

MCSS - MCTJ - G



The supremacy of ideas.

ROTO

45.21 MCSS

45.21 MCTJ

45.19 MCSS

50.16 MCSS





VERSATILITY AND EFFICIENCY



Technical excellence

The new ROTO MCSS series slewing handlers reinforce the supremacy of Merlo's technology and gives a glimpse of the future. Innumerable design features increase operating flexibility and produce an extraordinary on-site performance, assuring every user of a winning solution, whatever the application. The continuous rotation made possible by Merlo's exclusive rotary coupling, the MCSS Continuous Stability System and

MERlin digital information system, represent today's best technology in terms of reliability, safety and comfort. The unequalled lift height, the Load-Sensing hydraulic system and the turbocharged 6 cylinder Euro 2 engine add up to another incomparable solution from Merlo. It's part of a continuing drive to make machines rich in technology, the results of continuous research and innovation, with the guarantee of more than 40 years experience.

EXCLUSIVE TECHNOLOGY

Power where it could be needed

A double-acting hydraulic service, complete with quick-connectors, is a standard boom-end fitting.

Total protection

All the operating components of the boom assembly are placed totally within the boom, for maximum protection and reliability.

Complete control

The cab module allows the driver a continuous and complete vision of the working area at maximum lift height.

Less wasted energy

The hydraulic circuit features a Load-Sensing variable delivery piston pump.

Versatility without equal

The fork carriage is equipped with a Tac-Lock system, hydraulically operated from the cab, allowing rapid interchangeability of attachments.

Safety above all

The exclusive MCSS system assures an automatic and continuous assessment of the machine stability.

Maximum stability in every situation

Four hydraulic stabilisers ensure the correct position and levelling on uneven ground; the safety system maximises the performance whatever the chosen position.

Hydropneumatic suspension

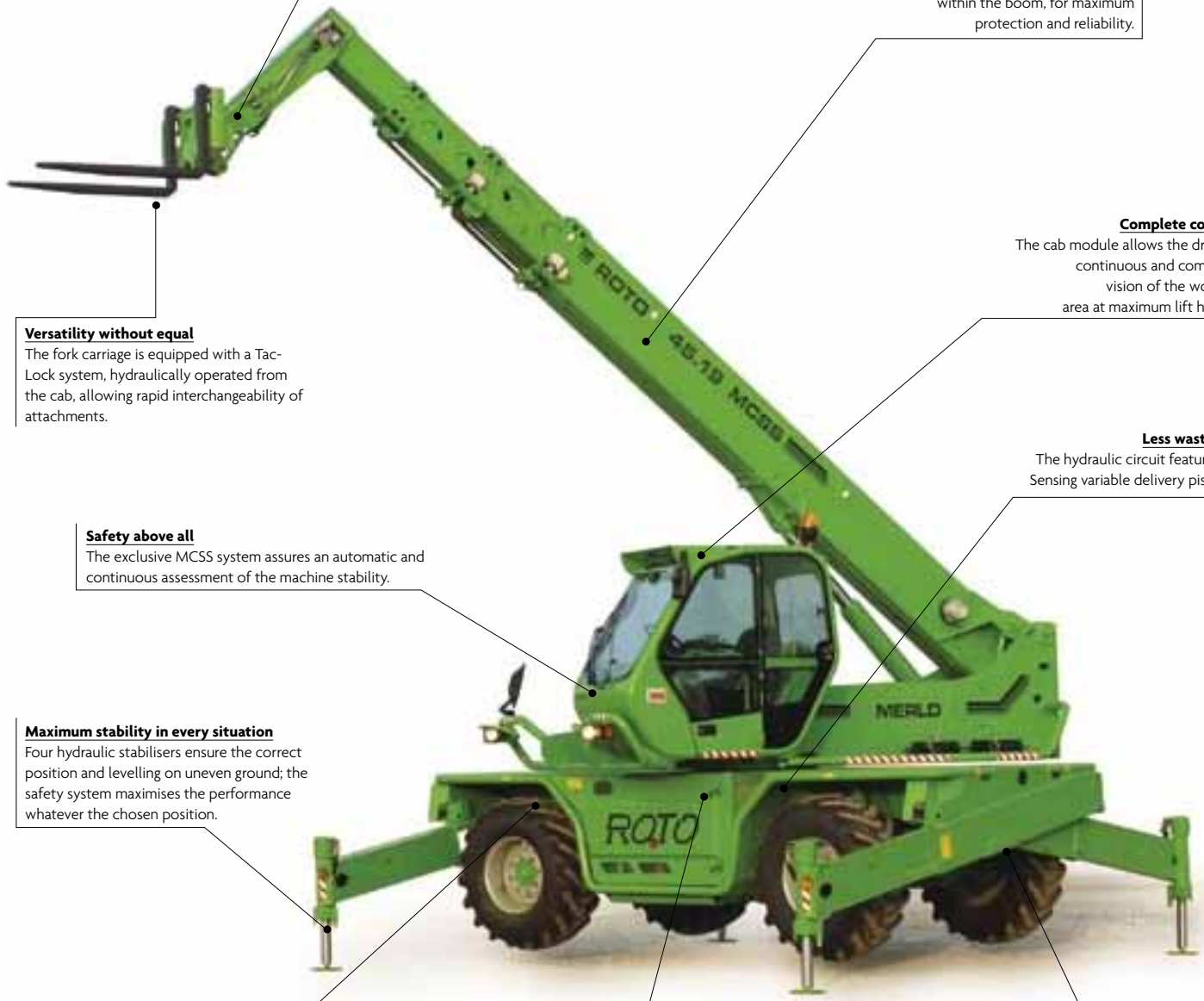
A high technology choice which guarantees ride comfort and best operation when working on tyres.

Side mounted engine

The use of a 6 cylinder engine provides reliability, conformity with the Euro 2 exhaust emission standard and provides more torque, guaranteeing a spectacular performance.

High ground clearance

'Portal' type axles give a better ground clearance than other designs and were designed and produced in-house specifically for Merlo telescopic handlers.



The MERlin® system - Merlo Local Interactive Network – ensures the electronic management of all the operating parameters of the machine with great advantages in terms of efficiency, safety and profitability.

The main structure of the machine is surrounded by the 'Ring of Steel' - a solid 70 mm diameter steel bar - which is a structural part of the chassis, and protects against site damage.



The ROTO MCSS series are part of a new range of slewing handlers designed to be the most technically advanced on the market. Several exclusive features add up to the highest productivity and best comfort in every application.

Safety without compromise

The MCSS system ensures an automatic and continuous assessment of machine stability in every operating condition, leaving the operator free to concentrate on other parts of the job.

Ergonomic controls and clear instrumentation

All the controls are easily reached and operate intuitively. The instrument panel is digital with analogic display, affording an immediate and easy check of all the machine's essential operating parameters.

Total visibility

Whatever the operator's position, the visibility of the working area is always excellent.

High level of comfort

Award-winning operating comfort. The operator has the biggest cab in the market and an exclusive hydro-pneumatic suspension system for the axles, particularly effective at high travel speeds.

Amazing manoeuvrability

Integrated design of all components leads to incomparable compactness. The ease of handling and precise positioning, together with a lively engine, give exceptional manoeuvrability.

Total confidence

The 'real-time' creation of load envelope according to the centre of gravity position gives the operator the highest level of safety in all conditions.

Excellent service access

The positioning of the engine, transmission and the hydraulic system make routine servicing very easy, with excellent access. Also, service engineers can work in safety from ground level.

Highest productivity

Higher operating speed, unequalled performance and tremendous versatility prove this to be a machine designed for profitability in the hardest of applications.



ROTO MCSS exclusive features

- Continuous rotation with hydraulic/electric/electronic rotary coupling
 - 6-cylinder Euro 2 turbo aftercooled engine, 107 kW (145 HP) engine
 - Load-Sensing hydraulic system
 - Hydro-pneumatic suspension
 - MCSS Continuous Stability System
 - MERlin digital control and diagnostic system
- Electronically managed hydrostatic transmission
 - Independent stabilisers
 - 40 kph travel speed (autolimited)



For Merlo, specialisation means applying research into innovative solutions in all the small detailed aspects of production: a production concept that has created a winning machine.



INSTRUMENTS AND CONTROLS



Comfortable and spacious cab - An exclusive workplace

The cab, stylish and designed for maximum comfort and safety, summarises technology in the workplace. Steering wheel and seat are adjustable to ensure the best driving position, the driving controls are designed to be operated without the driver needing to remove the hand from the wheel and the cab layout is a model of the latest ergonomic design and functionality. The interior dimensions make this one of the most spacious cab interior in the handler market.

- 1 MERlin® digital display
- 2 Interactive control panel
- 3 Forward/reverse selector
- 4 Slow/fast speed selector
- 5 Multifunction electronic joystick
- 6 Emergency stop button
- 7 Storage compartments

The speed change is electrically controlled with switch conveniently located at the side of the steering wheel.



The machine stability indicator light is positioned at operator eye-level to ensure the best possible visibility.



The "Finger-Touch" direction control lever allows the driver to select between forward and reverse without taking his hand from the steering wheel.



The new cab, a new standard to beat

- 995 mm internal width
- Innovative and functional design
- 360° visibility
- Structure conforms to ISO 3449 (FOPS) and ISO 3471 (ROPS)
- Ergonomic and intuitive controls
- Multifunction joystick control
- Digital instrumentation
- Window seals of slimmer profile to increase glass area
- Automatic air conditioner (optional)

Easy entry

Cab entry through the fully-opening door is facilitated by wide, self-cleaning steps and a flat, obstacle free floor.

Personal storage

Storage compartments are provided inside the cab for personal items.

An ideal climate

An optional climate control system ensures the ideal temperature for the operator whatever the outside conditions.

Noise reduction

Intensive research has resulted in the application of the latest techniques of sound reduction, to produce an exceptionally quiet cab environment.

Music 'while you work'

With the optional stereo hi-fi system, productivity is increased by ensuring the operator is attentive and relaxed.



Total control

Controls for the stabilisers and suspension have been regrouped into a wide lateral console, easily reached by the operator's right hand.

Stabiliser and suspension control console

- 1 Steering mode selector
- 2 Parking brake switch
- 3 Differential lock switch (optional)
- 4 Stabiliser operating controls
- 5 Hydro-pneumatic suspension controls

The electronic joystick gives the operator full control of boom and upperstructure in one lever.



An efficient ventilation system, complete with an anti-pollen filter, pressurises the cab to reduce dirt ingress.



The generous glazed area of the cab ensures a truly panoramic view. Front and rear windows can be opened for natural ventilation.



THE MERLIN SYSTEM



The MERlin® system introduces a new way of graphically displaying all machine functions, substituting a LCD display for the traditional instrument duster to present all necessary information to the driver in a clear and functional manner.

The heart of the system is a computer which receives all the inputs and outputs of the different machine functions in 'real-time'.

All functions are constantly monitored on the screen so it is always easy to check that all are working correctly.

- Manages all safety functions.
- Presents the most complete set of data in a clear and easily comprehensible form.
- Provides a basic diagnostics system.
- Finally, an optional anti-theft immobiliser guaranteeing a high level of security.

The software has several levels of interactive menus accessing different functions of the system.

Principal menu

Continuous display of principal operating parameters (travel speed, engine rpm, liquid levels etc), allows the setting of required cab temperature and controls the operation of auxiliary circuits such as lights and the differential lock.



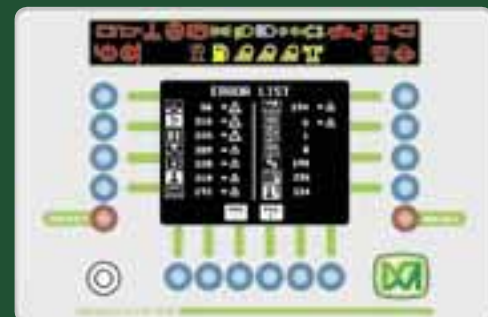
Operating Menu

Preselection of the main operating system parameters.



Cheek-up Menu

The driver can receive a 'real-time' information check of many systems, simply with the press of a button.





Centre of gravity position display

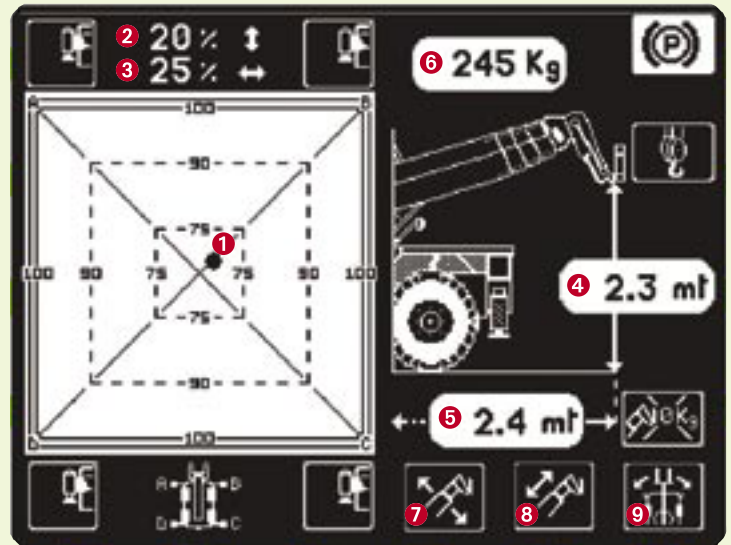
An exclusive feature of the MERlin® system is a real-time display, in both graphic and digital form, of the position and movement of the machine's centre of gravity during the working process.

The system is equally effective whatever the stabiliser extension and continually monitors the load situation (height above ground, radius from the machine's centre) and its weight.

An enormous advantage of this new system is that it works with any type of equipment mounted on the front carriage - forks, winch, jib, hook or platform. The operator can predetermine the work area simply by setting the slew angle of the turret rotation, lift and boom extension limits.

Priority to safety

The centre of gravity display also shows the stability limits of the machine with respect to the stabiliser configuration in use and the load position. In this way, the operator is continuously advised of his closeness to the operating limits, and can readily understand the actual longitudinal and lateral stability.



- ❶ Position of the centre of gravity with respect to the working area
- ❷ Percentage of longitudinal tipping limit
- ❸ Percentage of lateral tipping limit
- ❹ Load height
- ❺ Load radius from machine centre line
- ❻ Load weight
- ❼ Presetting of boom lifting angle (min-max)
- ❽ Presetting of boom extension (min-max)
- ❾ Presetting of slewing turret angle

Service Menu

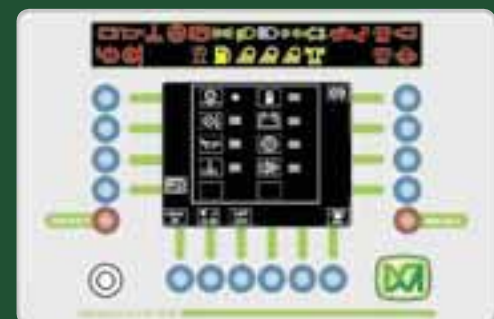
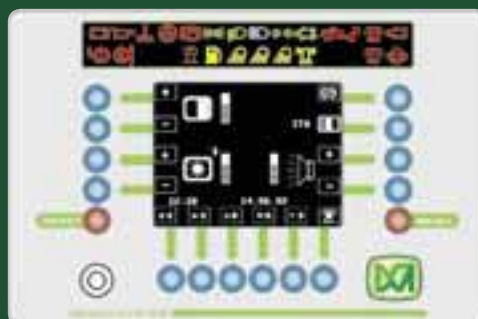
In reality a "black box" recorder constantly registering information arriving from all the various systems and warning the operator of scheduled service intervals.

Screen Adjustment Menu

Used to setup the screen display for use in varying ambient light conditions.

General Control Menu

Diagnosis of the various on-board systems providing a visual summary of the functionality of all elements.



TECHNICAL ADVANTAGES



The four extended stabiliser legs can be retracted simultaneously by a single control.

MCSS Continuous slew safety - Exclusive to Merlo

When the machine is working on its stabilisers, the continuous stability control system (MCSS – MERlin® Continuous Slew Safety) continually monitors the reactive force in each of the four stabiliser legs. With this information the system automatically and continuously calculates the position of the centre of gravity with respect to its footprint and decides, as a result of that position, whether or not stable operation can be guaranteed. If not, the system automatically blocks any further aggravating motion of the load.

The calculation algorithm works regardless of the geometry of the stabilisers upon the ground. In this operation mode, the operator can position the stabilisers as he will, confident in the knowledge that the effective machine load envelope will be automatically adjusted to suit.

Total safety Verification of stability is both automatic and continuous, leaving the operator free to concentrate on other parts of the operation.

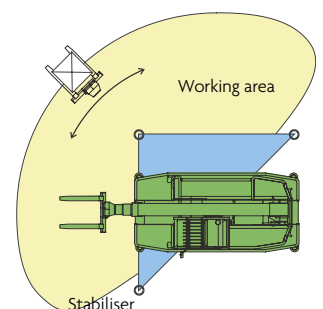
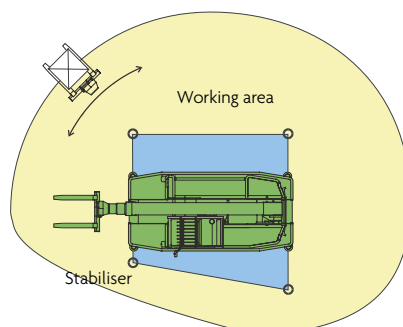
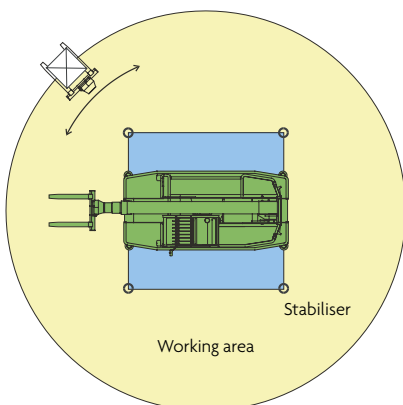
High reliability The 'real-time' creation of an effective load envelope in response to the moving centre of gravity permits completely safe operation in all conditions.

Tremendous versatility Effective operation of the machine with a non-conventional footprint is quite possible; whatever the configuration of the stabilisers, and the resulting polygon of stability, the system creates a 'virtual' load envelope and guarantees efficient and safe operation, whatever attachment in use, aerial platform included.

With stabilisers fully extended the working area is circular, providing equal stability throughout the rotation of the upperstructure.

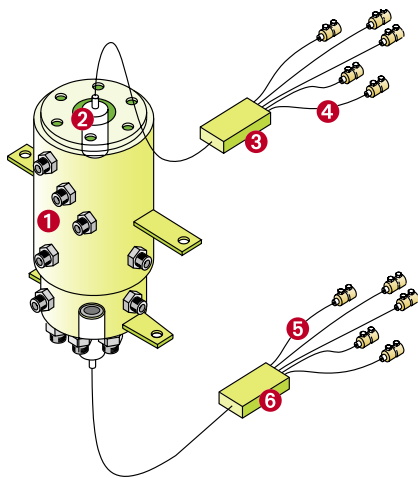
The working area is automatically limited where a stabiliser is only partially extended. The on-board computer adapts the load envelope to the operating conditions.

The lifting performance is severely limited where one stabiliser is not in ground contact (ground collapse). The automatically designed 'safe' working area is that upon the stabiliser legs correctly positioned.



Independent stabilisers

Four independently operated hydraulic stabiliser legs assure the necessary stability for working on any terrain. Wider pad feet are supplied as standard, to be used in lower ground bearing pressure conditions. The positioning of the stabilisers can be configured by the operator to suit conditions around the machine. This exclusive Merlo feature permits operations with the stabilisers partially extended, to position the machine next to a wall or for operating in narrow streets, but with full safety as the load envelope is automatically recalibrated by the actual polygon of safety. Levelling is performed by simultaneous operation of two stabilisers on each of the sides of the machine, so that either lateral or longitudinal angle is separately adjustable. The four extended stabilisers legs can be retracted simultaneously by a single control and when retracted lie within the width of the machine.



- 1 Hydraulic coupling
- 2 Digital control link
- 3 Microprocessor
- 4 Link to cab controls
- 5 Link to engine controls and management
- 6 Microprocessor

Continuous rotation - Merlo rotary coupling

Continuous rotation of the upperstructure is achieved through the use of a Merlo rotary coupling which includes a section dedicated to the transmission of electrical control signals between the upper and lower chassis.

Basically, the system transmits all signals and commands necessary to operate the machine through a single digital control channel, regardless of the rotary position of the transmitter or receiver, eliminating all the compromises and limitations of traditional sliding contacts; reliability and endurance are much higher, and downtime minimised.

Two microprocessors, one in the upperstructure and the other in the chassis, convert electrical signals to digitally coded impulses and vice versa. The hydraulic part of the coupling includes a stainless steel section which carries heated cooling water from the engine, to be used in the cab heater.

Load-Sensing hydraulic system

This device acts to vary the hydraulic oil flow delivery automatically adapting it to the needs of the hydraulic service being used. The delivery is always equal to that requested by the joystick movement so that power dissipation is reduced to a minimum. Making it highly cost effective in terms of reduced consumption rates and greater component duration.

Less wasted energy As the maximum system pressure is approached, the pump output is automatically reduced to suit the load, preventing the main relief valve from opening and wasting energy.

High quality The piston pump is constructed to very high quality levels, rated for hard, continuous operation.

Reduced fuel consumption The hydraulic distributor ensures simultaneous movements and the greatest operational precision.

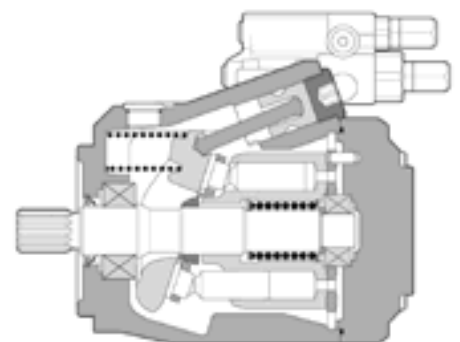


Telescopic boom

The ROTO MCSS series boom sections are each constructed of two u-shaped high yield steel pressings, welded along their longitudinal axis. The hydraulically-operated chain extension mechanism smoothly extends each section simultaneously.

All the components of the mechanism, the hydraulic piping and electric lines are mounted within the boom assembly, to guarantee their best protection against damage.

The Load-Sensing axial piston pump reacts quickly to load changes.



THE WINNING CONCEPT

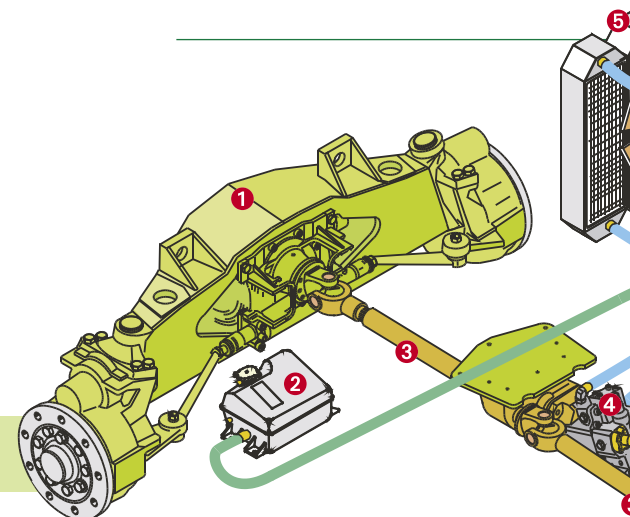


Side mounted engine

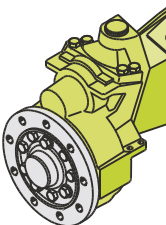
The engine is a 6 cylinder turbo intercooled Nef unit which complies with the Euro 2 emission control standard. Liquid cooled, it develops 107 kW (145 HP) at 2300 rpm. A considerable increase in torque is available throughout the operating regime.

The engine is fitted to the right side of the chassis for easy access and it provides for safe service intervention from ground level.

In fact Merlo were the first handler manufacturer to adopt the side mounted engine and continues to be the world leader in handler design.



- ❶ Axle
- ❷ Hydrostatic oil tank
- ❸ Propshaft
- ❹ Hydraulic motor
- ❺ Heat-exchanger
- ❻ Diesel engine
- ❼ Hydraulic pump
- ❽ Hoses



Hydrostatic transmission, tomorrow's technology

Ease of use

Simple to operate and simple to look after, reliable and precise, the hydrostatic transmission is very 'user-friendly' and time-saving.

Great versatility

The components of a hydrostatic transmission can be placed where needed, as they are not restricted by the limitations of a conventional layout. Not having those limitations leads to great advantages, such as tremendous visibility and good weight distribution.

Protected circuit

A separate, closed high pressure circuit is used for the transmission, minimising the possibility of contamination.

Improved braking effect

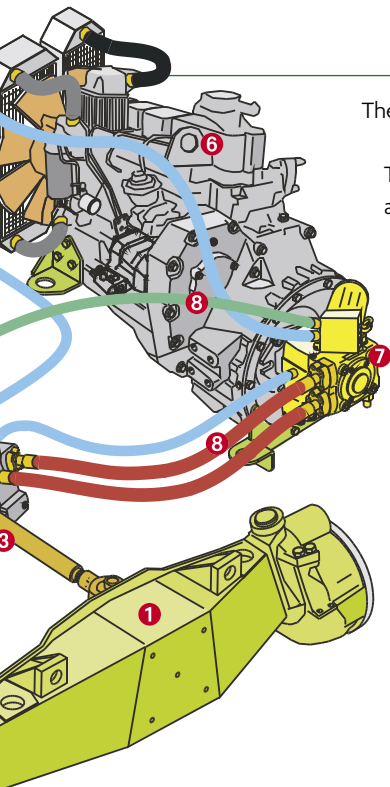
Because of the transmission's improved dynamic braking, use of the service brakes is minimised reducing periodic maintenance costs.

Maximum practicality

An infinite speed adjustment is available simply through the accelerator pedal, rather than using the gears of a conventional transmission, freeing the driver to concentrate on the job.

Ease of control

The forward/reverse lever can be easily operated without taking a hand from the steering wheel (the Finger-Touch system) and speed control is achieved purely with the accelerator.



The use of this type of transmission continues to be a winner. This system has many advantages and a broad possibility of control at high power levels

Braking system

The hydraulic service brakes are 4 large diameter dry discs with floating callipers, operated with servo assistance, mounted internally on the output shafts of each differential. Dual hydraulic circuits are provided for additional safety.

The independent disc parking brake is fitted to the main transmission drive shaft. A 'fail-safe' design, it is automatically operated when the engine stops.

The operator is also able to apply the brake whenever required.

Hydro-pneumatic suspension - Another Merlo exclusive

The levelling hydro-pneumatic suspension assures maximum comfort for the driver by eliminating pitching when travelling at maximum speed.

Three modes of operation provide for a wide range of applications:

- In 'automatic' mode the intelligent reaction of this unique suspension to ground conditions is ideal for travel over rough terrain and for high speed travel on the roads.
- 'Manual' mode permits the driver to vary the setting of the suspension units to level the machine on uneven ground. Correction of up to $\pm 9^\circ$ ($\pm 16\%$) laterally and $\pm 5^\circ$ ($\pm 9\%$) longitudinally is available.
- For operating on-tyres, the suspension can be 'blocked', locking the suspension units and providing the best stability.

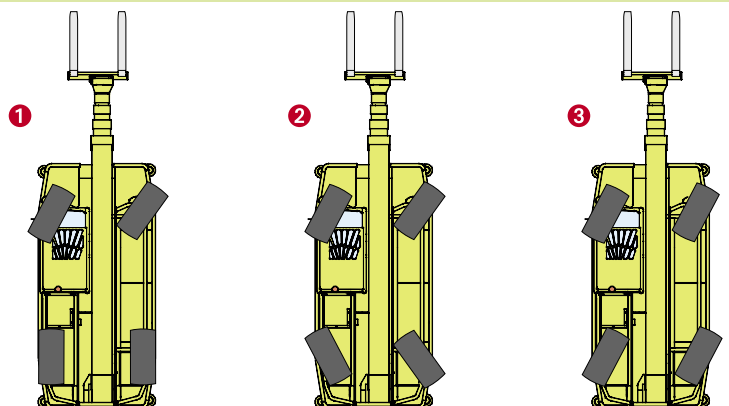
Three steering modes

The four drive wheels are steered with hydraulic assistance.

Three steering modes are available, with automatic resynchronisation should the wheels become unsynchronised.

The adoption of low maintenance spherical bearings assures maximum reliability.

- 1 Front wheel steer (for road use).
- 2 Four wheel steer (provides minimum steer radius).
- 3 Crab steer (provides sideways motion whilst retaining the longitudinal alignment of the machine).



TOWER JIB



The ROTO 45.21 MCTJ not only acts as a high performance telescopic boom with rotating turret, but as a tower crane.

This Tower Jib system which is hinged to the end section of the telescopic boom, consists of a lattice structure on which the distributor carriage slides.

When used in horizontal position the Tower Jib has the following features:

- Rated load capacity of 400 kg with maximum reach of up to 12.7 metres
- Rated load capacity of 800 kg with maximum reach of up to 8.8 metres
- Full lift height of up to 20.2 metres

The Tower Jib may also be used as a winch derrick with a maximum operating height of 31.7 m and a load capacity of 400 kg.

There is also an optional crane operation radio control device.

The structure folds away easily at the side of the boom, for the easy road transfer of the ROTO.45.21 MCTJ, or full use of the machine as a telescopic handler.

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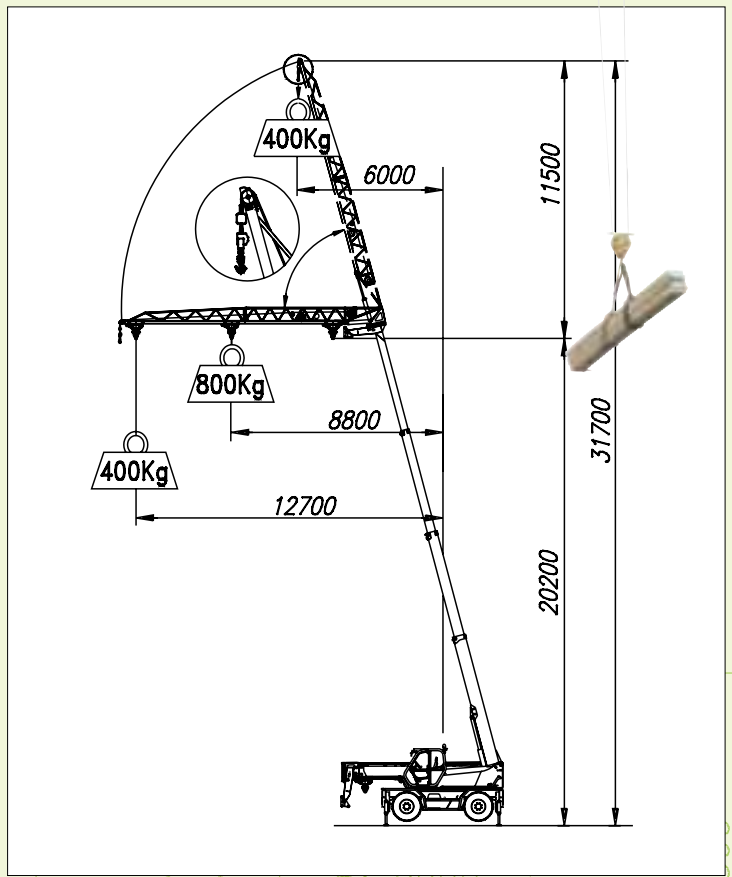
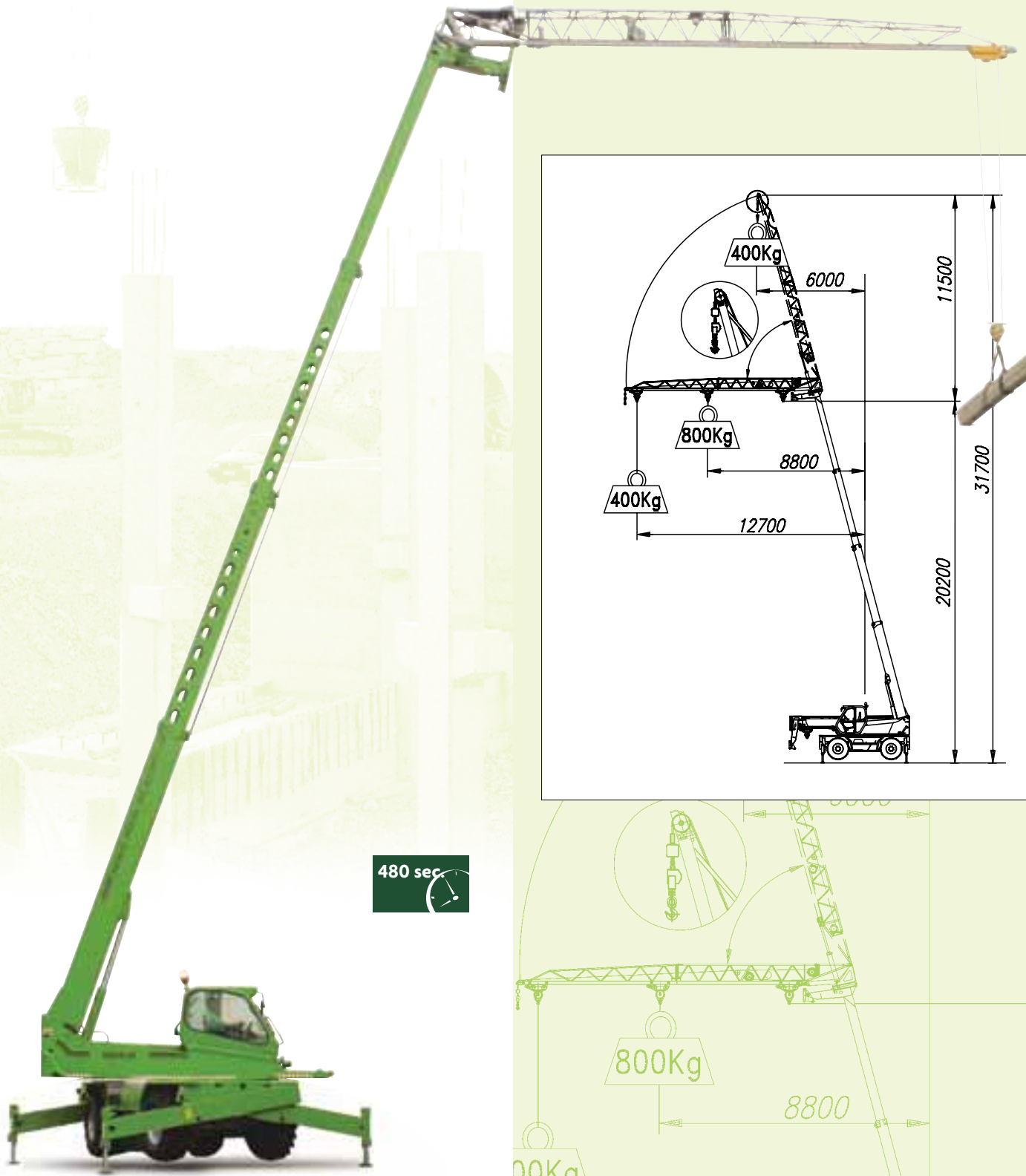


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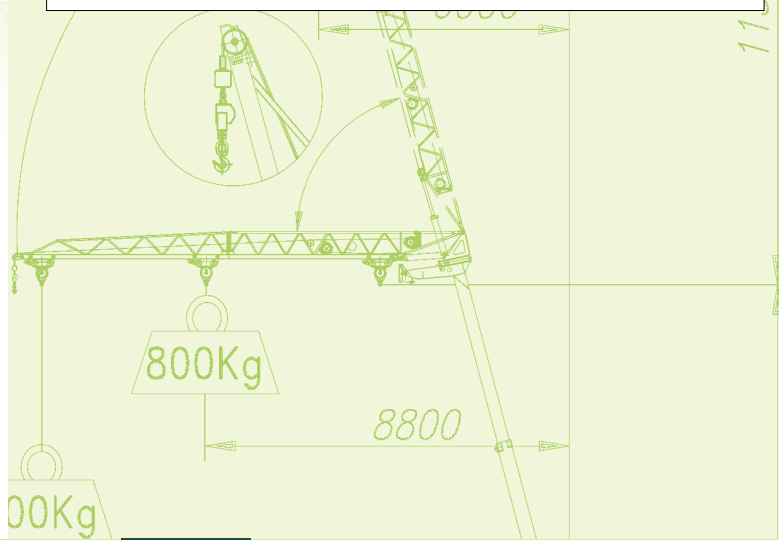


80 sec.





480 sec 



180 sec 

360 sec 



PERFORMANCE AND DIMENSIONS



ROTO		45.21 MCSS	45.21 MCTJ	45.19 MCSS	50.16 MCSS
Weight					
Operating weight (with forks)	kg	14500	15400	14400	14200
Performance					
Maximum lift capacity	kg	4500	800	4500	5000
Maximum lift height	m	20.8	31.7	18.7	16.4
Maximum reach	m	18	12.7	15.9	13.4
Lift height with maximum capacity	m	10.7	20.2	10.2	11
Reach with maximum capacity	m	6.2	8.8	6.6	6.1
Capacity at maximum lift height	kg	2500	400	3000	3000
Capacity at maximum reach	kg	500	400	1000	1000
Upperstructure rotation			continuous		
Low emission (Euro 2) engine			6 cylinder turbo aftercooled		
Power at 2300 rpm (97/68/CE)			107 kW (145 HP)		
Speed					
1st speed	kph	16	16	16	16
2nd speed (autolimited)	kph	40	40	40	40



Cab

- Conforms to ISO 3449 (FOPS) and ISO 3471 (ROPS).
- '5 x 1' electronic proportional joystick.

Boom

- Four section telescopic assembly (three on ROTO 50.16 MCSS) constructed of high yield steel, sliding upon anti friction wear pads.
- The hydraulic components are internally mounted within the boom structure for maximum protection.

Fork carriage

- Hydraulic operation of the Tac-Lock gives control of attachment locking from the cab.
- A single double-acting hydraulic service is provided at the boom end, together with quick couplings.

Forks

- Floating type: 1200 mm long, 130 x 50 mm section (150 x 60 mm on ROTO 50.16 MCSS).
- Fork spacing manually adjustable between 450 mm and 1050 mm.

Stabilisers

- Automatic and simultaneous retraction on command.

Steering

- All four wheels steer, and have an automatic resynchronisation system in case of misalignment, as well as selection of 3 steer modes.

Engine

- 6 cylinder water cooled turbo aftercooled Nef engine, compliant with Euro 2 emission regulations, direct injected and rated at 107 kW (145 HP) at 2300 rpm (97/68/CE).

Transmission

- Hydrostatic, variable flow pump with electronic management.
- Automatic and continuously variable speed from 0 to 40 kph simply by using the accelerator pedal.
- Electrically operated two speed range change gearbox.
- Finger-Touch system means it is possible to change direction even whilst the machine is moving, without the driver moving his hand from the steering wheel.

- Permanent four wheel drive.
- Portal axles for increased ground clearance.

Braking system

- Service brakes: hydraulic disc brakes on all 4 wheels, acting upon the half shafts at the differential.
- Automatic parking brake; locking disc brake on main transmission drive shaft, hydraulically released.

Hydraulic system

- Load-Sensing hydraulic system.
- Variable delivery axial piston pump.
- Maximum flow rate: 120 l/min.
- System pressure: 230 bar.

Electrical system

- 12 V system with 160 Ah battery and 90 alternator.
- Road lighting including rotating beacon.

Service capacities

- Hydraulic system: 130 litres
- Fuel: 155 litres
- Hydrostatic oil: 12 litres
- Engine oil: 12 litres
- Engine coolant: 12 litres

Tyres

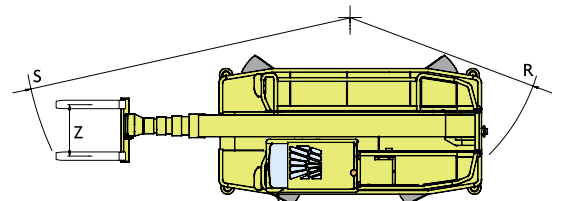
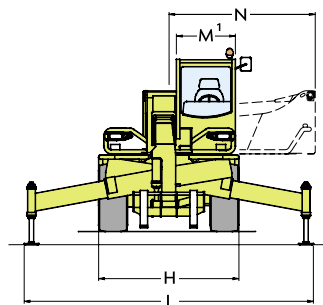
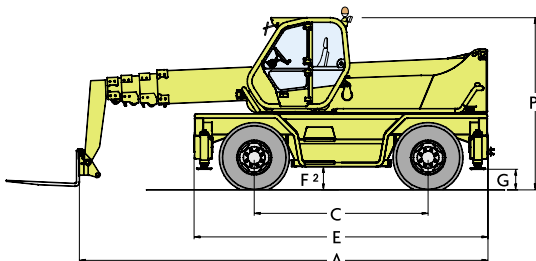
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Options

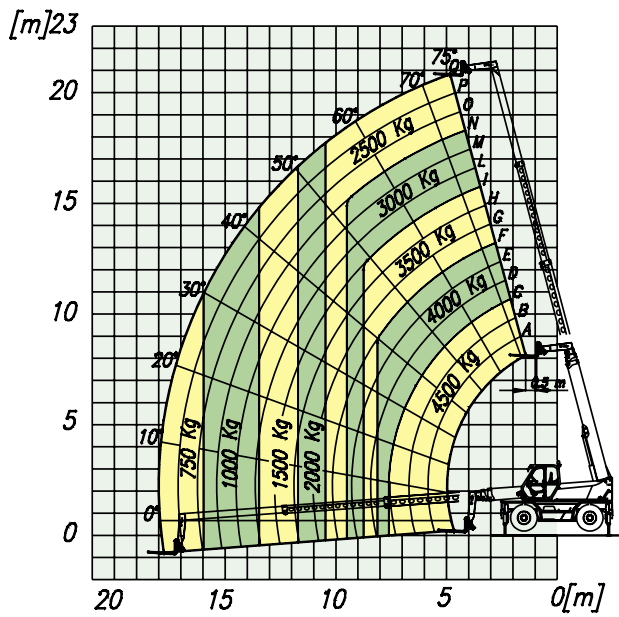
- Second electronic joystick mounted on left seat arm
- Radio remote control
- Rear axle differential lock
- Generator 4 kVA - 220 V
- Cab mounted working lights
- Prearranged double acting hydraulic service
- Air conditioning
- Anti-theft immobiliser

Dimensions		45.21 MCSS	45.21 MCTJ	45.19 MCSS	50.16 MCSS
A	mm	6600	6600	6075	6380
C	mm	2970	2970	2970	2970
E	mm	5030	5030	5030	5030
F ²	mm	330	330	330	330
G	mm	410	410	410	410
H	mm	2400	2400	2400	2400
L	mm	4950	4950	4950	4950
M ¹	mm	995	995	995	995
N	mm	2505	2505	2505	2505
P	mm	2950	2950	2950	2950
R	mm	4050	4050	4050	4050
S	mm	6100	5850	5150	5900
Z	mm	850	850	850	850

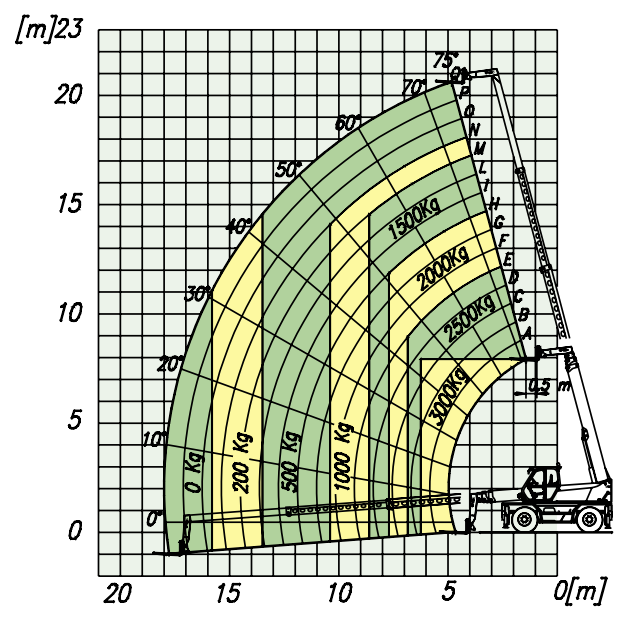
(1) Internal usable width. (2) ± 65 mm. Measured at suspension mid-point.



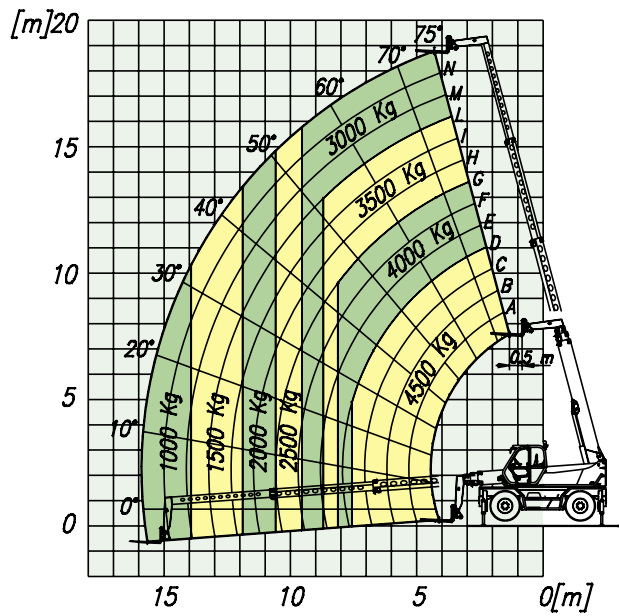
ROTO 45.21 MCSS WITH FORKS ON STABILISERS - 360° SLEW



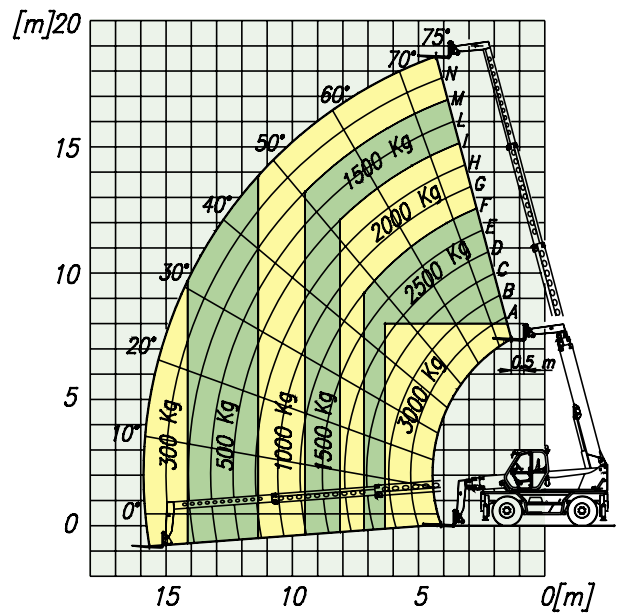
ROTO 45.21 MCSS WITH FORKS ON TYRES



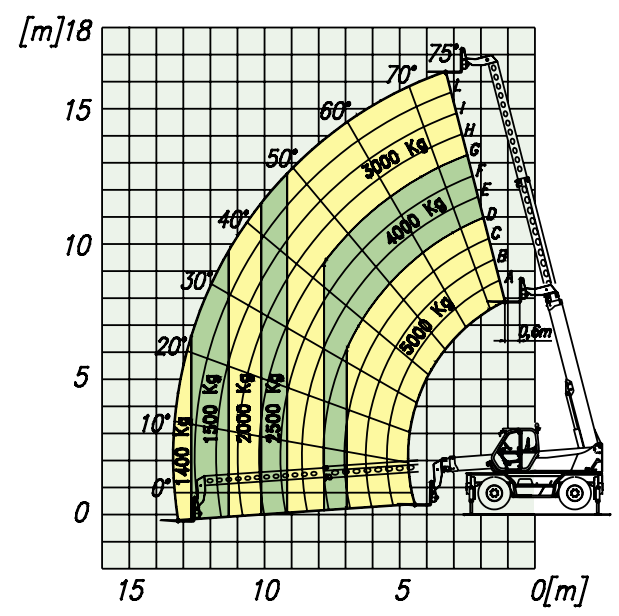
ROTO 45.19 MCSS WITH FORKS ON STABILISERS - 360° SLEW



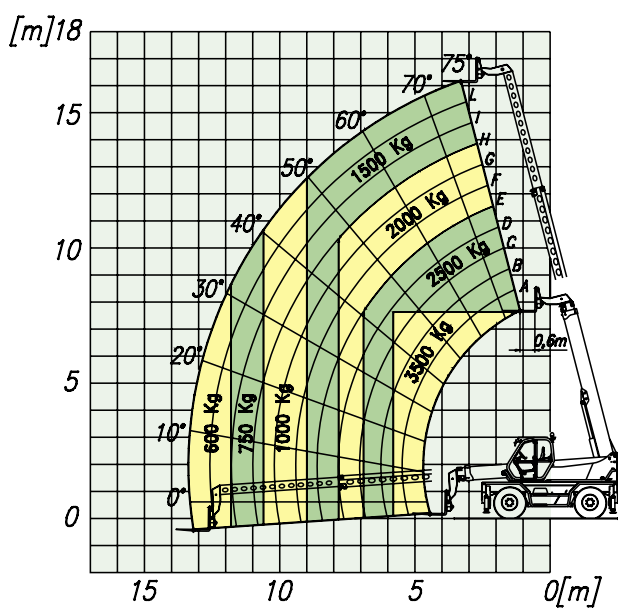
ROTO 45.19 MCSS WITH FORKS ON TYRES



ROTO 50.16 MCSS WITH FORKS ON STABILISERS - 360° SLEW



ROTO 50.16 MCSS WITH FORKS ON TYRES







Our winning card: a perfect mix of ideas, design and production

'Merlo' is synonymous with advanced technology in the world of telescopic handlers and operated plant, and its history is one of ideas and innovation. Not without reason do Merlo machines represent the perfect integration between the most diverse handling problems and the most innovative and productive technical solutions.

It means focussing on a single project and all the contemporaneous ones, on ideas and results, on designing to win, proposing innovative solutions, anticipating applications and possible changes in a very competitive market.

This winning attitude is to be seen in the drive for an integrated production process, in modern construction methods, automatic processes, integrated electronics, robotics and in many, many other ways.

The will to always maintain a closer bond with our users is reflected in programmes for training and updating personnel, in after sales service, and in the confidence of our dealers and salesmen.

And the results are compact and productive machines assuring unequalled levels of comfort, efficiency and safety.

That is why Merlo is the international reference point for handlers, world leader in handler design.



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MERLO has a policy of continual product research and development and specifications are subject to change without notice. Models illustrated may include attachments and options that are not standard.

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