



## OPERATION MANUAL

Translation from Polish language version.

### ABILUS GROUP SP Z O O

ul. Przemysłowa 24  
32-083 Balice

**Sales department:**

tel. +48 728 876 877, e-mail: [bielsko@dragonwinch.com](mailto:bielsko@dragonwinch.com)

**Service department:**

tel. +48 608 427 742, e-mail: [kraków@dragonwinch.com](mailto:kraków@dragonwinch.com)  
[www.dragonwinch.com](http://www.dragonwinch.com)

## TABLE OF CONTENTS

Introduction	23
Symbols used in the manual	23
Recommendations for a safe use of the winch	24
Winch operating principles	27
Mounting of the winch	29
Operation of the hydraulic winch	31
Connection of the hydraulic winch	33
Winch lubrication and maintenance	35
Winch capacity	35
Warranty Terms and Conditions	36
Declarations of Conformity	38
Block diagrams of connections for hydraulic winches	39
Table 1.0	42

## INTRODUCTION

Thank you for purchasing the Dragon Winch product. We wish you many years of enjoyable winching.

This manual was created to provide the user with information necessary for a safe and correct operation of the winch, as well as its maintenance, repair and storage. It also contains a description of the risks arising from the operation of the winch.

Before the first use of the winch carefully read all the information contained in this manual. If you have any questions or if anything is unclear, please contact the manufacturer for more detailed information.

The operation manual is an integral part of the winch and should be stored near the winch for reference, whenever necessary. The manual must also be transferred to the next user in case of resale of the winch.

The manufacturer reserves the right to make changes without notice.

## SYMBOLS USED IN THE MANUAL

Warning symbols used in this manual highlight the information on potential risks and other information of particular importance. These are:



### **WARNING**

Symbol for the procedure, which, if not performed correctly, may cause injury and even death of the operator.



### **ATTENTION**

Symbol for the procedure, which, if not performed correctly, may cause damage to the device.



### **IMPORTANT**

Symbol for important additional information which require particular attention.

**IMPORTANT**

Follow all instructions in this manual to ensure your personal safety and the safety of others. Proper operation, maintenance and storage of the winch have a crucial impact on its efficiency and lifetime. Improper use of the winch can be extremely dangerous both for the user and others, and may lead to serious damage. Before using the winch read this manual carefully, and follow the instructions contained herein.

**IMPORTANT**

Safety precautions and procedures presented in this manual cannot anticipate all possible circumstances and situations you may encounter. It is always essential to use your common sense and maximum caution.

**IMPORTANT**

In case of doubt concerning any point of this manual, please contact the manufacturer.

## **RECOMMENDATIONS FOR A SAFE USE OF THE WINCH**

**User****A) Operator**

Never use a winch if you are under the influence of alcohol, drugs or medications which reduce attention and speed of reaction.

**B) Clothing**

Do not wear loose clothing and jewelry that can be caught in moving parts.



Always wear leather gloves when holding the winch cable. Do not hold the steel cable with bare hands, because even small cracks on the cable may cause hand injury.



It is recommended to use non-slip shoes.





Use headgear and tie long hair.

**C) Distance**

Make sure unauthorized people are kept at appropriate distance from the working winch and its cable. It is recommended to keep a distance equal to 1.5 x of the cable length.

**WARNING**  
 A cracked cable may cause serious injury and even the death of people in its way.

  
 Do not cross over a stretched cable and never stand over the cable.



**Winch**

**A) Operation**

The vertical pull winch should only be used for the purposes for which it was designed - helping to get vehicles, cargo or objects out from a difficult position. The use of a winch for other purposes is inconsistent with its intended use and may result in death, injury and property damage.

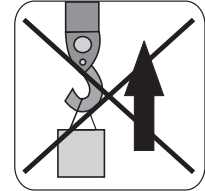
**B) Repair**

Use only genuine spare parts. If they are not available, use parts with appropriate approvals and safety certifications.

**C) Overloading**

Do not overload the winch. Winch capacity specifications are maximum parameters, not working parameters. Remember that the winch pull force values are specified for the first fake of the cable on the drum and for perfect conditions. Any obstacle (slope, mud, water, marshy terrain, etc.) significantly reduces the winch pull force.

Any jerks while pulling are very dangerous and may lead to breaking the cable, damaging the winch as well as serious injuries. Although, the term “vertical pull” is mentioned in the description of the winch capacity, under no circumstances may the winch be used for vertical load lifting. Both the winch and the cable are not designed for such use. The term “vertical pull” only serves to determine the capacity and the technical parameters of the winch.



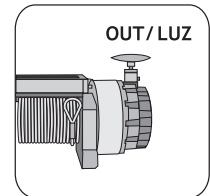
If the motor has heated up too much, stop working for a few minutes – until it cools down.

If the motor stops, disconnect the power supply and diagnose the problem.

Overloading the winch may also cause cable damage.

**D) Accidental activation of the winch**

Avoid accidentally activating the winch by disconnecting it mechanically from the power supply. When the winch is not in use, switch the gear transmission lever to “OUT” or “LUZ.”



### E) Winch inspection

Before each starting, check if the winch is not damaged. Repair or replace any defective components.

Periodically check the winch mounting and make sure that all screws are properly tightened.

### F) Winch cable

The strength of the steel rope (cable) provided with the winch is appropriate to the power and intended use of each specific winch.

The diameter and length of the cable for the same winch model may vary, maintaining constant strength and safety parameters.

Before each use, check the condition of the cable. Any frayed cable with broken wires should be replaced immediately. Always replace the cable with the same or equivalent type recommended by the manufacturer. The equivalent types must have the same pull force, quality, arrangement parameters and wire performance.

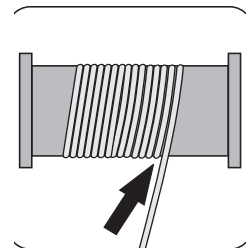
Pay attention to the correct direction of cable winding. The cable must be wound on the underside of the winch drum (between the mounting plate and the drum). Wrong direction of cable winding may cause serious damage to the winch.

The cable must be wound evenly, fake to fake, on the

winch drum in such a way that it does not cause the cable to build up in one place or jam it between the lower layers. Improper winding of the cable significantly reduces the efficiency of the winch and may lead to damaging the equipment. In such cases, unwind the cable and start winding it again.

After work, the cable should be pulled (laid on the drum) with no load. Hold the tightened cable in one hand and the winch remote controller the other.

For your own safety, during winding keep a minimum distance of 1.5 m from the winch.



#### ATTENTION

Do not use the winch cable as a tow-rope. Use only the winch while pulling the load. Do not “boost” the winch with the vehicle drive.

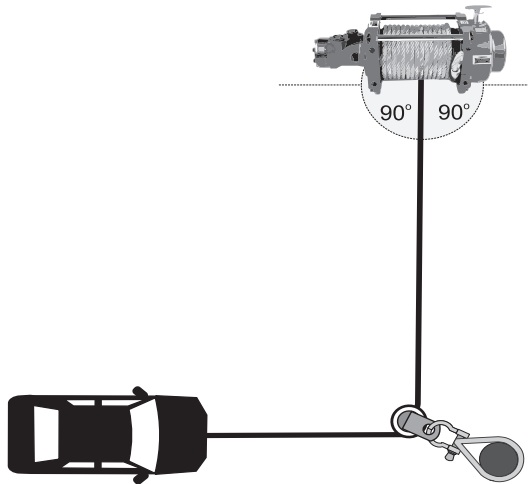
The working life of the cable is directly dependent on how it is used and stored.

#### Cable repair

It is not recommended to repair the cable. Any damaged cable should be replaced with a new one.

### G) Load

Loads must be pulled in a straight line. If pulling loads at an angle is necessary, use the appropriate snatch block. In this case, the angle between the winch drum axis and the cable should be 90 degrees.



The vehicle engine should be running during the winch operation.

### G) Chemical substances

Lubricants and hydraulic oil used during the operation of the winch are not edible products. Operators and people servicing the device must be trained in the construction

and operation of the winch. Before removing any plugs or flexible tubes make sure that there is no pressurized hydraulic oil in the tubes.



#### ATTENTION

Do not repair the cable. Any defective cable should be replaced with a new one. Your safety depends on this.

## WINCH OPERATING PRINCIPLES

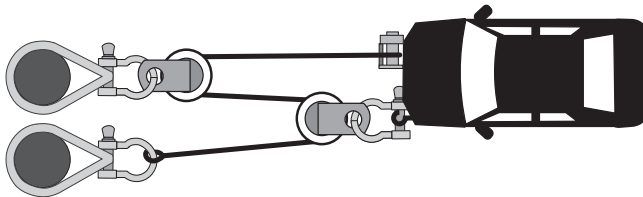
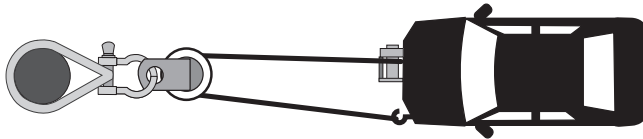
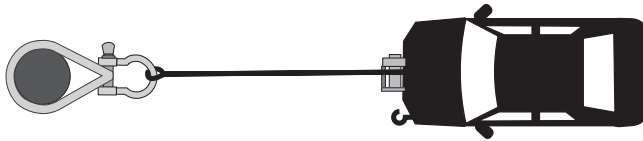
1. If the winch is factory-equipped with a remote controller, it must be stored inside the vehicle.
2. Check the technical condition of the remote controller before each connection.



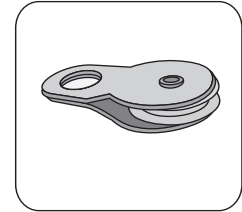
3. The winch is equipped with a manual lever that engages and disengages the gearbox. Begin load winding with the gear engaged. Do not disengage and engage the gear while the winch motor is running.
4. To avoid damaging the cable, do not install hooks directly on the cable. It is necessary to use the factory-provided thimble (eye) or snatch block with a movable pulley.

5. It is not recommended to attach the cable to the tow hook of the pulled vehicle. The cable should be attached to the vehicle frame.

6. Observe the winch carefully during operation while maintaining the maximum possible distance. It is recommended that the pulling process is paused every meter to check if the cable is wound correctly.



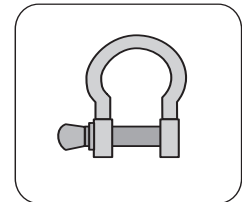
7. The use of a snatch block significantly increases the winch pull force. Pulling the load on a double rope (using the snatch block) increases the power of the winch almost twice, however it decreases the range of the cable and pulling speed by half. Remember to place the vehicle centrally, facing the snatch blocks and distributing the load uniformly on both sections of the cable.



8. Do not wrap the cable directly around a tree. Use appropriate synthetic bands or protection.



9. Omega shackles are recommended for connecting the winch cable with a chain or another cable.



10. When extending the cable from the winch remember to leave at least 5 cable fakes on the drum.

11. It is recommended to put a blanket or car mat on the cable of the winch when in operation. Should the cable break, this will direct it towards the ground.

It is also recommended to open the car bonnet to protect the windshield from breaking in such a case.

12. The winch cable should be constantly stretched during operation. This prevents cables from “breaking” and tangling. If the cable starts to tangle or fold stop using the winch, secure the pulled load, partially unwind the cable and start winding again. If this does not work, loosen the cable and straighten it manually.

13. To stabilize the vehicle when pulling loads, it is recommended to use stop blocks.



**WARNING**

Fully extending the winch cable and running the winch under load can result in ripping the rope fastening off the drum, damaging the equipment and seriously injuring persons nearby.



**ATTENTION**

The user is responsible for a correct installation of the winch on a car.

## **MOUNTING OF THE WINCH**

1. Particular care should be taken not to chamfer the winch during installation, which may lead to its permanent damage.

2. The winch shall be mounted in a suitable place.

3. The power of the winch must be adapted to the vehicle, place and type of assembly.

4. The winch should be mounted on a sturdy steel frame using a 4- or 8-point mounting system. The winch must be mounted horizontally.

5. It is important to mount the winch on a flat surface that is technologically adapted to support the winch.

6. A special steel mounting plate matching the specific winch model is recommended. The higher the pulling power of the winch, the thicker mounting plate must be used (e.g. for 12,000 lbs - the minimum plate thickness is 6 mm). Original bolts are designed for minimum mounting plate thickness.

7. If you use a thicker plate, bolts must be replaced with new ones of at least the same hardness and the adequate length so that the bolt completely passes through the nut.

8. The cable roller guide should be assembled in a way that facilitates pulling the rope in and out. The cable roller guide must not be fixed directly to the winch. The roller guide should be fixed to the mounting plate.





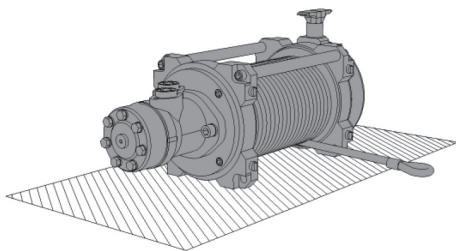
### IMPORTANT

It is recommended to use the shortest hoses possible. The pressure and flow of oil decrease with the increase of the hose length or the reduction of its diameter. If the user has a hydraulic pump that supplies hydraulic oil with a greater capacity and at a higher pressure than required, they should use a suitable reducer to adjust the maximum pressure in the winch hydraulic system.

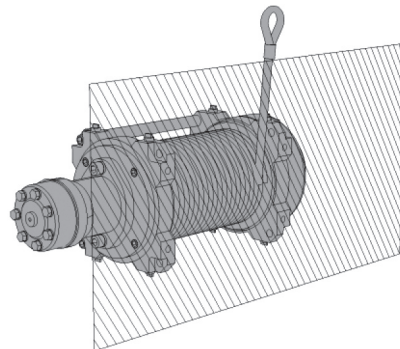
Ways of mounting the Dragon Winch device recommended by the manufacturer:

#### 1. Standard mounting:

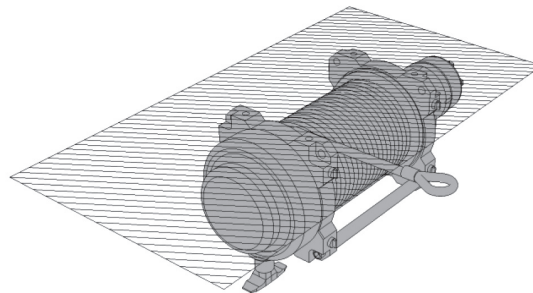
winch with mounting plate on the bottom.



#### 2. Installation of the winch with mounting plate on the side.



#### 3. Installation of the winch with mounting plate on the top.



## CABLE INSTALLATION

Hydraulic winches with a pulling force of up to 20000 lbs come with a factory-wound cable. The rope is extended between the base to which the winch is attached and the drum. Do not allow the rope to be rewound, i.e. to pull the rope from the top of the drum. Rewinding the rope will damage the winch brake.

For winches over 20000 lbs it is also recommended that the rope be pulled between the base and the drum. In the case of these winches, however, rewinding the rope will not damage the brake.



### ATTENTION

If you have any doubts or problems, contact the DRAGON WINCH service department.

## OPERATION OF THE HYDRAULIC WINCH



### IMPORTANT

Before loading the winch, it is recommended to test its operation by unwinding and winding the cable a few times. It is essential to get to know the correct operation of the winch, both visually and acoustically.

Pulling another vehicle or cargo

If you use the winch to pull another vehicle or cargo, pull the vehicle hand brake and put stop blocks under the wheels.

## WINCHES WITH PNEUMATIC AND MANUAL CLUTCHES - DWHI 200 HD

Starting the winch with the use of a pneumatic clutch.

1. After supplying air under the pressure of 8-12 atm (e.g. from a compressor for pumping car wheels) to the pneumatic clutch connector, the drum will uncouple.
2. Unwind the cable, leaving at least 5 fakes on the drum.
3. Attach the load in a suitable place.
4. Engage the drum by removing the air pressure at the clutch connector (disconnecting the compressor). After the pressure drops the drum engages. To ensure that the engaging is correct rotate the drum by several dozen degrees by hand. During manual rotation, the lock inside the gear will snap into place and the coupling is engaged. Do not operate the winch to pull the load without ensuring that the drum is engaged.
5. Start the winch.

Starting the **DWHI 200** winch with the use of a **manual clutch**.

1. To disengage the gears (if engaged), pull the handle on the lid and turn it by 90 degrees, making sure it stays in a horizontal position.
2. Expand the cable, leaving at least 5 fakes on the drum.
3. Attach the load in a suitable place.
4. Engage the drum by turning the handle by 90 degrees. To ensure that the engaging is correct rotate the drum by several dozen degrees by hand. During manual rotation, the lock inside the gear will snap into place and the coupling is engaged. Do not operate the winch to pull the load without ensuring that the drum is engaged.
5. Start the winch.

#### **DWHI 180 HD, DWHI 300 HD, DWHI 450 HD, DWHI 660 HD WINCHES**

1. The DWHI 180, DWHI 300, DWHI 450, DWHI 660 feature a pneumatic clutch. When the hydraulic winch is not in use (compressed air is not supplied to the clutch system) the winch is engaged. In order to disengage the gearbox from the drum, compressed air should be supplied to the clutch pneumatic system. The system is disengaged as long as compressed air is supplied.
2. Unwind the cable, leaving at least 5 fakes on the drum.
3. Attach the load in a suitable place.

4. The winch is activated by applying hydraulic oil under pressure.

#### **DWHI 10000 HD, DWHI 12000 HD, DWHI 15000 HD, DWHI 16000 HD, DWHI 18000 HD, DWHI 20000 HD WINCHES**

1. To disengage the gearbox, switch gear transmission lever to the “OUT” or “LUZ” position”, it will allow to unwind the rope freely. **DO NOT START THE MOTOR IN THIS POSITION!**
2. Unwind the cable, leaving at least 5 fakes on the drum.
3. Attach the load in a suitable place.
4. To start winding, before starting the motor, switch the lever to the “IN” or “PRACA” position”. The winch is ready to work. **DO NOT START THE MOTOR BEFORE THE GEARBOX HAS BEEN ENGAGED. PULL THE CABLE TO SECURE THE GEARBOX.**
5. Before you begin, please check again all the connections, the rope and cables.
6. If there is a wired / wireless remote controller in the control set plug it in. For safety reasons, it is recommended to sit in the driver’s place while pulling.

#### **Self pulling**

When you pull your car with the winch on your own, start the car engine, release the hand brake, switch the gears to neutral, do not “help” the winch with the car engine.

Control the winch using the “IN” and “OUT” buttons located on the controller. Check regularly if the cable is wound on the drum correctly.



#### ATTENTION

1. Helping the winch by using the car engine may cause sudden jerks of the cable resulting in permanent damage to the winch.
2. The pulled vehicle may not be in any gear and the automatic transmission may not be in “park” position. Otherwise serious damage may occur.
3. Do not wrap the hooks with the cable. This may lead to damage of these elements and the cable. Use the original thimble (eye) on the cable, shackles or snatch block.
4. Keep at a distance from the winch and cable in operation.
5. Do not allow third parties to come near the winch or cable in operation. Any cracked or sliding cable is a serious threat to life and health.
6. Having finished work, disconnect the winch from the power supply so that it can not be accidentally switched on.

If you stop the winch under load, put the stop blocks under the wheels of the vehicle or under the load. Do not stand behind the vehicle/load while putting the stop blocks.

## CONNECTION OF THE HYDRAULIC WINCH

### A. BLOCK CONNECTION DIAGRAM OF:

- DWHI 200 HD
- DWHI 10000 HD
- DWHI 12000 HD
- DWHI 15000 HD
- DWHI 16000 HD
- DWHI 18000 HD
- DWHI 20000 HD WINCHES

*Connection diagram - see section A at the end of the manual.*

**System type:** Open system

**Battery:** 12 or 24 volt battery, depending on the type of solenoid valves; the vehicle battery can be used

**Solenoid valves with a hydraulic block:** The solenoid valves are controlled using a wired or wireless remote controller. Ports A and B should be connected to the ports supplying the hydraulic motor. Port P is used to supply hydraulic oil from the pump. Port T (overflow) is used to drain excess oil from the hydraulic block.

**Tank:** It should be equipped with a filtering device, consisting of a sieve, air filter and oil level indicator. The oil filter should allow removal of impurities with a maximum size of approx. 250 microns (not shown in the diagram). The operating volume of the tank should be at least 60 liters. NOTE! Do not fill the tank completely to allow room for expansion. Use hydraulic oil, e.g. CastrolHyspin AWS 10, 15, 22, 32, 46, 68, 100, 150 or similar.

**Hoses:** Should be as short as possible, hose connectors should be compatible with the pump, tank and winch sockets.

**Pressure valve:** Provides better control over oil flow.

**Cooler:** The oil cooler is responsible for maintaining the operating temperature permissible for the type of oil used.

#### **B. BLOCK DIAGRAM OF HYDRAULIC CONNECTIONS:**

DWHI 180 HD  
DWHI 300 HD  
DWHI 450 HD  
DWHI 660 HD WINCHES

*Connection diagram - see section B at the end of the manual.*

**System type:** Open system with check valve.

**Safety pressure relief valve:** The safety pressure relief valve is mounted in the hydraulic block on the motor.

**Pump:** Maximum oil flow 60 l/min. The pump should provide a maximum pressure of 140 bar.

**Tank:** It should be equipped with a filtering device, consisting of a sieve, air filter and oil level indicator.

**The volume of the oil level tank:** The operating volume of the tank should be at least 60 liters. NOTE! Do not fill the tank completely to allow room for expansion. Use hydraulic oil, e.g. CastrolHyspin AWS 10, 15, 22, 32, 46, 68, 100, 150 or similar.

**Hoses:** Should be as short as possible, hose connectors should be compatible with the pump, tank and winch sockets.

**Hydraulic distributor:** 4-channel 4/3 distributor.

**Pressure valve:** Provides better control over oil flow.

**Oil filter:** The oil filter is designed to remove impurities up to approx. 250 microns.

## WINCH LUBRICATION AND MAINTENANCE

A new winch is factory lubricated and does not require additional preservation procedures.

The winch requires periodic maintenance and technical surveys, depending on the manner and conditions in which it is operated.

Periodic maintenance should be performed every 6 months from the date of purchase, as well as after every use of the winch in difficult terrain (off-road rallies, water, mud).

Periodic maintenance consists in: dismantling, cleaning, replacing the grease and replacing worn parts of the winch.

The steel wire cable should be greased periodically using an appropriate penetrating oil. After the first unwinding the cable is not covered by the warranty anymore. Check the new rope for any damage before use.

Also, keep all elements of the winch clean.

If you use a winch in difficult conditions (off-road rallies, water, mud), if the winch and controller box get wet, dry them, clean them, check their technical condition and preserve them.



### IMPORTANT

It is recommended to run the winch at least once per month. Unwind and wind the rope several times using the winch motor. In case of problems, contact the DRAGON WINCH service department.

## WINCH CAPACITY

See Table 1.0 at the end of the manual.

The specified values apply to a freely running vehicle, without additional terrain obstacles. In some cases, using a winch with a greater capacity or an appropriate snatch block may be necessary. The values specify the maximum pulling force of the winch using a single cable when winding the first cable layer on the drum.



### IMPORTANT

The parameters specified in the manual and the descriptions are maximum parameters, not working parameters. For your own safety and the safety of others load the winch at maximum 80% of its capacity.



### IMPORTANT

The pulling capacity of the winch is dependent on the sloping of the area. Table 1.0 specifies the maximum values of the weight of the load, which can be applied to the winch depending on the ground slope. The values are given in pounds and kilograms.

## WARRANTY TERMS AND CONDITIONS



### IMPORTANT

In case of any technical problems, please contact the Seller (hereinafter referred to as the Guarantor) or the DRAGON WINCH Regional Authorized Service Centre.

1. The warranty shall cover the period of 24 months from the date when the winch is handed over, as indicated in the proof of purchase. The warranty terms presented below are valid for products purchased in Poland. If goods are purchased abroad, the conditions compliant with the local law regulations shall apply. Outside Poland, the local distributor shall be responsible for dealing with warranty cases.

2. The Guarantor undertakes to repair the factory defects of the winch detected during the warranty period free of charge.

3. This warranty shall not cover defects resulting from: repairs carried out by entities other than the Guarantor, failure to observe correct installation and operation principles described in the manual, storing the winch in unsuitable conditions, negligence, lack of supervision, improper use, failure to observe the winch operation procedures, wrong direction of winch rope winding, overloading the winch, accidental events such as fire, electrical discharges, spills, impact of chemicals and the circumstances and

events of force majeure.

4. The warranty shall not cover defects caused by an accidental activation of the winch.

5. The warranty shall not cover operational mechanical defects such as damage to the housing, damage to the motor, gearbox, or drum, caused by winch overloading. The parameters which, if exceeded, shall be considered as winch overloading are specified in detail in the operation manual for every specific type of winch.

6. The warranty shall not cover housing parts and accessories subject to normal wear and tear, including: scratches, persistent dirt, fading of texts, etc.

7. Once the winch has been used under load for the first time, the winch rope (steel cable and synthetic rope) is not covered by warranty anymore. Therefore, check the rope before the first use.

8. The warranty shall not cover winches which failed due to the lack of proper maintenance (see “Winch Lubrication and Maintenance section”).

9. Contact the Guarantor concerning the delivery of the winch at the specified address of the service centre.

10. A defect reported during the warranty period shall be repaired by the Guarantor at the Guarantor’s cost within 14 working days. The period shall commence on the first working day after the date of the delivery of the damaged winch to the service centre.

11. If the repair requires spare parts to be imported from abroad, the repair period may be extended to 30 days, to which the Customer consents by using the service.

12. The Customer shall have the right to have the winch replaced with a new one if the Guarantor determines that the removal of defect is impossible.

The winch shall be replaced with a new defect-free one within not more than 30 days. If, in special cases (e.g. no such product on offer), the winch may not be replaced with the same type, the Guarantor, upon agreement with the Customer, shall replace the winch with a different type of winch with technical parameters as close as possible to those of the original one. Such action shall be considered as the fulfilling of the Guarantor's obligations. The warranty shall be extended by the duration of the warranty service.

13. If the complaint turns out to be unfounded, the Guarantor shall charge the Customer with the costs of the warranty procedures and transport costs.

14. The Guarantor shall not be liable for the damages resulting from an improper operation of the winch. The Guarantor shall not be responsible for additional costs incurred by the Customer resulting from damaging the winch.

15. The warranty rights shall not incorporate the Customer's claims for reimbursement of profits lost in connection with any winch defect.

16. If the Customer does not accept the warranty conditions, they are entitled to return the winch at the Guarantor's expense within 14 working days from the date of purchase. In this case, the winch may not show any signs of use. The Guarantor shall cover the cost of transporta-

tion, as long as the winch is shipped through the courier indicated by the Guarantor.

17. In disputable matters, not regulated by this warranty, applicable regulations of the Civil Code shall apply.



**ATTENTION**

If the Customer does not collect the winch from the Service Centre within 3 months from the date of sending the equipment to the Service Centre, the equipment shall be scrapped.



# CE



## Declaration of Conformity

**02/10/2013**  
(declaration number)

**1. The manufactures of the product:**

**ABILUS GROUP Sp. z o.o.**  
ul. Przemysłowa 24  
32-083 Balice

**2. Product Name:**

TYPE: DWHI 200 HD, DWHI 10000 HD, DWHI 12000 HD  
DWHI 15000 HD, DWHI 16000 HD, DWHI 18000 HD, DWHI 20000 HD  
DWHI 180, DWHI 300, DWHI 450, DWHI 660  
(Name, trade name, type, variety, grade, class, serial number)

**3. Purpose and scope of the product application:**

The machine is designed for:  
x pulling damaged vehicles  
x moving or hauling goods  
x removing or hauling road vehicles  
(in accordance with the reference document)

**4. Reference documentation:**

**Machinery Directive MAD 2006/42/EC**  
**Electromagnetic compatibility directive**  
**EMC 2004/108/EC**

(in accordance with the reference document)

I declare with full responsibility that the products referred to in item 2 are compliant with the reference documents mentioned in item 4.

**02/10/2013**

(Date of issue)

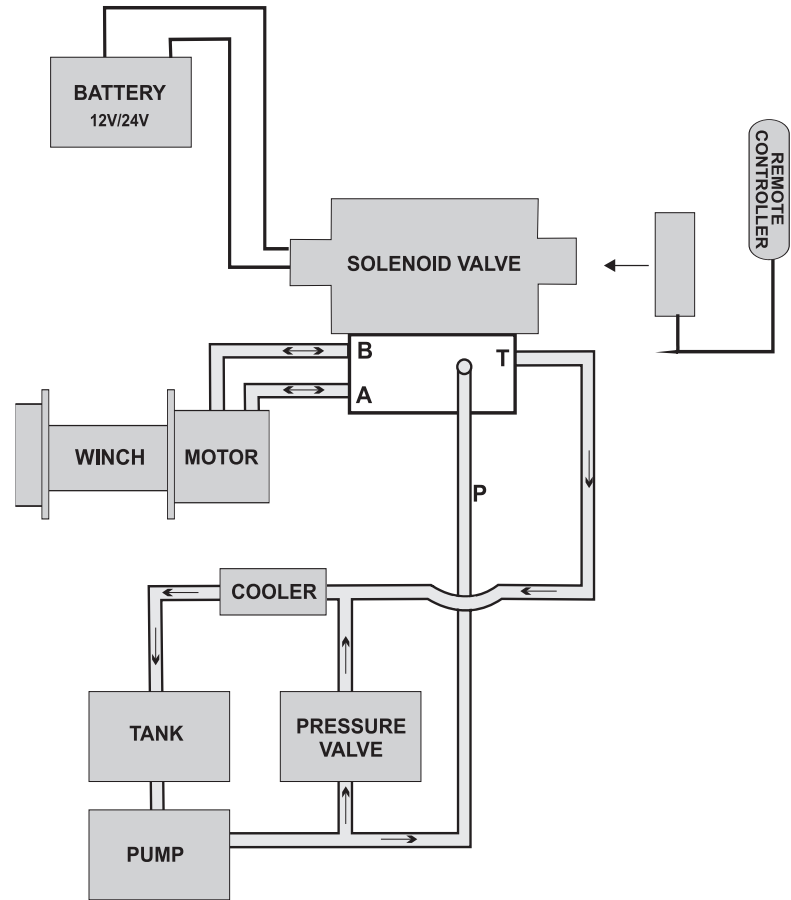


(Name and signature of authorized person)

Section A diagram

**BLOCK DIAGRAM OF  
HYDRAULIC CONNECTIONS  
OF WINCHES:**

- DWHI 200 HD
- DWHI 10000 HD
- DWHI 12000 HD
- DWHI 15000 HD
- DWHI 16000 HD
- DWHI 18000 HD
- DWHI 20000 HD



GB

*Section B diagram*

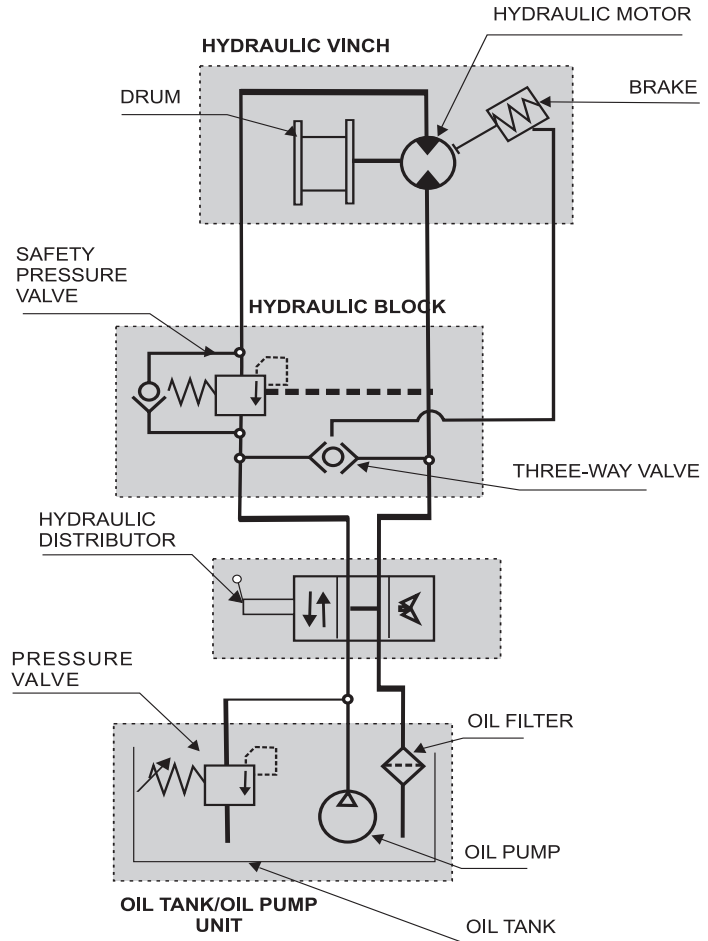
**BLOCK DIAGRAM OF  
HYDRAULIC CONNECTIONS  
OF WINCHES:**

DWHI 180 HD

DWHI 300 HD








DWHI 450 HD

DWHI 660 HD





## TABELA / TABLE 1.0

	 20°		 30°		 50°		 60°		 80°		 90°	
	MODEL	Lbs	kg	Lbs	kg	Lbs	kg	Lbs	kg	Lbs	kg	Lbs
2000	5760	2592	4094	1842	2489	1120	2194	987	2031	914	2000	907
2500	7200	3240	5117	2303	3111	1400	2887	1299	2539	1142	2500	1133
3000	8641	3888	6141	2763	2763	3734	1680	3464	1559	3047	1371	1361
3500	10081	4536	7164	3224	4356	1960	4042	1819	3554	1599	3500	1588
4500	12961	5832	9211	4145	5600	2520	5196	2338	4569	2056	4500	2041
6000	17281	7776	12281	5526	7467	3360	6928	3118	6093	2742	6000	2722
8000	23041	10369	16374	7368	9956	4480	9238	4157	8123	3656	8000	3629
9000	25922	11665	18421	8289	11201	5040	10393	4677	9139	4113	9000	4082
10000	28802	12961	20468	9211	12446	5600	11547	5196	10164	4569	10000	4536
12000	34562	15553	24561	11053	14935	6721	13857	6236	12185	5483	12000	5443
13000	37442	16849	26608	11974	16179	7281	15012	6755	13201	5940	13000	5897
13500	38882	17497	27632	12434	16801	7561	15589	7015	13708	6169	13500	6124
14000	40323	18145	28655	12895	17424	7841	16166	7275	14216	6397	14000	6350
15000	43203	19441	30702	13816	18668	8401	17321	7794	15232	6854	15000	6804
16000	48387	21774	34386	15474	20909	9409	19400	8730	17059	7677	16800	7620
18000	51843	23329	36842	16579	22402	10081	20785	9353	18278	8225	18000	8165
20000	57604	25922	40936	18421	24891	11201	23095	10393	20309	9139	20000	9072
30000	86455	39251	61476	27910	37360	16961	34682	15746	30488	13841	30000	13620
45000	129683	58876	92213	41866	56040	25442	52023	23618	45732	20762	45000	20430
66000	190202	86369	135246	61414	32192	37323	76301	34647	67073	30457	66000	29970