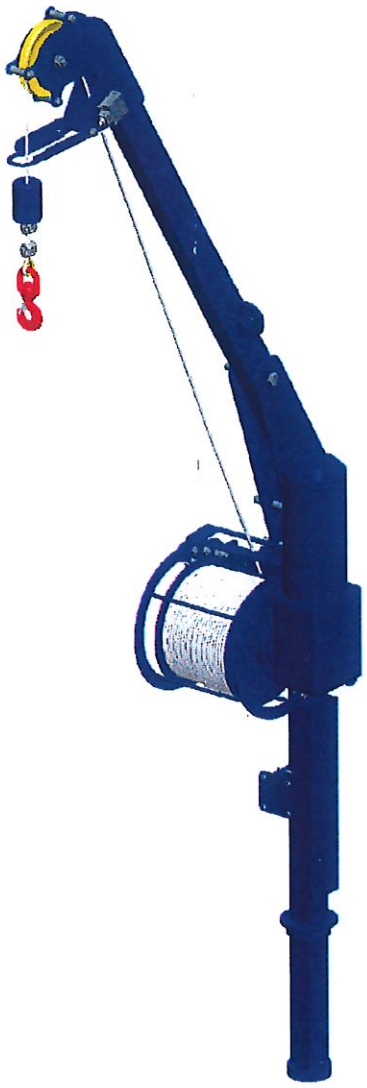
ArticCrane

Manufacturer´s Manual

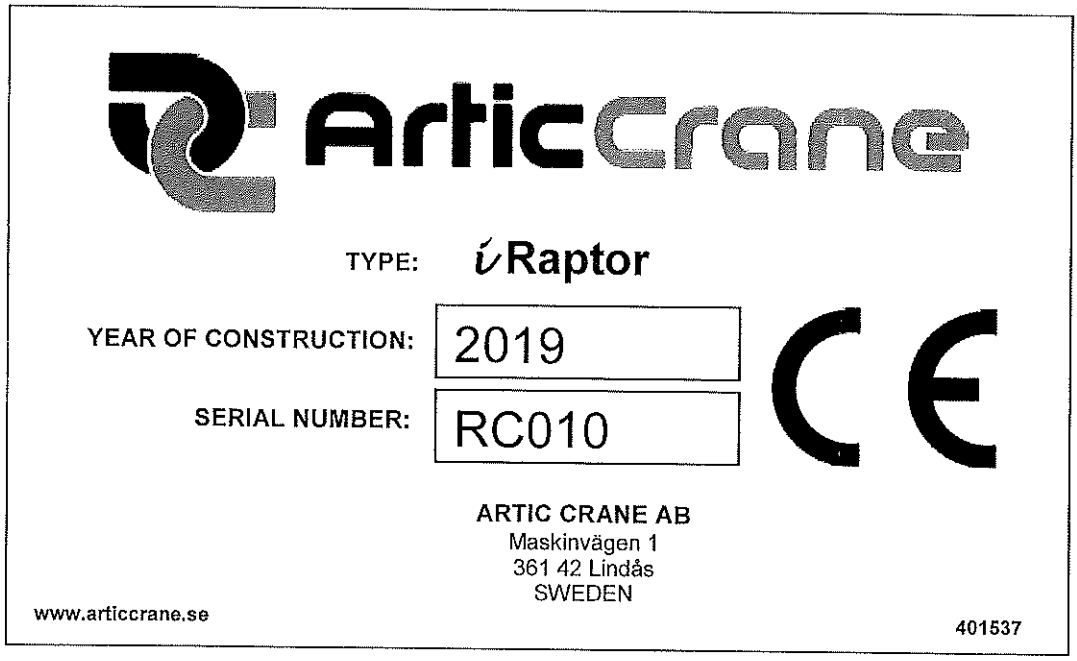
Driver Rescue System - DRS



11/02/2017 Rev2

MANUAL | Concept iRaptor

This book is valid for the following Crane



ArticCrane

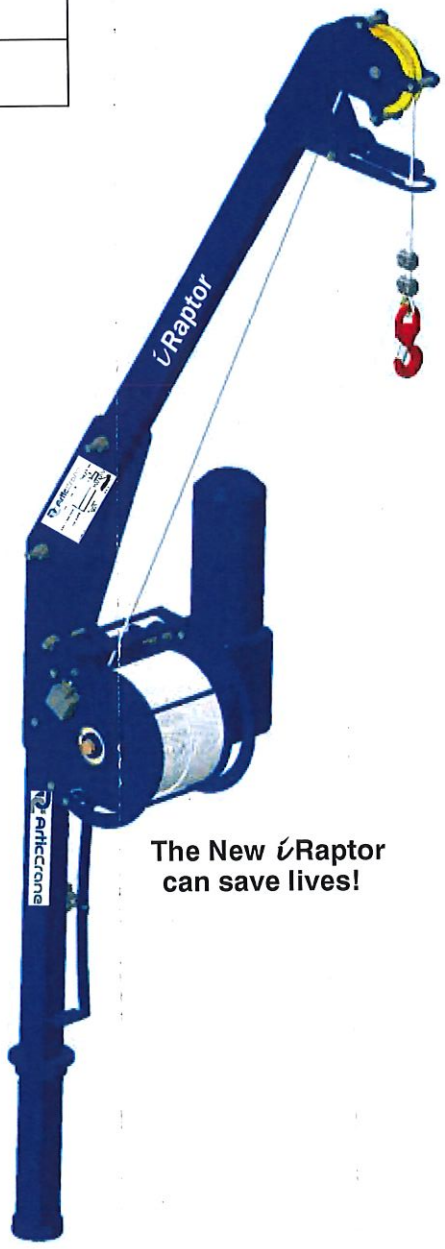
iRaptor

Driver Rescue System - DRS

Technical Data

Mechanical	Load	Personal lift	Motor Power	Rope Length
Hoisting	0-250 kg	0-125 kg	1.1 kW	70 m
	25 m/min	25 m/min		
Safe Working Load	Max. load 250 kg at 1.0 meter	Max. load 125 kg at 1.0 meter		
Working Radius	1.0 meter			
Lifting Height	70 metres			

Electrical	
Power Supply	230±10% Volt 50 / 60 Hz
Power Consumption	3 kVA
Main Fuses	16 Amp (230 V, 50 Hz)



The New iRaptor can save lives!

The New **iRaptor**, together with a rescue basket stretcher, uniforms a safe and compact driver rescue system - DRS.

The DRS system solves the problem to get a crane driver down on ground in case of heart problem or other severe illness.

The new **iRaptor** is strong, speedy and safe which is crucial in an emergency situation. Time is a key factor in all rescue situations,

The hook movement is controlled by a frequency inverter which gives a safe, smooth emergency ride to the patient.

If a power failure appears during a rescue situation, the battery back-up makes it possible to continuing the descending process of the patient.

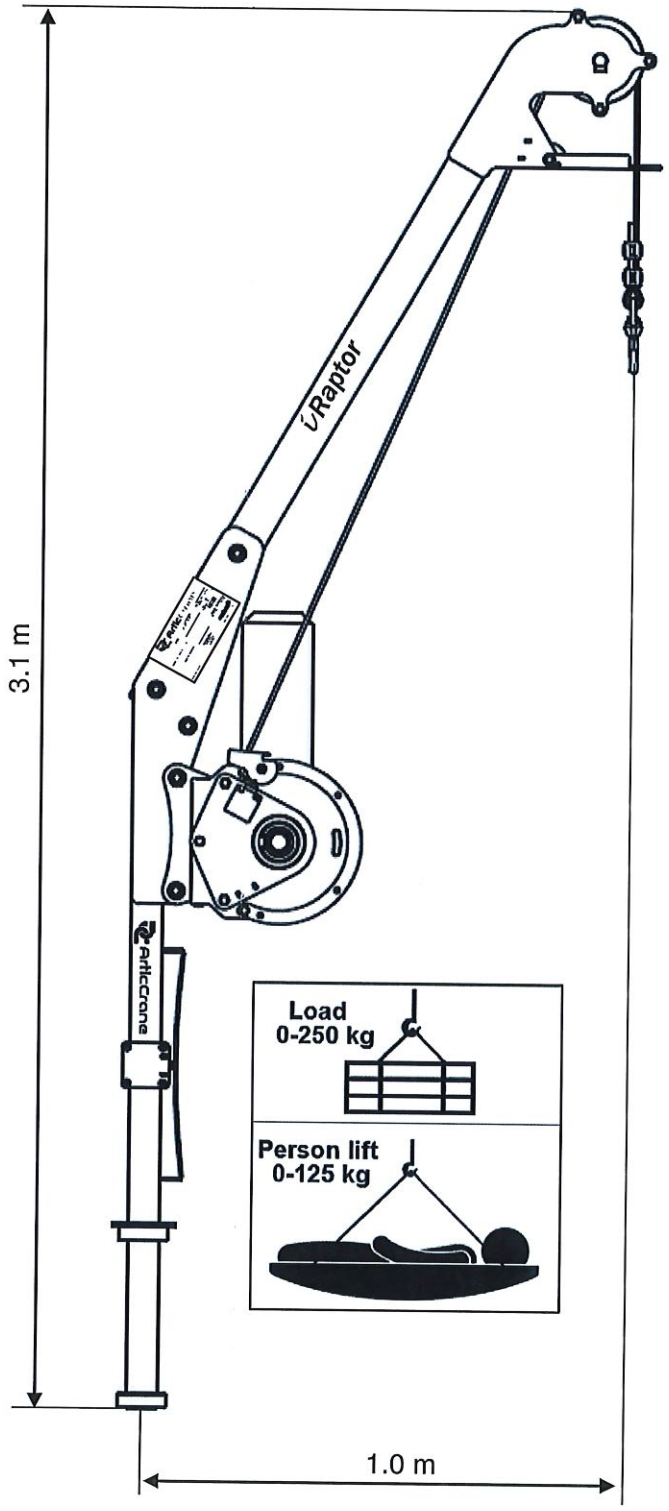
iRaptor is also equipped with a top-run over switch and an overload system.

The **iRaptor** DRS system is easy to fit on most crane platform's thanks to its compact design.

City Lifting

ArticCrane iRaptor

Driver Rescue System - DRS



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1 General

1.1 Purpose of documentation

This documentation is a part of the product iRaptor. The purpose of this Instruction Handbook is to provide the user with useful information regarding operation, erection, transportation, maintenance, disassembling and repairing.

Before any operation, read and understand this manual. Do not hesitate to request any clarification or additional information from us at ARTIC CRANE.

Crane operation is restricted to qualified personnel having received proper specialised training and specific iRaptor information. Apart from the operating instructions, applicable regulations must be taken into account, specifically those related to safety precautions such as personal protection and hazard prevention rules.

Prior to crane operation, the owner or user must make sure that any person involved in crane maintenance or operation is conversant with the safety and operating instructions regarding his duty, described in this Manual, as well as with applicable standards and regulations

Crane safety devices must be closely monitored. Check regularly their correct operation, and in case of any failure or malfunction, prohibit crane operation.

The Instructions Handbook is an important part of the crane and it must always be attached to the crane, in good condition and updated.

Pictures are only illustrative and do not necessarily show the design of the product on the market at a given point of time. All specification and data are subject to alteration without prior notice.

1.2 Symbols and Warnings

The symbols used in this handbook are explained in Table 1.

Symbols	Meaning
	Information to be considered when erecting, dismantling, and operating the crane.
	Read and understand the information given in the Instruction Handbook.
	Useful information or tips.
CAUTION:	**CAUTION:** is prefixed to sections of the text where failure to observe the instructions may lead to damage to the equipment.
	**WARNING!** Information which must be followed. Failure to do so may lead to severe personal injury or death.
	**WARNING!** Electrical shock hazard.
	Moving parts can crush and cut

Table 1, explanation of symbols and warnings used in handbook

1.3 Terms and definitions

Driver Rescue System - DRS

The *i*Raptor, together with a rescue basket stretcher, uniforms a safe and compact driver rescue system - DRS. The DRS system solves the problem to get a crane driver down on ground in case of heart problem or other severe illness.
The *i*Raptor is strong, speedy and safe which is crucial in an emergency situation. Time is a key factor in all rescue situations. If a power failure appears during a rescue situation, the battery back-up makes it possible to continuing the descending process of the patient.
The hook movement is controlled by a frequency inverter which gives a safe, smooth emergency ride to the patient. *i*Raptor is also equipped with a top-run over switch and an overload system.

In service condition

Condition where the crane is in working position handling goods or personal lifts and including the rated capacity, within permissible wind speeds and other conditions as specified by the manufacturer during normal operation, following thorough examination.

Out of service condition

Unloaded crane left in stable position, in conditions specified by the manufacturer, without performing any work, and ready to get onto operation when circumstances so require and allow.

Thorough examination

Examination by a competent person in such depth and detail as the competent person consider necessary to enable them to determine whether the equipment being examined is safe to be taken into continue in use.

Competent person

Person who has such practical and theoretical knowledge and experience of the lifting equipment to be thoroughly examined which enables them to detect defects or weaknesses and to assess their importance in relation to the safety and continued use of the lifting equipment.

Rated capacity

Load which is lifted by the rescue crane and suspended from the fixed load-lifting attachments

Lifting speed

The vertical speed of travelling lift block expressed in meter per minutes.

1.4 Main parts of crane

Illustrated images of the iRaptor are provided to give an overview of the crane.

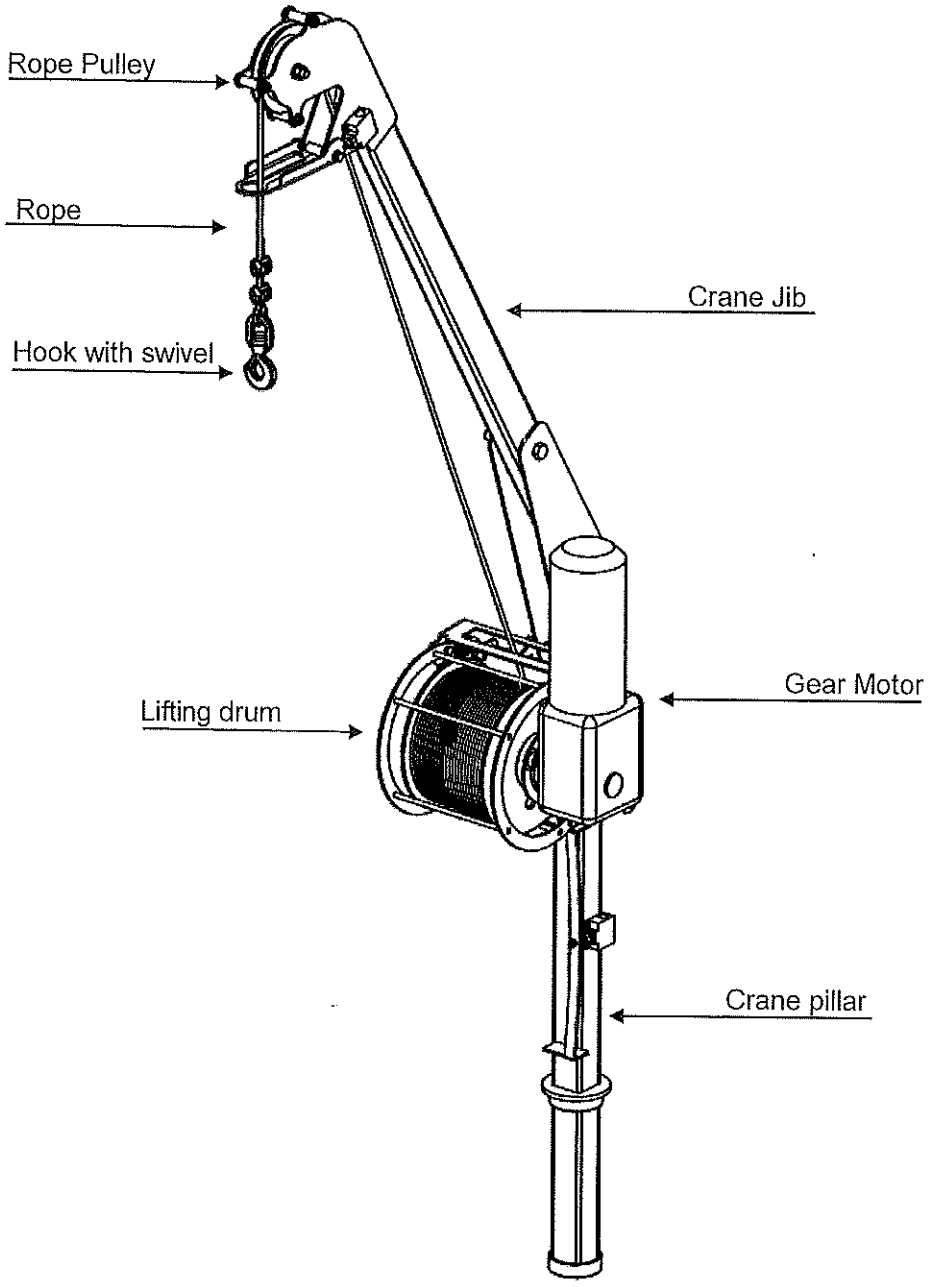


Figure 1, showing the main parts of the iRaptor, for more detailed view go to Chapter 7.Sparepart list

1.6 Units

Measure	Symbol	Name
Length	m mm	Metre Millimetre
Mass	kg t	Kilogramme Ton
Time	s min h	Second Minute Hour
Temperature	°C	Degree Celsius
Speed	m/s m/min rpm	Metre per Second Metre per Minute Revolutions per minute
Force	N kN	Newton Kilo Newton
Pressure	kg/cm^2 Pa Bar	Kilogram per square centimetre Pascal (N/m^2) 100 kPa
Work	Nm kNm	Newton per metre Kilo Newton per Metre
Electric output	W kW	Watt Kilo Watt
Volume	cm^3 dm^3 m^3	Cubic Centimetre Cubic Decilitre (1litre) Cubic metre (1000 litre)

Table 2, measuring units

2 Technical Specifications

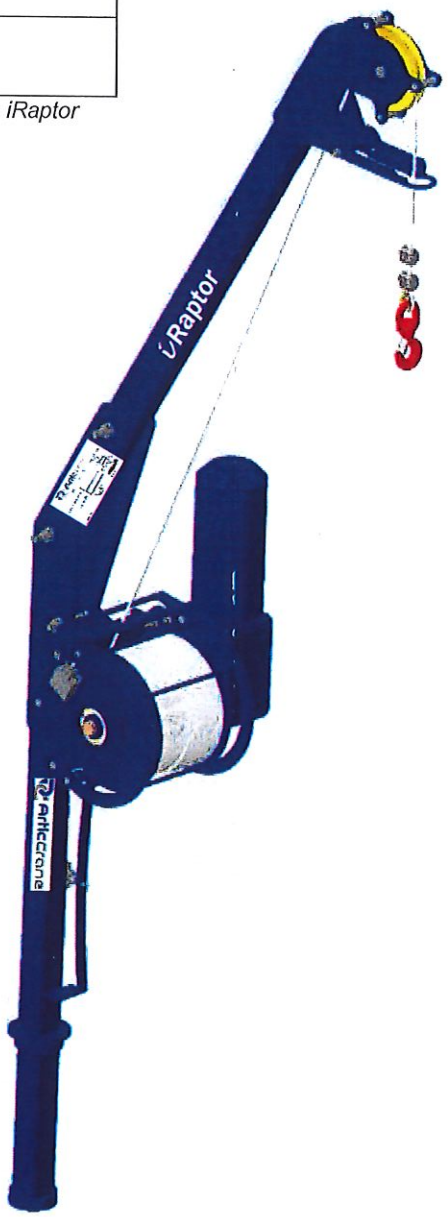
2.1 Operational speeds and Load capacity

Mechanical	Load	Personal lift	Motor Power	Rope Length
Hoisting	0-250 kg	0-125 kg	1.1 kW	70 m
	25 m/min	25 m/min		
Safe Working Load	Max. load 250 kg at 1.0 meter	Max. load 125 kg at 1.0 meter		
Working Radius	1.0 meter			
Lifting Height	70 metres			

Table 3, mechanical technical data on iRaptor

Electrical	
Power Supply	230±10% Volt 50 / 60 Hz
Power Consumption	3 kVA
Main Fuses	16 Amp (230 V, 50 Hz)

Table 4, electrical technical data on iRaptor



Temperatures: -10˚C to +30˚C

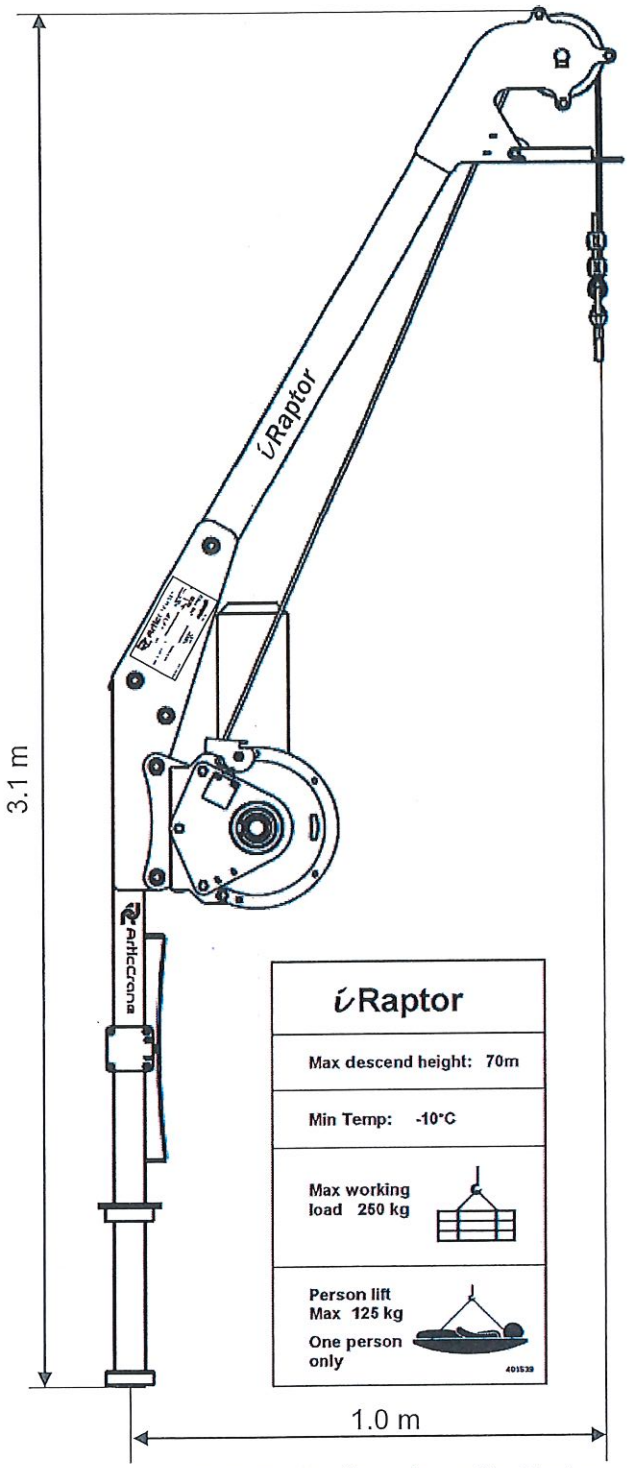


Figure 2, illustrates the dimensions of the iRaptor

2.2 Hoisting rope

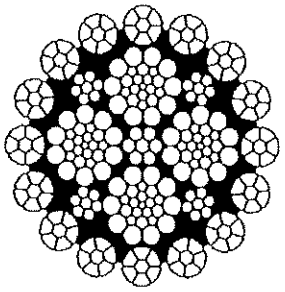
Wire Ø = 8 mm	Design according to	
Specifications	**VEROTOP E** Rotation resistance. Outer and inner strands compacted. Made of galvanized wires acc to EN 12385-1. Fully lubricated at delivery.	
Design	Nominal diameter = 8 mm Weight per meter = 0.31 kg **Nominal strength = 1960 N/mm²** **Calculated breaking strength = 58.2 kN** **Minimum breaking strength = 55.2 kN** Lang's lay, right handed Average fill factor = 0.67 Average spin factor = 0.87 Average weight factor = 0.88 Total number of wires = 327	
Basic equipment	The length of the hoisting rope on a standard hoist drum = 70 m.	
Attention!	A wire rope is a very complex part of the crane. It must be handled with care and according to given instructions. When changing the hoist rope, it must be replaced with a wire rope with the same specifications as above.	

Table 5, lifting rope

2.3 Lifting Hook

Load =1,25 ton	Design according to	
Specifications	**Hook with swivel 168 class 8** Lifting hook with needle bearing Rotatable with light load Protective coat Safety catch	
Design	Nominal diameter = 8 mm Weight = 0.45 kg **Proof force = 30,66 kN** **Breaking force = 49,05 kN** **Working load limit = 1,25 ton** Safety factor = 4	
Attention!	When changing the lifting hook, it must be replaced with a lifting hook with the same specifications as above.	

Table 6, lifting hook

The wire ropes are terminated in such a manner that they can be directly connected to a body holding device using the lifting hook.

2.5 Wind speeds Conversion Table

M/S	MPH	KPH	BEAUFORT SCALE	
			NO.	DESCRIPTION
4	9	14	3	**GENTLE BREEZE** Leaves and twigs in motion
6	13	22	4	**MODERATE BREEZE** Raises dust and loose paper
8	18	29	5	**FRESH BREEZE** Small trees in leaf begin to sway
10	22	36	6	**STRONG BREEZE** Large branches in motion, whistling heard in telephone wires, umbrellas used with difficulty.
12	27	43		
14	31	50	7	**NEAR GALE** Whole trees in motion; inconvenience felt when walking against wind.
16	36	58		
18	40	65	8	**GALE** Breaks twigs off trees, generally impedes progress.
20	45	72		
22	49	79	9	**STRONG GALE** Slight structural damage occurs. (chimney pots and slates removed)
24	54	86		
26	58	94	10	**STORM**

Table 8, wind speed conversion table

3 Erections / Dismantling

3.1 Preparations

To make a successful crane installation, following must be taken into account.

Check for National and local regulations applicable to the located site.

A competent person must be responsible for planning and supervision the erection and dismantling process of the iRaptor. Necessary training and experience are needed from the competent person.

A thorough examination of the crane is undertaken after its erection by a competent person who is sufficiently independent and imperial and is not involved in the erection process.

Everyone reading and understanding the manual can run the iRaptor.

The iRaptor can be attached to the crane platforms of the cranes. For other requests please contact us at Artic Crane.

Warning!
The iRaptor must always be installed at ground level.

Warning!
If the crane is placed near power lines, a minimum safety distance of 5 meter from any part of the crane to the power line must exist.

Make sure that the minimum distance between the rescue crane and other cranes are big enough to prevent crane parts, ropes and loads to interfere with each other.

Check that proper power and power cables are available see chapter **4: ELECTRICAL INSTALLATION.**

3.3.1 Assembly the iRaptor on to a crane platform

The iRaptor fits many different applications, for example at construction sites, industrial or truck mounted application. In this manual it will be described how to assembly on a pedestal base (this is an optional accessories) on the crane platform.

1. Clean the upper surface of the crane part tube and also the inner surface of the pedestal base attached to the crane platform. Make sure that no corrosion or other obstructions are on the surfaces.
2. Place the crane part tube in to pedestal base on the crane platform. Lift the rescue crane as described previous in the **lift plan** and place it on the bigger tube.

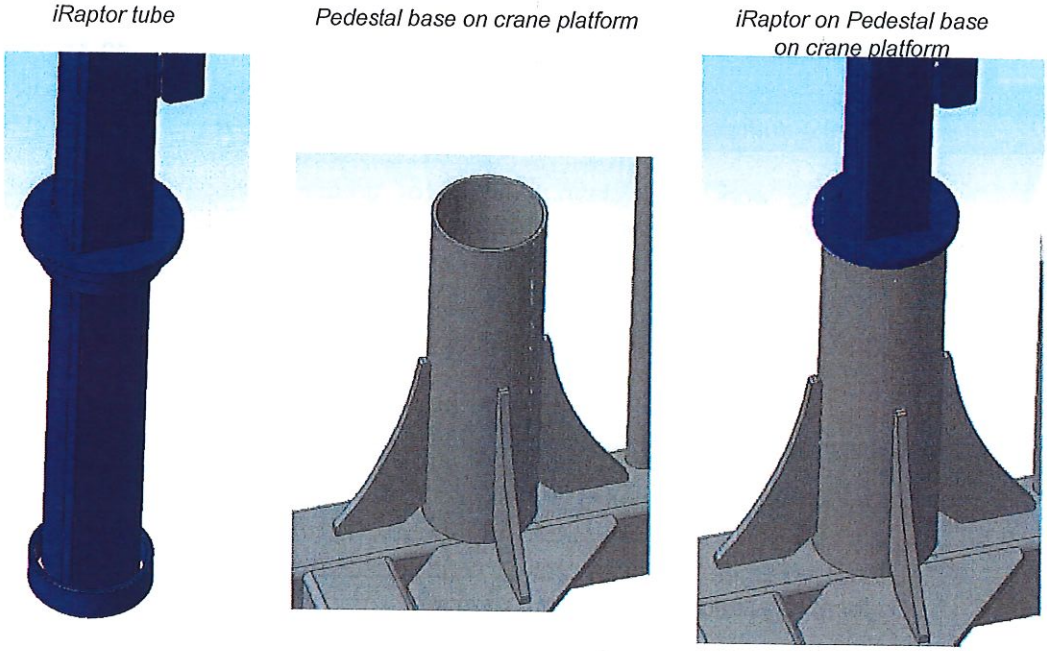


Figure 3, iRaptor placed on a pedestal bas eon crane platform

WARNING!
Don't put any body parts between iRaptor and platform when docking

The rescue crane is now possible to rotate 360 degrees in both directions.

WARNING!
Be careful that you don´t hit any objects or persons in the area around the rescue crane. The max radius is 1,0m.

Lift up the power cable and secure it to the crane tower. Connect the power cable plug to the electrical cabinet of the iRaptor.

4. Electrical Installation

4.1 Main supply

The electrical system is designed as a multi voltage execution and can be used on networks for single-phase **230 Volt AC, 50Hz.**

Mains voltage fluctuation must not exceed ±10%, when the power system is under load. Check the voltage drop when lifting test weights, before going in to service.

The installation must comply with local or national regulations issued for cranes regarding fuses, cables, earthing, lightning protection and so on.

WARNING!
The installation must only be done by a qualified person.

4.2 Fuses

Line protection switch with characteristics B or C, **16 Amp**

4.3 Mains cable

Use the cable which are delivered together with the crane. Standard length of cables are 5 metres each.

4.4 Site switchboard

Mains supply must be taken from the site switchboard. This switchboard must be enclosed and protected to at least IP44 and comply with special regulations for building site distributions.

4.5 Grounding

The crane electrical cabinet must be earthed through the protection conductor provided in the mains cable, without any interruptions.

WARNING!
Follow local regulations and recommendations from the manufacturer of lightening protection systems.

4.6 Motor data

Hoisting motor

Rated motor power = 1.1 kW
Rated supply current (Continuous 100%) I_{Supply}=16Amp (at V_{Supply} = 3x230V)

WARNING!
Before any work on the electrical system perform a **lock-out** of the system and make sure that the mains supply is dead.

All work must be done by a qualified electrician.

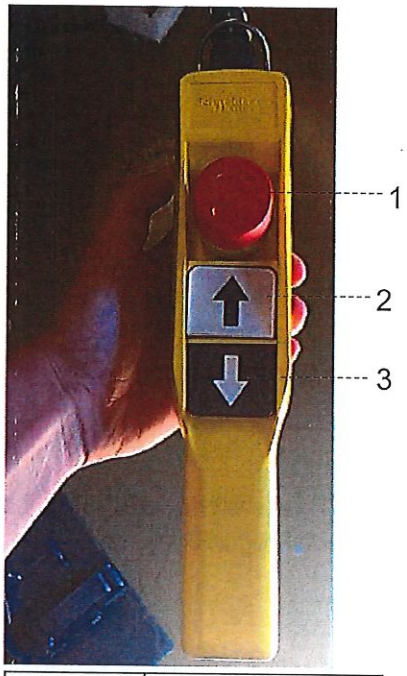
5 Operation iRaptor

5.1 Hand control and electrical cabinet

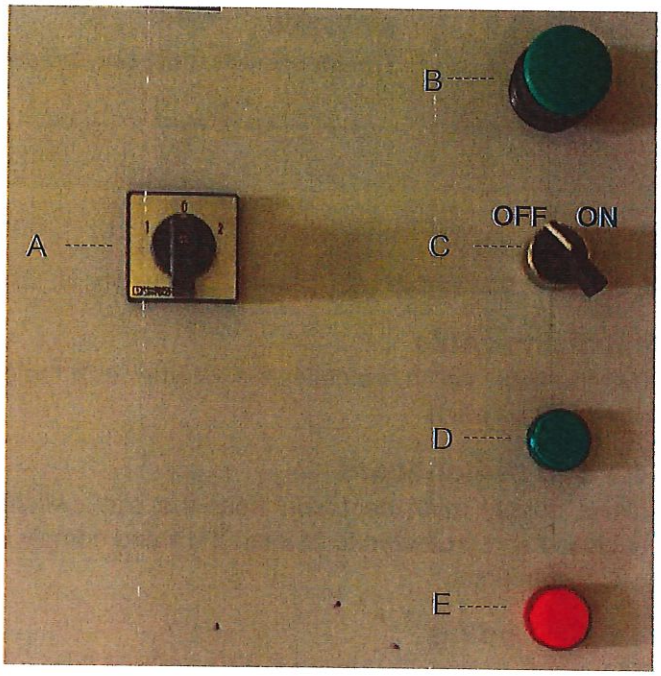
The hand control are attached to the iRaptor with a five metres cable, which makes it possible for the user to move on the platform with the controller in the hand.

With the hand control you can either lowering or raising by pressing the arrows up or down. The red button is an emergency stop.

On the electrical cabinet the power can be switched on, also indications of green light when VFC is ready and red light when overloading.



Notation	Description
1	Emergency stop
2	Hoist Up
3	Hoist Down



Notation	Description
A	*Power switch* 0=Power OFF 1=Power ON 2=Power ON with battery
B	Start / Reset
C	OFF / ON
D	Green light, *VFC* is ready
E	Red light when load is over 150 kg

Figure 4, illustrate the hand control, switches and indicators used on the iRaptor

5.2 Operation of crane

CAUTION Before any crane operation a lift plan and risk assessment must be carried out.

To make the rescue crane ready for hoisting goods or single person descending, following changes on the electrical cabinet of the rescue crane needs to be done, see Figure 4.

1. Turn *C* to *ON*, see Figure 4.
2. Turn *A* to *1*, see Figure 4.
3. Press button *B*, Start, see Figure 4.
4. Check *D* if VFC is ready, see Figure 4. A green light shows.

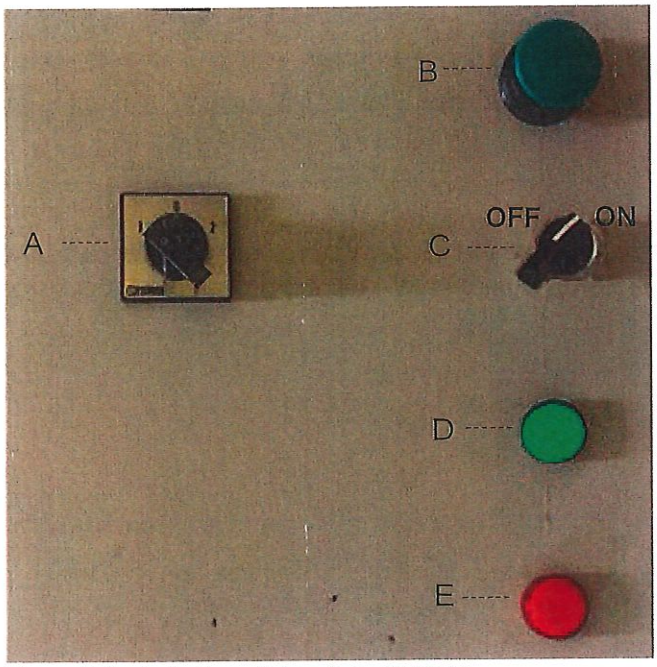


Figure 5, illustrate the switches in ready mode

5. Take the hand control in your hand and test the command "2-Hoist Up", "3-Hoist Down" and "1-Emergency Stop", see Figure 4.

The motion control system brings the motion to rest automatically when released.

6. The rescue crane is now ready to use.

Warning!
Crane operation should not be used when the weather conditions can affect the safety of personnel. Like winds exceeding 7 m/s, electrical storms, snow or ice, fog, sleet.

The switch on Figure 5 are always on 1 in use. But if there will be a power failure it should be on 2.

The speed is 1100 rpm when lifting or descending but when power failure appears the iRaptor will lift and descend the person or goods with a lower speed of 500 rpm.

If you want to rotate the crane you will need to push the rescue crane by hand force to do so.

Warning!
If the red light on E, see Figure 3 is shining in running mode the load is over 150 kg. Remove the overload directly.

The descending carrier must have guiding ropes and tag lines. This will prevent unintended rotation of the crane and carrier.

5.3 Rescue with Body-holding device

The driver rescue system demands a rescue basket stretcher that are made for lifting or lowering of single person. The rescue basket stretcher shall satisfy the demands according to EN 14502-1. The load capacity shall be at least 270 kg.

Figure 6, rescue basket stretcher recommendation

Warning!
For single use and rescue purpose only!

Warning!
Carriers should not be used when the weather conditions can affect the safety of personnel. Like winds exceeding 7 m/s, electrical storms, snow or ice, fog, sleet.

Any slack line between the user and the anchor point shall be avoided

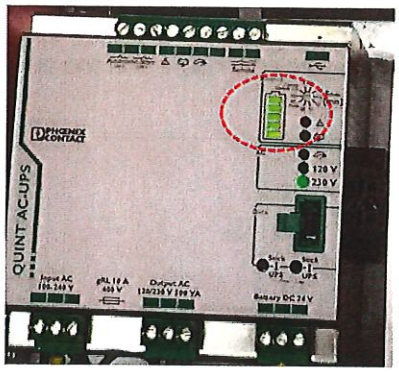
5.2 Daily Pre-Use checks

The daily checks that must be carried out at the start of every shift should include everything in Table 9. Which includes inspection of the crane, load-lifting attachments and carrier every day.

	iRaptor	Mon	Tue	Wed	Thu	Fri	Sat	Sun
1	Visual check of rescue basket stretcher							
2	Battery condition (Minimum of 2 staples)							
3	Visual checks on hooks, wire ropes and hook latch							
4	Visual check of damages on hand control, electrical cabinet and cables							
5	Rated capacity indicator (Lift a test weight)							
6	Function test of hand control							
7	Warning lights							
8	Check for any leak oil leak in gearbox							
9	Abnormal noise levels on the drive							

Table 9, daily pre-use checks

The battery condition is checked by looking at the staples shown in top view of the battery.



When the battery is only showing two staples the battery needs to be loaded.

6 Maintenance

6.1 General

A well maintained crane increases the level of safety, increasing the performance and reducing down time periods to a minimum.

This chapter is guide regarding regularly maintenance and service.

6.1.1 Bearings

The crane is equipped with a number of ball bearings which are permanent life lubrication for maintenance-free operation. But as we know nothing is for ever. Check the pulleys with this kind of bearings at least two times per year.

6.1.2 Gears

Hoist gears is factory filled with synthetic oil. Always use the same oil quality and type as specified.

6.1.3 Ropes

Regular maintenance and lubrication increases the safety and service life of the wire ropes. Use *Vero lube* or equal for best performance.

Visual inspection of lines including their end terminations according to manufactures guidance, Certex.

6.1.4 Pulleys

All pulleys are made of steel for increased performance and service life of the running wire ropes. The steel surface has less friction coefficient than the surface of plastic, and accordingly the ropes have less tendencies to climb on the side of the grove.

6.2 Lubrication points

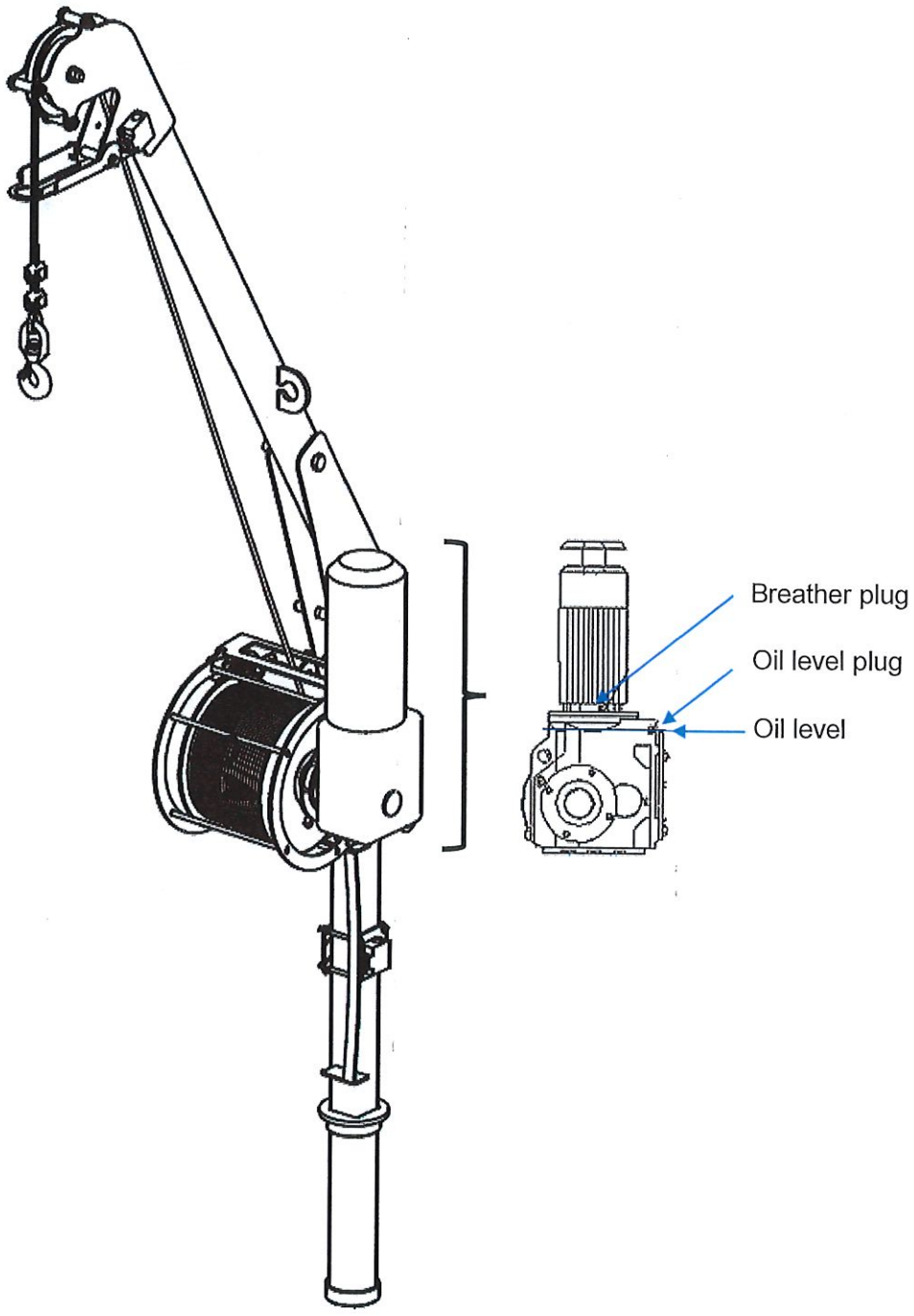


Figure 7, illustrate the iRaptor

7 Spare Parts

7.1 General

The spare parts numbers are found by finding the right main part of the crane, see Figure 8. This information helps to a better understanding of mechanical parts and makes the identification of spare parts easier. Also, precise information on how to place purchase orders for the required spare parts is given.

7.2 Order of Spare Parts

On following page there will be a table containing the parts of the iRaptor. The parts are numbered from [1] to [44].

How to place a purchase order of spare part

Example

Crane Model:	iRaptor
Serial no. :	001
Drawing part no:	100205
Notation:	[5]
Description:	Stock Seat
Quantity:	1

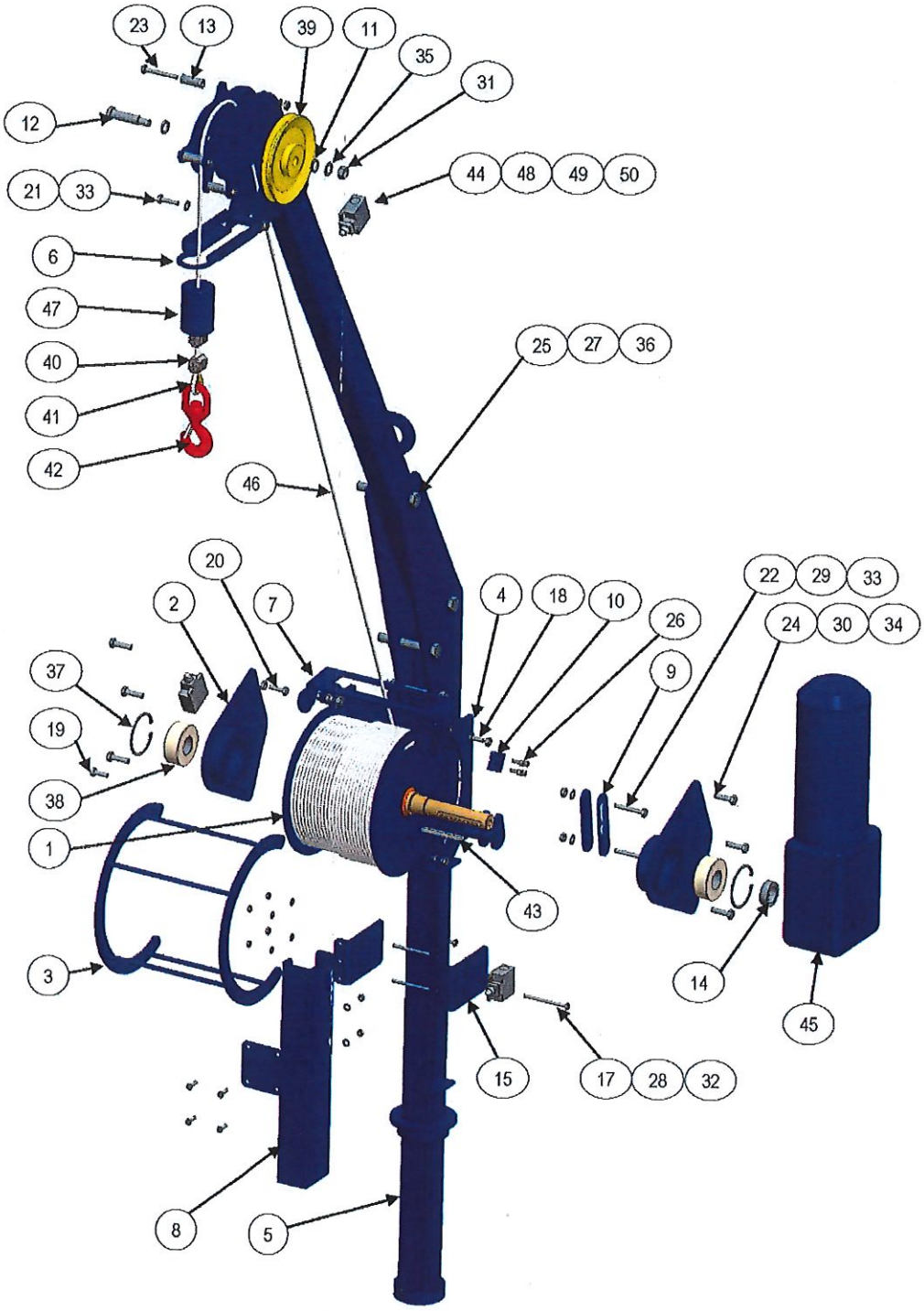


Figure 8, illustrate the iRaptor 100205

No.	Spare Part no.	Name	Quantity
1	200165	Hoist drum	1
2	300296	Bearing seat	2
3	300297	Guard	1
4	300298	Bracket	1
5	300299	Lower crane part	1
6	300302	Upper limit swich plate	1
7	300319	Hoist drum limit switch plate	1
8	300321	Coverplate	1
9	401295	Stay	2
10	401296	Rope socket	1
11	401298	Spacer	2
12	401300	Shaft	1
13	401352	Spacer	3
14	401364-2	Spacer	1
15	401365	Limit switch plate	2
16	710005-1	Screw	4
17	710018-1	Screw	4
18	710047-1	Screw	1
19	710048-1	Screw	4
20	710049-1	Screw	1
21	710050-1	Screw	2
22	710055-1	Screw	2
23	710057-1	Screw	3
24	710089-1	Screw	6
25	710226-1	Screw	5
26	711034-1	Socket head cap screw	4
27	713011	Locknut	5
28	713033	Locknut	8
29	713034	Locknut	12
30	713035	Locknut	6
31	713037	Locknut	1
32	714006-1	Washer	8
33	714008-1	Washer	11
34	714010-1	Washer	6
35	714012-1	Washer	1
36	714015-1	Washer	5
37	717043	Circlip	2
38	740015	Ball Bearing	2
39	750005	Pulley	1
40	750008	Wire lock	2
41	750009	Thimble	1
42	750010	Hook	1
43	760016	Wedge	1
44	790007	Limit Switch	3
45	810106	Hoist machinery	1
46	x	Hoist wire 8mm VerotopE	70m
47	401538	Weight	1
48	710506	Screw	6
49	713031-1	Locknut	6
50	714002-1	Washer	12

7.3 Technical data Engine

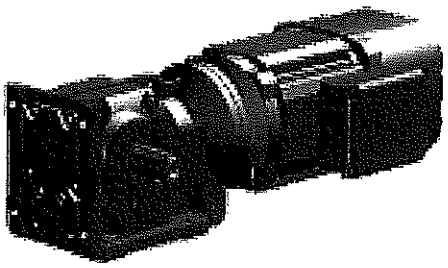
Engine	Design according to	
Specifications	**KA47/T** Fully lubricated at delivery.	
Design	**Serial Number : 60.7394160601.0001.16** Speed [R/M] : 1455 / 30 Total Ratio : 48,95 I Output Torque : 355 Nm Lubricant : CLP 220 Mineral Oil **Power : 1.1 kW** **Motor Frequency: 50 Hz** Motor Voltage [V] / Coupling : 230/400 D/Y –Coupling Brake Voltage [V] / -Torques [Nm]: 230 AC / 20	
Basic equipment	.	
Attention!	An engine is a very complex part of the crane. It must be handled with care and according to given instructions. When changing the engine, it must be replaced with an engine with the same specifications as above.	

Table 10, technical data of the engine on Rescue crane

7.4 Technical data Converter

Converter	Design according to	
Specifications	**MC07B0011-2B1-4-00/FSC11B** Housing class 20	
Design	**Serial Number** : **60.7394160602.0001.16** Selection Electronics Product: Movitrace B Building Size : 0L Nominal Voltage : 1 X 200-240 V Rated Supply : 13.40 A Nominal Frequency : 50-60 Hz **Nominal Power : 1.1 kW** **Output Power : 1.5 HP** Output Voltage : 3 X 0 V To Input Voltage Output Current : 5 A Speed Range [1/Min] : 0-5500	
Basic equipment	.	
Attention!	A converter is a very complex part of the crane. It must be handled with care and according to given instructions. When changing the converter, it must be replaced with a converter with the same specifications as above.	

Table 11, technical data of the converter on Rescue crane

8 Annex

8.1 Circuit scheme

The engine may only be connected in accordance with the circuit scheme enclosed.

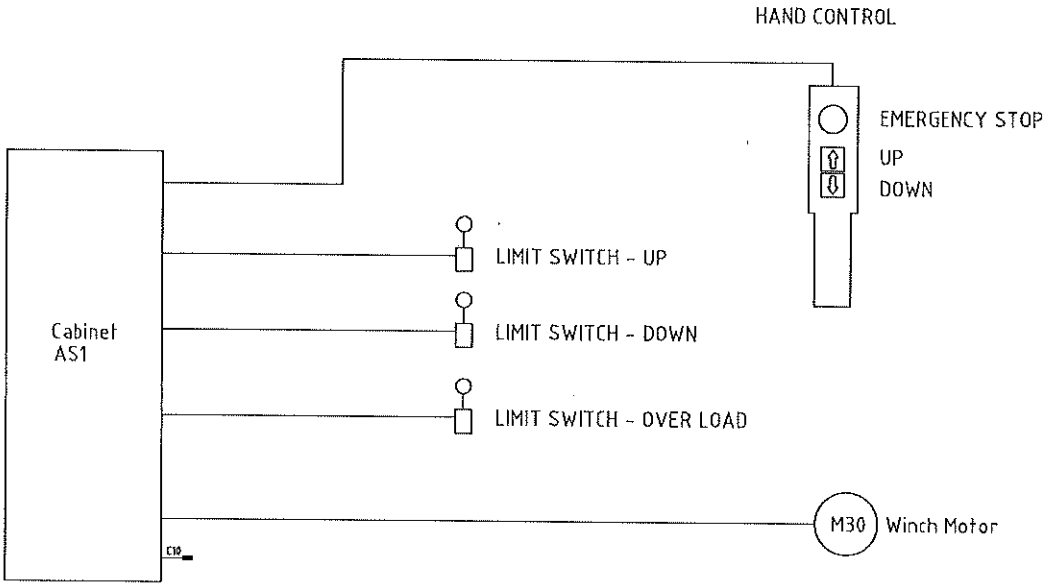


Figure 9, overview of the electrical cabinet, hand control and winch motor

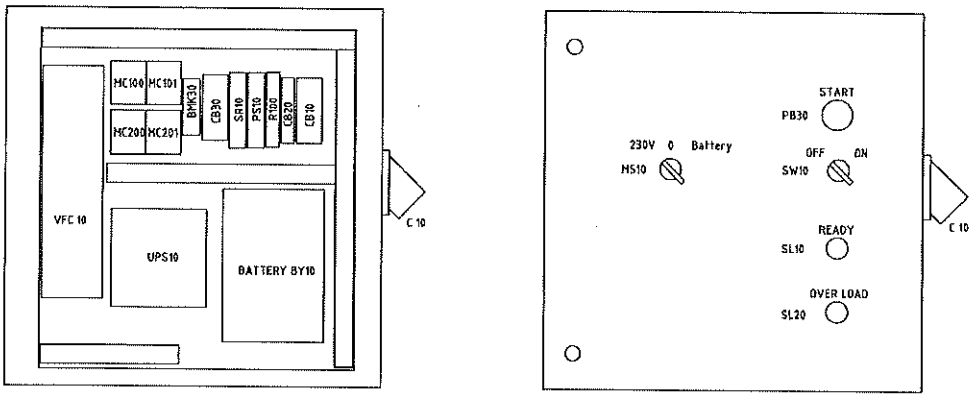


Figure 10, overview of the electrical cabinet