

Robot Grader

High accuracy automation solution
for fixed weight retail packs





Grading and Batching

RobotGrader

Dramatically improved yields and efficiency in the packing of fresh food pieces.

In the poultry industry, the filling of packs of two or more pieces of product to a fixed weight has resisted efficient automation for too long.

Even at two pieces per pack, trained workers find it difficult to fill more than nine or ten packs per minute. To be sure of meeting weight regulations, overfill can be anywhere from 5% to 20%.

Major manual intervention has been needed to keep pace with the modern processing of poultry products that nowadays can be moving at over 450 birds per minute. One particular task is the packing of the pieces in the correct orientation, ensuring no product protrudes into the seal area. This involves the expertise often referred to as 'styling'.

RobotGrader by Ishida solves all of these problems at a stroke. It harnesses the power of sector-specific algorithms developed over many years of packing poultry to modern robot technology, accurate dynamic weighing and reliable orientation checking.

The result is a near-continuous process packing up to 320 pieces per minute with giveaway of less than 1%, with a workforce reduced to just a few operators.

A wide choice of communication and remote control interfaces

RobotGrader is communications-friendly and readily integrates with ERP and control systems. For example fillet weight, retail pack rate, crate weight, giveaway and repack rate per line can be passed to your favourite software for presentation exactly as you want them. All settings (robots, package specification, dynamic weighing and more) can be adjusted from a control centre.



Robust technology that offers clear opportunities



Increase your yield of packed, saleable product by cutting giveaway 80-90%



Save labour in your pre-sealing styling and packing operations by 75%



Speed up activities that may be failing to keep pace with your processing



Eliminate considerable work-station space, increasing your return on floorspace (RoF)



Improve hygiene without imposing time or downtime penalties



Avoid increased changeover downtime while reaping the full benefits of automation



Increase the number of services you can offer your customers without increasing cost



Achieve all the above without investing in overly complex or unproven technology

The (robot) hand is faster than the eye

The gripper has been specially designed to grasp each piece firmly but gently and to orientate it correctly, position it over the right part of the tray and release it, all within a fraction of a second. Discharge into the tray takes place cleanly and decisively, thanks to a special positive outwards pressure element that operates as the gripper opens.

The mechanical reliability of the gripper is such that it can operate 5 million pick-and-release cycles between services.



What the RobotGrader can do for your packing operations

The RobotGrader takes product from your upstream processing or cutting areas and delivers trays accurately filled to target weights and ready for problem-free sealing.

For example, it will make up 600g trays from an input of chicken fillets with a normal weight distribution, and will reliably meet EU Average Weight regulations.

1. Product infeed

Product arrives from upstream processing steps such as deboning. Belts are of open construction for thorough, rapid washdown.

While strictly speaking the RobotGrader begins here, we offer conveyor expertise that links back into the heart of your upstream activities. For example, coloured bands indicate to your cut-up operatives where best to place the pieces on the belt.

2. Dynamic weigher

A highly accurate weight for each piece is determined and fed into the unique algorithms that will determine the robot's selection of pieces.

3. Orientation detector

A simple but highly effective array based on photocells determines the attitude, position and orientation of each piece, and feeds this information into the system. It can, for example, distinguish between the thicker and thinner ends of a fish or chicken fillet.

4. Tray infeed and handling

A patented system optimises the number of trays within the reach of each robot by dispensing with unnecessary flights and guides and allowing lip overlap. This system also liberates RobotGrader from set tray dimensions, allowing great flexibility in pack design and tray sourcing. Each RobotGrader can handle (depending on model) two, three or four different tray types at the same time.

Tray changeovers take place very rapidly, thanks to a well-proven mechanical design.

5. Robotic arm

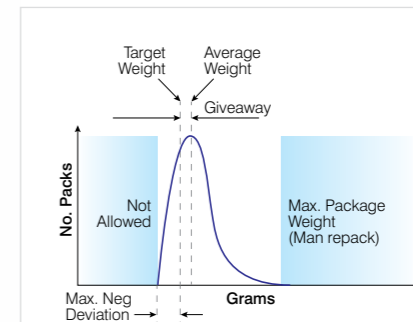
The all-stainless-steel robot picks up each piece, orients it perfectly with the tray, then places it in the correct place within the tray. Using the information from the orientation detector it will, for example, place one chicken drumstick with the thicker end facing the travel direction and the next in the opposite orientation, a typical styling operation.

These are light, fast delta robots designed to handle food industry pieceweights. Where earlier robots each carried a cumbersome control box, here the control boxes are much smaller and only one is needed for up to four robots.

6. Product output

Tray progress in and out of the RobotGrader is fast. While filling trays, the RobotGrader can simultaneously sort pieces whose weight is unsuited to tray inclusion to other destinations such as bulk bins, freezers, slicers and marination operations. This is particularly useful in meeting special customer demands where a narrow band of product weights is desired.

**Robot
Grader**



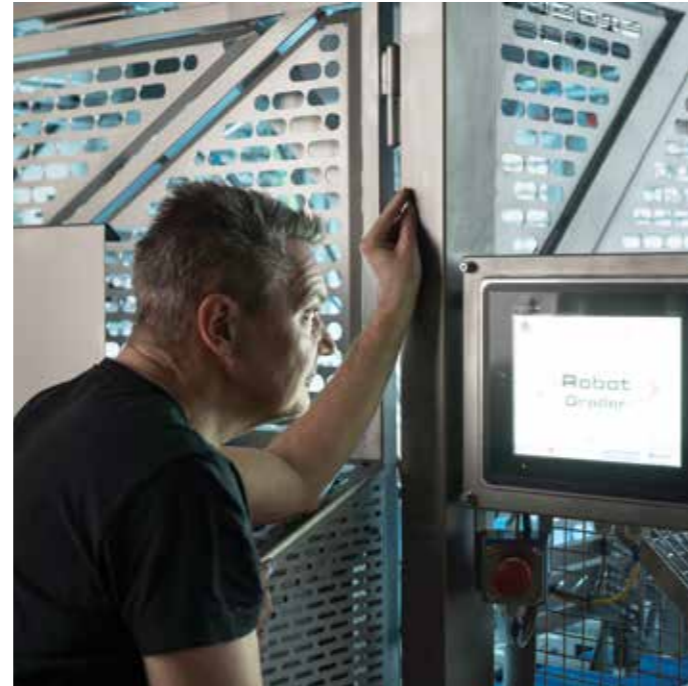
Unique sorting algorithm builds on massive experience

The RobotGrader sorting algorithm draws on years of food production experience. A team of high-level academic scientists have developed it to the point where the sorting possibilities available to the robots are at the absolute theoretical maximum for a given raw material and product mix.

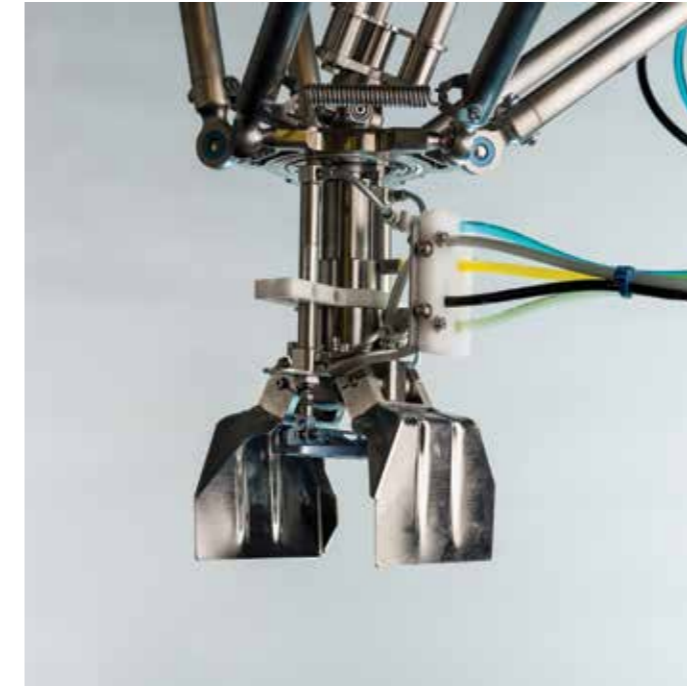
The solution that turns a problem into a profit



Hygienic all stainless steel construction



Easy-to-use, informative touchscreen interface



Unique gripper design enables super-fast orientation and placing of pieces

Cutting giveaway down to size

The RobotGrader consistently makes combinations so close to the target weight that giveaway is practically eliminated.

This is achieved by accurate dynamic weight measurement, with the system maintaining awareness both of all the weights available to each robot and of the weight trends among the incoming pieces. This information is fed into a unique sorting algorithm, developed over many years in the food industry in the handling of pieces of meat, fish and poultry.

It is common for the 5% giveaway experienced by a corresponding manual operation to be reduced to below 1%.

Major savings in one of the food industry's most labour-intensive activities

A well-trained operative can take pieces from the cutting line, weigh them and place a combination of two pieces into a pack at the rate of ten packs per minute. A RobotGrader 200, for example, can handle 200 pieces per minute, which corresponds to 100 packs of two pieces, the work of 10 operatives.

This is offset by the need to retain one worker to check the output of trays and perform any necessary remedial styling.

In this example therefore, there is a labour saving of 80% in the grading and sorting area. Please see table for further examples.

Systems built for speed

The RobotGrader relies not on heavy-lifting production line robots but on smart, fast, compact units perfectly suited to the food industry weights being handled. High performance conveyors deliver the product at a fast tempo. In multi-robot models, at no time need any robot wait for the actions of other robots to be completed.

Another important factor is the speed and precision of the unique robot hand (see inset).

RobotGrader model name	100	200	300	400
Pieces per minute	100	200	270	320
2-piece packs per minute	50	100	135	160
People needed to achieve this manually	5	10	13	16
Labour saved	5-1 = 4	10-2 = 8	13-3 = 10	16-4 = 12
Labour saving%*	80	80	77	75

*These reductions apply only to the grading and sorting area

The solution that turns a problem into a profit



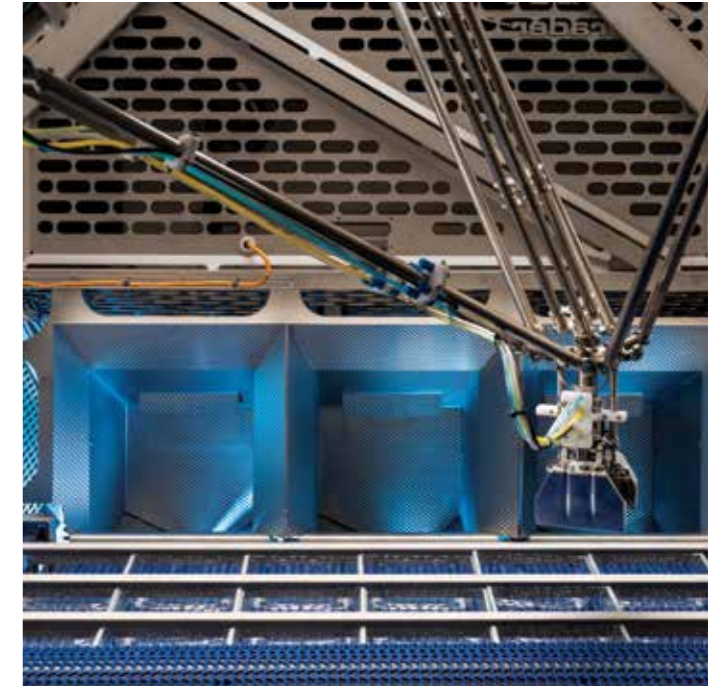
RobotGrader is 20-30% shorter than a traditional sorting system



Simple, reliable orientation determination based on photocells



No tools needed for dismantling



The system can also select product for bulk packing into crates

An impressive Return on Floorspace (RoF)

With its overhead-mounted robots, a RobotGrader takes up only the space required for product infeed belt and tray movements. Requiring an access point for just one styling supervisor, it dispenses with the need for worker stations, enabling it to fit into a very compact footprint indeed.

Given the high output of these units, the volume packed per square metre is an impressive figure.

A high level of hygiene-friendliness

RobotGrader has been developed for the handling of fresh foods such as meat, fish and poultry and meets the most stringent regulations for doing so. A number of measures ensure that hygiene is fully achieved without excessive downtime or expense.

All structures, including piece- and tray-handling belts and supports are of open plastic or metal design, enabling rapid and effective washdown with clearly visible results.

Above the work area, there are no continuous horizontal surfaces less than 2m above the ground. No equipment lies underneath the fresh-food handling level, enabling that level to be washed down so that all wastewater goes directly to the drainage system without further contact. An automatic belt-flushing option is available.

No dismantling is needed, with all equipment washable in place, including the stainless steel gripper arms which are treated with foam and high-pressure water.

Keeping changeovers simple

In moving from manual methods to automation, it is important that efficiency and hygiene benefits are not offset by undue operational demands from the new machinery.

Product changeovers on the RobotGrader are fast and simple. Tray guides can be moved in seconds from one clearly marked position to another and it is usually not necessary to stop the packing process.

Doing more for your customers

With up to 16 tray lanes served by fast robots, RobotGrader offers you more sorting possibilities, including the ability to divert pieces within particular weight bands to meet special customer needs. It can pack equally effectively into trays or thermoformer pockets.

Where grading is not required, it can even give you a super-fast catchweight facility, with up to 400 picks per minute.

Advanced technology with its feet on the ground

RobotGrader is an original and highly effective idea. However it is also robust. It combines dynamic weighing, an art which has been around long enough to attain near-perfection, with modern robotics and well-tested weight algorithms. It does not rely on vision technology, with its high demand for computer programming and updating.

Working with you every step of the way

Our extensive R&D investment is directed at meeting the challenges of the fast-changing food industry around the globe.

We aim to support our partners fully, from the very start of the buying process, and you will find many equipment brochures, visual animations and case studies available on our website. When you are ready to make contact, a well-resourced network of Ishida companies, distributors and agents, extending across Europe, the Middle East and Africa, can provide advice and organise demonstrations and trials.

Installation is rapid and efficient. For integrated packing lines, we use proven project management techniques and methodologies, tuned to your key objectives and specifications.

A dedicated pan-European service engineering team helps to maximise the performance, functionality and reliability of our installed base. In addition, spares facilities are strategically placed throughout the territory, offering 24-hour delivery in most cases.



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