for correct operation. (LED on/off) – possible faulty sensor or plug connection • Ensure S1 sensor is positioned correctly (as page 4). • Remove and inspect VMD pilot valve for correct operation. • Check filter on top of valve block (see Appendix B) for contamination. • Remove VRP valve and inspect for broken stem assembly (see Appendix A) causing erratic behaviour.
17	S2 NOT CLOSED	↓ End of down travel	S2 sensor is communicating that the lower sensor on the stepper motor/ flow control valve (VB) is not closing or is slow to close after travelling downwards. The correct signals at the end of a down journey (after losing signal D) are: NGV menu1.4 input C changes from 0 to 1 (VB open to closed). NGV menu1.5 output N changes from 1 to 0 and Y changes from 0 to 1 (RUN to READY).	<ul style="list-style-type: none"> • Check S2 sensor with a magnet for correct operation. (LED on/off) – possible faulty sensor or plug connection. • Ensure S2 sensor is positioned accurately (as page 4) • Check voltage supply to stepper motor – also NGV menu 1.6 to NGV board for 24vdc • Check smooth operation of stepper motor/VB spool assembly in NGV Menu 9.8. Replace complete assembly if sticking – ensure any replacement is for same flow rate of valve block.

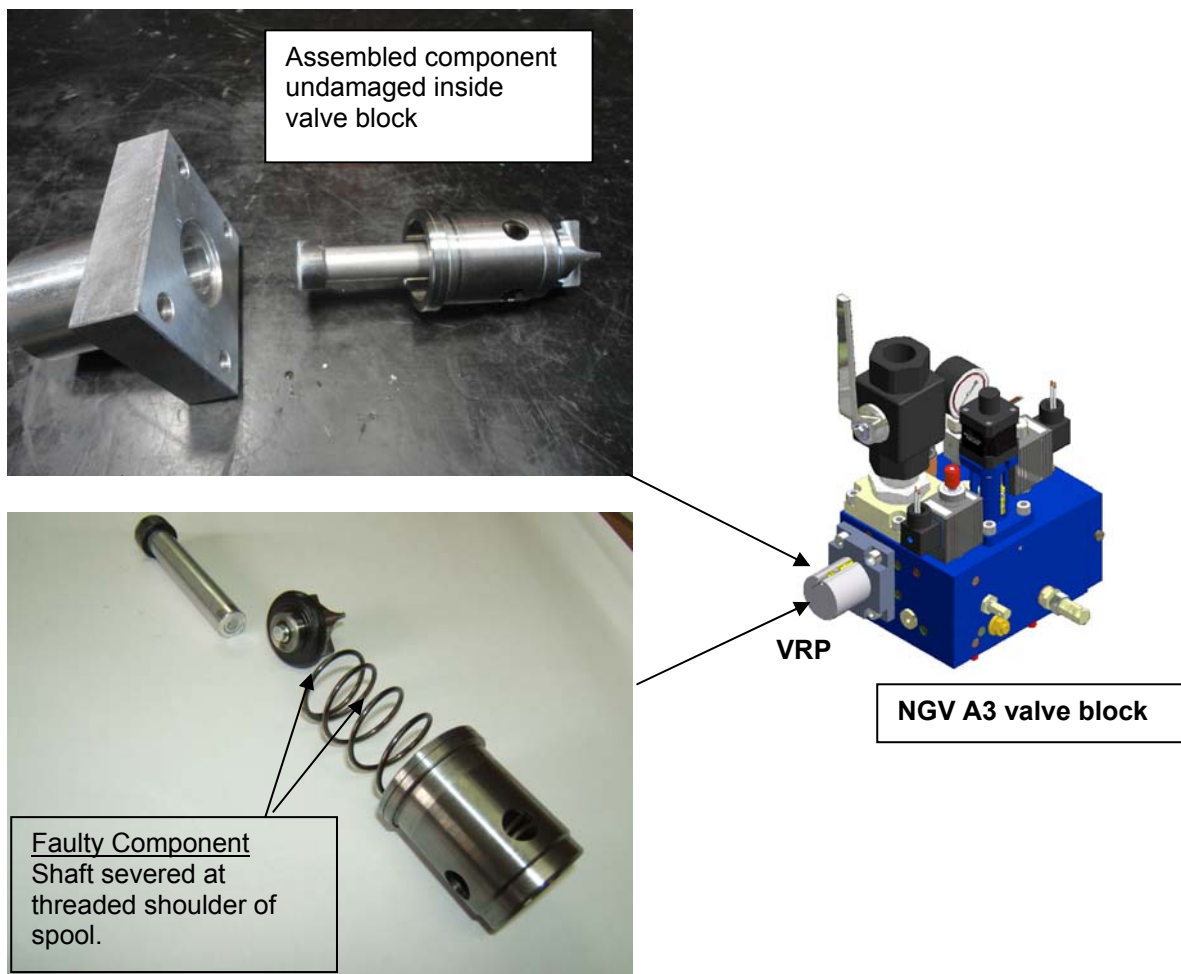
Fault CODE	Fault Description	When	Nature of fault	Checks/Possible cause
18	S3 NOT CLOSED	<p style="text-align: center;">↑ Start of up travel</p>	<p>Fault 18 can only happen at the start of an upwards journey. S3 sensor is the upper sensor on the stepper motor/flow control valve VB. The sensor checks and confirms that the valve VB is fully open (to initially allow oil to return back to tank) before enabling the 'RUN' signal to start the motor/pump. Correct signals at the start of a down journey are: NGV menu1.4 input A changes from 0 to 1 (open to closed). NGV menu1.5 output Y changes from 1 to 0 and N changes from 0 to 1 (READY to RUN).</p>	<ul style="list-style-type: none"> • Ensure S3 sensor is positioned correctly (as page 4). The most likely scenario is that the sensor is positioned too high. This sensor should be positioned with valve fully open using NGV Menu 9.8 but ensure that repeated operation in Menu 9.8 consistently lights the S3 LED. • Check S3 sensor with a magnet for correct operation. (LED on/off) – possible faulty sensor or plug connection. • Check smooth operation of stepper motor/VB spool assembly in NGV Menu 9.8. Replace complete assembly if sticking – ensure any replacement is for same flow rate of valve block.
19	S2 NOT OPENED	<p style="text-align: center;">↓ ↑ Start of up or down travel</p>	<p>S2 is the lower sensor on the stepper motor/ flow control valve (VB). The valve controls the speed of the lift in both directions of travel. S2 LED should be lit when the lift is stationary and should extinguish as soon as the valve VB opens. If S2 sensor is not turned off then no 'RUN' signal can be produced.</p>	<ul style="list-style-type: none"> • Check S2 sensor with a magnet for correct operation. (LED on/off) – possible faulty sensor or plug connection. • Ensure S2 sensor is positioned accurately (as page 4) • Check voltage supply to stepper motor – also NGV menu 1.6 to NGV board for 24vdc • Check smooth operation of stepper motor/VB spool assembly in NGV Menu 9.8. Replace complete assembly if sticking – ensure any replacement is for same flow rate of valve block. • After a call is placed, check input signals are present in NGV Menu 1.4 for speed (V0) and direction signal (S for up or D for down) change from 0 to 1
20	S1 ALREADY OPEN	<p style="text-align: center;">↑ Start of up travel</p>	<p>S1 sensor is communicating that the main check valve (VRP) has opened too early at the start of an up journey i.e. after the up signal (VS) but before the 'RUN' output signal. The lift is starting before the stepper motor/flow control valve is fully open (VB) and may cause the lift to jolt upwards.</p>	<ul style="list-style-type: none"> • Check NGV Menu 6.8 Start delay and extend if necessary. This is the time that the stepper motor (VB) is fully open for allowing the motor to return oil back to tank before closing to pressurise the system. The start delay 6.8 should be a minimum of 1.5secs but for Star/Delta starting should be 1 sec greater than the setting of the star/delta timer SDT. • Check S1 sensor with a magnet for correct operation. (LED on/off) – possible faulty sensor or plug connection. • Ensure S1 sensor is positioned accurately (as page 4). • Check smooth operation of stepper motor (VB) in NGV Menu 9.8. . Replace complete assembly if sticking – ensure any replacement is for same flow rate of valve block.

Fault CODE	Fault Description	When	Nature of fault	Checks/Possible cause
21	S1 NOT OPENED	<p style="text-align: center;">↑ Start of up travel</p>	<p>S1 sensor is communicating that the main check valve (VRP) is not opening at the start of an up journey. The valve is opened by motor/pump pressure. The stepper motor/ flow control valve (VB) opens first to allow the return of oil back to tank then as it closes the oil delivered by the motor/pump increases the pressure in the system to open VRP to raise the ram/car. If a journey timer event/fault is also registered on Nexus then this indicates that all the correct input signals (and hence 'RUN' signal) are present but the <i>motor has not started</i></p>	<ul style="list-style-type: none"> • After an up call is placed, check speed and direction input signals are received in NGV Menu 1.4 (V0=1, S =1). • After an up call is placed, check 'READY' status changes to 'RUN' in output signals in NGV Menu 1.5 (Y=0, N=1). • If both the above are correct then check motor circuit wiring, connections, contactors etc. for fault preventing motor start. • Check S1 sensor with a magnet for correct operation. (LED on/off) – possible faulty sensor or plug connection. • Ensure S1 sensor is positioned accurately (as page 4). This fault could occur during releveling upwards. If sensor S1 is incorrectly positioned too far away from the valve block then the small valve movement which occurs during releveling may not be being detected by the S1 sensor. • Remove VRP valve and inspect for broken stem assembly (see Appendix A) causing erratic behaviour.
22	S1 NOT CLOSED	<p style="text-align: center;">↑ End of up travel</p>	<p>S1 sensor is communicating that the main check valve (VRP) is not closing or is slow to close after an upward travel. The valve closes under spring pressure. The 'RUN' output signal should change to 'READY' at the end of the journey after losing the up signal S.</p>	<ul style="list-style-type: none"> • Check system pressure in NGV Menu 1.1. ≥ 12 bar. This actual pressure logged in 1.1 should also correspond with that manually entered in Menu 5.5 and 5.6 for empty car and fully loaded car. • Check S1 sensor with a magnet for correct operation. (LED on/off) – possible faulty sensor or plug connection. • Ensure S1 sensor is positioned accurately (as page 4). • Remove VRP valve and inspect for contaminant or broken stem assembly or spring (see Appendix A) causing erratic behaviour. • At the end of an up journey check that the speed and direction input signals are switched off in NGV Menu 1.4 (V0=0 and S=0) • At the end of an up journey check that the 'RUN' status changes to 'READY' in output signals in NGV Menu 1.5 (N=0 and Y=1).

Appendix – A

NGV A3 Valve block Procedure for replacing the VRP Spool

1. Display 'Lift out of service' notices on all landings.
2. Position the lift at the lowest floor level.
3. Isolate the lift electrical supply and lock off.
4. Close the shut off valve on the hydraulic tank.
5. Discharge the pressure in the valve block by manually pressing the emergency lowering button and then the VMD valve. (Confirm pressure drop via the manometer).
6. Locate the VRP valve on the side of the valve block. (See diagram below)
7. Remove the S1 sensor from the groove in the VRP housing and suspend in a convenient position.
8. Remove the 4 socket head screws from the VRP housing flange. N.B. some oil will be discharged into the tank when loosened and be careful to retain the large compression spring behind.
9. Remove the VRP spool as shown below.
10. Re-assemble the valve with replacement VRP spool.
11. Reinststate the electrical power supply.
12. Relocate the S1 sensor. Note: the sensor should be located in the groove in the VRP housing.
(Refer to page 4 for S1 sensor adjustment.
13. Reopen the shut off valve.
14. Clear all fault alarms by resetting the NGV programmer in Menu 3.
15. Test run and return to service.



Appendix – B

**NGV A3 valve block
Locating the restrictor/filter for the main check valve (VRP)**

