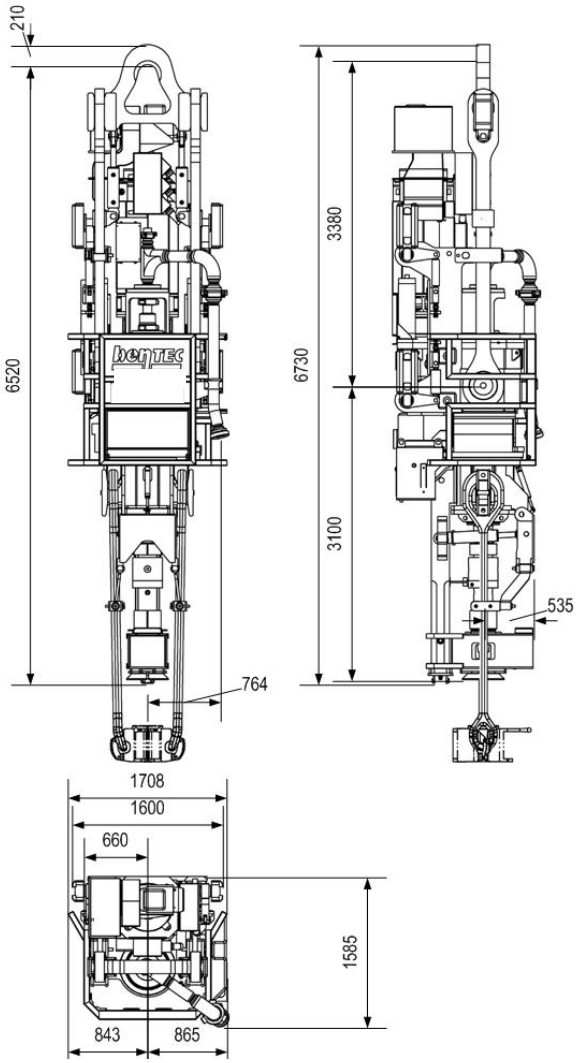
Technical Bulletin
Quotation 20020992 Rev 3
Top Drive
TD-500-HT

1 Technical Data

1.1 Dimension drawing

The drawing shows the basic Top Drive Configuration with optional elevator links and elevators.



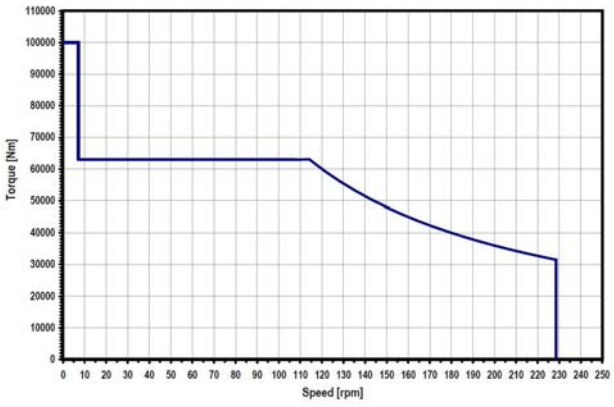
1.2 General

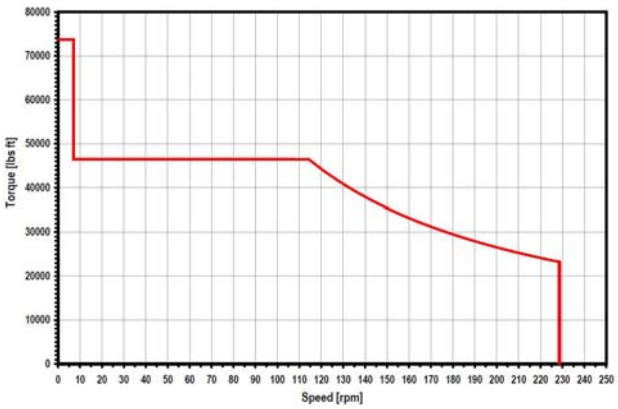
Description	Value	Dimension
Weight	35715 16,2	lb t
Length	265 6730	in mm
Width	70 1780	in mm
Height	61 1540	in mm

1.3 Performance Data

Description	Value	Dimension
API Load Capacity	500 454	ton t
Pressure Rating (max.)	7.500 500	PSI bar
Power Rating	1.030 758	HP kW
Drill Speed	0 to 115/230	1 min^{-1}
Drilling Torque	46.500 63.000	ft lbs Nm
Make up / Break out Torque	73.760 100.000	ft lbs Nm
Static Break Torque	77.440 105.000	ft lbs Nm
Link Tilt Lifting Capacity	5.500 lbs 2.500 kg	@4 ½ ‘ @1,4 m
Gear box Ratio 1. Gear	14:1	
Tool Joint OD Clamp Range	4” – 8 ½” OD 101,6 – 216 OD	In mm

1.4 Torque Speed Diagram





1.5 Connection values

Main drive electric	Description	Value	Dimension
	Voltage	D 575	V AC
	Current load (max.)	880	A
	Power input (max.)	750	kW
Main drive cooling electric	Description	Value	Dimension
	Voltage	D 400 / S690	V AC
	Current load (max.)	14.3 / 8.3	A
	Power input (max.)	7.5	kW
Hydraulic Power Unit electric	Description	Value	Dimension
	Voltage	D 400 / S690	V AC
	Current load (max.)	14,3 / 8,3	A
	Power input (max.)	7,5	kW
Gearbox Lubrication electric	Description	Value	Dimension
	Voltage	D 400 / S690	V AC
	Current load (max.)	14,3 / 8,3	A
	Power input (max.)	7,5	kW

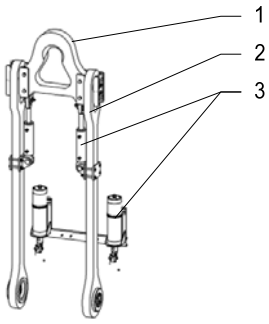
1.6 Operation conditions

Environment	Description	Value	Dimension
	Temperature range	-45...+ 55 -49...+ 131	°C °F

Top Drive Basic Configuration

2 Drilling Unit TD-500-HT

The Top Drive Basic Configuration contains:



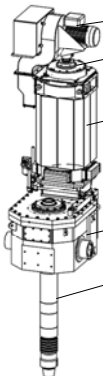
Hanger Assembly

The hanger assembly contains the following components:

- Yoke (1)
- Two upper links (2)
- Counterbalance system (3).
  The counterbalance system (3) is integrated within the Upper Links and consists of: 2 hydraulic cylinders & 2 hydraulic accumulators.

Note: The hanger design can be modified to suit the Top Drive to the existing travelling Block of the TBA 440 Rig. The Hanger assembly modification includes the engineering, manufacturing of the modified Hanger assembly with a stress test.

The final design and Interface Clarification need to be discussed between bentec's and Bauer's engineering dpt.



Drive System

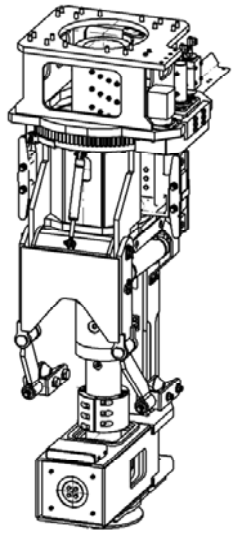
The drive system contains the following components:

- Engine cooling system
- Gearbox oil cooling unit (Cooling on demand)
- Brake (2-disc Brake spring-closed)
- AC Motor
- Gearbox (Gear Ratio 14:1)
- Mainshaft (Connection to IBOP: NC 61)
- Gear Oil Cooling Circle (connected with engine cooling system)
- Gearbox Lubrication Sensors (Low-Pressure Alarm)

Pipehandler

The Pipehandler contains the following components:

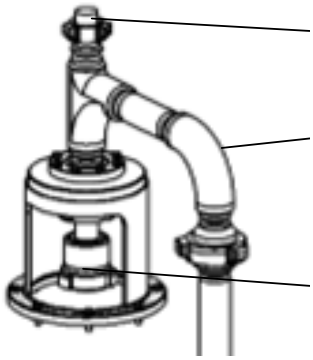
- Rotary Actuator & Arresting device (Index Positioning every 3°)
- Hydraulic swivel
- Link Adapter
- Linktilt mechanism
- Pipe handler monitoring
- Back up clamp (vertical travel during operation = 2" (50mm)
- Tool Joint Adapter kit Size III (Jaws for Tool Joints 6 1/4" (158,8mm) – 7 ¾" (197mm)) contains Tool a joint and one stabbing guide adapter for the specified tool joint sizes.



Other Tool Joint Adapter kits are available as an option

- IBOP – Remote and manual operated (Connection NC61 - both sides)
- One Saver Sub – The Standard Saver Sub connection to the Drillpipe is NC50

Other Quantities and connections of Saver Subs are available as an option



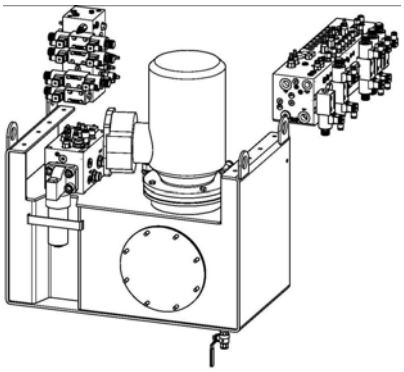
Mud Supply

Standard pressure rating of the Mud supply is 7500 PSI

The Mud Supply contains the following components:

- Washpipe - 3” (76,2mm) incl. Housing
- Wireline entry - 2” (50,8mm) Fig 1502 female
- S-Pipe
- Mud Hose Connection 4” (101,6mm) Fig 1502 female

Other Mud hose connections are available on request.



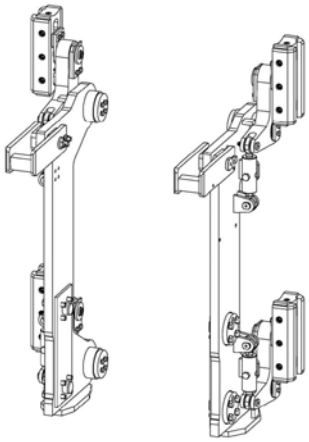
Onboard Hydraulic

The onboard hydraulic provides the system pressure for all hydraulic functions on the Top Drive. The hydraulic unit providing the following functions:

- IBOP open / close
- Link tilt mechanism
- Back Up Clamp open / close
- Pipehandler rotation
- Counterbalance functions

preparation for existing hydraulic elevators is available as an option

preparations for other hydraulic tools are available on request



Carriage

The Top drive is guided by a carriage package. It transfers the torque from the top drive into the Guide rails.

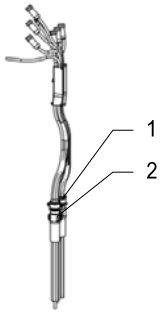
The Carriage Package consists of a frame with slide shoes, it transfers the Torque it to the Mast structure. Adjustment to centre well is performed by adjusting devices.

Note:

The Carriage will be modified to suit to the existing mast leg design of the TBA-440 Rig- Final design according to the proposal of Mr. Zacher (Email: 07.03.2012) need to be discussed between Bentec's and Bauer's engineering dpt.

Note Rev.3

According to the phone conversation between Mr. Zacher (28.03.2012) Bentec will supply the carriage without the Glide Pads. The connection design of the connection pins will be clarified between Bentec and Bauer engineering dpt.



Service Loop

The Top drive has a Power Loop (1) that supplies electrical power to the motor and a Control Loop (2). The control Loop holds all control lines and the electrical power supply for the auxiliary drives.

The Loop Length with an overall length of 263 ft (80m) is suitable for a 142ft (43,3m) Mast height with an average Rig Layout configuration.

Note:

Final Positions of the Service Loop Connection points at the Top Drive will be clarified between Bentec and Bauer Engineering Depts.

3 Transport Frame

An L-Skid is also assembled to this Frame to bring the Top Drive in upright position.

- Transport dimensions: (L/W/H): TBD
- Transport Weight (TD and Frame): (4,5t approx.)

Note: The Transport frame is designed to accommodate the drilling unit TD-500-HT backwards, that the face of the Carriage is in direction to the Mast Section during assembling.

The Transport frame got one Service Podest to make the connection to the travelling block and the Service Loop / Mud Hose

4 VFD-Container

Note: The Top Drive VFD System will be implemented in the already ordered Power Control Room #19

5 Supervision for Installation, Commissioning & Training

The duration of Supervision Installation, commissioning and training are 30 Days on location. (Travelling costs and accommodation will be charged separately.) This contains:

- Installation of the Top drive system by client into the existing rig under supervision of one Bentec engineer.
- Commissioning of the Top Drive system by two Bentec engineers
- Test Runs by two Bentec Engineers
- Hands on Training during operation by one Bentec engineer.

Duration of supervision is extendable on request.

Note: The duration is an estimate only. Exact time and personal expenses depends on final destination of the rig / Top Drive.

6 Documentation

Documentation

The Top Drive System will be delivered together with a technical documentation. This documentation contains all information regarding the Top Drive System and their subcomponents. These Information's contains:

- General Information's & Certificates
- Technical Data, Setup & Functions
- Transport, Installation, Commissioning & Decommissioning
- Operation, Maintenance & Repair
- Preservation & Storage
- Sub-Supplier Documentations

Options

7 Option – Travelling Block -TB-550-6-60 – Bauer Design

- Hook Load: 500t (550 ton)
- Lifting Eye Capacity: 55t (60ton)
- Width: 1625mm (64")
- Height: 3032mm (119,4")
- Depth: 834mm (32,8")
- Weight: Approx. 9,15t (20.170 lbs)
- Ambient Temp. -20°C +55°C (-4°F – 131°F)

According to API 8C standard, consisting of:

- Six (6) 60" (1524mm) Sheaves for 1-1/2"(38,1mm) Drill Line.
- Sheave Surface hardened
- Sheave made out of heat treatable steel
- Double sealed taper roller bearings with lubrication
- U-shaped Bail for Top Drive Connection

Conservation

- 2x, 2-Component coat EP-/PU based,
- Color: Yellow, RAL 1023; (OR TBD)
- Bentec coat Standard A-E2

Documentation

- Format: 2x printed 1x CD includes:
- General Drawing / Technical Specifications
- Installation- and Maintenance Manual
- Spare Parts List
- Manufacturer's Declaration

Note:

The Connection and bail is designed for the crown sheave arrangement of the Bauer Rig TBA 440. The Bail connection to the Top Drive is will be turned around 90°.

Note:

This Travelling block is an alternative Solution for the Top Drive Modification at the hanger assembly.

8 Option – Elevator Links

Elevator links with a capacity of 350 ton (317t) and 500 ton (454t) are possible.

The following sizes are available:

- 350ton (317t) or 500ton (454t) x 108" (2,74m)
- 350ton (317t) or 500ton (454t) x 120" (3,05m)(recommended)
- 350ton (317t) or 500ton (454t) x 132" (3,35m)
- 350ton (317t) or 500ton (454t) x 180" (4,57m)

Other Elevator link lengths are available on request.

9 Option – Preparation for existing hydraulic elevators

The Preparation for existing manual elevators can be added to the Top Drive basic configuration.

The Preparation includes:

- Additional Hydraulic Hoses for the existing elevator
- Switches and Valves for On/Off
- Implementation of the Controls within the Drillers Control

Note:

Bauer has to submit the specification of the Elevator to be used with the top drive.

10 Option – Tool Joint Adapter Kit

The Top Drive is equipped with one tool joint adapter kit. The kit contains a set of jaw assemblies and a suitable stabbing guide which fits to the specified Tool Joint Range.

If not specified the Top Drive is equipped with a Tool Joint Adapter Kit Size III.

The Following Tool Joint adapter kits are possible:

- Size I – Tool Joint range OD: 4"-5" (101,6mm – 127mm)
- Size II - Tool Joint range OD: 5 ¼" – 6 ¼" (133,4mm – 158,7mm)
- Size III – Tool Joint range OD: 6 ¼" – 7 ¾" (158,7mm – 196,9mm)
- Size IV – Tool Joint range OD: 7 ½" – 8 ½" (190,5mm – 216,9mm)

Note:

The Tool Joint adapter kits are removed from scope of supply. This Position will be ordered later.

11 Option - Service Loop Container

The Service Loop Container is an open Top 20ft (6m) open top container. The Service Loop and Service Loop saddle can be stored within this container during rig move. The Service loop will be stored within this container in optimal environments and avoid any damages during transport and storage.

12 Option - Maintenance Service

The following maintenance service options are possible:

- Monthly maintenance service
- 6-monthly maintenance service
- Yearly maintenance service

The Yearly Maintenance service will be done by Bentec onsite. Within the Maintenance Service our Top Drive Specialists check all Top Drive Parts, systems and functions. If some parts or systems need to be repaired or replaced Bentec will charge the costs separately. The following points are executed by Bentec service engineers according to the technical documentation.

Maintenance Service Contents:

- Maintenance of all Motors
- Maintenance of the gearbox
- Maintenance of the complete hydraulic system
- Maintenance of the complete mechanical system
- Maintenance of the complete electrical system
- Function Test

13 Option – Training Course

The Training Course is extensive classroom training. The training can be done in our main facilities in Bad Bentheim, Tyumen or Muscat. The training can be carried out prior to a Top Drive installation or after that. (Travelling costs and accommodation has to be paid by client.)

The training Course got the following content:

- Top Drive Operation
- Top Drive Hydraulics
- Top Drive Mechanics
- Top Drive Electrics

Participants:

This Course is provided for: Driller, Toolpusher, Repair- and Maintenance Crews or people who are directly responsible for the Top Drive.

Note:

Planned Persons per Training: 5

14 Contact

Germany			
Headquarters Production Service Sales	Bentec GmbH Drilling & Oilfield Systems Deilmannstraße 1 48455 Bad Bentheim Postfach 1253 • 48443 Bad Bentheim	Phone: +49-5922/72-80 Fax: +49-5922/72-457	E-Mail: info@bentec.com Web: www.bentec.com
Russia			
Production Service Sales	Bentec GmbH Drilling & Oilfield Systems Respubliki –str. 252, bild.1 office 1-06 625014 Tyumen	Phone: +73452261479	E-Mail: info@ru.bentec.com Web: www.bentec.ru
	Bentec GmbH Drilling & Oilfield Systems Russia Representation Office 1. Kasatschij per. 7, room 13 109017 Moscow	Phone: +7 495 234 42 38 or 39 Fax: +7 495 234 42 40	E-Mail: bentec@yandex.ru
Turkmenistan			
	Bentec GmbH Drilling & Oilfield Systems Turkmenistan Representation Office Azadi Street 95 / 2011 744000 Ashgabat	Phone: +99 312 395 561 Fax: +99 312 352 169	E-Mail: bentec.ashgabat@mail.ru.de
Kazakhstan			
	Bentec GmbH Drilling & Oilfield Systems Kazakhstan Branch Kabanbai Street 172 RK 480012 Almaty	Phone: +7 32 92 571 321 Fax: +7 3292 571 321	E-Mail: benteckz@gmx.de
Oman			
Production Service Sales	IDTEC International Drilling Technology Co.LLC P.O.Box 1278 PC 133 Al Khuwair	Phone: +968-2459-0103 Fax: +968-2459-0163	E-Mail: info@idtecoman.com Web: www.idtecoman.com

Note: All Data's are subject to technical changes. All shown pictures are typical pictures and not showing the final delivery.