The VG rope brake was designed by Dr D S Cameron in 2002 for Atwell International Ltd. The rope brake was re-designed in 2007 to enable it to operate in a bi-directional mode and to improve manufacture and assembly. However, the essential operating principles remain unchanged. The VG rope brake is covered by UK patent 2314070 and is “CE” certified by BSI.

The brake operates on the lift ropes and is designated as a “movement prevention” or “speed reducing” means in compliance with EN81-1 1998 clause 9.10. The VG rope brake combines the proven technology of “drop-jaw” type governors with the patented VG linkage mechanism. The brake operates in a similar manner to a VG safety gear except that it has one fixed jaw and one moveable jaw or “drop-jaw”.

The drop-jaw is spring-loaded by two torsion springs but is held clear of the lift ropes by a DC electro-magnet. Three strengths of torsion spring are available to suit the mounting position and application of the rope brake. The drop-jaw is released by an over-speed governor or other approved means such as the “Uncontrolled Movement Detector” (UMD-SRB01) available directly from Atwell International Ltd. When the bi-directional VG rope brake (VGRB2) is used in conjunction with the Uncontrolled Movement Detector (UMD-SRB01) full compliance with both EN81-1 1998 clause 9.10 and BS EN81-80:2003 significant hazard number 53 and clause 5.9.4. can be achieved. When used in conjunction with either the UMD or VG OSG will also comply with EN81-1:1998+A3:2009.

When the drop-jaw is released, the lift ropes are trapped between the moving and static jaws. Any subsequent movement of the lift ropes causes the drop-jaw to fully engage and generate the braking force. The rope contact pressure is kept to a minimum so as not to damage the lift ropes.

The brake incorporates a safety contact for inclusion into the safety circuit of the lift control system. Until the brake has been inspected and reset, the lift cannot be put back into service. The brake is reset by hand winding the lift motor until the drop-jaw releases whereby it can be reset manually using the in-built handle.

If hand winding is not possible, then the drop-jaw assembly can be released by slackening the four M12 x 25 Hex Head external screws securing the moving jaw assembly to the side plates. The bolts can then be re-tightened after the jaw has been reset.

To Reset the VG rope brake after engagement.

1. Turn key switch on UMD to reset.
2. Slacken 4 x M12 screws (19mm spanner) on front of the rope brake (green washers)
3. Pivot handle back until magnet re-latches
4. Retighten 4 x M12 Screws (no torque setting required)
5. Turn key switch on UMD Back to run.
To control upward falling or prevent uncontrolled movement, a VG rope brake must generate a **minimum dynamic braking force** equal to the **Out of Balance Load (OBL)** of the lift system. Any residual braking force in excess of the OBL will decelerate the lift car.

The VG rope brake uses groove and friction formulae given in EN81 to calculate the theoretical static and dynamic forces. The formulae are based on the rope speed and the groove profile of gripping jaws.

**The permitted friction values are considered conservative and the braking forces are likely to be slightly higher than calculated.**

The deceleration of the lift will depend on the magnitude of the residual braking force, the total kinetic energy of the lift system and any system losses.

**It is recommended that the dynamic braking force of the VG rope brake should be between two or three times the OBL of the lift system. This will provide a gentle and controlled deceleration of the lift without imposing high forces on the lift structure or damaging the lift ropes.**

To assist rope brake selection, a spreadsheet program has been prepared to calculate the theoretical static and dynamic braking force for the groove profile and spring force selected (see page 7). To ensure the correct rope brake configuration is selected, it is essential the enquiry form (see page 6) is completed as accurately and as comprehensively as possible.

For comparison purposes, the program also calculates the rope pressure generated by a 35 degree "V" groove traction sheave having the same number and size of ropes.

The braking force is controlled by the jaw geometry and the spring stack selected using the application program referred to above.

The table below has been prepared for a lift with a rope speed of 1.5 m/sec, a 50% balance and a dynamic braking force between 2 and 3 times the Out of Balance Load (OBL). The table is indicative only.

<table>
<thead>
<tr>
<th>Disc Spring Thickness</th>
<th>Braking Force - Newtons</th>
<th>Contract Load “Q” kg</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Static</td>
<td>Dynamic</td>
</tr>
<tr>
<td>2.0 mm</td>
<td>7160</td>
<td>6110</td>
</tr>
<tr>
<td>2.5 mm</td>
<td>12374</td>
<td>10554</td>
</tr>
<tr>
<td>3.0 mm</td>
<td>16282</td>
<td>13886</td>
</tr>
</tbody>
</table>
Rope Factors

Theoretically, a VG rope brake can be tailored to suit any rope speed. To date the brake has only been tested on rope speeds up to 5m/sec.

Theoretical calculations have proven that higher speeds can be achieved but will result in more rope slide and at higher rope contact pressure.

The standard rope jaws have a maximum width of 150 mm. This will permit a maximum of 6 ropes of 13 mm diameter with a pitch of 21 mm. However, special jaws can be supplied to suit other roping arrangements.

The VG rope brake will work with both fibre and steel cored ropes (steel core ropes are preferred as these can withstand higher clamping forces) of all construction types and can be installed without the necessity to re-rope.

It is recommended that new ropes are fitted when installing a VG rope brake for the first time. However, VG rope brakes can be fitted to existing ropes provided these are checked for size and wear before fitting the rope brake.

It is also essential that the ropes are correctly aligned and pitched along their entire length, a rope gatherer fitted to the lift ropes above the counterweight may be required in order to achieve this.

Gripping Elements

The standard groove profile for the jaws is an undercut, semi-circular groove. This permits the maximum braking force for the lowest rope contact pressure. The width of the undercut can be optimized for each application using the application program. If the undercut is too narrow to allow the brake to self-generate, the program will advise increasing the groove width.

The jaws are case hardened to reduce wear and are expected to withstand numerous full speed tests before they need replacing. When operating to prevent "uncontrolled movement", the number of operations will be greater.

The maximum recommended rope contact pressure is 25 N/mm². This represents a 50:1 safety factor of the tensile strength of the rope wire material.
Control Requirements

The VG rope brake does not require an external power source to generate the braking force.

A VG rope brake will provide the “speed reducing” means as required in clauses 9.10 and 9.11.4 of EN81-1:1998+A3:2009. The “speed detection” means is provided by a bi-directional over-speed governor (VG OSG) or other approved devices. When operating with an over-speed governor, the VG rope brake utilises the auxiliary contacts on the safety switch to release the DC electro-magnet.

The rope brake can also be used to prevent any form of uncontrolled movement when operated by a suitable control device such as the “UMD-SRB01” detector.

RB2

For the prevention of over speeding in the “up” direction only 1 VG rope brake is required and to simplify installation, testing and maintenance, it is recommended that the VG rope brake is operated by the control unit RB2. This unit incorporates a battery back-up circuit to prevent spurious operation should the power be disconnected for whatever reason. This will keep the VG rope-brake disengaged and fully operational for a minimum of 3 hours.

The control unit incorporates test buttons and indicator lights to facilitate routine maintenance and inspection.

UMD-SRB01 – Uncontrolled Movement Detector

The UMD-SRB01 connects to the main lift control panel and will provide power and battery back up for 2 x VG rope brakes for a minimum of 3 hours. From here it can receive power and signals to tell if the lift doors are open, or that the main safety circuit is OK and detect over speed conditions.

The UMD-SRB01 detects movement by means of a rope sensor system that can be bolted directly to the top of the VG rope brake so as the car moves the wire ropes attached to it also moves and so rotates the pulley which is connected to a 4 channel encoder system.

When the doors are open the system is checking for excessive movement. Excessive movement of the lift when the car / landing doors are open is factory set to 150 mm +/- 30mm, but can be adjusted from 0mm to 900 mm +/- 30mm as required. If excessive movement is detected then the VG rope brakes under its control will be deployed and in addition to this an emergency stop signal will be sent to the main lift control panel, this is by means of interrupting the main safety circuit.

Over speed signals can be detected from either the over speed governor or the rope sensor system and on detection will deploy the VG rope brake.
**Enquiry Form (Example)**

**VG ROPE BRAKE SELECTION CRITERIA**

<table>
<thead>
<tr>
<th>Job No.</th>
<th>W707/077</th>
</tr>
</thead>
<tbody>
<tr>
<td>Job Name</td>
<td>Lygon Street</td>
</tr>
<tr>
<td>Customer</td>
<td>XXXX</td>
</tr>
</tbody>
</table>

Details taken by. | Initials | Date. | Contact Name. |
|------------------|----------|-------|---------------|

**Features**

Key: All boxes marked with an "*" must be completed.

**Lift System Details**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lift Capacity</td>
<td>630 &quot;O&quot; Kg</td>
</tr>
<tr>
<td>Car Mass</td>
<td>1000 &quot;P&quot; Kg</td>
</tr>
<tr>
<td>Car Load Balance</td>
<td>50 %ge</td>
</tr>
<tr>
<td>Counterweight mass</td>
<td>1315 &quot;W&quot; Kg</td>
</tr>
<tr>
<td>Lift Speed</td>
<td>1 m/sec</td>
</tr>
<tr>
<td>Roping Ratio</td>
<td>1</td>
</tr>
<tr>
<td>Rope Speed</td>
<td>1</td>
</tr>
<tr>
<td>Number of Ropes</td>
<td>4</td>
</tr>
<tr>
<td>Rope Diameter</td>
<td>13 mm</td>
</tr>
<tr>
<td>Rope Pitch</td>
<td>21 mm</td>
</tr>
</tbody>
</table>

**Lift Machine Details**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Make of Machine</td>
<td>sassi</td>
</tr>
<tr>
<td>Make of Motor</td>
<td>sassi</td>
</tr>
<tr>
<td>Diameter of Traction Sheave</td>
<td>560</td>
</tr>
<tr>
<td>Motor Nominal Speed</td>
<td>1228</td>
</tr>
<tr>
<td>Gear Ratio</td>
<td>36</td>
</tr>
<tr>
<td>Wormwheel Inertia</td>
<td>0.05</td>
</tr>
<tr>
<td>Flywheel Size in mm (if applicable)</td>
<td>400 Outer diameter only</td>
</tr>
<tr>
<td>Flywheel Inertia</td>
<td>0.5</td>
</tr>
</tbody>
</table>

To be used for Uncontrolled Movement Detection | YES / NO |

Indicate position rope brake to be fitted

<table>
<thead>
<tr>
<th>Position</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Position 1</td>
<td>[ ]</td>
</tr>
<tr>
<td>Position 2</td>
<td>[ ]</td>
</tr>
<tr>
<td>Position 3</td>
<td>[ ]</td>
</tr>
<tr>
<td>Other</td>
<td>Location</td>
</tr>
</tbody>
</table>

**EXISTING OVERSPEED GOVERNOR**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturer's Name</td>
<td>XXXX</td>
</tr>
<tr>
<td>Model/Type</td>
<td>XXXX</td>
</tr>
<tr>
<td>Bi-Directional</td>
<td>YES</td>
</tr>
<tr>
<td>Does the Safety Switch Have N/O Auxiliary Contacts</td>
<td>YES / NO</td>
</tr>
<tr>
<td>Is a New Overspeed Governor Required</td>
<td>No</td>
</tr>
</tbody>
</table>

Any Other Details including contact numbers etc:

Show new governor as a cost option.
<table>
<thead>
<tr>
<th>Atwell International Job Reference</th>
<th>W707/077</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer Reference</td>
<td>Lygon Street</td>
</tr>
</tbody>
</table>

### Lift system variables

- **Lift capacity** "Q" 630 kg
- **Car mass** "P" 1000 kg
- **Car load balance** 50%
- **Counterweight mass** 1315 kg
- **Lift speed** 1 m/sec
- **Roping ratio** 1
- **Rope speed** 1 m/sec
- **Number of ropes** 4
- **Rope diameter** "d" 13 mm
- **Rope pitch** 21 mm
- **Spring Stack Configuration** 4
- **Spring Thickness** 2.5 mm
- **Number of Disc Springs** 5
- **Number of spacers** 4

### Groove data - undercut "U" groove

- **Length of jaws** 115 mm
- **Percentage of groove undercut** 50%
- **Width of undercut** 5.5 mm
- **Rope Brake Clamping Force** "F" 34200 Newtons
- **Rope contact area per jaw** 5342 mm²
- **Contact pressure between rope and jaws** 13.1 N/mm²
- **Rope Pressure on Traction Sheave** 9.3 N/mm²
- **Static Braking Force** 11137 Newtons
- **Dynamic Braking Force** 9988 Newtons
- **Force to overcome Out of Balance Load** (OBL) 3090 Newtons
- **Dynamic Braking Factor** "k" 3.23
- **Static Braking Factor** "k" 3.60

### Lift machine and motor data

- **Sheave Diameter** 560 mm
- **Gear Ratio of drive unit** 36
- **Motor Nominal Speed** 1228 rpm
- **Motor and wormwheel inertia** 0.56 refer to manufacturer's data
- **Flywheel inertia** 0.19
- **Total high speed inertia** 0.20 kgm²
- **Rotational speed of motor/flywheel etc** 129 Rads/sec
- **Kinetic energy of motor/flywheel** 1653 Nm
- **Kinetic energy of lift car and counterweight** 1158 Nm
- **Kinetic energy of ropes, cables and pulleys** 289 Nm
- **Total kinetic energy to be dissipated** 3100 Nm

### Dynamic Performance of Brake

- **Residual Braking force to overcome Kinetic Energy** 6898 Newtons
- **Deceleration of lift ropes** 1.11 m/sec²
- **Rope slide through brake at lift speed** 449 mm
- **Rope slide through brake at governor tripping speed** 594 mm
- **Car slide at governor tripping speed** 594 mm
- **Governor Electrical tripping speed** 1.15 m/sec
- **Time of test** 0.90 secs
The VG rope brake should be installed using brackets which will facilitate accurate alignment and adjustment of the brake so that it is both parallel and square to the lift ropes. The brackets must be capable of withstanding the static braking force calculated by the application program with an appropriate margin of safety.

It is recommended that the VG rope brake is located close to the lift traction sheave or diverter sheave(s). It should be installed with a minimum clearance between the static jaw and the lift ropes.

The minimum distance between the centre-line of the sheave and the top of the rope brake jaw is 400 mm with a maximum clearance of 1 mm. As the distance from the sheave is increased, the running clearance may be increased to a maximum of 5 mm (see figure TD-RB4, page 9).

A bi-directional arrangement can be located between the traction and diverter sheave provided the distance between the sheaves will permit this. The brakes must be fitted with the correct torsion spring to suit the angle of inclination “A”. A bi-directional arrangement can also be fitted to either the car or counterweight side or single “down” brakes to both car and counterweight ropes as illustrated above.

Single rope brakes are only fitted to prevent over speed in the “UP” direction and should be used in conjunction with a “DOWN” acting safety gear. When used in this application the rope brake should be fitted in a position that the ropes are moving in a down direction through the rope brake jaws when the counterweight is also moving in the down direction.
POSSIBLE LOCATIONS FOR VG ROPE BRAKES

A bi-directional arrangement consists of one brake for the "Down" direction and one for the "Up" direction. See note.

**Rope Brake Spring colours**

<table>
<thead>
<tr>
<th>Angle &quot;A&quot;</th>
<th>&quot;Down&quot;</th>
<th>&quot;Up&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 30</td>
<td>blue</td>
<td>silver</td>
</tr>
<tr>
<td>30 to 60</td>
<td>red</td>
<td>silver</td>
</tr>
<tr>
<td>60 to 90</td>
<td>red</td>
<td>red</td>
</tr>
</tbody>
</table>

**"Down" brake RB2**

**"Down" brake RB2**

**braking direction of single rope brakes**

**Recommended installation positions**

The top of the rope brake must be located at least 400 mm below the centreline of the diverter or traction sheave. The clearance between the static jaw and the ropes should be kept to a minimum. The maximum clearance should be as outlined below.

<table>
<thead>
<tr>
<th>Dimension &quot;H&quot;</th>
<th>Maximum Clearance</th>
</tr>
</thead>
<tbody>
<tr>
<td>400</td>
<td>1 mm</td>
</tr>
<tr>
<td>600</td>
<td>2 mm</td>
</tr>
<tr>
<td>800</td>
<td>3 mm</td>
</tr>
<tr>
<td>1000</td>
<td>4 mm</td>
</tr>
<tr>
<td>1200 +</td>
<td>5 mm</td>
</tr>
</tbody>
</table>

A bi-directional arrangement can be located between the traction and diverter sheaves provided the distance between the sheaves will permit this. The brakes must be fitted with the correct torsion spring to suit the angle of inclination "A". Springs are colour as indicated above. A bi-directional arrangement can also be fitted to either the car or counterweight side or single "Down" brakes to both car and counterweight ropes as illustrated above.
Installation VGRB2

**Fig. 1 – As Delivered.**

Lift the drop jaw and fit the “yellow” plastic removable stop to the back of the drop jaw. This will prevent the jaws binding during the installation.

![Diagram of As Delivered](image)

**Fig. 2 – Splitting the rope brake**

Using the supplied 19mm spanner undo and remove the 4 x M12 Hex Hd Screws and split the drop jaw assembly from the fixed jaw assembly.

![Diagram of Splitting the Rope Brake](image)

**Fig. 3 – Duplexing the rope brake**

Using the supplied joining plate duplex the 2 rope brake fixed jaw assemblies. Ensure that the Jaw serial number “TA XXX” matches the jaw serial number on the drop jaw assembly and they are assembled as shown with the down brake on the top.

![Diagram of Duplexing the Rope Brake](image)
**Installation VGRB2**

**Fig. 3 – Attaching mounting plates**

Attach the mounting side plates as per the installation’s requirements.

The VG rope brake is secured to its mounting brackets by 4 x M16 screws. Each screw must react on half of the braking capacity of the VG rope brake. Based on a shear stress of 100 N/mm², the maximum braking force these can react to is 31.4 kN.

Many mounting options are available from Atwell International on request.

**Fig. 4 – Fitting to the ropes**

Position the assembly around the ropes in accordance with the drawing TD-RB4 shown on page 9.

Fix the mounting plates in position and secure.

The rope brake will impose a dynamic load on the floor or steelwork of only 15% of the static load.

**Fig. 5 – Completed Assembly**

Re-attach the 2 x Drop Jaw assemblies ensuring the jaw serial numbers match the respective fix jaw assemblies.

Remove the “yellow” plastic stops.

Connect the electrical leads from either the RB2 or UMD-SRB01 control boxes to the electrical plug on the front.

Power up the control box, lift the drop jaw and check the magnet holds it clear of the ropes.
Dimensions VGRB2 – single brake unit

Weight per rope brake = 24kg
Weight of each standard side plate = 2kg

Pivot handle back to enable the jaws to reset. Do not pull up vertically.
Dimensions VGRB2 – duplexed brake units

Weight of above assembly = 56kg
Dimensions VGRB2 – with UMD-SP01 sensor unit

- 100mm dia drive wheel
- Traction Ropes
- UMD-SP01 sensor unit
- Sensor mounting plate
- Sensor mounting bracket
- 2 x M6 x 16mm screws with spring and flat washers per bracket
- Sprung loaded tension bolts
- Electrical connection plug

Tensioning Bolt Arrangement
- M5 lock nut
- M5 washer
- Sensor plate
- Spring
- M5 washer
- M5 washer
- M5 Skt screw x 55mm

Alternative Tensioning Bolt Arrangement
- M5 lock nut
- M5 washer
- Sensor plate
- Spring
- M5 washer
- Support plate
- M5 washer
- M5 Skt screw x 55mm
**MAIN Lift Controller**

**UMD Connections**

1. **L**
2. **N**
3. **SC**
4. **SC**
5. **AL**
6. **AL**
7. **DR**
8. **MT**
9. **MT**
10. **DR**
11. **OSG**
12. **OSG**
13. **SP**
14. **RBGD**
15. **SP**
16. **RBGD**

**UMD Connections**

17. **SNR**
18. **SNB**
19. **SNG**
20. **SNT**
21. **SNW**
22. **SNBR**
23. **SNBL**
24. **RB1R**
25. **RB1B**
26. **RB1Y**
27. **RB1G**
28. **RB2R**
29. **RB2Y**
30. **RB2G**
31. **RB2L**
32. **SP**

**Motor Connection**

- The UMD needs a contact to open when the motor contactor is open.

**Door Connections [Car & Landing]**

- The UMD needs a contact that opens when the landing door is not in the locked position and the car door is not in the closed position. It needs to close when the doors are closed. (Section 9.11.1)

**Over speed Governor Connection**

- The UMD needs a contact that is directly connected to the over speed governor safety switch.

**Key**

L = Live
N = Neutral
SC = Safety Circuit
AL = Alarm Signal
DR = Door Contacts (landing and car door wired in series)
SP = Spare
OSG = Over speed Governor Contact
RBGD = Rope Brake Ground
SN* = Sensor Pack *Cable Colour
RB1* = Rope Brake 1 *Cable Colour
RB2* = Rope Brake 2 *Cable Colour

**Notes:**

1. It is recommended that bootlace ferrules are used when connecting the cables to the socket.

**Cable Size Recommendations**

- Pins 1 & 2 (inc Earth) = 3 core 1.5mm
- Pins 3 - 12 = 0.5mm tri-rated cable
- Pins 13 - 32 = Supplied multi core Smtr Cables.

**Refer to UMD Manual for Detailed Wiring Diagrams**
RELEASE INSTRUCTIONS

1. INVESTIGATE REASON FOR ENGAGEMENT AND CARRY OUT APPROPRIATE ACTION.
2. CARRY OUT VISUAL INSPECTION OF ROPE BRAKE.
3. READ LOCAL HANDWINDING INSTRUCTIONS.
4. HAND WIND IN THE DOWNWARD TO DIS-ENGAGE THE ROPE BREAK.
5. TURN KEY SWITCH TO "RESET" POSITION.
6. SLACKEN 4 X M12 SCREWS WITH GREEN WASHERS ON THE FRONT FACE OF THE DROP JAW ASSEMBLY.
7. USING ROPE BRAKE HANDLE LIFT DROP JAW FREE OFropes.
8. CHECK LED’S 1,2,3 & 4 ARE ILLUMINATED.
9. RE-TIGHTEN 4 X M12 SCREWS WITH GREEN WASHERS ON THE FRONT FACE OF THE DROP JAW ASSEMBLY.
10. TURN KEY SWITCH TO "RUN" POSITION.
VG rope brake with UMD-SRB01 Hand Winding Instructions

**Bi-Directional VG Rope Brake Installed**

Disengage Before Hand Winding

---

**RELEASE INSTRUCTIONS**

1. Check the visual displays on the “UMD-SRB01” control box.
2. Carry out visual inspection of the VG rope brakes, checking which brake has fully engaged.
3. Investigate reason for engagement and carry out appropriate action.
4. Read local hand winding instructions.
5. On the “UMD-SRB01” control panel insert the key and turn to the “RESET” position.
   
   Note: An audible alarm will sound until the key is returned to the “Run” position.
6. On the deployed but not fully engaged rope brake, using the rope brake handle re-engage the drop jaw with the electro-magnet. Check the “ROPE BRAKE SET” LED is lit on the “UMD-SRB01” control panel.
7. Hand wind the machine in the opposite direction of the engagement for approximately 25mm. This will free the drop jaw from the ropes.
8. Using the rope brake handle re-engage the drop jaw with the electro-magnet. Check the “ROPE BRAKE SET” LED is lit on the “UMD-SRB01” control panel.
9. Continue following the local hand winding instructions for the geared machine.

**NOTE:** If no power and the battery back up has failed, release the drop jaw and insert the plastic mechanical stops to the back of the drop jaw.

**TO RE-INSTALL LIFT SERVICE FOLLOWING HAND WINDING**

1. Ensure both rope brakes are reset and the corresponding LEDs on the “UMD-SRB01” are lit.
2. Ensure the reason for engagement has been investigated and appropriate action taken.
3. Turn key switch back to “RUN” position and remove key.
4. Check lift is working correctly.
At 6 monthly intervals, the following checks should be carried out -

1) the “drop jaw” should be released and the brake checked that the ropes are being clamped between the “drop jaw” and the static jaw.

2) that the top of the “drop jaw” is between 10 and 12 mm above the top of the static jaw when the “drop jaw” is released. If the “drop jaw” is less than 10 mm, this could indicate that either the ropes or “drop jaw” have worn. Worn jaws will have to be replaced.

   A limited amount of rope wear can be accommodated by re-setting the rope brake as per instructions on page 23. This should be carried out by a competent person. Please contact the manufacturers (Atwell International) should this need to be done.

3) that the rope brake safety switch has operated, this can be done by releasing the electro-magnet and checking that the red LED on the control box is illuminated.

4) that the “drop jaw” linkage moves freely when operated by hand.

5) Ensure the back-up battery is at a sufficient charge. Note the battery requires changing after 3 years from installation.

Contact Atwell International Ltd for any spares.

The only maintenance required is to spray the link arms and the disc springs with a water repellent lubricant if there is any sign of atmospheric corrosion.
**Typical Installation of VG rope brake and UMD-SRB01**

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>*1</td>
<td>UMD-SRB01 Control Box</td>
<td>Supplied with wall mounting brackets and fixings</td>
</tr>
<tr>
<td>*2</td>
<td>Electrical Connection Hood</td>
<td>32mm conduit fittings</td>
</tr>
<tr>
<td>*3</td>
<td>Connection Cable to Down Brake</td>
<td>Pre-wired to connection socket one end (Smtrs long)</td>
</tr>
<tr>
<td>*4</td>
<td>Connection Cable to Up Brake</td>
<td>Pre-wired to connection socket one end (Smtrs long)</td>
</tr>
<tr>
<td>*5</td>
<td>Connection Cable to UMD-SP01</td>
<td>Pre-wired to connection socket one end (Smtrs long)</td>
</tr>
<tr>
<td>*6</td>
<td>UMD-SP01</td>
<td>Movement Sensor Pack and Mounting Bracket</td>
</tr>
<tr>
<td>*7</td>
<td>VG rope brake “Down”</td>
<td>Supplied with Joining Plate and fixings or standard side plates and fixings</td>
</tr>
<tr>
<td>*8</td>
<td>VG rope brake “Up”</td>
<td>Supplied with Joining Plate and fixings</td>
</tr>
<tr>
<td>9</td>
<td>Side (angle) mounting plates</td>
<td>Various options available on request</td>
</tr>
<tr>
<td>10</td>
<td>Mounting Plate</td>
<td>Various options available on request</td>
</tr>
<tr>
<td>11</td>
<td>Connections to Lift Control Panel</td>
<td>Customer connections (see page 13)</td>
</tr>
<tr>
<td>12</td>
<td>Traction Sheave</td>
<td>Existing equipment</td>
</tr>
<tr>
<td>13</td>
<td>Machine Bedplate</td>
<td>Existing equipment</td>
</tr>
<tr>
<td>14</td>
<td>Machine Room Steels</td>
<td>Existing equipment</td>
</tr>
<tr>
<td>15</td>
<td>Diverter Sheave</td>
<td>Existing equipment</td>
</tr>
<tr>
<td>16</td>
<td>Traction Ropes</td>
<td>Existing equipment</td>
</tr>
</tbody>
</table>

* Items 1–8 are supplied as standard when ordering a bi-directional VG rope brake with uncontrolled movement control.
### Mounting Brackets

**Design Calculations**

To facilitate the installation of the VG rope brake, Atwell International can provide mounting plates and side plates. These brackets are designed in accordance with the lift installation and are verified by use of the following programme and in conjunction with drawing “BI-DIRECTIONAL MOUNTING BRACKET DESIGN – FILE 2ROPE6”.

#### Rope Brake Mounting Bracket - See File 2ROPE6 Rev 1 (Drawing)

<table>
<thead>
<tr>
<th>Angle from Vertical</th>
<th>“A”</th>
<th>15 degrees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hole centres</td>
<td>“L”</td>
<td>135 mm</td>
</tr>
<tr>
<td>Height</td>
<td>“H”</td>
<td>300 mm</td>
</tr>
<tr>
<td>Bolt offset dimension</td>
<td>“O”</td>
<td>107 mm</td>
</tr>
<tr>
<td>Mounting plate/bracket width</td>
<td>“W”</td>
<td>250 mm</td>
</tr>
</tbody>
</table>

| Static Braking Force (as specified on calc sheet) | 12687 Newtons |
| Vertical Component | 12255 Newtons |
| Horizontal Component | 3284 Newtons |

#### Braking Upwards

<table>
<thead>
<tr>
<th>Securing bolt force</th>
<th>position 1</th>
<th>3649 Newtons</th>
<th>Safety factor</th>
<th>45</th>
</tr>
</thead>
<tbody>
<tr>
<td>Securing bolt force</td>
<td>position 2</td>
<td>6127 Newtons</td>
<td></td>
<td>27</td>
</tr>
</tbody>
</table>

#### Braking Downwards

<table>
<thead>
<tr>
<th>Securing bolt force</th>
<th>position 1</th>
<th>0 Newtons</th>
<th>Safety factor</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Securing bolt force</td>
<td>position 2</td>
<td>-2479 Newtons</td>
<td></td>
<td>N/A</td>
</tr>
</tbody>
</table>

#### Plain Mounting plate

| Bending moment on mounting plate | 533092 Nmm |
| Maximum permissible stress | 160 N/mm² |
| Minimum section modulus | “Z” | 3332 mm³ |
| Effective width of plate resisting moment | 125 mm |
| Minimum plate flat plate thickness | “T” | 13 mm |

#### Flanged Mounting Plate

| Flanged plate - flange height | 27 mm |
| Material thickness | 10.06 mm |
| Plate section modulus | 2083 mm³ |
| Flange modulus | 1248 mm² |

![Calculated result for thickness of base plate](image1)

```latex
\text{Alternative design}
```
Braking in the "up" direction
The bolt force at position 2 = Braking force x Cos A
The bolt force at position 1 = Braking force x Sin A x H/L

Braking in the down direction
The force induced in bolt 1 is nominally zero
The bolt force at position two = Braking force x SinA x H - Braking force x CosA x L

Notes
1. The vertical component of the braking force acts through securing bolts at position 2.
2. 4 off fixing bolts 16 mm diameter high tensile steel with a minimum tensile load of 16.3 kN securing mounting to plate to steelwork by others.
3. 4 off c'sunk HT screws securing side plates to mounting plate.

FEBRUARY 2008
Adjusting the rope brake to allow for rope wear

THIS PROCEDURE SHOULD ONLY BE CARRIED OUT BY A COMPETENT PERSON FOLLOWING DISCUSSION WITH ATWELL INTERNATIONAL OR ITS APPOINTED REPRESENTATIVE

When assembled and adjusted correctly, the drop-jaw must clamp the ropes when it is 10 to 12 mm higher than the static jaw. This is specified as dimension “h” in figure TD-RB7. This will ensure that the rope brake will self-actuate when the drop-jaw is released. To achieve this, proceed as follows:-

1. On the top rope brake only lower the drop jaw on the ropes and measure the height “h” when clamping the ropes. If this is outside the range 10 to 12 mm, adjust the setting nuts, one flat at a time in rotation until this is achieved.

NB: tightening the setting nuts will reduce the height “h”. Conversely, slackening the nuts will increase the height. To determine how many turns to adjust the setting nut, please refer to the chart

<table>
<thead>
<tr>
<th>Dim “h”</th>
<th>Setting (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>0</td>
</tr>
<tr>
<td>24</td>
<td>0.3</td>
</tr>
<tr>
<td>23</td>
<td>0.6</td>
</tr>
<tr>
<td>22</td>
<td>0.9</td>
</tr>
<tr>
<td>21</td>
<td>1.2</td>
</tr>
<tr>
<td>20</td>
<td>1.5</td>
</tr>
<tr>
<td>19</td>
<td>1.7</td>
</tr>
<tr>
<td>18</td>
<td>2.0</td>
</tr>
<tr>
<td>17</td>
<td>2.2</td>
</tr>
<tr>
<td>16</td>
<td>2.4</td>
</tr>
<tr>
<td>15</td>
<td>2.6</td>
</tr>
<tr>
<td>14</td>
<td>2.8</td>
</tr>
<tr>
<td>13</td>
<td>2.9</td>
</tr>
<tr>
<td>12</td>
<td>3.1</td>
</tr>
<tr>
<td>11</td>
<td>3.2</td>
</tr>
<tr>
<td>10</td>
<td>3.4</td>
</tr>
<tr>
<td>9</td>
<td>3.5</td>
</tr>
<tr>
<td>8</td>
<td>3.6</td>
</tr>
<tr>
<td>7</td>
<td>3.7</td>
</tr>
</tbody>
</table>

For example, if “h” measures 16 mm, subtract 2.4 mm from 3.2 mm (the setting dimension at 11 mm minus the setting dimension at 16 mm) to give a difference of 0.8 mm.

A turn of one flat of the setting screws will move the nut 0.25 mm. Therefore, each nut will need to be tightened by 3 flats to reduce the height to 11 mm.

2. When adjusted correctly, mark each nut and seal with red paint.

The dimension “h” should only be changed by altering the setting nuts located inside the terminal box.

Remove front cover to expose 4 x M18 adjusting nuts

TD-RB7
Frequently Asked Questions

Will the VG rope brake damage the ropes?
No. It was a fundamental requirement that the VG rope brake did not cause any significant damage to the ropes, even after repeated testing on the same installation. After testing, all that is evident is a “polishing away” of the rope lubricant where the jaws have contacted the rope.

Will the VG rope brake impose additional reactionary loads on to the machine room floor or steels?
No. Machine room floors and steelwork must be designed to take a dynamic load equal to the static load of the lift, i.e. twice the static load. The VG rope brake will impose a dynamic load on the floor or steelwork of only 15% of the static load.

Which control unit should be used with the VG Rope Brake?
If the rope brake is to be used to arrest over speed in the “UP” direction only, then the control box “RB2” should be used.
If the rope brake is to be used to arrest over speed and prevent movement of the lift car in either direction with the doors open then the control box UMD-SRB01 should be used. Please refer to the “Operation and maintenance Manual for the Uncontrolled Movement Detector” for further information.

What is the minimum space required between the centre line of the ropes and the machine room wall/upstands?
The minimum dimension from the rope brake back plate to the centre line of the ropes is 38mm. Please refer to the dimensioned drawings on page 12 and 13 for more detailed information.

What is the maximum capacity of the rope brake?
The VG rope brake has been tested for lift speeds up to 5 m/sec. This is regardless of the mass of the lift car, the VG rope brake only has to brake the Out of Balance Load and not the full mass of the lift system. The effect of different car and motor masses is to change the slide distance. See brake selection program on page 7.

What is the voltage and wattage of the electro–magnet?
The standard voltage for the brake coil is 12 Volts DC. Other voltages are available to special order. The power consumption of the standard coil is only 4 watts.
Other quality products available from Atwell International: