From manual to automated processing

1,000 to 2,000+ bph poultry processing plants

- Consistent and manageable process
- Higher production efficiency
- High value end products

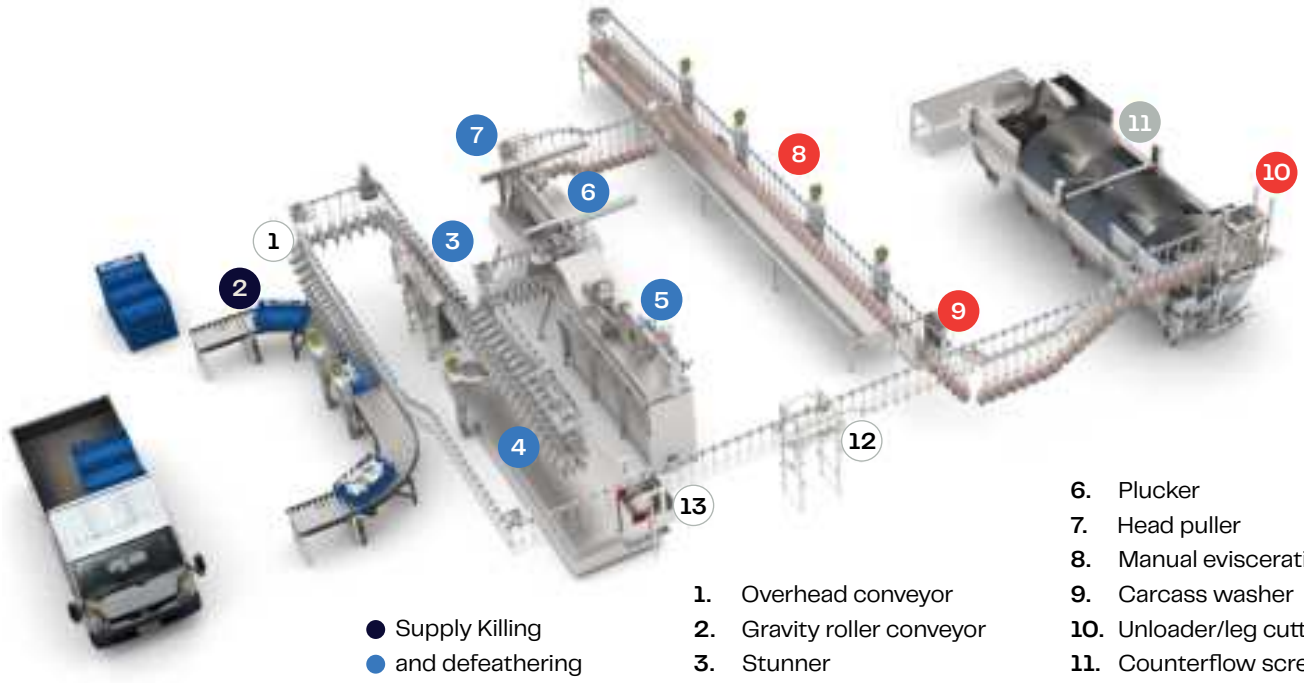
JBT Marel

From manual to automated processing

Are you considering opening a new poultry processing plant? Or do you already have one and want to automate parts of the process, which you are now doing manually? Alternatively, do you want to increase capacity and are looking at the various automation options for doing this? If so, JBT Marel will be happy to be your partner in the automation of your production processes.

JBT Marel develops, produces, installs and maintains equipment for poultry processing plants. Our customers, from small to big, can be found all over the world. We listen to our customers' wishes and to the demands set by the local market. We think through possible solutions with them. This together with experience and knowledge built up over many years makes us the ideal partner for every poultry processor. While working closely with JBT Marel many customers have grown from small to medium and large-sized businesses, from a manual process to operations where production is increasingly automated. Important benefits are a higher level of production, greater production efficiency, a consistent and manageable process, high value end products and high yields.

Above a certain daily capacity, processing chicken by hand becomes hard work and a logistical headache. With equipment from JBT Marel the whole production process in a poultry processing plant can be automated. We offer complete processing lines, where each step in the process has been developed as an autonomous unit. JBT Marel's machines and equipment are modular in construction, so they can be made to fit your requirements perfectly. They are manufactured from stainless steel and other non-corrosive materials.



- Supply Killing
- and defeathering
- Evisceration
- Chilling

1. Overhead conveyor
2. Gravity roller conveyor
3. Stunner
4. Bleed trough
5. Scalder
6. Plucker
7. Head puller
8. Manual evisceration
9. Carcass washer
10. Unloader/leg cutter
11. Counterflow screw chiller
12. Feet unloader
13. Shackle washer

Poultry processing plants handling 1,000 bph

The first step towards automating your plant is the purchase of an overhead conveyor, a stunner, a scalder and a defeathering system. Compared to working manually, this level of automation allows for processing of a larger number of birds, saving labor, producing a better quality end product and increasing yield. Naturally, we would like to discuss with you all solutions, tailoring them to your specific needs.

Live bird supply

Overhead conveyor

The overhead conveyor is the heart of an automated poultry processing plant. The conveyor transports product through the various steps of the process and gives you a consistent and manageable flow of product.

The overhead conveyor, manufactured from galvanized steel or stainless steel, consists of a steel chain with trolleys from synthetic material and product carriers. The plastic trolleys run on a 'T' or 'Sigma' profiles track, where the loading on all parts of the trolley wheels in contact with the track is vertical. This reduces wear and the risk of breakdowns to a minimum. 'Sigma' profile allows greater distances to be spanned and makes it easier to create 'up' and 'down' differences in height. 'T' and 'Sigma' profiles can be combined without problems. Installation of the overhead conveyor in a processing plant must be done precisely. A stable overhead conveyor system will guarantee the exact synchronization and optimal functioning of all connected equipment.

An automatic tensioning unit with a tension protection device keeps the chain at the correct level of tension and is easy to operate by hand. The overhead conveyor is built up from track components and corner wheels of different diameters.

This makes the overhead conveyor flexible and easy to adapt to a specific space. The overhead conveyor needs minimal maintenance.

Gravity roller conveyor

Broilers can be supplied in crates, which are then placed onto a gravity roller conveyor. A downward slope in the conveyor and the effect of gravity cause crates to roll towards the hang-on point, where broilers are hung to the shackles of the overhead conveyor. Besides supplying full crates, the gravity roller conveyor is also able to take away stacks of empty crates.

Killing and defeathering

Stunner

JBT Marel's Water Bath Stunner stuns product in the best possible way, as a result of which an accurate kill cut can then be applied to the bird.

Hanging in a shackle suspended from the overhead conveyor, birds enter the water bath over a sloping plate. Entry has been designed in such a way that birds remain quiet. The bath is charged with alternating current. The head of the bird, the shackle and the shackle guiding close the electrical circuit. The depth of stun is determined by the length of time that birds are in the water and by the voltage set into the stunner's switchbox.

The stunner has stepless voltage control, an ideal feature if varying flock weights are processed. Stepless control also allows differing international requirements and norms for stunning voltages to be met.

Stunning stimulates the muscles, which then contract. High frequency stunners reduce muscle contraction, which benefits meat quality.

Bleed trough

After passing through the automatic killer, birds are conveyed over a 'V' shaped bleed trough. A connecting trough to fit between the bleed trough and the scalder can also be supplied.

Blood pump

The blood pump pumps blood collected in the bleed trough to a receiving tank. The pump is supplied with an air management unit consisting of a water separator, a pressure regulator and a speed regulator.

Scalder

After bleed out, birds are transported through the scald tank hanging in the shackles of the overhead conveyor. A good scald offers the best guarantee for optimal defeathering in the next process step.

The scalder is modular in construction and can be easily extended.

Scalding is a process where hot water is used to weaken the connection between feathers and the feather follicles. This water is agitated to give the best possible scalding effect. Agitation is done by blowing air into the scald water through a large number of nozzles placed in the bottom of the scald tank. The particularly powerful agitation achieved ruffles the feather pack well, allowing water to penetrate thoroughly between the feathers and down to the feather follicles. Highly accurate temperature control makes for a perfect result.

Water in the scald tank can be heated indirectly by heating elements, through which hot water is circulated or by injecting steam directly into the scald water. The first system is a closed one, where any pollution of the surrounding air in the form of unpleasant odor or escaping steam is minimal. The scalder is of compact build with pipework integrated into the heating elements, an efficient solution for your energy consumption, which also makes the scalder easy to clean. The scalder is built up from sections and is therefore easy to extend for higher capacities.

Plucker

The correct combination of scalding and plucking equipment is the only way to achieve the best possible defeathering result. Downstream steps in the production process will profit considerably from the added value which results from such an ideal defeathering combination.

The plucker is made entirely from stainless steel, and its design allows no dead corners. The ability to move the cabinet with its plucker banks fully outwards makes for optimum accessibility for maintenance and cleaning.

Fine adjustment of the cabinets and plucker banks makes it possible to adjust the plucker to various different products. Each plucker configuration is modular and can flexibly be extended to match an expanding plant capacity. Multiple pluckers can be set up, having different functions such as attack plucking, plucking/finishing and washing/finishing.

Head puller

The head puller removes the head from the bird automatically. The head puller is installed after the plucker.

Evisceration

In processing plants handling 500 up to 1,000 bph, birds can be eviscerated by hand. A range of hand tools is available for this.

Tools for manual evisceration

A	Killing knife	Application of bleeding cut
B	Neck skin slitter	Application of a longitudinal neck skin slit in order to facilitate removal of crops, gullet and windpipe
C	Butcher's irons	Knife sharpening
D	Opening scissors	Cutting open abdominal cavity after insertion of ball point in vent in order to avoid damage to the large intestine
E	Vent knife	Pre-opening of product, cutting loose of vent and bursa fabricius
F	Eviscerating fork	Easy removal of intestines from abdominal cavity
G	Bent gizzard trimmer	Separation of intestines from gizzard and opening of gizzard
H	Neck shears	Breaking and separation of necks
I	Lung raker	Removal of the lungs
J	Leg scissors	Cutting off legs, including tendons

Vent gun

The vent gun is the first piece of equipment in the evisceration line. It allows you to remove vent and bursa fabricius simply, quickly, and effectively in a semi-automatic process, after which an opening cut can be made using scissors.

The centering pin is pushed into the vent, which is pulled taut with a vacuum. The vacuum also ensures that the intestines are sucked clean, which reduces the risk of contamination.

A rotating blade then cuts round the vent and pulls it and a part of the intestine out of the bird, without, however, breaking the intestine. The blade stops rotating, and the vacuum is cut off. The vent with the end of the intestine remains hanging over the back of the bird. Finally, both blade and centering pin are cleaned automatically.

The complete installation consists of:

- Vent gun including spring suspension, hoses and blade
- Vacuum pump including pipework
- Collection tank/pressure vessel

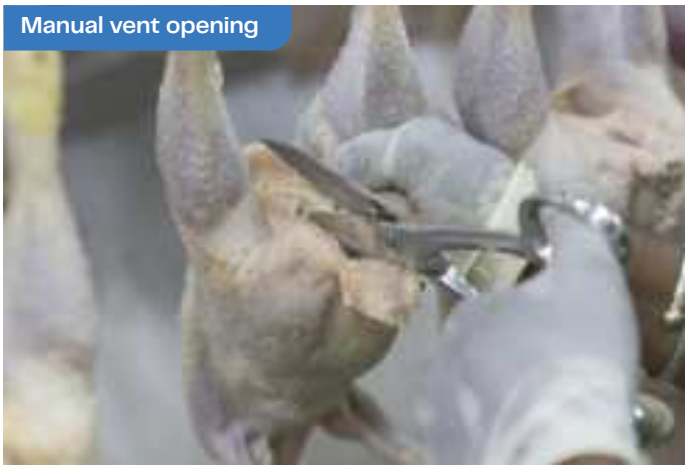
Lung gun

The lung gun is one of the last pieces of equipment in the evisceration department. It is used to remove the lungs (also ovaries or other debris) from poultry not processed in automated lines. A vacuum pump ensures that lungs are removed in their entirety, producing a product that is internally clean. This benefits shelf life.

The complete lung gun installation consists of:

- Lung gun including spring suspension and hoses
- Vacuum pump including pipework
- Collection tank/pressure vessel


Vent cutting with vent gun


Manual vent opening


Manual heart harvesting

Carcass washer
The outside of the product is cleaned with water using sprays, allowing the skin to be cooled at the same time.

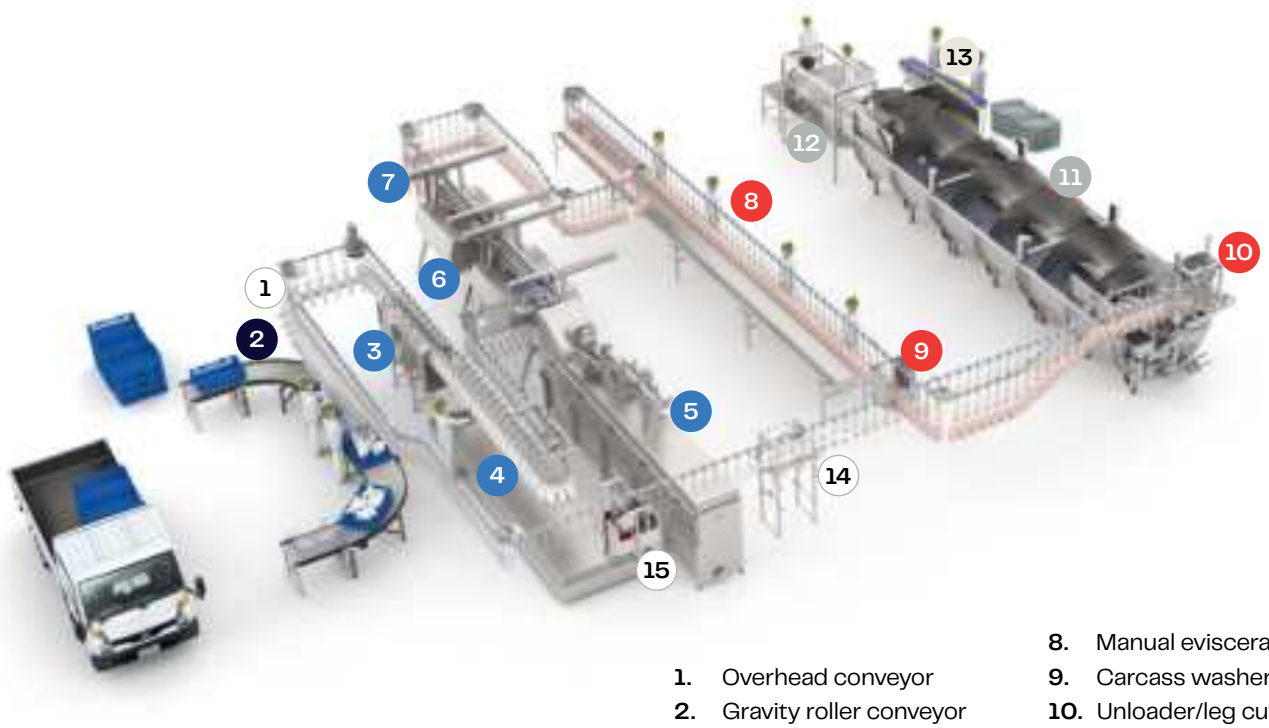
Unloader/leg cutter
The leg cutter is installed at the end of the killing and defeathering/evisceration line. The unloader consists of a leg cutter with a rotating blade. The leg cutter cuts legs through the tarsal joint allowing the bird to be unloaded into a receiving bin.

The machine is equipped with a corrector, which compensates for differences in leg length. It is possible to switch the machine out of line, allowing birds to pass by whose legs do not have to be cut off.

Chilling

Counterflow screw chiller
The screw chiller is used to chill birds by immersing them in chilled water. This guarantees a longer shelf life.

The rotating movement of a screw transports birds through the water in the screw chiller, while the water itself flows in the opposite direction. Thanks to this counterflow principle, birds move into ever-cleaner water before being unloaded from the screw chiller at the end of the process.



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- Packaging

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7. Head puller
8. Manual evisceration
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10. Unloader/leg cutter
11. Counterflow screw chiller
12. Drip drum
13. Compact Grader
14. Feet unloader
15. Shackle washer

Poultry processing plants handling 1,000 – 2,000 bph

As more products are being processed, each individual operation reaches the point where automation is necessary to keep the process manageable and create high value products and high yields.

Killing and defeathering

The live bird supply department and the killing and defeathering departments of processing plants with capacities of 1,000 bph can be easily adapted to 2,000 bph.

Plucker
A single plucker is suitable for capacities between 500 and 1,000 bph and can be expanded for processing higher capacities by installing a second plucker behind the first one. Of course, it's also possible to install a double capacity plucking configuration right from the start.

Evisceration

In the evisceration department the capacity can be expanded by adding an additional vent gun or immediately switching to a Vent Opening Cutter machine (VOC-8). It is also possible to add a second long gun.

Chilling

Counterflow screw chiller
The counter flow screw chiller can be expanded to double capacity, by installing a second chiller behind the first one.

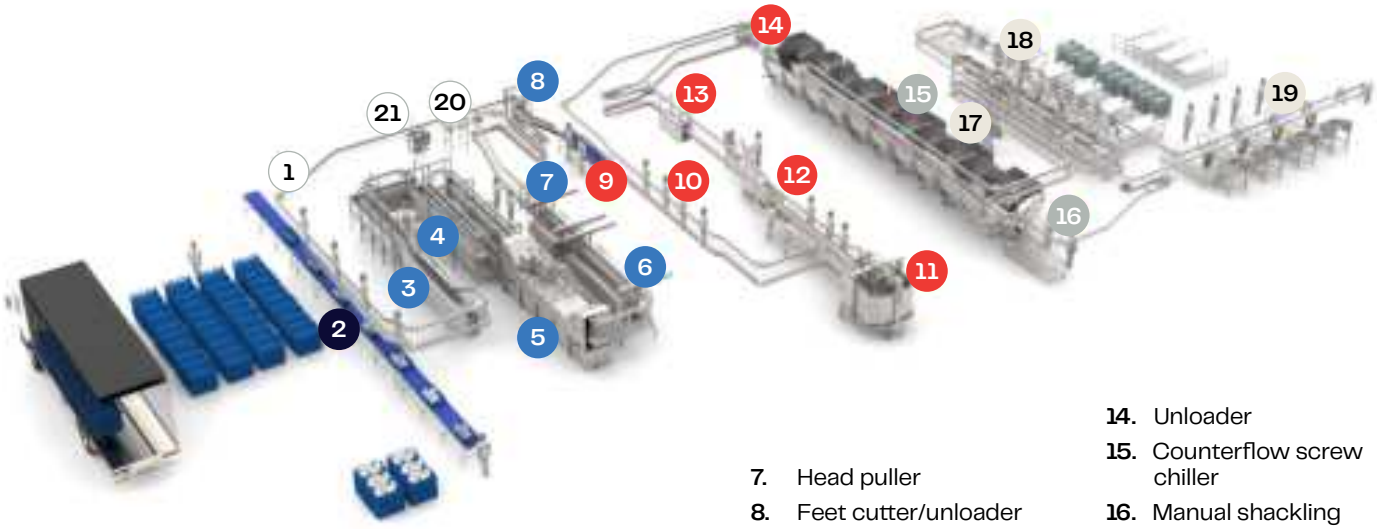
Drip drum
This is a rotating drum, where free water is separated from birds after they leave the screw chiller. A drip drum is an efficient way of speeding up the drying process and improving production continuity.

Grading

Compact Grader
The highly economical JBT Marel Compact Grader is part of a line of low-cost advanced processing equipment that offers essential high-tech characteristics.

Suitable for simple grading and batching of a wide variety of products, the grader is designed to fulfill the needs of small and medium-sized companies. The grader is also an ideal addon for larger companies requiring a machine that can handle temporary or seasonal overflow needs that do not justify the expense of a full-size grader.

The Compact Grader grades product pieces into different weight ranges. As the pieces move along the grader, the system's sturdy arms quickly swivel out and gently pull each individual piece into the correct chute for its weight. The Compact Grader is available for various capacities.



- Supply
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1. Overhead conveyor
2. Crate conveyor belt
3. Stunner
4. Bleed trough
5. Scalder
6. Plucker
7. Head puller
8. Feet cutter/unloader
9. Manual shackling
10. Manual vent cutting and opening
11. Nuova CoreTech eviscerator
12. Manual/automated giblet harvesting
13. Carcass washer
14. Unloader
15. Counterflow screw chiller
16. Manual shackling
17. Weighing station
18. Unloading per weight and whole product bagging
19. Unloading per weight and portion cutting
20. Feet unloader
21. Shackle washer

Poultry processing plants handling 2,000+ bph

As capacities grow, automation has to grow along. JBT Marel will support and advise you in adding the appropriate modules, replacing equipment or rearranging the plant lay-out. Together with you, we'll figure out the best solutions, perfectly tailored to your individual circumstances and your market requirements. In plants with capacities of more than 2,000 bph, the live bird supply, killing and defeathering departments can be similar to those used in 1,000–2,000 bph plants.

Evisceration

Realizing the same high value yield when processing more than 2,000 bph requires further automation in the evisceration department.

VOC-8

The manually operated vent guns and opening knives can be replaced by the Vent Opening Cutter machine (VOC-8). This is a carrousel machine, which is a combined automatic vent cutter and opening machine with eight units that can be extended to double the number of units. A vent blade removes the vent and bursa fabricius and hangs these over the back of the bird. An opening cut is then made to allow removal of the viscera pack.

Nuova CoreTech eviscerator

Nuova CoreTech is ideally suitable for automating evisceration from capacities of 2,000 bph upwards. The eviscerator is installed after the VOC machine and is driven by the overhead conveyor.

The viscera pack is removed from the bird in a single movement and hung over its back. The clearly visible viscera pack with access on all sides allows for easy inspection. Nuova CoreTech is a carousel machine with ten units, to which another ten units can be added to process double the number of birds per hour.

If you want to harvest giblets manually or automatically in a highly efficient and hygienic way, a separate viscera pack line can be added to the Nuova CoreTech eviscerator.

After evisceration the viscera pack is separated from the bird and re-hung to a special viscera pack shackle in a separate line. Due to this separation the viscera pack cannot contaminate the bird. This also opens the way for easy hygienic manual harvesting and even automatic giblet harvesting. The viscera pack line and the line with eviscerated birds run synchronized to the veterinary inspection station.

Chilling

The chilling department is similar to the one used for capacities between 1,000 and 2,000 bph and has to be extended for higher capacities.

Weighing station
An easy-to-use weighing station can determine weight classes for the downstream drop station. Whole products are released per weight class in one of the collecting bins.

Cut-up

Products which aren't selected for whole bird packing can be released from the line to another series of collecting bins, destined for cut-up.

Using one or more cone tables, operators can perform their manual cutting in an ergonomic setting. On a product carrying cone, the carcass gives easy access to the operator to make all conceivable cuts without damaging other parts. Whole products can be divided into pieces of high quality and high yield. Typical 8-piece or 9-piece fast food cuts can be done here, by cutting wings, keelbone, breast halves, thighs and drumsticks. Eventually, the cut-up department can be extended with a automatic cone line, which conveys products from work station to work station.

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