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Press Release

Revolution in the kitchen

The new Thermomix enabling digital cookery!

Food processors must be ever more versatile

Multi-functional food processors are still very much in vogue. In 2014 the sales of classical small electrical appliances such as food processors achieved an above-average growth rate – according to the findings of GfK TEMAX. The multi-talent Thermomix made by Vorwerk stands out in this market. For more than 50 years this smart kitchen appliance has been loved by over seven million users worldwide. And the new Thermomix Generation TM5 is now revolutionizing the kitchen and stepping into the digital world with its innovative Recipe Chips, touch screen and unique Guided Cooking function.

Thermomix TM5

The latest Thermomix model TM5 has been available since the 6th September 2014 and is already proving extremely popular. The Thermomix combines twelve functions in one machine: It not only stirs, mixes, kneads and chops but also cooks, steams, weighs, blends, grinds, beats, heats and emulsifies. Enabling anyone to achieve complicated Bain-Marie recipes such as hollandaise sauce or zabaglione. The great thing about this: there is no need for complicated alterations or time-consuming modifications!

Complete meals can be created with only a mixing bowl and a knife with four blades. If clockwise rotation is activated the blades chop the contents of the bowl and in anti-clockwise rotation the blades turn backwards; ideal for stirring without cutting. All accessories are included in delivery. The cook can use the Varoma attachment for steaming, the simmering basket, a whisk, a measuring cup as well as a spatula with safety shield. You do not need to use several bowls, the Thermomix cooks over four different levels at the same time, without burning or overcooking – a real multi-talent.

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For cooks who want to experiment with new culinary ideas, developing their potential and saving time and effort, the Thermomix is the ideal kitchen workmate. The new Thermomix TM5 allows users quickly and simply to prepare fresh new dishes for friends and family. Healthy, creative and energy efficient.

Thermomix owners can create a whole meal in only 30 minutes. A large part of the cooking is automatic, particularly the new Guided Cooking feature which leads the user step by step through the recipe and adjusts all required settings automatically. The simple, stress-free way to create great dishes in no time at all. "Guided Cooking is fast, precise and utterly simple – and you have not only the usual guaranteed success of the Thermomix, but also plenty of fun!" explains Dr. Stefan Hilgers, Senior Product Manager of Thermomix at Vorwerk. The machine can also be cleaned extremely quickly and simply, instead of several bowls, it is only the mixing bowl and any accessories used which must be cleaned.

Thermomix up close

The Thermomix takes on the tasks of so many different kitchen appliances that the oven and hob will seldom be used. The low energy consumption of the machine contributes to lower gas and electricity bills and is therefore particularly economical and environmentally friendly.

There are no limits on creativity with the Thermomix: The Recipe Chip, the recipe platform, the Thermomix App or the official cookbooks provide a huge selection of recipes. Cooks can discover a wide variety of healthy and delicious dishes to prepare for any occasion. Success is guaranteed and cooking is easy and hassle-free thanks to the Guided Cooking feature. The intuitive touch screen and the dial to select time, temperature and speed are particularly user-friendly. The new locking bars are also easy to use: Once the Thermomix TM5 is switched on the cover is locked automatically. Dr. Stefan Hilgers emphasizes: "This automatic locking of the cover is unique in household appliance technology".

Also new on this model is the larger mixing bowl made from non-corrosive stainless steel with 2.2 liter capacity. All ingredients can be weighed directly in this bowl due to the integrated scales. The

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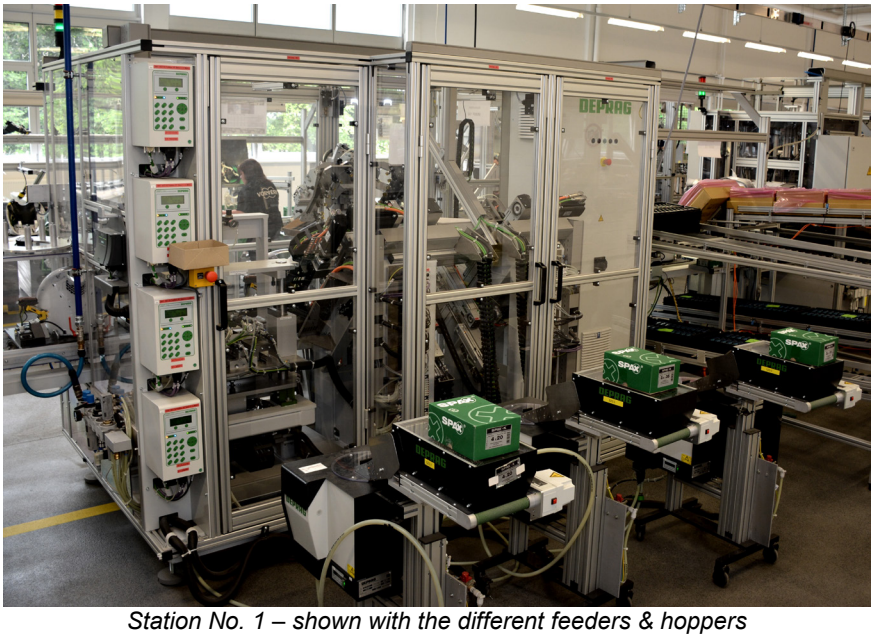
powerful motor with continuously variable speed from step 1 (100 rpm) to step 10 (10,700 rpm) and the gentle stir setting (40 rpm) is just the job for any requirement.

This power and practicality goes down well! But it is not only the design and technology which is important but also simplicity in production. And it is for this reason that Vorwerk were looking for an expert full service provider for the production of the new Thermomix TM5 who would design and manufacture the assembly system for the screw assembly of the housing components. DEPRAG SCHULZ GMBH u. CO. in Amberg, Germany with decades of experience in the fields of screwdriving and feeding technology were obviously the ideal choice. The DEPRAG engineers create innovative concepts for automation in every industry imaginable – each individually designed to the customer's requirements. "We have worked with DEPRAG for decades", confirmed Tobias Fasselt, Production Technology & Engineering at Vorwerk, "and with much success. DEPRAG provides a perfect all-round package and is quick on the scene with expert personnel when servicing is required".

In order to meet the high demands for the Thermomix machines, four identical DEPRAG assembly systems were required. Integrated into each assembly system were two automatic screwdriving stations and a manual repair work station. In screwdriving station 1, screws are assembled both from below and horizontally from the rear simultaneously. The underfloor assembly joins the roller support with the pre-assembled pan. The second screwdriving unit is used to assemble a handle and electronic bracket onto the pan from the rear. In the second screwdriving station the pan is assembled to the design cover. This task is fulfilled by two specially designed screwdriving units



Station No. 1 – shown with the different feeders & hoppers

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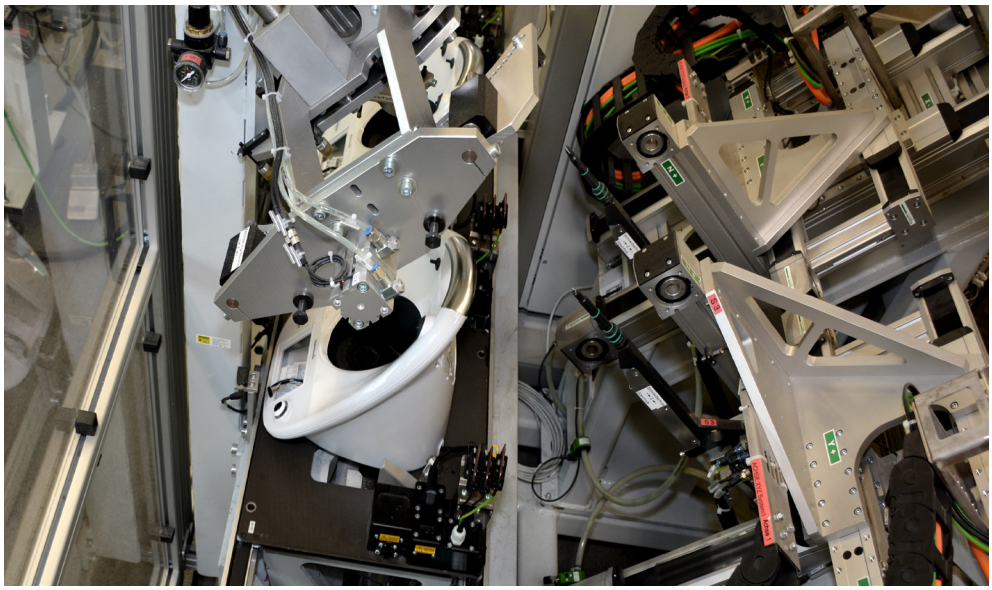
which arrange the component at an angle of 45 degrees and have freely programmable XYZ axes.

The automated assembly systems are designed for the screw assembly of the various housing parts of the TM5. First they move the workpiece carrier automatically across a transport belt from the right to its processing position in the assembly unit. A lifting device positions and lifts the workpiece carrier from the belt where it is then checked by several sensors to make sure all components are present. Using a down holder they are then held from above onto the workpiece carrier. Then a counter holder moves into position and presses against the parts from the inside to compensate for the pressure created by screw assembly. The holder fixes and centralizes the individual parts in their correct positions. The down holder and counter holder are equipped with flexible spring pins which compensate for tolerances in the plastic components. This ensures that the component is securely fixed and also cannot be damaged or scratched during assembly.

Once the parts to be assembled have been correctly positioned the first screw assembly procedure begins. An underfloor screwdriving unit is fixed to an XY-axis system. This is then built into an underfloor pull-out, a manual moveable attachment for easy removal allowing simple maintenance. The integrated screwdriving technology is based on a stationary MINIMAT-EC screwdriver type 320E27-0024-D in straight design. This assembles three screws after one another to connect the housing base and internal parts of the Thermomix with each other. Once the pre-set torque has been reached the MINIMAT-EC screwdriver switches off automatically. Using the AST11 screwdriving sequence controller the process is monitored and evaluated. The sequence controller allows precise control and monitoring of the torque and angle. If the message "OK" appears and the screw



Assembly Unit for Thermomix Base

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procedure is completed then the axes return to base position. If the result is "NOT OK" then the workpiece carrier is sent to the repair work station.

After every successful screw assembly the next screw is shot in through the screw feeder integrated into the system, a vibratory bowl feeder with hopper. The hopper monitors the fill level of the feed parts using a fill level sensor and refills automatically as required. This ensures that the required fill level is constant, thereby ensuring that the vibration intensity of the feed system is always constant and does not need to be adjusted.

At the same time as the underfloor screwdriving procedure another MINIMAT-EC screwdriver assembles three screws horizontally from behind into the housing parts. The handle and electronic bracket are assembled onto the housing base. Screws are also fed here using a vibratory spiral bowl type SZG 0611-EP with hopper and the screwdriving process is monitored by an AST11 controller. If both screw procedures are completed the counter holder, down holder and lifter return to their base positions. The workpiece carrier is placed back on the belt and runs automatically to the next screwdriving station along to the left.

Once the workpiece carrier arrives at screwdriving station 2 it is raised by a lift driven by a servo motor into a temporary position. An intermediate check determines the status of the assembly, first and foremost checking which step is required next once the component has been returned to the belt from the repair station. This ensures that the component is placed in the correct position on the workpiece carrier and that the screwdriving process can continue without any problems. After this check the lift driven device is returned to the screwdriving position. The two MINIMAT-EC screwdrivers set to 45° angle ensure ultra-reliable screw assembly of the housing parts.

Again at this station the components are held in place and positioned correctly by the down holder. A counter holder creates the necessary counter pressure on six screwdriving positions. In order to prevent damage to the sensitive high grade finish of the housing parts the down holders and counter holders are equipped with spring pins.

In the next step two symmetrical XYZ axes powered by servo motor drives are used in order to achieve the required cycle time. On each XYZ-axes system a customized version of a screwdriving function module (SFM) is attached. The screwdriving procedure consists of assembly of a component at an angle of 45 degrees and it is important that the SFM provides certain features: to ensure reliable processing of the screwdriving positions without making contact with the plastic parts a

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special longer mouthpiece is used. The SFM also works with a partial nosepiece with magnet. This guarantees that the screw is held in the correct position.

For assembly two MINIMAT-EC spindle screwdrivers type 320E27-0024-D are used. These tighten three screws to a pre-set torque and join the housing base part to the upper cover. AST11 controllers monitor and analyze the screwdriving procedure. Screw feeding is controlled by a two-fold vibration feeder type SZG 0611-2-P with hopper. Once this assembly step is completed the down holder and counter holder return to their original positions. The lift first runs quickly back to its temporary position and then moves slowly back to base position.

It returns the workpiece carrier to the belt almost vibration free and this then moves left automatically along out of station 2 to a 90° rotary unit.

Here all stored screwdriving data from the coded workpiece carrier is read and checked. If there are any NOT OK assemblies reported then the workpiece carrier with the rejected component is returned to the repair station via the rotary unit. There an operator can check whether repair will be possible or if the product must be removed. If no repairs are made the system will not allow the rejected part to continue with further processing. The manual repair on the component is carried out using a MINIMAT-EC handheld screwdriver type 320EPT27-0022 with pistol grip. The touch screen displays the exact position of the problem on the product for the operator. Using this indication the operator can select the correct screwdriving program and complete the assembly. This screwdriving process is also monitored by an AST11 screwdriving sequence controller. If the parts are assembled correctly and approved they are returned back into the automatic assembly line. "Vorwerk have always placed great emphasis on quality and durability. The high quality standards which our customers have come to expect can be fulfilled by using the DEPRAG systems", explains Mr. Fasselt.

VORWERK & Co. KG was founded as a family business in 1883 in Wuppertal. The core business of the company is the worldwide direct sales of high quality products. This includes the multi-functional food processor Thermomix, which has constantly been setting new standards in innovation with its technology. The turnover in the business area of Thermomix alone has continuously shown double-digit growth over the past years. In the year 2014 for the first time more than 950,000 machines were sold worldwide.

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DEPRAG SCHULZ GMBH u. CO. based in Amberg employs 600 people worldwide. The middle-sized company is the go-to partner for the fields of screwdriving technology, automation, air motors and air tools. DEPRAG combines their expertise over many decades of experience with customized engineering solutions – perfect for versatile projects.

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