

ABI MOBILRAM-System TM and SM Models



ABI MOBILRAM-System

- the Revolution in Civil Engineering

The introduction of the MOBILRAM-System in the mid 1970's marked an enormous progress for special civil engineering at that time and turned out to be the basis of the future of the company ABI Maschinenfabrik und Vertriebsgesellschaft mbH of today.

The ABI MOBILRAM-System RE 7500 was designed for sewer construction and sheeting. Trench sheeting and lightweight sections with a length of max. 7.5 m were inserted using a vibrator. The machine took care of the hard and dangerous work. Only two persons are required for the operation: the machine operator and a slinger. Productivity increased significantly.

Even then, not only the vibrator but also an auger drive could be attached to the MOBILRAM-System, e.g. for pre-drilling. The founder of the

company Alfred Heichel constantly speeded up the further development. Within short time, other models and new attachments followed. At the bauma 1989 ABI presented the ABI Hydro-Press-System for static pressing of steel sheet piles.

The presentation of the TM leader mast series in 1995 was a milestone in the development of the MOBILRAM-System. In the following years telescopic leader mast with an effective length of up to 25 m were constructed. Besides the telescopic leader masts which have especially favorable transport dimensions, the ABI MOBILRAM-System is also offered as a fixed leader mast. Those were introduced on the market at the end of the 1990's.

At the bauma 2010 ABI presented the TM 22 which marked the new leader mast generation, the so called „Mast in Mast“ system (MiM). The patented design (EP and US patent) provides even higher pulling and pre-stressing forces and torques. It combines the latest findings in material research and technical development as well as years of experience on construction sites resulting in machines with high stability and rigidity. The performance data of this telescopic leader mast generation are comparable with the data of fixed leader masts but offering notably more compact transport dimensions.

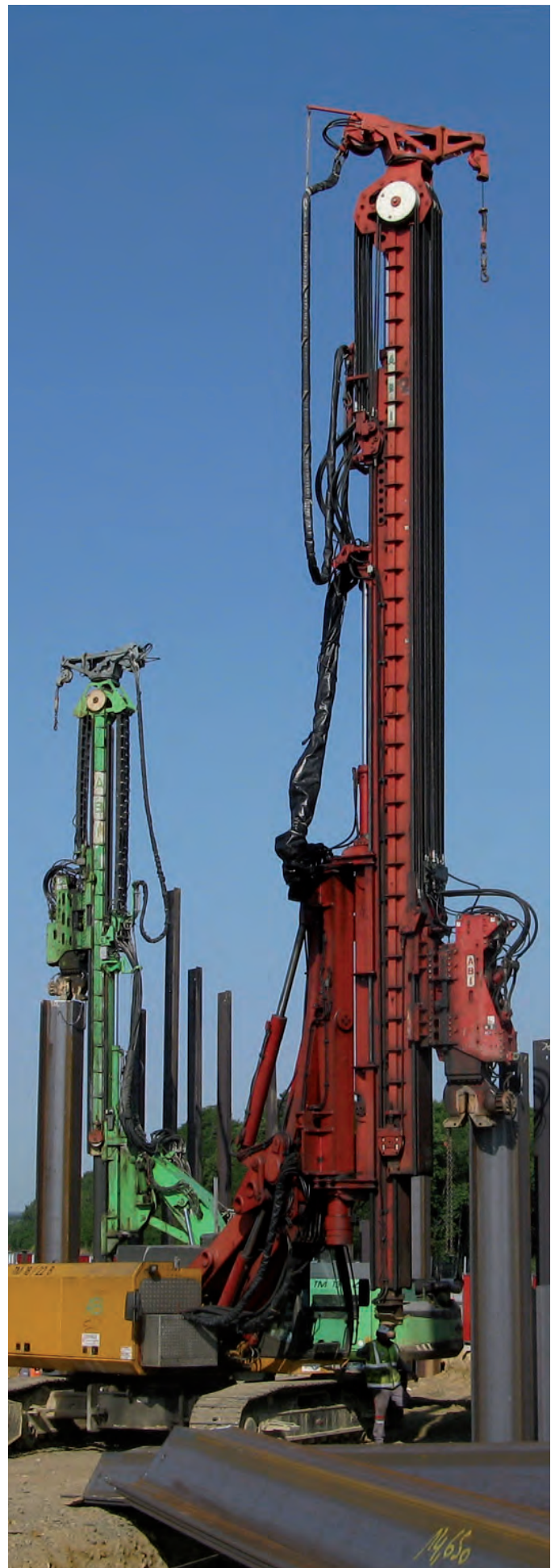


Then and now the name MOBILRAM stands for mobile pile driving systems. However, the variety of fields of application was extended with each new attachment. With a large choice of attachments today's MOBILRAM-System can cover nearly all areas of special civil engineering from pile driving, drilling to pressing and up to impact pile driving.

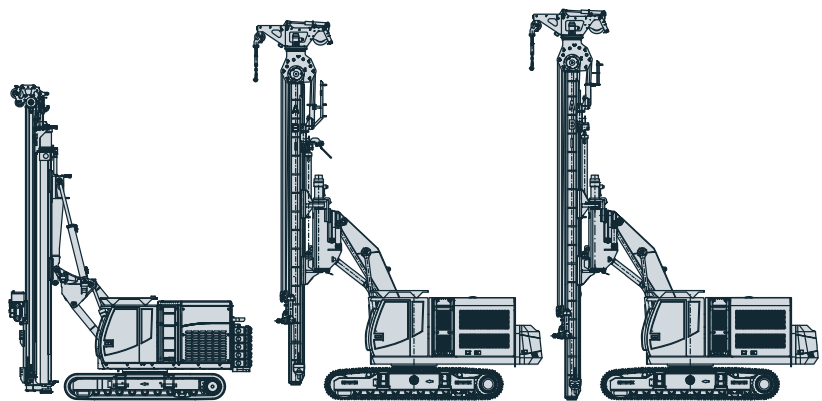
If the machine is equipped with a vibrator all kinds of pile elements (steel sheet piles, light-weight sections, trench sheeting, beams, steel plates, etc.) can be driven or extracted. Among other things, an auger drive is used to drill or mix foundation and shoring piles.

With a Hydro-Press-System steel sheet pile sections can also be statically pressed into the ground at very low vibrations. With a diesel pile hammer or hydraulic impact hammer the pile elements are impact driven into the ground.

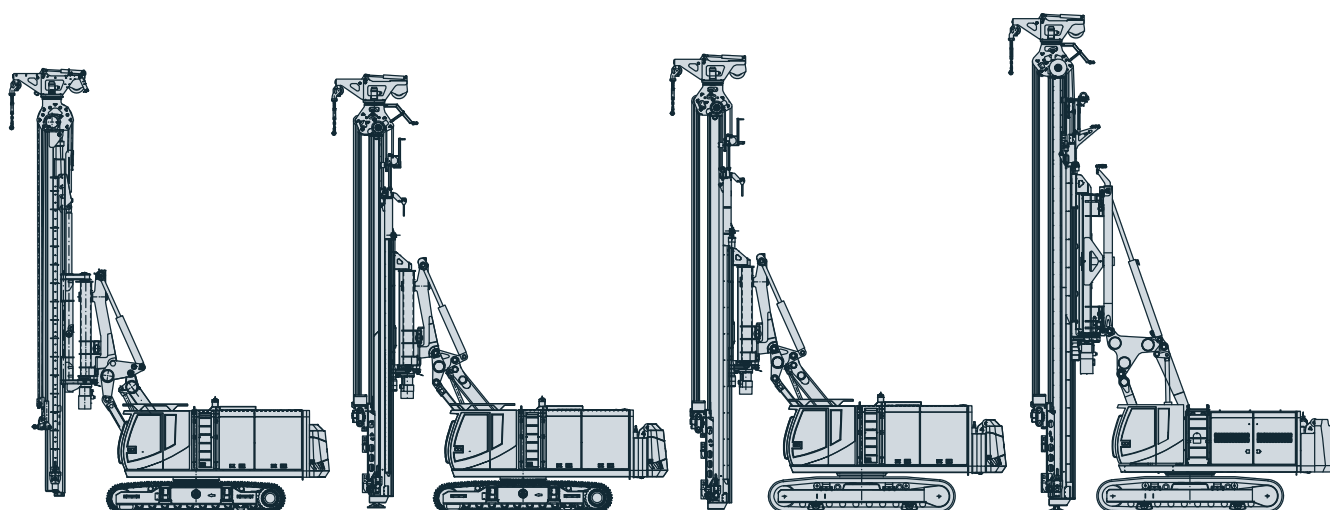
The biggest advantages of the ABI MOBILRAM-System are its efficiency and flexibility. A low diesel consumption as well as the reduction of energy losses in the system are among the highest priorities in further and new developments. The efficient utilization of the available energy has a name at ABI: Efficiency Drive. With the Efficiency Drive huge fuel savings can be achieved without loss in performance.



ABI Telescopic Leader Masts - Overview

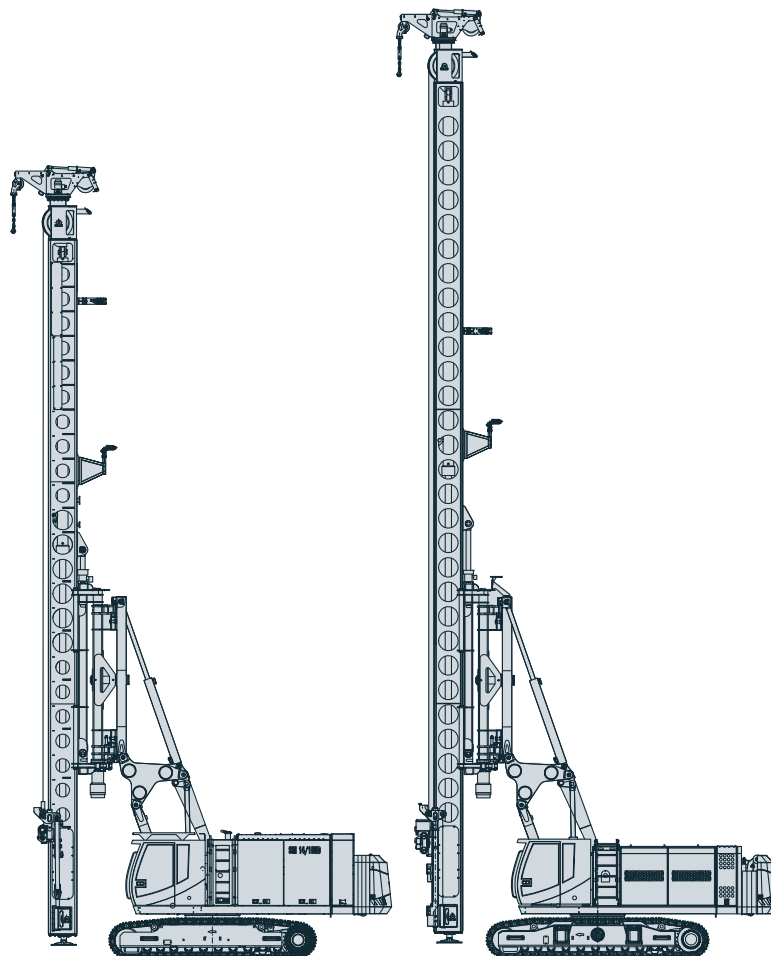


Model		TM 13	TM 11/14 SL	TM 13/16 SL
Engine power	kW	209	257 / 294	294 / 470
Stroke guiding carriage	mm	13500	14500 / 14000	16000
Torque absorption max.	kNm	45	60 / 45	45
Max. load capacity <small>at 360 degrees operation, reach dependent on ballasting</small>	kg	7000	5000 / 9000	9000
Carrier		SR 20	SR 25 / SR 30	SR 30 / SR 35
Transport weight <small>(incl. standard counter weight, reduction of transport weight possible by detaching counter weight)</small>	ca. t	39	42 / 49	49 / 51
Operating weight with standard vibrator	ca. t	43	45 / 52	53 / 55



TM 14/17 V (VSL)	TM 17	TM 20	TM 22
470 (294)	470	470	470 / 563
17000	18000	20000	22000
100 (45)	150	150	200
10000 (9000)	11000	12000	15000
SR 35 (SR 30)	SR 35	SR 35	SR 35 HD / SR 45
58 (53)	63	67	76 / 77
63 (58)	68	72	81 / 82

ABI Fixed Leader Masts - Overview



Model		SM 14/18 HD	SM 18/22 HD
Engine power	kW	470	563
Stroke guiding carriage	mm	18000	22000
Torque absorption max.	kNm	200	200
Max. load capacity <small>at 360 degrees operation, reach dependent on ballasting</small>	kg	15000	19000
Carrier		SR 35	SR 45
Transport weight <small>(incl. standard counter weight, reduction of transport weight possible by detaching counter weight)</small>	ca. t	78	86
Operating weight with standard vibrator	ca. t	84	92



In many building projects, especially in the middle of existing buildings, great importance is attached to the precision of special civil engineering work. Here, the leader guided working method offers many advantages. Besides the very exact positioning of pile elements in pile driving work or of drilling tools in drilling work, prestressing and pulling forces can be introduced selectively and well-dosed in addition.

In an ABI MOBILRAM-System the **standard load capacities** are designed for the **complete 360 degrees slewing range** of the upper carriage at minimum reach. For safe and stable working, each machine is provided with an individual stability calculation diagram that determines the permissible load capacities depending on the relevant parameters such as reach, ballast used and attachment.

ABI MOBILRAM-System at Work

The ABI MOBILRAM is most commonly used for pile driving and extracting a big variety of pile elements with vibration.



The classic case of use:
driving steel sheet piles.



Increasing the ground load capacity by
driving H-beams.



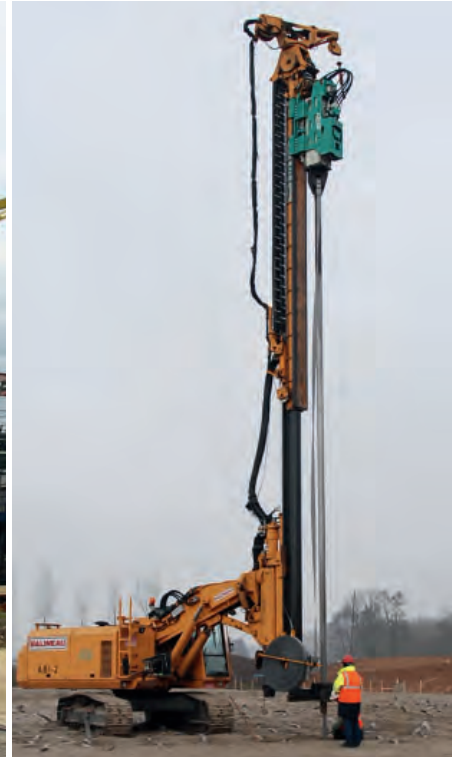
Driving large steel plates as excavation
support.



Installation of thin diaphragm wall as a sealing wall using a special H-beam. Displaced soil in form of the H-beam is filled with suspension.



With a vibrator also full displacement piles with lost plate or reusable tip can be installed.



Installing wick drains in a tight pattern for water level control.



Soil improvement measure: large diameter casing is driven into the ground the resulting hollow space is filled with additional material.



Stone columns: probe is driven to desired depth and while extracting the hollow space is filled and compacted with gravel using the pilger process.



Installing geotextil piles: as a pile element a casing with reusable tip is used, after reaching the desired depth a fabric tube is inserted and filled with material.

Big variety of different procedures can be accomplished with ABI auger drives. They are most typically used for installing concrete piles or pile walls.



Pre-drilling: driveability can be increased by pre-drilling in difficult soil conditions. With a auger drive the continuous auger is drilled in and reversed retracted, so that the soil is just loosened.

Installing CFA piles: after reaching the desired depth during extraction concrete is pumped through the hollow stem of the continuous auger. (Photo left)

DTH hammer: in hard, rocky soils Down-the-hole hammers are used for drilling. (Photo right)





VDW drilling: with the VDW double auger head system cased single piles as well as secant pile walls can be installed. The drilling is carried out in one step, after drilling down concret is pumped during withdrawal.



VDW drilling: the classic case of use - installing secant pile wall directly in front of existing structure.



Double auger head system DH 18: works similar as VDW, but the auger heads are separately moveable. It enables the auger to be withdrawn while the casing ist staying in the ground.



Soilmixing WSM: homogenous concrete piles are formed by mixing the existing soil with suspension while drilling and extracting the mixing tool.



To achieve more efficiency the soilmixing procedure can be carried out as twin- or triplex version, mixing two or three piles simultaneously.



Kelly drilling: the machine is equipped with a kelly winch. The casing is drilled as deep as possible first and then drilled out with the auger. This process is being repeated till the requested depth is achieved.

On vibration and settlement sensitive sites the steel sheet piles can be pressed in the ground using the Hydro-Press-System.



Static pressing with Hydro-Press-System: four steel sheet piles are pressed in a step sequence.



Static pressing direct in front of an existing building. In some cases the soil have to be loosened by pre-drilling before pressing.

For impacting procedures DELMAG diesel pile hammers or hydraulic impact hammers can be mounted on ABI MOBILRAM-System.



Impacting H-beams with DELMAG diesel pile hammer. With the DELMAG formula the load bearing capacity of the soil can be prooved.



Driving casings with DELMAG diesel pile hammer.

For the MOBILRAM-System, flexibility is a synonym for the variety of fields of application on the one hand, and the fast change between attachments on the other hand. This makes the ABI MOBILRAM-System a „Swiss army knife“ for special civil engineering.

The attachments are attached using a rapid change device or, even faster, a Docking-System. The Docking-System allows to change the attachments within a few minutes only. Thus, the vibrator can be swapped very fast with an auger

drive for pre-drilling and then swapped back to the vibrator. In the new leader mast generation on the Docking-System is part of the standard equipment.

Besides its fastness, the Docking-System also contributes largely to the increase in working safety. The hydraulic supply of the attachment is made automatically by quick-acting couplings.



Custom-designed Machines



ABI MOBILTRAM TM 8/10 mounted on a wheel drive under carriage is particularly agile and flexible.



ABI MOBILRAM mounted on John Deere carrier.



ABI groyne piling machine - between the crawler and upper carriage an intermediate piece (pylon) is mounted, so that the machine can be used for pile driving in shallow waters.



ABI MOBILRAM SM 14/18 HD equipped with vibroflot and powerful electric generator on the back.



ABI MOBILRAM TM 17 with micro pile equipment, the auger drive can be moved laterally out of the drilling axis, the clamping and breaking device is used for handling the single micro pile elements.

The ABI machines are manufactured in small batches. This provides a high flexibility and short response times when realizing customer-specific modifications. As far as technically possible, specific customer requirements are taken into consideration and implemented. However, there are applications that are unique and require a special machine or a specific configuration.

ABI is always prepared to take up these challenges.

Transport



Besides the functionality and performances, the transport dimensions and weights are important properties of construction machinery. Telescopic leader masts have more favorable transport dimensions compared to fixed leader masts, as the leader mast is retracted in transport position.

For transportation the attachments are removed and placed and secured in their proper transport fixture.

Depending on the size of the machine and the required ballast the MOBILRAM-System can be equipped with an optional hydraulically removable counterweight. No additional lifting gear is required for the removal. The fixed counterweights can also be removed by means of a crane, if required.



ABI MOBILRAM is driven in a transport position into a building.



Motorisation

With the introduction of the EU Emissions Regulation for mobile machinery (EU 2016/1628), which is also known as EU Stage V, in Europe from 01.01.2019 for engines of the power range 130 - 560 kW a limit for the particle number will be introduced. In addition, the scope of the regulation will be extended to engines with a power greater than 560 kW.

Since the introduction of the EU emissions legislation in 1999, the limit values for exhaust gas pollutants from engines of the power range 130 - 560 kW (175-760 hp) for such as nitrogen oxides and particulate matter have been reduced by more than 95%. For the first time in this power range a limit value for particle number has been introduced, which is only technically completable using a diesel particulate filter. Above an output of 560 kW, the limit values for the pollutants nitrogen oxides and particulate matter are significantly higher, or the number of particles is not limited. In a transition period of 24 months, or 36 months for machine manufacturers with a total annual production of less than 100 units, machines of the previous emission stage can still be placed on the market.

Compliance with the limit values of the current EU Stage V is achieved by the engine manufacturers by installing a comprehensive exhaust after treatment system. The essential components usually comprise of the Diesel Oxidation Catalytic converter (DOC), Diesel Particulate Filter (DPF) and Selective Catalytic Reduction (SCR) with urea injection. The DOC catalytic converter removes carbon monoxide (CO) and hydrocarbons (HC) from the exhaust gas by oxidation with the residual oxygen, and under certain conditions can significantly increase the exhaust gas temperature. The DPF filters a large

part of the particles, substantially most particle matter and soot from the exhaust gas flow. If the exhaust gas temperatures are too low or the exhaust back pressure too high, the soot particles are converted to ash via active regeneration and collected in the DPF. After achieving an operating hour's limit the DPF must normally be replaced or cleaned. In the SCR catalytic converter, the nitrogen oxides are reduced by a chemical reaction with injected urea and converted into non-toxic nitrogen and water. In Europe, urea is known under the brand name AdBlue and in North America as DEF.

In addition to the acquisition of the required machine technology, the operating companies have to meet higher requirements for maintenance and operation of the machines as well as in the purchase of operating materials, which are generally readily available in the EU and the USA. For example, the use of low-sulphur diesel, low-sulphur and low-ash engine oil and care in filling the urea/AdBlue for trouble-free operation of the machine is essential. Due to the complex exhaust after treatment system, use of the machines in less regulated countries is generally only recommended in consultation with the respective engine manufacturer.

Thanks to the modern and environmentally friendly technology, the ABI and Sennebogen carrier units comply with the latest emission regulations in the EU and the USA and can therefore be used flexibly on construction sites. Together with the optionally available ABI Efficiency Drive, with transmission losses minimised and increases in the efficiency of the machines, the result is an ideal combination, especially if high demands are placed on environmental protection and cost-effectiveness.

Efficiency Drive

Efficiency Drive is a newly developed control system for the ABI MOBILRAM-System. Once developed to reduce fuel consumption, it offers further advantages like reduction of noise and exhaust-gas impact, less wear on diesel engine, pumps and hydraulic system. What is important is that the available power still remains unrestrictedly available at the attachment or is even excelled.

The Efficiency Drive I (ED I) is used in the MRZV-VV vibrators and is part of the standard equipment starting with the E series carriers. Vibrators are driven hydraulically as is most construction machinery, however, they show some device-related particularities. For example the hydraulic losses are relatively high due to the large distance between the hydraulic pump and the load, in addition, a constantly circulating oil volume flow rate is required to maintain the eccentric weights in rotation. Another specific characteristic is that in vibro driving the part load operation is prevailing. It occurs every time the working pressure falls below the permissible maximum value. The circulating volume flow that is not required in part load operation causes considerable losses.

The Efficiency Drive controls that only that much oil is moved as is required to transfer the power that the vibrator transforms. The adaptation of the hydraulic flow rate has no negative effects on the available power. The full power is available at the vibrator at any time.

In addition, the Efficiency Drive II (ED II) is offered as an option starting with the E series carriers. It regulates the efficiency of the diesel engine. Then, the engine is controlled tailored to need and, due to the optimized hydraulic system, there is even more power available at the attachment. In contrast to ED I the Efficiency Drive II works for all ABI standard attachments, like auger and mixing drives and the Hydro-Press-System. In addition, the ED II is equipped with an automatic throttle function. This one controls the speed of the diesel engine such that it always runs in idle as long as no loads, e.g. chassis, leader mast, etc. are activated.

All these measures do not only result in considerable fuel savings but also in a higher efficiency of the machine. In addition, the environmental compatibility of the machines is increased through less noise emissions. The ED II is a worthwhile investment that will amortize quite fast.



Control System

The control system is one of the most important components of a machine because as the interface between man and machine it decisively influences the efficiency of the machine.

The up-to-date control system has the following advantages:

- extensive standard equipment, e.g. leader alignment automatic, depth reader, indication of working parameters like operating pressure, feed force, etc.
- high reliability and availability through shorter signaling paths
- easy to expand
- error diagnosis with clear text display reduces downtimes and maintenance times

In addition to the standard scope of delivery the machine can be equipped with different options:

- data acquisition with integrated measuring computer
- data backup on USB stick and optional print-out on site
- transfer and analysis of the site data in the office using special software
- error diagnosis via modem
- anti-theft protection and location via GPS
- camera monitoring systems (e.g. clamp assembly camera for a safe observation of the clamping process)
- transmission of logged data and working data via ABI customer portal



After Sales Service

Machines are only profitable if they are permanently available. Inspections and instant troubleshooting contribute decisively to ensure a high availability.

The ABI mechanics regularly perform prescribed checks and inspections, eliminate errors or repair damages that can occur due to the rough applications.

Due to the fast availability of spare parts and competent contacts downtimes are minimized and a smooth and profitable application of the machines is ensured.





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