

## FITTING & OPERATING INSTRUCTIONS



## BHW DC ELECTRIC WINCH MODEL BH DELTA 2250

Part Nos: 12v = 10995 24v = 10996  
Also available with optional Load Limiting Device

CONFORMING TO  
EN14492-1 Cranes – Power driven winches and hoists – Part 1: Power Driven Winches

## CONTENTS

<b>INTRODUCTION</b>	3
<b>NEW EUROPEAN STANDARDS &amp; BHW GROUP LIMITED</b>	3
INSTALLER RESPONSIBILITY FOR CE COMPLIANCE	4
<b>WINCH INFORMATION</b>	
WINCH SPECIFICATIONS	5
WINCH PERFORMANCE	5
WINCH DIMENSIONS	6
WINCH LABELS	7
<b>INSTALLATION</b>	
WINCH MOUNTING	8
SOLENOID PACK	9
POWER SUPPLY FROM BATTERY TO SOLENOID PACK	9
POWER SUPPLY FROM SOLENOID TO WINCH MOTOR	10
ISOLATOR SWITCHES AND HEAVY DUTY FUSES	11
LOAD LIMITING DEVICE (OPTION)	12
WANDERLEAD REMOTE SOCKETS	14
EMERGENCY STOP	15
<b>TESTING</b>	
TESTING THE WINCH	15
TRIALLING THE WINCH	15
<b>WIRE ROPE</b>	
WIRE ROPE INSTALLATION	15
<b>OPERATING INSTRUCTIONS</b>	
SAFETY PRECAUTIONS	16
RATING THE WINCH	17
OPERATING THE WINCH	17
FREESPOOLING AND CAPACITIES	17
<b>MAINTENANCE</b>	
MONTHLY MAINTENANCE	18
ANNUAL MAINTENANCE	18
CARE OF THE WIRE ROPE	18
<b>WINCH PARTS</b>	
GENERAL PARTS	19
SOLENOIDS, WIRE ROPES, WANDERLEADS, ACCESSORIES	20
<b>TROUBLESHOOTING</b>	21
<b>NOTES ON BATTERIES</b>	22
<b>WARRANTY</b>	23

## INTRODUCTION

Thank you for purchasing a BH Delta 2250 winch, one of a range of professional recovery winches available from the BHW Group Limited.

**PLEASE READ THIS MANUAL CAREFULLY BEFORE INSTALLATION OR OPERATION OF THE WINCH**

Those responsible for the installation and the operation of this winch must read and understand this manual. The first section deals with the installation requirements and the second section is for the user and provides information to ensure safe use of the winch.

This introduction also includes information on the European standard EN14492-1 for winches and the importance of correct product specification, installation and testing to ensure the essential Health and Safety requirements of the EC machinery directive are met.

## PLEASE KEEP THIS OWNERS MANUAL WITH THE WINCH

## EUROPEAN STANDARDS & BHW GROUP LIMITED

The harmonised European standard: EN14492-1 for power driven winches provide the means for conformity to essential Health and Safety requirements of the EN Machinery Directive. This standard is law throughout the European Union and must be applied. Conformity to these standards is the joint responsibility of the winch supplier, the installer and the company operating the machine.

Selecting the correct winch for the application is very important not only from the health and safety aspect, but also to maximise product life and value for money by reducing maintenance costs and vehicle down time.

BHW Group Limited products are fully compliant and carry a CE mark. A Declaration of Conformity is also supplied with each winch. BHW Group Limited aim to ensure the correct machine is supplied to suit the application and we welcome the opportunity of discussing the proposed application and offer advice. It will help us considerably if information regarding the maximum and average loads to be lifted or pulled - and approximate frequency of use can be provided.

This winch is to be used only for the purpose of vehicle recovery when fitted to equipment designed for the purpose, or the loading of wheeled vehicles upon bodies designed for the purpose, or used for a purpose specifically agreed with the BHW Group Limited.

For recovery vehicles the permissible standard of wire rope MBF\*\* to winch rating must be a minimum 2:1 and the ratio of wire rope to mean drum diameter\* only 10:1. This minimum standard is permitted because the running time for recovery winches is so short and the winch rarely sees maximum load. Whilst the requirements of this standard are very reduced compared to lifting winches it imposes a much higher standard of safety than those that before 2010. The new line pull ratings shown overleaf reflect this improved safety level.

Winches with the potential to apply forces over 1000kg must be load limited to prevent them applying loads above the safe working capacity.

Maximum wire rope length permissible on the drum must leave 1.5 x wire rope diameter from the top layer to drum flange.

The standard EN14492-1 considers all types of winches used for all applications and suggests guards are fitted if there is a chance an operator may become entangled. Personnel using vehicle-mounted winches are not generally close to the winch drum during recovery for this risk to occur. It is also important for the safety and ease of operation for the user to clearly see the wire rope wrapping onto the drum to ensure serious bunching and resulting jamming does not occur. Winches can be used in many different applications and the user or installer should carry out a risk assessment to determine any guarding that may be required.

In an application where hand tension is applied to the hook whilst the rope is being wound back on to the drum for storage there is a risk of the hand being pulled into the roller guide or drum. A short webbing strap should be used that is looped onto the hook to prevent the risk of this occurring (See picture on front of manual). These straps are supplied with wire rope provided with new winches and are available as a replacement part (No.9867) from BHW Group, or online at [www.red-bhw.com](http://www.red-bhw.com).

\* Mean drum diameter = the drum diameter plus the diameter of the wire rope. \*\* MBF = the Minimum Breaking Force of the wire rope.

## INSTALLER RESPONSIBILITY FOR CE COMPLIANCE

1. Mount winch in accordance with instructions.

**IMPORTANT NOTE:** The direction of drum rotation during winching must be observed to ensure correct functioning of the overload device and the winch brake as this is only active in one direction.

2. Install an emergency stop switch in accordance with installation instructions included in this manual. (See Page 14). There are also options listed of BHW Emergency Stop systems listed in this section.
3. Install 8 mm 1960N/mm<sup>2</sup> grade, 6/36 wire core rope with minimum breaking strain of 44.7kN (4556kgf) Maximum rope length of 23m x 3 layers. This is the maximum rope length permissible to ensure compliance with EN14492-1 as this requires a 1.5 x wire rope diameter from the top layer to the drum flange.
4. Attach rope to the drum as per WIRE ROPE INSTALLATION INSTRUCTIONS. (Page 14).
5. Hook must have a safety latch and a minimum rated capacity of 1.5 Tonne. Use only high tensile grade 80 or 100. These hooks are rated and stamped for lifting and have a safety factor of 4:1. A 1.5 Tonne hook has therefore a minimum yield of 1.5 x 4 = 6 tonne. For pulling applications with a 2:1 factor of safety they are suitable for up to 3.0 tonne line pull.
6. Install a heavy duty, slow burn fuse in fuse carrier as close to the battery as possible to prevent fire risk. For 12v winch this should be rated at 300amp and for 24v use 200 amp. Details on heavy duty fuses can be found on Page 11.
7. Load test the winch following installation to check the integrity of the mounting and adjust to ensure the correct load setting is achieved. See Page 14.
8. You are also advised that adherence to the directive ISO4309:2004/2010 regarding care, installation and disposal of wire ropes also applies to this range of hoists. (See section on Wire Ropes & Hooks).

### FITTING INSTRUCTIONS

The BH Delta 2550 has been built to a BHW Group specification to comply with EN 14492-1. This Winch is tough and will provide many years of reliable service if it is being used for the correct application. Like all machines it must be installed correctly in accordance with these fitting instructions (Pages 8-14) and subsequently the user must also adopt the correct procedures as those included in the section headed operating instructions. (Pages 15 – 16).

Irrespective of how the winch is mounted it is important that adequate provision is made so that the load is transmitted into the body of the vehicle and then into the chassis.

### WINCH ROTATION VERY IMPORTANT

The rotation of the drum when winching in must be correct as the load holding brake is only operational in one direction. The BH Delta 2550 is also fitted with an electronic load-limiting device and for this to function the rotation must also be correct. **Viewed from the motor end, the drum rotation is clockwise when winding the rope onto the drum.**

## WINCH INFORMATION

### WINCH SPECIFICATIONS

<b>Model</b>	<b>BHW Delta 2250 low profile planetary gear type EN 14492-1 Compliant</b>
<b>Typical Uses</b>	Light duty car transporters and trailers, plant moving vehicles with GVW up to 3500, spec-lifts and 4x4's.
<b>Construction</b>	Die cast aluminium end housings with steel drum
<b>Motor</b>	High torque series wound 12v (6hp) 24v (4.7hp)
<b>Gear Reduction</b>	216:1 for either 12v or 24v versions.
<b>Switching</b>	Heavy duty, double acting solenoids. These can be mounted adjacent to the winch or on the winch tie bars with straps provided.
<b>Wanderlead</b>	Tough, 2 button hand held control with 4.5m lead. Other lengths available on request.
<b>Freespool Clutch</b>	Lever on gear housing to disengage clutch.
<b>Drum Rotation</b>	Clockwise viewed from motor end when pulling in..
<b>Recommended Wire Rope</b>	8mm dia.(max.)1960N/mm <sup>2</sup> grade 6 x 36 wire core construction with 44.7kN minimum braking strain must be used to comply with EN-14492-1 standards. Recommended length is 23m maximum.
<b>Recommended Hook</b>	1.5 tonne rated with safety latch. Use only high tensile grade 80 or 100 to comply with EN14492-1 standards.
<b>Load Limiting Device (Optional)</b>	Electronic limiting device that measures a millivolt change in the supply current. This includes the power supply cable incorporating a shunt wire that <u>must not</u> be modified or changed. This cable should be fitted between the winch motor and isolator switch.
<b>Weight</b>	Winch, complete with mounting plate, roller guides and wire rope = 40kg.
<b>Rope to Mean Drum Ratio</b>	10.2:1
<b>Drum Dimensions</b>	76mm diameter x 225mm length. 151mm flange diameter.
<b>Recommended Storage Capacity</b>	23m (Using 8mm dia.wire rope).
<b>Roller Guides (optional)</b>	Heavy duty 4 way commercial type.
<b>Noise Level</b>	72db
<b>Ambient Temp. Operating Range</b>	-28°C to 60°C

### BH DELTA 2250 WINCH PERFORMANCE

		LAYER		
		1	2	3
Maximum Rated Line Pull by Layer*	kgf kN	2250 22.07	1860 18.24	1584 15.53
Cable Drum Capacity Cumulative by Layer (8mm dia. cable)	m	7	15	23

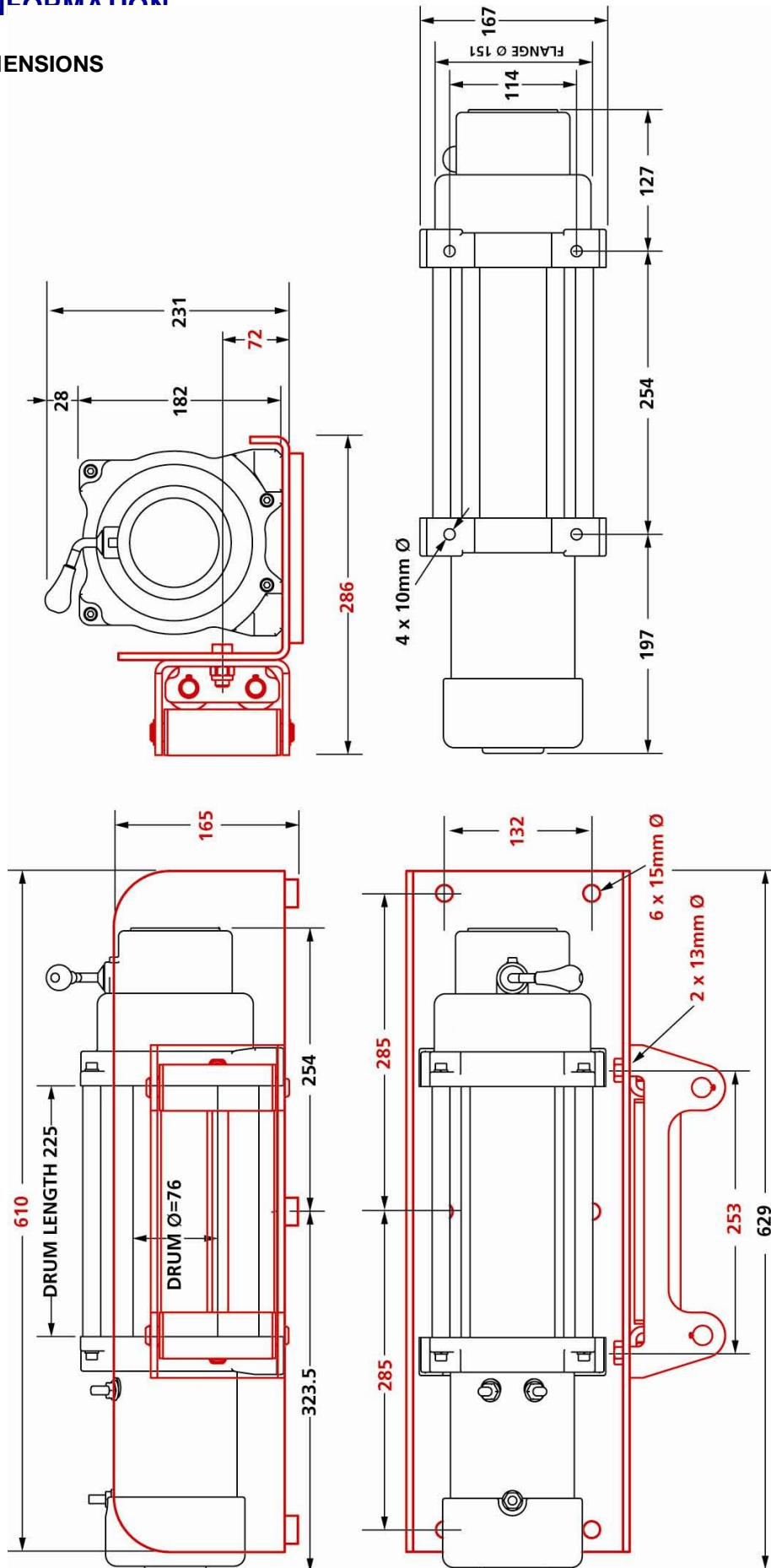
\*By incorporating a snatch block in the line it is possible to double these capacities.

PERFORMANCE FIRST LAYER OF CABLE				
LINE PULL kgf	LINE SPEED (approx)		AMP DRAW (approx)	
	12v m/min	24v m/min	12v	24v
0	8	8	66	32
500	6	7	120	60
1000	4.5	5	170	85
1500	4	4.2	204	102
2000	3.2	3.5	240	120
2500	2.6	2.8	280	140

All figures are based on battery maintaining normal voltage.

## WINCH INFORMATION

### WINCH DIMENSIONS

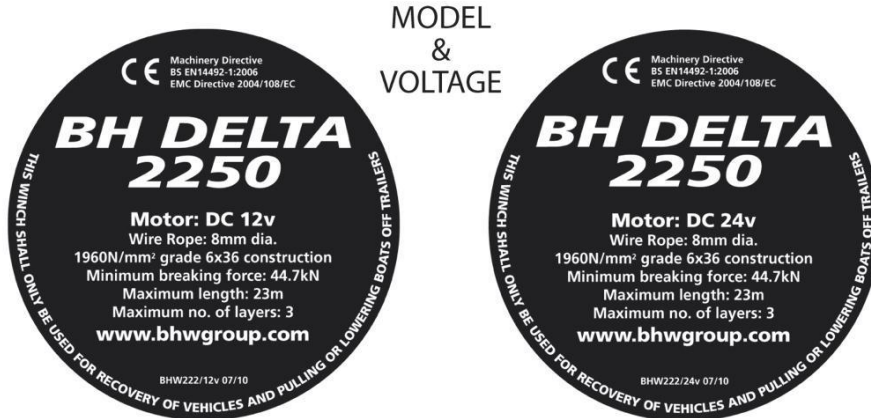




## WINCH INFORMATION

### WINCH LABELS

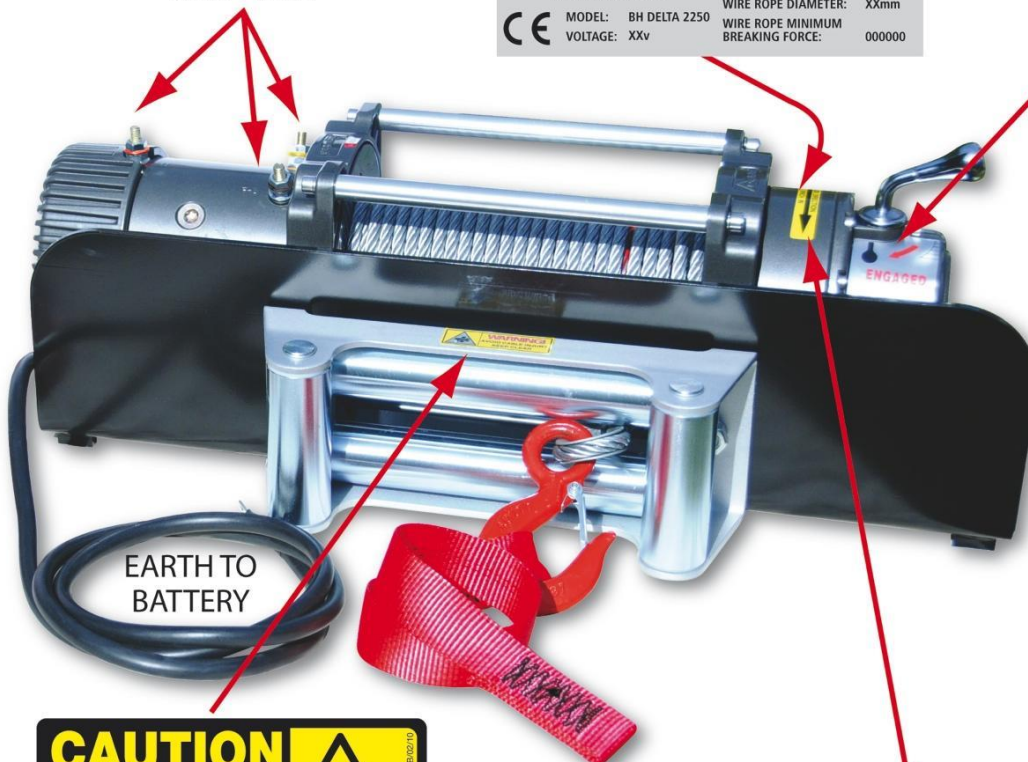
The two alternative end labels shown below are for either 12v or 24v and are located at the end of the winch housing. Other labels are located as shown.



### RATINGS

WINCH RATING	
<b>BHW GROUP</b>	SERIAL No: 000000
Bushey Hall • Winchmaster	DATE OF MANUFACTURE: 000000
Unit 6, South Central Trading Park, Heddon Road, Hall 1009 101	WORKING LOAD LIMIT HOISTING: 000000
Tel: +44 (0)1482 223663	DRAGGING: (TO EN 14492-1) 000000
CE	WIRE ROPE DIAMETER: XXmm
MODEL: BH DELTA 2250	WIRE ROPE MINIMUM BREAKING FORCE: 000000
VOLTAGE: XXv	

COLOUR CODED  
TERMINALS TO  
SOLENOID



CABLE INJURIES WARNING



DRUM ROTATION

## INSTALLATION

### WINCH MOUNTING

The winch must be securely mounted on a flat surface so that the three major sections (the motor end, cable drum and gear housing end) are properly aligned. It is advisable to use the standard mounting bracket for this winch that includes pre-punched holes to ensure correct alignment.

The mounting surface must be flat (level support) within 0.38mm and sufficiently stiff to resist flexing. Winch securing holes must be kept in alignment and not oversized.

Using the standard mounting bracket with the winch pre-fitted, install angle or channel sections between the first and second body cross bearer positioned so the centerline of the winch drum is on the centerline of the body.

The universal winch mounting plate from BHW Group (Part No. 10766) is available for the BH Delta 2250 and requires the fixings as listed below.

### FIXINGS

#### Winch to Mounting Plate requires:

4 x M10 x 35mm high tensile (8.8) BZP bolts, 4 x M10 plain square full nut BZP,  
4 x M10 plain washer BZP, 4 x M10 spring washer BZP

#### Roller Guide to Mounting Plate requires:

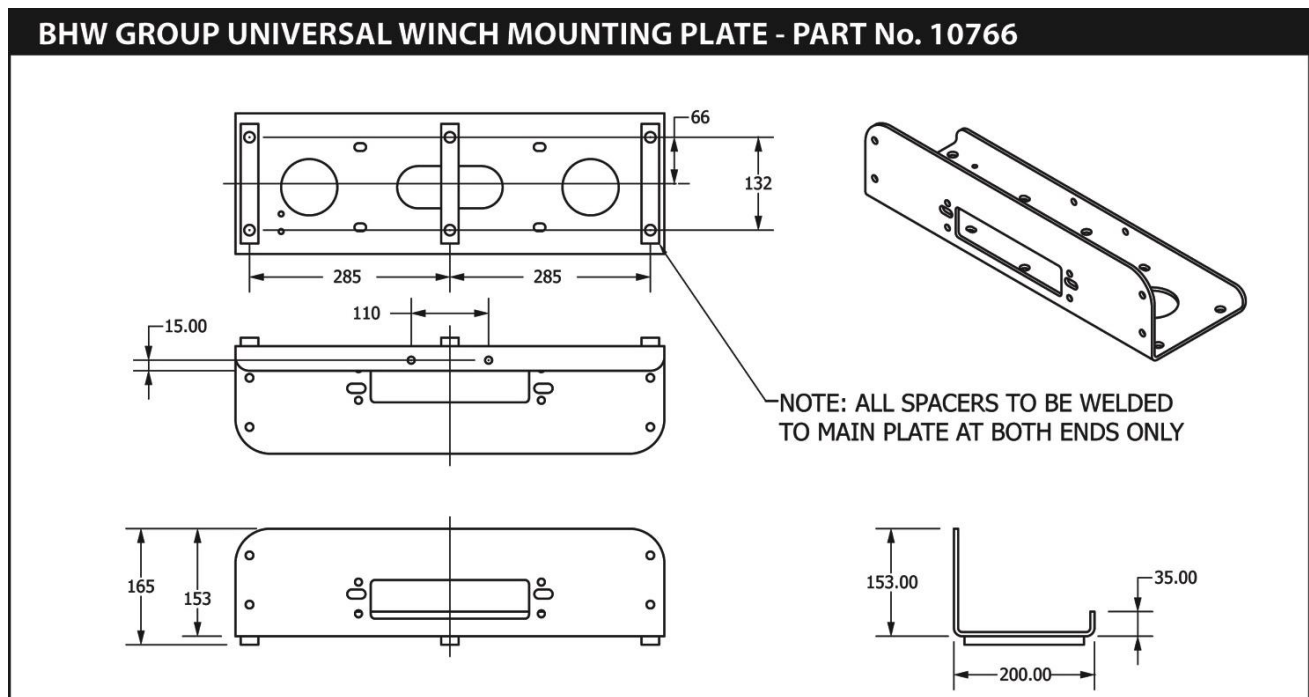
2 x M12 x 25mm high tensile (8.8) BZP bolts, 2 x M12 plain full nut BZP,  
2 x M12 plain washer BZP, 2 x M12 spring washer BZP.

#### Mounting Plate to Body Floor /Subframe Sections (level support) requires:

6 x M12 high tensile (8.8) BZP bolts – NB: length dependant on fit, (must be a minimum of 5mm length of the bolt thread turned through the Nylock insert after tightening),  
6 x M12 Nylock full nut BZP, 12 x M12 plain washer BZP – 2 per bolt.

(BZP = Bright Zinc Plated)

In many applications the body floor will be sandwiched between the mounting bracket and subframe sections.





## INSTALLATION

### ELECTRICAL CONNECTIONS & OPERATIONS

Always ensure the correct voltage corresponding to the chassis electrical system is used. If in doubt consult the dealer. For general advice on batteries please see section in the back of this manual.

**Correct attention to the wiring of the winch is essential for correct functioning and safety.**

### SOLENOID PACK

The BH Delta 2250 is supplied with OR without an electronic load-limiting device. The installation regarding wiring is different for each case so please determine the type being installed and read the following information.

Important note: a load-limiting device must be fitted to ensure compliance with EN14492-1. This is legal safety requirement throughout the European community. Some bodybuilders may however wish to install their own load limiting system.

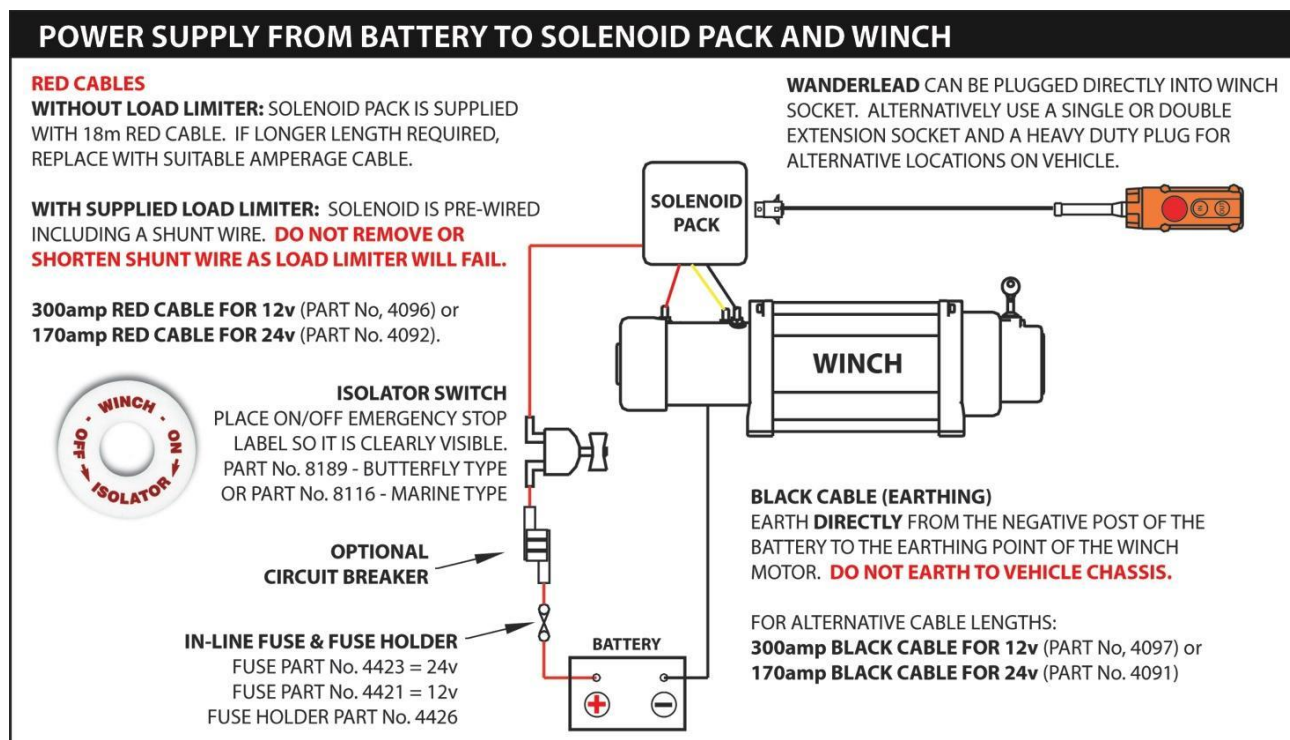
**Supplied without Load Limiting Device:** Solenoid pack is supplied with a 1.8m length red cable. If longer cable length is required, replace red cable. Ensure that cable size is correct for either 12v or 24v.

**Supplied with Load Limiting Device:** Solenoid is pre-wired with a red cable **INCLUDING A SHUNT WIRE**. **On no occasion should the shunt wire be either shortened or removed.**

Mount the solenoid pack either on the winch using the winch tie straps provided or in a convenient position remotely from the winch so it is not susceptible to damage. Also consider water and snow ingress and it should be positioned so this cannot occur. **NOTE: It is very important that the solenoid control box is easily accessible to enable solenoid replacement in the event of a failure.**

### POWER SUPPLY FROM BATTERY TO SOLENOID PACK

The power feeds must be rated at 300 amps for 12v and 175 amps for 24v winches. Recommended cable types are shown below. Available from BHW Group or online from [www.red-bhw.com](http://www.red-bhw.com).

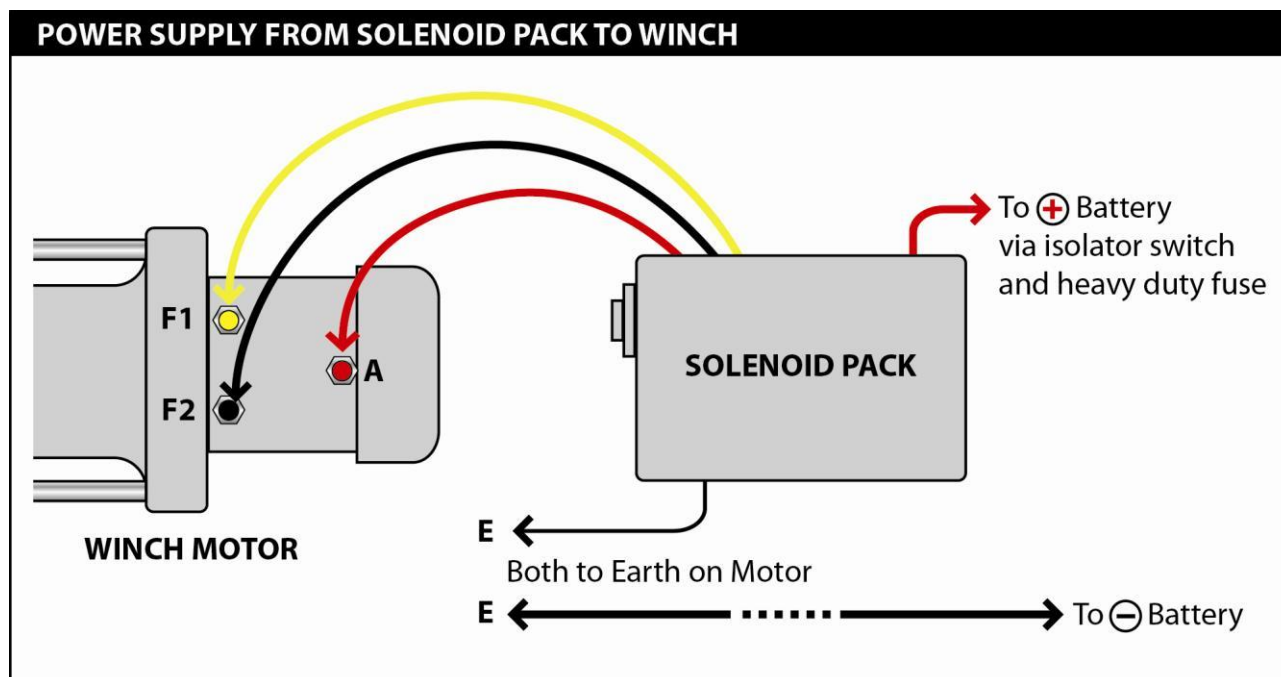


Cables from the batteries should be kept as short as possible to minimise any voltage drop.

## INSTALLATION

### POWER SUPPLY FROM SOLENOID TO WINCH MOTOR

The solenoid should be wired to the winch motor as shown below



1. Short **RED** sleeved cable connects to red terminal (A) of the motor.
2. Short **YELLOW** sleeved cable connects to the yellow terminal (F1) of the motor.
3. Short **BLACK** sleeved cable connects to the black terminal (F2) on the motor.
4. Thin **BLACK** cable (e) connects to bottom terminal of the motor (earth).
5. Long **BLACK** cable (1.8m), one terminal (E) connecting to the bottom terminal (earth) of the motor, and the other terminal connecting to negative (-) terminal of battery.
6. Long **RED** cable positive (+) connect to positive terminal of battery via the isolator switch and heavy-duty fuse.

Ensure that the correct voltage winch is fitted to match the vehicle electrical system.

Always connect an earth wire **direct to the battery** and not just to the chassis. Not only will this prevent a voltage drop to the winch motor but also on modern chassis this is a requirement to prevent damage to the vehicle electrics and to also ensure a good earth return. The power feed and earth wire cables should be kept as short as possible to avoid voltage reduction to the motor as this will result in reduced pulling force and a slower line speed.

## INSTALLATION

### ISOLATOR SWITCHES

A high amperage isolator switch must be fitted- either:  
Marine type (left) - Part No. 8116.  
Butterfly type (right) - Part No.8189.  
Isolator switch kits include cable boots and rotation label.  
Available from BHW Group or online at [www.red-bhw.com](http://www.red-bhw.com)

Isolator must be placed so that rotation on/off label is  
in a clearly visible position.

**ISOLATOR SWITCH MUST BE TURNED OFF  
WHEN WINCH IS NOT BEING USED.**



### HEAVY DUTY FUSES (MEGAFUSE)

A fuse and fuse holder must be fitted in the positive feed cable as close to the battery as possible to prevent  
fire risk to the vehicle in the event of a short circuit in the supply cable.

These can be purchased separately from BHW Group Limited, or online at [www.red-bhw.com](http://www.red-bhw.com).



Please quote the following part numbers.

4421 ..... **300 amp** Megafuse (for **12v** winch)  
4424 ..... **150 amp** Megafuse (for **24v** winch)  
4426 ..... Megafuse Enclosure for above fuses



In some circumstances when the vehicle is involved in high usage with only short driving distances between  
winching operations, it will be necessary to fit an additional heavy duty battery wired in parallel with the  
vehicle battery and kept as close to the winch as possible.

**It is also advisable to have the vehicle fitted with a heavy-duty charging system and heavy duty  
batteries. For battery information please see page 21.**

## INSTALLATION

### ELECTRONIC LOAD LIMITING DEVICE (Optional)

The BH Delta 2250 can be supplied pre-fitted with an electronic load-limiting device that shuts the machine down when the maximum load limit is reached.

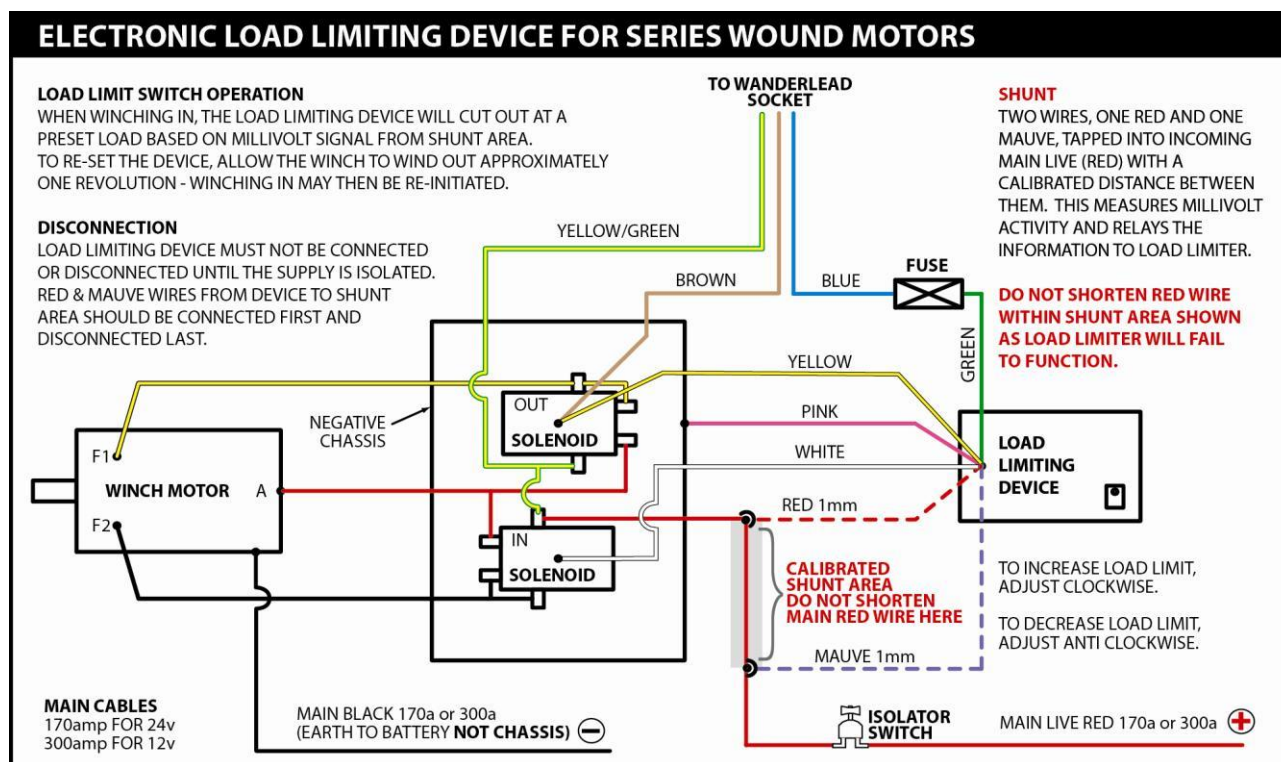
The load limiting device is supplied factory set, but the shut down line pull may not necessarily be accurate for the application due to elasticity in the wire rope and in the vehicle suspension, and may need recalibration.

The sections below detail the connection, testing and adjustment of the load limiting device supplied with the BH Delta 2250.

#### CONNECTING THE LOAD LIMITING DEVICE

The load limiting device is contained in a sealed / potted container (usually positioned on the underside of the solenoid control) with wires for connection as shown in the diagram below.

**IMPORTANT NOTE** The positive supply cable (Red 170a or 300a depending on voltage of winch) is pre-fitted, wired into the load limiter. Linked to this are two 1mm wires (Mauve and Red) whose connections to the positive supply cable are set to a calibrated distance between them. This circuit measures millivolt change in supply and determines when the load limiting device will register maximum load and shut down the operation of the winch. **This section of the positive supply cable and the attached wires must not be removed or modified in any way, as it will cause the load limiting device to fail to function correctly.**



The following page shows how to measure and how to adjust the settings for the load limiting device.

## INSTALLATION

### MEASURING THE SETTING OF THE LOAD LIMITING DEVICE

Use a wire rope on the bare drum with at least seven wraps and the hook connected to an anchor with a dynamometer in the line to measure the load applied. Make sure the battery on the vehicle is fully charged and the engine is running.

It is advisable to have two technicians during this process; one to slowly apply the load by powering the winch using the wanderlead control, and the other to watch the reading on the dynamometer.

**Technicians should stand well away from the line of the wire rope and hook in case of a failure.**

On a new winch installation a proof load test of 125% of the rated winch capacity should be applied to prove the integrity of the winch and its supporting structure.

Following this, further adjustment should be made so that the winch rating is no greater than the maximum load specified on the plate attached to the winch.

### ELECTRONIC LOAD LIMITING DEVICE ADJUSTMENT

**Before any adjustment is made, the load must be relieved to take tension out of the wire rope.**

Once the load limiter has stopped the winch can be re-set by pressing the 'OUT' button on the wanderlead. Usually a quarter turn of the winch will be sufficient to re-set it for operation.

An adjustment screw to enable an accurate load setting is bedded into the outer of the load limiting device.

To make an adjustment use a screwdriver and wind in to increase the rating or wind out to reduce the rating.

The load limiting device should then be measured again for load tolerance as per instructions above, and this process should continue until the correct calibration is achieved.

Following final adjustment a drop of nail varnish or similar proprietary compound can be placed in the hole containing the adjusting screw as this will show any tamper evidence on future inspection.



## INSTALLATION

### WANDERLEAD REMOTE SOCKETS

Position female connector to accept wanderlead at convenient point that will avoid damage and water spray. Connect a 3 core 5amp waterproof cable and secure this to avoid chaffing and route to winch position. Fit a male connector to plug into winch socket. Silicon waterproof sealant is recommended around all electrical connectors. BHW optional kits are available for both single and double rear sockets. Part numbers 11066 and 7093.

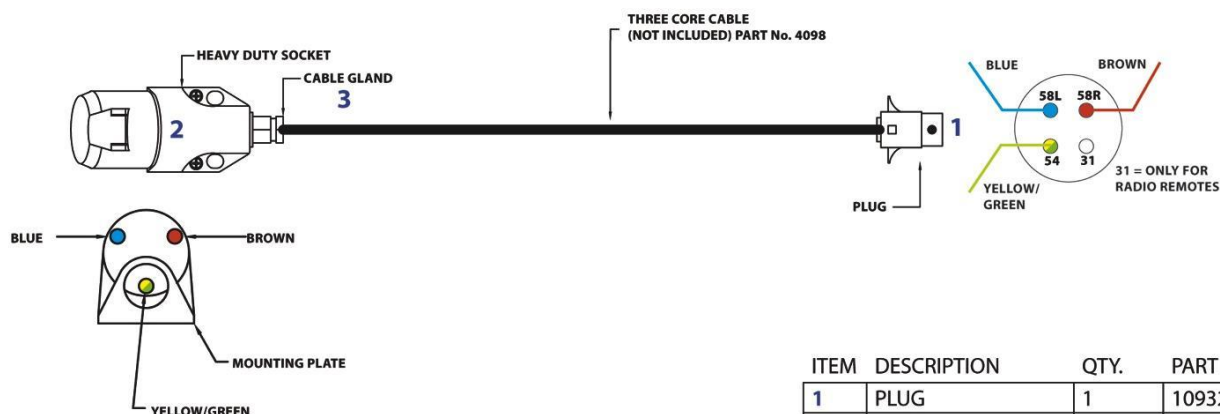
#### SINGLE EXTENSION SOCKET WIRING

##### TO WIRE HEAVY DUTY SOCKET

REMOVE TOP COVER PASS THREE CORE CABLE THROUGH GLAND AND ENTRY HOLE.  
VIEW SOCKET FROM GLAND END WITH MOUNTING PLATE DOWN AND CONNECT THREE CORE CABLE AS SHOWN BELOW.  
APPLY SILICONE SEALANT AROUND EDGES OF TOP COVER BEFORE IT IS SECURED IN PLACE TO PROVIDE WATER RESISTANCE.  
FINALLY SCREW CABLE GLAND INTO SOCKET MOUNTING PLATE AND GENTLY TIGHTEN USING A SPANNER.

##### TO WIRE PLUG

BLUE TO 58L  
BROWN TO 58R  
YELLOW/GREEN TO 54.  
FILL INSIDE OF PLUG WITH SILICONE SEALANT TO PROVIDE WATER RESISTANCE.  
PIN 31 ONLY USED FOR RADIO REMOTE CONTROLS.



ITEM	DESCRIPTION	QTY.	PART No
1	PLUG	1	10932
2	H/D SOCKET	2	7078
3	CABLE GLAND	2	6067

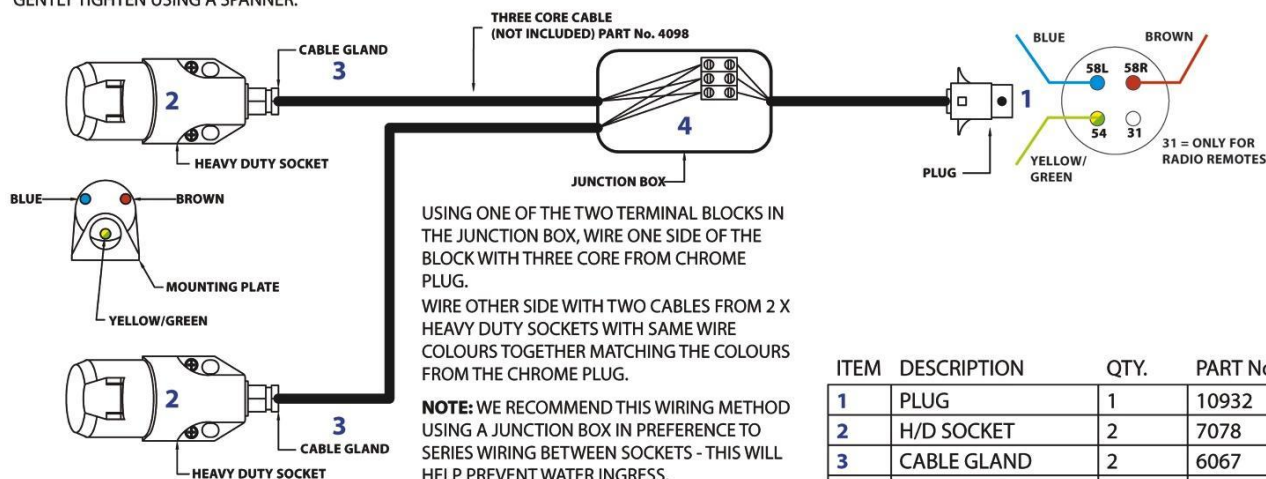
#### DOUBLE EXTENSION SOCKET WIRING

##### TO WIRE HEAVY DUTY SOCKET

REMOVE TOP COVER PASS THREE CORE CABLE THROUGH GLAND AND ENTRY HOLE.  
VIEW SOCKET FROM GLAND END WITH MOUNTING PLATE DOWN AND CONNECT THREE CORE CABLE AS SHOWN BELOW.  
APPLY SILICONE SEALANT AROUND EDGES OF TOP COVER BEFORE IT IS SECURED IN PLACE TO PROVIDE WATER RESISTANCE.  
FINALLY SCREW CABLE GLAND INTO SOCKET MOUNTING PLATE AND GENTLY TIGHTEN USING A SPANNER.

##### TO WIRE PLUG

BLUE TO 58L  
BROWN TO 58R  
YELLOW/GREEN TO 54.  
FILL INSIDE OF PLUG WITH SILICONE SEALANT TO PROVIDE WATER RESISTANCE.  
PIN 31 ONLY USED FOR RADIO REMOTE CONTROLS.



ITEM	DESCRIPTION	QTY.	PART No
1	PLUG	1	10932
2	H/D SOCKET	2	7078
3	CABLE GLAND	2	6067
4	JUNCTION BOX	1	5978

## INSTALLATION

### EMERGENCY STOP SYSTEM

It is a requirement under EN14492-1 and the Machinery Directive that all machines have Emergency Stops.

Whilst BHW Group can offer a comprehensive range of Emergency Stop systems, it is ultimately the responsibility of the person installing the winch to carry out a risk assessment to decide and provide the Emergency Stop suitable for the application.

BHW Group Emergency Stop options include:

1. A heavy duty Emergency Stop circuit breaker button that is wired into the main power feed, that when activated cuts the power to the winch.
2. An additional solenoid, that utilises a diode and is energised as soon as either 'In' or 'Out' buttons on the wanderlead are activated. This diode ensures that the vehicle battery will not go flat if the operator forgets to turn off the winch isolator button after use. Emergency Stop circuit breaker button or buttons can be located in the appropriate position for the vehicle application. This system can work in conjunction with the BHW Group FM Connect radio remote system.
3. As No. 2 above but with an additional Emergency Stop circuit breaker button located on the wanderlead handset.
4. A complete control panel incorporating the directional solenoids, Emergency Stop and isolator switch. The control system can then be mounted in the most suitable work area and comes with a full wiring harness.

Please contact BHW Group sales to discuss any of these options on 0208 953 6050.

### TESTING

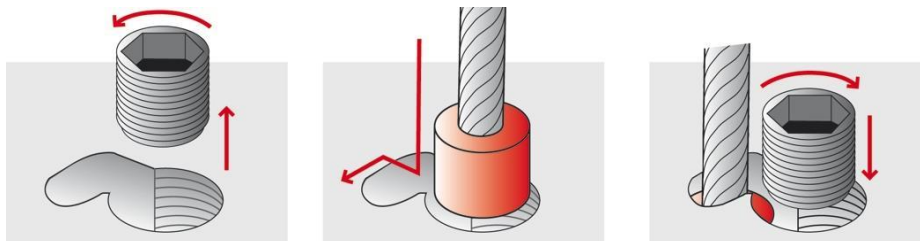
After the installation is complete, a proof load test of 125% of the rated load should be carried out to ensure correct installation before the winch goes into service. To adjust the load limiter to provide the necessary force required see above under load limiting devices.

### TO TRIAL THE WINCH

Turn on isolator switch, plug in wanderlead control. The winch can be powered both 'In, and 'Out'. The load is automatically held safely when control button is released.

### WIRE ROPE INSTALLATION

Unwind the new cable by rolling it out along the ground behind the vehicle to prevent kinking. Position the cable drum so the large 10.3mm diameter hole in the drum flange is approximately on top. Remove grub screw from drum and insert cable end with plug into aperture, sliding plug sideways and down (see diagram below). Replace flange screw to secure rope end into drum. Keeping tension on end of rope, run the winch in the 'reel in' direction and spool all the rope onto the rope drum, taking care to form neatly wrapped layers. Test wire ropes are available from BHW Group if required.



The BH DELTA 2250 winch is rated at 22.07kN (2250kgf) and this refers to its safe working load, measured as the force being applied to the winch in a horizontal place. As in the case of all winches, this refers to the first layer of rope on the drum.

## OPERATING INSTRUCTIONS

### SAFETY PRECAUTIONS

#### PLEASE READ THIS CAREFULLY BEFORE OPERATING THE WINCH.

It is important that you read and digest the information contained in this handbook. The winch is of the highest quality and has been designed to give a robust and efficient service for many years if care and attention are given at all times to correct, safe operation and maintenance.

Respect for a winch and common sense in its operation, will ensure complete safety and reliability. Do not underestimate the potential danger in winching operations. Be aware of the basic dangers so you can avoid risk of accidents and unnecessary damage to the winch or the vehicle / application.

#### The following safety precautions must be observed at all times whilst using the winch.

Keep yourself and others at a safe distance to the side of the wire rope when pulling under load.

Never step over, stand near or guide a rope under tension. Always use heavy-duty gloves when handling the wire rope to protect against cuts or possible burns.

Take care of the wire rope. Check regularly for signs of damage or stretch in the form of broken strands or severe kinks along its length. If there are more than 10 strands broken in any 25mm of the rope's length then it will be significantly weakened and must therefore be replaced.

Wear and tear can be prevented by regular application of rope dressing available in aerosol form from your winch supplier. Oil and grease should never be used.

Always apply tension to the wire rope (using the safety hook webbing strap attached to the hook) to ensure that the wire rope is rewound neatly and evenly on to the drum. Loose coils or uneven wrapping are dangerous and can result in trapping or snatching when next used - and also damage to the wire rope or the winch.

Do not drive the vehicle to pull a load on the winch wire rope, e.g. as a tow rope, Any resulting shock load could break the rope or damage the winch.

If the winch is being operated at maximum capacity, drape a heavy blanket or coat over the wire rope, halfway along its length. The blanket will reduce the speed of a snapped rope.

When recovering a vehicle, the winch hook should be attached to the towing hitch, if available, or to a strap or chain around a chassis leg or cross member. **NEVER** anchor the winch hook onto bumpers, or shipping / transit anchorage.

Do not allow the load to 'snatch' during a pull, as this can momentarily double or even treble the load on the rope.

Try to position either your vehicle or the anchor point to ensure as straight a pull as possible. Use a snatch block if it is necessary to turn any corners with the rope.

When attaching the hook to the load, always double check that the hook is secure and the safety catch is fully closed. Remember that if the hook breaks away under tension, serious injury can result, as the hook will travel through the air at speed.

A minimum of five wraps of rope around the drum is recommended to hold the load.

**NEVER** hold the safety hook to rewind the winch – use the safety hook webbing strap provided.

## OPERATING INSTRUCTIONS

### WINCH RATING

The Winch rating on the BH2550 Delta model refers to its maximum rated line pull, measured as the force being applied to the winch in a horizontal plane. As in the case of all winches, this refers to the first layer of rope on the drum.

In most cases, when the winch is being used, there is no way of accurately determining the exact pull being applied. It is important, however, to try and establish that it is within the working capacity of both the winch and wire rope and this can be done by considering the following formulae which applies for gradients up to an angle of 45°. For wheeled vehicles, the pull required to move the load equals:

$$\frac{W}{25} + \frac{(W \times \text{angle of gradient})}{60}$$

Where W = load in tonnes and angle of gradient is in degrees.

**EXAMPLE:** If W, the load of the vehicle is 2 tonne and is being pulled up skids, which form a gradient of 15°, the force on the rope is:

$$\frac{2}{25} + \frac{(2 \times 15)}{60} = 0.08 + 0.50 = 0.58 \text{ tonne.}$$

Remember the winch pulling capacity reduces as the number of layers of wire rope increase on the drum.

If it is necessary to work beyond the limits of either the winch or wire rope, it is essential that a snatch block be employed, which will enable the line pull to be nearly doubled. If you should have any queries regarding the maximum load applied in a particular application, please do not hesitate to contact us and we will be pleased to offer our assistance.

### TO OPERATE WINCH

**Operator familiarisation:** Operators must firstly become familiar with the winch operating system with no loading applied.

Note the position of the power isolator switch and turn it on. All systems must by law include at least one emergency stop and these should be located in an easily accessible position and this should be noted. Plug in the wanderlead control and with the winch under no load but with hand tension applied through the strap attached to the hook power out and then in several times.

Now operate the freespool clutch to both see and feel the full engagement and disengagement position. With the winch disengaged freespool wire rope of the drum and then re-engage freespool.

When you are familiar with the operating features turn on the isolator and plug in the wanderlead control. The winch can be powered both in and out. The load is automatically held safely when control button is released.

The best way to become acquainted with how your winch operates is to make test runs. Plan your tests in advance. Remember that you hear your winch as well as see it operate. Come to recognise the sounds of a light steady pull, heavy pull, and sounds caused by load jerking or shifting. Gain confidence in operating your winch and its use will become second nature to you.

The uneven spooling of wire rope whilst pulling a load, is not a problem, unless there is a pile up of rope on one end of the drum. If this happens, reverse the winch to relieve the tension on the rope and move your anchor point further to the centre of the load. After the job is complete, you can unspool and rewind the wire rope neatly. Always switch off the power supply isolator switch after use and always use the webbing strap attached to the safety hook when rewinding rope back onto the drum to prevent potential injury to hands from the roller guide.

### FREE SPOOLING

To release clutch, power out winch until tension is released from cable. Turn the control lever on side of casing and turn 90°. To re-engage, turn lever back through 90°. Ensure that handle is fully engaged before imposing load on winch.

### CAPACITIES

The BH DELTA 2250 winch is rated at 2250kg (22.07kN) and this refers to its safe working load, measured as the force being applied to the winch in a horizontal plane. As in the case of all winches, this refers to the first layer of rope on the drum.

## MAINTENANCE

### REGULAR MONTHLY MAINTENANCE

Externally:

The winch should be kept clean in order to prevent any build up of corrosion on external working parts.

Inspect roller guides for grooving and if excessive, wire rope life will be reduced. Worn guides should be replaced to ensure wire rope is not damaged.

- Check winch for external damage.
- Check winch mounting for distortion and re-tighten mounting bolts if necessary.
- Operate free spool clutch mechanism to ensure correct operation, giving full engagement and disengagement.
- All external-moving parts should be lubricated with lightweight oil.
- All electrical connections and wiring should be inspected for loose connections, corrosion or fraying.
- Check the tie bars that hold the winch in alignment replace if bent or broken.
- Check the emergency STOP control to ensure it functions correctly by operating the winch and pushing the STOP button.

### SPARES

If it becomes necessary to obtain replacement parts, refer to diagram and list shown on pages 19-20.

Please contact us quoting serial numbers if possible and model number.

BHW Group Limited reserve the right to change specifications without notice.

### CARE OF THE WIRE ROPE

#### **NOTE: ISO 4309:2004/2010 – WIRE ROPES DIRECTIVE**

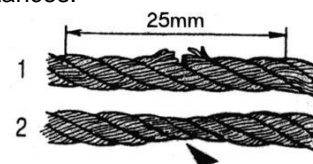
*ISO 4309:2004 / 2010 details guidelines for the care, installation, maintenance and examination of wire rope in service on winches, hoists and cranes, and enumerates the discard criteria to be applied to promote the safe use of the machinery.*

*It is important that these guidelines - for safe care, installation and ultimately disposal of wire ropes is strictly adhered to according to this directive.*

It is most important that the wire rope is inspected on a regular basis, for kinks, flat spots, broken strands and other damage, and if necessary the damaged sections should be cut away and the rope reattached or completely replaced.

Check both the rope and the hook and replace under any of the following circumstances:

- 10 strands of rope or more broken with a space of 25mm (See fig. 1).
- Rope shows visible signs of wasting (See fig.2).
- Deformed or excessively corroded rope.
- Twisted rope.
- Bent rope.



A good habit is to rewind the rope onto the winch drum after it has been used, so that it is evenly layered. To do this, rewind keeping the rope under tension. Normally the load can be applied by hand.

Under no circumstances wrap the wire rope around the load being recovered and then attach the hook back on to the rope. This will result in serious rope damage or breakage. Always employ a chain or webbing strap from the hook to the load.

- Wire rope and hook must be replaced if damaged.

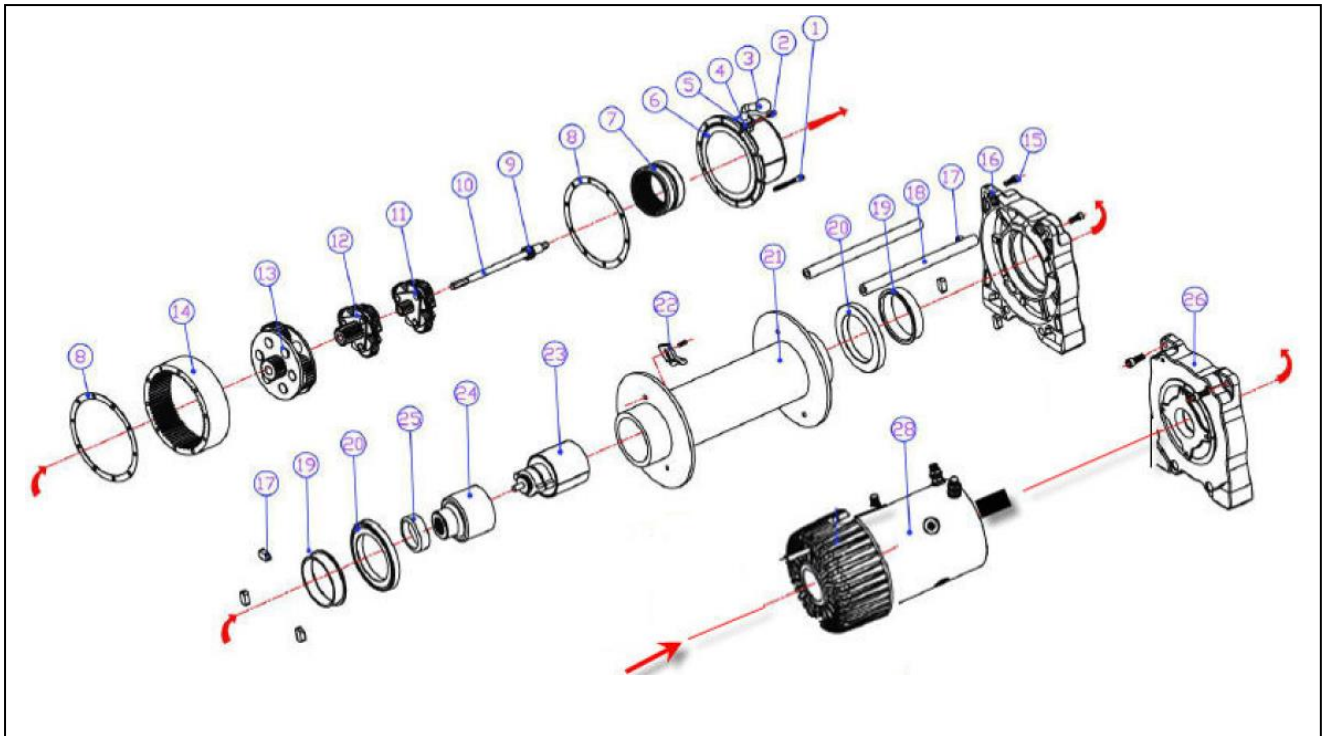
If the winch is not being used on a regular basis it should be powered in and out from time to time to minimise corrosion of the internal motor components that may occur due to condensation. Energising the motor will generate heat, which will help dissipate any moisture.

**WIRE ROPES ARE NOT COVERED BY WARRANTY.**



## WINCH PARTS

### GENERAL PARTS DIAGRAM



### GENERAL PARTS LIST

No.	BHW No.	QTY.	DESCRIPTION
1	10695	10	Socket head cap screw
n/s	10694	1	Decals label ' free spool'
2	10696	1	Detent screw
3	10698	1	Clutch lever
4	10697	1	O ring
5	10730	1	Metal cover (for item 4)
6	20762	1	End housing
7	16880	1	Ring gear sliding
8	10699	2	Gasket
9	10701	1	Sun gear
10	10700	1	Hex shaft
11	10702	1	Carrier assembly, stage 1
12	10703	1	Carrier assembly, stage 2
13	10705	1	Carrier assembly, stage 3
14	10706	1	Ring gear fixed

No.	BHW No.	QTY.	DESCRIPTION
15	10707	8	Flange head cap screw M8
16	10708	1	Drum support, gear train
17	16881	6	Anti-friction mat
18	10711	4	Tie rod
19	10710	2	Drum bushing
20	16883	2	Oil seal
21	10713	1	Drum standard
22	10718	1	Rope plug M20 x 18mm , 2.5 pitch
23	18198	1	Brake assembly GEN 4
24	15691	1	Brake coupling steel
25	16884	1	Brake spacer 8mm
25a	17238	1	Brake spacer 17mm
26	10709	1	Drum support, motor
28	10719	1	Motor 12 volt
28a	10720	1	Motor 24 volt

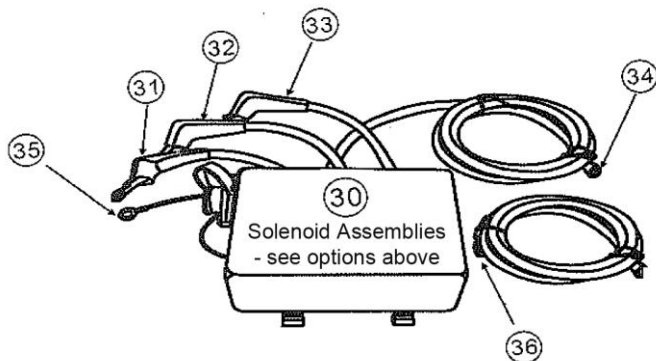
Brake Shoes also available in sets of 3. Item No.19983

## WINCH PARTS

### PARTS LIST – SOLENOID ASSEMBLIES, WIRE ROPES, WANDERLEADS

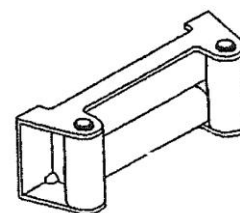
#### Solenoid kit options

BHW No.	DESCRIPTION
13576	12v Heavy duty 4 pin socket, mounting plate, load limiter, shunt wire
13577	24v Heavy duty 4 pin socket, mounting plate, load limiter, shunt wire
13574	12v Heavy duty 4 pin socket, mounting plate only
13575	24v Heavy duty 4 pin socket, mounting plate only
13572	12v with standard Heavy duty 4 pin socket only
13573	24v with standard Heavy duty 4 pin socket only
13570	12v3 pin chrome factory socket, mtg plate, load limiter, shunt wire
13571	24v 3 pin chrome factory socket, mtg plate, load limiter, shunt wire
13567	12v 3 pin chrome factory socket, load limiter, shunt wire only
13568	24v 3 pin chrome factory socket, load limiter, shunt wire only
13565	12v 3 pin chrome factory socket, mounting plate only
13566	24v 3 pin chrome factory socket, mounting plate only
10724	12v 3 pin chrome factory socket only
10734	24v 3 pin chrome factory socket only



#### Solenoid assembly spares

No.	BHW No.	QTY.	DESCRIPTION
31	10725	1	Motor field wire (black)
32	10726	1	Motor field wire (red)
33	10727	1	Motor field wire (yellow)
34	10728	1	Positive (+) cable 2m
35	10729	1	Earth wire from solenoids to motor
36	10730	1	Earth cable black 2m
N/S	3357	2	12v Solenoid Unipoint
N/S	3358	2	24v solenoid Unipoint
N/S	10932	1	Black 4 pin plug only
N/S	10933	1	Black 4 pin socket only
N/S	6287	1	Load limiter only
N/S	11234	1	Solenoid mounting plate only
N/S	6256	1	12v Shunt wire only
N/S	6289	1	24v Shunt wire only
N/S	13989	1	Solenoid cover only

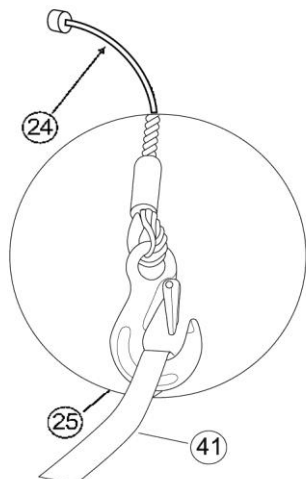


#### Roller guide

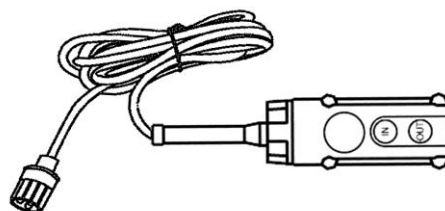
BHW No.	QTY.	DESCRIPTION
10732	1	Heavy Duty 4 way roller guide

#### Wire ropes, hooks and accessories Wanderlead options

No.	BHW No.	QTY.	DESCRIPTION
24	10825	1	15m x 8mm Wire rope 1960N 6x36 + hook
24a	10826	1	23m x 8mm Wire rope 1960N 6x36 + hook
25	10718	1	Safety hook 1.5 Tonne alloy
41	9867	1	Safety hook webbing strap



BHW No.	Description
10722	3.5m BH2250 Delta wanderlead, std. factory chrome plug
10997	4.5m wanderlead, black 4 pin plug, 2 button IN / OUT
11974	10m wanderlead, black 4 pin plug, 2 button IN / OUT



## TROUBLE SHOOTING

CONDITION	POSSIBLE CAUSES	CORRECTIONS
Clutch inoperative and will not rotate.	Dry gearbox and mechanism.	Strip gearbox clean and re grease.
Cable drum will not freespool	1) Winch not mounted squarely, causing end bearings to bind drum 2) Drum bearing dry	1) Check mounting, refer to winch mounting Page 12 2) Strip clean and grease
Winch will not hold the load	1) Excessive load. 2) Worn or damaged brake	1) Reduce the load or double line using snatchblock 2) Repair or replace brake
Motor runs in one direction only	1) Inoperative solenoid or stuck solenoid  2) Broken wire or bad connection  3) Load limit switch malfunctioning (if fitted)	1) Jar solenoid to free contacts. Check by applying 12 volts to coil terminal (it should make an audible click when energised) 2) Check for loose connection on wanderlead control  4) Replace load limiter and reset
Motor runs extremely hot	1) Long running period at high loading. . 2) Damaged motor 3) Damaged brake	1) Cooling-off periods are essential to prevent overheating 2) Replace motor 3) Replace brake
Winch runs in reverse	1) Motor wires reversed 2) Solenoids wired incorrectly	1) Check wiring 2) Recheck wiring
Motor will not operate	1) Isolator switch not turned on 2) Fuse has blown 3) Break in power lead or extension socket 4) Inoperative solenoid or stuck solenoid  5) Inoperative motor 6) Loose connections 7) Emergency stop button depressed	1) Turn on isolator switch 2) Replace fuse 3) Repair or replace wiring 4) Jar solenoid to free contacts. Check by applying 12volts to coil terminal (it should make an audible click when energised). If there is no click fit new solenoid 5) If solenoids operate, check for voltage at armature post, replace motor 6) Check all power lead connections are tight 7) Check emergency stop and if depressed, release
Motor runs but with insufficient power or line speed	1) Weak Battery 2) Battery to winch power lead too long creating voltage drop 3) Poor battery condition 4) Poor earth connection 5) Damaged brake 6) Poor isolator switch condition	1) Recharge or replace battery. Check charging system 2) Check correct amperage cable and/or reduce length 3) Check battery terminals for corrosion. Clean as required 4) Check and clean connection Cable should earth to battery not chassis. 5) Repair or replace brake 6) Repair or replace isolator switch
Motor runs but drum doesn't turn	Clutch not engaged Drive shaft damage	Engage clutch Repair or replace drive shaft

## NOTES ON BATTERIES

As a result of radical changes in vehicle battery design and performance that have taken place over recent years it is essential that the correct type are specified on new vehicles that will include an electric winch or other high electrical power consumer.

Heavy Duty ED3/VB3 rated should be specified as these are vibration proof and have 2.5mm thick plates compared to the standard 1.5mm. They also have glass wool separators, which reduces the leeching problem. The operating duty cycle for this class of battery is 14 starts compared to only 6 on a standard battery.

For extra heavy duty applications where high start up surges are required, Holchstrom Gel filled batteries should be specified which have a flat instead of declining rate of discharge. These offer up to a 40% increase of cold start performance for a battery of the same physical size.

Incorrect type will cause problems for vehicles using equipment requiring high DC Power consumption such as an electric winch, flashing beacons and work lights.

A standard amp hour rating is used for all batteries and this indicates the amperage available when a constant discharge is achieved over 20 hours. As an example a battery with an amp hour rating of 75 means the battery can carry a load of 3.75 amps for 20 hours.

Vehicle manufacturers' requirements have changed due to improved engine efficiency and many now require hundreds of amps for a few seconds for starting and to save space they demand small lightweight batteries. These batteries are designed to discharge around 15% of their total capacity and then recharge quickly from the alternator.

The duty cycle design criteria for vehicle batteries is to crank a cold engine for 10 seconds and then rest for 1 minute allowing the battery to recover and the starter motor to cool down. The engine would normally have started consuming equipment like a DC winch is operated for much longer periods of time with only short breaks and then recharged this is referred to as deep cycling. In winching applications the battery is continuously subjected to deep cycling and recharging this will result in premature loss of battery capacity.

The new generation of starter batteries are now light duty designed to retain 75% - 85% charge throughout their working life with a maximum duty cycle of 6 – 7 starts.

If batteries are used for winch or similar applications and suffers voltage drop, soft lead sulphate deposits may appear on the plates and separators. If left discharged for a period of around 70 hours the lead sulphate hardens and crystallises forming an insulation barrier preventing it from accepting a charge and effectively causing irreparable damage.

All popular traditional batteries leech between the plates when not in use particularly in warmer weather causing a self-discharge. In poor quality batteries this problem is worse.

24v systems using two 12v batteries of this type:- If one battery deteriorates and becomes weak it will resist charging and the stronger battery will take precedence. A voltage reading of 25-26v may be measured but under the very high load during winching this will reduce dramatically putting excessive strain on the good battery causing it to fail prematurely.

## WARRANTY

BHW GROUP LIMITED warrants each new winch and ancillary equipment supplied against factory defects in material and workmanship for one year from date of purchase.

The responsibility for removing the winch or ancillary equipment is the owner's together with its return, transportation prepaid to BHW Group Limited.

BHW Group Limited will, under this Warranty, without charge repair or replace at its option, parts, which on inspection are deemed to be defective. The loss of use of the produce, loss of time, inconvenience, commercial loss or consequential damages are not covered.

Warranty does not apply where the product has been tampered with or altered in any way, or where the serial number or date stamp has been defaced, altered or removed, or if in the view of BHW Group Limited the damage or failure occurred from misuse, negligence or accident.

### THIS WARRANTY EXCLUDES THE WIRE ROPE

BHW Group Limited reserve the right to change the design of any product without assuming any obligation to modify any product previously supplied.

Fitted vehicles or equipment returned under warranty should be sent to BHW Group Limited service department at the address indicated below, with full name and address of sender, and a statement detailing the defect.

**BHW**  
**Bushey Hall Winchmaster**  
**www.bhwgroup.com**

Service Department  
Lismirrane Industrial Park  
Elstree Road  
Elstree Herts WD6 3EE

Telephone: +44 (0)20 8953 6050

Email: [sales@bhwgroup.com](mailto:sales@bhwgroup.com)

Website: [www.bhwgroup.com](http://www.bhwgroup.com)

**BH DELTA 2250 VOLTAGE.....**

**SERIAL NUMBER.....**

**DATE OF PURCHASE.....**