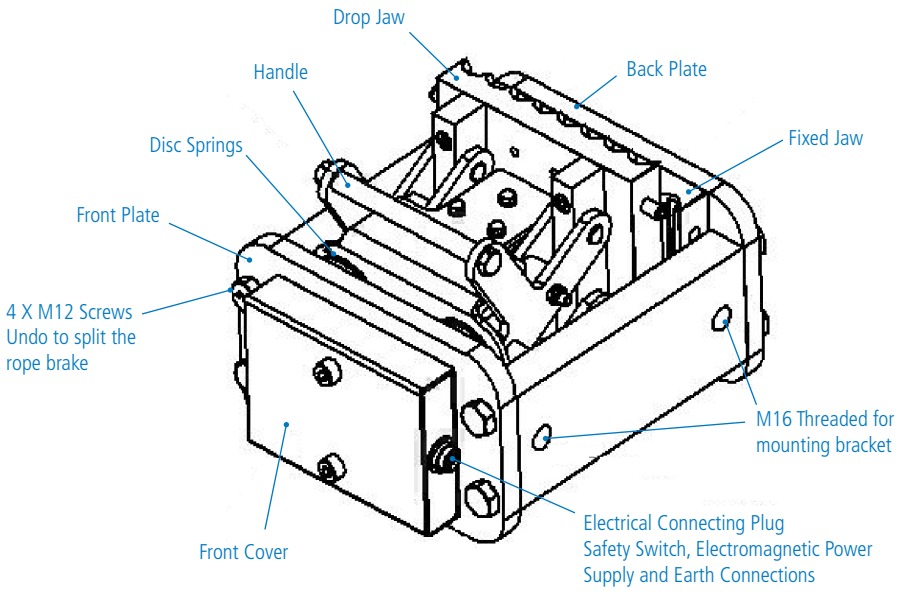
VG Rope Brake (VGRB2)

Operation and Installation Manual

Version 5.0

ATWELL INTERNATIONAL

Contents



Overview

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" and "UKCA" certified by BSI.

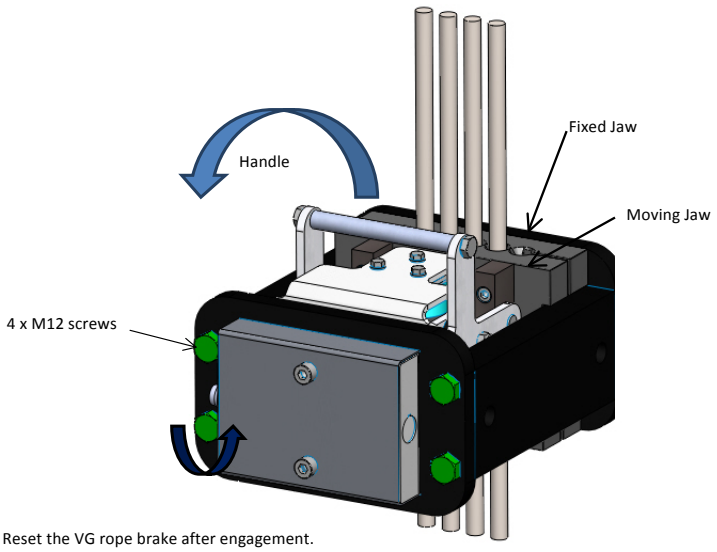
The brake operates on the lift ropes and is designated as a "movement prevention" or "speed reducing" means in compliance with EN81-20 2020. The VG rope brake combines the proven technology of "drop-jaw" type governors with the patented VG linkage mechanism. The brake operates in a similar manner to 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 electromagnet. 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" (VG UMD-SRB02) available directly from Atwell International Ltd. When the bi-directional VG rope brake (VGRB2) is used in conjunction with the Uncontrolled Movement Detector (VG UMD-SRB02 or RB2a) full compliance with both EN81-20 2020 can be achieved. When used in conjunction with either the VG UMD SRB02 or VG OSG will also comply with EN81-20 2020.

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. Refer to RB2A / UMD-SRB02 reset procedure
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. Refer to RB2A / UMD-SRB02 reset procedure

Braking Capacity

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 the 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 damage to 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.

Disc Spring	Braking Force - Newtons		Contract Load "Q" kg	
Thickness	Static	Dynamic	Maximum	Minimum
2.0 mm	7160	6110	630	423
2.5 mm	12374	10554	1000	630
3.0 mm	16282	13886	1250	800

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 5 m/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 core 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 EN81-20-2020. 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 electromagnet.

The rope brake can also be used to prevent any form of uncontrolled movement when operated by a suitable control device such as the "VG UMD-SRB02" detector.

RB2A

For the prevention of overspeeding 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 RB2A. This unit incorporates a battery backup 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.

VG UMD-SRB02 – Uncontrolled Movement Detector

The VG UMD-SRB02 connects to the main lift control panel and will provide power and battery backup for 2 x VG rope brakes for a minimum of 1 hour. The UMD-SRB02 can still receive signals to tell if the lift doors are open and the main safety circuit is made. It will still monitor for overspeed conditions.

The VG UMD-SRB02 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 but can be adjusted at the time of order by Atwell International 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)

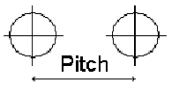
VG ROPE BRAKE SELECTION CRITERA

Job No.	W707/077
Job Name	Lygon Street
Customer	XXXX

Details taken by.	Initials	Date.	Contact Name.

Features
Key: All boxes marked with a "*" must be completed,

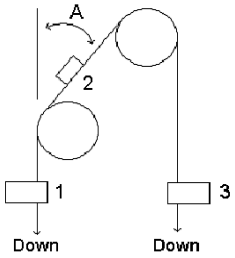
Lift System Details

LIFT CAPACITY	*	630	"Q" Kg		
CAR MASS	*	1000	"P" Kg		
CAR LOAD BALANCE	*	50	%ge		
Counterweight mass	*	1315	"W" Kg		
LIFT SPEED	*	1	m/sec		
ROPING RATIO		1	enter 1 for 1:1; 2 for 2:1		
ROPE SPEED		1			
NUMBER OF ROPES	*	4			
ROPE DIAMETER	*	13	mm		
ROPE PITCH	*	21	mm	>>	

Lift Machine Details

MAKE OF MACHINE		sassi	<<<<<<	S = Sassi
MAKE OF MOTOR		sassi		M = Montenari
DIAMETER OF TRACTION SHEAVE	*	560		O = Otis
MOTOR NOMINAL SPEED	*	1228		E = Express
GEAR RATIO	*	36		X = other (please specify)
WORMWHEEL INERTIA		0.05		
FLYWHEEL Size in mm (if applicable)		400	Outer diameter only	
FLYWHEEL INERTIA		0.5		

To be used for Uncontrolled Movement Detection		YES / NO
Indicate position rope brake to be fitted *	✓	✓



Position 1			✓	0 - 30°
Position 2	✓	>> Angle >> "A"		30 - 60°
Position 3				60 - 90°
Other		Location		

EXISTING OVERSPEED GOVERNOR

MANUFACTURERS NAME *	XXXX	
MODEL/TYPE *	XXXX	
BI-DIRECTIONAL *	yes	
DOES THE SAFETY SWITCH HAVE N/O AUXILIARY CONTACTS		YES / NO
OR IS A NEW OVERSPEED GOVERNOR REQUIRED	No	<<<<<< YES / NO

Any Other Details including contact numbers etc:
Show new governor as a cost option

Brake selection Program (Example)

Atwell International Job Reference	W707/077
Customer Reference	Lygon Street

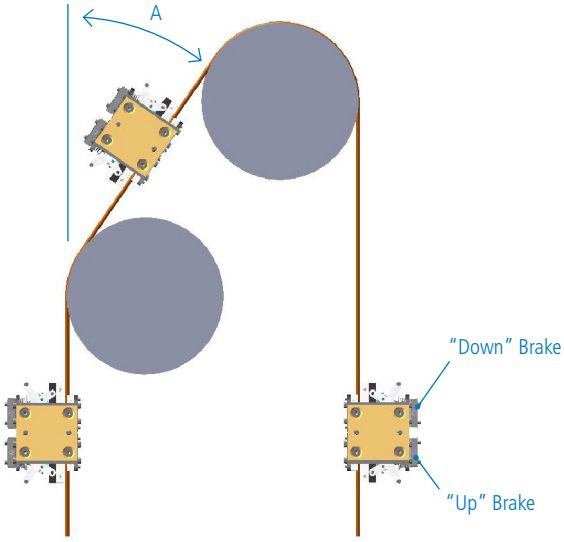
Lift system variables	Data	Units	Comments
Lift capacity "Q"	630	kg	
Car mass "P"	1000	kg	
Car load balance	50	%	
Counterweight mass	1315	kg	
Lift speed	1	m/sec	
Roping ratio	1		enter 1 for 1:1; 2 for 2:1
Rope speed	1	m/sec	
Number of ropes	4		
Rope diameter "d"	13	mm	
Rope pitch	21	mm	
Spring Stack Configuration	4		Enter number 1 to 9
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	6.5	mm	Select groove width from chart
Rope Brake Clamping Force "F"	34200	Newtons	
Rope contact area per jaw	5342	mm^2	
Contact pressure between rope and jaws	13.1	N/mm^2	
Rope Pressure on Traction Sheave	9.3	N/mm^2	35° "V" groove on 40:1 D:d ratio
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	0.05	refer to manufacturer's data	
Flywheel inertia	0.15		
Total high speed inertia	0.20	kgm^2	
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/sec^2	
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	

Installation of the VG rope brake

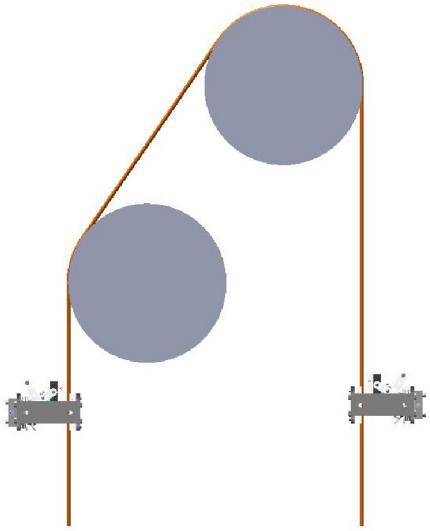
The VG rope brake should be installed using brackets which will facilitate accurate alignment and adjustment of the brake, so that it is both parallel and square to the lift ropes. The brackets must be capable of withstanding the static braking force calculated by the application program with an appropriate 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).



Bi-directional arrangement consists of one brake for the "Down" direction and one brake for the "Up" direction



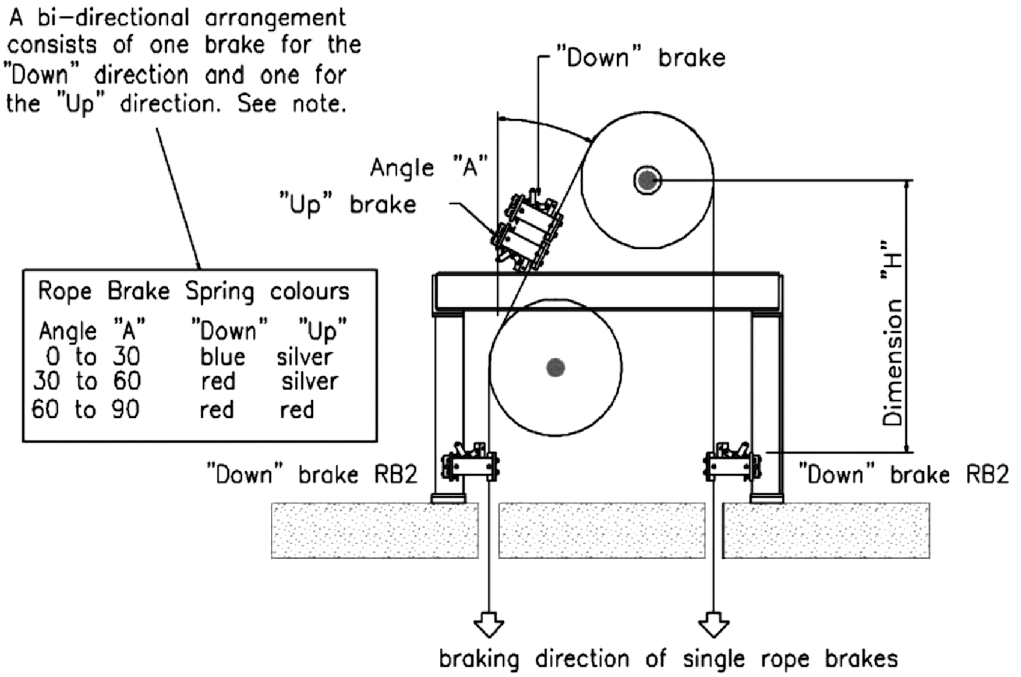
Down direction of single rope brakes

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 springs to suit the angle of inclination "A". A bidirectional 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 where 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

FIGURE NUMBER TD-RB4
YEAR 2008 ISSUE B



Rope Brake Spring colours		
Angle "A"	"Down"	"Up"
0 to 30	blue	silver
30 to 60	red	silver
60 to 90	red	red

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.

Dimension "H"	Maximum Clearance
400	1 mm
600	2 mm
800	3 mm
1000	4 mm
1200 +	5 mm

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.

CAMERON DESIGN - NORTHAMPTON ENGLAND

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.

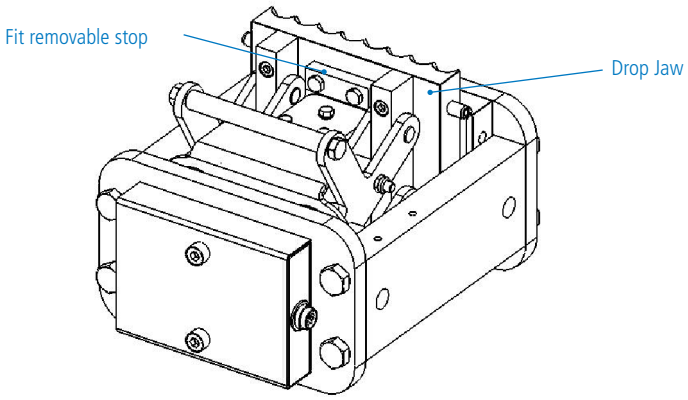


Fig. 2 – Splitting the rope brake

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.

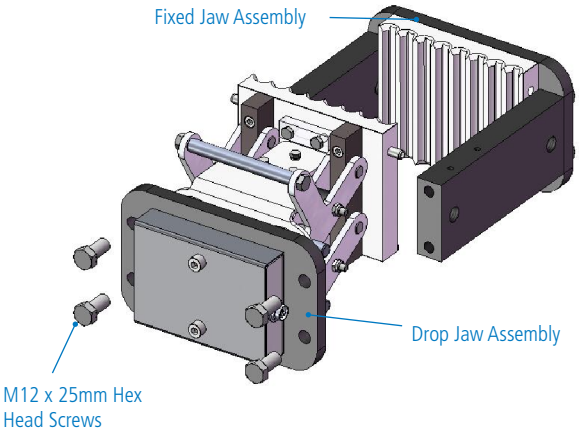


Fig. 3 – Duplexing the rope brake

Using the supplied joining plate duplex the 2 rope brake fixed jaw assemblies.

Ensure that the Jaw serial number "W*****.001" matches the jaw serial number on the drop jaw assembly and they are assembled as shown with the down brake on the top.

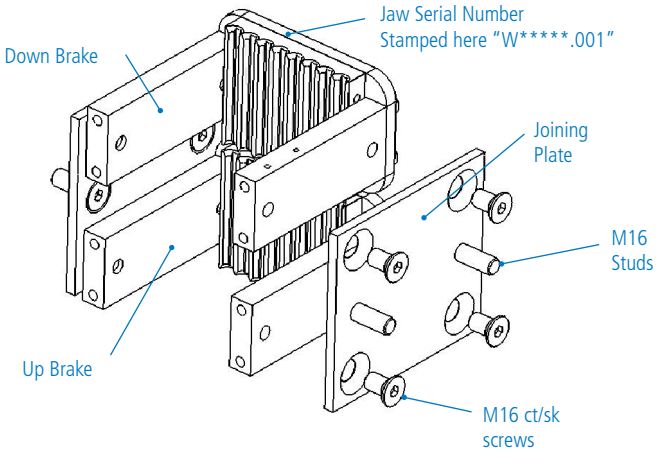


Fig. 4 – Attaching mounting plates

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.

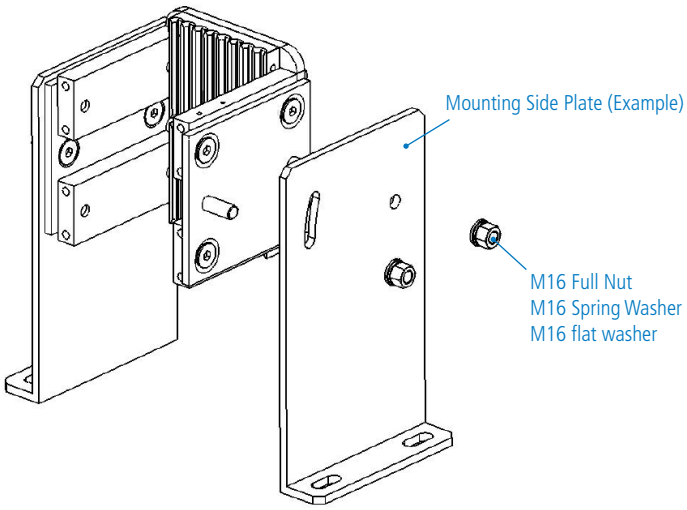


Fig. 5 – Fitting to the ropes

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.

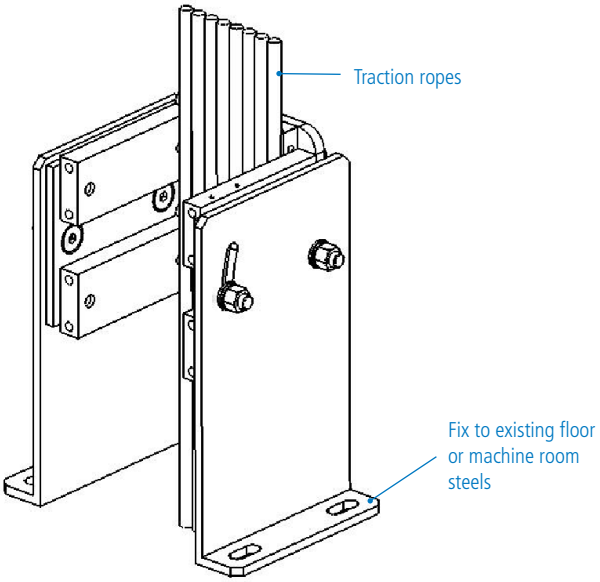


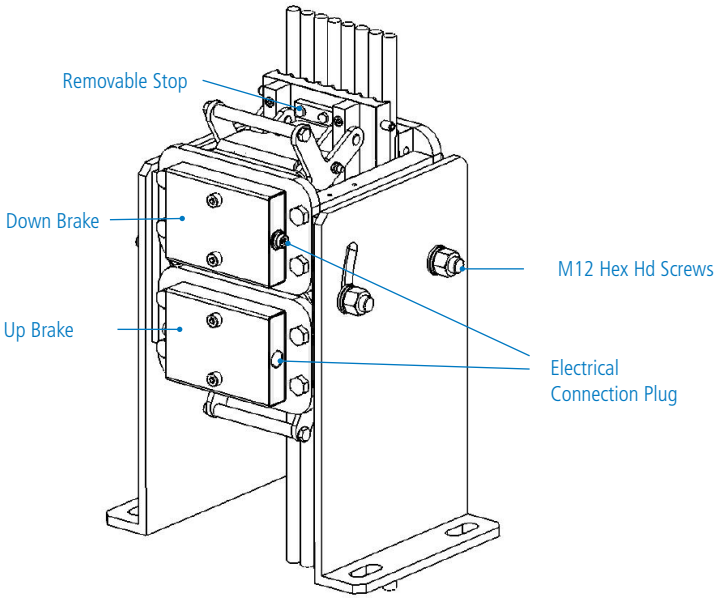
Fig. 6 – Completed Assembly

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

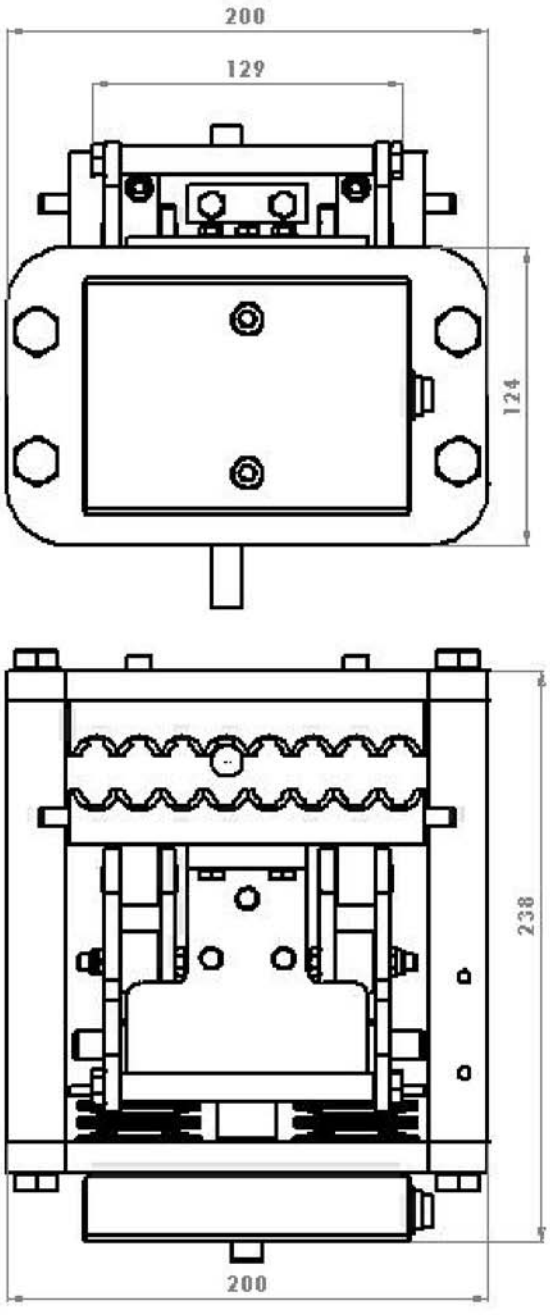
Remove the "yellow" plastic stops.

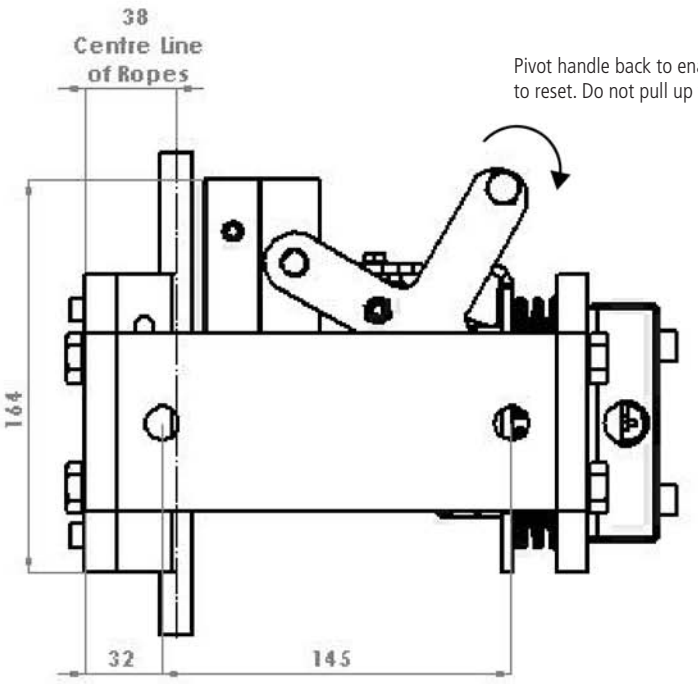
Connect the electrical leads from either the RB2a or UMD-SRB02 control boxes to the electrical plug on the front.

Power up the control box, lift the drop jaw and check the magnet holds it clear of the ropes.

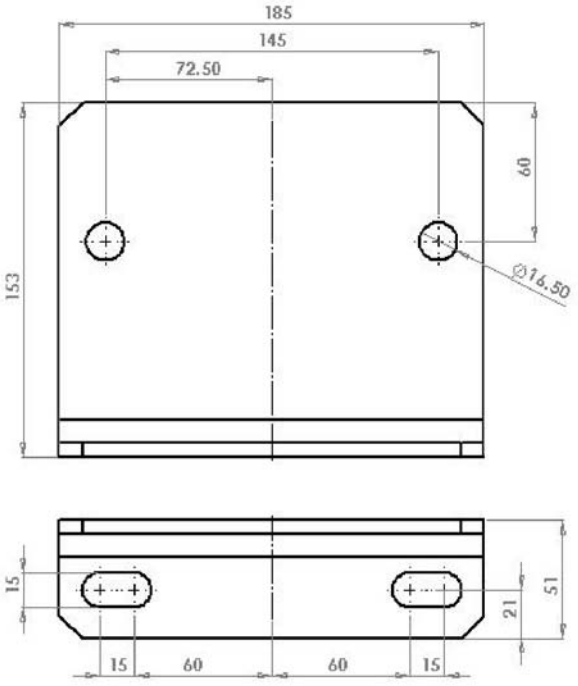


Dimensions VGRB2 – single brake unit





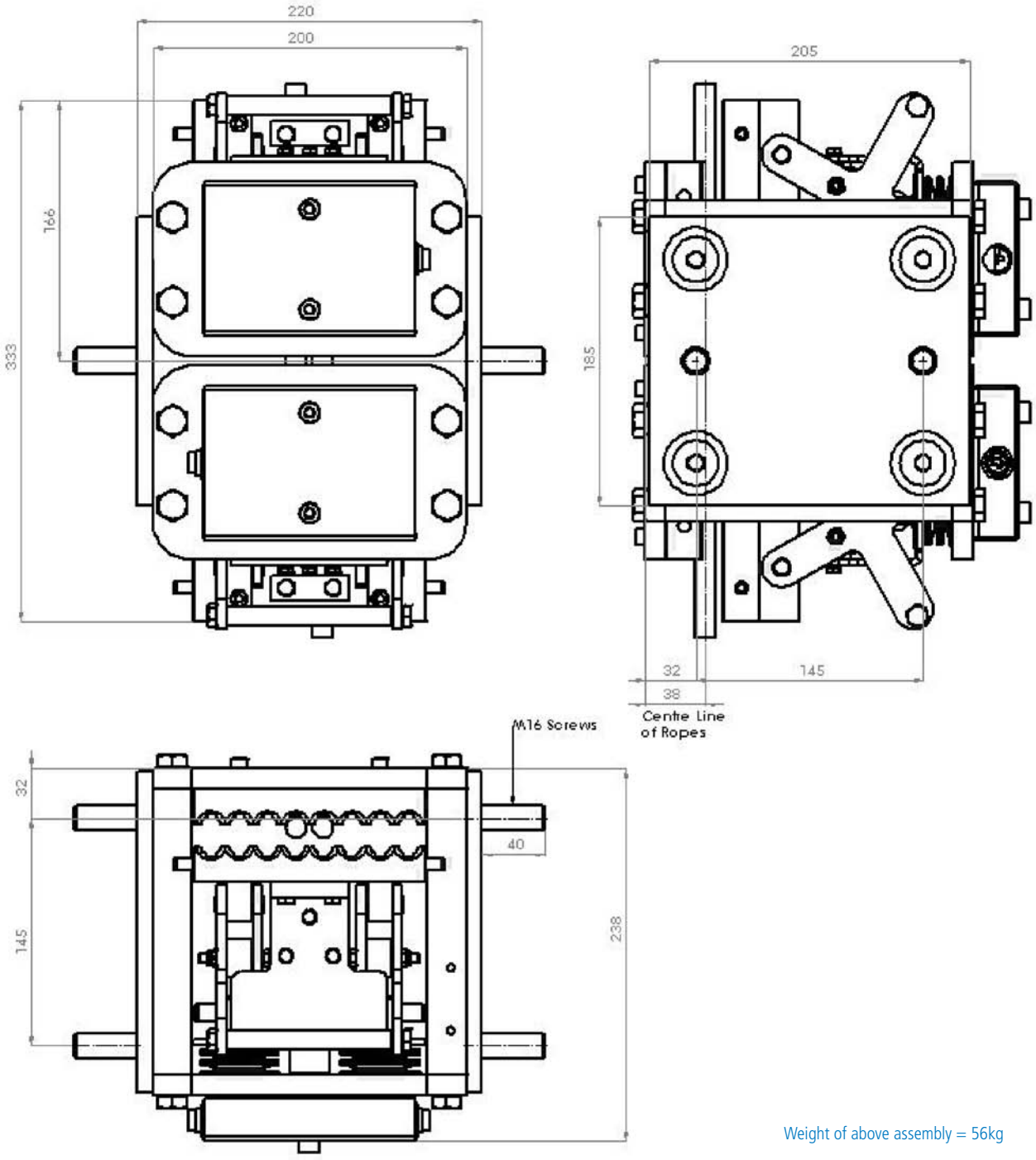
Pivot handle back to enable the jaws to reset. Do not pull up vertically.



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

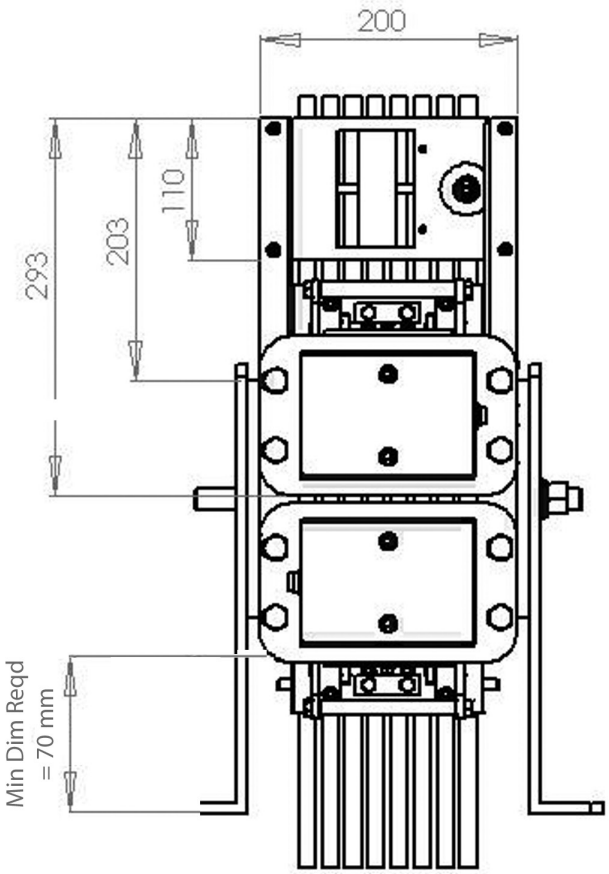
Standard Side Plate

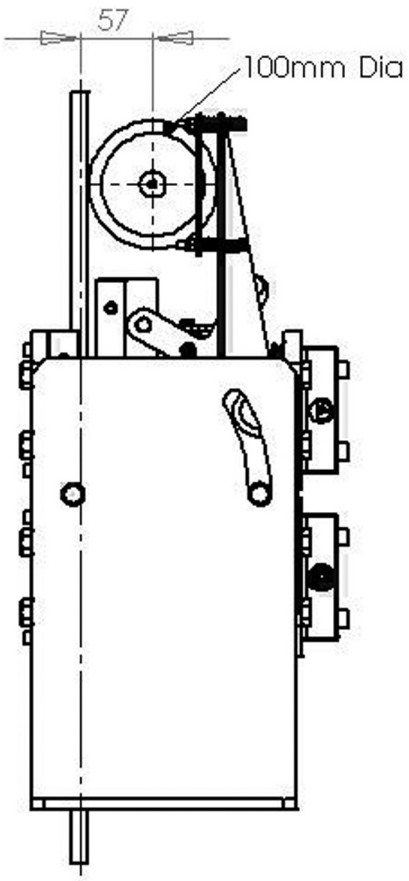
Dimensions VGRB2 – duplexed brake units



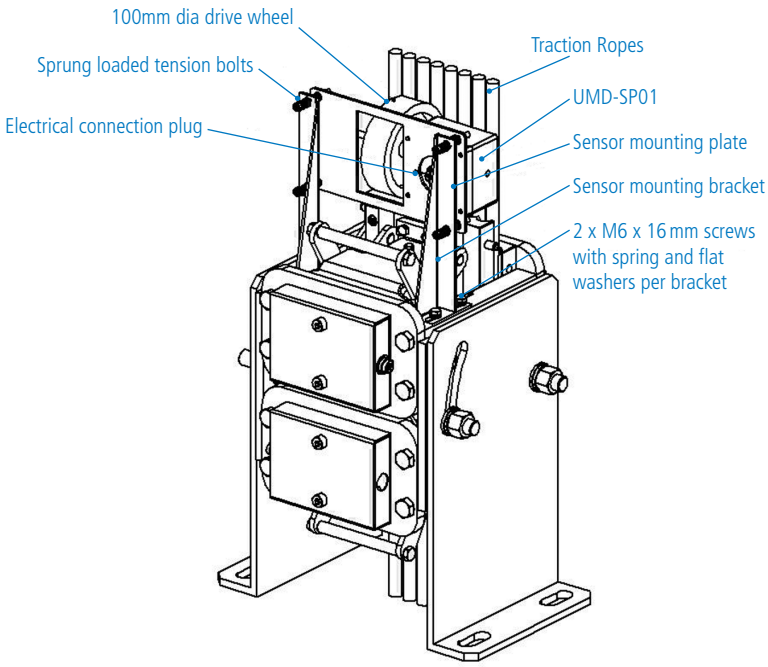
Weight of above assembly = 56kg

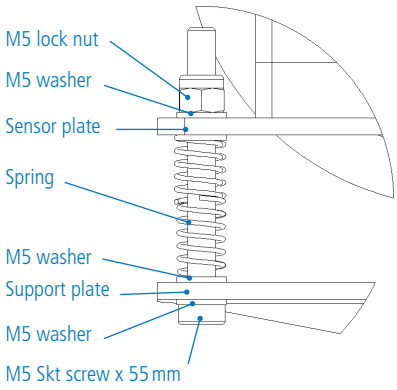
Dimensions VGRB2 – with UMD-SP01 sensor unit



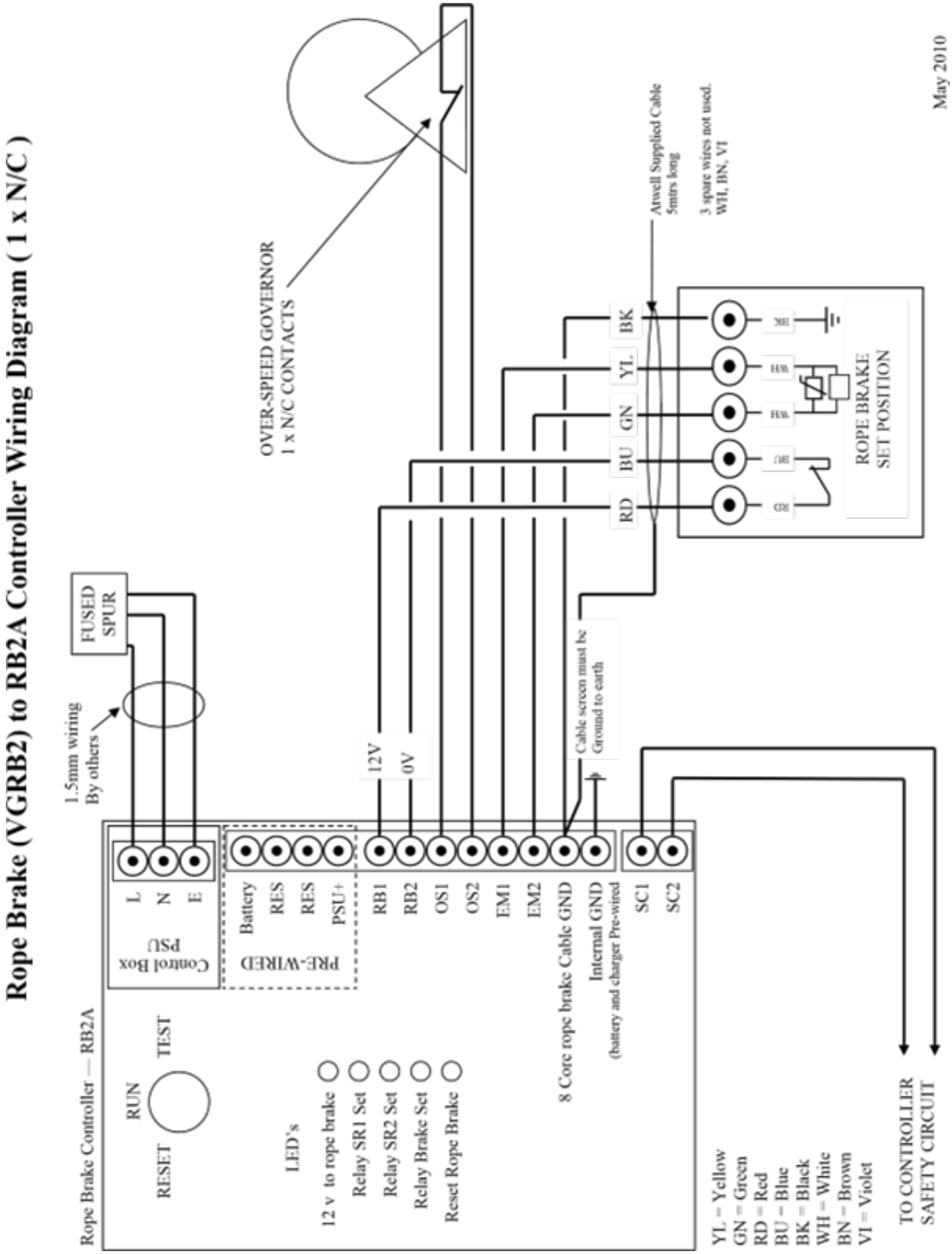


Tensioning Bolt Arrangement

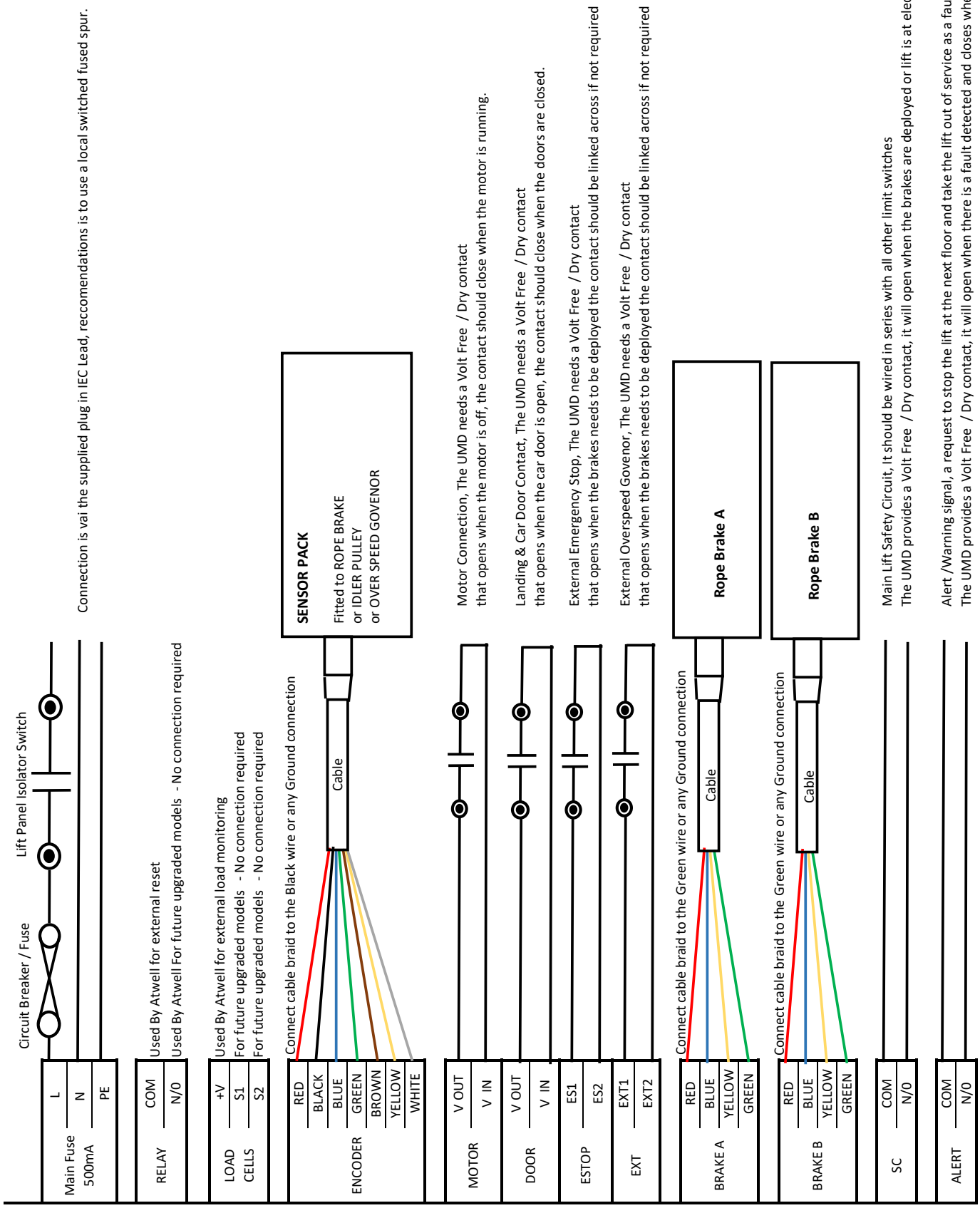




Wiring Diagram - RB2a Control Box



Wiring Diagram - UMD-SRB02 Control Box



VG rope brake with RB2A Hand Winding Instructions

VG Rope Brake Installed
Disengage Before Hand Winding Machine

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 BRAKE.
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 OF ROPES.
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.

Hand Winding Instructions - VG rope brake with UMD-SRB02

VG Rope Brake Installed
Disengage Before Hand Winding Machine

RELEASE INSTRUCTIONS

1. CHECK THE VISUAL DISPLAY ON THE VG-SRB02 CONTROL PANEL.
2. CARRY OUT A VISUAL INSPECTION OF THE VG ROPE BRAKE(S) CHECKING WHICH BRAKE HAS FULLY ENGAGED
3. INVESTIGATE THE REASON FOR THE ENGAGEMENT AND CARRY OUT THE APPROPRIATE ACTION
4. READ LOCAL HAND WINDING INSTRUCTIONS
5. TO RESET THE BRAKE(S) PRESS THE GREEN RESET BUTTON
6. SELECT "CONFIRM" TO ENTER RESET MODE (RELAY SHOULD SOUND)
7. PERFORM A MANUAL RESET ON THE BRAKE(S) AND PRESS THE RED RESET BUTTON ON THE PANEL. THE SCREEN WILL THEN RETURN HOME. DOWN LOAD THE VG ROPE BRAKE MANUAL FOR GUIDANCE.
8. 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 IS LIT ON THE CONTROL PANEL.
9. HAND-WIND THE MACHINE IN THE OPPOSITE DIRECTION OF THE ENGAGEMENT FOR APPROXIMATELY 25mm. THIS WILL FREE THE DROP JAW FROM THE ROPES.
10. ON THE DEPLOYED AND ENGAGED ROPE BRAKE, USING THE ROPE BRAKE HANDLE RE-ENGAGE THE DROP JAW WITH THE ELECTROMAGNET. CHECK THE ROPE BRAKE SET IS ALSO LIT ON THE CONTROL PANEL.
11. CONTINUE TO FOLLOW THE LOCAL HAND-WINDING INSTRUCTIONS FOR THE GEARED MACHINE.

NOTE: IF THERE IS NO POWER AND THE BATTERY BACKUP HAS FAILED AFTER 2 HOURS RELEASE THE DROP JAW AND INSERT THE PLASTIC MECHANICAL STOPS AT THE BACK OF THE DROP JAW TO PREVENT THE JAW FROM RE-ENGAGING.

TO RE-INSTALL LIFT SERVICE FOLLOWING HAND WINDING

1. ENSURE BOTH ROPE BRAKES ARE RESET AND THE CORRESPONDING GREEN LIGHTS ARE LIT ON THE CONTROL PANEL.
2. ENSURE THE REASON FOR THE ENGAGEMENT HAS BEEN FULLY INVESTIGATED AND RESOLVED
3. CHECK THE LIFT IS OPERATING CORRECTLY.

Maintenance

At 6 monthly intervals, the following checks should be carried out:

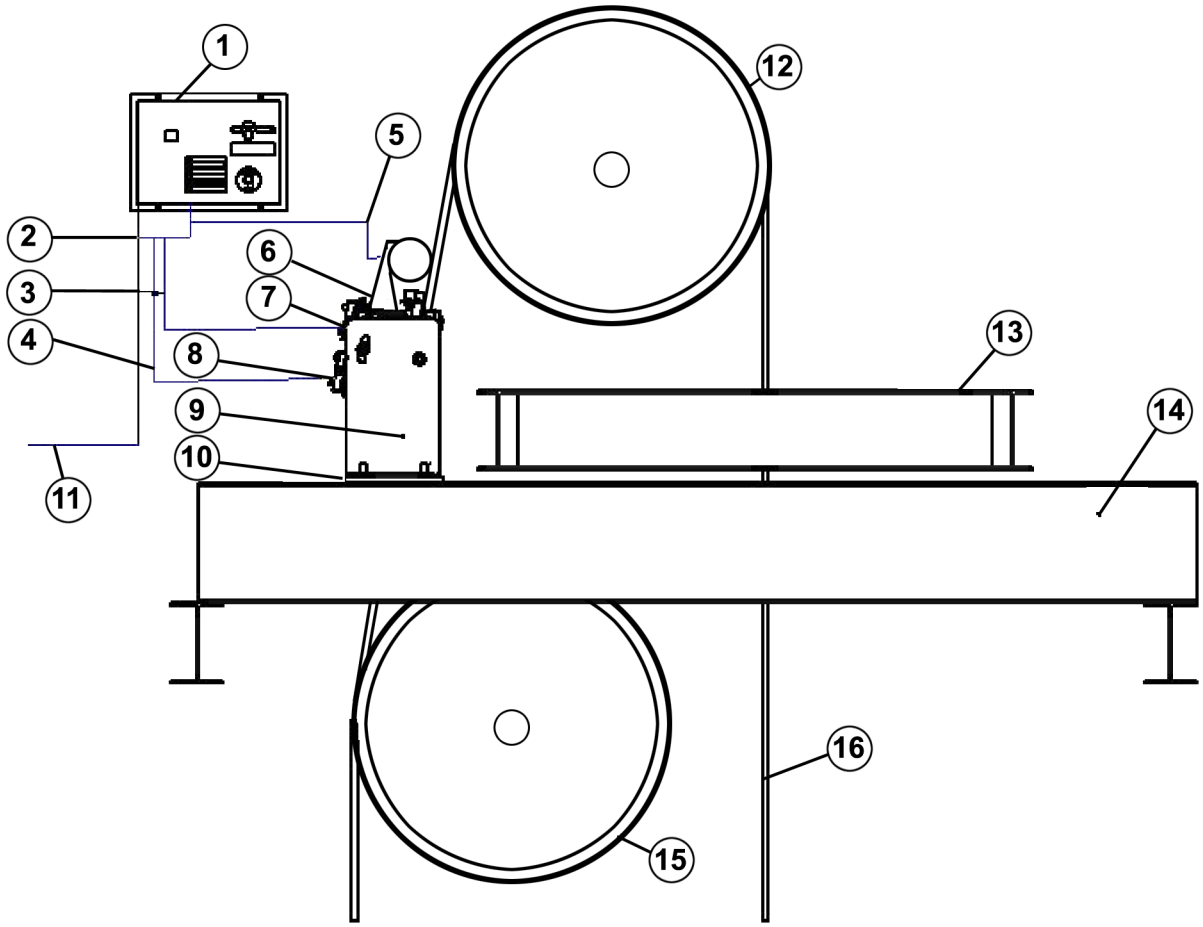
1. A static test should be carried out and the brake checked that the ropes are being clamped between the “drop jaw” and the static jaw using the VG-UMD-SRB02 control box.
2. On the VG-UMD-SRB02 control box press the menu button.
3. Select Eng Mode and enter Eng pass code 554.
4. Select back to access the home screen.
5. Press the RED Test Button.
6. Select static test. You then have 30 seconds to deploy the brake(s) or the screen will return to the home screen.
7. Press the RED Test Button and the Brake(s) should deploy as indicated on the screen
8. Check the jaws have released and 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 Must be carried out by a competent person. Please contact the manufacturers (Atwell International) should this need to be done.
9. Check that the “drop jaw” linkage moves freely when operated by hand.
10. To Rest the Brake(s) Press the GREEN Reset Button.
11. Select Confirm to enter Reset Mode (relay should sound).
12. Perform a manual reset on the Brake(s) and press the RED reset button on the panel. The Screen will then return home. Download the VG Rope Brake Manual for guidance.
13. The only routine 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.

You must then exit the Eng Mode. Select the menu and select Exit Eng Mode. The Eng Mode will be disabled and the screen will return home.

Contact Atwell International Ltd for any spares.

Typical Installation of VG rope brake and UMD-SRB02



Item No.	Description	Comments
*1	UMD-SRB02 Control Box	Supplied with wall mounting brackets and fixings
*2	Connection Cable to Down Brake	Pre-wired to connection socket one end (5mtrs long)
*3	Connection Cable to Up Brake	Pre-wired to connection socket one end (5mtrs long)
*4	Connection Cable to UMD-SP01	Pre-wired to connection socket one end (5mtrs long)
*5	UMD-SP01	Movement Sensor Pack and Mounting Bracket
*6	VG rope brake "Down"	Supplied with Joining Plate and fixings or standard side plates and fixings
*7	VG rope brake "Up"	Supplied with Joining Plate and fixings
8	Side (angle) mounting plates	Various options available on request
9	Mounting Plate	Various options available on request
10	Connections to Lift Control Panel	Customer connections (see page 13)
11	Traction Sheave	Existing equipment
12	Machine Bedplate	Existing equipment
13	Machine Room Steels	Existing equipment
14	Diverter Sheave	Existing equipment
15	Traction Ropes	Existing equipment

* Items 1–7 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)

Angle from Vertical	"A"	**15**	degrees
Hole centres	"L"	**135**	mm
Height	"H"	**300**	mm
Bolt offset dimension	"O"	**107**	mm
Mounting plate/bracket width	"W"	**250**	mm

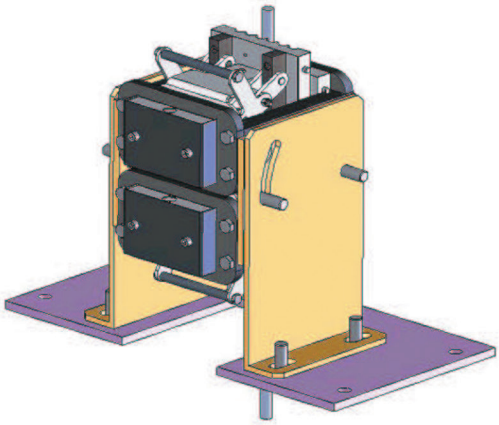
Static Braking Force (as specified on calc sheet)	Bf	**12687**	Newtons
Vertical Component		12255	Newtons
Horizontal Component		3284	Newtons

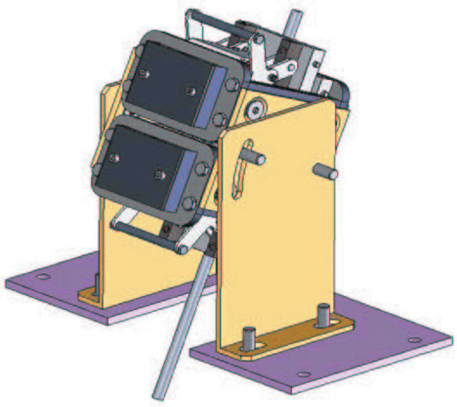
Braking Upwards				Bolt Safety factor
Securing bolt force	position 1	3649	Newtons	45
Securing bolt force	position 2	6127	Newtons	27

Braking Downwards				
Securing bolt force	position 1	0	Newtons	N/A
Securing bolt force	position 2	-2479	Newtons	N/A

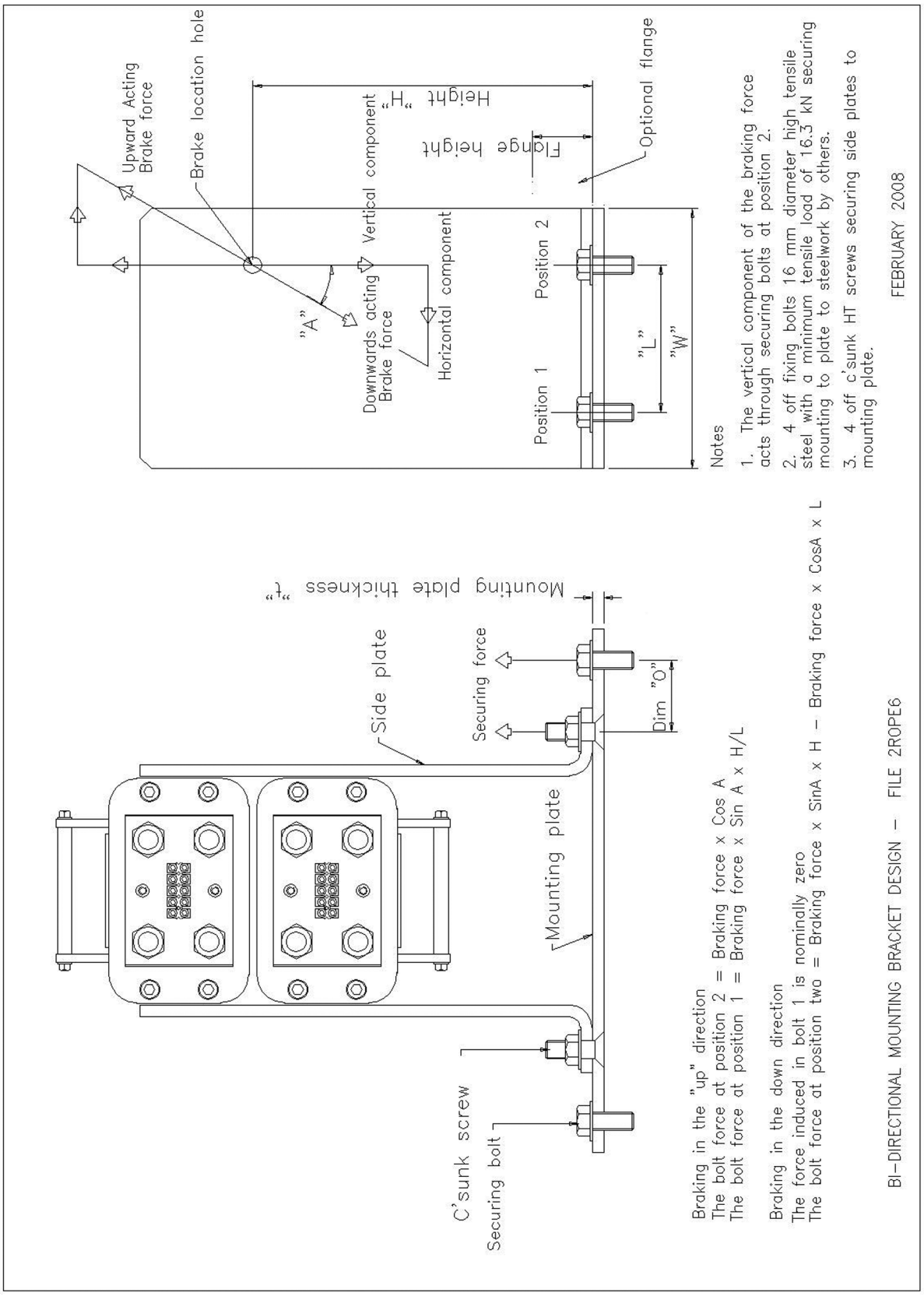
Plain Mounting plate			
Bending moment on mounting plate		533092	Nmm
Maximum permissible stress		160	N/mm^2
Minimum section modulas	"Z"	3332	mm^3
Effective width of plate resisting moment		125	mm
Minimum plate flat plate thickness	"t"	**13**	mm

Flanged Mounting Plate			
Flanged plate - flange height		27	mm
Material thickness		**10.00**	mm
Plate section modulas		2083	mm^3
Flange modulas		1248	mm^3





Bi-Directional Mounting Bracket Design “FILE 2ROPE6”



Adjusting the rope brake to allow for rope wear

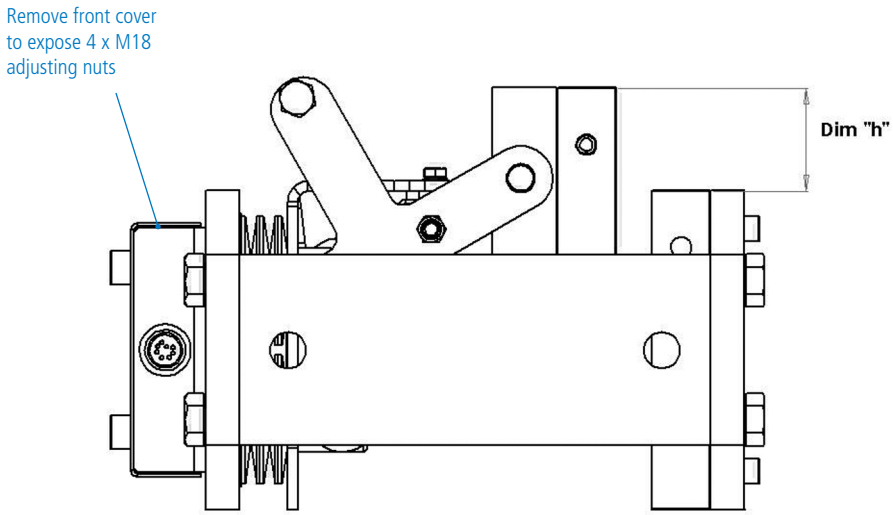
THIS PROCEDURE SHOULD ONLY BE CARRIED OUT BY A COMPETENT PERSON FOLLOWING DISCUSSION WITH ATWELL INTERNATIONAL OR ITS APPOINTED REPRESENTATIVE

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

Dim "h"	Setting (mm)	
25	0	
24	0.3	
23	0.6	
22	0.9	
21	1.2	
20	1.5	
19	1.7	
18	2.0	
17	2.2	
16	2.4	
15	2.6	
14	2.8	
13	2.9	
12	3.1	**Correct Setting Height**
11	3.2	
10	3.4	
9	3.5	
8	3.6	
7	3.7	



TD-RB7

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.

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 "RB2A" 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-SRB02 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?

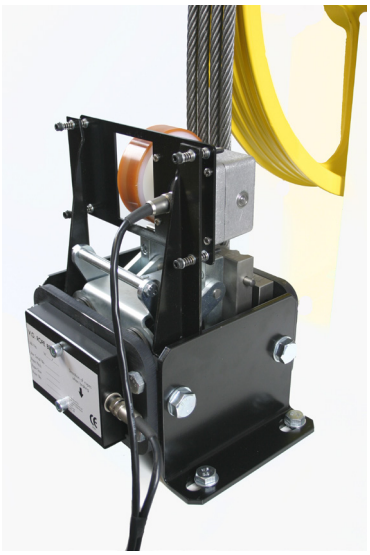
The minimum dimension from the rope brake back plate to the centre line of the ropes is 38mm. Please refer to the dimensioned drawings on page 12 and 13 for more detailed information.

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.



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ATWELL INTERNATIONAL

Atwell International Ltd
Ball Mill Top Business Park
Hallow Worcester WR2 6PD
United Kingdom
Telephone +44 (0)1905 641881
info@atwellinternational.com