Atlas Copco Water Well Drills

TH10 LM

DTH, Rotary air and mud drilling
Pullback capacity 111 kN (25,000 lbf)
Pulldown capacity 66 kN (15,000 lbf)

Atlas Copco

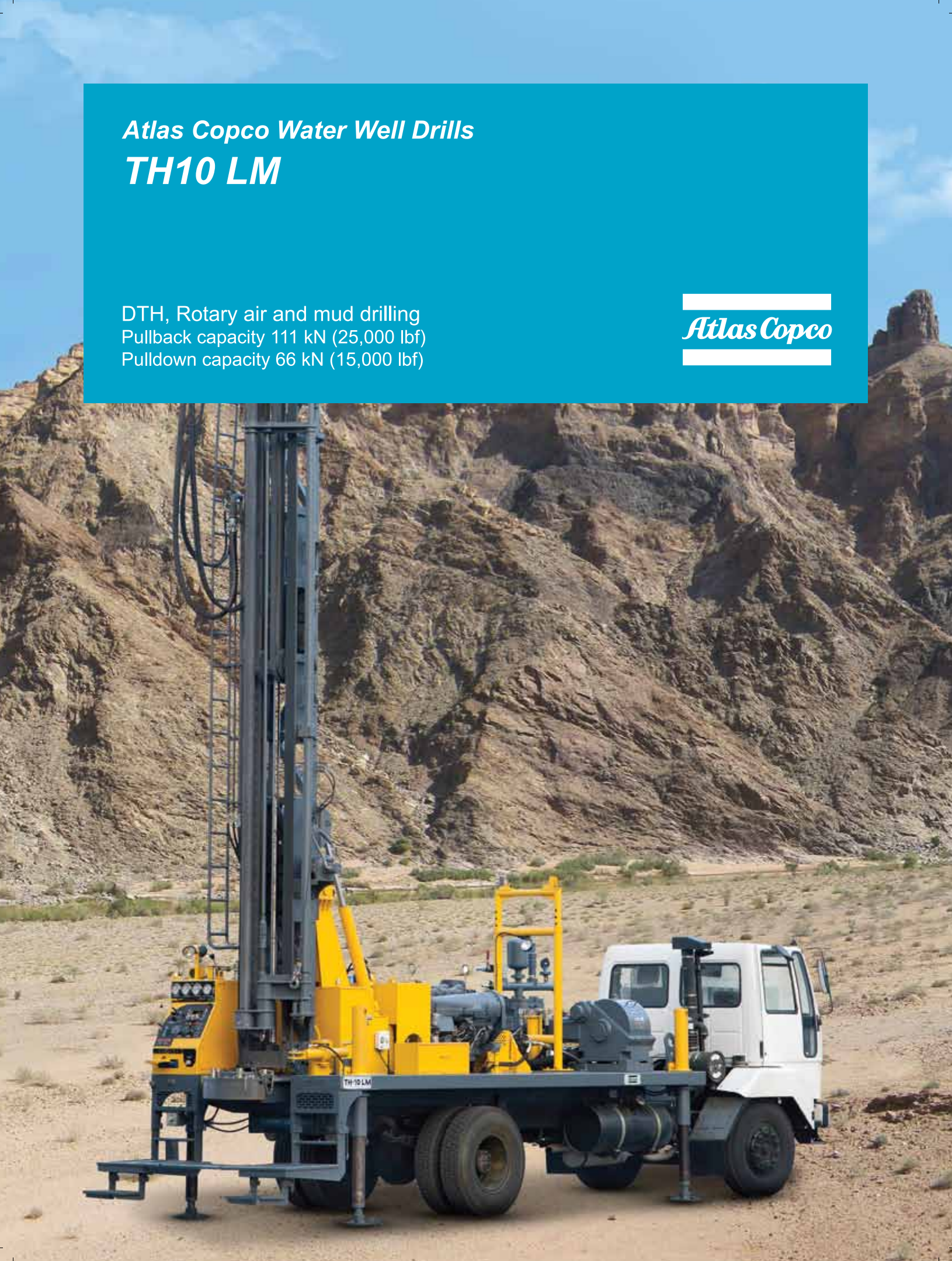


Table of Content

CAPACITY	3
STANDARD ITEMS ON TH10	4
DERRICK / MAST	4
DRILL PIPE	4
CASING HANDLING	4
DECK ENGINE	5
MUD MODULE	5
ROTARY HEAD DRIVE & DRILL PIPE ELEVATOR	6
FEED SYSTEM	6
HYDRAULIC SYSTEM	7
LEVELING JACKS	7
CONTROL CONSOLE & DRILLER'S / HELPERS PLATFORM	8
CENTRALIZER & BREAKOUT WRENCH	8
AUXILIARY HOIST	8
DOWN HOLE DRILLING HAMMER LUBRICATOR	9
WATER INJECTION PUMP	9
HYDRAULIC WELDER	9
TOOL BOX	9
COMPRESSOR	10
CARRIER/TRUCK	10
SHIPPING DIMENSIONS	10
LAYOUT DRAWING	11

The Atlas Copco TH10 LM is hydraulically powered and designed for air foam / mud rotary / down the hole drilling. It can be combined with a choice of circulation systems and drill pipe to enable drilling in semi-consolidated / consolidated formations using air / air foam / mud rotary or DHD depending upon the formation with suitable accessories and tools.

CAPACITY

DHD Drilling:

a] 165 - 200 mm (6 ½”- 8”) diameter hole in hard rock up to 300 m (984 ft)

MUD / Rotary Drilling:

b] 200 - 311 mm (7 7/8” - 12 ¼”) diameter hole up to 200 m (656 ft) in steps

SYMMETRIX Drilling:

c] 168 - 219 mm (6 5/8” - 8 5/8" casing) diameter hole up to 100 m (328 ft)

Note: The diameter and depth capability are indicative and based on pull back and torque of the drilling rig and are under ideal drilling conditions. It is the responsibility of the customer to ensure that the drilling rig is suitable for their drilling depths and conditions.

STANDARD ITEMS ON TH10 LM

- Sturdy long mast to handle 6.1 m (20ft) drill pipes and casing pipes
- Deutz Naturally aspirated (air cooled) deck mounted diesel engine to drive the hydraulics
- High torque rotation head 518 kgf.m (3,746 ft-lb) with two hydraulic motors
- Anti-skid foldable driller and helper platform
- High quality dust curtains to prevent dust during drilling
- High torque hydraulically operated breakout wrench to make and break drill pipe joints
- Auxiliary winch for handling drilling accessories
- Single manually operated Rod changer
- Operator friendly control console with symbols and guidelines
- Four enclosed hydraulic leveling jacks
- Bubble level for perfect leveling of the drilling rig
- Drill pipe handling elevators and tools
- Maintenance and overhaul tool box
- High quality lamps for better visibility on machine for drilling at night

DERRICK

Construction	:	Welded, rolled carbon steel channel with square bar for rotary head guide
Height	:	8,780 mm (28.80 ft)
Width	:	620 mm (2.03 ft)
Depth	:	475 mm (1.55 ft)
Control	:	Hydraulic lever located on control console

The derrick is made out of welded steel tubing to handle 6.1 m (20 ft) long drill pipe. The derrick is raised and lowered hydraulically.

DRILL PIPE

Following drill pipe of two options can be offered to suit drilling conditions -

a] 101 mm x 6.1 m (4” OD x 20 ft) long with 2 7/8” API (IF) pin up / box down connections

b] 114 mm x 6.1 m (4 ½” OD x 20 ft) long with 2 7/8” API (IF) pin up / box down connections

CASING HANDLING

The casing size up to 6.1 m (20ft) is possible to handle on the TH10 LM. The casing elevator can be coupled to a rotary head spindle for inserting the casing pipes in the drilled hole. This arrangement gives additional time saving as it doesn't need to move rotary head while inserting the casing pipes.

DECK ENGINE

Naturally aspirated engines have better life and performance compared to water cooled engines, requires less space for mounting and offers easy access for maintenance. The engine doesn't need a radiator compared to water cooled engines. It has less moving parts and hence has reduced maintenance cost.
The deck engine is a 6-cylinder diesel engine mounted onboard for powering the rig hydraulics and mud pump. The rig layout provides the provision for easy serviceability.

Options:

a] Engine Deutz BF6L914 for driving drill pack and mud pump, developing (135hp) at 2000 rpm
b] Engine Deutz F6L912 for driving drill pack, developing (88hp) at 2000 rpm (This option is without mud pump)

A fuel tank of 160 liter (42 gallons) capacity with all fuel connections is provided. The tacho hour meter, gauges, dry type air cleaner with filter change indicator, kill switch, accelerator cable and battery etc., are also provided on the rig.

MUD MODULE

The mud pump is used for rotary drilling in soft formations with a mixture of mud, where DTH drilling is not possible. The mud pump is guarded by relief valve to maintain optimum system pressure during drilling.
The following three options can be offered with the TH10 LM. It is mounted onboard and driven by a deck engine.

Options:

a] 3 x 4 Centrifugal mudpump of capacity
1134 l/min @ 10 bar (300 gpm @ 145 psi)
b] 6 x 6 Duplex mudpump of capacity
779 l/min @ 15 bar (205 gpm @ 217 psi)
c] 5 x 6 Duplex mudpump of capacity
536 l/min @ 22 bar (142 gpm @ 319 psi)
c] 5 x 6 Duplex mudpump of capacity
568 l/min @ 21 bar (150 gpm @ 304 psi)

The other accessories required for mud drilling like mud mixer, mud balance etc., can also be offered depending on the requirement.

ROTARY HEAD DRIVE & DRILL PIPE ELEVATOR

Rotation : 0-85 rpm (variable)
Torque : 5.07 kNm (3746 lbf-ft)
Swivel : Inline swivel external to the rotary head with 70 mm (2 ¾") water course

The rotation rpm can be varied from the operator control console. Inline swivel mounted directly on the rotary head can handle air/air foam/mud as medium and it's packing can be easily replaced, if wornout.

A drill pipe elevator is used to load and unload drill pipe under the rotary head (as shown in picture on the right hand side). The pull back force is provided by the rotary head through a feed cylinder and cable rope system. The rotary head also provides desired torque for coupling & de-coupling of drill pipe. The whole system works efficiently to reduce effort and time.

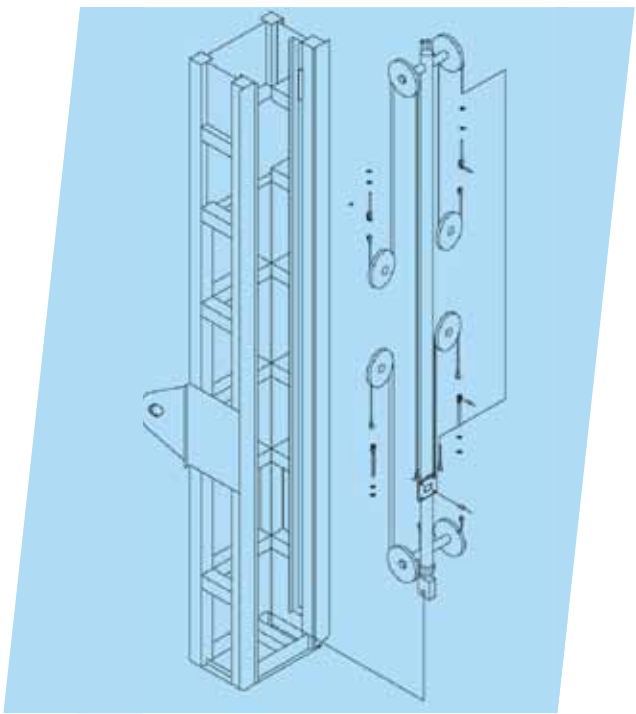
FEED SYSTEM

The feed system is powered through a hydraulic cylinder and wire rope system and has a pull back capacity of 111 kN (25,000 lbf) and pull down of 66 kN (15,000 lbf).

The feed has provision of fast and slow feed, micro feed and hold back arrangements. The rotary head travel of 7 m (22.96 ft) is provided to handle 6 m (20 ft) drill pipe and 6 m (20 ft) casing pipe.

- High speed up : 24.5 m/min (80 ft/min)
- Drilling feed rate : 5.7 m/min (18 ft/min)
- High speed down : 35.7 m/min (117 ft/min)

- Cable is light in weight, absorbs heavy shock loads without breaking & provides clear evidence of wear before failure occurs
- Easy greasing points access for regular maintenance
- Longer drill pipes reduces non-productive time & helps to improve the bottom line



HYDRAULIC SYSTEM

The hydraulic system consists of a hydraulic reservoir, hydraulic pumps, hydraulic motors, valves, cylinders, pipes, hoses, filters and gauges. The system is designed to be simple, reliable and functional. The hydraulic system is driven by the deck engine.

A. Reservoir

Capacity : 445 liters (117 gallons)
Location : Underneath derrick support
Filtration : Return filtration with 20/10 micron element

B. Pumps

The main hydraulic pump is a four section tandem gear pump

Functions:

Stage 1 - Rotation / fast feed / high speed casing hoist
Stage 2 - Slow rotation
Stage 3 - Slow feed / low speed
Stage 4 - Derrick hoisting cylinder, break-out wrench, jacks, water injection (optional) hydraulic oil cooler motor

C. Hydraulic Oil Cooler

The efficient hydraulic oil cooler provides air to oil cooling and thereby maintains optimum system temperature.
The system is designed to work up to ambient temperature of 50°C (122°F).

LEVELING JACKS

Four hydraulically operated leveling jacks are provided for leveling the rig. It provides a stroke of 760 mm (30”) and has jack pads of 355 mm (14”).

The jacks are provided with lock check valves for safety during operation. The hydraulic circuit is designed to get 3-point fast leveling, which maintains less stress on mainframe compared to 4-point leveling.

CONTROL CONSOLE & DRILLER / HELPER PLATFORM

All operator controls are controlled from a console which is located on the rear left side of the rig. The console includes pull down, hold back, rotation and air pressure gauge with all drilling and auxiliary controls. The drilling rig is provided with a full width steel mesh foldable platform.

The sturdy platform provides a space for the driller and a helper to stand comfortably and perform their tasks during drilling operation. The central plate of the platform can be removed to access the centralizer for changing the bushings and other miscellaneous activities.

CENTRALIZER & BREAKOUT WRENCH

The centralizer has a table opening of 400 mm (15.7”) and is split- swing-out type for ease of operation. The table includes a removable table bushing for drill pipe guide. The centralizer table is split-swing-out type and has dust curtains to prevent dust to maintain clean environment during drilling.

A hydraulic cylinder operated breakout wrench is provided for breaking drill pipe and hammer tool joints. It has a stroke of 356 mm (14”) and the wrench develops 71.6 kN (16,100 lbf-ft) break out torque.

AUXILIARY HOIST

An auxiliary hoist is provided for handling drilling tools and accessories. The rope has a high capacity hook.

The auxiliary boom swings around the tower for aligning the tools with the rotary head axis.

Options:

a) Bare drum capacity 1,000 kg (2,200 lb) with spooling a capacity of 30 m (96 ft) rope

b) Bare drum capacity 2,000 kg (4,400 lb) with spooling a capacity of 100 m (320 ft) rope

DOWN HOLE DRILLING HAMMER LUBRICATOR

A Positive displacement DHD hammer lubricator is provided for injecting oil in the compressed air stream, complete with an oil reservoir for lubricating the working parts of pneumatic tools.

The lubricator is mounted on the deck near the operator console for easy access and it has three settings with which the operator can vary the flow of oil injected into air stream.

Options:

a] 11 liters (3 gallons) Venturi DHD Lubricator suitable for 250 psi

b] 26 liters (7 gallons) Electric DHD Lubricator suitable for 350 psi

WATER INJECTION PUMP

The water / foam injection pump is driven hydraulically and is controlled from the main control panel. The pump is provided with a suction hose, foot valve and filters for drawing water from the tank or drum placed on the ground.

Options:

a] 19 l/min @ 24.1 bar (5 gpm @ 350 psi)

b] 45 l/min @ 31 bar (12 gpm @ 450 psi)

A hydraulic flow control valve is provided to adjust the output flow of a water injection pump from the console. A relief valve is provided at the delivery port of the water pump.

HYDRAULIC WELDER

The hydraulic driven welding machines with integrated generator of 300 Amps @ 60% duty cycle is totally enclosed and has mode selector for selection of welding and lighting. Because of its lightweight, it can be easily mounted on the deck.

TOOL BOX

A tool box of 765 mm (30”) x 300 mm (12”) x 300 mm (12”) is provided for storing maintenance tools and accessories on the deck.

COMPRESSOR

Atlas Copco model compressor can be mounted on a separate truck for providing adequate air during drilling. For more options contact your local Atlas Copco sales office.

Options:

a] XAVS 600, with 284l/s @ 15kg/sq.cm (600 CFM @ 13.8 bar)

b] XRH 1100, with 520l/s @ 20kg/sq.cm (1100 CFM @ 20.7 bar)

CARRIER/TRUCK

The TH10 LM can be mounted on a carrier or truck of suitable wheelbase and payload capacity. For more details on carrier or truck options contact our sales offices.

Options:

a] MAN FORCE CLA 26,280, 6x4 RH and LH drive

b] IVECO AD190T, 4x4 RH and LH drive

c] TATA 2516, 6x4 RH drive

d] ASHOK LEYLAND AL 2516, 6x4 RH drive

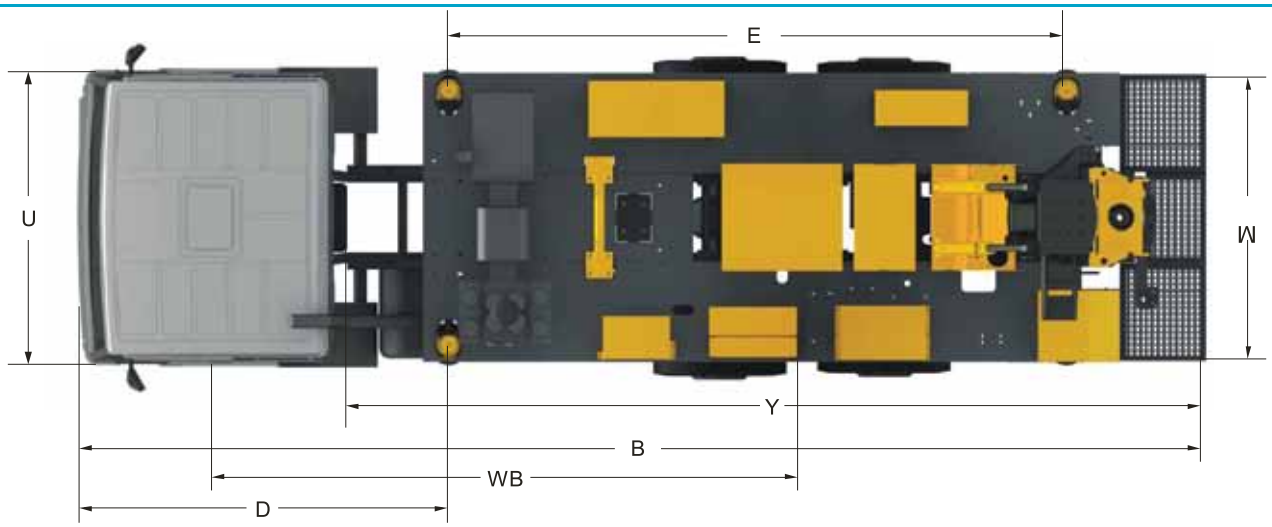
SHIPPING DIMENSIONS

A TH10 LM without a carrier can be shipped in a 40 ft open flat rack container and if mounted on a carrier can be shipped in a Roll-on / Roll-off (RoRo) vessel. The dimensions are :

	Without carrier	With carrier
Length	8,800 mm (28.86 ft)	10,000 mm (32.80 ft)
Width	2,400 mm (7.87 ft)	2,400 mm (7.87 ft)
Height	3,920 mm (12.85 ft)	4,360 mm (14.30 ft)
Approx. Weight	11,000 Kg (24,200 lb)	20,000 Kg (44,000 lb)

TH10 LM MODULE (It can be mounted on a truck of suitable capacity)

TH10 LM
LAYOUT DRAWING



SYM	DESCRIPTION	mm	inch
A	Width - tower crown	675	26.5
B	Length - overall, tower up	9,306	366
C	Height - ground to drill table	1,155	45
D	Length - front bumper to front jack	3,022	119
E	Length - Jack to jack	5,100	201
H	Height - overall, tower up	10,300	406
I	Height - mainframe to ground	1,350	53
J	Height - ground to mud pump top	2,788	110
L	Width - jack centers	2,130	84
M	Width - mainframe	2,400	94
Q	Height - jack to ground	665	26
R	Head - overall, tower down	4,360	172
T	Rotary head travel	7,000	276
U	Width - cabin	2,550	100
V	Height - ground to top of cab	3,104	122
Y	Length - mainframe	6,000	236
WB	Length - wheelbase	4,500	177

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Sustainable Productivity

We stand by our responsibilities towards our customers,
towards the environment and the people around us.
We make performance stand the test of time.
This is what we call – Sustainable Productivity.

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