



Vibratory Tables/Packers Automated Vibrating Weigh Systems

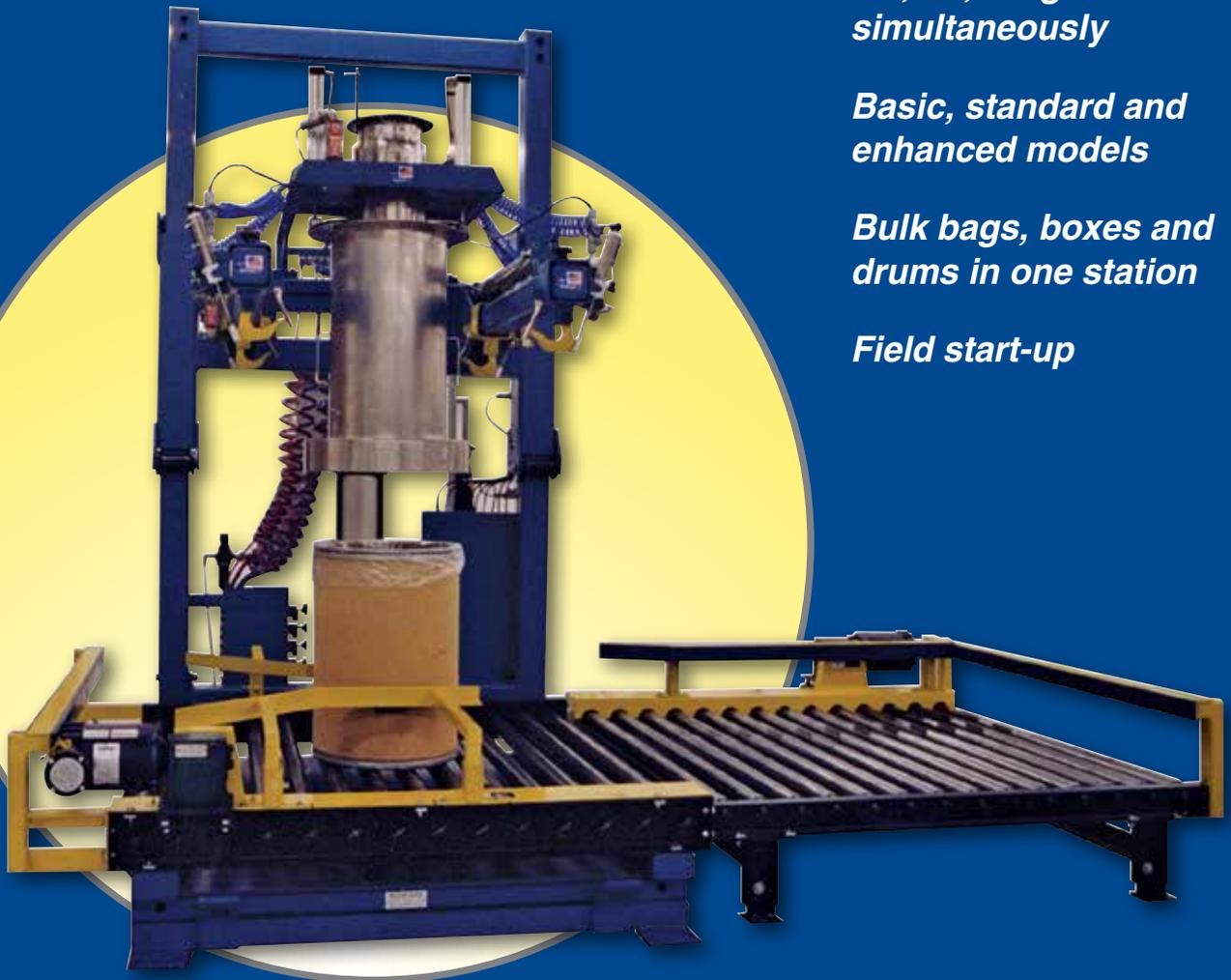
*Robust design built to last
a lifetime*

*Fill, lift, weigh and densify
simultaneously*

*Basic, standard and
enhanced models*

*Bulk bags, boxes and
drums in one station*

Field start-up



RENOLD

Superior Technology

www.renold.com

Renold AJAX Vibratory Tables/Packers

Our expertise in the vibratory packaging industry allows us to confidently build a functional piece of equipment the first time that will last a lifetime.

Renold AJAX vibratory tables/packers provide effective and economical compacting of bulk materials during packaging.

Compacting is extremely important to the efficient packaging of bulk materials. Renold's vibratory tables/packers provide the proper vibration, eliminating voids and increasing the density of the materials being packaged. **THE RESULT IS MORE MATERIAL IN LESS SPACE.**

Renold led the way in utilizing a packer with our packaging systems to get 20%-50% more material in the container while weighing during the vibration cycle. This design has become a standard in the industry which many of our competitors have duplicated.

The Benefits Of Proper Bulk Materials Compaction:

- Reduced warehouse space for storage
- Reduced freight costs
- Fewer containers required
- Fewer containers to handle
- Reduced container damage because there are no voids in the packaging to collapse during stacking

Applications

Renold utilizes three types of vibrators in its tables/packers to meet the requirements of a wide spectrum of applications:

- Foundry mold shakeout
- Foundry sand compaction
- Container compaction
- Bulk bag compaction and shakeout
- Food packaging
- Chemical and resin compaction
- Plastic and metal parts compaction
- Explosive material compaction
- Waste products compaction
- Fatigue testing
- Batch weighing and vibrating
- Refractory and concrete de-aeration
- Belt conveyance settling
- Bag and box filling

Renold Decks

Renold provides both flat deck and grid deck designs. Flat decks must be manually loaded, while grid decks are normally installed between in-line roller conveyors for automated production.



Drive Arrangements

We recommend that whenever possible the vibratory drive be below the table deck. Outboard above-deck drives are installed when the deck must fit a low profile configuration. In such installations, two vibrators are used to produce even compaction patterns.

TYPES OF VIBRATORS		
	OPERATING RANGES	
	Force	Frequency
Air Piston	250 lbs @	3500 VPM
	4,000 lbs @	1000 VPM
AJAX Shaker	587 lbs @	1300 RPM
	11,336 lbs @	900 RPM
Rotary Electric*	220-17,600 lbs @	3600 RPM
	660-48,400 lbs @	1800 RPM
	1,320-81,400 lbs @	1200 RPM

The Dynamics of Vibration

Vibration is created by applying an alternating force to an isolated mass. The two critical factors when determining the proper vibration for a given application are amplitude and frequency. Amplitude is the distance through which the mass is moved from one extreme to another. Frequency is the number of times that the mass is moved during a given period of time, usually measured as revolutions per minute (RPM). Renold Engineers take these factors- along with the applied G-Level with which the mass is moved- into account when recommending the table/packer

specifications for a given application. All materials react differently under vibration. The chart below offers general guidelines for compacting various materials.

Why Materials Compact Differently

- Process of handling changes
- Particle size
- Moisture content
- Number of pieces of equipment used in the process
- Variation in types of containers

Type Industry	Product (general)	Density (ppcf)	Recommended Frequency/G-Level		
			Optimum	Acceptable	Not Recommended
Foods Feeds Chemicals	Croutons	1-15	1200/2.5	1800/2.5	900/3600
	Powders/Resins	20-60	900/2.0	1200/2.0	1800/3600
	Pellets/Feed Plastic	35-50	900/2.0 1200/2.0	1800/2.0	3600
	Powders/Lime	60-90	1200/2.5 1800/2.0	900/2.0 3600/2.0	————
	Powders/Metal	100-200	3600/2.0	1800/2.0	900/1200
Foundry Refractory	Sand (air set)	100	3600/1.0	1800/2.0	900/1200
	Sand (green)	80-100	1800/1.5	3600/1.0	900/1200
	Mixes	90-110	1800/2.5 3600/2.0	1200/2.5	900
Industrial	Hard Goods (misc parts) Stampings	50-150	900/1.5	1800/1.5	3600
			1200/1.5		

Vibration Isolation

Renold provides three methods for isolating the vibratory forces induced into the deck structure from the base structure:

Coil Springs are economical and are generally used for high temperatures. They do not provide uniform isolation and are noisy.

Rubber Mounts provide good response to vibration but can only be used where temperatures are less than 130° F. They are subject to attack by industrial chemicals.

Air Mounts are generally more expensive but provide optimum isolation characteristics and quiet running. Heavier loads can be supported by regulator adjustment.

Installation

If the deck level is too high, pit installation may be required to achieve a low profile design. Drives for pit installation should be mounted above deck and outboard.

To avoid excessive pressure drop in supply lines, the control panels for the pneumatic vibrators must be installed as close to the table as possible.

Cable lengths for electric vibrators should be kept to a minimum to avoid line voltage drop. Proper overload protection should also be provided for each motor.

Renold can provide noise absorbing, abrasion resistant, rubber lining on deck surfaces to avoid metal to metal contact with containers. This should be considered when G-Levels exceed 1.5. The installation of container restraints is recommended when single air, electric or outboard mounted drives are used. This will prevent the container from walking off the deck due to non-symmetrical loading/ vibration, particularly when empty; and protect the exposed top-mounted vibrator(s).

Design

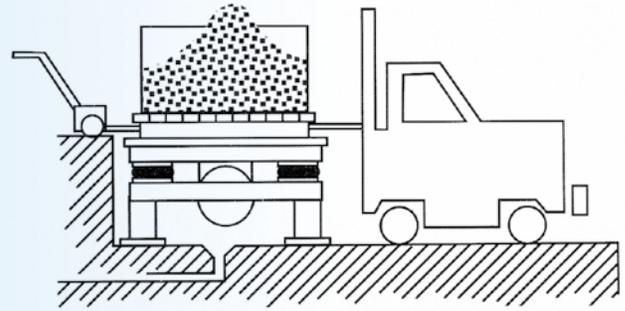
All Renold products are custom built and designed to suit your application. Our equipment is based upon standard parameters utilized in the industry. However, we go one step further and tailor the equipment to operate the way you want it to. Our design is derived from data submitted to us, or data collected testing your product.

Types of Compacting Tables and Packers

Model FD

Flat Deck Table

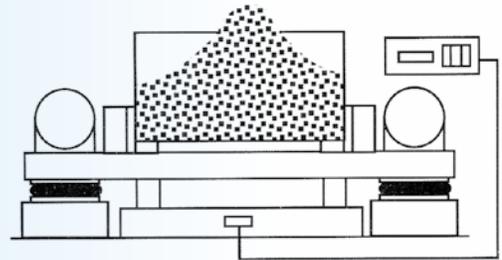
Can be located in a pit for ease in loading manually or by forklift above ground. Isolation of vibration is accomplished by heavy duty air mounts. Pits should be designed with drains.



Model FD-O

Flat Deck-Outboard Drives

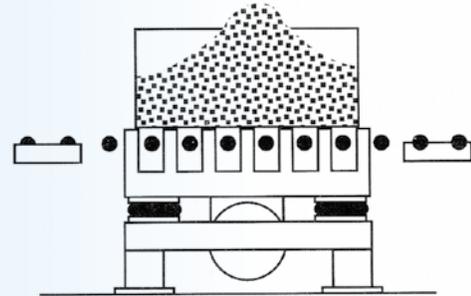
Offer a lower profile design which can straddle scales or fit into existing process systems. Two drives produce the necessary rectilinear motion to compact the material.



Model GD

Grid Deck Table

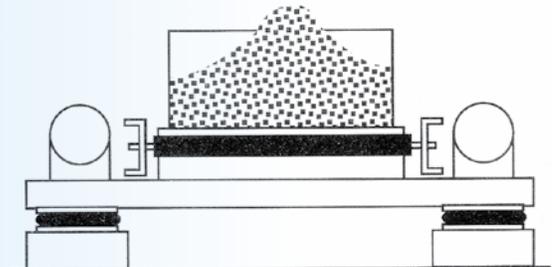
Used where high production of packing is required. Straddles all types of existing conveyor systems. Air mounts are used for lifting, lowering and isolation of vibration.



Model GD-O

Grid Deck-Outboard Drives

Offers the ability to fit into conveyor systems near the floor. Conveniently located vibrators are easy to maintain. Eccentric forces can be adjusted quickly.

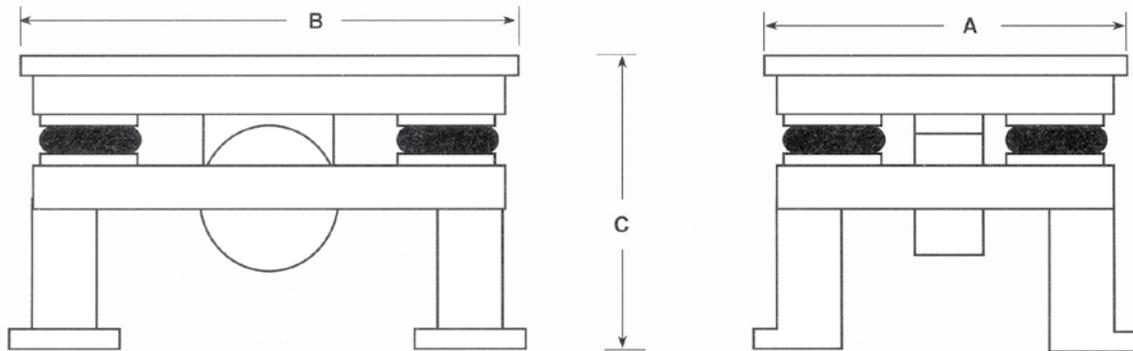


Model FD & FD-O Flat Deck and Flat Deck-Outboard

Powered by air, dual rotary electric or electromechanical vibration

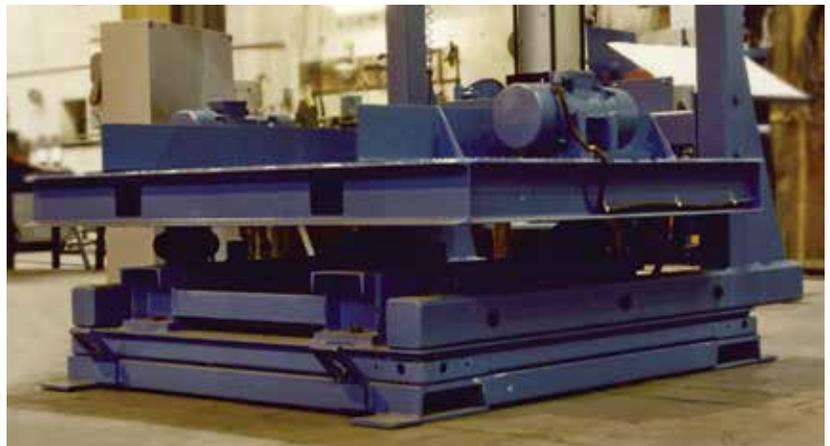
- Isolation by heavy duty air mounts circuited to one common inlet
- Outboard designs offer lower profile heights

- Applications: Compacting all types of bulk materials in cartons, bins, bags, drums or molds
- Fatigue testing



Model Type	Normal Load (lbs.)	A (in.)	B (in.)	C		Approximate Shipping Weights	
				Std. Height (in.)	Min. Height (in.)	FD (lbs.)	FD-O (lbs.)
FD-1	500	24	24	24	13	324	425
FD-2	500	24	30	24	13	375	450
FD-3	1,000	24	36	24	15	450	450
FD-4	1,000	24	48	24	15	500	650
FD-5	2,000	30	30	24	17	550	650
FD-6	2,000	30	36	24	17	650	750
FD-7	2,000	30	48	24	18	750	900
FD-8	3,000	36	36	24	19	725	900
FD-9	3,000	36	48	24	19	1,125	1,300
FD-10	4,000	48	48	24	23	1,200	1,375
FD-11	4,000	48	60	30	24	1,225	1,550
FD-12	5,000	60	60	30	24	1,350	1,750

- Vibrators are selected for optimum frequency response of the material
- G-Levels determined for maximum density
- Sample of materials can be analyzed to determine proper selection



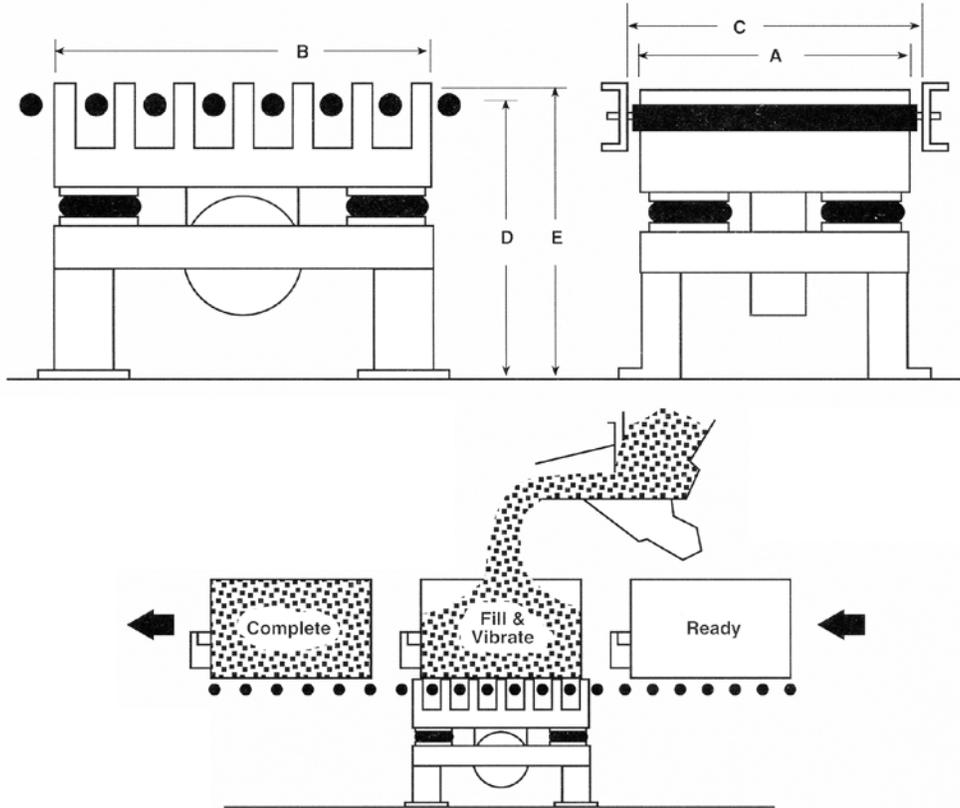
Flat deck units are designed and built to meet customer specifications

Model GD & GD-O Grid Deck and Grid Deck-Outboard

Powered by air, dual rotary electric or electromechanical vibration

- Designed for in-line roller conveyor usage
- Isolation and lifting by heavy duty air mounts circuited to one common inlet

- Outboard designs offer lower profile heights
- Applications: Compacting bulk containers, storage vessels, foundry sand shakeout, mold and core densification

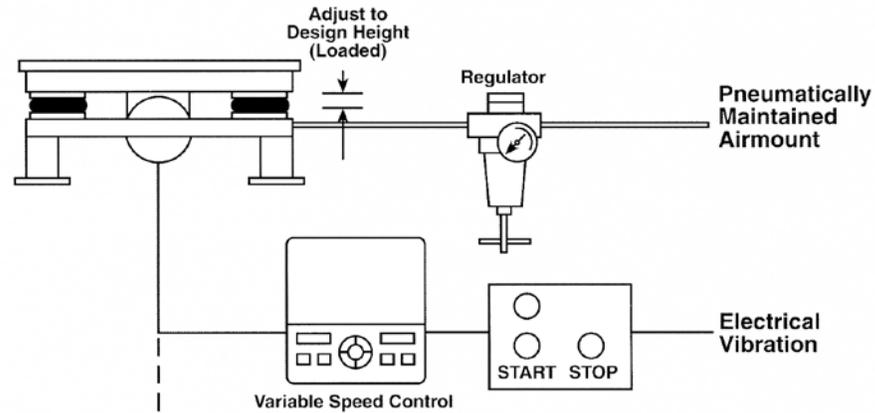


Gravity rollers require manual operation. Power rollers allow for automatic cycling, feeding and indexing. Complete systems are available.

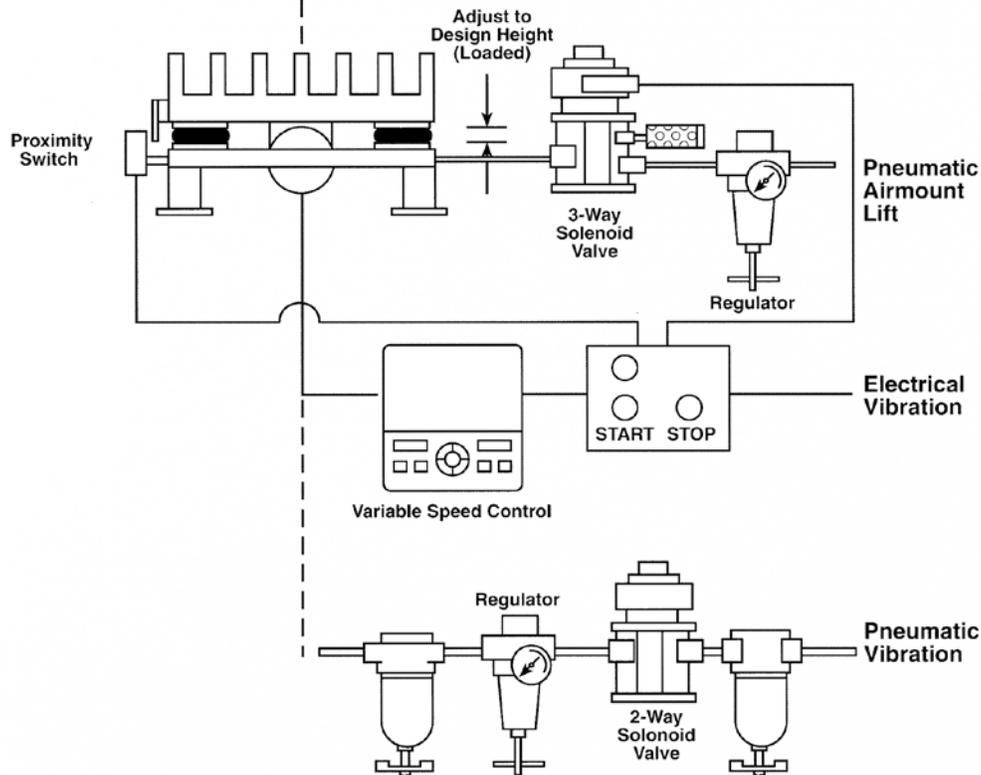
Model Type	Normal Load (lbs.)	A (in.)	B (in.)	C (in.)	D (in.)	E (in.)	Approximate Shipping Weights (lbs.)
GD-1	500	23	26	25	19-1/4	20-3/4	550
GD-2	500	23	38	25	19-1/4	20-3/4	600
GD-3	1,000	23	50	25	20-1/4	21-3/4	725
GD-4	1,000	29	38	31	20-1/4	21-3/4	750
GD-5	1,500	29	50	31	21-1/2	23	850
GD-6	1,500	29	62	31	21-1/2	24-3/4	950
GD-7	1,500	35	38	37	23-1/4	24-3/4	800
GD-8	2,000	35	50	37	24-1/4	25-3/4	950
GD-9	2,000	35	62	37	24-1/4	25-3/4	1,400
GD-10	2,000	41	50	43	24-1/4	25-3/4	1,500
GD-11	3,000	47	50	49	26-1/2	28	1,650
GD-12	3,000	47	62	49	26-1/2	28	1,750

Types of Controls

Model FD



Model GD



Model FD/FD-O

- Regulated air pressure ensures proper air mount pressure during operation
- Electric single or dual magnetic starter with optional variable speed control
- Pneumatic FLR and solenoid valve for piston type vibrator operation

Model GD/GD-O

- Proximity switch ensures grid is up before vibrators can start
- Regulated air pressure ensures proper air mount pressure to raise grid deck
- Electric single or dual magnetic starter with optional variable speed control
- Pneumatic FLR and solenoid valve for piston type vibrator operation

Weigh Systems Custom designed to last a lifetime

Renold AJAX units are custom designed to meet individual plant or process needs. We build our equipment from the sturdiest structural steel and plate. Our vibration systems are designed to achieve maximum densification in minimal time. We supply vibrators specifically sized for your product. Our expertise in the vibratory industry allows us to confidently build a functional piece of equipment the first time that will last a lifetime.

Renold offers the flat deck design for manual loading and unloading of the pallet and bag, or the grid deck and roller conveyor design for automated indexing and take away. Renold supplies systems complete with a variety of individual components needed for the bulk packaging process, such as pallet dispensers, roller conveyor systems, printers and label applicators.

A Step Ahead

The unique thing about Renold units is they are always weighing. The entire unit rests on load cells, insuring there are no inaccuracies in weight due to incidental contact with a non-weighed surface. We have eliminated the need for a pre-weigh hopper device to achieve filling requirements. This allows you the ability to go straight from the process to the container. Our vibration isolation and weigh system design has the distinct ability to weigh, vibrate, fill and lift or drop the bag without weighing inaccuracies.

Renold systems are built with maintenance in mind. Our airmount access holes, above mounted vibrators (optional), cut away loadcell access, easily accessible pneumatic controls, lines and devices, generously sized J-boxes, proximity and reed switches make our units maintenance friendly.

Automation

Renold offers a full range of automation interface options:

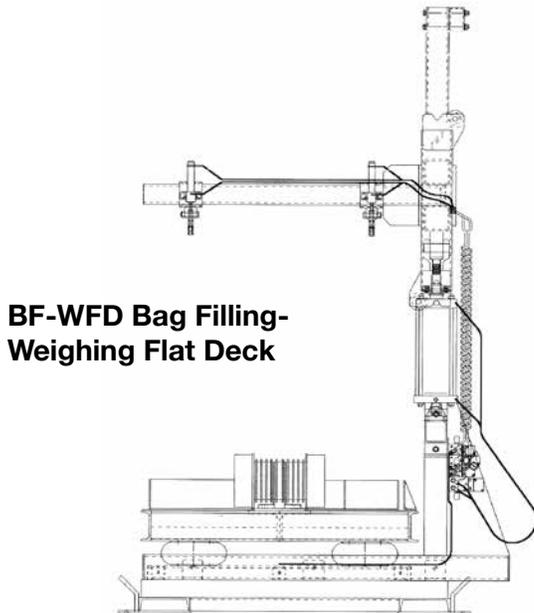
- All hardware and software will meet any plant needs
- We will supply your system complete with software and hardware or we will write all control logic and allow you to house it in your PLC and communicate with us via remote I/O
- We work with your engineers to custom design a control sequence that meets your needs
- We can use a variety of custom designed weigh systems

Tables

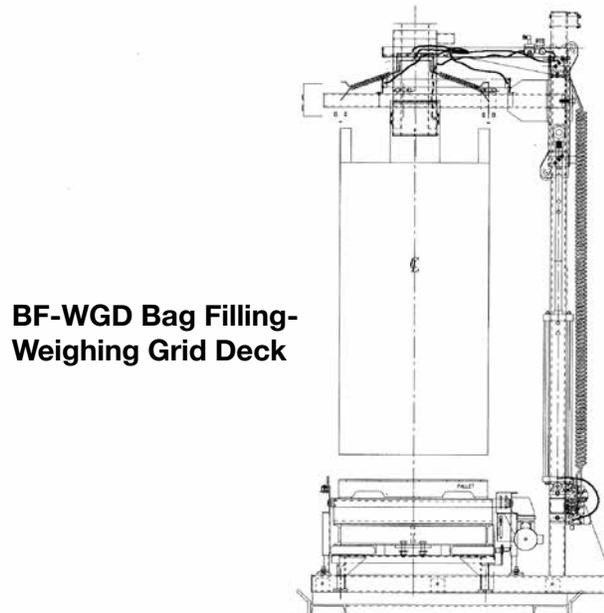
- Heavy duty construction
- Isolated by Firestone airmounts
- Custom design to suit height requirements

Bag Frames

- Robust structural tubing and plate design
- Lift cylinder with varying strokes and down positions to accommodate multiple bag sizes – this allows the guaranteed lifting of any bulk bag
- Automatic retracting bag hanging hooks – capable of releasing under full load
- Laterally adjustable bag hanging arms
- Four point rubber roller design with needle bearings for good rollability
- Rear to front hooks



BF-WFD Bag Filling-Weighing Flat Deck



BF-WGD Bag Filling-Weighing Grid Deck

Model BF-WFD-O

Automated Vibratory bag/box filling & weighing systems

Renold's fully automated bag or box filling systems are designed for quick installation and immediate use. All hardware is fully interfaced. The only requirement is main power and factory air to the operators control panel. The PLC is capable of interfacing with existing MHS supervisory networks.



- Increase productivity
- Single operator
- Automatic sequencing
- Guaranteed straight bag walls
- 20%-50% more material in container
- Requires less warehouse space

Weigh Systems

Custom designed to last a lifetime

All Renold products are custom built and designed to suit your application. Our equipment is based upon standard parameters, but we go one step further to tailor the equipment to operate it the way you want it to.

Standard System



- Bag inflation blower
- Dust collection
- Custom rubber guide wheels with roller bearings
- Single no-lube bag lifting cylinder
- Weigh indicator & custom control panel
- Automatic release bag hanger hooks that move front to rear for hanging
- Dual rotary electric vibrators
- Heavy duty structural leveling base used for total system leveling

Model BF-WGD-O Automated Vibratory bag/box/bin filling & weighing systems

Renold's fully automated weigh and fill stations are designed to integrate with your total material handling process. The Renold system handles boxes, bins, bags and drums. Containers are automatically indexed to the fill station, filled, weighed and data recorded for proper labeling, all perfectly coordinated with PLC system communication.

Bins



- Increase productivity
- Single operator
- Automatic sequencing
- More material per container
- Requires less warehouse space
- Fewer containers to ship
- Reduces container damage
- Designed to fit existing processes
- Provides greater system reliability
- Interfaces with existing MHS supervisory network

Boxes



Bags



Bag/Box Automated Filling System Enhanced version

Vibratory feeder enhances target accuracies (fast/dribble)

Dual collection port, complete with isolation/butterfly valve

Main control panel houses all starters and brakes, PLC and weighing instrument hardware. Variety of PLCs available. Thumbwheel feature allows operator to choose product menu target weights (panel functions based upon system design/sequence of operation).

Operators remote push button station for cuff inflation, bag inflation and other automatic functions

Work platform

Surge hopper

Bag inflation blower assembly, complete with isolation/butterfly valve

Telescoping fill spout, retracts while filling (fixed spouts available)

Powered indexing roller conveyors; incoming, station, and outgoing

Low profile outboard vibratory grid deck

Scale platform with load cell summing box, secured to a heavy duty leveling platform

Options not shown:

- Automatic bag release pins
- Bag lifting cylinder with guided roller frame
- Label printer/or print and apply features
- Pallet dispenser
- Palletizer

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