ASCOM BHT 470T

MAIN TECHNICAL DATA

LIFTING CAPACITY - DIMENSIONS – WEIGHT

– Overall Lifting Capacity	metric ton	470	
– Dock Span A)	mm	13.000	
– Max. negative stroke N)	mm	1.000	
– Dead-weight	metric ton	202	Approx.

MAIN FEATURES

- **Structure** **S355JR steel**

– Travelling speed at full load; stepless	Km/h	0 ÷ 1.10	± 5%
– Travelling speed unloaded; stepless	Km/h	option	± 5%
– Hoisting speed at full load; stepless	m/1'	0 ÷ 1.10	± 5%
– **Hoisting speed unloaded; stepless**	**m/1'**	**0 ÷ 2.20**	**± 5%**
– Max gradeability at full load on flat grounds	%	3	
– Ground Pressure (Tire Air Inflate Pressure)	Kg/cm²	10	
– Brand-new OTR tyres 21.00-35/48 E high abrasion resistance		N°	16
– Traction Wheels	N°	8	
– Idle wheels	N°	8	
– **Steering Wheels**	**N°**	**all**	
– Electronic steering system		standard	
– Laptop + PLC SIEMENS		included	
– Fixed Lifting Points		2	
– **Adjustable Lifting Points**		**6**	
– Winches independent and synchronized	N°	8	
– **Digital encoders to control winch speed and travel**			**included**
– Number of slings	N°	16	
– Slings length	m	22	TBA
– Sling protectors in polyester		Excluded	
– Rigid Pipes		painted cold galvanized steel	
– **Wireless radio remote control**		**standard**	
– Back-up wireless radio remote control		included	
– Emergency levers on the hydr. oil distributors		standard	
– Weighing system with display		standard	
– **Extended rear cross beam – U shaped**		**included**	
– Operating temperature	°C	+5° / +35°	

LIFTING EQUIPMENT CLASSIFICATION ACCORDING WITH ISO 4301

Each BHT is designed in order to guarantee a long life, according with its use and complying with ISO 4301. The proposed lifting equipment has the following classification:

– Equipment as a whole:	U2	Q2	A2
– Lifting Mechanisms:	T5	L2	M5
– Travelling Mechanisms:	T4	L2	M4

Further to your request, ASCOM can design lifting equipment with different classification.

MAIN FRAME STEELWORKS

Equipment design fully complies with Regulations "FEM Fédération Européenne de la Manutention n° 1001 Cahier 1, 2, 3 et 4", which are at the moment considered the strictest design standards for lifting equipments worldwide.
All structural components of our machines, especially the steel structure, are analyzed with software programs of finite element calculation. The structure is divided into countless small pieces, in order to analyze the stresses in all its parts ; in this way, it is possible to know the points of the

structure with the maximum values of moment and shear, the maximum stress and maximum strain and the structure is dimensioned accordingly.
This solution allows to realize structures that are shaped by following the trend of the moments and forces (dynamic loads applied); also allow the use of greater thickness where it is needed and smaller thicknesses where the material is less stressed, moreover this type of construction, plans to enter the internal baffles to increase the rigidity of the structure in particular in the way the points of application of the load.
The quality of steel used for each specific machine, is selected by our engineering department following UNI EN 10025 standards. The steel plates are supplied by first-class steelworks plants, accompanied by the related foundry certificates. The frame has a single cross-member at rear and this "U" shape allows a wide variety of crafts to be accommodated.

Box-beam structures are submerged-arc welded with an electronic and automatic control system; welders and welding procedures fully comply with International Standards EN287-EN288. Box-welded sections are internally reinforced with diaphragms, to guarantee mechanical resistance, stiffness and side stability.
All joints are flanged with high resistance nuts and bolts; mutual position fixed with pins. Specific sealing that is applied during assembly phases prevent from water penetration.

EXTENDED REAR CROSS BEAM

A special extended rear cross beam, "U"-shaped and mounted behind the vertical axis of the rear piers, is included in this scope of supply.
It provides additional clearance without the need for removing or adjusting the vessel's rigging.

PAINTING AND PAINT PREPARATION

Every single part is disassembled and then assembled again, in order to receive full and complete protection. At first, all frame parts are sandblasted according with Sweden Standards SIS 055900 – grade SA2,5 and, at the end of this process, all the members are carefully cleaned with compressed air in order to eliminate any kind of residue that could affect the proper application of subsequent treatments.
Then, to prevent from rust, obtain a better corrosion resistance and a better appearance, we apply:

- First coat of Zinc primer.
- Midcoat of epoxy-polyamidic primer resins.
- Finish coat of polyurethane enamel; . Winches and rims are painted black RAL9005.

Total thickness of dry film: 250 µm
Paint warranty is 5 years.

WHEEL GROUPS

Traction takes place through No. 16 wheels, of which No. 8 are driven/motorized.

No. 8 planetary gearboxes with rotating self-supporting casing, which enclose ground gears keyed on roller bearings, transmit motion to the wheels. Hydraulic motors coupled with speed reducers are housed inside the traction wheels hubs and are responsible for direct drive transmission.
The driveline is encased in a totally sealed enclosure, preventing parts from rust wear, and accidents.

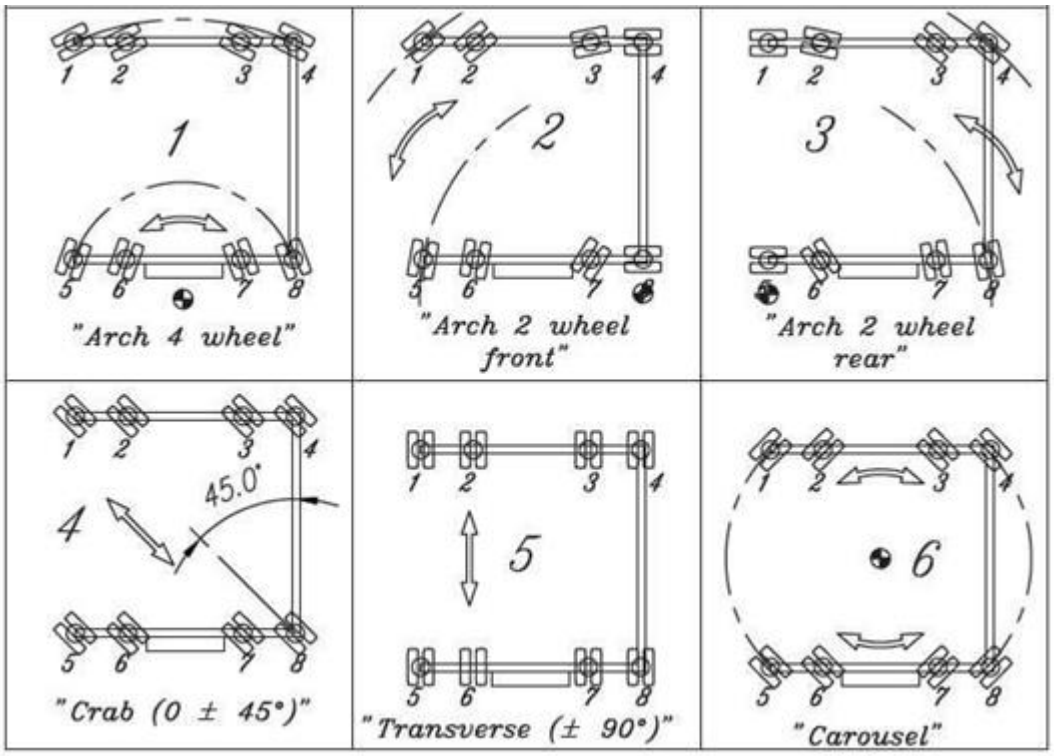
A **hydrostatic transmission circuit**, via a variable displacement axial pistons pump operating in closed circuit, controlled by a proportional electrohydraulic valve, feed the hydraulic motors that are responsible for the transmission of the motion.
Hydraulic braking is smooth and progressive; when oil pressure is off, brakes are applied to the Boat Hoist (negative brakes).
We supply large diameter steel bearings, roller type, providing free rotation minimizing vibrations.
In the front and rear of the tires, mechanical protections are installed to protect people who may be near the wheels.
All tires will be **filled up with a liquid mixture** (water and glycol, water and calcium chloride, etc.); this feature avoids a considerable air blow, which, considering the size of the tyre, could result as being very dangerous for people close to it.

ELECTRONIC STEERING SYSTEM

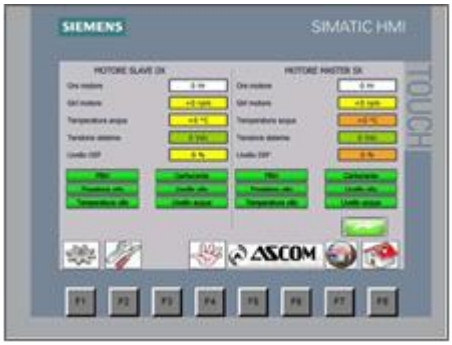
The proposed machine features an electronic steering system based on hydraulic Gearboxes drives. Each hydraulic motor powers a gearbox connected with a geared pinion which transmits the rotation movement to a big, teethed slewing bearing purposely fitted for this use; the rotation of the latter makes the wheels steering.
The whole gears and pinions system is completely encased in order to avoid sand and dirt to get in contact with this rotating part and also represents a safety feature during the operation and the maintenance.
The gearboxes are controlled by linear encoders and a PLC with proprietary software controls the position of each steering wheel-group.
The Electronic Steering System permits the following steering manoeuvres:

1. **Integral Self Correcting Steering** – (R/min ‹ Turning Radius ‹ ∞)
   The lifting equipment can turn on the right or on the left with any possible turning radius starting from the minimum value, that depends only on the dimensions of the lifting equipment.
2. **Rear Self Correcting**
   The lifting equipment can pivot (clockwise or counterclockwise) having one of the front wheels as the fulcrum of the rotation.
3. **Front Self Correcting**
   The lifting equipment can pivot (clockwise or counterclockwise) having one of the rear wheels as the fulcrum of the rotation.
4. **Crab**
   The lifting equipment can align all tires (on the right or on the left) along the same direction chosen by the operator and move along that straight line up to 45°.
5. **Sideway or Transversal** - (all wheels at 90 °)
   The lifting equipment can align all tires at 90 ° and move sideways (on the right or on the left) along a straight line.

6. **360 °** - (Turning Radius = R/min)
   The lifting equipment can rotate 360° degrees from the centre of the machine.



MONITORING AND DIAGNOSIS SYSTEM



The proposed Machine features a touchscreen display dedicated to the SIEMENS PLC, which allows the operator to check the machine status and visualize the alarms (by means of error codes and diagnosis messages).
On the same interface, located in the electric panel, it is possible to set and adjust some functions of the machine.
For same particular operations a safety password is required.

Hereafter is a list of some of the possible operations and monitoring:

- Real-time control of the speed of each individual winch
- Control of the rotation angles of the various wheels
- Control of the steering angles of the various wheels
- Control of travelling parameters

- Control of lifting parameters
- Delayed switching off of engines / radio controls
- Display of hydraulic oil tank levels
- Display of PLC input / output status
- Display of engine status and parameters, etc.

Hereafter is a list of some of the possible visualizations:

- Load cell overload
- Filter clogging
- Lack of fuel or sensor breakage
- Encoder damage or breakage
- Engine over temperature, Etc.

REMOTE ASSISTANCE

ASCOM supplies a LAPTOP Computer with pre-installed SIEMENS and PARKER software with which to connect, using a special cable also supplied, to the machine's PLC to verify and restore any anomalies and / or alarms.

The customer must guarantee an Internet connection to the Internet.
In this way, we will have the possibility to check on-line and eventually adjust the Software parameters in order to assist the Customer directly from Italy.

SIEMENS

ENGINE – ENGINE COMPARTMENT

- Engine type	Diesel; off-road Engine
- Brand	VOLVO PENTA
- Max power	235 kW
- Cylinders	No. 6
- **Emission compliance**	**EPA TIER 4 FINAL**
- Fuel Tank	500 l

Inside a water-tight, enclosed engine compartment, there are:

- Diesel Engine and Coupler
- Hydraulic pumps
- Hydraulic components
- Battery

The hydraulic oil temperature is controlled by a heat exchanger.
The water engine temperature is cooled by an oversized fan.

WINCHES

The winches can operate simultaneously or separately, permitting the levelling in any positions (transverse or longitudinal).
All winches have grooved drums as to guarantee proper wire-rope winding and features electrically welded steel structure with two symmetrical ends interconnected by heavy struts.
The mechanism features an orbital reduction unit with negative operating static brake, which transmits maximum lifting torque to the winding drum whose remaining end is joined to the bearer- structure via a sealed ball bearing.
Each winch features an **integrated control**, which continuously detects and adjusts the speed of each winch.

As a standard, a BHT has **two lifting speeds** (see main features) and the operator can vary them ranging from zero up to the maximum selected speed, via remote control or instrument panel.
A variable displacement axial pistons pump operating in an open circuit, controlled by a proportional electrohydraulic valve with Load Sensing technology, feed the hydraulic motors acting on the speed reducers driving each winch.
An automatic overload system prevents winches from lifting not admissible loads.
Reliability and easy maintenance are guaranteed since there are no transmission components exposed to bad external climatic conditions.

LIFTING POINTS

In order to get easier wrapping manoeuvres with slings, and avoid any contact with delicate shaped keel appendixes, helix axle, stabilizers and so on, the machine is supplied **with n.6 lifting points / sling blocks adjustable hydraulically and n.2 fixed**.
ASCOM sling blocks feature **in-line pulleys**, in order that the sling block does not 'twist' towards the boat when in the slings.
Hoist rope pulleys are **modular cast iron / reinforced polyamide**, turning on paired ball bearings that are pre-packed with grease and sealed for corrosion-free and maintenance-free service.

- Ropes are calculated with a safety factor > 5
- Clamps are CROSBY-LAUGHLIN wedge types.
- Slings are in polyester with a safety factor = 7:1

PROPORTIONAL REMOTE RADIO CONTROL

The radio control system allows the operator to check directly, walking around the lifting equipment, any manoeuvre in advance having the best view angle.

Main functions are:

- Start
- Engine Acceleration
- Travel
- Steering
- Lifting, with independent winches or synchronized
- Adjustment of mobile lifting points
- Speed Selections
- Emergency Stop

The transmitter is free from radio disturbance or interference.
The control unit has dynamic research of the free frequency, so that other radio control devices can be operated in the same area without the risk of false command.
We supply a free battery (Ni-Cd) charger unit and one spare battery.
Each battery, with full charge, provides 10 hours continuous use of the remote handset. The battery charger switches itself off once the battery is fully charged.
Recharging takes around five hours.

The radio control is shockproof and waterproof, and it features a display for boat weight reading (bow, stern, overall).

In case of radio remote control failure, the operator can:

BACK-UP RADIO REMOTE CONTROL

- Use a spare radio remote control included in this scope of supply.

EMERGENCY LEVERS

- Use the emergency levers on the hydraulic distributors to lower the boat safely in case of emergency.

MAIN SWITCHBOARD

The control panel is made of **AISI 316 stainless steel**.
It contains all the electromagnetic devices for command and manoeuvre, control and protection, of the Boat Hoist functions, and in particular:

- Enabling commands for switching on the machine and accessories (e.g., lights, radio control, etc.).
- PLC and hydraulic control electronics.
- Load limiter with lifting residual life recording.
- Touch screen panel dedicated to Siemens PLC:
  - Diagnostic lights,
  - Counts hours of operation,
  - Check operation of the diesel engine,
  - Alarm displays,
  - Indication of load lifted at bow, stern and total.
- Emergency stop mushroom pushbutton.
- Radio control receiving unit.

ELECTRONIC LOAD DETECTION SYSTEM

The machine is equipped with an **electronic load limiter with dynamometric pins in stainless steel**, located on the lifting pulleys.
This device measures the stern and bow load applied to the machine and transmits the detected data to the PLC, which sends them to the digital display of both the radio control and the control panel, allowing the operator to read the weight (stern/bow/total) of each boat with instantaneous survey.
The operator, by reading the displays, can evaluate the position of the boat's center of gravity and, if necessary, modify the placement of the slings along the vessel to better balance it.
The electronic load limiter is also equipped with no.5 thresholds for limiting movements:

- 5% threshold for blocking movements of the bow lifting points.
- 5% threshold for blocking movements of the stern lifting points.
- 30% threshold for blocking fast lifting and translation.

- 100% alarm threshold for reaching the nominal load.
- 110% threshold for blocking lifting. Max SWL reached.

On the radio control display, when a threshold is exceeded, a LED alarm activates.
When the 100% threshold is exceeded, an audible warning activates intermittently at 1Hz.
When the 110% threshold is exceeded, an audible warning activates intermittently at 5Hz.
The load limiter also acts as memory of the lifts carried out and therefore of the residual lifting hours, referred to the Boat Hoist class, according to the "UNI 4301-1: / 2016 classification of lifting equipment service" standard.

MAIN SAFETY DEVICES

The proposed machine has many safety devices.
The most important are:

- Lower\Upper Lifting Electric Limit Switches
- Lower\Upper Lifting Mechanical Limit Switches
- Mechanical Limit Switches for Steering Manœuvres
- Max. Pressure Hydraulic Valves (Relief Valves)
- OverLoad Limiting Devices
- Beepers during machine travel
- Emergency Stop at each corner of the machine
- Emergency Stop on the main Electric Cabinet
- Emergency Stop on the Remote control
- Flashing Light during travel
- Emergency Levers
- Liquid-filled tyres
- Grooved-type winches
- Electronic digital encoders on each winch to detect and adjust the hoisting speed and movement.

MAIN COMPONENTS BRAND

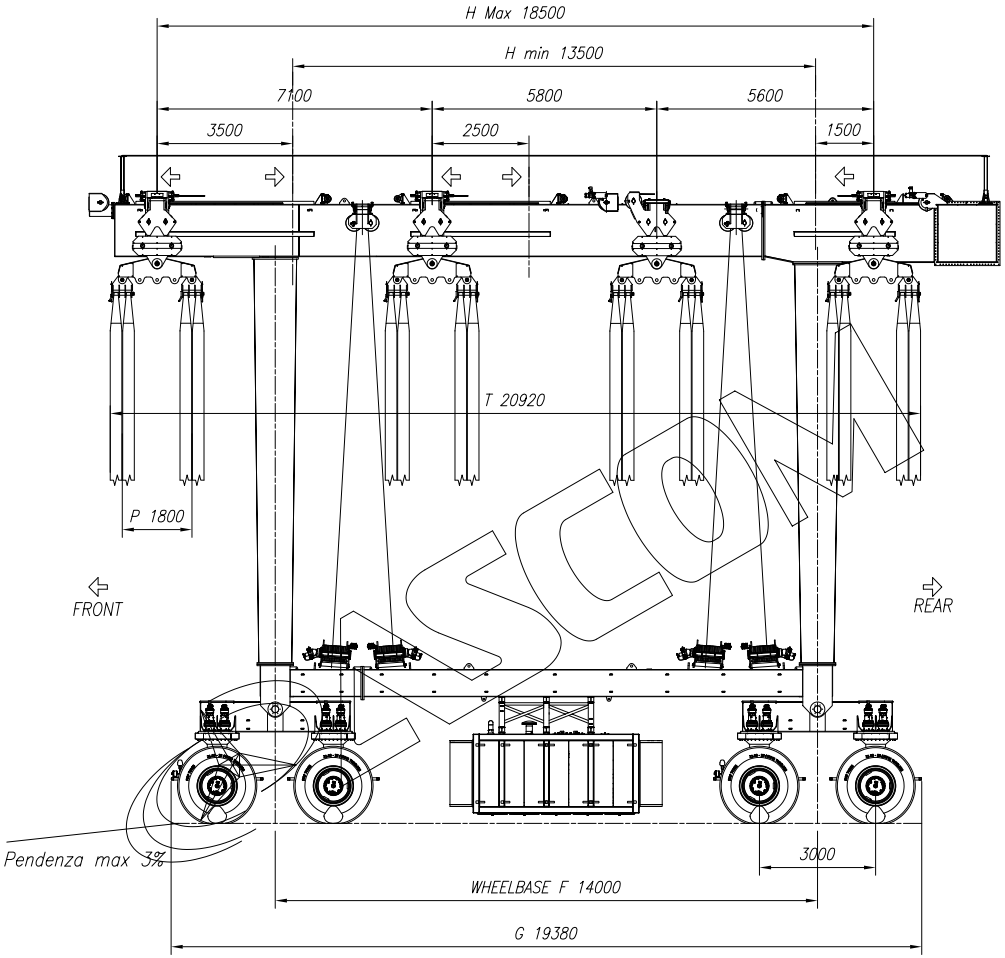
ASCOM machines feature first quality components supplied by very well worldwide known brands such as:

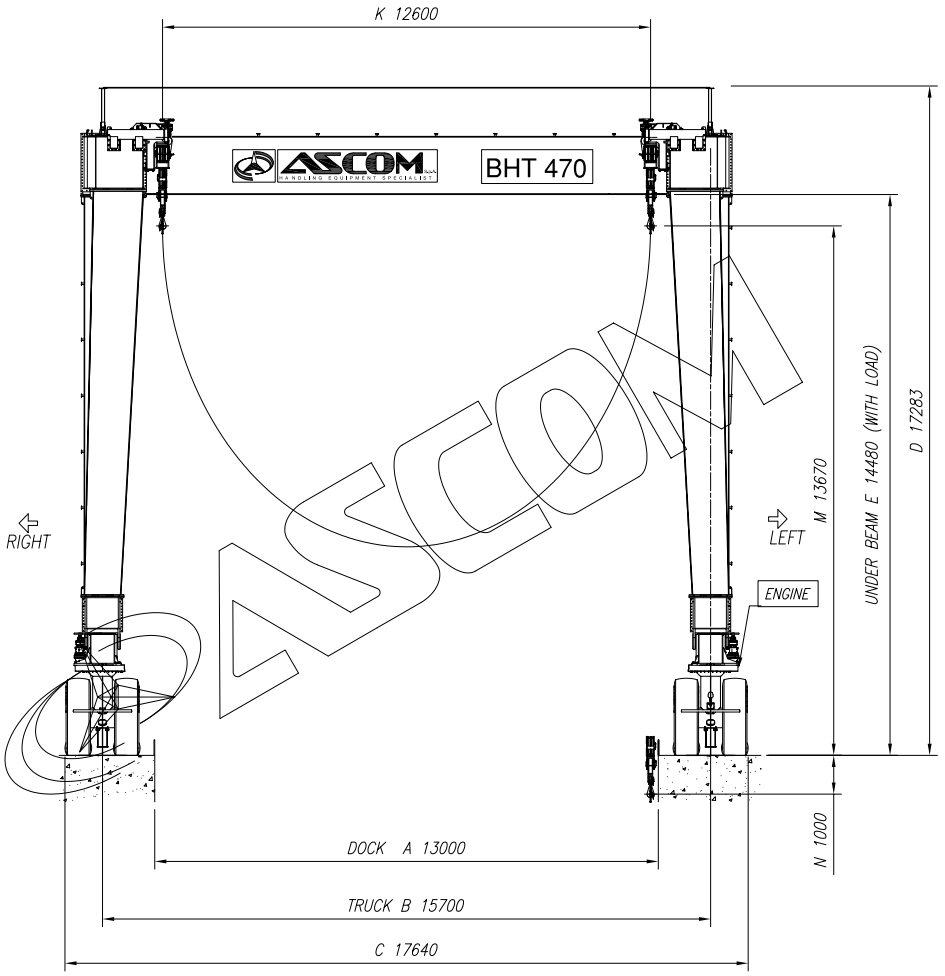
COMPONENT	BRAND
Diesel Engine	VOLVO PENTA (Sweden) or IVECO (Italy)
Drive Pumps	TWIN DISC TECHNODRIVE (Italy)
Hydraulic Pumps	PARKER (USA) DANFOSS (Denmark) LINDE (Germany)
Wheelgroups (Gearboxes)	BONFIGLIOLI TRASMITAL (Italy)

	DANA INCORPORATED (USA)
Hydraulic Motors	PARKER (USA) LINDE (Germany) DANFOSS (Denmark)
Winches	ASCOM (Italy) DINAMIC OIL (Italy)
Ropes	TREFIL EUROPE (France) SIRTEF (Italy)
Slings	SPANSET (Germany)
Electric \ Electronic Devices	TELEMECANIQUE (France) SCHNEIDER (France) SIEMENS(Germany)
Radio Remote Control	AUTEC (Italy)

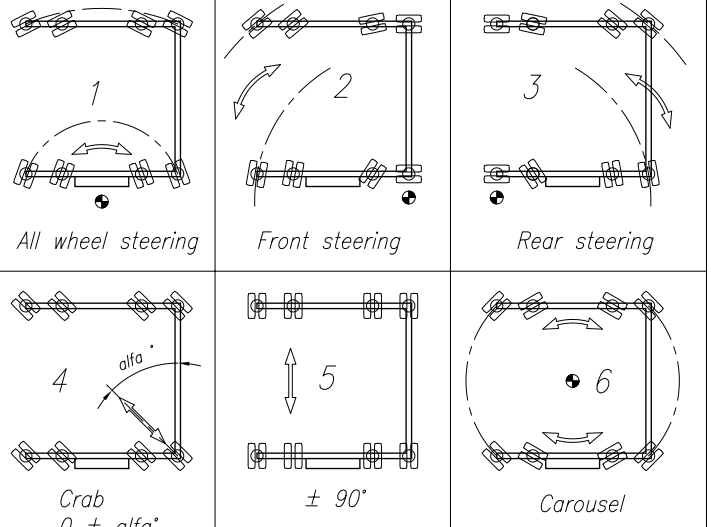
ASCOM Boat Hoist model BHT 470

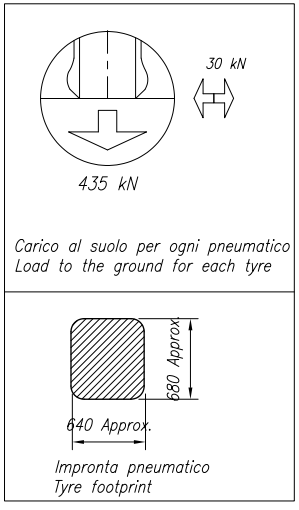
- 13 m inside clear dock width
- N.16 brand-new OTR tyres
- N.8 driving/motorized wheels
- N.16 steering wheels
- Electronic multimode steering system (N.6 steering modes)
- PLC SIEMENS + LAPTOP for remote Assistance
- N.8 lifting points, 6 adjustable hydraulically and 2 fixed
- N.8 independent and synchronized winches
- N.16 polyester slings
- Double hoisting speed
- Digital encoders on lifting
- N.2 wireless radio remote controls with display
- Emergency levers on the hydr. oil distributors
- VOLVO PENTA diesel engine / enclosed compartment
- Electronic load detection system
- Main switchboard and fuel tank in stainless steel
- Extended rear cross beam (sailboat beam)





ELECTRONIC STEERING MODES





Pos.	Codice	Titolo	Q.ta'	Materiale	kg
N° REV.	DATA	NOTE			REVISIONE
DISEGNATO	DATA	COMMESSA N°	QUANTITA'	VISTO	PESO
ASCOM S.p.A. HANDLING EQUIPMENT SPECIALIS	BOAT HOIST mod. BHT 470				DISEGNO N° / REVISIONE N°