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Cartoning & Robotic Solutions









Bradman Lake Group

Combining the strengths of these brands, with experience amounting to over 200 years, has made the Bradman Lake Group a world class supplier of stand alone and integrated packaging machinery lines and services. Bradman Lake Group equipment is at work in more than 20,000 installations all supported by a global network of sales and service support.

United States.

From receipt of the enquiry right through design, installation, commissioning and training, customers are guaranteed the commitment, technical expertise, market knowledge and attention to detail that result from our business striving to develop a partnership with our customers.

Our equipment works to the maximum efficiencies possible, which makes your business equally successful and profitable.

INDEX

Process Carton E Top Load Carton C End load

Bradman Lake Group is a privately owned business specialising in the design, development, manufacture and service of packaging machinery to an extensive range of industries globally. The company is composed of three key brands. Each of the brands - Autowrappers, Bradman Lake and Europack, has many years of specialised knowledge with their range of equipment.

Bradman Lake Group has integrated the brands to become a major supplier of packaging technology to the Bakery and Biscuit, Confectionary, Frozen Foods, Dry Foods, Consumer and Healthcare industry sectors.

We have plants in Bristol and Beccles in the United Kingdom and Charlotte, North Carolina in the

Of the four Bradman Lake Group brands, Bradman Lake designs and manufactures an extensive range of stand alone and fully automated cartoning machinery plus flexible robotic solutions. Many years of supplying equipment to the fast moving consumer goods markets has positioned the company as a leading innovator of carton erecting machinery, top and end load cartoning machines and feeding systems along with carton closers and robotic pick and place feeding not only to top load cartoners but Autowrappers flow wrapping machines and into thermo formed trays, containers and cases.

This extensive range of cartoning machines, combined with the robotic solutions on offer make Bradman Lake a major supplier to a comprehensive range of industries across all continents.

ses		Machines	
Frection	2	Carton/Tray Erection	(
d	3	Top Load	
Closer	4	Carton Closer	;
ł	5	System Solutions	
		End Load	10-1
		Feeding Systems	1
		Robotic Solutions	13

PROCESSES Carton Erection

The erection of the empty carton in preparation for the product loading is such a key procees in the overall packaging line efficiency it is crucial that every detail of such an important aspect is considered to the finest detail. Coupled with fast change over Bradman Lake Group has created a range of erectors using a small footprint that goes from erector to top loader and lid closer with simple tooling changes for all types of cartons. The erector can be part of an integral line or a stand alone unit. Whether it's square, round, rectangular, triangular, large or small cartons secured by glue or self locking, Bradman Lake's technology for carton erection offers flexibility for your packaging requirements.



Descending plunger pushing carton blank



Unformed carton placed and conveyed toward forming head in register

2



The erectors can be equipped to produce up to four cartons per machine cycle by the use of multiple plungers and carton magazines, allowing high outputs from a single machine. The flat blanks are fed from the magazine using a feed bar equipped with vacuum cups.



Plunger descends to fold side walls and simultaneously engages locks to erect carton

3

Erected carton to top loader

Dependent on which model of erector is used the carton blanks can be placed directly on top of the forming head or alternatively placed on to a flat bed and shuttled forward into the forming position. The latter method is shown in the drawing, which also shows a carton being erected with four corner locking. Once the carton is in position a plunger descends vertically and pushes the blank down through the forming head. In this part of the process, the four corners of the carton lock together via a tab pushed through a slot in the corner of the carton side flaps. In the case of glued cartons, the glue sets to form a rigid container for product loading. The perfectly formed carton is then fed by conveyor belt to the product loading station.

The process of top loading a carton, tray or flow wrapping machine infeed to produce accurate pack collations at high speed has been developed from experience gained over many years supplying integrated packaging solutions by the Bradman Lake Group. The principle of top loading is not new but the Bradman Lake Group of companies has developed and introduced innovations that give cost effective solutions to hundreds of customers worldwide. The basic principle is simple, the empty container whether it is an erected carton, board tray, PVC tray, U board for multi-packs or just the infeed of the flow wrapping machine follows the same loading process. The individual wrapped product leaves the primary wrapping machine in a controlled manner on a powered flat-belt infeed conveyor. The wrapped products with their narrow edge leading are fed into empty fast-indexing pockets of the racetrack mechanism. When loading a carton the empty cartons are transferred from the erector into a positioning conveyor using side belts that space them to the loading position.

carton lid closer.



At this point the custom designed end-of-arm tooling of the robot picks product from the racetrack, groups the products and loads them in the required collation pattern into the stationary carton. The main infeed conveyor continues to index a supply of product to the robot where the cycle of loading continues. Filled cartons are then automatically released on to a conveyor leading in to a

PROCESSES Тор Load

PROCESSES Carton Closer

The automatic or manually filled carton is presented for closing, normally perfectly formed with the base walls secured and the loaded product seated in it final position.

There are occasions, particularly with naturally variable products such as frozen fish or chicken, where the carton is overfilled and cannot be closed properly. Unlike many machines on the market. Bradman Lake carton closers have a system, which allows it to pass through the machine where it can be removed without stopping the upstream production process.

The filled carton is presented to the closer (see inline carton closer illustration) for the lid and the remaining two side flaps to be closed and sealed with hot melt glue.



The principle of end load cartoning offered by Bradman Lake is one the simplest of any machine supplier in this field. The design allows many types of carton board to product size range.







From top load and 'lid ploughed down' unit

90° Carton

Closer

FCC flexible

carton control

From carton top loader

dowr

alternatively the flaps can be tucked with the option of glue for security. The cartons are driven from the machine by side running outfeed belts where they can be coded.

MACHINES Carton/Tray Erection

servo n carton

AMI servo driven carton erector

> The carton erector is the heart of the packaging line, the equipment must function to maximum efficiency at all times. Any carton which is not formed correctly may have downstream loading and closing problems which affect the

overall lines performance. Bradman Lake have recognised this issue due to many years of supplying erectors and formers, loaders and closing systems to handle an exhausting array of products to all industry sectors. Whatever your requiements Bradman Lake have a tray and carton erector that will meet your packaging requirements. The range of machines is extensive covering simple low cost mechanical machines to high speed servo motion controlled machines. The machines can form various types of board along with solid or corrugated board and secure the container with glue, hot air, or the conventional 4 corner lock system.

The all mechanical 2/60 range of machines follow the basic principle of erecting the flat blank and plunging it through the forming head. The machines have several key features.

- Mechanical agitation of carton magazine or powered unit for consistent carton feeding.
- ◆ CE compliant.
- Multiple forming for up to four cartons at the same time.
- Complete wash down specification machines offered.
- Easily changed carton forming tools.

The AMI Servo range of machines are more suited to continuous high speed production, the features are:

- All movements are through servo motors and linear guides.
- Indirect flat blank feeding.
- Carton control below tooling and plunger.
- Quick change devices for plunger, tooling and magazine.
- Wash down version available.



CARTON/TRAY FORMERS

Machine model	Carton type	Speed cartons/min	Carton size		Forming head
			W x L (flat blank dimension)	H min/H max (height)	
HS2/60 +10	Locking	60	762mm x 1000mm	22mm/165mm	Single
HS2/60 +10	Locking	120	520mm x 1000mm	22mm/165mm	Double
HS2/60 +10	Locking	180	280mm x 1000mm	22mm/165mm	Triple
HS2/60G (Glue Gun)	Gluing	50	762mm x 1000mm	22mm/165mm	Single

AMI FULLY SERVO DRIVEN VERSIONS

Machine model	Carton type	Speed cartons/min	Carton	Forming head	
			W x L (flat blank dimension)	H min/H max (height)	
AMI/S	Locking	80	650mm x 700mm	22mm/110mm	Single
AMI/S	Locking	150	650mm x 500mm	22mm/110mm	Double
AMI/S	Locking	210	650mm x 500mm	22mm/110mm	Triple
AMI/K	Gluing	70	650mm x 700mm	22mm/110mm	Single
AMI/K	Gluing	130	650mm x 500mm	22mm/110mm	Double
AMI/K	Gluing	180	650mm x 500mm	22mm/110mm	Triple

NOTE: Maximum and Minimum sizes shown should be used as guide only and must be confirmed by BL technical department.

We can also offer an alternative hot air sealing system along with an interlocking means of closure for specific carton styles, details which can be supplied on request.

The Bradman Lake range of robotic top load cartoning machines represents a perfect example of our company's progression into new equipment development in response to market demands for replacement of manual product loading with fully automatic systems requiring little or no labour. This range of automatic, integrated, top load cartoning systems is designed to pack products of an awkward shape or large multiple counts which cannot be easily handled on our end load cartoning systems. Such products could be an irregular slice of pizza, an unstable shaped muffin or a collation of 36 wrapped chocolate bars.

Available with multi-axis robots, the LJ series of cartoners will accept products contained in the flow wrap style, bags or unwrapped products. These products are then collated in fast indexing pocketed conveyors and loaded into chipboard cartons, trays or corrugate cases. Models in this range can handle varying speeds of product input speed, up to 400, 650 and 1000 single products per minute depending upon size and shape. Dual infeed versions are also available, designed to accept products from two primary sources.



End of arm tool and race track

There are three models in the LJ range – the SRT (single race track), DRT (dual race track) and TRT (triple race track) for different loading speeds plus dual infeed versions of all three of these variants. Each model is designed for a particular product speed input and carton count.

The combination of a separate lock or glue carton/tray or case formers, the LJ series of top load and carton or case closers creates totally integrated systems incorporating enormous benefits. Systems are modular, capable of different pack collations and a wide range of speeds and floor plan options. Their modularity enables a wide variety Size changeovers can be accomplished in only minutes and require few change parts. These changeovers are consistent with virtually instant repeatability requiring little or no engineer intervention. Strong, lightweight end of arm tooling fitted to the robot is designed for fast and secure interchange to suit different collations and product shapes.

All the LJ series incorporate standard Rockwell Allen Bradley component platforms enabling spares and support to be sourced quickly and inexpensively – using parts and software that are very familiar to maintenance personnel.

TOP LOAD CARTONING MACHINES

Machine model	Products/min	Cartor
LJ-SRT	400	A 102mm B 80mm C 20mm
LJ-DRT	650	A 102mm B 80mm C 20mm
LJ-TRT	1000	A 102mm B 80mm C 20mm



of packaging line configurations to be considered making the best use of available space.

MANNANA

110120-1012

LJ-DRT

top loader

The unique carton management system incorporated into the LJ series makes use of the 'intelligent belt technology' developed in its cartoning machines to create a method of transferring formed cartons, trays or case into the robotic loading station with the precise spacing and consistent speed so vital for high speed product loading. This system is programmed into the software and automatically adjusts to suit different sizes and shapes of carton, tray or case. Selection is automatic from programmed operator touch pad.



MACHINES Carton Closer

The Bradman Lake range of top load three flap carton closing machines are designed to handle all types of board. Whether the carton is made from a thin or heavy gauge chipboard, a corrugated micro flute board finished with a high quality print, the Bradman Lake range of carton closers will produce a perfectly formed, square and mark free carton that is secure and strong for shipping and shelf or freezer display.

The range of carton closers available from Bradman Lake is very extensive; every conceivable type of product can be handled on one of the four models available from Bradman Lake. Speeds of 60cpm up to 250cpm can be closed on one of the four models available from the company. Inline and right angle models are available to user preferences and floor space constraints.

All the machines use the patented 'flexible carton control' (FCC) technology system. This unique FCC system handles cartons that may have the top loaded product higher than the maximum size of the carton and thereby creating a bulging carton. This system has been developed over many years of supplying machines to the bakery and frozen food industry where the finished products can be extremely variable in their dimensions.

Some of the many features of the four machine models.

◆ Speeds of 60 to 250 cartons per minute from the four machine range.

CARTON CLOSERS

cavity glue guns. Long term reliability of high performance Allen Bradley

• Hot-melt glue jetting system with 3 hoses and reduced

◆ Large carton range, easily upgraded to handle

• Quick carton size changeover with adjustable shafts

Three dimensional carton size changes in 10 minutes

• Touch screen display to control of all machine systems.

running 'flexible fingers' automatically spaces and meters

cartons into the machine which eliminates troublesome

• Patented flexible carton control (FCC). Rubber fingers

Individual fingers inexpensive and easy to replace.

Unique servo-powered correction system ensures every

carton turned consistently through 90° before second

closing section, regardless of water, grease, product

Overhead conveyors cantilevered from gas struts.

contamination or shifting contents.

Easy for operators to lift.

on overhead conveyors propel cartons through closing

operations and uniquely control carton flap squareness

fingers flex to minimize jams caused by oversize products.

and digital readouts for accurate repeatability.

Easily upgraded to full wash down specifications.

Variable speed, powered infeed section with side

or less with no change parts.

mechanical timing devices.

bigger sizes.

servo-drives controlled through a Sercos fibre optic network.

NOTE: All maximums may not apply on the same carton. and Million Con-

Triliner carton closer

receiption and may not apply on the banks banks	
Maximum and Minimum sizes shown should be used as guide only	Y
and must be confirmed by BL technical department	

Machine Speed Carton size Туре model cartons/min min max Compact R 60 A 100mm A 350mm Servo B 305mm **Right Angle** transfer B 876mm C 25mm C 120mm Compact 3 Servo 120 A 100mm A 325mm correction B 90mm B 300mm C 150mm C 19mm 120 A 100mm A 325mm Compact 3 Servo RA correction B 876mm B 300mm C 19mm C 120mm Triliner Servo 250 A 100mm A 368mm B 250mm correction B 90mm C 19mm C 165mm





Every application in the packaging industry is experiencing increased system performance requirements to give higher speeds and efficiency, reduce waste in both product and wrapping materials, decrease product change over times which all reduce the ends users operating costs and enhance their profitability. The Bradman Lake Group is fully aware of these criteria and is addressing these key elements to provide a single source for integrated packaging solutions. Packaging performance is enhanced because all system control elements not only reside on the same hardware chassis but also within the same multi tasking control architecture, providing faster communication and data manipulation for motion control. The Bradman Lake Group is partnering with Rockwell Automation through Allen-Bradley, Siemens and ABB for motion and robotic solutions. We can therefore offer an integrated packaging solution to our customer that gives world wide support from our customer service teams and our global partners.



MACHINES End Load







Erected carton with product prior to major flap closing

Machine model	Туре	Speed carton max per min	Carto min	n size max	Feed system
SL 50 with End Flap Sealer	Operator erected carton	60	A 40mm B 20mm C 140mm	A 254mm B 110mm C 305mm	Manual carton erector and product loading
SL 80	Semi-automatic reciprocating feeder	80	A 50mm B 19mm C 140mm D 19mm	A 245mm B 76mm C 305mm D 40mm	Manual product loading
SL 902	Automatic 2 head rotary	135	A 50mm B 19mm C 135mm D 19mm	A 254mm B 76mm C 305mm D 40mm	Manual or auto
SL 903	Automatic 3 head rotary	200	A 50mm B 19mm C 135mm D 19mm	A 254mm B 100mm C 304mm D 40mm	Manual or auto
SL 904	Automatic 3 head rotary	270	A 76mm B 19mm C 116mm D 19mm	A 200mm B 115mm C 305mm D 40mm	Manual or auto
SL 906	Automatic 4 head rotary	350	A 76mm B 19mm C 116mm D 19mm	A 254mm B 115mm C 300mm D 40mm	Manual or auto
SL 6000	Automatic 2 head rotary	120	A 50mm B 19mm C 114mm D 19mm	A 305mm B 100mm C 330mm D 40mm	Manual or auto



There is a Bradman Lake cartoner for every application. Whether intermittent or continuous motion, stand alone or fully automatic, Bradman Lake cartoners operate with a wide range of sizes and output speeds. All are designed with the maintenance engineer and operator in mind providing repeatability of operation, user-friendly interface, quick and tool free size change where possible, modular construction and easy access for maintenance. The design of all Bradman Lakes SL series of end load cartoning machines is the natural evolution of years of experience in supplying machines for every type of carton shape and handling all types of products. The machines are designed to operate over a large size range, with easy, fast and reproducible size changeover. The SL series of machines can handle many lower-grade carton materials and is available with a variety of product infeed systems for total automation from the flowrapping machine input to

case packer or shrink wrapping machine all supplied by the Bradman Lake Group.

The SL range of machines is extensive, from the simple SL 50 low cost operator erected carton and manual product loading up to the SL 906 fully automatic high speed machine running at 350cpm. There is a machine to suit every application low speed, hand fed or automatic and high speed all with the same level of detail in the high quality of construction.

The range of machines from the small footprint SL 50 thorough the range to the mid speed SL 904 and top end model SL 906 have an array of features that are fitted as standard or many optional to meet your requirement.

Some of the key features.

- Carton erection has to work perfectly every cycle of the machines life. The range of units for the machine range is extensive with a semi automatic reciprocating feeder to multi head 2, 3 and 4 arms.
- Low level gravity and motorised carton feed magazine.
- Easy change over infeed chain buckets for different product widths (dimension A).
- Servo motion drives on all the main components of the machine for model SL 904, carton feed, flap tuckers, loader, flight chains, product infeed and transfer conveyors.
- ♦ GMP and CE compliant.
- Leaflets insertion units.
- Automatic feeding systems including robotic product loading.
- Allen Bradley control platform.





MACHINES

End

Load

END LOAD CARTONING MACHINE

NOTE: All maximums may not apply on the same carton. Maximum speeds vary subject to the carton size and the infeed pitch.

END LOAD Feeding **Systems**

cartone

High volume production lines demand systems that are able to accept products from the manufacturing process and deliver them to the cartoning machine without manual intervention. Any irregularities in the product flow must be accommodated by the system.

Bradman Lake has many years experience in the handling of products and has developed a range of feeding systems which suit a wide variety of applications and complement the range of top and end load machines offered. Whether the product is a solid chocolate or delicate cereal bar to a large bag of milk powder or breakfast cereal to a flow wrapped collation of tea bags, Bradman Lake has a solution suitable for most applications where a cartoning machine is involved.

Just a few of the most widely used feeding systems.

Servo Driven Right Angle Timed Infeed

Product arrives narrow edge leading and at 90° to the infeed. The principle of operation is the same as the below unit in terms of loading in to the end load machine. An overhead unit actions the change in direction.



target pocket

(Servo gear follows

infeed pocket)

Cascade Loading System

This unit is usually linked to a VFFS machine. Typical product would be bags of breakfast cereal, pet food or milk powder. An inclined conveyor feeds the bags to the cascade loader; a fail safe device prevents two bags being fed in to one pocket of the infeed mechanism. The 3 stage cascade unit synchronises the bag in to the pocketed flights of the end load machine.



End Load Collator/Loader

Product is conveyed from the primary wrapping machine in a single lane, narrow edge leading to an infeed belt of the loader. The product is driven in to a pocket of a waiting twin racetrack, which will index on demand. When the racetrack has been filled, it moves to an unload position, whilst the second set of pockets on the racetrack continue to receive product. When the filled racetrack is in the unload position an overhead pusher transfers the product in to a 'pocketed positioner' which lifts and separates the required collations to the pitch of the end load cartoner. A second servo driven pusher transfers products in to the

First product

group indexed



Twin racetrack



Robotic working range can cover a complete circular area having 1130mm in diameter (ø) and 250mm depth 800mm x 800mm 500mm x 1000mm

TECHNICAL DATA

Machine model	Capacity kg	No axis	Environment	Position reproduction
IRB 340	1	4	Standard (IP55)	0.1mm
IRB 340SA	1	4	Wash down (IP67)	0.1mm
IRB 340SAS	1	4	Stainless Wash down (IP67)	0.1mm
IRB 340/2	2	4	Standard (IP55)	0.1mm
IRB 340SA/2	2	4	Wash down (IP67)	0.1mm
IRB 340SAS/2	2	4	Stainless Wash down (IP67)	0.1mm

Bradman Lake is an innovator of flexible automation using parallel axis robotics technology. The company not only offers top load cartoning solutions using the proven robot picking of products from a racetrack mechanism but we supply the ever increasing demand for pick and place feeding from a random source using vision based technology.

Robots can replace manual feeding by humans in many applications. Automation using robots provide a strong case for use in the food industry where incidences of receptive strain injury and lost time in production are key factors for companies moving to use robot technology. Robots have become simpler to use, cost significantly less and the technology has evolved for use in a broad range of industries.

The increasing demand for user operational plant flexibility without sacrificing performance has given the Bradman Lake Group significant opportunity in the core industry sectors



With our global partner ABB we have developed equipment that detects an object using vision technology which enables the robot to track fast moving conveyor belts with high speed and accuracy. Using the IRB 340 FlexPicker[™] from ABB, this robot is the latest Delta style robot with 4-axis robot kinematics. The IRB 340 range can operate at speeds of 150 picks/minute (depending on object weight) and can come as a standard painted unit or a wash down version for the frozen food industry. As the robot's key motors and gear drives are fitted in the body of the robot the mass of the moving arm is limited to a minimum weight which enables accelerations of 10q. Although the robot picks the product, the individual item must be recognised first. This is achieved using single or multiple cameras along with highly scaleable PC application software and appropriate controller to steer the robot.

- maintenance.
- Highest standards of hygiene with fully enclosed motors; therefore the robots are washable.
- Industry proven control system. • None of the joints or drive mechanisms requires lubrication.

in which it operates. The group's end and top load cartoning machine range, flow wrapping machines and case packers interfaces seamlessly with the new robot technology that we can offer our world wide customers.

The complete Bradman Lake/ABB system robotic vision package can be integrated in to end and top load cartoning machines, flowrapping and case packing machine range as a stand alone units or part of a system.

- Compact design for 3-shift operation and low
 - Robot drives have no moving wires resulting in longer life, easier maintenance, higher speeds and accelerations.
 - The robot upper and forearms as well as end-effectors are made of high performance plastics and aluminium and have been optimized for low weight, high strength and long life.

Product presented from cooler for robot picking and placing into flow wrapping machine infeed or empty case.

MACHINES Robotic Solutions