



AC PRESS

ANTONIO CARRARO NEWS

PRESS RELEASE

15/11/2021

**ANTONIO CARRARO SPA – SITEVI – MONTPELLIER (F) 30/11-02/12/2021
PAD. B2 – STAND B 065**

BIG NEWS AT SITEVI 2021

SRX HYBRID (102 HP): CONCEPT is born, with ACHybrid technology

Antonio Carraro S.p.A, a world leader in compact tractors for specialised agriculture, takes innovation to the next step, unveiling the first CONCEPT compact tractor with hybrid electric drive system at SITEVI 2021.

The development of a new hybrid drive system for Antonio Carraro compact tractors is perfectly consistent with current energy-saving projects in the “Non Road Mobile Machinery” NRMM sector. The project sets the strategic objective of reducing harmful emissions as mandated by the PNRR Piano Nazionale di Ripresa e Resilienza (National Recovery and Resilience Plan) and by the Next Generation calls for proposal issued by the EU. In recent years, the demand for efficient, high-performing non-road mobile machinery able to satisfy specific operating needs has led the scientific community and most industrial producers in this field to explore new design solutions. The choice of hybrid, or fully electrified drive systems is setting an example in the automotive sector regarding the environmental benefits that can be achieved in terms of reducing air pollutant emissions, in particular CO2. And that’s not all: vehicles fitted with electrical subsystems can offer improved overall performance thanks to very precise power distribution control, leading to a general increase in the machine’s productivity as compared to equivalent models fitted with traditional drive systems.

For the engineers of the AC Research & Development department who worked in collaboration with Ecothea (start-up of the Polytechnic of Turin, specialised in the design and prototyping of electric vehicles for applications on agricultural machinery), the challenge was just as ambitious as it was exciting; the aim was to build a compact tractor with hybrid technology, based on the most complex model of the Antonio Carraro range. An isodiametric tractor with reverse drive and articulated frame, keeping in mind the typical DNA of compact tractors designed for specialised agriculture. Vehicles that necessarily had to be compact, agile and comfortable. The result didn’t disappoint: SRX Hybrid is a compact vehicle equipped with all comforts, which is captivating even to look at, but above all, “environmentally friendly”. A tractor with a 55kW combustion engine (3 cylinders; cc1861; fluid cooled; Common Rail Turbo Intercooler fuel injection system) combined with a 20kW electric motor, for a total of 75kW, equal to 102hp.

In short, SRX Hybrid (diesel/electric) has several objectives:

- Guarantee the performance level of so-defined conventional machines;
- Reduce pollution;
- Reduce fuel consumption and maintenance costs;
- Reduce noise emissions;
- Operate in *full electric* mode in closed environments (sheds, greenhouses, stables, etc.)

The architecture of the hybrid-electric system resulting from the collaboration between ANTONIO CARRARO S.p.A. and ECOTHEA, primarily makes it possible to exploit the available power of a diesel engine combined with an electric drive system, guaranteeing continuous traction when working with the PTO (with all equipment), during transportation (with trailer), and in material handling works (combining the vehicle with a forklift, loader or equipment for roadworks). This type of solution, also by virtue of the complexity due to the small spaces typical of a specialised tractor, places the project at the highest levels of innovation also with respect to hybrid architectures in the automotive sector.



AC PRESS

ANTONIO CARRARO NEWS

PRESS RELEASE

15/11/2021

The overall peak power can in fact reach that of the most powerful configurations in the current Antonio Carraro range. Interaction between the two diesel and electric traction motor-generator drive systems is managed by an electronic power control developed specifically for this type of machine. The unprecedented architecture of the transmission whereby the electric motor is inserted between the diesel engine and the gearbox, has been deposited with an *ACHybrid* industrial patent.

A BRILLIANT, ECOLOGICAL, SILENT, COST-EFFICIENT MOTOR

The electric motorisation in subsequent versions will also be able to work in *full electric* mode, exploiting the lithium-ion battery charge. In this case, the diesel engine is off and the machine works with zero emissions, in absolute silence. Autonomy in *full electric* mode obviously depends on the capacity of the battery pack, which is recharged each time the brakes are actioned when working in descent, or in plug-in mode with recharging via an electric charging station, or else on request of the user thanks to the diesel engine. Considering an average work cycle, the CO2 reduction translates into **fuel savings of more than 25%**. Not to mention the significant overall reduction in vibrations and noise.

Thanks to the combination of diesel/electric torque, the tractor offers brilliant “starting” performance on take off and during works with specific equipment such as sprayers, cutters, trailers.

As with all Antonio Carraro machines, the compact configuration and weight distribution, even with the hybrid drive system, guarantees maximum stability of the hybrid tractor even on the roughest terrain, remaining “steady” and safe with a turning radius that highlights the typical agility of compact tractors. Also worth mentioning is the logic of the control panel equipped with an LCD screen on the dashboard, allowing the operator to keep an eye on all technical data, including electrical power consumption, and a dedicated screen to manage recharging. The details of the latest generation LED work lights are no less appreciable.

SRX Hybrid is a tractor fully equipped with Industry 4.0 systems, ensuring eligibility for tax breaks through tax credits, currently equal to 50% given they fully satisfy the requirements of the transition 4.0 legislation.

ON GROUP AC CHARGING STATIONS

Alongside the AC hybrid tractor on display at the SITEVI fair is the charging station by *On Group*: the Italian start-up, of which Antonio Carraro S.p.A. became the *lead investor* in March 2021, and which builds and distributes charging stations with Siemens technology for various types of electric mobility including scooters, cars, bikes, and even tractors. Further proof that this Paduan company is determined to lead the way in the ambitious challenges of the European Green Deal and ecological transition currently under way.



AC PRESS

ANTONIO CARRARO NEWS

PRESS RELEASE

15/11/2021

TOP MODELS AT SITEVI 2021

1) NEW TORA SERIES

The new Tora Series is equipped with 4-cylinder, Stage V engines with power capacities of 52 and 66 hp. Their defining feature is provided by the upgrade of the hydraulics, mechanics and drive comfort and there are two reversible drive models. There are 5 multi-functional, super compact models which can be isodiametric or with bigger rear wheels in the “orchard” set-up and are offered in different versions such as with the ACTIO™ articulated chassis or with steering wheels, monodirectional or fitted with reversible drive on an RGS™ rotating control tower (new AC patent), with a rollbar or cab. These tractors can be combined with complex equipment such as inter-row machinery, shearers and hydraulic equipment for vineyards, thanks to the increase in hydraulic power with constantly adjustable flow providing maximum control in the management of the equipment.

TOP PLAYER SOLUTIONS FOR THIS POWER RANGE

The AC Research and Development Department has developed this new design by turning the traditional approach to study around in order to be able to integrate new technical solutions into this power range such as the gearbox (16+16) and the PTO, which are the same as the ones on the AC flagship series. The new platform for the driving seat provides the operator with ample living space whilst keeping the external dimensions of the tractors to a minimum. The dimensions have remained almost unchanged compared with previous models fitted with more compact engines as they were not required to use anti-particulate filters in accordance with Stage V legislation.

SRX 5800/6800, HIGHLY DECORATED

The first SRX model, articulated and reversible in the 5800 (52 hp) and 6800 (66 hp) versions made its debut at the Eima Digital Preview 2020/21 last November and was well-received by the jury for the Technical News Competition 2021 which recognised it for having kept its dimensions in line with previous models as well as for its high-performance hydraulic circuit, reversible drive and the possibility of being fitted with a cab.

The compactness of the new SRX Tora Series provides excellent handling with its tight steering and articulated chassis. Another important characteristic and a new feature for this power range is the mechanical transmission with 16 forward and reverse speeds with a synchronized inverter. The reversible drive amplifies its usage, rendering the tractor ideal for vineyards, orchards, nurseries, city centres, crops in greenhouses, particularly fruits of the forest and is fitted with all those features that up till now have been reserved for the AC top range models. Furthermore, the SRX is a particularly narrow tractor (external width up to 99 cm) with a short wheelbase that is extremely agile in narrow spaces. The overhang engine, thanks to the ACTIO™ chassis and the integral traction on four equal-sized wheels guarantee stability in all conditions allowing it to operate safely on slopes with constant traction. The independent PTO set at 540/540E is fitted with Plus and Normal engagement, selected by cluster. The load-sensing hydraulic system, with a 51 l/min oil pump is fitted with five double effect distributors which allow for the tractor to be fitted with various pieces of trailing or push-along equipment, ideal for complete management of inter-row and under-foliage tasks. The rear powerlift has a lifting capacity of around 2200 Kg on the bearings, ideal in combination with seeders used also for green manure activities.

On request, the new Tora Series tractors can be fitted with the new multi-control device, the *Hydraulic Remote Control* for the complete management of the equipment, front powerlift with adjustable lifting arms and quick release catches.



AC PRESS

ANTONIO CARRARO NEWS

PRESS RELEASE

15/11/2021

NEW patented Rev-Guide System

An integral part of the multifunctionality belonging to the reversible Toras, the SRX (articulated) and the TRX (with steering wheels), is the new RGS™ Rev-Guide System, the AC reversible drive system on a rotating control tower that, together with its highly ergonomic controls, aids task execution by improving accuracy and quality of execution. The system allows the inversion of the drive direction in a matter of seconds allowing it to operate professionally with trailing or front-fitting equipment. The new RGS™ incorporates the inverter controls and the gears on the dashboard that rotate through 180 degrees together with the control tower to invert the drive direction.

The uniqueness and innovative nature of this technical solution render this new reversibility a special product in the reversible tractor market. Getting the mechanical levers close to the steering wheel and no longer on the central tunnel was a great technical challenge which was widely appreciated by the final customers. The central tunnel is free of levers and aids the operator's access aboard and brings the controls on the steering wheel nearer thus offering a bigger living space. Aware of the potential success of such a solution, Antonio Carraro has protected this innovation by patenting it.

The spacious drive platform fitted on *silent-block*, isolates the cab both thermally and acoustically from the gearbox thus absorbing vibrations and offering optimum comfort. The suspended pedalboard for the reversible drive is sealed leaving no gaps in the direction of the ground thus guaranteeing the protective efficiency of the devices on the driver's seat along with the operator from dust.

REDCAB CAB

On request, the new specialized Tora can come with a joystick and a mechanical draft and position control lift, as well as the *REDCab*, which is soundproofed, fitted with an air-conditioning system and is enhanced with many high level optional extras. The wide windscreen guarantees the operator excellent visibility in all directions, privileging visibility over the equipment and the space around the tractor, which can be appreciated above all in reverse drive when operating amongst very narrow-rowed crops. The LED work headlights also guarantee the right illumination at night and in dark places. The *RedCab* has a streamlined design and a conical shape to assist the tractor's disengagement amongst rowed crops, even on lateral slopes. In the articulated version of the *REDCab* has 4 uprights and full glass doors and a wider opening. Access aboard the tractor and rear visibility are the main strong points of this solution.

2) INFINITY SERIES

SR 7600 INFINITY, THE ARTICULATED REVERSIBLE with a hybrid mechanical hydrostatic transmission.

The latest evolution of the AC compact tractors with a hydrostatic transmission and reversible drive in the Padova company's line-up, highlighted in SITEVI 2021, is the highly decorated SR 7600 *Infinity*, an articulated, isodiametric tractor with a narrow track, along with another two specialized models from the same *Infinity Series*: the TR with steering chassis and the TTR with a "wide" steering chassis and low centre of gravity (destined for crops on slopes). These models which represent the AC response to the demands of future precision agriculture that require high performance, digitalized tractors perfect for precision agriculture. With a Stage V, 75 hp, 4-cylinder, 16 valve, direct injection engine with turbo intercooler, the SR 7600 *Infinity* is fitted with great operative comfort despite the compact dimensions provided by the streamlined design in order to guarantee the tractor's disengagement amongst the narrowest rows of crops or where minimum dimensions are necessary.



AC PRESS

ANTONIO CARRARO NEWS

PRESS RELEASE

15/11/2021

ELEVATED OPERATIVE FLEXIBILITY

This model has numerous end-uses when combined with hydraulic or PTO activated equipment working on specialized cultivations (terraced vineyards, greenhouses, narrow rows) or when carrying out civil maintenance (urban spaces or sports grounds). The engine operates in synergy with the *Infinity* hybrid mechanical-hydrostatic transmission which allows it to work in both drive directions with the same speeds (each is fitted with three hydraulic ranges) from 0-15 and from 0-40 km/h, that can be inserted manually or automatically without losing traction. The forward motion pedal assists braking on slopes by halting the vehicle as it is released, even without using the brakes. The Cruise Control (or Tempomat), Limit RPM, Intellifix, Drive Mode, Fast Reverse devices together with the Uniflex suspension allow the operator to find the right setting in accordance with the type of activity being carried out.

Furthermore, the operator aboard the tractor with a hydrostatic transmission like the *Infinity* doesn't need to use the clutch, which is a particularly useful feature when performing activities that require rapid backward and forward manoeuvres carried out in quick succession (material movement, crates of fruit, amongst rows) or slow, precise movements or when it is necessary to suddenly accelerate. The electrohydraulic inverter on the steering wheel is useful during forward and backward movement, also if repetitive, without the need to use the clutch. The brakes are not used much, given the accelerator pedal, in addition to controlling forward speed, manages deceleration to the point of bringing the tractor to a halt.

STARLIGHT COMPACT CAB

On request the *Infinity* can be fitted with the panoramic *Starlight* cabs, air-conditioned and bright capable of offering, along with great comfort, total visibility thanks to the wide windows and porthole with its view over the wheels and the equipment. All of this combined with extremely contained dimensions is highly conducive to working in the most diversified specialized agricultural sectors.

3) CONCEPT TONY

The series of AC tractors known as Tony came from the development of a project aimed at guaranteeing the best possible ratio between performance and fuel consumption, regardless of the activity being carried out, with tractors capable of simplifying and speeding up field activities with the goal of lowering operative costs. It is made up of 5 models with a mechanical-hydrostatic hybrid transmission amongst which the Tony 8900 TTR, an isodiametric with wide track, and the Tony 8700 V, the first AC tractor with a conventional chassis, are the latest to have been developed.

TONY TRANSMISSION

It provides automatic functions run by the ITAC (INTELLIGENT TRACTOR AC) operative system along with *Cruise Control* (or *Tempomat*) and *Tractor Management Control* (TMC) which simplify all the driver's tasks. It is a technical solution that allows the parameters for all kinds of tasks to be set and personalized. Speed is independent of the number of engine revolutions and so both can be programmed separately. The speed range moves from just 100 m/h to 40 km/h. The set parameters can be memorized and recalled at will, depending on whether the task at hand is field work or road transfer. The *Tractor Management Control* (TMC) runs the engine and the transmission so that the tractor always works in optimum conditions in order to maximise productivity and savings. The diagnostic system warns the operator in the case of the tractor's malfunctioning or wearing out so that the tractor is always at the top of its operative efficiency.



AC PRESS

ANTONIO CARRARO NEWS

PRESS RELEASE

15/11/2021

TONY 8700 V: FINALIST OF TRACTOR OF THE YEAR 2021

Finalist in the prestigious competition Tractor of the Year 2021, it sets itself apart from the rest by its special and innovative features. AC, a well-known world leader in the compact isodiametric market, is offering the Italian market its first tractor with a conventional chassis in order to extend its offer to a wide range of customers offering each one of them a “made to measure” tractor.

It comes with a *Tony* transmission designed to render the agricultural worker's tasks easier, more pleasurable and safer. It is an outsider model compared with the AC isodiametrics as it is categorised as a conventional tractor with frontal oscillating bridge. Designed for narrow-rowed vineyards and for working with ventral equipment, it offers versatility, practicalness and accuracy. The hydraulic system consists of mechanical pumps with gears and a large hydraulic variable pump with pistons. The load-sensing management of the pumps and the large, sectioned pipe circuit have the goal of reducing loss of charge while being able to operate at low engine revolutions and high hydraulic capacity all of which is aimed at reducing fuel consumption and having a low environmental impact. The distributors have CAN-bus control and offer the possibility of customised controls in order to satisfy the demands of all operators and for a perfect combination of all types of hydraulic equipment. Thanks to the extremely compact transmission, the tractor's dimensions are extremely reduced, arriving at a minimum width of just one metre. The monodirectional drive position offers the operator every comfort. It is situated on a spacious platform with isolating and soundproofing systems that reduce vibrations and noise. The smaller front wheels provide a 55° steering angle thus guaranteeing maximum handling precision.

AIR “V” CAB

It is a cab with 4 uprights that offers full visibility in all directions. It has Cat. 4 pressurisation and is ROPS homologated. The automatic air-conditioning system is managed by a digital display on the console. The LED headlights for road circulation are integrated into the cab's roof and their raised position confers maximum visibility over the equipment. The rear mirrors are adjustable electrically. The adjustable steering wheel both in height and angle with assisted return aids the operator's access aboard.

HYDRAULIC PERFORMANCE

- Hydraulic tank capacity dedicated to the distributors is 35 l
- 9 double effect independent electronic distributors (4 rear and 5 lateral)
- 2 ZP (Zero-Pressure) exhausts: one rear and one ventral
- Hydraulic capacity up to 137 l/min (with extra flow)
- Variable capacity pump that activates only when in use
- “Adaptive” rear powerlift for moving equipment in more than one direction
- Standard multifunctional joystick for the running of the transmission's double effect distributors built with CAN-bus technology.
- Colour display for the management of all the tractor's functions and for the personalisation of the joystick controls