

# TECHNICAL SPECIFICATION

18.09.2018



**IBAU HAMBURG**

**MECHANICAL SHIP UNLOADER**

**TYPE IB UL 300/14**

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**Brief Description**

The IB UL 300/14 ship/barge unloader is a system of screw conveyors.

A unique design makes the entire unloader foldable. Mounted on a semi-trailer the IB UL 300/14 is road mobile. The unit is suitable for mobile and fixed installations, onshore and offshore. The unloader can also be delivered with a gantry. The outlet with two spouts can be connected to bulk trucks, to belt conveyors, to screw conveyors or to a pneumatic system.

The IBAU HAMBURG IB UL 300/14 is:

- **Flexible**  
Mounted on a semi-trailer it can be moved on public roads to reach different sites and ships.
- **Multipurpose**  
The unit handles materials like cement and other free flowing dry bulk cargoes.
- **Cost efficient**  
High unloading capacity, multipurpose, low maintenance and operation cost, totally enclosed conveying system without cargo spillage etc.
- **Environmental friendly**  
The conveying line is totally enclosed without any dust emission or spillage. Total sound emission is also well covered by the standard diesel engine.
- **Reliable**  
The well proven IBAU HAMBURG screw conveyor technology ensures a reliable operation as well as the vertical conveyor including the IBAU HAMBURG inlet feeder efficiently feeds both free flowing and crusted material into the conveying system.

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**General Specification and Data****Materials****Note:**

All data is in metric units.

In order to avoid damages to the mobile unloader or cargo, always contact IBAU HAMBURG before unloading any material not handled before.

Type of material	Cement
Bulk density, conveying/stowed	0,9 / 1,3 t/m <sup>3</sup>
Moisture contents	<0,5 %
Max. temperature	<60 °C
Blaine	3500 cm <sup>2</sup> /g

\*Contact IBAU HAMBURG for specification of material, i.e. particle size, density, moisture content etc.

**Unloading Conveying Capacity****Note:**

All data is in metric units.

Cement	rated 220 t/h
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\*Contact IBAU HAMBURG for specification of material, i.e. particle size, density, moisture content etc.

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### Acoustics

Sound power/pressure level - Diesel version		
Lw (A) - source	103	dB(A)
Lp (A) - 1 meter	95	dB(A)
Lp (A) - operator distance (10 meter)	75	dB(A)

### Ambient conditions

Max. wind in operation	20	m/s
Max. wind out of operation	35	m/s
Temperature	+10 to +40	°C

### Weights, loads and dimensions

Total weight	49,7	t (incl. trailer, dust filter & bulk loading chute, excl. fuel in diesel tank)
Length in transport mode/trailer based	14,30	m
Width in transport mode/trailer based	2,55	m
Height in transport mode/trailer based	4,6	m

Overall dimensions see attached dimensional sheet.

Inlet feeder

### General

The inlet feeder consists of a two-winged inlet head with a low support beam, which gives a good capacity at lower angles between inlet and tank top of ship.  
The inlet feeder bottom bearing is of light antifriction type.

The inlet feeder is controlled jointly with conveyor 1 (ON/OFF) from the remote control box.  
The speed of the inlet feeder is adjustable from 0-100% on the remote control box.

### General data

Speed	0-50	rpm
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### Motor

Type	hydraulic piston motor
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### Transmission

Type	planetary gear, pinion, slewing rim
Lubrication hydraulic motor	automatic from hydraulic system
Lubrication slewing rim	manual

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**Screw conveyor 1****General**

The conveyor transport tube is self-supporting and manufactured in a high quality material. There is one intermediate bearing on the conveyor 1.

The conveyor screw is journal led in a heavy duty bearing together with the hydraulic drive motor in the top section and an end bearing in the bottom section.

The conveyor screw is also reversible from the remote control box.

From the diesel panel the conveyor screw speed is possible to manual adjust in order to correspond with the receiving system capacity or type of unloaded material.

The conveyor overload protection system is regulating the inlet feeder by means of stopping and starting the inlet feeder automatically when overload occur.

**General data**

Conveyor size	400
Conveyor length	7,0 m

**Motor**

Type	hydraulic piston motor
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**Screw conveyor 2****General**

The conveyor transport tube is self-supporting and manufactured in a high quality material. There is one intermediate bearing on the conveyor.

The conveyor screw is journal led in heavy duty bearing together with the hydraulic drive motor and in an end bearing in the bottom section.

**General data**

Conveyor size	400
Conveyor length	7,0 m

**Motor**

Type	hydraulic piston motor
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**Screw conveyor 3****General**

The conveyor transport tube is self-supporting and manufactured in a high quality material. The conveyor screw is supported by intermediate bearing and journal led in bearing for drive unit and with its end bearing.

**General data**

Conveyor size	500
Conveyor length	9,5 m

**Motor**

Type	Hydraulic piston motor
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**Screw conveyor 4****General**

The loading conveyor 4 transport tube is self-supporting and manufactured in a high quality material. The loading conveyor screw is supported by intermediate bearing and journal led in bearing for drive unit and with its end bearing.

**General data**

Conveyor size	500
Conveyor length	7,5 m (for single loading spout)

**Motor**

Type	hydraulic piston motor
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**Hydraulic system - Diesel version****General**

The hydraulic system is built in a special designed frame with cover. All hydraulic components are from well-known branch manufactures.

The main component is the pump drive gear box which splits up the power produced by the main engine to the hydraulic pumps. It also consists of the hydraulic oil reservoir, proportional valves, directional valves, oil filters, sensors for pressure, sensor for hydraulic oil temperature, sensor for hydraulic oil level and hydraulic oil cooler.

**General data**

Weight	5000 kg
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**Main engine**

Type	turbo charged diesel
Power output	224 kW
Speed	1800 rpm
Electric system	24 V
Complying with emission standards	U.S. EPA Tier 3 and European Stage III

**Transmission**

Type	pump drive splitter gearbox
Number of output	3
Lubrication system	closed system ( internal gearbox )
Oil - air cooler	yes

**Oil reservoir**

Type	special design
Volume	~400 l
Oil quantity	~300 l
Total oil quantity in system	~500 l

The oil reservoir is equipped with both automatic and visual level- and temperature indicator.

**Oil cooler**

Type	oil to air
Motor	hydraulic driven



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**Pump for feeding and cooling circuit**

Type	gear pump
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**Pump for movements**

Type	Variable piston pump
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(Luffing, slewing, outer-and middle hinge, tower cylinder- and telescopic functions, trailer support legs, dust filter fan, oil cooler and diesel engine)

**Pump for inlet feeder**

Type	Variable piston pump
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**Pump for conveyor 1**

Type	Variable piston pump
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**Pump for conveyor 2**

Type	Variable piston pump
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**Pump for conveyor 3**

Type	Variable piston pump
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**Pump for conveyor 4**

Type	Variable piston pump
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**Connection screw 1 and 2****General**

The connection consists of a special heavy duty ball bearing with outside teeth and a hydraulic driven planetary gearbox arrangement with a motion angle of max 270°.

This presents a major advantage, by increased reach of the unloader and also allowance of a virtually horizontal digging under ship's deck.

The transported material is passing through the centre of the bearing from outer conveyor to middle conveyor in a closed area.

The motion is controlled from the remote control box, but can also be controlled from the hydraulic power unit.

**General data**

Number of machinery	1
Angle of motion, working mode	±40°
Angle of motion, max.	270°
Speed	0-0,25 rpm (0-90°/min)

**Drive motor**

Type	hydraulic motor
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**Brake**

Type	integrated in planetary gearbox
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**Transmission (closed)**

Type	planetary gearbox
Lubrication	fixed from internal filling

**Transmission (open)**

Type	open gear
Bearing	heavy duty bearing

**Connection screw 2 and 3****General**

To achieve the motion of the conveyor 2, there is a heavy duty bearing and one cooperating hydraulic cylinder mounted on the conveyor 3.

The transported material is passing through the centre of the bearing from conveyor 2 to conveyor 3 in a closed area.

The motion is controlled from the remote control box, but can also be controlled from the hydraulic power unit.

**General data**

Number of hydraulic cylinders	1
Angle of motion, working mode	$\pm 30^\circ$
Angle of motion, max.	$130^\circ$
Speed	0-0,08 rpm (0-30 <sup>o</sup> /min)

**Hydraulic cylinders**

Size	200/125	mm
Stroke length	2200	mm

**Bearing**

Bearing	heavy duty bearing
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Luffing

**General**

Topping and slacking of the conveyor 3 is performed by two cooperating hydraulic telescopic cylinders. The transported material is passing through the centre of the bearing from conveyor 3, via a chute, to conveyor 4 in a closed area.

The motion is controlled from the remote control box, but can also be controlled from the hydraulic power unit.

**General data**

Number of hydraulic cylinders	2
Angle of motion, working mode	±30°
Angle of motion, max.	130°
Speed	0-0,08 rpm (0-30 <sup>o</sup> /min)

**Hydraulic cylinders**

Size	Stage 1 - 200 mm Stage 2 - 150 mm
Stroke length	2120 mm

**Bearing**

Bearing	heavy duty bearing
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**Slewing****General**

All parts of the unloader are attached to the platform which is placed on a slewing bearing. The slewing motion is achieved by the slewing machinery consisting of a special heavy duty ball bearing with inside teeth and a hydraulic driven gearwheel arrangement.

The motion is controlled from the remote control box, but can also be controlled from the hydraulic power unit.

**General data**

Number of machinery	1
Angel of motion	270°
Speed	0-0,35 rpm (0-126 <sup>o</sup> /min)

**Drive motor**

Type	hydraulic motor
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**Brake**

Type	integrated in planetary gearbox
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**Transmission (closed)**

Type	planetary gearbox
Lubrication	Fixed from internal filling

**Transmission (open)**

Type	open gear
Bearing	heavy duty bearing

**Electrical equipment****General**

The electrical equipment is placed in a cabinet located at the power unit.

The unloader is equipped with a plc unit which is a part of the security system. The plc unit is receiving signals from limit switches and guards. Those signals are processed in the plc unit that allow or deny operation of the unloader.

The operator's panel is connected to the plc unit and gives a message about the status of the unloader.

The unloader is operated by a wireless remote control unit. All main functions are manoeuvred from the remote control. It is also possible to connect a cable from the remote control to the base unit.

**Electrical control system**

Applied voltage	24 V
Frequency	DC
Enclosure protection	IP 65
Temperature range	from -5 °C to 40 °C
PLC system	Siemens S7-1200

According to German and European rules for construction and building of electrical control switchboards and -cabinets (VDE, VBG4, IEC). Switch cabinet with certificate of isolation- and function cold test.

**Visualisation system**

<ul style="list-style-type: none"><li>• touch panel (mounted into the cabinet door)</li></ul>
<ul style="list-style-type: none"><li>• display of process and plant conditions</li></ul>
<ul style="list-style-type: none"><li>• alarm indication as text message</li></ul>

**Battery pack for power supply of the electric control**

<ul style="list-style-type: none"><li>• 2 x 12 DC Battery</li></ul>
<ul style="list-style-type: none"><li>• battery pack is charged via the engine</li></ul>
<ul style="list-style-type: none"><li>• main battery switch, incl. housing</li></ul>
<ul style="list-style-type: none"><li>• location at power pack (engine)</li></ul>

**Remote control unit**

• radio remote receiver (mounted in the control cabinet)
• antenna, located at the tower
• battery charger (24 DC) , located at the power pack
• radio remote transmitter with control elements (joysticks, push buttons, etc.)
• two rechargeable batteries

**Pendant push-button control box**

for positioning of the loading chutes

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### Road mobile trailer

#### General

The trailer is a specially designed semi-trailer. The trailer is used as a carrier for the unloader during transportation.

During unloading, the trailer and its four supporting legs form a foundation for the unloader.

The trailer is designed according to EU standard and road permissions.

#### General Data

Length	12,5	m
Width	2,5	m
Weight	10,5	t

#### Wheel Suspension

Number of axle	3
Number of steering axle	1
Suspension	air suspension
Wheel dimension	235/75 R17,5

#### Brakes

Brake type	air manoeuvres with ABS
According to	98/12 EC (71/320/EEC)
Parking brake type	manual

#### Communication System

Communication system	According to: 76/756/EEC
Electrical conditions	According to: ISO 1185, ISO 3731, ISO 7638
Air connections	According to: ISO 1728 1980 (SAE 318 VG 74.342)

#### Loads

Bogie load	30	t
King-pin load (2" mouth)	11,8	t

#### Supporting Leg

Type	hand operated	
Stroke	350	mm



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**Dust filter****General**

The dust filter is of hose-cartridge filter type, with 9 pieces filter cartridge integrated in the bulk loading chute.

Cleaning of the dust filter takes place during operation, by means of short compressed air shots.

When cleaning the dust filter the material will fall down into the truck.

The dust filter is controlled (ON/OFF) automatically when starting, stopping the conveyor 4.

**General Data**

Type	cartridge
Number of filter	1 unit
Number of filter cartridge	9 pieces
Filter area	18 m <sup>2</sup>
Air flow	1200 m <sup>3</sup> /h
Motor	1,1 kW
Cleaning	compressed air

**Air supply**

There is a compressed air tank, in connection to the dust filter, which is supplied with compressed air from the compressor at the diesel engine, or from a separate compressor unit (electrical version). The air from the tank is led through a filter-regulator before it reaches the dust filter. It is possible to use compressed air at approximately 8 bar pressure when connecting to a quick release coupling at the power unit.

Air capacity (diesel version)	350 l/min
Air capacity (electrical version)	200 l/min
Number of air tank	1
Volume of air tank	30 l

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**Bulk loading chute****General**

Compact unit for bulk loading of pressure vessel car/railcar with inner bulk material cones and outer bellow for separately guided material and venting-air flow, adjustable negative air pressure flap, hoisting winch with hydraulic motor, overfilling guard with tuning fork

**General data**

Type	IB 400
Number of loading spouts installed	2
Loading capacity	200 m <sup>3</sup> /h
L. min.	1627 mm
L. max.	4711 mm
Loading socket <input type="checkbox"/>	500-650 mm

**Design Standards****Structural Parts**

The loads and stresses are calculated in accordance with the FEM (Federation Européenne de la Manutention) Rules for the design of mobile equipment for continuous handling of bulk materials, 1997, Document 2 131 / 2 132. Major welding joints are examined by X-ray or ultrasonic tests.

**Electrical Motor Starter and Control System**

The electrical components are of the IEC Standard and of well-known brands.

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### Performance of delivery

Steel- and plate work are sand-blasted SA 2 ½ from the outside according to DIN EN ISO 12944-4.

Painting : according to DIN EN ISO 12944-5  
category : C2 high  
base coating : Epoxy 50 µm (2K-EP)  
cover coating : Polyurethane 50 µm (2K-PUR)

Sub-supplier parts and standard equipment are supplied according to the production standard and colour.

Piping and accessory parts from the store are without painting in sub-supplier standard.

Colour tone : Machine and plant parts acc. to RAL 7031.

Supporting constructions are not included in our scope of supply, unless they are expressly mentioned. Documentation for supporting constructions to be manufactured by the customer may be prepared by us against payment.

Unless specifically mentioned, piping and connecting elements are not supplied premanufactured and without painting, but in straight lengths. Structural elements are prepared for transport.

Welding as well as steel- and plate construction for our equipment are carried out on the basis of IBAU construction standard, based on the requirement for pneumatic conveying equipment with an operating pressure of max. 0,8 bar.

Sound pressure level data for compressors according to DIN EN ISO 3744.

Welding connections for conveying air and compressed air pipes are performed according to DIN EN ISO 5817 classification group C.

Expendable assembly material such as electrodes welding wire, gas, oxygen, electric power, water, polishing and cleaning agents, fuels etc. are not included in our scope of supply. If elements are prefabricated, fitting works may become necessary.

### Documentation

You will receive the documentation in English language 1x in paper form (standard folder, colour: black, two-fold punching) and 1x on CD.

Each additional copy as well as special executions are charged separately.

The documentation is supplied with the equipment.