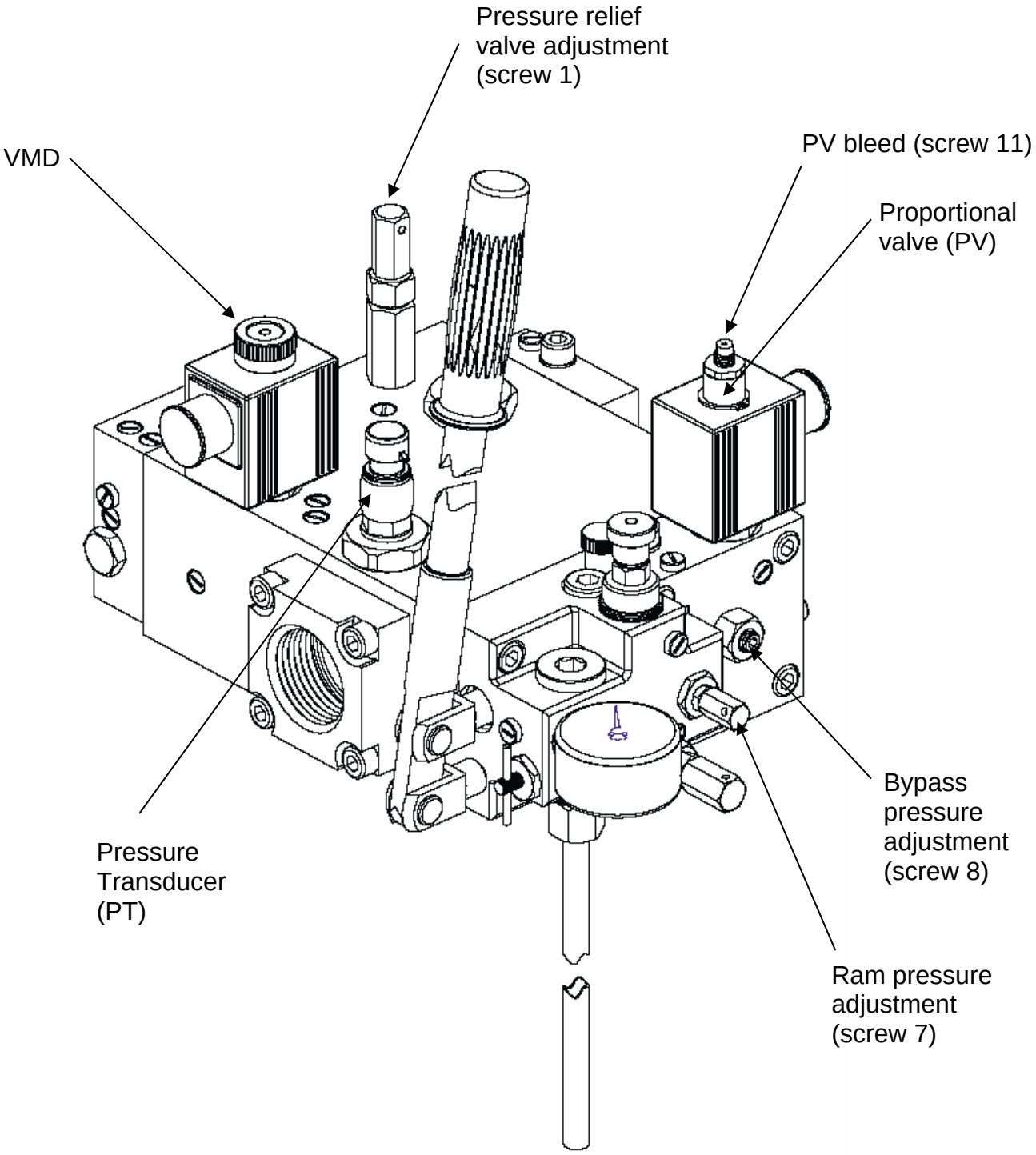
Stannah

GEV FAULT FINDING GUIDE & SERVICING NOTES



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Section 1 - Introduction

This document provides a logical sequence to resolve performance problems, which may arise on the GMV GEV electronic valve system, used on the Stannah MRLi product.
Note: Most faults observed will be related to issues of speed control (e.g. overspeeding or inconsistent levelling speed).
In many cases a single symptom could be as a result of several possible causes. These are listed in section 4. This makes fault finding quite difficult to achieve.

1.1 Prior to replacing any components on the valve block.

The first step should be to check and confirm that the equipment is set up in accordance with the manufacturers' installation guide and section 3 of this document. The Alarm log in GEV menu 2 can provide valuable information for fault finding.

1.2 If this does not resolve the performance problems:

PLEASE FOLLOW THROUGH THE SECTIONS OF THIS DOCUMENT IN THE ORDER THEY ARE WRITTEN, TO ENSURE THE PROBLEM IS RESOLVED AS EFFICIENTLY AS POSSIBLE.

The most practical way of determining whether a component is faulty is to replace the components, one at a time, in the order listed.
Go to section 5 of this document.

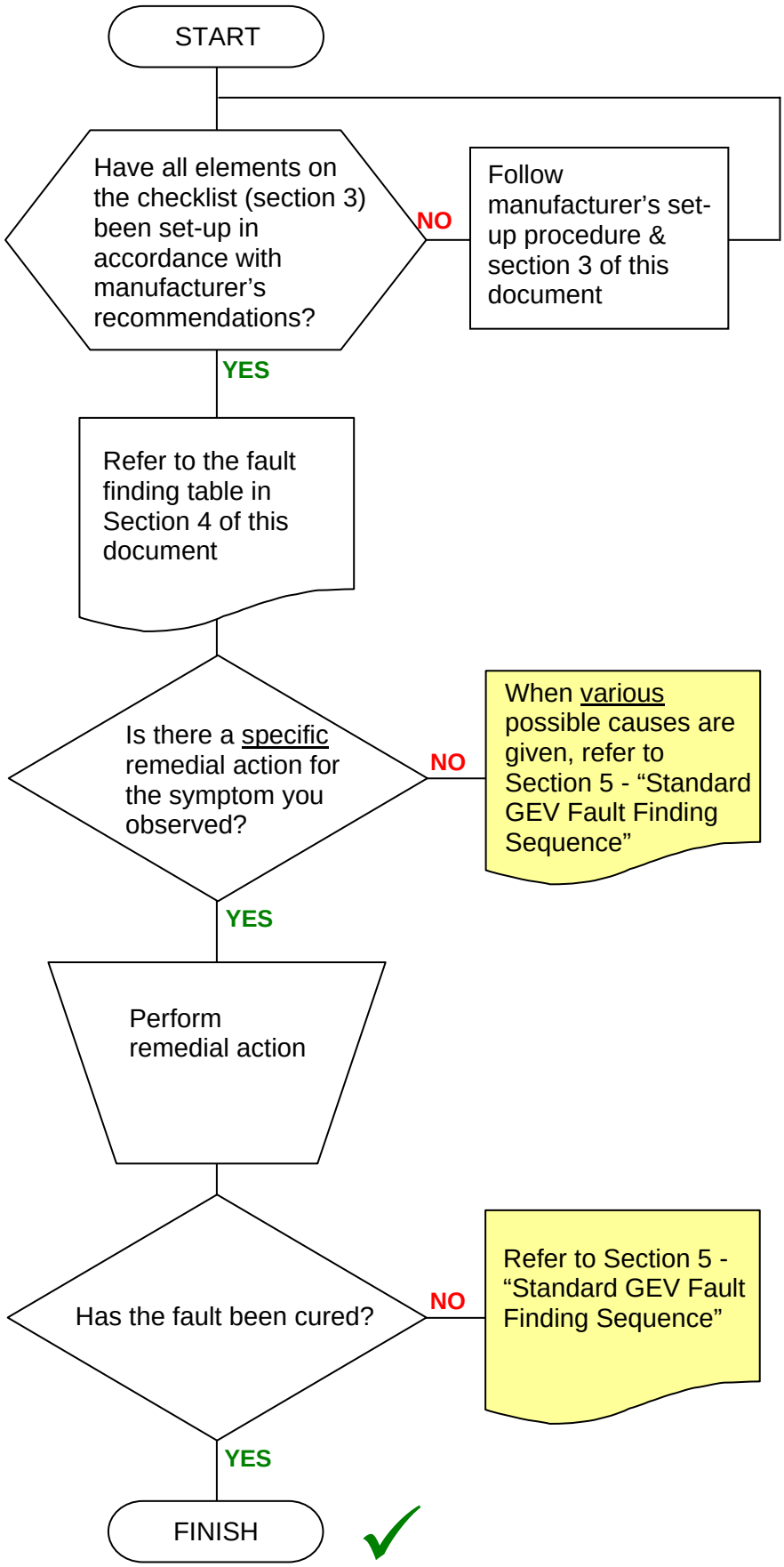
1.3 If at the end of this process the fault still exists, it will be necessary to replace the valve block itself.

Note: Replacement valve blocks may be stamped with a different flow rate to that originally installed. The GEV valve is a standard unit, suitable for all flow rates (from 75 to 210 l/min) with all components being identical. The flow rate stamped on the block merely indicates the flow rate for which the bypass pressure has been set to in the factory. **It is important that when replacing a complete valve block the following actions are performed:**

- **Bleed proportional valve (PV)**
- **Set bypass pressure (screw 8)**
- **Set pressure relief valve (screw 1)**
- **Check ram pressure adjustment (screw 7)**
- **Run the autotune sequence**

NOTE: Before performing autotune, check that the relief pressure is 5-6 bar above the full load static pressure set in parameter 4-2; if not, increase the relief valve setting pressure temporarily.

Section 2 - Fault Finding Process



Section 3 - Checklist (prior to Fault Finding)

Before considering replacing any components, please ensure that the following items have been checked.

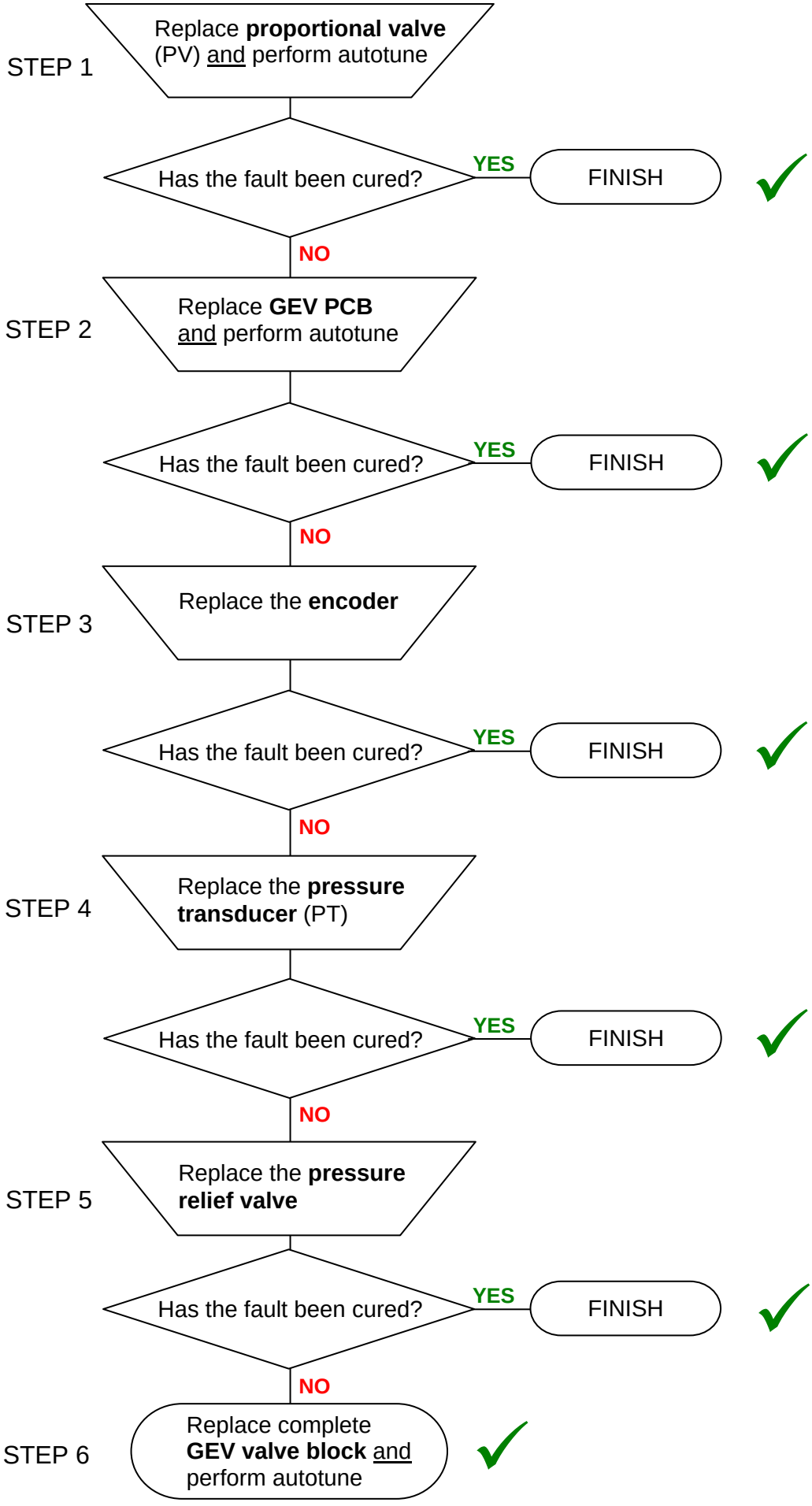
Section	Question	How to check	Corrective Action
Control System	Are the correct inputs being supplied to the GEV PCB?	View the inputs in menu 1-6 using the handheld programmer. Refer to diagnostics page in the GEV installation guide.	If the inputs are not correct, it is necessary to fault find the control panel wiring.
GEV Valve Block	Has the PV valve been bled?	Follow standard process detailed in GEV installation guide. Only oil should flow out, all air should be expelled.	Follow standard process detailed in GEV installation guide.
	Is the bypass pressure set correctly?	Follow standard process detailed in GEV installation guide. Value should be between 6 and 7 bar.	If less than 6 bar, turn screw 8 clockwise. If greater than 7 bar, turn screw 8 anti-clockwise.
	Is the pressure relief valve set correctly?	Follow standard procedure. It should be set to 1.4 x max static pressure. NOTE: Before performing autotune, check the relief pressure is 5-6 bar above the full load static pressure set in parameter 4-2; if not, increase the relief valve setting pressure temporarily	If too low, increase by turning screw 1 clockwise. If too high, reduce by turning screw 1 anti-clockwise.
Encoder Assembly	Is the chord engaged correctly in the pulley grooves?	Visually inspect.	If disengaged, feed the chord around the pulley grooves.
	Does the encoder pulley slip on the chord?	Rotate the pulley by hand. It should not rotate too freely.	If the chord is oily: dry the chord with a clean cloth. If the chord is too slack: adjust tension. See GEV installation guide for correct setting of the chord tension.
Mechanical Friction	At the beginning of an upwards journey, does the pressure rise more than 3 bar from the static value?	Monitor the pressure using the hand held programmer (menu 1-1).	Reduce the mechanical friction in the system (see a, b & c below)
	a) Is the car clearance correct?	Nominal clearance of 1mm between each sling rubbing pad and the guide rail.	Remove packers from behind the rubbing pads if the clearance is too small.
	b) Is the tackle pulley assembly clearance correct?	Nominal clearance of 1mm between each shoe and the guide rail.	Adjust shoes to achieve correct clearances.
	c) Is the ram plumb?	Measure using a plumb line as reference.	Re-align ram brackets if not plumb.

If the fault still exists after all these measures have been taken, move on to Section 4

Section 4 - Fault Finding Table

Symptom		Possible Cause(s)	Remedial Action	Comments
SPEED RELATED FAULTS				
1	No initial downwards movement	Various	Replace VMD valve	If problem persists, refer to section 5. Possible alarm: 08: DW Speed=0
2a	Jolt at the start of an upwards journey (usually after a down journey has been completed)	Various	Replace VB spool and sleeve.	NOTE: Consecutive up journeys may appear ok. After the jolt the lift may travel normally or at a slower speed. If problem persists, refer to section 5.
2b	No initial downward movement after a first down journey has been completed	Various	Replace VB spool and sleeve.	If problem persists, refer to section 5.
3	Motor running but no upwards movement	Pressure relief valve set too low	Check pressure relief valve setting and adjust if pressure setting is too low	If the correct setting cannot be achieved replace the pressure relief valve. If set correctly and problem persists, refer to Section 5.
		Various	Refer to Section 5	
4	Inconsistent levelling speed	Various	Refer to Section 5	
5	Inconsistent re-levelling speed and/or accuracy	Various	Refer to Section 5	
6	Overspeeding downwards	Various	Refer to Section 5	Possible alarm: 10: DW overspeed
UNCONTROLLED DESCENT				
7	Uncontrolled downwards movement (speed restricted to approx 0.07m/s by Blain valve where fitted)	VMD valve sticking open	Replace VMD valve	Will most likely result in lift sitting on buffers and ram fully retracting (see 9 below)
8	Lift sinks slowly, frequent re-levelling	Emergency lowering valve leaking	Replace emergency lowering valve	Note: Sometimes possible to hear a noise from the emergency lowering valve when leaking.
		VMD valve leaking	Re-seat or replace VMD valve	
		VRP seal leaking	Replace VRP seal	
9a	Ram retracts in to cylinder after lift comes to rest on the buffers WHILE ACTING ON MANUAL LOWERING VALVE (either manual or electrical)	Ram pressure adjustment incorrect	Adjust screw 7	Refer to GMV installation guide. NOTE: Adjusting screw 7 has no effect if VMD or VRP are leaking.
9b	Ram retracted in to cylinder with lift resting on the buffers DURING NORMAL RUNNING.	VMD valve leaking	Re-seat VMD valve or Replace VMD	See separate procedure for re-seating VMD.

Section 5 - Standard GEV Fault Finding Sequence



ANNEX A - ADDITIONAL NOTES FOR COMMISSIONING, FAULT FINDING & SERVICING

AUTOTUNE PROCESS

On versions of software 02030 onwards, the autotune process uses the values set in 4-1 & 4-2 (P_{stat} min & P_{stat} max) for calibration. *Previous versions of software were calibrated using default values of P_{stat} min = 12 and P_{stat} max = 40.*

On versions 02030 or later, the values in parameters 4-1 and 4-2 must be set to the correct values for the lift before commencing the autotune process.

The pressure relief valve must be set to at least 5 bar above P_{stat} max before the autotune process is performed. Note: If the relief valve has been set to the correct value of 1.4 x P_{stat} max the setting will already be high enough to permit autotuning.

If the values in 4-1 and 4-2 are not set correctly and/or the pressure relief is not set at a high enough value before the autotune process is performed the I_{min} and I_{max} values obtained during the autotune will be incorrect.

I_{min} value should be between 4,000 and 6,000
I_{max} value should be between 10,000 and 12,000

RECOMMENDED SETTINGS

Up Parameters

5-4 Levelling	= 0.04m/s (soft stop disabled, i.e. no motor run on)
	= 0.05m/s (soft stop active)
5-5 Re-levelling	= 0.03m/s
5-6 Acceleration	= Slow
5-7 Deceleration	= Slow

Down Parameters

6-4 Levelling	= 0.04m/s
6-5 Re-levelling	= 0.04m/s
6-6 Acceleration	= Slow
6-7 Deceleration	= Slow

Levelling distance = 30 to 50mm (1 to 2 seconds)

STICTION

The pressure required to just make the lift start moving up should be between 2.5 and 3.5 bar above the static pressure. This can be viewed using the GEV-DS logging software. If the value is found to be more than 3.5 bar, it indicates there is too much static friction in the lift system. This can lead to inconsistent levelling and re-levelling and "pulsing" during the start of a down journey and during levelling upwards. **Check that the lift car and tackle pulley are not too tight in the guides and that the guides and ram are plumb.** *Note: During re-levelling the required pressure rise to begin movement is normally about 1.5 bar, and during levelling is about 1 bar.*

PV VALVE STROKE LIMITER

At the top of the PV valve there is a locknut which secures the setting of the stroke limit of the PV spool. This is set by GMV in the factory and is the same setting for all GEV valves. **The stroke limiter should not be adjusted.**

If the locknut is found to be loose or it is believed the setting may have been "tampered with" in the past, it may be reset to the factory position by the following process:

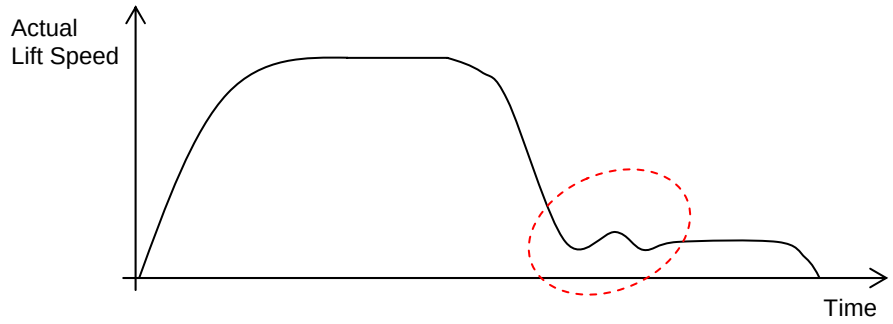
- Loosen the locknut
- Turn the top of the valve stem clockwise until it comes to a stop (do not use excessive force as it may result in damage to the end of the PV spool)
- Turn the valve stem back out by 1 ¾ turns
- Tighten the locknut
- Perform the autotune process to re-calibrate the I_{min} and I_{max} values

ADVANCED PARAMETERS

1. Using "Custom" deceleration and associated advanced parameters (135 and 145)

Sometimes "bouncing" may be observed at the end of the deceleration phase of a journey. This symptom is usually only found on longer travel lifts and can be observed using the GEV-DS logging software.

A graph similar to that shown below will be observed:



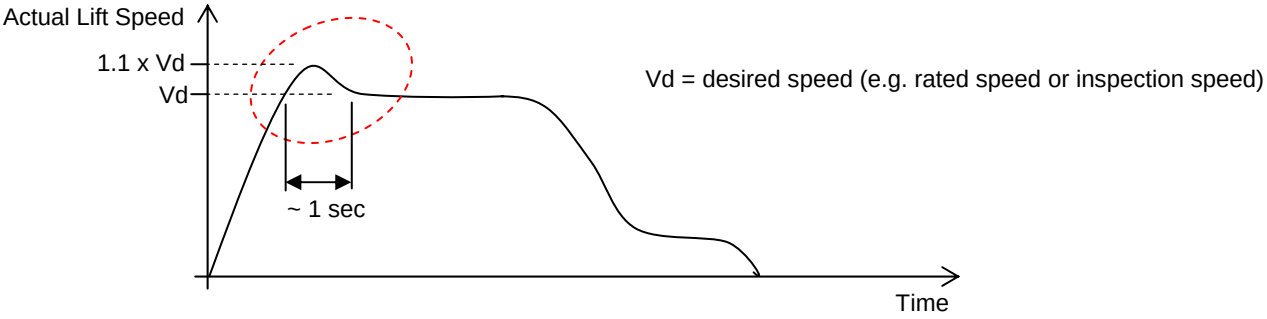
This effect can be eliminated by selecting the "Custom" setting for the deceleration (5-7 for up, 6-7 for down). The Custom value is then adjusted in the advanced parameters (menu 9 on the hand held programmer).

The custom up deceleration is adjusted by changing parameter 135 (negative number), the custom down deceleration is adjusted with parameter 145 (positive number). The value is in mm/s^2.

These parameters may also help to reduce "pulsing" on levelling speed (also see PV valve details - PV spool could be sticking).

2. Using Advanced parameters for adjusting the down acceleration gains (193 and 194)

If the lift overspeeds at the end of the down acceleration phase and then later stabilises at the desired speed (rated speed, intermediate speed or inspection speed) the down acceleration gains may need to be adjusted in the Advanced parameters.



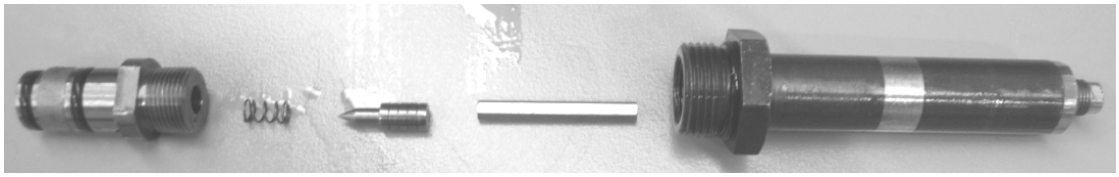
Parameter 193 (P gain) has a maximum value of 18,000 and can be adjusted in increments of 1000.

Parameter 194 (I gain) has a minimum value of 100 and can be adjusted in increments of 50.

Note: Only adjust these parameters if everything else is working correctly.

SERVICING/FAULT FINDING FOR SPECIFIC COMPONENTS

1. Proportional Valve (PV)



- Check that the spool is free to move and does not stick
- Check that the restrictors are clean
- Upon re-assembly, bleed PV.

Note: If a high frequency vibration can be heard at the end of a down journey, it may indicate that there is air in PV. Perform the PV bleeding process to eliminate the air.

If the lift speed “pulses” whilst levelling this can be due to the PV spool sticking.

2. Internal Leakage (within the GEV valve block)

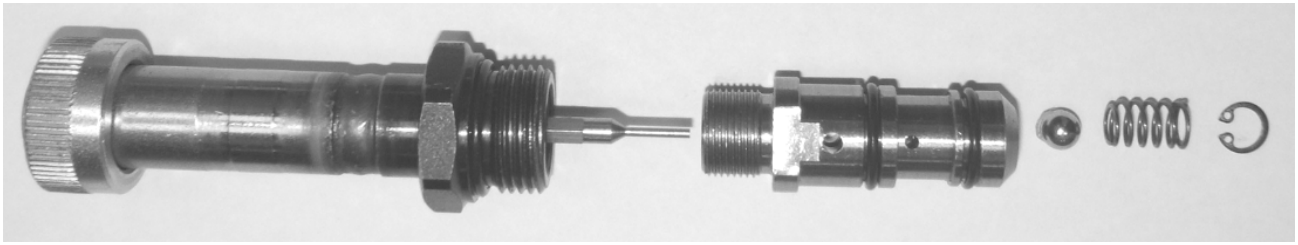
A leak in the GEV valve block can easily be checked by closing the shut-off handle and monitoring the pressure gauge. If the pressure drops to zero then an internal leak is present.

The GEV valve has 3 sealing points: VMD, ML and VRP.

On newer lifts VRP probably accounts for 10% of leakage problems, ML 45% and VMD 45%. *Note: On older lifts VRP leakage is more likely due to the seal having degraded over time.*

2(a) Down solenoid valve (VMD)

- Check that the valve is clean and free from contamination (as this can prevent the ball from seating correctly)
- VMD can be re-seated by disassembling and then tapping the ball in to its seat (using an M6 screw struck once with a hammer). **Upon re-assembly ensure the spring is re-inserted the correct way around; the tapered end should go towards the ball.**

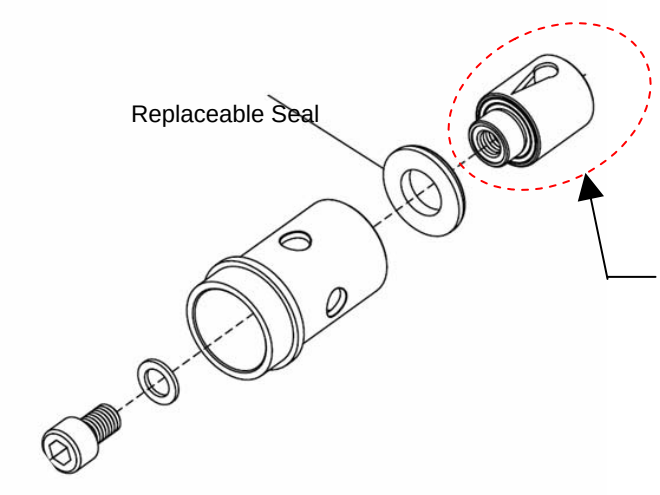


2(b) Manual lowering valve (ML)

- Check that the valve is clean and free from contamination (as this can prevent the ball from seating correctly)
- ML can be re-seated by disassembling and then tapping the ball in to its seat (using an M8 screw struck once with a hammer). Note: the balls in VMD and ML are not the same size - VMD is 6mm dia, ML is 8mm dia.
- Re-assemble the valve, including the small washer which goes between the spring and the circlip.

2(c) Main non-return valve (VRP)

- The VRP spool incorporates a replaceable seal (see below)



NOTE: WHEN DISASSEMBLING, AVOID DAMAGE TO THE SPOOL. DO NOT GRIP THIS PART OF THE SPOOL.

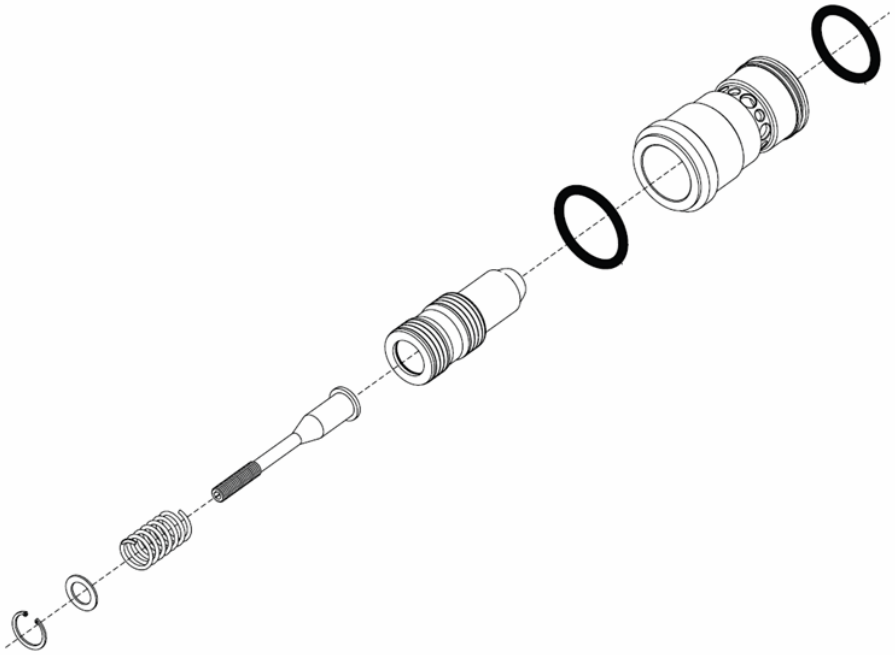
- Remove the cap head screw. To prevent damage, care should be exercised when gripping the spool (see diagram above).
- Separate the two halves of the spool
- Replace the seal
- Re-assemble VRP and tighten the cap head screw

Note: The VRP spool is the same in all GEV valve blocks.

3. VB Spool

- The most likely cause of a problem with the VB spool is that it doesn't move freely and/or it sticks at the fully closed position after a down journey has been completed (since VB is driven fully closed by the current applied to PV).
- Remove the VB spool and sleeve.
- Check the spool moves freely.
- Move the spool rapidly towards the closed position. After this the spool should be able to be pulled open easily - if it sticks in the closed position the sleeve and spool must be replaced. Note: To change the VB spool and sleeve on the MRL tank, it is necessary to move the valve block across (as there is insufficient space between the valve block and the side of the tank).
- After re-installing the VB spool and liner, the bypass pressure needs to be reset.

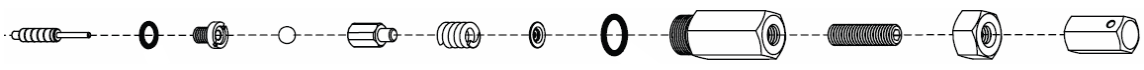
Note: If problems are experienced when setting the bypass pressure, screw 8 should be wound out fully and then wound in to achieve the 6 to 7 bar setting.



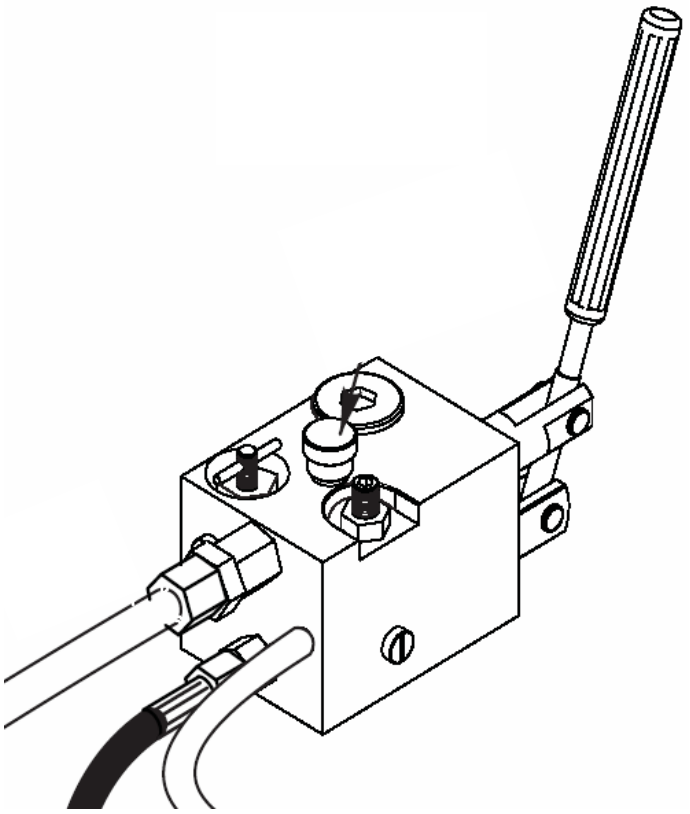
4. Pressure Relief Valve (VS)

- Check that the pin moves freely
- Upon re-assembly of the valve, ensure that:
  - the spring is inserted the correct way around (small dia towards setting screw)
  - the pin is installed the correct way around - see diagram below

Note: If the pin is inserted the wrong way around the lift may initially run ok, but will cause problems in the future.



5. Remote Hand Pump



If air re-enters the suction pipe after the system has been bled, check the following:

- Ensure the locknut on the pressure relief valve is done up tight
- Check that all pipe connections are tight. PTFE tape can be used on the low pressure hoses to reduce the possibility of air entering the system.
- If a fitting with a copper washer is removed from the hand pump, the copper washer should be replaced with a new one (as the sealing face may have indentations in it causing a leak).
- The remote hand pump pressure relief valve should not be adjusted too low (should be 2.3 x max static pressure).

Note: The pressure relief should be adjusted at the remote hand pump, NOT the hand pump on the GEV valve block