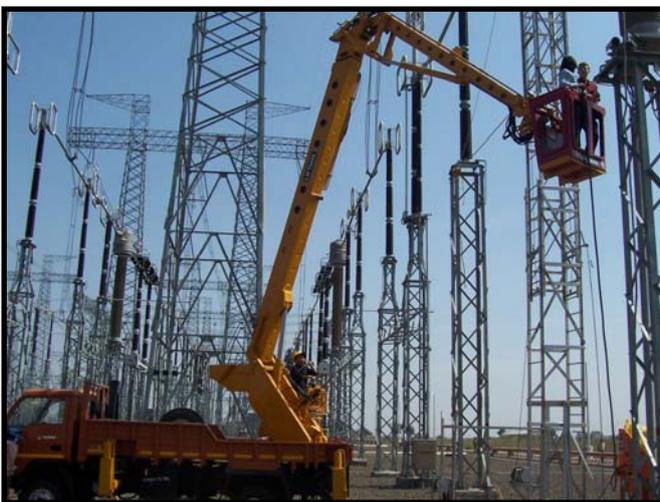


SPECIFICATION OF LIFTMAK 16.5M WORKING HEIGHT HYDRAULIC TELESCOPIC CUM ARTICULATED, ZERO ELBOW PLATFORM MODEL LMTAHP165 ON SHORT WHEEL BASE (3800MM OR LONGER) 11T GVW MMV TRUCK CHASSIS

1. SCOPE

The design of Liftmak model **LMTAHP165** telescopic platform incorporates several advantageous features as under:

- * Ease of operation by virtue of telescopic cum articulated boom, with inching capability, which enables operator to zoom-out to point to be accessed.
- * Long reach
- * Compact stowed length, reduces travelling length making the unit more manoeuvrable
- * Easy entry/exit into/from cage, which rests on chassis deck during transportation
- * Hydraulic cage levelling with additional cage level control in cage/basket
- * Optional independent basket rotation $\pm 45^\circ$ to align cage to work area
- * 4-point outriggers for stabilizing vehicle with optional single push-button vehicle auto-levelling system



2. TRUCK CHASSIS

Liftmak model **LMTAHP165** telescopic platform is mountable on any MMV chassis having a wheel-base exceeding 3800mm and a GVW of 11000kg.



3. POWER SUPPLY

Power for the hydraulic platform is provided by a hydraulic pump driven from chassis power take off unit only. The pump is of ample and sufficient output for normal smooth operation of the platform with low engine speed.

Hydraulic reservoir is incorporated in the main frame and hydraulic circuit is fully protected by efficient filters.

The control valves/pump/motors are of reputed make such as Rexroth, Vickers, Yuken, Badestnoist, Eaton, Danfoss, Parker, Boss, Hydro Control or equivalents.

4. HYDRAULIC HOSES

The hydraulic hoses are located so that they do not interfere with the movement of the platform, booms etc. Make of hoses offered is Parker, Dunlop, Gates, Universal, Duroflex, King Power or equivalent.

5. STRUCTURE

The booms are made from MS structural steel of good quality. Telescopic and articulated booms (as offered) sections are rigid, reinforced box section. All fabricated sections are rust inhibited from the inside while the exterior surfaces are pretreated and finished to give a glossy look.

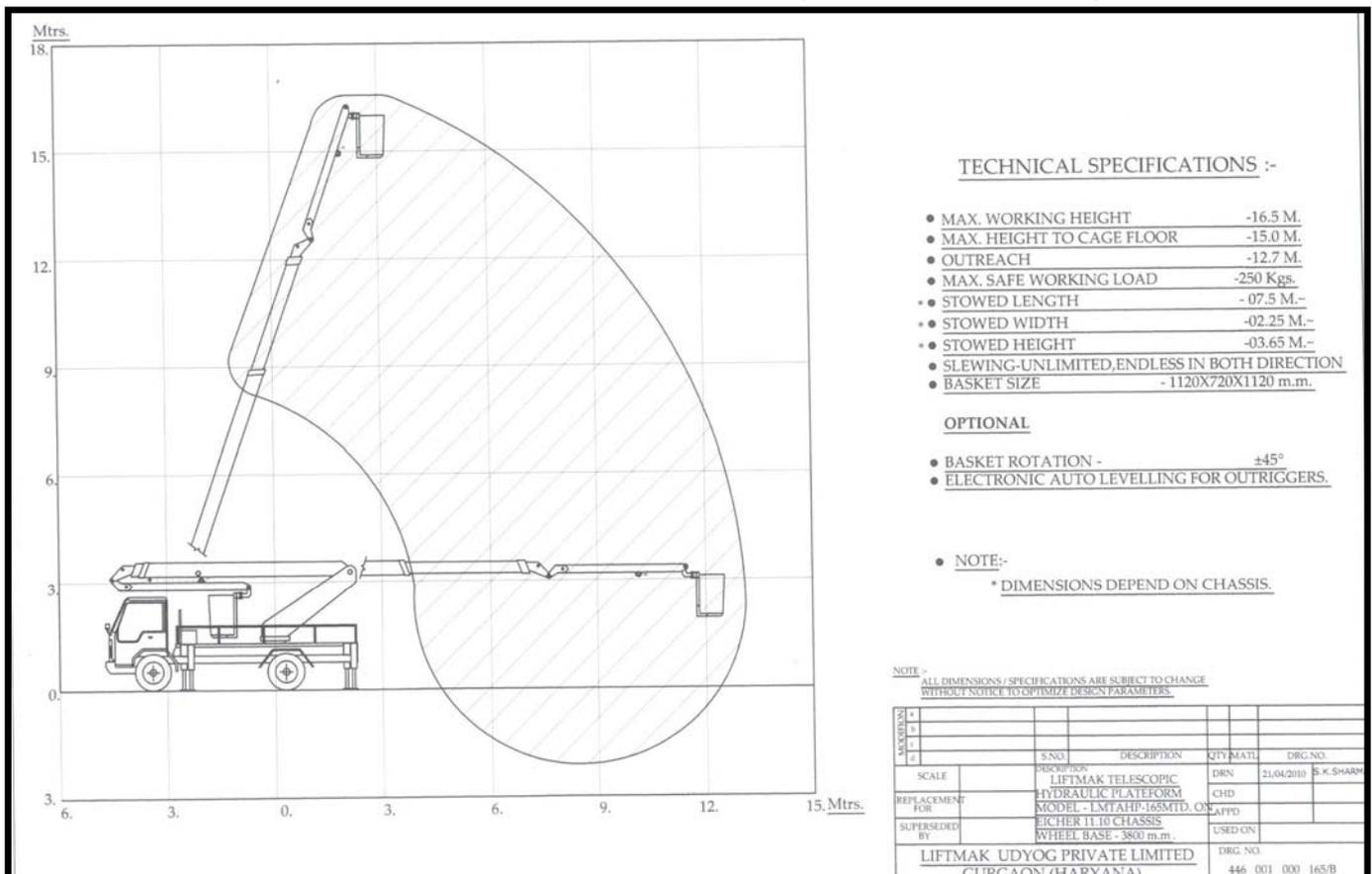


6. STABILIZERS

Four out and down H-type stabilizers, hydraulically powered, are provided, two at rear & two in front. Each of the stabilizers is operated independently, to allow levelling on uneven ground. Suitable level indicators are provided to check the level, both along the length as well as along the width of the chassis/vehicle.

When stowed, no part of the stabilizers protrude beyond the chassis
 Suitable interlocks are provided to ensure that the stabilizers cannot be retracted until platform booms are stowed and also to ensure that booms cannot be operated until stabilizers are deployed.

As an option, a single push-button outrigger auto-levelling system is available, which automatically commands the outriggers to level the vehicle. The auto-levelling mechanism eliminates the possibility of human error in levelling the machine. Levelling of the vehicle before use is most important, to prevent the possibility of accident/toppling.



Note: Cage capacity options are available till 600kgs.

7. HYDRAULIC CYLINDERS

All platform motions are performed either by double acting hydraulic cylinders or hydraulic motors with automatic brake.

- The cylinder tubes are of ST52, cold drawn seamless tubes conforming to DIN 2391, having H8 tolerance and surface roughness Ra0.2 microns
- The piston rods are of CK45, hard chrome plated and ground steel rods having minimum 20 microns hard chrome plating and surface roughness Ra0.2 microns and corrosion resistance NSS ISO 3768 & ASS/ISO3769
- Piston glands are from EN8
- Seals are of Bushak, Shamban; U-cup seals are of Polyurethane

- Hoses are tested to twice rated pressure and the bursting pressure shall be at least four times the rated pressure.

8. SLEWING

The hydraulic telescopic platform model **LMTAHP165** is designed for continuous slewing by a high torque, low speed motor, through reduction gear box up to and beyond 360° in either direction – continuous, unlimited. Slewing speed is precisely controlled by using fine restrictors in the circuit.

9. PERSONNEL CAGE

A special designed reinforced fibre-glass basket of size 1120x720x1120mm approx. is provided. All attachment points are bonded to withstand most arduous use. The non-slip floor with drain holes is provided to give the operator safe working condition. The basket is insulated to withstand 600 volts, even though the platform is not to be used on live line and hoses/links/controls are not be insulated. The basket is designed to carry a safe working load of 250 kgs. The hydraulic platform design is such that entry and exit into/from cage is easy. As an option independent cage rotation of $\pm 45^\circ$ and intercom between cage and turntable can be provided.

10. CAGE LEVELLING

The cage is level in all positions, achieved through a hydraulic cum mechanical levelling system. Additional hydraulic control is provided in the cage to correct any levelling error, should it occur, thus providing the operator total safety and operational control.

11. PLATFORM CONTROLS

The hydraulic controls for all functions (except outriggers) are in cage. All control levers shall be self-centering and hooded for protection against accidental operations. A hand pump permitting lowering of the boom is provided at the base in case of vehicle engine/electrical system failure. The stabilizer controls are provided only at base, at rear of vehicle.

12. TRAVELLING DIMENSIONS

No part of the hydraulic telescopic platform model **LMTAHP165** protrudes beyond outrigger position, during operation. In other words, design is based on 'zero elbow' concept during operation to avoid accident/collision with road-side traffic or obstructions near vehicle on side opposite to the cage. Travelling dimensions are compact, with cage resting on vehicle deck in stowed position.



13. SAFETY SYSTEM

Considering the high working height of 16.5m, safety of the operator is of prime importance. Liftmak **LMTAHP165** incorporates the following safety systems, at par with the best industrial practices world-wide:

LIFTMAK HYDRAULIC ACCESS PLATFORM SAFETY SYSTEM

Safety systems in hydraulic access platforms is of the utmost importance, as the operator is working at considerable height. Liftmak access platforms incorporate the best safety systems available world-wide including and surpassing the systems listed in EN280-2010-02.

The safety systems are:

- a) Independent outrigger controls and spirit level indicator to check vehicle level (as per EN280-2010-02 para 5.3.2).

Optional/recommended: Electronic single push button vehicle auto-levelling provided as an option, which commands the outriggers to level vehicle automatically, eliminating human effort and skill in levelling the vehicle before the booms are operated.
- b) Optional/recommended: Slew restriction system to automatically prohibit slew movement on the side where the outriggers have not been fully extended (mandatory as per EN280-2010-02 para 5.3.8.1). It is obvious that if the hydraulic platform slews on the side where outriggers have not been fully extended, instability can occur.
- c) Interlock to prevent boom operation, unless outriggers are deployed (as per EN280-2010-02 para 5.3.8.1)
- d) Load holding valves on all cylinders to prevent boom crash in case of hose failure (as per EN280-2010-02 para 5.10.2). The cylinders conform to IS10585:2002.
- e) Outreach management as per design controlled automatically by a combination of electrical, mechanical and/or hydraulic safety systems (as per EN280-2010-02 para 5.4.1.3).
- f) Optional/Recommended: Digital cage load display, with alarm and cut-off indicating overload beyond maximum 120% of rated load. Please note that conventional overload protection through a pressure relief valve at main cylinder is a basic overload protection system but insufficient under certain operating conditions. The cage overload protection system should ideally be directly at the cage and independent of the operating radius of the hydraulic platform (mandatory as per EN280-2010-02 para 5.4.1.2)
- i) Optional/recommended: Cage collision guard through ultrasonic sensors with automatic cut off and possibility to over-ride the cut-off as decided by operator in cage. This safety system prevents accidental collision of cage.
- j) Interlock to prevent outrigger movement unless platform is stowed and to prevent operation of booms unless outriggers are deployed (as per EN280-2010-02 para 5.3.10).

- k) Optional: Electro-hydraulic proportional joysticks for controlled and simultaneous movements. End stroke damping provided in main boom cylinders. (unless opted for, on/off controls are provided)
- l) Optional: Indication in cabin to warn driver if the hydraulic platform is not in ready to move condition (as per EN280-2010-02 para 5.3.14)
- m) Cage levelling is through a dual mechanical/mechanical cum hydraulic parallelogram system (depending on design) to ensure that the cage is level in all positions (as per EN280-2010-02 para 5.6.1). Additional provision for direct hydraulic levelling adjustment of cage (available for telescopic design access platforms only).

The above apart, the following safety systems are incorporated:

- Optional: Emergency standby engine with a hydraulic pump is provided enables platform to be stowed in the event of vehicle engine/PTO/main hydraulic pump failure. Option of battery driven back up is also available.
- Restrictor valves are provided to ensure slow descent in the event of lock valve failure (as per EN280-2010-02 para 5.7.8)
- Pressure gauge points provided in each hydraulic circuit (as per EN280-2010-02 para 5.9.5)
- Overload protection through pressure relief valve in main lift cylinder (as per EN280-2010-02 para 5.4.1.4)
- Hand operated emergency pump for stowage purpose in case of main pump failure (as per EN280-2010-02 para 5.7.8).
- Positive cage levelling in all positions, with additional lever in cage, to adjust cage level hydraulically* (*for telescopic and telescopic cum articulated design only).
- Automatic stops to prevent platforms from reaching unsafe area of operation are provided (as per EN280-2010-02 para 5.4.1.3).
- Emergency cut off device are provided at turntable and cage controls to cut off all functions, with easy restoration (as per EN280-2010-02 para 5.7.5).
- Manual rotation of turntable is possible in case of emergency
- Illumination of cage and base controls are provided for night operation.
- Anchor points for 4 safety harnesses are provided in cage.
- Cage controls duplicated at turret
- Optional: Dead man's switch/control at cage
- Optional: Intercom between cage and base control stations
- Optional: Independent cage slew of $\pm 45^\circ$ to align cage to any overhead surface.
- Optional: Alarm and cut off in case any outrigger loses contact with ground

- Optional: Computer aided CAN BUS safety system, not only restricting load, reach etc to within permissible limits but also dynamically displaying all information such as reach, height, cage load, wind speed, outrigger position etc on graphic colour monitors (14cm size) at outrigger, turret and cage control stations (as per EN280-2010-02 para 5.11).
- Liftmak hydraulic access platforms are tested for stability at 150% of rated load, surpassing EN280-2010-02 para 6.1.4.3 which specifies 125%.
 - a) Independent outrigger controls and spirit level indicator to check vehicle level.

Optional/recommended: Electronic single push button vehicle auto-levelling provided as an option, which commands the outriggers to level vehicle automatically, eliminating human effort and skill in levelling the vehicle before the booms are operated.
 - b) Optional/recommended: Slew restriction system to automatically prohibit slew movement on the side where the outriggers have not been fully extended.
 - c) Interlock to prevent boom operation, unless outriggers are deployed
 - d) Spirit level indicators provided to check the vehicle level
 - e) Outreach management as per design controlled automatically by a combination of electrical, mechanical and/or hydraulic safety systems.
 - f) Optional/Recommended: Digital cage load display, with alarm and cut-off indicating overload (please note that conventional overload protection through a pressure relief valve at main cylinder is a basic overload protection system but insufficient under certain operating conditions. The cage overload protection system should ideally be directly at the cage and independent of the operating radius of the hydraulic platform)
 - i) Optional/recommended: Cage collision guard through ultrasonic sensors with automatic cut off and possibility to over-ride the cut-off as decided by operator in cage. This safety system prevents accidental collision of cage.
 - j) Interlock to prevent outrigger movement unless platform is stowed and to prevent operation of booms unless outriggers are deployed.
 - k) Optional: Electro-hydraulic proportional joysticks for controlled and simultaneous movements. End stroke damping provided in main boom cylinders. (unless opted for, on/off controls are provided)

The above apart, the following safety systems are incorporated:

- Optional: Emergency standby engine with a hydraulic pump is provided enables platform to be stowed in the event of vehicle engine/PTO/main hydraulic pump failure. Option of battery driven back up is also available.
- Restrictor valves are provided to ensure slow descent in the event of lock valve failure
- Hand operated emergency pump for stowage purpose in case of main pump failure.
- Positive cage levelling in all positions, with additional lever in cage, to adjust cage level hydraulically.

- Automatic stops to prevent platforms from reaching unsafe area of operation are provided.
- Emergency cut off device are provided at turntable and cage controls to cut off all functions, with easy restoration.
- Manual rotation of turntable is possible in case of emergency
- Illumination of cage and base controls are provided for night operation.
- Anchor points for 4 safety harnesses are provided in cage.
- Load holding valves on all cylinders to prevent boom crash in case of hose failure.
- Cage controls duplicated at turret
- Optional: Dead man's switch/control at cage
- Optional: Intercom between cage and base control stations
- Optional: Independent cage slew of $\pm 45^\circ$ to align cage to any overhead surface.
- Cage levelling is through a dual mechanical cum hydraulic parallelogram system to ensure that the cage is level in all positions. Additional provision for direct hydraulic levelling adjustment of cage.
- Optional: Computer aided CAN BUS safety system, not only restricting load, reach etc to within permissible limits but also dynamically displaying all information such as reach, height, cage load, wind speed, outrigger position etc on graphic colour monitors (14cm size) at outrigger, turret and cage control stations.



14. OPERATING DATA**Model LMTAHP165**

- Maximum height of cage floor from Ground level..... 15.0M
- Maximum working height (taken as cage base +1.50M) 16.5M
- Minimum operating radius corresponding to 8.5M working height 11.0M
- Cage capacity (tested at 50% overload; higher cage capacity option available) 250 kgs.
- Outriggers (Hydraulically operated) 4 Nos.
- "Zero-Elbow" of boom on opposite side of cage (within outrigger width) Zero
- Levelling of cage..... Positive hydraulic cum mechanical
- Lock valves provided on all cylinders Yes
- Slew (continuous & unlimited in both directions) 360°+ endless
- Hydraulic pump drive through chassis PTO..... Yes
- Cage insulation.....600 volts
- Intercommunication between cage and base control (at slew base) Available

Other parameters :

- Boom to stabilizer and stabilizer to boom interlocks provided for safety
- Controls provided as follows –
Stabilizer controls on rear side of chassis,
Slew, boom elevation and boom telescoping/tip-boom articulation/cage slew controls at cage
- Emergency hand pump to stow platform in case of main system failure.

Note: Specifications and details as shown in the photographs and drawing are subject to change and may vary, depending upon chassis selected

OTHER SIMILAR PRODUCTS