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TELESCOPIC HANDLERS

# Telehandler upgrades proliferate

The ability to provide forward reach for forklift work put the telescopic handler on the map, with the market continuing to grow with more choice and types than ever. This year is seeing significant upgrades from manufacturers based around the move to Stage V power units, but also larger and more innovative developments, Nick Johnson reports.

## Diversity growth 50 years on

The development of the telescopic handler goes back a long way with Koehring, Lull and Pettibone in North America credited with some of the earliest machines with high rear boom pivots – a style still utilised in this market today. The first Pettibone Model 88 Extendo was delivered back in 1970.

In Europe the first telehandler was almost certainly the Giraffe launched by the Liner Concrete Machinery Company of Gateshead in 1974. Developed following market research with forklift users by Loughborough University of Technology, it set the pattern for the machines now used in so many construction, industrial and agricultural applications.

Originally described by Liner as a site placing vehicle, the Giraffe had equal sized small wheels that

provided both all wheel drive and steer. Maximum capacity was 2,032kg and it could raise 1,016kg up to a maximum height of 8.53 metres. Whilst the Liner company and its Giraffe have long been consigned to history, the company that really put the telehandler on the map was JCB. It launched its first model, the two wheel drive Loadall 520, in 1977 and, after quickly adding 4x4 models, it became a leading supplier of telehandlers.

Merlo of Italy has the distinction of introducing the first telehandler with a side mounted engine and a low boom pivot point, with its Panoramic XS in 1987. It then went on to launch the world's first 360 degree telehandler – the Roto 25.11XS in 1991.

Adding a slew ring to a telehandler created a new product concept, with a large proportion now supplied with work platforms as well as winches and jibs to effectively create a Rough Terrain crane. 360 degree machines have also taken the telehandler concept to new heights with Magni of Italy leading the way, last year it broke its own existing record with the 51 metre RTH 6.51.

## New power and ranges

Meanwhile fixed frame telehandlers are now effectively sub-divided into different types such as ultra compact, compact, standard and heavy duty, while manufacturers have been fitting ever more environmentally friendly diesel engines to meet emissions



The electric Faresin becomes the Snorkel SR626

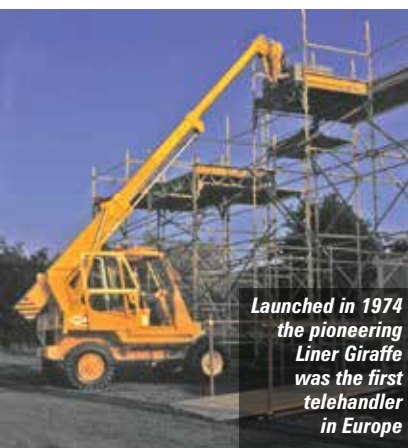


Italian telehandler manufacturer Faresin was the first to bring a full production compact electric telehandler to market

requirements. The trend to go a step further is also growing, with lithium-ion batteries electric models able to meet the requirements of the stringent ultra-low emission zones that are proliferating in cities around the world. Italian telehandler manufacturer Faresin was the first to bring an electric compact telehandler to market, the pioneering 6.26 Electric, which was spotted at bauma 2019 by UK based GGR which subsequently became a dealer and pioneer. A significant number of UK companies, including Bennie Equipment, Flannery Plant

Hire, O'Brien Plant Hire, Sunbelt Rentals and Thomas Plant Hire have already taken units.

With an overall height of 1.93 metres and a width of 1.89 metres, the compact Faresin 6.26 Electric has a maximum capacity of 2,600kg and a 5.9 metre lift height. It also has a very useful boom suspension option. The potential of the Faresins were also spotted by Snorkel which now sells the electric machine in its own colours as the SR626E. Powered by 80V/32kW lithium-ion batteries, the SR626E can perform up to six hours



Launched in 1974 the pioneering Liner Giraffe was the first telehandler in Europe



One of the earliest telehandlers, the Pettibone Model 88 Extendo delivered in 1970





Manitou's new MT 930H with hydrostatic transmission

continuously between charges depending on site conditions.

As part of its Road to Zero initiative, JCB has added the 525-60E electric telehandler to its growing portfolio of small electric machines and matched chargers (see article on page 41). The first models are now with customers, including rental company UK Forks which showed the first of six units it has ordered at Rail Live earlier this month.

Other companies developing compact electric telehandlers include Manitou and Merlo which have been testing their new models for some time. The Manitou contender is the 2,500kg/4.8 metre

MT625e Oxygen, while Merlo will offer both two and four wheel drive versions of its new 2,500kg/4.8 metre E-Worker.

**Common rapid chargers**

As more manufacturers unveil electric machines, there will be increased demand for rapid charging equipment to be standardised in terms of power output and connections providing sites with greater flexibility and charging stations.

**The ultras**

Whilst compact telehandlers have overall widths and heights of under two metres there are now an

increasing number of significantly narrower, lighter machines being dubbed 'ultra-compact'. A good example is AUSA's 1,350kg/four metre T144H-4 Taurulift with an overall width of 1.4 metres and a two metre overall height. Importantly its overall weight of 2,527kg allows it to be carried on a two axle trailer. The same applies to the 1,250kg/4.3 metre Wacker Neuson TH412, which weighs 2,750kg. Even Chinese manufacturers are looking at the market, with Everun Machinery offering the 1,300kg/4.02 metre ERT1500, which weighs 2,800kg

and is 1.44 metres wide by just under two metres high. The Perkins powered machine is sold in Europe as the JMac JMT1500.

In an initiative that it calls 'Build the Future', Manitou has announced the development of new Ultra-Light Manitous (ULMs) weighing no more than 2,700kg with attachments. They are said to have an overall width of 1.5 metres by 1.9 metres high and will feature the company's JSM joystick controller.

**Bigger compacts**

Manitou is also introducing new three tonne MT 730 H and MT 930 H



JCB now offers Stage V compliant diesels on all models

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Bobcat's new T40.180SLP is part of its new R-Series



hydrostatic telehandlers with maximum lift heights of seven and nine metres respectively. Both are compact machines powered by a Kubota Stage V engine and with a width and height of no more than two metres.

A new standard size fixed frame telehandler is the 6,500kg capacity Snorkel SR1065 that reaches up to 9.5 metres with a similar forward reach. Built by Faresin it is 2.3 metres wide by 2.5 metres high and is powered by a turbo-charged Stage V compliant Deutz diesel.

JCB's entire construction range is now available with Stage V compliant engines. All models from seven metre 531-70 to 20 metre 540-200, can be powered by the 81kW JCB 448 DieselMAX engine with no requirement for EGR. They also feature auto engine stop to reduce fuel consumption and excessive idling hours.

The new engine has the same footprint as previous power units, so no changes in overall dimensions, turning circles or view lines. Indeed, right-hand visibility over the engine cover has improved slightly, as the exhaust pipe passes through a new integrated vent grille and is no longer visible.

The big news from Bobcat in May was the new generation R-Series fixed frame telehandler range with Stage V engines – 12 models for construction and seven for agriculture. The new telehandlers have lift heights from six to 18 metres with maximum lifting capacities between 2,600kg and 4,100kg.

#### Double production

Bobcat currently has a capacity limit of 3,000 machines a year at its plant in Pontchâteau, France, but with the arrival of the new R-series models, it aims to double telehandler production

C&A

telehandlers

by 2025. The newcomers gain a completely redesigned cab with a new Grammer seat, a new ergonomic joystick, a new central control panel and a new five-inch LCD display (that can include feed from the optional rear view camera). There is a choice of 56kW or 75kW Stage V Bobcat D34 diesels.

With designations reflecting maximum capacity and lift height, there are three new 'Compact' models, four 'Middle Range' models and five 'High Lift' models for the construction market. The Compact construction trio are designated

the 2,600kg/six metre TL26.60, the 3,000kg/six metre TL30.60 and 3,000kg/seven metre TL30.70. They are all 2.1 metres wide on standard tyres and either 2.14 or 2.29 metre high with low or high cab.

The Middle Range models are the TL35.70, TL10S, TL35.10SL and the TL36.120SL. S = Stabilisers, L = Frame Levelling and P indicates the boom positioning system, providing built-in side-shift.

The High Lift machines are the T35.130S, T35.130SLP, T35.130SLP, T35.140S, T412.140SLP and T40.180SLP.



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**GT LIFTING**







Bobcat is now selling Magni built 360 degree telehandlers

Bobcat previously badged Dieci 360 degree telehandlers, but has now turned to Magni for these machines, in a new OEM badging deal. The resulting Bobcat TR range includes 10 models, all Stage V compliant, with lift heights from 18 to 39 metres and lifting capacities from 4,000kg to 7,000kg.

At the same time Magni will launch six more fixed frame 'TH' models with capacities from 5,000kg to 6,000kg and lift heights from eight to 19 metres. Powered by Deutz engines, the first TH newcomers are the 24 metre/5,500kg TH 5.5.24 and the 9.7 metre/6,000kg TH 6.10. The company is also building a new 35,000 square metre production facility alongside its original 6,000 square metre plant, which will more than double its current capacity while bringing more fabrication in house.

### Extreme Xtreme rides the load

Xtreme Manufacturing unveiled what it claims is the world's highest reaching fixed frame telehandler at the recent World of Concrete show in Las Vegas. Designated the XR1585-C, its five section boom provides a maximum fork height of 25.9 metres and offers a maximum capacity of 5,443kg. Overall weight is just under 30 tonnes and power comes from a Cummins Tier 4 Final diesel.

It has also applied for a patent on what it calls the 'Operator Station', a

platform fitted to the rear of the fork carriage with a wireless RF pendant remote controller for all boom functions, enabling the operator to travel with the load for enhanced view and control of load placement. The company also launched a new patent-pending coordinated boom control option, also referred to as 'coordinated motion', which is designed to aid picking and placing loads at height when the telehandler is working on uneven terrain.

This option - initially for the XR944-B and XR1147-B models - uses boom length and angle sensors to allow operators to achieve true horizontal and perpendicular fork motions, independent from the chassis angle.

### Heavy Merlo

Amongst the increasing number of heavy duty rigid frame telehandlers developed especially for use in arduous agricultural, aggregates, renewable energy, timber and waste applications is the new Merlo TF65.9TCS170-HF. Providing a maximum capacity of 6,500kg and 8.8 metre lift height, it sports a Stage V 125kW FPT turbo diesel matched to a Merlo hydrostatic transmission with EPD TOP/ 'Eco Power Drive' electronic transmission control allowing the operator to select Eco or Speed control characteristics. Another feature is the brand new Adaptive Stability Control System (ASCS) that comes with a 10.1 inch LCD



Merlo's heavy duty TF65.9TCS170-HF working in a waste handling station



The red line around this Magni comes from the FHOSS Halo Zone safety system

colour screen that updates and displays the load dynamics and capacity in real time.

### New range new look

Market leading Manitou is looking to strengthen its position in the 360 degree market with a slew of new MRT models, in two ranges Vision and Vision+. All models gain the same very distinctive cab style, joining Magni with a curved front screen for improved visibility, along with a common control station.

The more basic Vision range includes four models with lift heights of 16, 18, 21 and 25 metres, all with a maximum capacity of 4,500kg. Designated MRT 1645, MRT 1845, MRT 2145 and MRT 2545, they are powered by Deutz Stage V diesels.

The higher capacity Vision+ range offers capacities of six and seven tonnes, with lift heights from 22 to 35 metres in the form of the MRT 2260, MRT 2660, MRT3050, MRT

2570, MRT 3570 and MRT 3570 ES. The Vision+ models are all powered by Yanmar Stage V engines with the option of a removable bi-energy system that allows the machine to operate on electric power once the outriggers are set.

### Safety beams

A useful on site telehandler safety system is the Halo Zone from UK based FHOSS. This system uses seven LED lights to create a red line on the ground all around the machine to clearly identify an exclusion zone for anyone on site.

For 360 degree telehandlers operating with a winch and hook there is also a Hook Path indicator. Two powerful LED lights on the telehandler's boom nose shine straight down to provide a red spot on the ground, helping the operator to check that the hook is precisely above the load, while also warning those in the area to keep clear of the path of the hook.



The stylish new Manitou MRT2260 with its distinctive cab design





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# fast On a charge

The arrival of battery powered telehandlers is a major factor in the industry, Nick Johnson visited JCB to take a closer look at the 525-60E Electric telehandler announced last year and now in production.

As the car industry is busy introducing ever more environmentally friendly electric and hybrid vehicles so construction equipment makers are becoming more focused on developing 'greener' machines. Small equipment lends itself to being battery powered and JCB is amongst the notable producers leading the charge towards a range of equipment powered by the latest generation lithium-ion batteries.

As it travels ever faster along what it describes as its 'Road to Zero', JCB has introduced a variety of battery powered machines with matched charging systems, including scissor lifts, a 1.9 tonne mini excavator, a 500kg capacity tracked carrier, a one tonne capacity high tip dumper, two Teletruk industrial telehandlers and the new compact telehandler.

With JCB - arguably - claiming world leadership in telescopic handlers, the arrival of its first electric compact model created a lot of interest. Announced last November, during a virtual online launch due to Covid-19 restrictions, the 525-60E High-Viz Loadall is an electric version of the 525-60 Hi-Viz powered by a JCB Diesel by Kohler engine.

*The new telehandler joins JCB's other small electric machines with variety of matched chargers*



## As good as diesel

In developing an electric version of the 525-60, JCB engineers have sensibly retained the diesel machine's well accepted operational characteristics, including the 2,500kg maximum lift capacity and ability to take 2,000kg to the full height of six metres. Physically they have similar external dimensions, at 1.9 metres high, with an overall width of 1.8 metres, and the same 3.7 metre outside turning radius.

JCB contends that the battery powered 525-60E performs as well as its diesel counterpart whilst being quieter and fume free. So, this 'green' machine, distinguished by its prominent E-Tech blue and white chevron markings, will satisfy the growing demand for a quiet, emissions free compact telehandler able to work effectively inside and in sensitive areas, including ultra-low city centre emission zones.

## Quarry test track

A quarry is not the place one would expect to find an electric telehandler working but, as Covid restrictions eased in May, such a location - close to JCB's factory in Staffordshire - provided an ideal outside, socially distanced opportunity to check out a 525-60E. Having shut the Arena



*Nick Johnson at the controls at JCB's Customer Experience Centre*



*The new 525-60E is distinguished by its prominent E-Tech blue and white chevron markings*



*The side mounted compartment swaps an engine for a big battery pack*

demonstration at its headquarters in Rotherham, JCB has been busy developing a better location for machine demonstrations and customer appraisals.

The new JCB Customer Experience Centre is located in Kevin Quarry (a former Tarmac facility) where 100 of its 550 acres can be used for realistic displays, a 250 seat grandstand is also being constructed.

Apart from its blue 'electric' wording, plug symbol and rear chevrons, there is not much visually to set the 525-60E apart from its diesel brother. But a look under the skin reveals that JCB has not simply

electrified the diesel machine but has effectively created a brand new electric model.

Cleverly utilising the existing side mounted engine compartment, the JCB designers have neatly installed a Jungheinrich 96 volt/24 kWh lithium-ion battery pack. Having studied data on compact telehandler operation from its LiveLink telematics system, the company is confident that it is more than capable of working a typical full day shift on a single charge.

The lithium-ion battery pack is designed to be maintenance free and operate at temperatures from -20°C to 60°C. It also carries a five



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year battery warranty and is said to be good for 5,000 charge cycles, which equates to 10 years of average operational life.

A motor controller manages electrical power demand, converting the DC output from the batteries into AC to power the machine's two Jungheinrich electric motors. A 17kW transmission drive motor, mounted centrally behind the front axle, and a 22kW hydraulic system drive motor, both are 85 percent efficient, according to JCB, compared to the 45 percent efficiency of a diesel engine.

### Electric drive & regeneration

The drive motor is connected via a dropbox and prop shafts to the front and rear axles. Whilst the axles are the same in terms of looks, beam strength and durability, as those used on the diesel model, they have been refined internally to provide higher efficiency and conserve battery life. Changes include the use of different oils and finishes on the gears.

Interestingly, the 525-60E has regenerative braking so that, whenever the operator takes their foot off the accelerator, the machine recuperates electrical energy that is returned to the battery. The brake regeneration function automatically turns off when the battery is fully charged.

The electric motor for the hydraulic system powers a low noise gear pump that provides the same flow and pressure as that on the diesel. Hydraulic flow is not linked to

engine rpm and so joystick position alone determines the flow and speed of operation. The electric unit also features smart hydraulics controlled by an electro-hydraulic Husco valve block with hydraulic regeneration on boom lower and retract to help preserve battery charge. I wonder if to make the machines even 'greener' it would be possible to install a solar panel along the flat top of the base boom section so that, when the sun shines, even more battery charging could be achieved on the move?

### Charger choice

The machine has the same on-board charger as other JCB E-Tech products, capable of recharging the battery in eight hours from a standard 240 volt/16 amp electrical supply. An optional three phase/415 volt JCB Universal Rapid Charger will take a completely empty battery to being fully charged in just 60 minutes. The rapid charger can be used for a rapid top-up during breaks, in as little as 35 minutes. A good safety feature on the electric model is the magnetic sensor fitted on the charging port door so you cannot drive off with the machine connected.

JCB has designed its Universal Rapid Charger to automatically adapt the voltage and the current supply to suit the machine as the plug is inserted, allowing it to be used for the 96 volts on this machine, as well as the 48 volt systems in JCB's electric mini excavator and dumpers. Contractors and rental companies - for whom chargers provide a welcome additional rental stream - should welcome this innovation.

For sites with limited access to a mains supply, JCB offers a range of easily transportable power packs. A typical example is the 1.25QE with manganese laminated lithium-ion batteries that provides a total storage capacity of 23kWh. This can be used to feed the onboard charger.

### Cab comforts

The new machine has an easy entry, roomy ROPS/FOPS cab with good all round vision, aided by the low boom pivot point and sizable rear view mirrors, helping it live up to its Hi-Viz description. Inside the operator gets a comfortable and notably quieter working environment. Quoted noise level in the cab is 75LpA. However, as I drove across the rough quarry floor, I experienced an irritating rattle from the top half of the cab window when it was latched back in the fully open position.



Fork pockets allow the 1.25QE power pack to be easily moved around on site



The visual display of JCB's Adaptive Load Control system



The instrument panel display includes a clear indication of the charge left in the battery

Although I did not need them on my sunny test day, the front, rear and side screens are all heated for rapid defrosting/ demisting and the operator even gets a heated suspension seat, but no air conditioning as it would create a significant drain on the battery.

The controls are all logical and the instrument panel display includes a clear indication of the charge left in the battery so there is no excuse to run out. Safety is aided by the fitment of JCB's EN1500 compliant Adaptive Load Control system. This longitudinal load moment indicator receives a signal from a load sensor on the rear axle and clearly displays any approach to overload by means of coloured lights. There is an audible warning and prevention of unsafe movements when overload approaches.

My test drive revealed that, whenever you take foot off accelerator, the motor does the

braking, so you rarely need to depress the brake pedal. The test machine had a compact tool carrier attachment bracket which meant that the loader bucket did not have as much roll back as it would have done on the more usual Q-Fit carriage.

The machine performed well, and its maximum speed of 15km/h is significantly faster than some competitive machines. However, the 525-60E does not have the option of the boom suspension system available on some equivalent electric models.

Whilst electric telehandlers are significantly more expensive than their diesel counterparts, their use will increase rapidly as more jobs demand low emission machines. With this 525-60E (the 505-20E in North America) and its other electric machines and matched chargers, JCB is now well placed to benefit from a switch to greener machines.



A magnetic sensor on the charging port door prevents driving off with the machine still connected

