MAGNUM SYSTEMS

Gravity Net Weigh Scale

Model GN

Operation and Maintenance Manual

2205 Jothi Avenue
Parsons, Kansas 67357-8460

Toll Free: 888.882.9567
Phone: 620.421.5550
Fax: 620.421.5531

Web: www.magnumsystems.com

Machine Serial Number: _____

Sales Order Number: _____

Important Information

Conventions

Safety Alert Symbols

The ⚠ symbol indicates that important personal safety information follows. Carefully read this text for the warnings information it contains. The signal word next to each safety alert symbol is defined as:

	***WARNING***	*Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury.*
	**CAUTION**	Indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury, or damage to the equipment. This single word may also be used to identify unsafe practices.
	**LOCKOUT**	This symbol will be used anytime that a procedure requires an electrical lockout.

Static Sensitive Symbols for Equipment Handling Instructions

The  and  symbols indicate important handling guidelines for proper handling of electronic equipment modules and sensitive components for the prevention of potential damage that could be caused by ESD (electrostatic discharge) during routine maintenance, handling and transportation.

	**ESD NOTICE**	To protect against ESD damage to electronic equipment, follow the Standard ESD Prevention Procedures. Failure to use protective measures could result in permanent equipment damage, either immediate or latent, when handling modules.
	**ESD NOTICE**	To protect against ESD damage to electronic equipment containing components, follow the Standard ESD Prevention Procedures. Failure to use recommended protective measures could result in permanent equipment damage, either immediate or latent, when handling components.

Standard Electro-static Discharge (ESD) Prevention Procedures
The GN Series Electronic Small Packer utilizes many electronic components that are susceptible to damage from Electro Static Discharge. Anytime electronic components are serviced, the following precautions should be followed:

1. Wear a commercial grounding wrist strap.
2. Remove power from the machine.
3. Leave all static sensitive components in their protective packaging until it is time to install the component
4. Always hold static sensitive components by their metal mounting tabs, and/or by their edges

Important/Notable Information
While all of the information in this manual is important, there are some pieces of information where special attention needs to be paid to avoid equipment damage, or specific information needs to be emphasized. This information will be handled as follows:

> ***Important:*** *Indicates an operating procedure, practice, or condition that, if not strictly followed, may cause equipment damage.*
>
> ***Note:*** *Indicates additional information or emphasizes a topic related to the subject being discussed.*

Personal Safety Instructions
Only qualified personnel should work on or around this equipment. To ensure the highest degree of personal safety, all who use this equipment are required to become thoroughly familiar with all safety instructions contained in this document. Successful and safe operation of this equipment depends upon proper handling, operation, maintenance, and application of associated equipment. Refer to Appendix A of this manual for all safety instructions. Safety instructions are also provided where they apply within the body of this manual.

WARNING

No information in this manual supersedes or replaces your employer's operating rules. If there is a difference in instructions between this manual and the employer's operating rules, follow the most restrictive instruction.

Deliberate misuse or abuse of electronic components may cause personal injury or death.

Warranty Information
Seller warrants that the Products will operate substantially in conformance with Seller's published specifications, when subjected to normal, proper and intended usage by properly trained personnel, for a period of one (1) year from the date of shipment to Buyer (the "Warranty Period"). Seller agrees during the Warranty Period, provided it is promptly notified in writing upon the discovery of any defect and further provided that all costs of returning the defective Products to Seller are pre-paid by Buyer, to repair or replace, at Seller's option, defective Products so as to cause the same to operate in substantial conformance with said specifications. Replacement parts may be new or refurbished, at the election of Seller. All replaced parts shall become the property of Seller. Replacement Parts will be billed at list price, unless they are approved as warranty replacement item(s) by the service technician and the technical services manager.

Lamps, fuses, bulbs and other expendable items are expressly excluded from the warranty. Seller's sole liability with respect to equipment, materials, parts or software furnished to Seller by third party suppliers shall be limited to the assignment by Seller to Buyer of any such third party supplier's warranty, to the extent the same is assignable. In no event shall Seller have any obligation to make repairs, replacements or corrections required, in whole or in part, as the result of (i) normal wear and tear, (ii) accident, disaster or event of force majeure, (iii) misuse, fault or negligence of or by Buyer, (iv) use of the Products in a manner for which they were not designed, (v) causes external to the Products such as, but not limited to, power failure or electrical power surges, (vi) improper storage of the Products or (vii) use of the Products in combination with equipment or software not supplied by Seller. If Seller determines that Products for which Buyer has requested warranty services are not covered by the warranty hereunder, Buyer shall pay or reimburse Seller for all costs of investigating and responding to such request at Seller's then prevailing time and materials rates. If Seller provides repair services or replacement parts that are not covered by the warranty, the Buyer shall pay Seller therefore at Seller's then prevailing time and materials rates. ANY INSTALLATION, MAINTENANCE, REPAIR, SERVICE, RELOCATION OR ALTERATION TO OR OF, OR OTHER TAMPERING WITH, THE PRODUCTS PERFORMED BY ANY PERSON OR ENTITY OTHER THAN SELLER WITHOUT SELLER'S PRIOR WRITTEN APPROVAL, OR ANY USE OF REPLACEMENT PARTS NOT SUPPLIED BY SELLER, SHALL IMMEDIATELY VOID AND CANCEL ALL WARRANTIES WITH RESPECT TO THE AFFECTED PRODUCTS.

Field Service
Magnum Systems can provide field service for start-up assistance, training, maintenance, and replacement/spare parts for new and existing equipment. Contact Magnum Systems at (888) 882-9567.

This Page Intentionally Left Blank

GN Series
Table of Contents

Chapter **Page**

1 Product Description 1-1
1.1 General Description 1-1
1.2 Introduction 1-1
1.3 Manual Scope 1-1
1.4 Electrical Requirements 1-1
1.5 Pneumatic Requirements 1-1
1.5.1 Lubrication Requirements 1-1
1.6 Major Systems and Components 1-2
1.6.1 GN Series Cabinet Assembly 1-2
1.6.2 Flow Gates 1-2
1.6.3 Flow Gate Cylinders 1-3
1.6.4 Bag Clamps 1-3
1.6.4.1 Standard V-Type Bag Clamps 1-3
1.6.4.2 Optional Inflatable Bladder Bag Clamp 1-4
1.6.5 Weigh Bucket Assembly 1-5
1.6.5.1 Dump Gates 1-5
1.6.5.2 Dump Gate Cylinders 1-6
1.6.6 Bag Clamp Actuator Switch 1-6
1.6.7 Bag In Place Switch 1-6
1.6.8 Load Cells 1-7
1.6.9 MAC Valves 1-7
1.6.10 Machine Controls 1-8
1.6.10.1 Standard T4000 Control Box 1-8
1.6.10.2 Standard Electronic Control Components 1-9
1.6.10.3 Optional T3000 Operator Control Box 1-11
1.7.10.4 Optional T3000 Electronic Control Components 1-12

2 Receiving Equipment 2-1
2.1 General Description 2-1
2.2 Uncrating the Equipment 2-1

3 Setup/Installation 3-1
3.1 General Description 3-1
3.2 Mechanical Setup 3-1
3.2.1 Mounting the GN Series 3-1
3.2.2 Determining The Height Of The GN Series Feeder System 3-1
3.2.3 Determining Hopper Size 3-1

3.2.4 Remove the Shipping Bracket 3-1
3.3 Making Electrical Connections 3-2
3.4 Making Pneumatic Connections 3-2
3.4.1 Pneumatic Component Lubrication Requirements 3-2
3.5 Making Network Connections – T3000 3-3
3.6 Establishing Security Settings 3-3
3.6.1 Establishing T4000 Security Settings 3-3
3.6.2 T3000 Security Settings 3-6
3.7 Dry Cycle 3-7
3.8 Calibration 3-8
3.8.1 T4000 Control Panel Pre-Calibration Mechanical Checks 3-8
3.8.2 T4000 Control Panel Calibration 3-9
3.8.3 Optional T3000 Control Set 3-12
3.9 Timer and Counter Programming 3-14
4 Operation 4-1
4.1 General Description 4-1
4.2 General Fill Cycle Information 4-1
4.2.1 Basic Fill Process 4-2
4.2.2 Typical Fill Cycle 4-2
4.2.2.1 Filling the Weigh Bucket 4-2
4.2.2.2 Putting a Bag on the Bag Spout 4-3
4.2.2.3 Filling the Bag 4-3
4.3 Operational Controls 4-4
4.3.1 Bulk Gate Adjustment 4-4
4.3.2 Electrical Controls 4-5
4.3.2.1 T4000 Control Panel 4-5
4.3.2.1.1 Entering Numbers Using the T4000 Control Panel 4-6
4.3.2.2 T3000 Control Panel 4-8
4.3.3 Allen-Bradley MicroLogix™ 1000 4-9
4.3.4 PV300 Control Panel 4-9
4.3.4.1 PV300 Menus 4-10
4.4 Initial Setup 4-11
4.4.1 Setting Up a GN Series with T4000 Controls 4-11
4.4.2 Setting Up a GN Series With T3000 Controls to Fill 4-13
4.4.2.1 Using the T3000 to Set Up A Product From Scratch 4-14
4.5 Starting the Unit 4-15
5 Preventive Maintenance 5-1
5.1 General Description 5-1
5.2 Daily Maintenance Procedures 5-1
5.2.1 Cleaning 5-1

5.2.2 Check Calibration 5-1
5.2.3 Drain Water From the FRL 5-1
5.3 Weekly Maintenance 5-2
5.4 Monthly Maintenance 5-2
6 Troubleshooting 6-1
6.1 General Description 6-1
6.2 The Troubleshooting Process 6-1
6.3 Trouble Symptoms 6-1
6.3.1 Scale is Not Accurate 6-1
6.3.2 Scale Does Not Return to Zero 6-2
6.3.3 The Main Gate and/or Dribble Gate Does Not Open 6-2
6.3.4 Weighments are Erratic 6-2
6.3.5 Machine Fails To Start After The STOP Button Is Pulled Out 6-2
6.3.6 Bag Clamp Won't Apply 6-3
6.3.7 Bag Clamp Won't Release 6-3
6.3.8 Bag Clamp Applies, But Doesn't Stay Applied 6-3
6.3.9 Load Cell Fails Frequently 6-3
6.3.10 Fill speeds are too slow 6-3
6.4 System Alarms 6-4
6.4.1 T4000 Alarms 6-4
6.4.2 T3000 Alarms 6-5
6.4.2.1 Fill Alarms 6-5
6.4.2.2 Jog Alarms 6-5
6.4.2.3 Filler Discharge Alarms 6-5
7 Repair and Adjustment 7-1
7.1 General Description 7-1
7.2 System Adjustments 7-1
7.2.1 Air Pressure Adjustments 7-1
7.2.2 Pneumatic Flow Control Adjustments for Flow and Dump Gates 7-2
7.2.3 Adjusting Bag Clamp Cylinder Actuation Speed 7-2
7.3 System Repairs 7-3
7.3.1 Load Cell Replacement 7-3
7.3.1.1 Load Cell Removal 7-3
7.3.1.2 Load Cell Installation 7-4
7.3.2 Dump Gate Cylinder Replacement 7-4
7.3.2.1 Dump Gate Cylinder Removal 7-4
7.3.2.2 Dump Gate Cylinder Installation 7-5
7.3.3 Dump Gate Replacement 7-6
7.3.3.1 Dump Gate Removal 7-6
7.3.3.2 Dump Gate Installation 7-6

7.3.4 Dribble Gate Cylinder Replacement 7-7
7.3.4.1 Dribble Gate Cylinder Removal 7-7
7.3.4.2 Dribble Gate Cylinder Installation 7-7
7.3.5 Dribble Gate Replacement 7-8
7.3.5.1 Dribble Gate Removal 7-8
7.3.5.2 Dribble Gate Installation 7-8
7.3.6 Dribble Gate Pivot Bearing Replacement 7-8
7.3.6.1 Dribble Gate Bearing Removal 7-8
7.3.6.2 Dribble Gate Bearing Installation 7-9
7.3.7 Main Gate Cylinder Replacement 7-9
7.3.7.1 Main Gate Cylinder Removal 7-9
7.3.7.2 Main Gate Cylinder Installation 7-10
7.3.8 Main Gate Replacement 7-11
7.3.8.1 Main Gate Removal 7-11
7.3.8.2 Main Gate Installation 7-11
7.3.9 Main Gate Pivot Bearing Replacement 7-11
7.3.9.1 Main Gate Bearing Removal 7-11
7.3.9.2 Main Gate Bearing Installation 7-12
7.3.10 Bag Clamp Pad (V-Type Bag Clamp) Replacement 7-13
7.3.10.1 Bag Clamp Pad (V-Type Bag Clamp) Removal 7-13
7.3.10.2 Bag Clamp Pad (V-Type Bag Clamp) Installation 7-13
7.3.11 Bag Clamp (V-Type Bag Clamp) Cylinder Replacement 7-13
7.3.11.1 Bag Clamp Cylinder (V-Type Bag Clamp) Removal 7-13
7.3.11.2 Bag Clamp Cylinder (V-Type Bag Clamp) Installation 7-14
7.3.12 Bag Clamp Pad Arm (V-Type Bag Clamp) Replacement 7-14
7.3.12.1 Bag Clamp Pad Arm (V-Type Bag Clamp) Removal 7-14
7.3.12.2 Bag Clamp Pad Arm (V-Type Bag Clamp) Installation 7-15
7.3.13 Bag Clamp Jaw Replacement 7-15
7.3.13.1 Bag Clamp Jaw Removal 7-15
7.3.13.2 Bag Clamp Jaw Installation 7-15
7.3.14 Bag Clamp Jaw Bearing Replacement 7-16
7.3.14.2 Bag Clamp Jaw Bearing Installation 7-17
7.3.15 Spout (V-Type Bag Clamp) Replacement 7-17
7.3.15.1 Spout (V-Type Bag Clamp) Removal 7-17
7.3.15.2 Spout (V-Type Bag Clamp) Installation 7-18
7.3.16 Inflatable Bladder Replacement 7-18
7.3.16.1 Inflatable Bladder Removal 7-18
7.3.16.2 Inflatable Bladder Installation 7-20
7.3.17 MAC Valve Replacement 7-21
7.3.17.1 MAC Valve Removal 7-21
7.3.17.2 MAC Valve Installation 7-22
7.3.18 Bag Clamp Actuator Switch Replacement 7-23
7.3.18.1 Bag Clamp Actuator Switch Removal 7-23
7.3.18.2 Bag Clamp Actuator Switch Installation 7-23

7.3.19 Bag In Place Switch Replacement 7-24
7.3.19.1 Bag In Place Switch Removal 7-24
7.3.19.2 Bag In Place Switch Installation 7-24
7.3.20 Pneumatic Quick-Connect Fitting Replacement 7-25
7.3.20.1 Pneumatic Quick-Connect Fitting Removal 7-25
7.3.20.2 Pneumatic Quick-Connect Fitting Installation 7-25
7.3.21 T3000 Interface Card Replacement 7-26
7.3.21.1 T3000 Interface Card Removal 7-26
7.3.21.2 T3000 Interface Card Installation 7-26
7.3.22 Hardy Summing Board Replacement 7-26
7.3.22.1 Hardy Summing Board Removal 7-26
7.3.22.2 Hardy Summing Board Installation 7-27
Glossary Glossary-1
Index Index-1
Appendix A Safety Procedures, Cautions, Warnings, and Notices A-1
Appendix B Spare Parts B-1
Appendix C Mechanical Drawings C-1
Appendix D Electrical Drawings D-1
Appendix E T3000 Control Panel User Guide E-1
Appendix F Custom Features F-1

This Page Intentionally Left Blank

List of Figures

Figure **Page**

Figure 1-1. Flow Gates 1-2
Figure 1-2. Bag Clamp and Cylinder 1-3
Figure 1-3. Optional Inflatable Bladder Spout 1-4
Figure 1-4. Weigh Bucket 1-5
Figure 1-5. Dump Gates (Closed) 1-5
Figure 1-6. Dump Gates (Open) 1-6
Figure 1-7. Bag Clamp Actuator and Bag In Place Switches 1-6
Figure 1-8. Load Cell (1 of 2 shown) 1-7
Figure 1-9. MAC Valve Arrangement 1-7
Figure 1-10. Control Box with T4000 Control Panel 1-9
Figure 1-11. Control Box with T4000 Control Panel - Internal Components 1-10
Figure 1-12. T3000 Control Panel 1-12
Figure 1-13. Optional T3000 Electronic Control Components 1-13
Figure 2-1. Typical Shell Crate 2-1
Figure 3-1. Shipping Bracket 3-1
Figure 3-2. Lubricator – Oil Flow Control 3-2
Figure 3-3. Placing The Cursor In Front Of Security 3-3
Figure 3-4. Placing The Cursor In Front Of Set Password 3-4
Figure 3-5. Set Password Menu 3-4
Figure 3-6. Password Set To 123 3-4
Figure 3-7. Verify Password 3-5
Figure 3-8. SECUR Menu Item Shown Above Function Key 3-5
Figure 3-9. Parameter Shown Locked 3-6
Figure 3-10. Load Passing Through Load Cell 3-8
Figure 3-11. Placing the Cursor In Front Of Calibration 3-9
Figure 3-12. Placing The Cursor In Front Of Trad Cal 3-10
Figure 3-13. Placing The Cursor In Front Of Zero Value 3-10
Figure 3-14. Span Value Displayed 3-11
Figure 3-15. Calibration Line 3-12
Figure 3-16. Selecting TRAD Calibration 3-13
Figure 3-17. Checking Zero Value 3-13
Figure 3-18. Setting Span Value 3-13
Figure 3-19. Programmable Logic Controller (PLC) 3-14
Figure 4-1. Fill Rates 4-1
Figure 4-2. Bulk Gate Adjuster 4-4
Figure 4-3. T4000 Faceplate Layout 4-5
Figure 4-4. Control Box Layout with T4000 Control Panel 4-6
Figure 4-5. Cursor Positioned Below Digit On Right 4-6
Figure 4-6. Operator Has Pressed The Up Arrow Causing Digit On Right To Increase To 4 4-7
Figure 4-7. Operator Has Pressed The Left Arrow Moving Cursor Over 1 Position 4-7
Figure 4-8. Operator Has Pressed The Down Arrow Causing Center Digit Decrease To 1 4-7
Figure 4-9. T3000 Faceplate Layout 4-8

Figure 4-10. Control Box with T3000 Control Panel 4-8
Figure 4-11. Programmable Logic Controller (PLC) 4-9
Figure 4-12. Allen-Bradley PV300 Control Panel 4-9
Figure 4-13. POWER Switch 4-11
Figure 4-14. Setting the Dribble Weight (SP2) 4-12
Figure 4-15. SP1 Adjustment Screen 4-12
Figure 4-16. Setting the Target Weight (SP2) 4-12
Figure 4-17. SP2 Adjustment Screen 4-12
Figure 5-1. Filter/Regulator/Lubricator Assembly – Drain Valve 5-2
Figure 7-1. Air Pressure Regulator Adjustment Knob 7-1
Figure 7-2. Adjusting Airflow to the Flow and Dump Gates 7-2
Figure 7-3. Bag Clamp Cylinder Air Flow Adjusters 7-2
Figure 7-4. Load Cell (1 of 2 shown) 7-3
Figure 7-5. Dump Gate Cylinders 7-5
Figure 7-6. Dump Gate Components 7-6
Figure 7-7. Dribble and Bulk Flow Gates and Cylinders 7-7
Figure 7-8. Dribble Gate Bearings 7-8
Figure 7-9. Cylinder To Flow Gate Connection 7-10
Figure 7-10. Main Gate Exploded View 7-12
Figure 7-11. Bag Clamp Pad Mounting 7-13
Figure 7-12. Bag Clamp Cylinder (1 of 2 shown) 7-14
Figure 7-13. Bag Clamp Pad Arm 7-15
Figure 7-14. Main Gate Bearings 7-16
Figure 7-15. Spout Mounting Bolts 7-17
Figure 7-16. Section View of Open Mouth Bag Spout and Inflatable Bladder 7-18
Figure 7-17. Inflatable Bladder Compression Ring 7-19
Figure 7-18. Creating the Flap 7-20
Figure 7-19. Pulling the Bladder Up, and Creating the Upper Flap 7-21
Figure 7-20. MAC Valve Solenoid Mounting Screws 7-22
Figure 7-21. MAC Valve (Solenoid Removed) 7-22
Figure 7-22. Bag In Place Switch 7-24
Figure 7-23. Pneumatic Quick-Connect Fitting 7-25

List of Tables

Table **Page**

Table 4-1. PV300 Main Menu 4-10
Table 4-2. PV300 Timer Screen 1 4-10
Table 4-3. PV300 Timer Screen 2 4-10
Table B-1. GN Series Spare Parts List..... B-1
Table C-1. GN Series Mechanical Drawings..... C-1
Table D-1. GN Series Electrical Drawings..... D-1

This Page Intentionally Left Blank

Chapter 1
Product Description

1.1 General Description
This chapter provides a high-level product description of the GN Series.

1.2 Introduction
The Magnum Systems GN Series is an electronic net weigh scale that is capable of filling up to 8 bags per minute. The GN Series is designed to fill packages ranging in weight from 15 to 125 lbs.

The GN Series comes standard with a painted finish, but can be ordered with 304 stainless steel product contact parts.

1.3 Manual Scope
This manual will provide information on installation, operation, preventive maintenance, troubleshooting, and repair of the GN Series.

The appendices include safety information, spare parts list, and mechanical drawings.

1.4 Electrical Requirements
Before connecting the GN Series to the electrical supply, it is vital that the unit be properly grounded. The recommended method is to plug the power cord into an earth grounded receptacle.

The GN Series requires 115 VAC at 60 Hz to operate. The GN Series should be placed within 6 feet of the electrical outlets that it will be connected to.

WARNING *Before installing, adjusting, or servicing any electrical component, be sure to become familiar with the electrical schematics for the machine.*

1.5 Pneumatic Requirements
The GN Series uses approximately 2 CFM (57 liters) @ 80 PSI (.55 MPa) of compressed air. Magnum Systems recommends that the air supply line be equipped with a refrigerated air dryer, or at the very least a water separator.

WARNING *Before installing, adjusting, or servicing any pneumatic component, be sure to become familiar with the pneumatic schematics for the machine.*

1.5.1 Lubrication Requirements
The pneumatic cylinders require lubrication to ensure their proper operation and to extend their useful life. The lubricator should be filled with 10 weight, non-detergent oil. The oil flow control knob, located on top of the lubricator, should be set so that the lubricator is delivering 1 drop of oil for every 30 cycles.

1.6 Major Systems and Components

When working with the GN Series, it is important to understand the major systems and components of the unit. The major components of the system are:

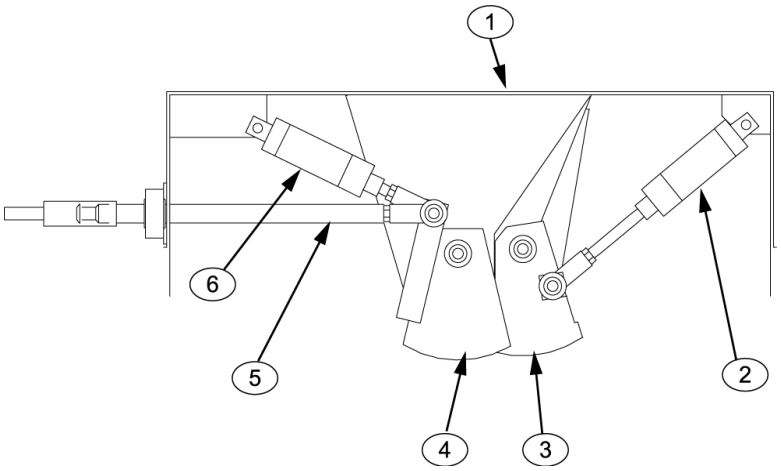
- Cabinet
- Flow gates
- Flow gate cylinders
- Bag clamps
- Bag clamp cylinders
- Weigh bucket
- Bag clamp actuator switch
- Bag in place switch
- Load cells
- MAC valves
- Machine controls

1.6.1 GN Series Cabinet Assembly

The cabinet acts as the backbone of the GN Series. It serves as the mounting point for all other GN Series sub-assemblies. The cabinet consists of four panels that are fastened together with machine screws, lock washers, and nuts.

1.6.2 Flow Gates

The GN Series is equipped with two flow gates, the main gate and the dribble gate. The main gate is used to start and stop the bulk flow of product. The main gate will only be open during the bulk fill portion of the fill cycle. The main gate is the larger of the two gates. The dribble gate is used to start and stop product flowing through the dribble port of the spout. The dribble gate is open during both the bulk and dribble fill portions of the fill cycle.



Item #	Description	Item #	Description
1	Cabinet	4	Main gate
2	Dribble gate cylinder	5	Main gate adjustment
3	Dribble gate	6	Main gate cylinder

Figure 1-1. Flow Gates

1.6.3 Flow Gate Cylinders

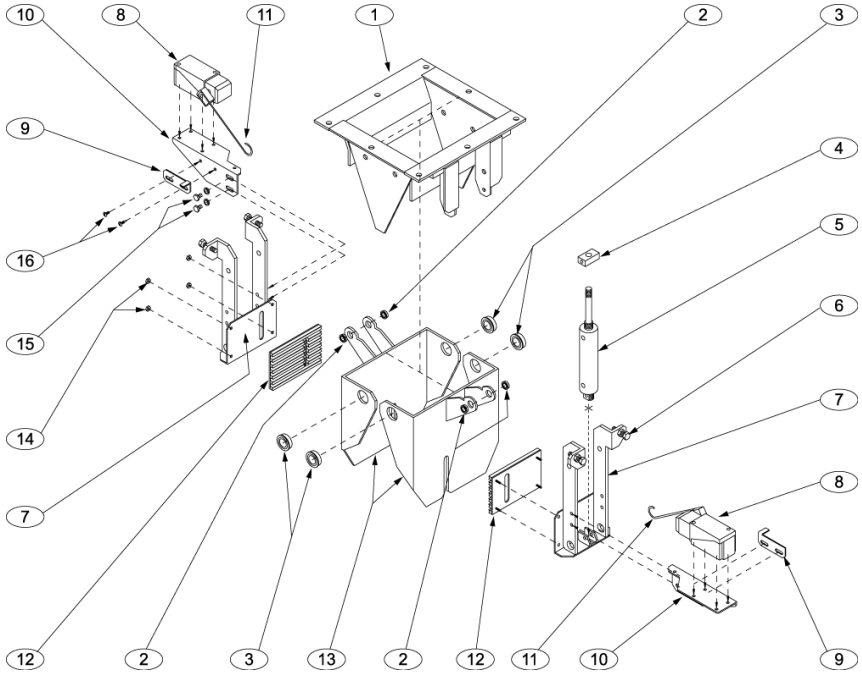
Each flow gate is opened and closed by a pneumatic cylinder. The pneumatic cylinders are mounted to the cabinet assembly, while the cylinder rods are connected to the gates. The main gate cylinder extends to open the main gate, and the cylinder retracts to close the main gate. The dribble gate cylinder extends to close the dribble gate and retracts to open the dribble gate. The GN Series uses MAC valves to control the airflow to the flow gate cylinders. Refer to 1.6.9 MAC Valves, for information regarding the MAC valves.

1.6.4 Bag Clamps

A bag clamp system is used to hold the bag in place for filling. The GN Series comes standard with a V-type bag clamp system, but an optional inflatable bladder bag clamp system is available.

1.6.4.1 Standard V-Type Bag Clamps

V-type bag clamps are applied by a set of pneumatic cylinders. The cylinders extend to force the bag clamp jaws out until they press against a set of rubber bag clamp pads, pinching the bag between the jaw and the bag clamp pad. Each bag clamp jaw pivots on a set of bearings, while each of the bag clamp pads is mounted on a stationary bag clamp pad arm. After the bag is filled, the bag clamp cylinders will retract, forcing the jaws away from the bag clamp pads, dropping the bag from the spout. The bag clamp jaws are designed to be compatible with most automatic bag hangers to allow for a fully automatic system if desired.

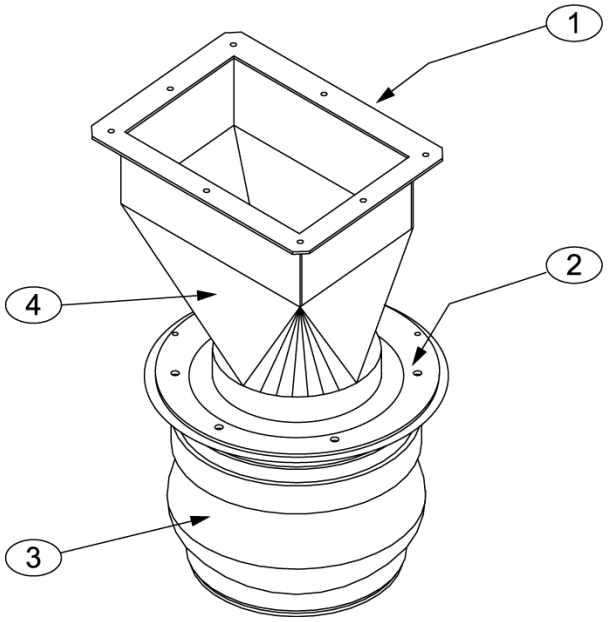


Item #	Description	Item #	Description
1	Spout	9	Bag in place switch mounting tab
2	Bag clamp cylinder pivot block bearing	10	Bag in place switch mounting bracket
3	Bag clamp jaw bearings	11	Bag clamp actuator switch bale
4	Bag clamp cylinder pivot block	12	Bag clamp pad
5	Bag clamp cylinder	13	Bag clamp jaws
6	Bag clamp pad arm adjustment bolt	14	Bag clamp pad mounting nuts
7	Bag clamp pad arm	15	Bag in place switch mounting bracket nuts
8	Bag clamp actuator switches	16	Bag in place switch mounting screws

Figure 1-2. Bag Clamp and Cylinder

1.6.4.2 Optional Inflatable Bladder Bag Clamp

The optional inflatable bladder bag clamp uses a rubber bladder to hold the package in place during the fill cycle. The operator places the package on the spout. Once the bag clamp actuator switch is tripped, compressed air will fill the bladder causing it to expand. The bladder will press outward on the inside of the bag, holding it in place. The air supply line for the inflatable bladder is equipped with a pressure regulator. The regulator should be set so that air pressure in the bladder will not exceed 7 psi (.048 MPa). A blow out switch is used to prevent over inflating the inflatable bladder.



Item #	Description	Item #	Description
1	Transition Mounting Flange	3	Inflatable Bladder
2	Spout Mounting Flange	4	Transition

Figure 1-3. Optional Inflatable Bladder Spout

1.6.5 Weigh Bucket Assembly

The weigh bucket in the GN Series is used to weigh the product before it is put in the bag. The weigh bucket hangs from two load cells. At the bottom of the weigh bucket are a pair of dump gates. When closed, the dump gates close off the bottom of the weigh bucket allowing the weigh bucket to fill with product. Once the cutoff weight has been reached, a pair of pneumatic cylinders is used to open the dump gates to dump the product into the bag.

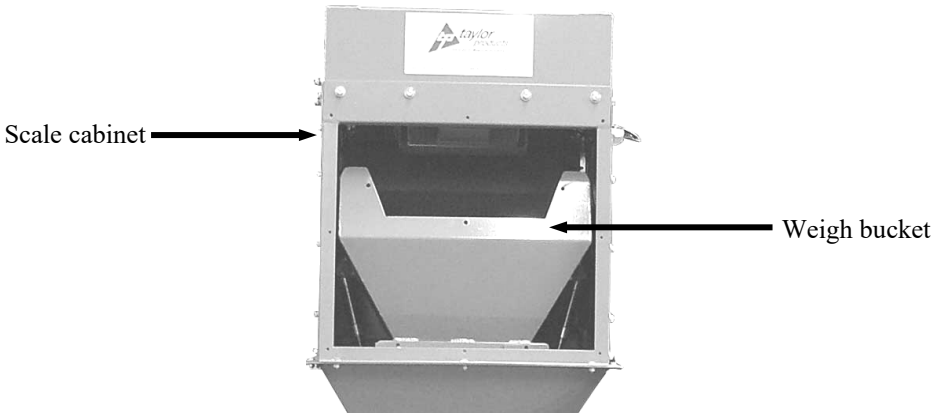
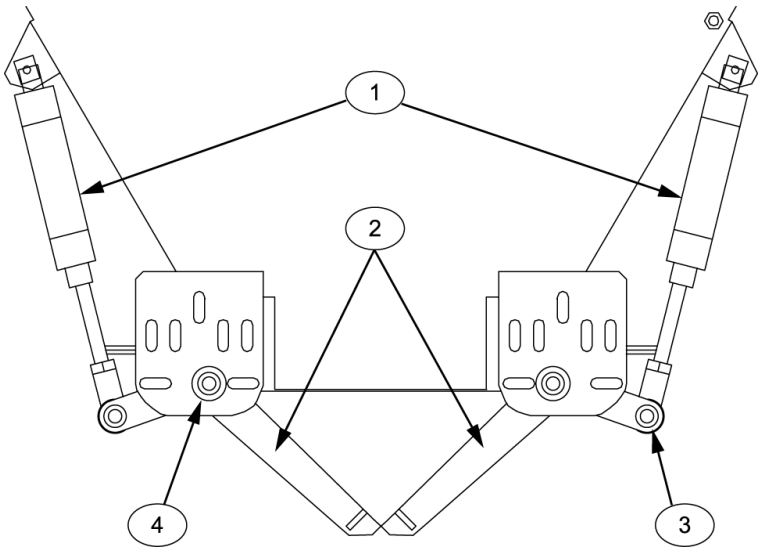


Figure 1-4. Weigh Bucket

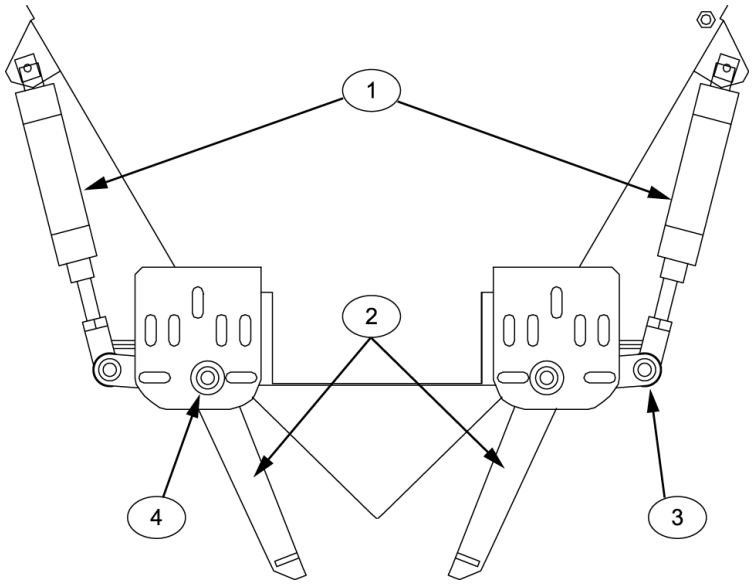
1.6.5.1 Dump Gates

Located at the bottom of the weigh bucket assembly is a pair of dump gates. The product is weighed prior to being placed in the package. Once the weight of the product in the weigh bucket assembly reaches the cutoff point and the product is no longer flowing into the weigh bucket assembly, the dump gate cylinders will retract to open the dump gates. This will allow the product to fall through the spout into the package.



Item #	Description	Item #	Description
1	Dump gate cylinders	3	Dump gate lever (part of item #2)
2	Dump gates	4	Dump gate pivot bearing

Figure 1-5. Dump Gates (Closed)



Item #	Description	Item #	Description
1	Dump gate cylinders	3	Dump gate lever (part of item #2)
2	Dump gates	4	Dump gate pivot bearing

Figure 1-6. Dump Gates (Open)

1.6.5.2 Dump Gate Cylinders

The dump gates are opened and closed using pneumatic cylinders. The two cylinders are controlled by one MAC valve. Each of the air supply lines from the MAC valve has a T-connection so that one output can feed both cylinders. This makes it possible to keep the cylinders in sync with one another.

1.6.6 Bag Clamp Actuator Switch

The GN Series comes equipped with a bag clamp actuator switch. The switch is a rotary type switch. A wire bale is attached to the switch. When the operator places a new bag on the spout, it contacts the bale on the bag clamp actuator switch causing it to rotate the switch to start the fill cycle.

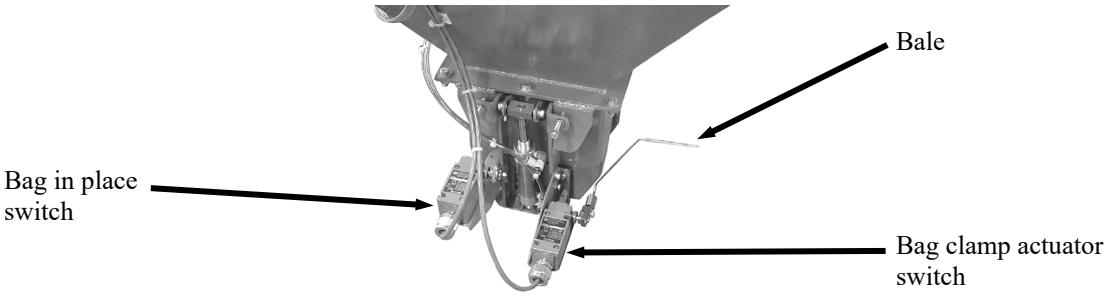


Figure 1-7. Bag Clamp Actuator and Bag In Place Switches

1.6.7 Bag In Place Switch

On standard v-type bag clamp spouts, a bag in place switch is used to prevent the weigh bucket from dumping without a bag being in position to receive the product. If this switch is not “made”, after a two second delay, the bag clamps will open, and the fill cycle will not begin.

1.6.8 Load Cells

The weigh bucket assembly hangs from two load cells that are mounted inside the main cabinet. The load cells are used to sense the weight of the material in the weigh bucket. As material is loaded into the weigh bucket, the voltage output from each load cell increases. The output from the load cells is supplied to the controller. The controller balances the two inputs and uses its internal logic to determine the weight of the product in the weigh bucket assembly.

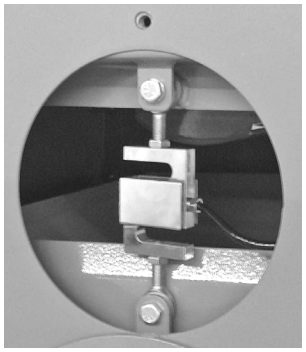


Figure 1-8. Load Cell (1 of 2 shown)

CAUTION A sudden jerk or shock, such as being struck by a tool or hitting the weigh bucket etc., can cause load cell damage. The load cell is NOT covered by warranty.

1.6.9 MAC Valves

The GN Series uses a series of MAC valves to control the flow of air to the various pneumatic components used. The MAC valves are pneumatic valves that are controlled by electric solenoids. When power is applied to the solenoid, it causes the valve to change states. The MAC valves are used to control the dump gates, bag clamps, and flow gates.

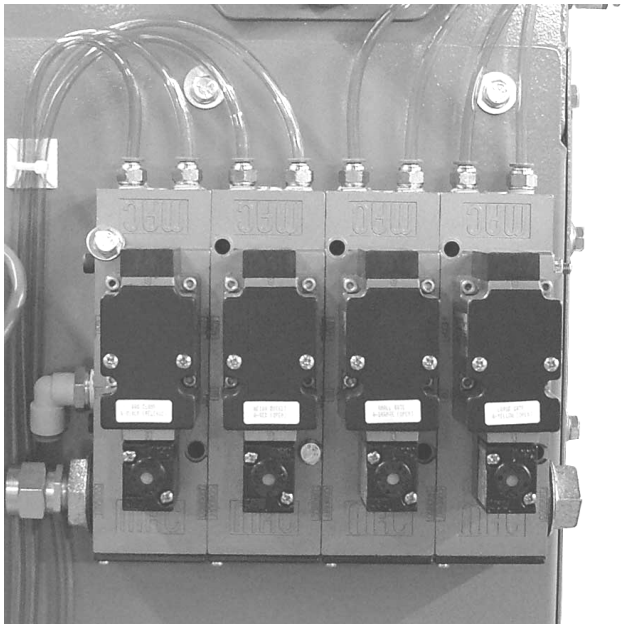


Figure 1-9. MAC Valve Arrangement

1.6.10 Machine Controls

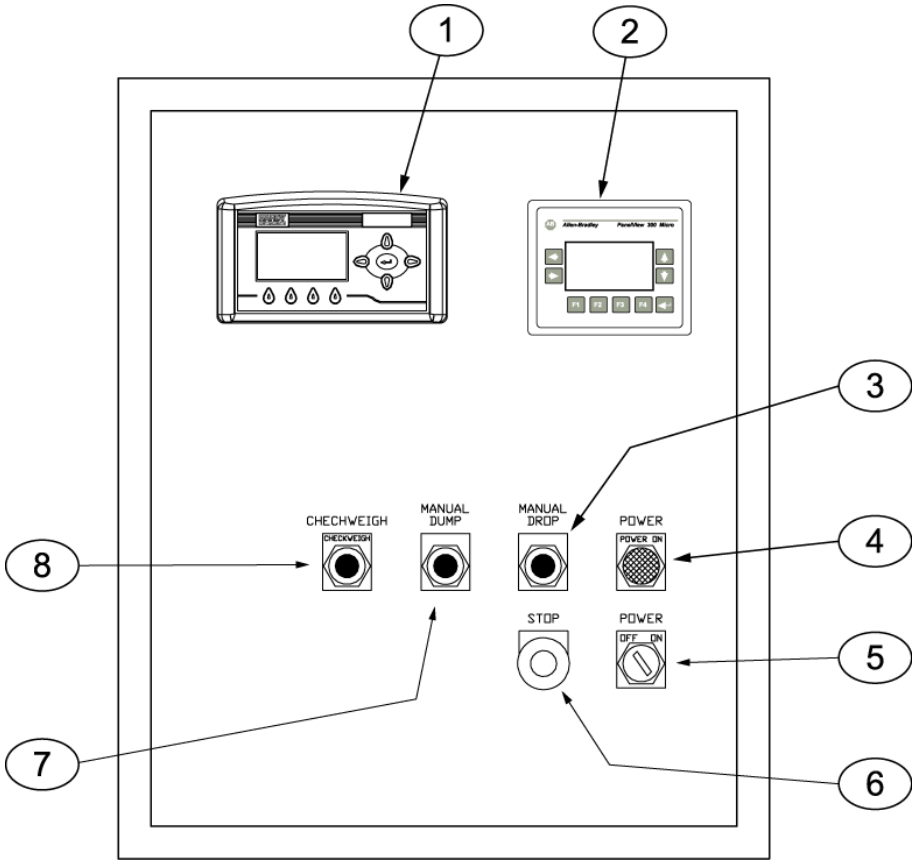
The GN Series can be equipped with one of two types of control systems. The standard control system uses a Magnum Systems/Hardy Instruments T4000 control panel. An optional control system utilizes a Magnum Systems/Hardy Instruments T3000 control panel. In either case, the control box will have several control switches and indicators in addition to the control panel used. Both the T4000 and T3000 include a weigh meter and control keys.

Both systems utilize a control box that will be mounted on a freestanding pedestal, with 15 feet of control cabling. The control box contains the control components that allow the GN Series to function.

1.6.10.1 Standard T4000 Control Box

The controls that the operator will use to start, stop, and adjust machine functions are located on the front side of the control box. The operator controls consist of the following items:

- **T4000 control panel** – Located in the upper left corner of the control panel door. The T4000 has the connections for the weigh meter and the load cells. The load cells send their voltage signal to the Harding summing board, which balances the inputs from the load cells and combines them into a single input to the T4000 to be displayed on the weigh meter.
- **PV300 control panel** – Located to the right of the weigh meter. This panel is the user interface to the PLC. The operator will use it to adjust system timer and counter settings.
- **MANUAL DROP button** – Located to the left of the POWER indicator is the MANUAL DROP button. This button is used to manually release the bag clamps and drop the package.
- **MANUAL DUMP button** – This button is located just to the left of the MANUAL DROP button. It is used to manually open the dump gates on the weigh bucket and unload any product that may be in the weigh bucket.
- **CHECKWEIGH button** – Located to the left of the MANUAL DUMP button, this button is pressed by the operator to force the bag clamps to continue holding the filled package so the operator can check the current package weight.
- **POWER indicator** – Located directly above the POWER switch. When the POWER switch is turned to the ON position, if the machine is connected to its power source, this indicator will illuminate green.
- **POWER switch** – Located in the lower right of the control box. This switch is used to turn the power to the machine on and off.
- **STOP button/indicator** – Located directly to the left of the POWER switch is the STOP button/indicator. The STOP button/indicator will immediately stop the machine when it is pushed in. When pushed, this button will illuminate red to indicate that the button is pushed and that machine function has been interrupted.



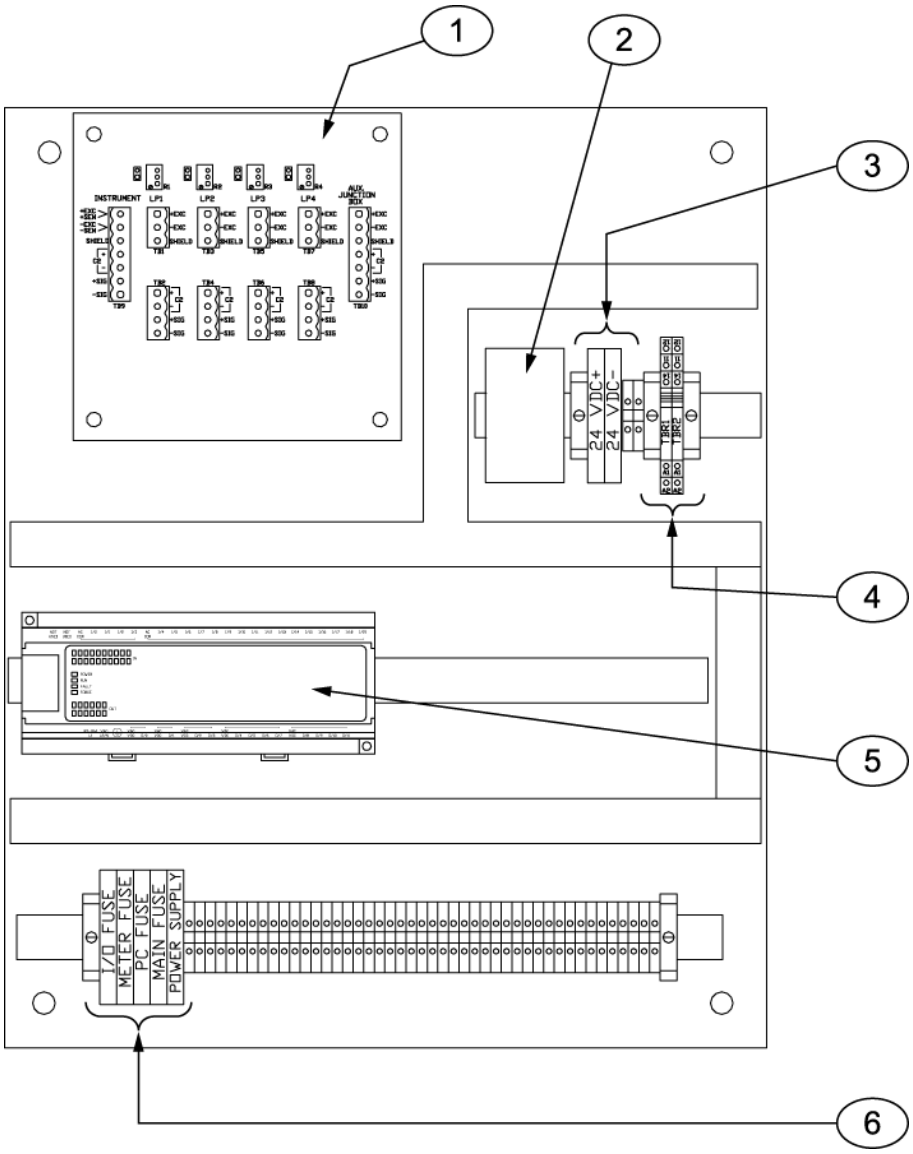
Item #	Description	Item #	Description
1	T4000 control panel	5	POWER switch
2	PV300 control panel	6	STOP button/indicator
3	MANUAL DROP button	7	MANUAL DUMP button
4	POWER ON indicator	8	CHECKWEIGH button

Figure 1-10. Control Box with T4000 Control Panel

1.6.10.2 Standard Electronic Control Components

Inside the control box are the components that actually perform the control functions for the machine. These components include the following components:

- **Hardy summing board** – The load cells are connected to the Hardy summing board. The Harding summing board processes the inputs from the load cells, balances them and combines them into a single signal input for the T4000.
- **Power supply** – The 24VDC power supply converts the incoming 115VAC power to 24VDC, which is required by the Allen-Bradley PV300 operator interface
- **Allen-Bradley MicroLogix™ 32 PLC** – Provides multiple timer and counter functions, as well as logic control.
- **Relay boards** – Mounting points for relays.
- **Fuse holders, fuses, and terminals** – Circuit protection for the GN Series.



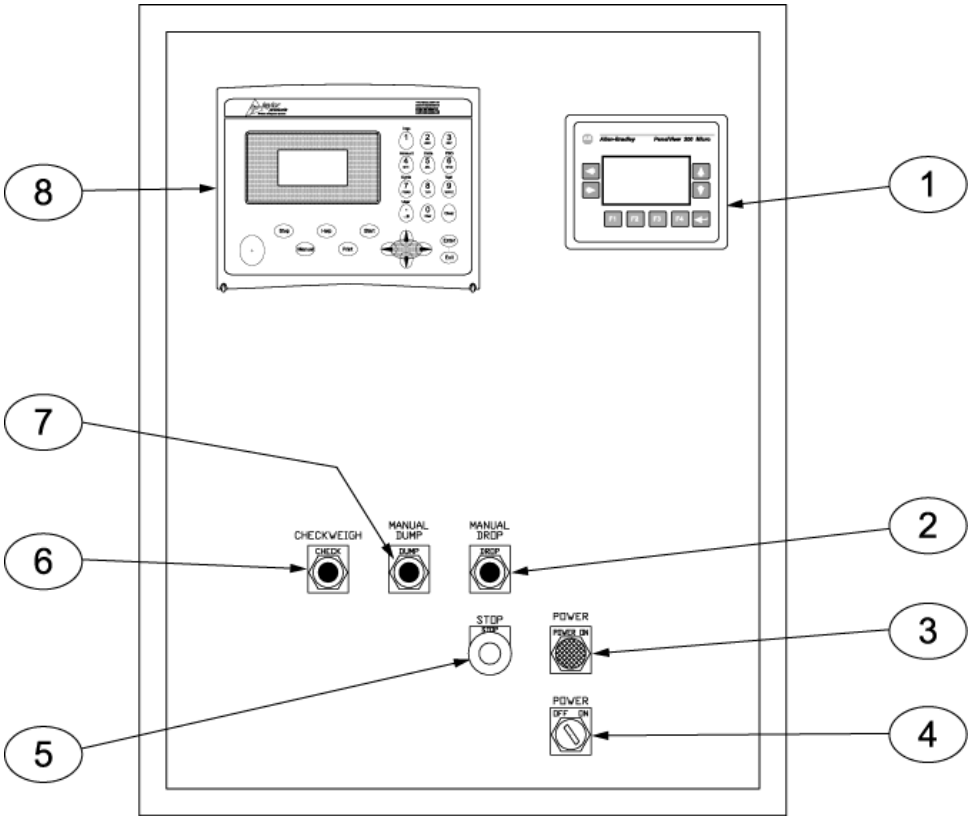
Item #	Description	Item #	Description
1	Hardy summing board	4	Relay terminals
2	DC power supply	5	MicroLogix PLC
3	24 VDC fuses	6	Fuses

Figure 1-11. Control Box with T4000 Control Panel - Internal Components

1.6.10.3 Optional T3000 Operator Control Box

The controls that the operator will use to start, stop, and adjust machine functions are located on the front side of the control box. The operator controls consist of the following items:

- **T3000 control panel** – Located in the upper left corner of the control panel door. The T3000 has the connections for the weigh meter and the load cells. The internal processor in the T3000 balances the inputs from the load cells and combines them into a total weight that will be displayed on the weigh meter.
- **PV300 control panel** – Located to the right of the T3000 control panel. This panel is the user interface to the PLC. The operator will use it to adjust system timer and counter settings.
- **POWER indicator** – Located directly above the POWER switch. When the POWER switch is turned to the ON position, if the machine is connected to its power source, this indicator will illuminate green.
- **POWER switch** – Located in the lower right of the control box. This switch is used to turn the power to the machine on and off.
- **STOP button/indicator** – Located directly to the left of the POWER indicator is the STOP button/indicator. The STOP button/indicator will immediately stop the machine when it is pushed in. When pushed, this button will illuminate red to indicate that the button is pushed and that machine function has been interrupted.
- **MANUAL DROP button** – Located above the POWER indicator is the MANUAL DROP button. This button is used to manually release the bag clamps and drop the package.
- **MANUAL DUMP button** – This button is located just to the left of the MANUAL DROP button. It is used to manually open the dump gates on the weigh bucket and unload any product that may be in the weigh bucket.
- **CHECKWEIGH button** – Located to the left of the MANUAL DUMP button, this button is pressed by the operator to check the current package weight.



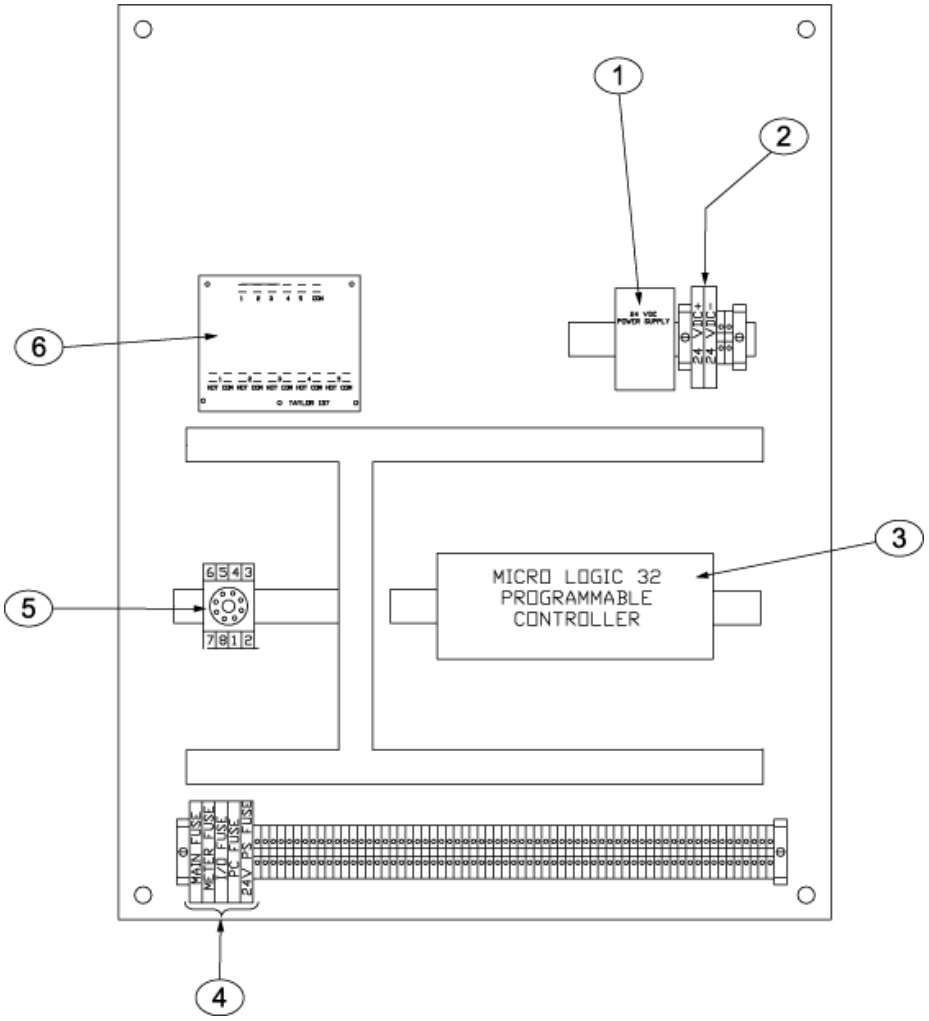
Item #	Description	Item #	Description
1	PV300 control panel	5	STOP button/indicator
2	MANUAL DROP button	6	CHECKWEIGH button
3	POWER indicator	7	MANUAL DUMP button
4	POWER switch	8	T3000 control panel

Figure 1-12. T3000 Control Panel

1.7.10.4 Optional T3000 Electronic Control Components

Inside the control box are the components that actually perform the control functions for the machine. These components include the following components:

- **T3000 interface board** – The load cells are connected to the T3000 interface board. The T3000 interface board processes the inputs from the load cells, balances them and combines them into a single signal input for the T3000.
- **Power supply** – The 24VDC power supply converts the incoming 115VAC power to 24VDC, which is required by the Allen-Bradley PV300 operator interface.
- **Allen-Bradley MicroLogix™ 32 PLC** – Provides multiple timer and counter functions, as well as logic control.
- **Relay base** – Mounting points for relays.
- **Fuse holders, fuses, and terminals** – Circuit protection for the GN Series.



Item #	Description	Item #	Description
1	Power supply	4	Fuses
2	Fuses	5	Relay base
3	Allen-Bradley MicroLogix 32 PLC	6	T3000 interface board

Figure 1-13. Optional T3000 Electronic Control Components

This Page Intentionally Left Blank

Chapter 2
Receiving Equipment

2.1 General Description

The GN Series and all of its components are thoroughly inspected before shipment. Upon receipt of the equipment, it is important that the machine be carefully inspected for shipping damage. In the event that damage is found, contact the shipping company and follow their process for reporting shipping damage.

2.2 Uncrating the Equipment

The GN Series is shipped in a shell crate to protect it during shipment. Follow the procedure below to unpack the equipment and prepare it for installation.

1. The GN Series should be suspended from a sturdy product hopper or framework, that is capable of supporting it without allowing it to move, or allowing vibration to interfere with its operation.
2. The GN Series requires an area that is approximately 10' x 10' in size. Complete any nearby construction before installing the GN Series.
3. Before removing GN Series from the shipping pallet, inspect GN Series for visible damage. Inspect for damaged or missing parts. If there is damage, notify the shipper immediately. If the unit is not damaged, proceed to the next step.
4. Remove the shell crate. Use care when unpacking the GN Series to avoid damage to any hinged parts and external controls.

Figure 2-1. Typical Shell Crate

5. Carefully cut the plastic shrink-wrap that is wrapped around the GN Series away and remove it.
6. Remove any lag bolts that may be securing the machine to the pallet.
7. Grasp unit by the main cabinet to handle. Care must be taken to NOT lift the machine using any component that may damage the load cells.

CAUTION A sudden jerk or shock, such as being struck by a tool or hitting the weigh bucket etc., can cause load cell damage. The load cell is NOT covered by warranty.

8. Remove all crating and packing materials. Recycle or discard these materials, as appropriate.

This Page Intentionally Left Blank

Chapter 3
Setup/Installation

3.1 General Description

Only persons who have been properly trained and hold the appropriate qualifications should attempt to install, operate, or maintain this equipment.

WARNING	*Before installing, adjusting, or servicing any electrical component, be sure to become familiar with the electrical schematics for the machine.*

WARNING	*Before installing, adjusting, or servicing any pneumatic component, be sure to become familiar with the pneumatic schematics for the machine.*

3.2 Mechanical Setup

Use the following procedures to assemble the GN Series and prepare it for operation.

3.2.1 Mounting the GN Series

When mounting the GN Series, it should be suspended from a sturdy product hopper, or from framework that will support it without movement or vibration. The hopper flange should have a 12" X 12" opening. The mounting holes should be 5/8". There should be 12 mounting holes spaced on 5" centers. Additional supports should be installed on the 4 corner holes.

3.2.2 Determining The Height Of The GN Series Feeder System

When determining the height of the GN Series feeder system, the spout should be positioned at a comfortable working height. Care must be taken to include allowances for any conveyor systems, the height of the longest bags that the unit will fill, and any other factors that may affect working conditions.

3.2.3 Determining Hopper Size

The hopper that will be feeding the GN Series should be a minimum of 30 cubic feet. The sides of the hopper should be at a sufficient angle to allow the product to flow into the top of the feeder and not have a column that is greater than 18".

3.2.4 Remove the Shipping Bracket

After securing the feeder to the product hopper, remove the shipping bracket from the cabinet/weigh bucket. The weigh bucket should hang freely from the cabinet once the shipping bracket has been removed.

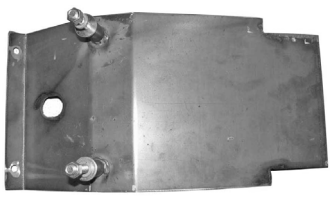


Figure 3-1. Shipping Bracket

3.3 Making Electrical Connections

Before connecting the GN Series to the electrical supply, it is vital that the unit be properly grounded. The recommended method is to plug the power cord into an earth grounded receptacle.

The GN Series requires 115 VAC at 50 or 60 Hz. The GN Series should be placed within 6 feet of the electrical outlets that it will be connected to.

> ***Important:*** *Refer to the factory electrical schematics for machine specific current and voltage requirements.*

3.4 Making Pneumatic Connections

The GN Series requires a compressed air supply line that is capable of delivering approximately 2-3 CFM (57-85 liters) @ 80-100 PSI (.55-.69 MPa) of compressed air. Magnum Systems recommends that the air supply line be equipped with a refrigerated air dryer, or at the very least a water separator. After making pneumatic connections, check all connectors for leaks using a soapy water mixture. Bubbles will appear at the site of any leaks. Eliminating or reducing air leaks will reduce wear on the air supply equipment.

3.4.1 Pneumatic Component Lubrication Requirements

The pneumatic cylinders require lubrication to ensure their proper operation and to extend their useful life. The lubricator should be filled with 10 weight, non-detergent oil.

The oil flow control knob, located on top of the lubricator, should be set so that the lubricator is delivering 1 drop of oil for every 30 cycles.

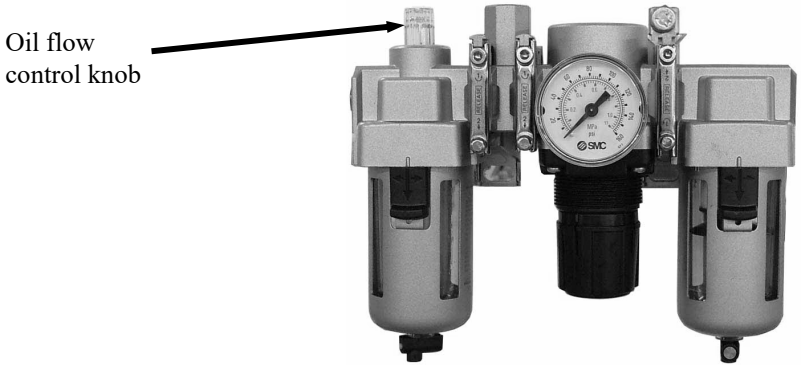


Figure 3-2. Lubricator – Oil Flow Control

Use caution when setting the flow control on top of the lubricator. While too little oil can cause operational problems, so can too much oil. If the oil control is set too high, it may result in gummed up solenoid valves and cylinders.

3.5 Making Network Connections – T3000

GN Series units that are equipped with the optional digital control set have the ability for total monitoring and instrument control via the built in communication connectivity of the T3000. The T3000 has the following network capabilities:

- DeviceNet
- HardyLink Ethernet
- IR Port
- RS-232 Simplex Serial Port
- Remote I/O (RIO) (optional)
- ControlNet (optional)
- Profibus I/O (optional)
- Modbus over TCP/IP (optional)
- OLE Process Control (OPC) (optional)

3.6 Establishing Security Settings

On all GN Series packaging machines, the manager has the ability to control who does and who does not have the ability to change system and calibration settings. The process for setting security varies, based on the type of controller used.

3.6.1 Establishing T4000 Security Settings

The Security parameters allow management to place security on the instrument and any menu or sub-menu requiring a password before enabling any changes. The Change Security parameter enables all persons to see the security status for a given menu, and selected persons to change that security status for any menu.

1. From the Configuration menu press the down arrow until the cursor is in front of Security.

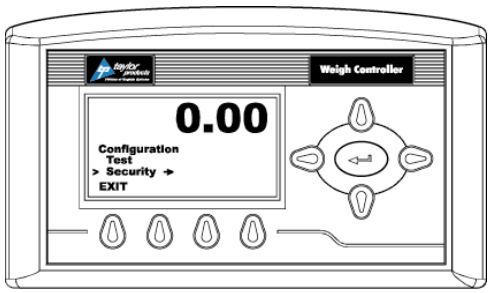


Figure 3-3. Placing The Cursor In Front Of Security

2. Press the Enter key. The Security menu appears.
3. Set the Password Parameter. The Set Password parameter enables the operator to create a password for entry to secure menus and sub-menus. If the password is 0 there is no security. If the password is anything other than 0 the security is enabled.

   Note: *It is recommended that the passwords be created before setting security on the various menus.*

4. Press the down arrow key until the cursor is in front of Set Password.

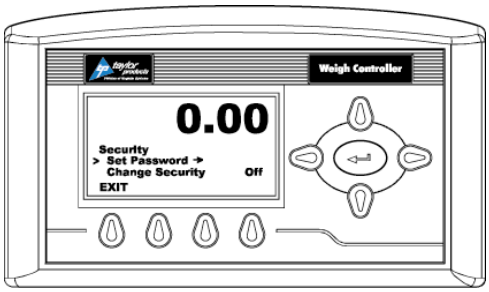


Figure 3-4. Placing The Cursor In Front Of Set Password

5. If the password is being set for the first time or if the factory defaults have been reset in the Test menu, enter the default password "2205". If the password is being reset, and the existing password is known, enter that number. Press the Enter key. The Verify Password display appears. Enter the password, refer to 4.3.2.1.1 Entering Numbers Using the T4000 Control Panel for information on how to enter numbers into the control panel.
6. Press the Enter key. If the password is correct a brief message "Entry Accepted" appears and the Set Password display with the current password appears.

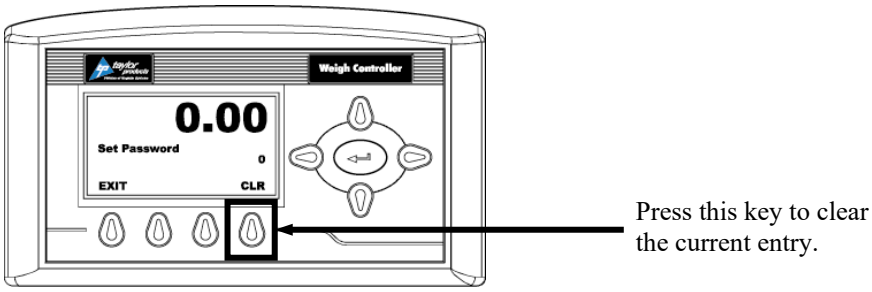


Figure 3-5. Set Password Menu

7. Press the function key located directly below the CLR item on the display to clear the entry. Use the left or right arrow keys to move the cursor left and right. Use the up or down arrow keys to enter the password number. To delete a single entry, press the left arrow key. In the example below, "123" was entered.

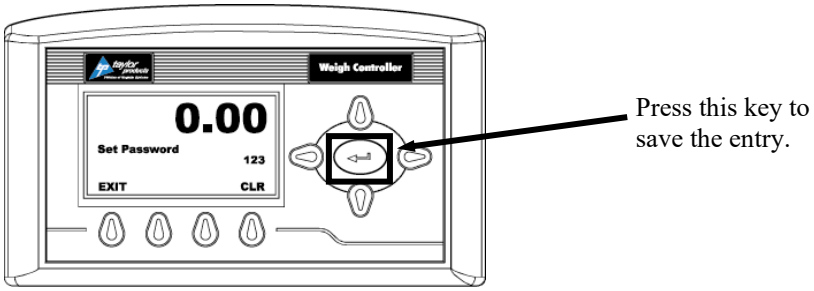


Figure 3-6. Password Set To 123

8. Press the right or left arrow keys to toggle Change Security On. The Verify Password display appears.

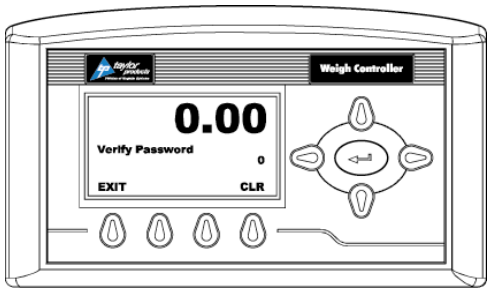


Figure 3-7. Verify Password

9. Use the left or right arrow keys to move the cursor left and right. Use the up or down arrow keys to enter the password number.

   Important: *When entering the password, the last digit is entered first, then the next digit to the left and so on. For example, if the password is set to 123, then 3 is entered first, then the 2, and the 1 is entered last.*

10. Press the Enter key. The Change Security status changes to On. In this instance we turned Change Security ON because we want to change the security of a sub-menu.
11. Now that the Change Security On feature has been turned on, press the function key below the word EXIT on the display to return to the Configuration menu.
12. Use the up or down arrow keys to go to the desired sub-menu that is to be secured. In the example below, the Decimal Point sub-menu has been selected. Notice that the display now includes a SECUR menu item above the function keys.

    Note: *Steps 8-12 will need to be repeated to lock and unlock a parameter.*

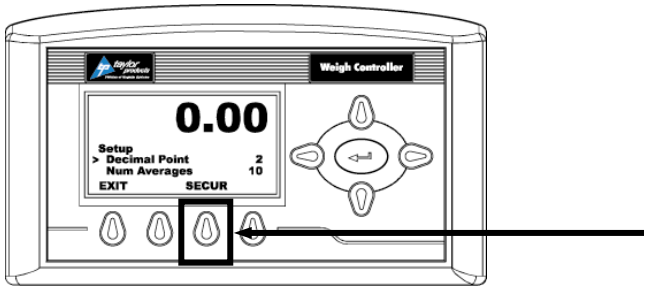


Figure 3-8. SECUR Menu Item Shown Above Function Key

13. Press the function key that is positioned below the SECUR item on the display, to view and/or change the security status of this parameter.
14. Press the right arrow key to changed to LOCKED thereby securing this sub-menu.

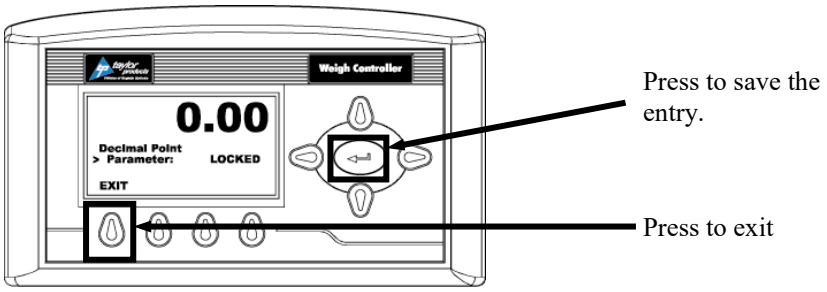


Figure 3-9. Parameter Shown Locked

15. Press the Enter key to save the entry.
16. Press the function key below EXIT on the screen until the summary display is shown.

    Note: *To check to see if the security is set on a specific sub-menu, press the EXIT key until the summary display appears. Then re-enter the menus and try to change the secure parameters.*

17. Until security has been changed, changing this parameter will require a password (other than 0) to be entered.
18. To turn the Change Security OFF, go back to the Security menu and repeat steps 1-6.

3.6.2 T3000 Security Settings

On GN Series machines that are equipped with the optional T3000 digital control set, the manager has the ability to control who does and who does not have the ability to change system and calibration settings. There are three levels of system security:

- Low – No password required
- Medium – A password is required to access some, but not all of the top level menus
- High – A password is required to access all top-level menus.

Additionally, the manager also has the ability to assign different levels of security to individual menus. The menus where this applies are:

- Adjust Ingredient
- Setup
- Calibration
- Options
- I/O Mapping

If a menu has a security setting of Medium or High, the users' access will be read-only, unless they enter the correct password.

The typical method for setting security settings on the T3000 is via the control panel. Follow the steps below to set security.

1. Press the User shortcut key. Enter the User ID and high-level password.
2. From the Standby display, press the Setup key. The Configuration Menu will appear.
3. Use the up/down arrows to position the cursor in front of SECURITY. Press the Enter key.
4. The SECURITY MENU will appear. The cursor will be in front of SET SECURITY MENU selection. Press the Enter key.
5. The SET SECURITY MENU will appear. The Top-Level Menus will be listed with the security level set at the default LOW setting.
6. Press the up/down arrow keys to position the cursor in front of the desired menu selection.
7. Press the left/right arrow keys to change the security setting for that menu item.
8. Once the desired security level is displayed, press the Enter key to set the entry.
9. If other menus require an adjustment to its security setting, repeat steps 5 through 7.
10. When all security setting adjustments have been completed, press the Exit key to return to the Standby display.

3.7 Dry Cycle

Once all electrical/pneumatic connections have been made, the operator should dry cycle the machine to test the control components. If all components operate properly, the machine is ready to calibrate.

Note: *The cylinders may be cycled manually by pressing the test keys on the solenoid valves.*

1. Press the STOP button.
2. Turn the power switch on the control panel to the ON position.
3. Make sure that the air pressure on the FRL is set to specification.
4. Press the MANUAL DUMP button on the control box. The dump gates will open and will remain open.
5. Pull the STOP button out. The dump gates will close and the flow gates will open.
6. Push the STOP button in. The flow gates will close. Repeat steps 4, 5, and 6 several times.
7. Place an empty bag on the spout and trip the bag clamp actuator switch. On machines equipped with traditional bag clamps, they will apply. On machines equipped with the optional open mouth spout, the inflatable neck seal will inflate.

   Important: *Once actuated, if the bag in place switch is not "made", the bag clamps or inflatable neck seal will release after a 2 second delay. This means that the bag must be properly positioned and that the bag in place switch must be properly adjusted.*

8. Press the MANUAL DROP button. On machines equipped with traditional bag clamps, they will release and drop the bag. On machines equipped with the optional open mouth spout, the inflatable neck seal will deflate and drop the bag.

3.8 Calibration

Each GN Series is calibrated prior to leaving the factory. However, the unit should be reassessed before first use of the unit. Magnum Systems recommends that the calibration of the unit be checked every week. A certified test weight must be used to check the calibration of the GN Series.

3.8.1 T4000 Control Panel Pre-Calibration Mechanical Checks

1. Check to determine if the load cells have been installed properly. On some load cells there is an arrow that indicates the direction of the applied load. If the arrow is pointing in the wrong direction, change the position of the load cell so that it is mounted in the direction of the applied load.
2. Check for Binding on the load cell or other parts of the system.

CAUTION Binding on a scale/vessel or load cell does not allow the load cell free vertical movement and may prevent the instrument from returning to the original zero reference point.

   a. The load cell must be mounted so that 100% of the load (vessel + contents) is applied vertically to the load cell.

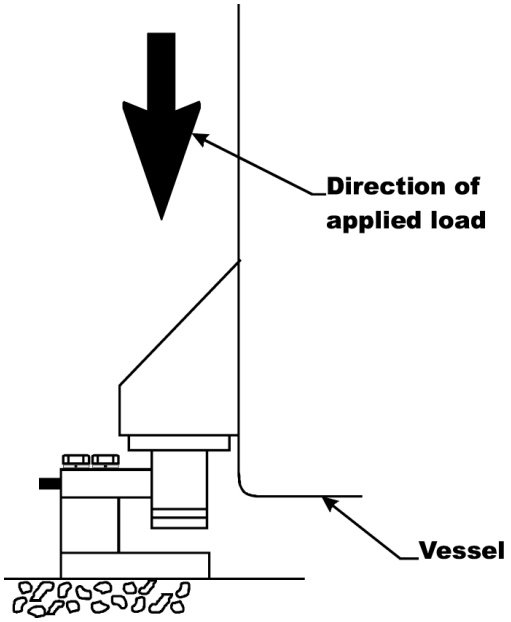


Figure 3-10. Load Passing Through Load Cell

   b. Do a visual check to see that nothing is binding the load cell or other parts of the weighing system. Make sure that nothing is draped over the scale/vessel or the load cell, such as a hose, electrical cord, tubes, or other objects.
3. Check to see that nothing comes in contact with the scale/vessel other than service wires and piping that have been properly mounted with flexible connectors.

4. Check to see that there is power to the T4000.
    a. If there is power to the controller, the front panel display should be illuminated.
    b. If the display appears and a weight value is being displayed, the unit is ready for calibration.
5. Allow the instrument to warm up for about 15 minutes before doing the calibration procedures.
6. Put a load (weight) on the scale or vessel. For a full load test, the operator can put 80 – 100% of the expected weight for their process on the scale or vessel.
7. Check to see if the weight reading changes on the display in the proper direction.
    a. For example, if the display reads 100 lbs and a 20 lb load is placed on the vessel or scale, the display should read 120 or some value over 100.
    b. If the display reads 80 lbs and a 20 lb load is placed on the vessel or scaled, the reading is going in the wrong direction and indicates some problem with the system.
    c. If the display is reading improperly or shows no change there is something wrong with the configuration or the load cells.
8. If the display changes in the proper direction, remove the weight and proceed to calibrate the Weigh Controller.

Note: *When calibrating the T4000 for the first time, go from one sub-menu to the next in sequence.*

Note: *The settings provide below are just an example. The actual settings used will vary based on the specific application.*

3.8.2 T4000 Control Panel Calibration

1. Make sure the T4000 has been configured for the intended application. This includes setting the units, decimal point, scale capacity, averages, etc.
2. From the Summary display press the Enter key. The Configuration menu appears.
3. Press the down arrow key until the cursor is in front of Calibration.
4. Press the Enter key. The Calibration menu appears.
5. Traditional Calibration is the method of calibration that uses test weights. Magnum Systems recommends that the test weights total 80 – 100% of the desired package weight, and that the weight be distributed uniformly on/in the scale.
6. From the Summary display, press the Enter key. The Configuration menu appears.
7. Press the down arrow key until the cursor is in front of the Calibration line.

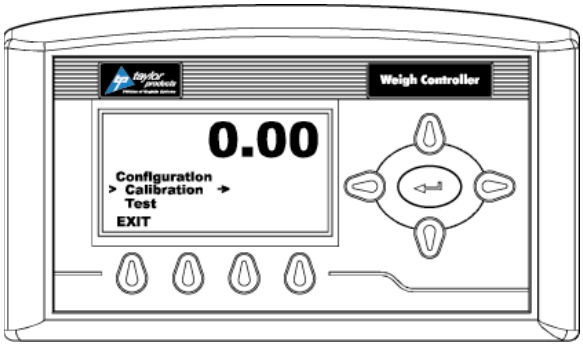


Figure 3-11. Placing the Cursor In Front Of Calibration

8. Press the Enter key. The Calibration menu appears.
9. Press the down arrow key until the cursor is in front of Trad Cal.

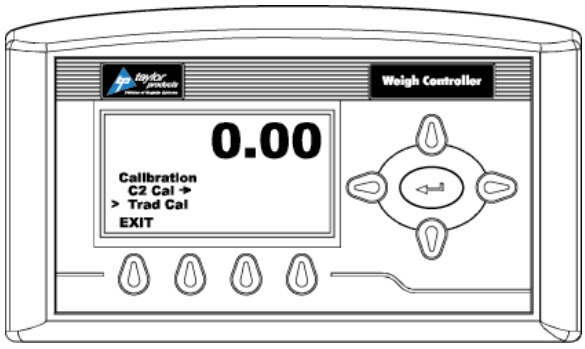


Figure 3-12. Placing The Cursor In Front Of Trad Cal

10. Press the Enter key. The Trad Cal menu appears.

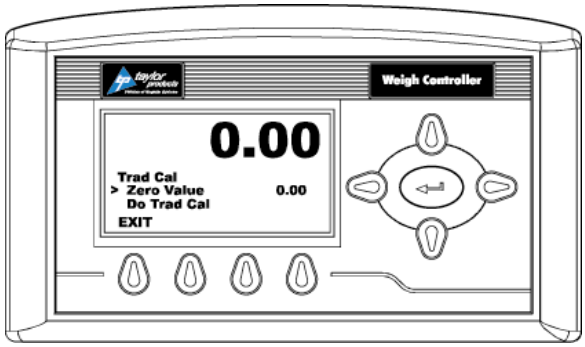


Figure 3-13. Placing The Cursor In Front Of Zero Value

11. Press the Enter key. The Zero Value weight menu appears.
12. Traditional Calibration requires a zero point and the physical placement of test weights on the scale. To set the Zero Value Weight:
    a. Remove all weight "live load" from the Scale. The Zero Value should be 0.0.

CAUTION The scale MUST be empty.

    b. Wait 12 seconds or more.
13. Use the left and right arrow keys to position the cursor. Use the up or down arrow keys to enter the Zero Value for this instrument.

    Note: *Most applications will set the Zero Value to 0.00.*

14. Press the Enter key to save the entry.
15. Press the down arrow key until the cursor is in front of Do Trad Cal (Zero).

16. Press the Enter key to Do Trad Cal (Zero).
    a. A "Cal Completed OK" message appears briefly if the calibration was successful.
    b. If an error message appears, the calibration was not successful. A list of possible error messages is provided with the troubleshooting information later in this guide. Refer to this list in order to correct the error.
17. Press the down arrow key until the cursor is in front of Span Value.
18. Press the Enter key. The Span Weight menu appears. The last Span Weight is displayed.

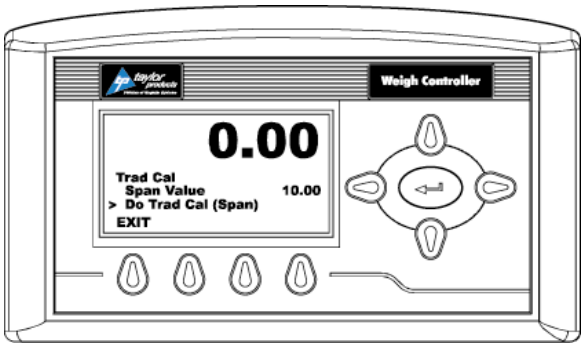


Figure 3-14. Span Value Displayed

19. To set the Span Weight:
    a. Place a certified test weight on the scale.
    b. Use the left and right arrows to position the cursor and the up or down arrows to enter the value of the test weight. If a 10 lb. weight is used, enter 10.00.
    c. Press the Enter key to save the entry.
20. Press the down arrow key until the cursor is in front of Do Trad Cal (Span).
21. Press the Enter key to Do Trad Cal (Span).
    a. A "Cal Completed OK" message appears briefly if the calibration was successful.
    b. If an error message appears, the calibration was not successful. A list of possible error messages is provided with the troubleshooting information later in this guide. Refer to this list in order to correct the error.
22. The scale is now calibrated.

3.8.3 Optional T3000 Control Set

The Calibration Menu is used to calibrate the weighing system of the T3000. Before beginning the calibration procedure, be sure that the machine is ready to be calibrated. Make sure that the load points have been installed properly. Follow the steps below to make sure the GN Series is ready for calibration:

1. Make sure the load system is free of binding and that nothing is draped over the equipment, such as hoses, electrical cords, tubes, etc.
2. Verify that the load cells are mounted so that 100% of the load always passes vertically through the load cells at the same point.
3. Check all communication and power cables to be sure they are securely fastened to their connectors on the rear of the control panel.
4. Make sure that power is supplied to the controller. The panel display should illuminate.

   Important: *The operator MUST log in with the proper security level to initiate calibration. Once logged in, an access timer will run. If the timer expires (typically about 5 minutes), the operator will be logged out. The operator will have to log in again to regain access.*

When the operator selects CALIBRATION from the Configuration Menu, the CALIBRATION screen appears. There is one line on that screen, it is the Cal Type line. The currently selected method of calibration will appear at the far right on the Cal Type line. Use the left/right arrow keys to toggle to until TRAD is displayed on the line. Press the Enter key to access the screen for the TRAD calibration method. This screen will provide the following lines for the operator.

- Zero Value – This value should be set to zero.
- Zero Ct – This parameter not adjustable and is controlled by the controller.
- Do Trad. Cal (Zero) – Start the calibration procedure.
- Span Value – The amount of weight being used for calibration.
- Span Ct – This parameter not adjustable and is controlled by the controller.
- Do Trad. Cal (Span) – Start the calibration procedure.

Use this procedure to calibrate a machine with traditional load cells.

1. Turn on the meter.
2. Press the User shortcut key. Enter the User ID and medium or high-level password.
3. Press the Setup key to access the CONFIGURATION MENU.
4. Use the up/down arrow keys to scroll to the CALIBRATION line. Press the Enter key to access CALIBRATION.

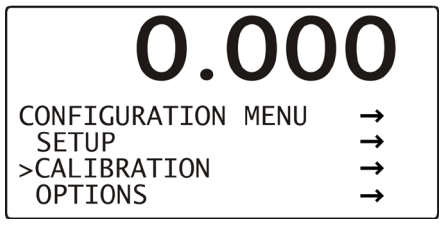


Figure 3-15. Calibration Line

5. Use the left/right arrow keys to toggle to the TRAD selection if it is not already displayed. Press the Enter key.

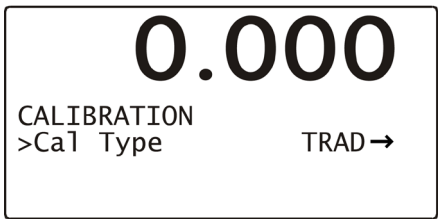


Figure 3-16. Selecting TRAD Calibration

6. A Function OK message will flash briefly in place of the Cal Type line, then the TRADITIONAL CAL screen will appear. Check the display to make sure that the Zero Value reads 0.0.

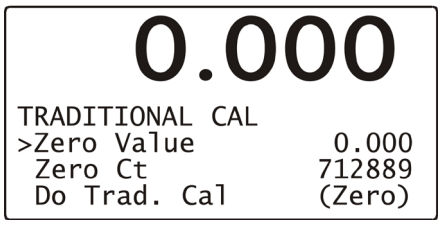


Figure 3-17. Checking Zero Value

7. Use the up/down arrow keys to scroll to the Do Trad. Cal (Zero). Press the Enter key. The weight display will display !Calibration in Progress! and will return to its calibration screen.
8. Use the up/down arrow keys to scroll to the Span Value selection and use the alphanumeric keypad to enter the weight that will be used for calibration. Press the Enter key.

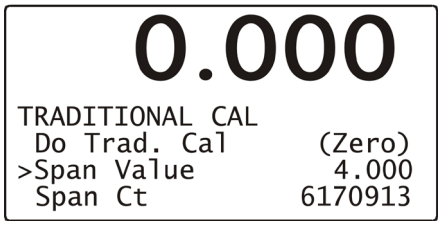


Figure 3-18. Setting Span Value

9. Use the up/down arrow keys to scroll down to the Do Trad. Cal (Span). Place the calibration weight on the scale by hanging it on the fill spout directly under the bag clamp cylinder. Press the Enter key. The weight display will display !Calibration in Progress! and will then return to its calibration screen. Press the Exit key three times to return to the main screen.

3.9 Timer and Counter Programming

All models of the GN Series utilize timers to allow them to function correctly. The timers are adjustable. The Allen-Bradley MicroLogix™ 1000 Programmable Logic Controller (PLC) will perform all timer functions. The PLC is mounted inside the control box and is connected to multiple electrical components. Components that are connected to the Input side of the PLC are components that are being monitored by the PLC. Components that are connected to the Output side of the PLC are components that are being controlled by the PLC.

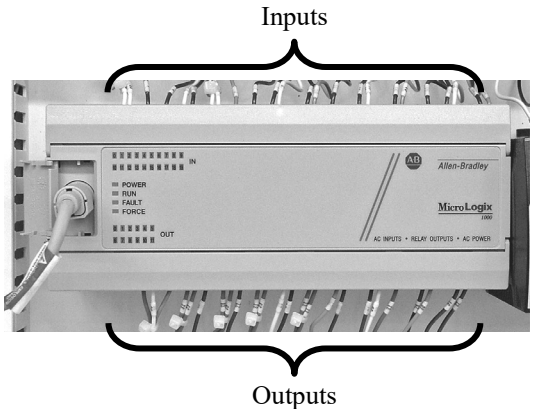


Figure 3-19. Programmable Logic Controller (PLC)

The operator adjusts the timer settings via the Allen-Bradley PV300 control panel that is connected to the PLC. The PV300 is mounted in the control box door, just to the right of the T3000. The PLC is mounted inside the control box. Refer to 4.3.4.1 PV300 Menus for information on timer adjustments.

- **Bucket Dump Time Delay** – This setting is the amount of delay after the dump gates open to when they are closed.
- **Auto Zero Delay** – This setting is the amount of time from when the start switch is made until the fill cycle begins. This delay gives the unit time to stop motion, so an accurate tare can be performed. This setting should be tuned so the auto tare occurs just as the motion stops. If auto tare is not being used, set it to zero to ensure the fastest fill.
- **Dump Delay** – This setting is the amount of time that will elapse from the time that the fill cycle ends until the dump gates open.
- **Drop Delay** – This setting is the amount of time that will elapse from when the bucket dumps until the bag clamps drop the filled bag. Set this so that the bag drops just after the last of the product enters the bag.
- **Bulk Dump Counter** – This is an optional feature that is used when filling packages that are larger than normal. This option allows the GN Series to fill and empty the weigh bucket multiple times during a single fill cycle. The setting is the number of weigh bucket fill and dump cycles required to fill one bag. For example, if filling a 500 lb. bag, if this setting is set to 5, the machine will fill and dump the weigh bucket 5 times to fill one bag, with each weighment being 100 lbs. If the setting is 4, the machine will fill and dump the weigh bucket 4 times to fill one bag, with each weighment being 125 lbs.

Chapter 4
Operation

4.1 General Description

This chapter will provide detailed descriptions of the operational controls of the GN Series.

4.2 General Fill Cycle Information

The GN Series is a dual set point unit. This means that it uses two fill rates, bulk rate and dribble rate. Bulk rate is a faster rate that is used to fill the package quickly. Once the package achieves the SP1 weight, the main gate cylinder will retract to close the main gate and slow the fill rate to the dribble rate. Once the package achieves the SP2 weight, the dribble gate will close and the filler will stop. Once the product that is in free fall settles into the weigh bucket, the product weight should match the target weight.

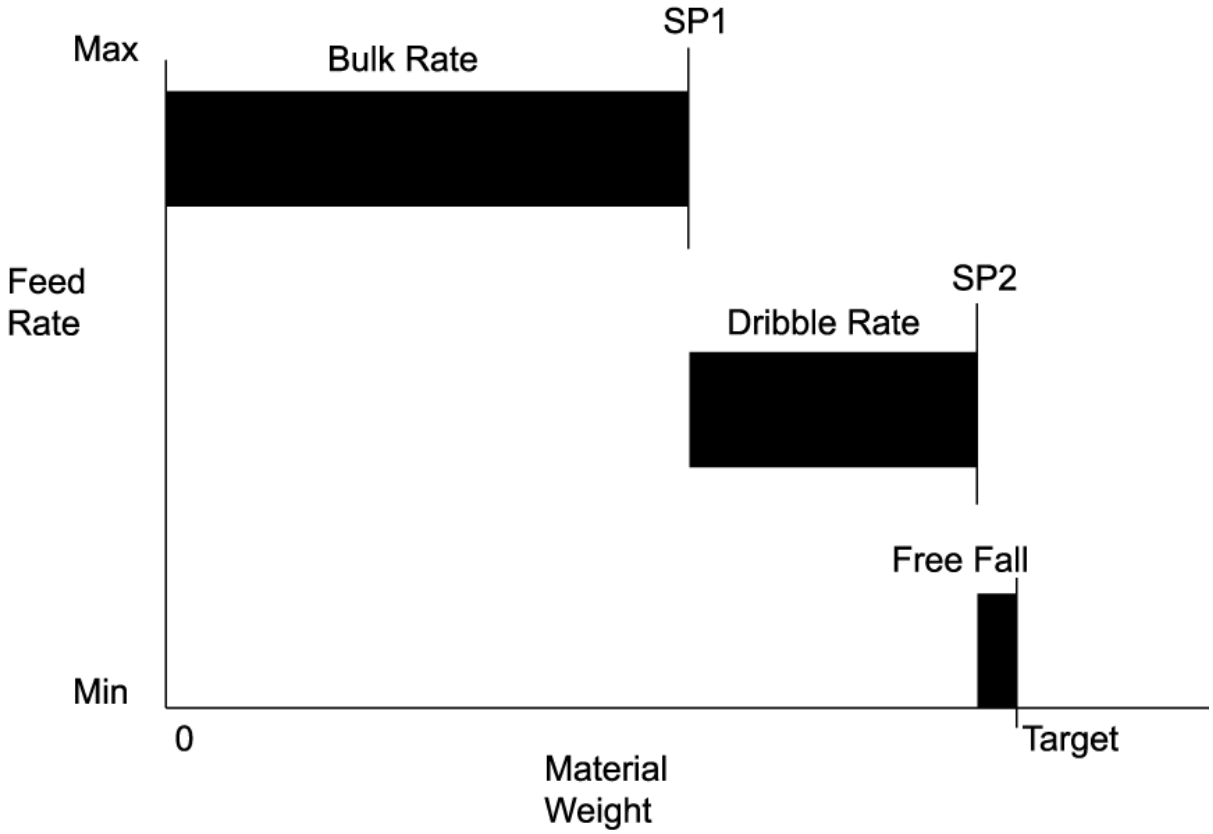


Figure 4-1. Fill Rates

4.2.1 Basic Fill Process

The basic fill process for the GN Series will include the following events:

- The filler will load the weigh bucket with product
- The weighing system will weigh the product
- The operator will place a bag on the spout (this may occur while filling the weigh bucket)
- The weigh bucket will drop the product into the bag (bag in place switch must be "made" first)
- The dump gates will close and the fill cycle will start again
- The bag clamps will release the filled bag.

The GN Series machines have a unique feature to prevent the operator releasing a package that is either underweight or overweight. On machines with the T4000 control panel, this feature is the Target Min/Max menu option. On machines with the T3000 control panel, this feature is the Over/Under Reject menu option. The operator will manually set the points where the package would be considered overweight and underweight. If the final weight of the product in the weigh bucket is outside of this range, the GN Series will hold the product in the weigh bucket until the operator manually releases the bag by pushing the MANUAL DUMP key. This feature is helpful when there is a sudden change in the bulk density of the material or when the feed bin runs out of material. This guarantees that no bag over or under the allowable weight will be shipped.

4.2.2 Typical Fill Cycle

The typical fill cycle will vary, based on the configuration of the machine. The fill cycle listed below assume that the machine has been turned ON, the controls have warmed up, and that the machine is already calibrated. The fill cycle can be broken down into three basic processes.

- Filling the weigh bucket
- Placing a bag on the spout
- Filling the bag

4.2.2.1 Filling the Weigh Bucket

1. Pull the STOP button out.
2. The dump gates will close (if they weren't already closed)
3. On GN Series machines that are equipped with the auto-zero feature, and if the auto-zero function is enabled, the machine will auto-zero at this time.
4. The main and dribble gates will open. Product will flow into the weigh bucket.
5. When the weight of the product in the weigh bucket reaches SP1 (dribble weight), the main gate will close. The bucket will continue to fill, but at a reduced rate.
6. When the weight of the product in the weigh bucket reaches SP2 (cutoff weight), the dribble gate will close. The flow of product into the weigh bucket has stopped.

4.2.2.2 Putting a Bag on the Bag Spout

The following steps can be completed while the weigh bucket is being filled. If the operator chooses to perform these steps after the weigh bucket has filled, the efficiency of the machine/fill cycle is reduced.

1. Place a bag spout.
2. Actuate the bag clamps. The operator does this by tripping the bale on the bag clamp actuator switch with their hand, or by using the optional foot switch.

   Important: *Once actuated, if the bag in place switch is not "made", the bag clamps or inflatable neck seal will release after a 2 second delay. This means that the bag must be properly positioned and that the bag in place switch must be properly adjusted.*

CAUTION To prevent injury, keep hands clear of the clamps. The bag clamps must apply significant pressure to prevent the filled bags from slipping.

4.2.2.3 Filling the Bag

1. After successfully clamping a bag on the spout, a dump delay timer will run. The available range is 0 to 25 seconds (typically set to 0). After the timer expires, the dump gates will open.
2. The dump gates will stay open for the amount of time set in the bucket dump time parameter. Ideally, the timer will expire just as the product clears the weigh bucket dump gates.
3. Once the bucket dump timer has run, the dump gates will close. The main and dribble gates will open, starting the next fill cycle.
4. After the dump gates open, another timer will start to run. It is the drop delay timer. Once the drop delay has expired, the bag clamp cylinders will retract and drop the bag. The operator can place an empty bag on the spout.

4.3 Operational Controls

The operational controls will vary, based on the type of control unit and any custom features that have been selected. The types of controls are:

- Mechanical controls (bulk gate adjustment)
- T4000 controls
- T3000 controls
- PLC controls (PV300 control panel)

4.3.1 Bulk Gate Adjustment

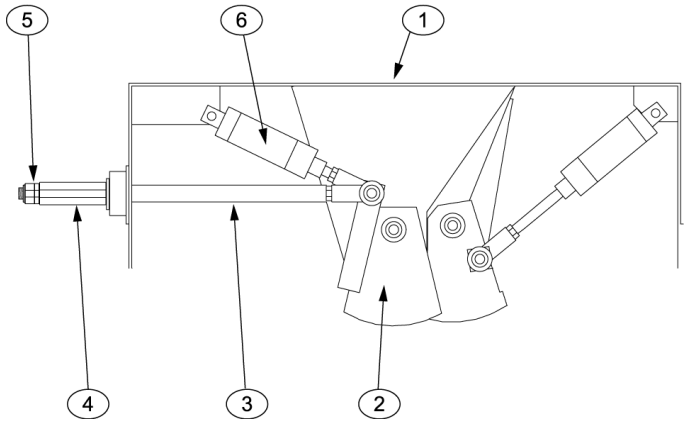
The bulk gate adjustment on the GN Series is a mechanical adjustment. By turning the adjustment knob, the operator can increase or decrease the flow of product during the bulk fill cycle. All adjustments start with the adjustment knob turned all the way in (clockwise).

To adjust the bulk gate, loosen the jam nuts, and then turn the adjustment knob counter-clockwise as follows:

> ***Note:*** *The bulk gate settings shown here are to be used as a general guide. Actual settings are dependent on the bulk density of the product. In this example, the product is a free flowing, granular product with a bulk density of approximately 50 lbs per cubic foot. For products that have greater density, such as sand, the settings will be half, or less than half, of these settings.*

- 2 turns = 15 to 25 lb. weighments
- 4 turns = 25 to 40 lb. weighments
- 6 turns = 40 to 50 lb. weighments
- 8 turns = 50 to 80 lb. weighments
- 10 turns = 80 to 125 lb. weighments

> ***Important:*** *After making the adjustment, tighten the jam nuts.*



Item #	Description	Item #	Description
1	Cabinet	4	Adjustment nut
2	Main gate	5	Jam nuts
3	Adjustment rod	6	Main gate cylinder

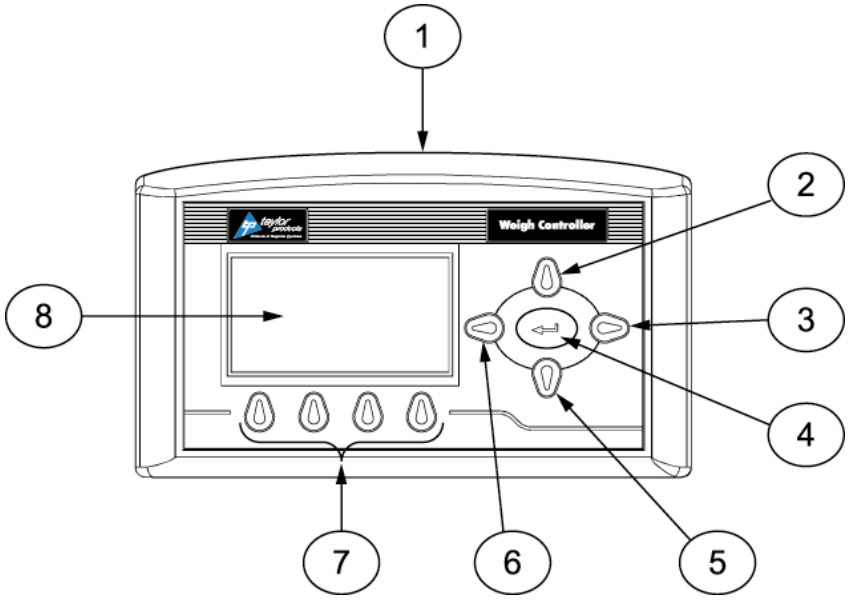
Figure 4-2. Bulk Gate Adjuster

4.3.2 Electrical Controls

The operational controls will vary, based on the type of control unit and any custom features that have been selected. This manual will focus on the standard T4000 control units, and the optional T3000 control unit.

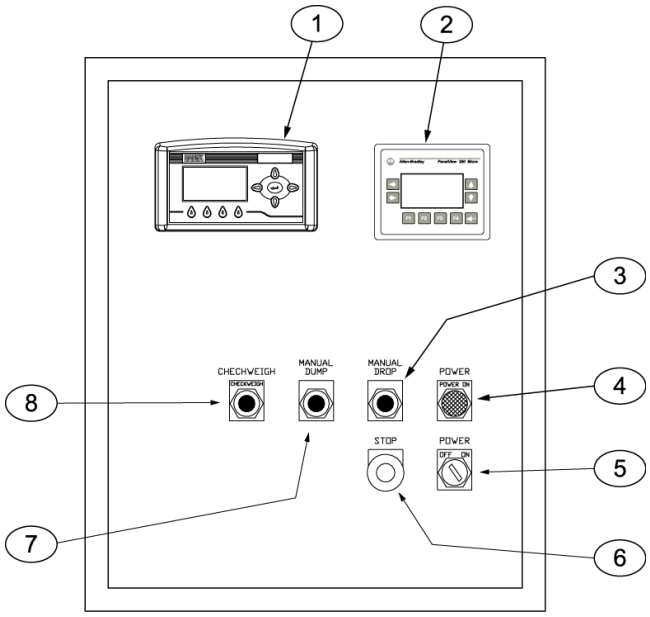
4.3.2.1 T4000 Control Panel

The T4000 control panel uses an electronic display in conjunction with a T4000 control pad that allows the user to make system adjustments and to monitor the system status.



Item #	Description	Item #	Description
1	T4000 control panel	5	Down key
2	Up key	6	Left key
3	Right key	7	Function keys
4	Enter key	8	LCD screen

Figure 4-3. T4000 Faceplate Layout



Item #	Description	Item #	Description
1	T4000 control panel	5	POWER switch
2	PV300 control panel	6	STOP button/indicator
3	MANUAL DROP button	7	MANUAL DUMP button
4	POWER ON indicator	8	CHECKWEIGH button

Figure 4-4. Control Box Layout with T4000 Control Panel

4.3.2.1.1 Entering Numbers Using the T4000 Control Panel

Prior to using the control panel, it is important to understand the process for entering a number into a field. When accessing a numbered field, the cursor will be placed in the default position, which is under the digit to the far right. To position the cursor at the desired position, use the left or right arrow keys to move the cursor. Once the cursor is placed in the desired position, use the up arrow key to increase the number, or use the down arrow key to decrease the number. Each press of the key will result in a change increment of one digit. For example, if 0 is displayed, pressing the up arrow key once will change the number to 1. After the desired number has been entered, press the enter key to save the entry.

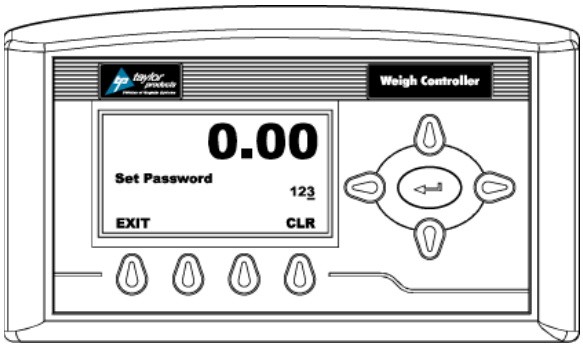


Figure 4-5. Cursor Positioned Below Digit On Right

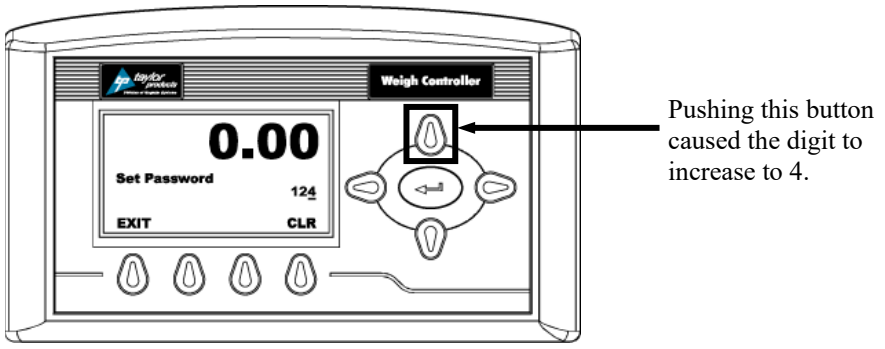


Figure 4-6. Operator Has Pressed The Up Arrow Causing Digit On Right To Increase To 4

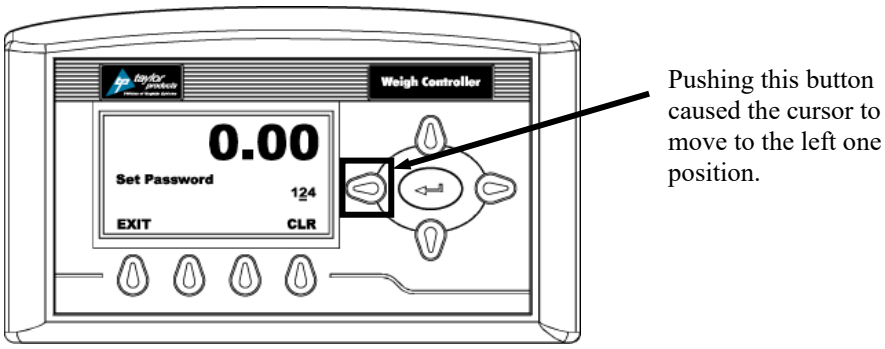


Figure 4-7. Operator Has Pressed The Left Arrow Moving Cursor Over 1 Position

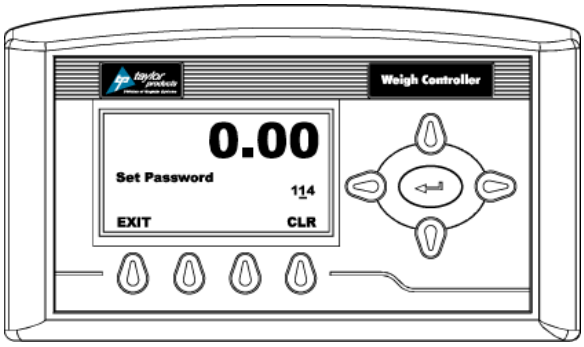


Figure 4-8. Operator Has Pressed The Down Arrow Causing Center Digit Decrease To 1

4.3.2.2 T3000 Control Panel

The T3000 control panel uses an electronic display in conjunction with a T3000 control pad that allows the user to make system adjustments and to monitor the system status.

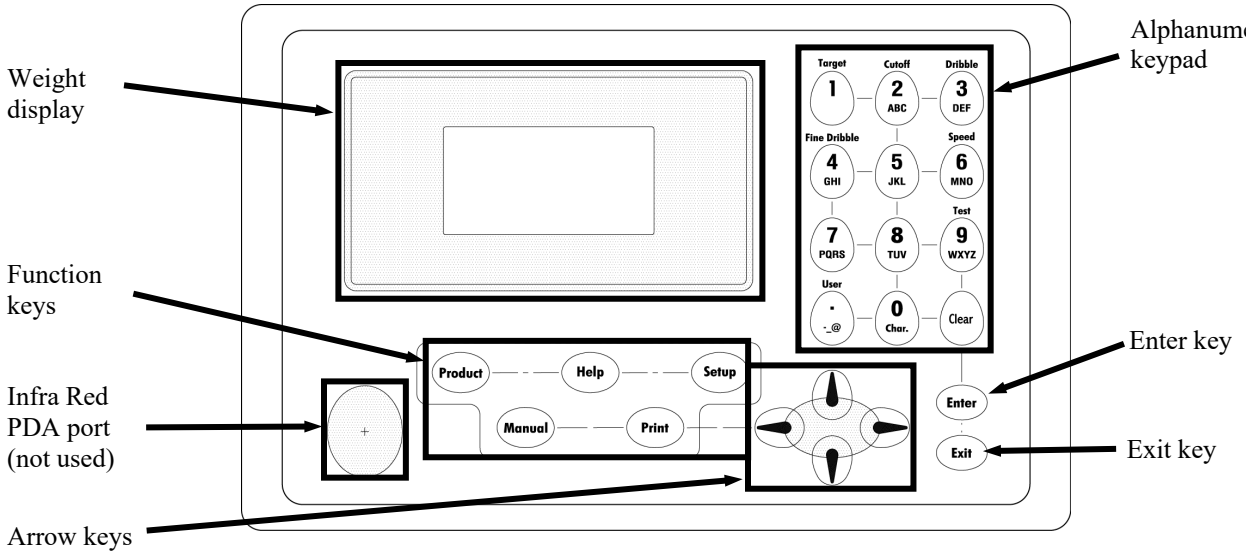
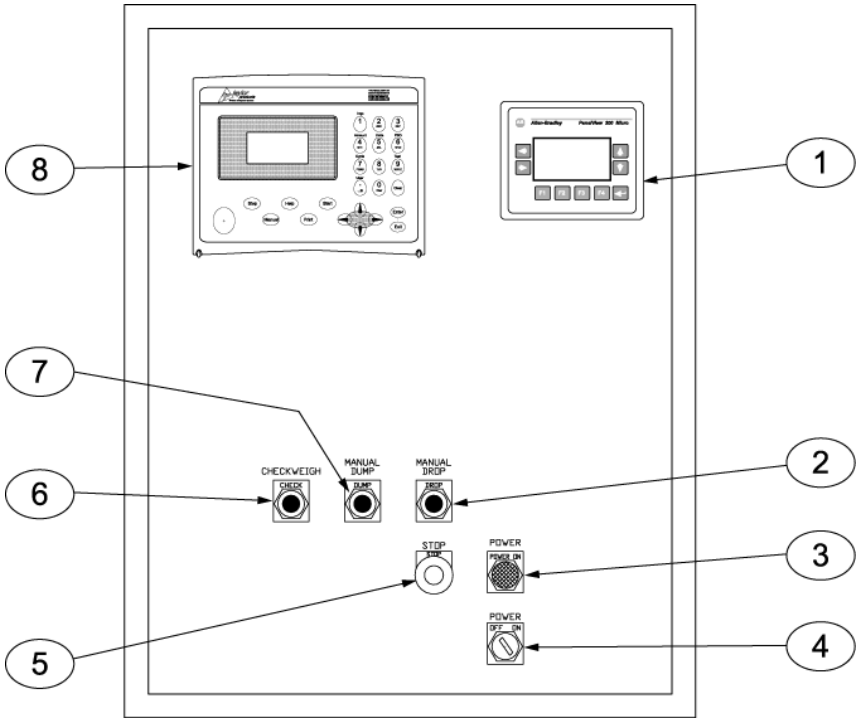


Figure 4-9. T3000 Faceplate Layout



Item #	Description	Item #	Description
1	PV300 control panel	5	STOP button/indicator
2	MANUAL DROP button	6	CHECKWEIGH button
3	POWER indicator	7	MANUAL DUMP button
4	POWER switch	8	T3000 control panel

Figure 4-10. Control Box with T3000 Control Panel

4.3.3 Allen-Bradley MicroLogix™ 1000

All GN Series units are equipped with an Allen-Bradley MicroLogix™ 1000 Programmable Logic Controller (PLC). The PLC is located inside the control box. The PLC is loaded at the factory with a software program that includes adjustable timers for specific functions. The PLC is equipped with multiple input and output connections. The inputs are used to monitor device status, while the outputs are used to control device operation. The processor takes the incoming data and compares that data to the program. When input conditions and the program deem it necessary that the PLC activate or change the state of a device connected to one of the output terminals, the PLC will execute that command.

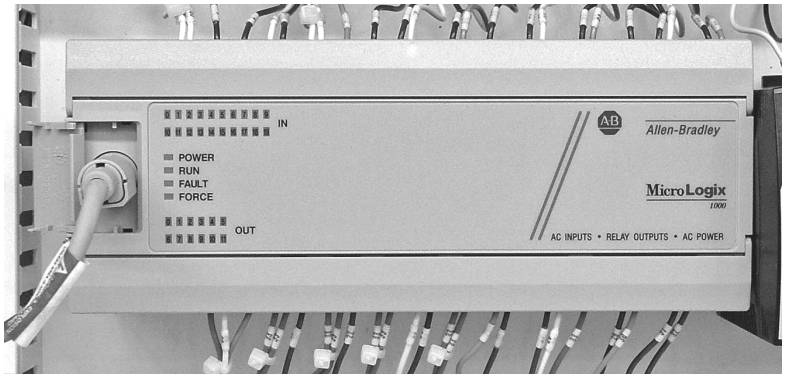


Figure 4-11. Programmable Logic Controller (PLC)

The PLC also provides the ability to monitor the inputs and outputs. The PLC is equipped with LEDs to provide the status of each input and output. The PLC is also equipped with LEDs to provide the status of the power input, the current operational state, if there are any program or hardware faults, and if any of the outputs have been manually activated (forced).

4.3.4 PV300 Control Panel

All GN Series units are equipped with an Allen-Bradley PV300 control panel. This control panel is the interface to the Allen-Bradley MicroLogix™ 1000 PLC that is located inside the control box. The control panel is used to adjust system timers controlled by the PLC. The PV300 uses a series of menus to allow the operator to make these adjustments.

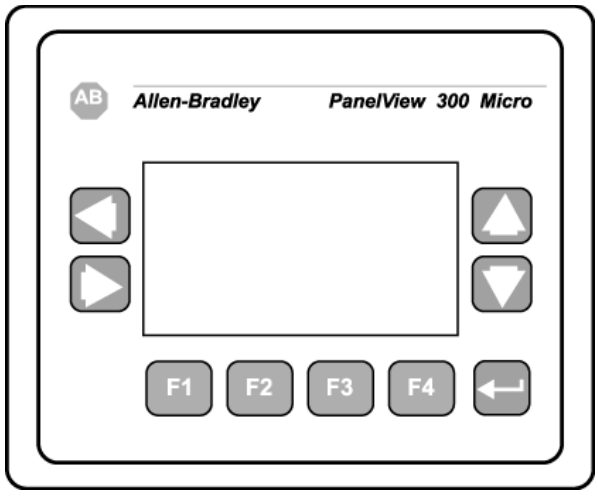


Figure 4-12. Allen-Bradley PV300 Control Panel

4.3.4.1 PV300 Menus

The PV300 has several menus that allow the operator to adjust different timer functions for the GN Series. The available timer functions, and their definitions are listed below:

> ***Note:*** *Some of the timers mentioned below are for optional features. The machine that accompanied this manual may or may not have or use all of the timers listed.*

Table 4-1. PV300 Main Menu

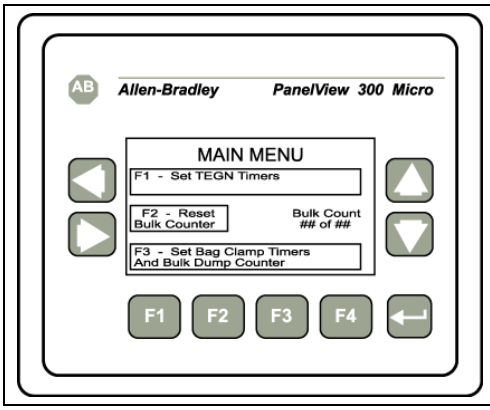
	Key	Function
	F1	Pressing F1 will result in the system advancing to the first timer screen.
	F2	Pressing F2 will result in the system resetting the bulk counter.
	F3	Pressing F3 will result in the system advancing to the screen where the bag clamp timers and bulk dump counter can be adjusted.

Table 4-2. PV300 Timer Screen 1

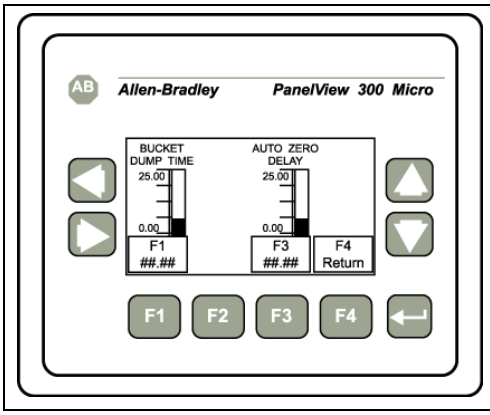
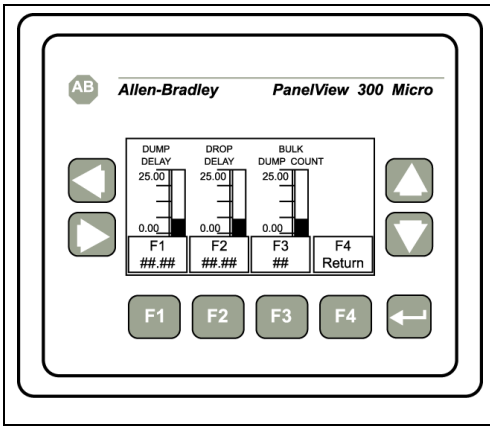
	Key	Function
	F1	Pressing F1 will result in the system placing the cursor in the field where the bucket dump timer can be adjusted.
	F3	Pressing F3 will result in the system placing the cursor in the field where the auto zero delay timer can be adjusted.
	F4	Pressing F4 will result in the system returning to the Main Menu screen.

Table 4-3. PV300 Timer Screen 2

	Key	Function
	F1	Pressing F1 will result in the system placing the cursor in the field where the dump delay timer can be adjusted.
	F2	Pressing F2 will result in the system placing the cursor in the field where the drop delay timer can be adjusted.
	F3	Pressing F3 will result in the system placing the cursor in the field where the bulk dump counter can be adjusted.
	F4	Pressing F4 will result in the system returning to the Main Menu screen.

4.4 Initial Setup

GN Series units can be categorized based on the type of controls they use.

- T4000 controls
- T3000 controls

4.4.1 Setting Up a GN Series with T4000 Controls

The typical bagging cycle for a GN series that will proceed as follows:

1. Turn the GN Series on and pull the STOP button out.
2. Place a new bag on the spout and press the START button to apply the bag clamp and start filling the package with material at the bulk rate (Fast A).
3. When the package weight reaches SP1 the main gate will close, leaving the dribble gate open.
4. When the package weight reaches SP2, the dribble gate will close.
5. After the product in free fall settles in the package and the final weight is taken, the bag clamps will release and the package will drop.
6. As soon as the package has been removed, place a new package on the spout and press the START button to apply the bag clamp and begin filling the package. This cycle will repeat until the surge hopper is empty, or until the unit is turned off or stopped.

Before the GN Series is put into operation, the initial setup procedure needs to be performed to ensure proper weighments. Follow the procedure outlined below to set up a dual set point GN Series for its first run. Before beginning this process, the operator should become familiar with the controls and functions of the GN Series.

1. Turn on the power by turning the POWER switch to the ON position. Allow fifteen (15) minutes for the controls to warm up.

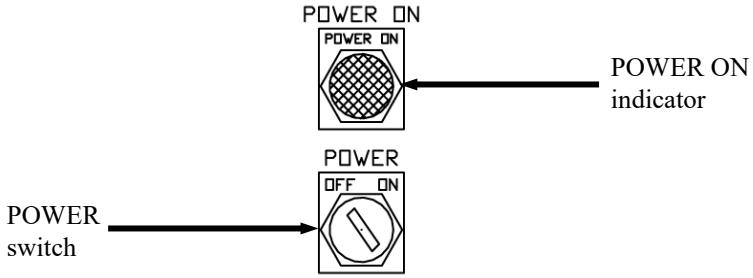


Figure 4-13. POWER Switch

2. Set the Dribble Weight. From the Standby screen, press the function key below SP1 on the display.

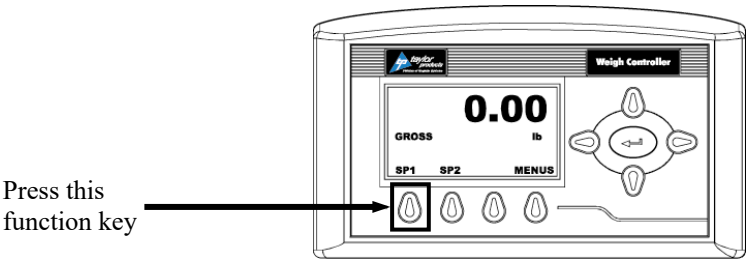


Figure 4-14. Setting the Dribble Weight (SP2)

3. When the SP1 adjustment screen appears, use the up, down, left, and right arrows to adjust the SP1 setting.

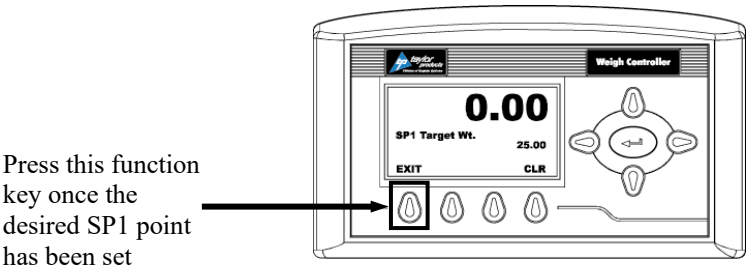


Figure 4-15. SP1 Adjustment Screen

4. When the adjustment to the SP1 setting is complete, press the Enter key to save the setting and return to the Standby screen.
5. Set the Target Weight. From the Standby screen, press the function key below SP2 on the display.

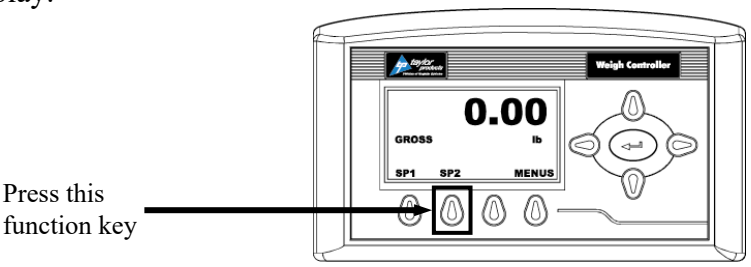


Figure 4-16. Setting the Target Weight (SP2)

6. When the SP2 adjustment screen appears, use the up, down, left, and right arrows to adjust the SP2 setting.

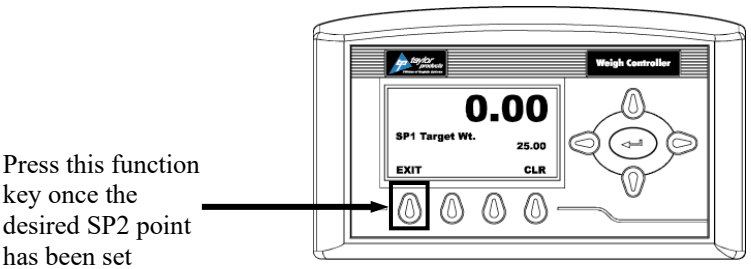


Figure 4-17. SP2 Adjustment Screen

7. When the adjustment to the SP2 setting is complete, press the Enter key to save the setting and return to the Standby screen.

8. Place a bag on the spout.
9. Press the START button, or optional foot switch. The GN Series will apply the bag clamp will apply and will begin filling the package with material. After SP2 has been reached, and the flow of product has stopped. **BEFORE** removing the package, check the weight display to see how close the actual package weight is to the target weight. If the actual package weight is more than or less than the target weight go back and adjust SP2 up or down by an amount equal to the difference between the target weight and actual weight.
10. Remove the package.
11. Install a new package on the spout and press the START button, or optional foot switch, to start the fill cycle. Once again, the GN Series will begin filling the package with material. After SP2 has been reached, and the auger has stopped, check the weight display to make sure that actual weight matches the target weight. If the actual weight is on target, remove the package and install a new package on the spout and press the START button to inflate the neck seal. There will be a short delay before the auger begins filling the new package. It is important to make any SP1 correction before the package is removed. It may take several cycles before to get the machine properly set up for that specific product.

    Note: *Also keep in mind that every time the fill rate is changed, SP2 will most likely need to be adjusted. This adjustment alters the amount of product moving through the spout, thus changing the amount of material in free fall.*

4.4.2 Setting Up a GN Series With T3000 Controls to Fill

GN Series units equipped with the T3000 can be programmed to fill as many as 25 different products. Use the steps below to select a specific product from the available list.

1. Check the T3000 to make sure the Filler is configured for the specific product that is being used.
2. Make sure the T3000 is in Standby Mode.
3. If the product shown on the display is the product that is going to be packaged, the setup is complete. If not, continue to Step 4.
4. If the product shown on the Standby Menu is not the product being packaged, do the following:
    a. Press the Product key once. A list of products that have been programmed into the control panel will appear. The currently selected product will be displayed.
    b. The operator can change the product using the up or down arrow keys to scroll through the available list of products. When the desired product is found, position the cursor next to it and press the Enter key. The menu for that product will appear, with the cursor adjacent to the Accept Settings line. Press Enter again to accept the settings, or use the up/down arrows to scroll through the available parameters for that product. To change a specific parameter, place the cursor next to that line and key in the new value for that parameter, followed by pressing the Enter key. When finished, scroll back to the Accept Settings line and press the Enter key to accept the changes.

4.4.2.1 Using the T3000 to Set Up A Product From Scratch

To configure one of the 25 available product selections for a specific product, follow the steps below:

1. Press the Setup key once. The Configuration Menu will appear and will have the cursor on the ADJUST PRODUCT line. Press the Enter key.
2. The cursor will be positioned next to the currently selected product ID. Use the arrow keys to scroll down until the cursor is next to the first product number that has not been previously programmed.
3. Press the Enter key to select that product.
4. Position the cursor next to the line for the product name. Use the alphanumeric keypad to enter the name that has been selected for this product configuration. The default name can be used, but it is not recommended. Magnum Systems recommends using a name that provides some indication of what the product configuration is for. Press the Enter key to save the change.
5. Scroll down to the Unit of Measure line. Use the left/right arrow keys to select the appropriate unit of measure (Lb, Oz, Kg, G). Press the Enter key to save the change.
6. Scroll down to the WAVERSAVER line. Use the alphanumeric keypad to enter the desired setting. Magnum Systems recommends setting the WAVERSAVER to 3.50 Hz. Press the Enter key to save the change.
7. Scroll down to the Averages line. Use the alphanumeric keypad to enter the desired setting. Press the Enter key to save the change.
8. Scroll down to the Jog line. Press the Enter key to access the Jog Menu.
9. Set Jog On Time to 0.000s, to disable the jog function. Press the Enter key to save the setting.
10. Press the Exit key.
11. Scroll down to the Fill Timer Line. Use the alphanumeric keypad to enter a new value, if desired. Press the Enter key to save the setting.
12. Scroll down to the Wait Timer line. Use the alphanumeric keypad to enter a new value, if desired. Press the Enter key to save the setting.
13. Scroll down to the Speeds line. Use the left/right arrow keys to select the Dual speed setting. Press the Enter key to access the settings for that fill speed.
14. Use the left/right arrow keys to toggle between OFF and ON. When this option is ON, the controller will auto adjust the dribble point.
15. Leave the Mode setting at the factory preset setting.
16. Scroll down to the Fill Proof Menu and press the Enter key.
    a. The Fast Switch and Slow Switch settings MUST be off for the machine to run.
    b. The recommended setting for the Fast Switch Tmr and the Slow Switch Tmr is 5s.
17. Press the Exit key three times to return to the Standby Display.

4.5 Starting the Unit

Once the unit has been installed, and calibrated, it can now be started. The process for starting the GN Series will be the same, regardless of the type of control set that is used. The following steps are used to start the machine.

1. Press the STOP button in.
2. Turn the power switch to the ON position. The POWER ON indicator should illuminate. The weigh display, or controller display, should also illuminate and perform its initiation sequence. When complete, the weigh display or controller should display its opening screen.

   Important: *The GN Series does require some time to warm up before performing setup procedures or starting the first fill cycle. For machines that are equipped with the T4000 control panel, allow at least 15 minutes for the machine to warm up. For machines equipped with the T3000 control panel, allow at least 30 minutes for the machine to warm up.*

3. Pull the STOP button out.

CAUTION Once the power switch is in the ON position, and the STOP button has been pulled out, the machine will start operating automatically.

4. Place a bag on the spout so that the bag in place switch is made. Make sure to trip the bag clamp actuator switch lever, which will start the fill cycle.

   Important: *Once actuated, if the bag in place switch is not "made", the dump gates will not open and the bag clamps or inflatable neck seal will release after a 2 second delay. This means that the bag must be properly positioned and that the bag in place switch must be properly adjusted.*

This Page Intentionally Left Blank

Chapter 5
Preventive Maintenance

5.1 General Description

To minimize downtime, preventive maintenance should be made a priority. Proper preventive maintenance practices will also extend the life of the equipment. Developing a preventive maintenance schedule will ensure that critical maintenance procedures are not missed.

5.2 Daily Maintenance Procedures

At the start of each working day, the perform the following tasks before starting the machine:

1. Thoroughly clean the machine.
2. Check the calibration, using a known weight.
3. Drain water from the FRL.

5.2.1 Cleaning

Keeping the GN Series clean is an important part of the daily maintenance tasks. Remove any dust and/or dirt that accumulates on a daily basis. Keeping the unit clean will keep debris from entering the control mechanisms, which could cause the performance of the GN Series to suffer. Also, by taking the time to clean the GN Series on a daily basis, the operator will be able to give the GN Series a thorough inspection. Take the time to inspect all components for possible damage or wear.

5.2.2 Check Calibration

On a daily basis, check the calibration of the machine using a known weight. If calibration is required, refer to 3.8 Calibration.

5.2.3 Drain Water From the FRL

It is very important to remove unwanted moisture from the incoming air to ensure proper operating of the pneumatic components. At the beginning of each day, the operator should empty the water from the FRL. Use the process below to drain the water.

1. Disconnect the air supply line.
2. Place a container under the drain valve.
3. There are two types of drain valves, follow the appropriate step below to open and close the drain valve:
    a. If the water separator has a pin-type drain valve, press the pin upward and hold it in to drain the water. Release the pin once all water has drained.
    b. If the water separator has a screw-type drain valve, turn the screw cap counter-clockwise to completely loosen the cap. After the water has completely drained, lightly push the cap upward to engage the threads and turn the cap clockwise until snug.
4. Discard the water from the container.
5. Reconnect the air supply line.

Figure 5-1. Filter/Regulator/Lubricator Assembly – Drain Valve

5.3 Weekly Maintenance

On a weekly basis, or every 100 operating hours, whichever comes first, the operator should do the following items:

1. Inspect the bearings for wear or damage.
2. Lubricate exposed metal surfaces with light machine oil.

5.4 Monthly Maintenance

On a monthly basis, or every 700 operating hours, whichever comes first, the operator should do the following items:

1. Inspect and service the filter and lubricator in the FRL.
2. Inspect all electrical cords and cables. Replace any damaged cords or cables.
3. Inspect all hoses, air cylinders, linkages, and bearings. Replace any worn or damaged parts.
4. Inspect the rubber shutoff gate seal. Replace the seal if it is worn or leaking.
5. Clean any dust or product that may have accumulated around the load cells.
6. For spouts with v-type bag clamps, inspect the rubber bag clamp pads. Replace them if they are worn.
7. Inspect and lubricate the bearings. Lubricate using two pumps from a grease gun filled with grease.
8. For spouts with inflatable bag clamps, inspect the inflatable bladder for damage or wear. Replace the bladder if necessary.
9. Check the calibration. Refer to 3.8 Calibration.
10. Check the retainer flange bolts. Tighten them if they are loose.

Chapter 6
Troubleshooting

6.1 General Description

When a problem occurs, proper troubleshooting techniques will allow maintenance personnel to quickly identify the problem.

6.2 The Troubleshooting Process

The actual troubleshooting process is just as important as the repair process. Use the following troubleshooting keys to assist with the troubleshooting process:

- Identify the trouble symptom
  - What is the problem?
  - What were the circumstances when the problem occurred?
  - Could weather be a factor?
  - Are there any other contributing factors?
- Sectionalize the problem
  - Look at the problem.
  - What area of the machine is the problem occurring in?
  - Has anything changed recently?
- Isolate the problem
  - Try simple things first.
  - Observe indication and trouble codes.
  - Check test points.
  - Avoid complicating the problem.

6.3 Trouble Symptoms

Use the following information to assist in troubleshooting.

6.3.1 Scale is Not Accurate

If the load cell is providing inaccurate readings, check the following:

1. Check for proper calibration. Refer to 3.8 Calibration.
2. Check the surge hopper to make sure an adequate supply of material is available in the product hopper to ensure a consistent head pressure.
3. Check to make sure there is nothing restricting material flow from the surge hopper.
4. Check the shipping bolts/nuts. Make sure the shipping nuts have been backed off until they bottom out against the mount.

6.3.2 Scale Does Not Return to Zero

If the scale reading does not return to zero after the weigh bucket has been dumped. Check the following items:

1. If the AutoZero function is enabled, the weight display will show a negative weight reading.
2. Check to make sure that nothing is coming in contact with the weight bucket.
3. Check the inside of the weigh bucket to make sure that the product is not sticking to the inside of the weigh bucket.

6.3.3 The Main Gate and/or Dribble Gate Does Not Open

If the feeder will not run when the STOP button is pulled out, check the following:

1. Check the power coming into the unit to make sure you have 115 volts.
2. Check the bag clamp actuator switch to see if it is functioning.
3. Check the bag in place switch to see if it is functioning.

6.3.4 Weighments are Erratic

If the weighments vary from too high to too low, check the following items:

1. Check the mechanical operation of the weigh bucket to make sure there is not anything coming into contact with it.
2. Check the size of the package to make sure there is enough room for the product to fit into the bag without it having to be forced into the bag. A few inches are recommended for this. (To find out if this is happening lower the weight going into bag to see if it runs accurate).
3. For dual set point machines, check the dribble (SP1) and cutoff (SP2) set points. Once SP1 is achieved, the machine should run at the dribble rate for a minimum of two seconds for proper operation.
4. Check the load cells for proper operation. If a load cell is damaged or does not function properly, replace it.
5. Check the zero of the machine. Make sure it stays on zero and doesn't jump around. If the zero is unstable, a faulty load cell or zero pot may be the cause.

6.3.5 Machine Fails To Start After The STOP Button Is Pulled Out

If the GN Series won't start when the bag clamp actuator switch is tripped, even though the machine is turned on, check the following items.

1. Check the STOP button to see if the contacts are working properly.
2. Check the voltage to and from the STOP button. The voltage should be 110 volts.
3. Check the MAC valve to see if it is getting voltage and the valve is functioning properly.
4. Check for the presence of voltage at the auto zero delay timer. If voltage is present, check to see if the valve changes states. If it does not change states, replace the MAC valve. Refer to 7.3.17 MAC Valve Replacement.
5. Check the MAC valve to see if it is getting air. If compressed air is not being supplied to the MAC valve, correct the air supply problem.

6.3.6 Bag Clamp Won't Apply

If the bag clamps do not apply when the bag clamp actuator switch is tripped, check the following items:

1. Check the bag clamp actuator switch to see if it is functioning.
2. Check the MAC valve to see if it is getting voltage and the valve is functioning properly.
3. Check the MAC valve to see if it is getting air. If compressed air is not being supplied to the MAC valve, correct the air supply problem.

6.3.7 Bag Clamp Won't Release

If the bag clamps won't release, use the steps below to diagnose the problem.

1. Check the MAC valve to see if it is getting voltage and the valve is functioning properly.
2. Check the MAC valve to see if it is getting air. If compressed air is not being supplied to the MAC valve, correct the air supply problem.

6.3.8 Bag Clamp Applies, But Doesn't Stay Applied

If the bag clamps won't stay applied, even though a bag is properly positioned, use the steps below to troubleshoot the problem.

1. Check the bag in place switch to see if it is functioning.

6.3.9 Load Cell Fails Frequently

CAUTION A sudden jerk or shock, such as being struck by a tool or hitting the spout, etc., can cause load cell damage. The load cell is NOT covered by warranty.

If the load cell fails frequently, check the following items:

1. Check the operating conditions to make sure that the load cell is not jarred, jerked, or being loaded with a sudden excessive force.
2. Check the load cell to make sure that the product being weighed does not exceed the rating of the load cell.

6.3.10 Fill speeds are too slow

If the fill rate is slow, check the following items:

1. Check the dribble (SP1) setting to make sure it isn't set too low. This would result in longer fill times.

6.4 System Alarms

During the filling process, conditions may occur that result in an alarm from the GN Series. Depending on the type of controller used, the alarms will vary.

6.4.1 T4000 Alarms

During the filling process, conditions may occur that result in one of the following T4000 alarms:

- A/D Failure Error! – An internal electronics error has occurred. Retry the operation. If the failure error re-occurs, power the machine down, then restart the machine and try the operation again. If the operation still fails, contact Magnum Systems technical assistance.
- A/D Convert Error! – The input from the load cell is outside of the acceptable range. Check the load cell for damage. If a new load cell has been installed, check the rating of the load cell to make sure that the correct load cell has been installed.
- Motion Error! – The controller has detected that the vessel or product is in motion and the controller cannot finalize the weighment. Check the machine settings and retry.
- Trad Cal Error! – An error occurred during the calibration process. Try to calibrate the machine again. If the error occurs again, contact Magnum Systems technical assistance.
- C2 Cal Error! – This error should not occur, as Magnum Systems does not use C2® type load cells. If this error does occur, contact Magnum Systems technical assistance.
- Too Lo Error! – Verify that the load cell signal level is 0-15 mV. Verify that there is enough weight on the scale. Perform Span then go back and Zero.
- Too Hi Error! – Verify that the load cell signal level is 0-15mV. Verify that there is not too much weight on the scale. Perform Span then go back and Zero.
- No C2 Sensor! – Instrument did not detect a C2® Load Sensor. This error should appear if C2® Cal is selected, as Magnum Systems does not use C2® type load cells. If this error does occur, contact Magnum Systems technical assistance.
- CAL Failed! – There are too few counts between Zero and Span. Reset either of the values, so that the counts are more than 1,000 counts of each other.
- C2 Caps Unequal! – This error should not occur, as Magnum Systems does not use C2® type load cells. If this error does occur, contact Magnum Systems technical assistance.
- HI/LO Too Close! – The Zero and Span values are not more than 1,000 counts from each other or there is no change, or there is a negative change. Reset either of the values, so that the counts are more than 1,000 counts of each other.
- Function Error! – The operator has pressed a function button and the function did not work. Try the function again. If it does not work, cycle the power off and on. If it still doesn't work, contact Magnum Systems technical assistance.
- Not Allowed! – The value entered by the operator is outside of the range that is allowed. The operator should try another value that is within the acceptable range.
- Security Violation! – User signed in with a password that does not allow performance of a certain function or entry to certain menus. Security level of the user identified in the User ID, too low for the menu or function.
- Overrange – The final package weight has exceeded the set point target.
- Gross ADC Error – The controller has detected a load cell error. Check all load cell connections. Repair connections as necessary. Check the load cell for damage. Replace the load cell if necessary. Refer to 7.3.1 Load Cell Replacement.

6.4.2 T3000 Alarms

During the filling process, conditions may occur that result in an alarm from the T3000. There are 3 different categories of alarms:

- Fill alarms
- Jog alarms
- Filler discharge alarms

For a full description of these alarms, refer to Chapter 3: Operating Procedures/Filler, of the Magnum Systems Filler/Dispenser/IBC T3000 User Guide, that is included in Appendix E of this manual.

6.4.2.1 Fill Alarms

Fill alarms are used to indicate that current conditions will not allow the selected fill feature to function properly. These alarms are:

- Not OK to fill alarm
- Lost OK to fill alarm
- No fast feed alarm
- Feed on alarm
- No medium feed alarm
- No slow feed alarm
- Slow feed on alarm
- Fill timeout alarm
- Underfill/overfill alarm

6.4.2.2 Jog Alarms

Jog alarms are used to indicate that current conditions will not allow the selected jog feature to function properly. These alarms are:

- Did not jog alarm
- Jog stuck on alarm
- Jog count alarm

6.4.2.3 Filler Discharge Alarms

Filler discharge alarms are used to indicate that current conditions will not allow the selected fill feature to function properly. These alarms are:

- Not OK to discharge alarm
- No discharge alarm
- Discharge clogged alarm
- Discharge on alarm

This Page Intentionally Left Blank

Chapter 7
Repair and Adjustment

7.1 General Description

When troubleshooting procedures have indicated that a component needs to be repaired, replaced, or adjusted, following the repair procedures contained in this chapter will assist maintenance personnel return the machine to operation in a timely manner.

7.2 System Adjustments

Depending on how the GN Series is configured, there are several adjustments that may be required from time to time. They are:

- Air pressure adjustments
- MAC valve flow control adjustments
- Bag clamp actuator speed adjustments

7.2.1 Air Pressure Adjustments

The Filter/Regulator/Lubricator (FRL) is the air pressure regulator for the GN Series. The machine requires that compressed air from the compressor be between 80 and 100 PSI (.55-.69 MPa) at 15 SCFM for proper operation. The operator will set the pressure regulator on the FRL to 80 PSI (.55 MPa). If air pressure is too high, the air pressure regulator can be used to adjust the output air pressure. The pressure regulator cannot be used to increase the air pressure higher than the pressure of the source.

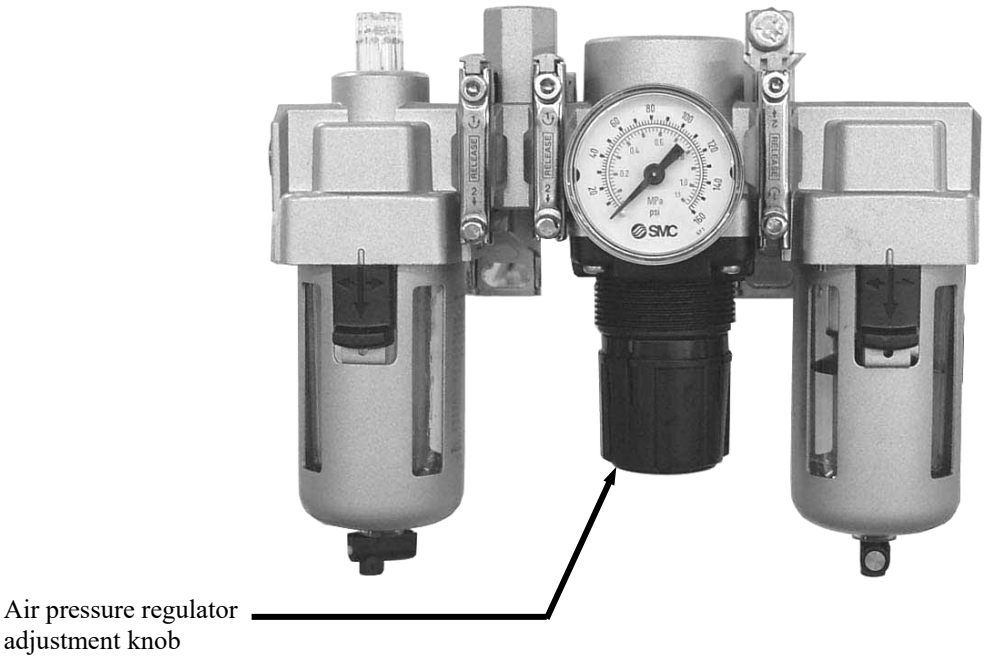


Figure 7-1. Air Pressure Regulator Adjustment Knob

7.2.2 Pneumatic Flow Control Adjustments for Flow and Dump Gates

If the operator has determined that the actuation speed of a pneumatic component is either too fast or too slow, the operator can adjust the actuation speed of that component by adjusting the flow control on the air supply line that feeds that pneumatic component. Use the steps below to adjust the airflow.

1. Locate the MAC valve that controls the affected component.
2. Locate the flow control screw on the top of the MAC valve.
3. Using a screwdriver turn the flow control screw. To increase the actuation speed, turn the adjustment screw counter-clockwise. To decrease the actuation speed, turn the adjustment screw clockwise.

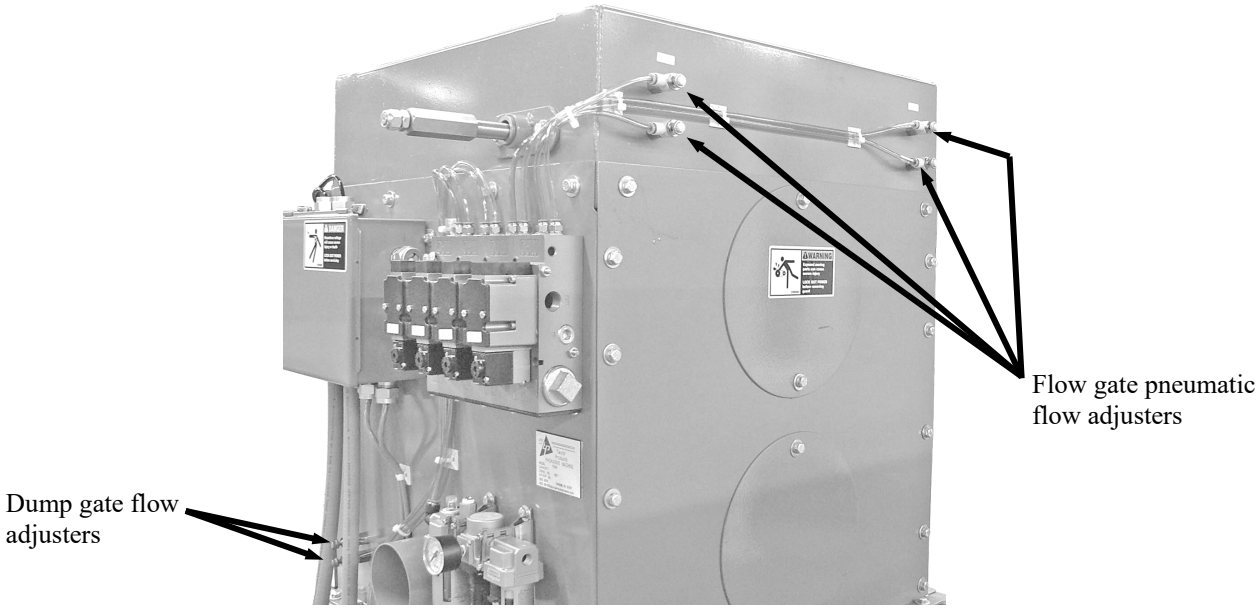


Figure 7-2. Adjusting Airflow to the Flow and Dump Gates

7.2.3 Adjusting Bag Clamp Cylinder Actuation Speed

To increase or decrease the speed of a bag clamp cylinder extending or retracting, use the flow adjusters on the quick connect fittings of the cylinder. Turning the adjusters clockwise will reduce the flow of air and will slow the speed. Turning the adjusters counter-clockwise will increase the flow of air and will increase the speed.

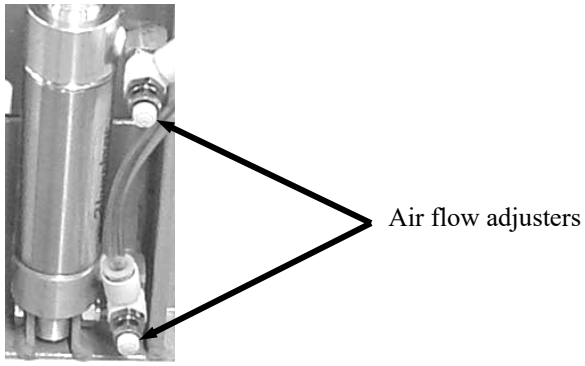


Figure 7-3. Bag Clamp Cylinder Air Flow Adjusters

7.3 System Repairs

Over time, components on the GN Series may become worn or damaged. If this occurs, follow the procedures in this section to repair or replace individual components.

> ***WARNING*** *When replacing parts, it is critical that only parts approved by Magnum Systems are used.*

7.3.1 Load Cell Replacement

In the event of a load cell failure, use the following steps to replace it.

> **CAUTION** A sudden jerk or shock, such as being struck by a tool or hitting the weigh bucket etc., can cause load cell damage. The load cell is NOT covered by warranty.

7.3.1.1 Load Cell Removal

1. Turn the GN Series off.
2. Disconnect the main electrical and pneumatic connections.
3. Remove the access panel that covers the load cell being replaced.
4. Install the shipping brackets to remove the load from the load cell.
5. Open the control panel.
6. Label and disconnect the load cell wires from the control board in the control panel.
7. Pull the load cell cable out of the control panel.
8. Remove any tie wraps that may be securing the load cell cable to the control panel, GN Series, or other cables.
9. Loosen and remove the load cell mounting bolts/nuts.
10. Remove the load cell and set it aside.

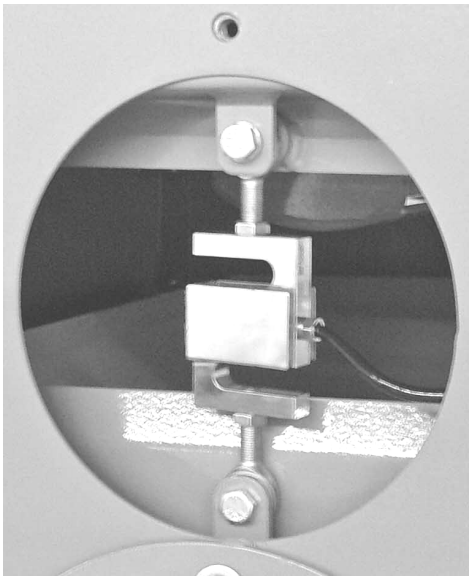


Figure 7-4. Load Cell (1 of 2 shown)

7.3.1.2 Load Cell Installation

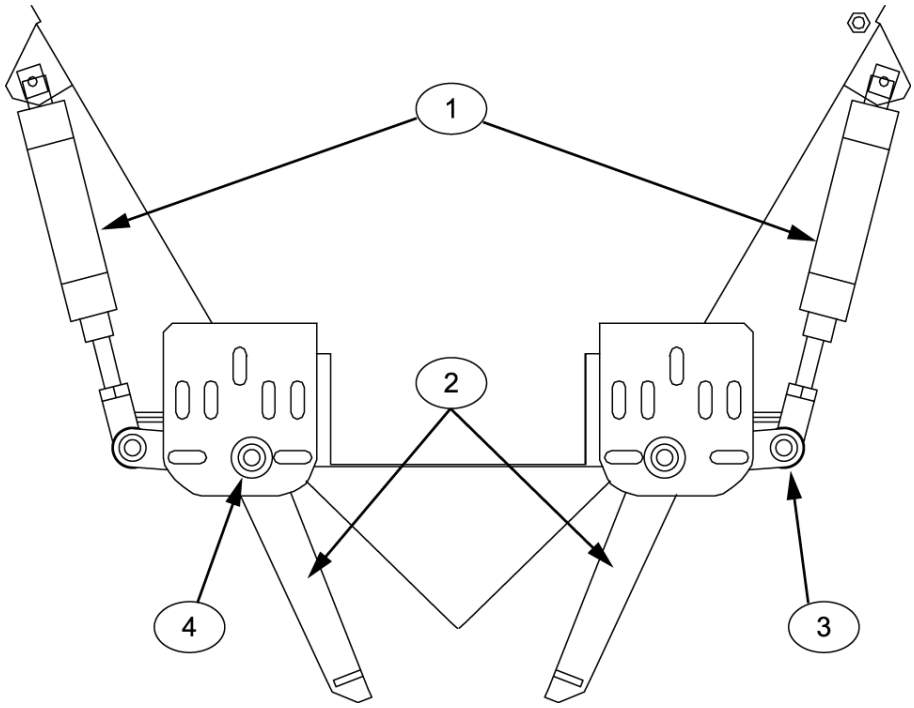
1. Carefully place the old load cell next to the new load cell.
2. Loosen the jam nuts on the rod ends on the old load cell about ½-turn.
3. Back the top rod end out of the old load cell.
4. Install the top rod end into the new load cell until the jam nut just touches the load cell.
5. Back the top rod end out of the new load cell ½-turn.
6. Tighten the jam nut on the top rod end against the load cell. DO NOT over tighten the jam nut.
7. Back the bottom rod end out of the old load cell.
8. Install the bottom rod end into the new load cell until the jam nut just touches the load cell.
9. Back the bottom rod end out of the new load cell ½-turn.
10. Tighten the jam nut on the bottom rod end against the load cell. DO NOT over tighten the jam nut.
11. Position the load cell and install and tighten the top mounting bolt/nut.
12. Install and tighten the lower mounting bolt/nut.
13. Install the access panel.
14. Route the load cell cable into the control panel.
15. Connect the load cell wires to the control board.
16. Close the control panel.
17. Connect the main electrical and pneumatic connections.
18. Calibrate the GN Series. Refer to 3.8 Calibration.

7.3.2 Dump Gate Cylinder Replacement

If one of the dump gate cylinders fails to function, use the information below to replace it.

7.3.2.1 Dump Gate Cylinder Removal

1. Turn the GN Series off.
2. Disconnect the main electrical and pneumatic connections.
3. Open the access panel.
4. Label the air supply lines connected to the dump gate cylinder.
5. Disconnect the air supply lines from the dump gate cylinder.
6. While using a wrench to hold the bolt on the rod end of the cylinder, loosen and remove the mounting nut.
7. Remove the bolt from the rod end.
8. While using a wrench to hold the mounting bolt on the cylinder end, loosen and remove the mounting nut.
9. While holding the cylinder with one hand, remove the mounting bolt.
10. Remove the cylinder.



Item #	Description	Item #	Description
1	Dump gate cylinders	3	Dump gate lever (part of item #2)
2	Dump gates	4	Dump gate pivot bearing

Figure 7-5. Dump Gate Cylinders

7.3.2.2 Dump Gate Cylinder Installation

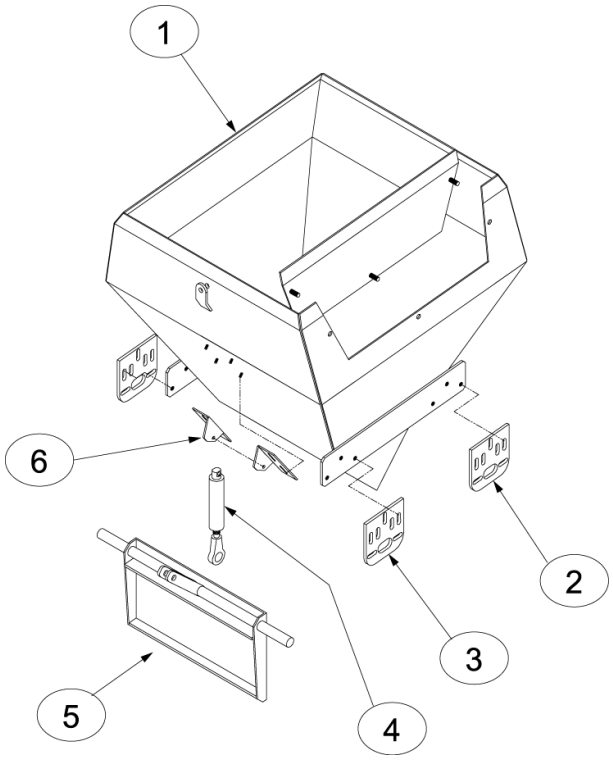
1. Place the new cylinder on a bench next to the old dump gate cylinder. Make sure that both rods are retracted. Loosen the jam nut on the rod end of the new cylinder.
2. Either tighten or loosen the rod end until it is even with the rod end on the old cylinder.
3. Tighten the jam nut against the rod end to prevent it from moving.
4. Position the cylinder in its mounting location and install the cylinder to mounting bracket bolt.
5. Install the washer and nut on the bolt. DO NOT over tighten the nut. Over tightening could impede the operation of the dump gate.
6. Position the rod end of the cylinder so that the rod end is lined up with the mounting arm on the dump gate. Install the mounting bolt.
7. Install the washer and mounting nut. Tighten the nut. DO NOT over tighten the nut. Over tightening could impede the operation of the dump gate.
8. Connect the air supply lines to the cylinder.
9. Connect the main electrical and pneumatic connections.
10. Turn the GN Series on and test for proper operation.

7.3.3 Dump Gate Replacement

Due to the abrasiveness of some products, the dump gates may require periodic replacement.

7.3.3.1 Dump Gate Removal

1. Turn the GN Series off.
2. Disconnect the main electrical and pneumatic connections.
3. Open the access panel.
4. Disconnect the dump gate cylinder from the dump gate.
5. Remove nuts from the dump gate mounting bracket bolts.
6. While holding the dump gate with one hand, remove the mounting bolts and then lower the dump gate.



Item #	Description	Item #	Description
1	Weigh bucket	4	Dump gate cylinder (1 of 2 shown)
2	Dump gate pivot bracket (gate not shown)	5	Dump gate (1 of 2 shown)
3	Dump gate pivot bracket (gate shown)	6	Dump gate cylinder to weigh bucket bracket

Figure 7-6. Dump Gate Components

7.3.3.2 Dump Gate Installation

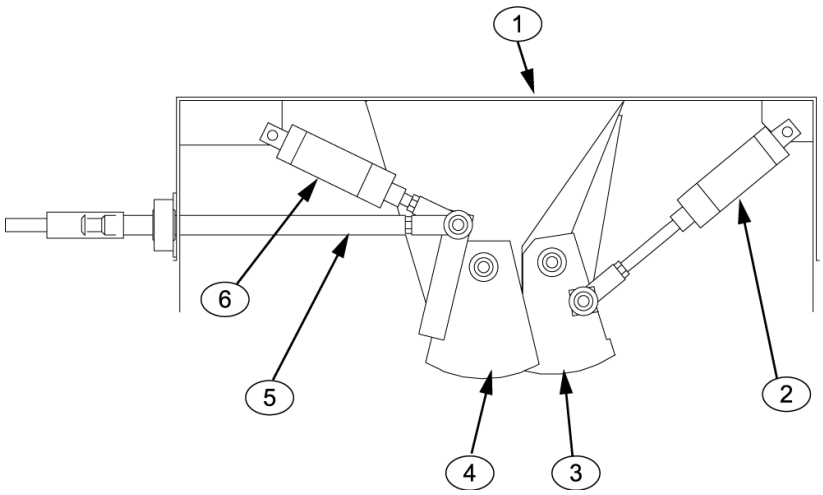
1. Position the dump gate.
2. Install the mounting bolts.
3. Install the nuts on the mounting bolts.
4. Connect the dump gate cylinder to the dump gate.
5. Close the access panel.
6. Connect the main electrical and pneumatic connections.
7. Turn the GN Series on and test for proper operation.

7.3.4 Dribble Gate Cylinder Replacement

If the dribble gate cylinder fails to operate or develops a leak, use the steps below to replace it.

7.3.4.1 Dribble Gate Cylinder Removal

1. Turn the GN Series off.
2. Disconnect the main electrical and pneumatic connections.
3. Open the access panel.
4. Label and disconnect the air supply lines from the cylinder being replaced.
5. Loosen and remove the nut that secures the rod end on the stud on the gate.
6. Remove the washer from the stud on the gate.
7. Loosen and remove the nut from the bolt that secures the cylinder to the spout.
8. While holding the cylinder with one hand, remove the bolt that secures the cylinder to the spout.
9. Pivot the spout end of the cylinder outward and then slide the rod end off of the stud on the gate and remove the cylinder from the GN Series.



Item #	Description	Item #	Description
1	Cabinet	4	Main gate
2	Dribble gate cylinder	5	Main gate adjustment
3	Dribble gate	6	Main gate cylinder

Figure 7-7. Dribble and Bulk Flow Gates and Cylinders

7.3.4.2 Dribble Gate Cylinder Installation

1. Check to make sure that a washer is on the stud on the dribble gate.
2. Position the rod end of the cylinder onto the dribble gate stud.
3. Pivot the cylinder so that the cylinder mounting hole is lined up with the holes in the mounting bracket on the spout.
4. Insert the bolt through the cylinder mounting bracket and cylinder mounting hole.
5. Install the nut on the cylinder mounting bolt.
6. Install the washer on the flow gate stud.
7. Install and tighten the nut on the stud.
8. Connect the air supply lines to the quick connect fittings on the cylinder.
9. Connect the main electrical and pneumatic connections.
10. Turn the GN Series on and test for proper operation.

7.3.5 Dribble Gate Replacement

Due to the abrasiveness of some products, the dribble gate may require periodic replacement.

7.3.5.1 Dribble Gate Removal

1. Turn the GN Series off.
2. Disconnect the main electrical and pneumatic connections.
3. Open the access panel.
4. Remove the dribble gate cylinder. Refer to 7.3.4 Dribble Gate Cylinder Replacement.
5. Loosen the two dribble gate to spout mounting bolts.
6. While holding the dribble gate, remove the two mounting bolts.
7. Remove the dribble gate.

7.3.5.2 Dribble Gate Installation

1. Position the dribble gate and loosely install the dribble gate mounting bolts.
2. Once both mounting bolts have been started, tighten the bolts.
3. Install the dribble gate cylinder. Refer to 7.3.4 Dribble Gate Cylinder Replacement.
4. Close the access panel.
5. Connect the main electrical and pneumatic connections.
6. Turn the GN Series on and test for proper operation.

7.3.6 Dribble Gate Pivot Bearing Replacement

In the event that one or both of the bearings mounted in the dribble gate becomes worn so that it no longer allows free movement, follow the procedures below to replace it.

7.3.6.1 Dribble Gate Bearing Removal

1. Remove the dribble gate. Refer to 7.3.5 Dribble Gate Replacement.
2. Stand the dribble gate on its side so that the bearing being replaced is located at the top.

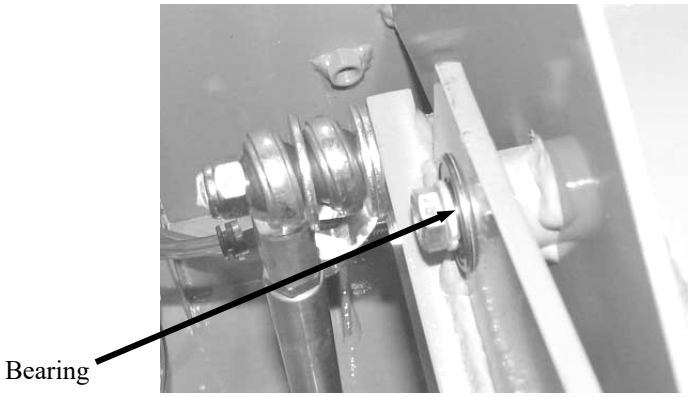


Figure 7-8. Dribble Gate Bearings

3. Heat the area immediately surrounding the bearing being replaced to approximately 480°F (250°C).
4. Place a clean metal container against the dribble gate, just below the bearing being replaced.
5. Use a screwdriver or punch to push the bearing out of the hole into the metal catch container.
6. Repeat Steps 3, 4, and 5 for all bearings that need replaced.

7.3.6.2 Dribble Gate Bearing Installation

1. Position the dribble gate so that the metal surfaces with the bearing holes are vertical.
2. Apply a small bead of LOCTITE® 680 Retaining compound around the outer surface of the bearing.

CAUTION Do not allow any of the LOCTITE® 680 to penetrate into the actual bearing. This would likely cause the bearing to seize, or at the very least would adversely affect the operation of the bearing.

3. Insert the bearing into the bearing hole in the dribble gate.
4. The bearing is slightly thicker than the dribble gate itself. Center the bearing in the hole.
5. Repeat Steps 1, 2, and 3 until all of the bearings have been installed.
6. Set the dribble gate aside for a couple of minutes to allow the LOCTITE® 680 to setup.
7. Install the dribble gate. Refer to 7.3.5 Dribble Gate Replacement.

7.3.7 Main Gate Cylinder Replacement

If the main gate cylinder fails to operate or develops a leak, use the steps below to replace it.

7.3.7.1 Main Gate Cylinder Removal

1. Turn the GN Series off.
2. Disconnect the main electrical and pneumatic connections.
3. Open the access panel.
4. Label and disconnect the air supply lines from the cylinder.
5. Loosen and remove the nut from the main gate stud.
6. Remove the washer from the main gate stud.
7. Slide the bulk flow adjustment rod end off of the stud.
8. Remove the second washer from the stud.
9. Loosen and remove the nut from the bolt that secures the cylinder to the spout.
10. While holding the cylinder with one hand, remove the bolt that secures the cylinder to the spout.
11. Pivot the spout end of the cylinder outward and then slide the rod end off of the stud on the gate and remove the cylinder from the GN Series.

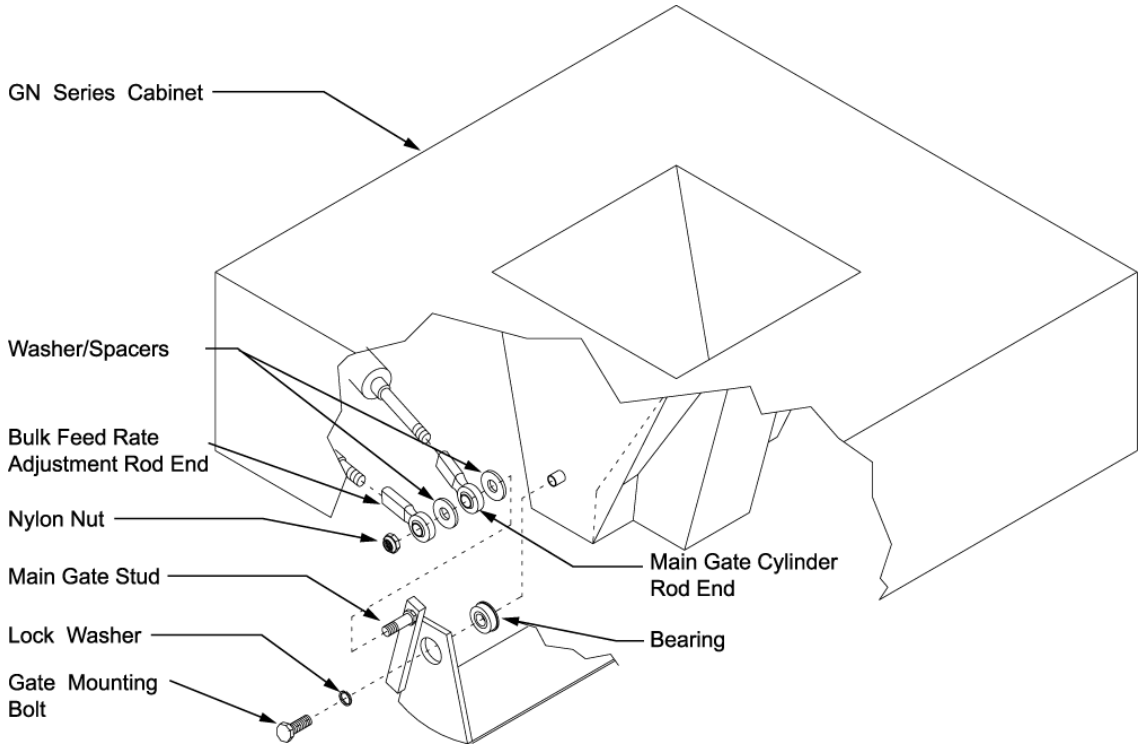


Figure 7-9. Cylinder To Flow Gate Connection

7.3.7.2 Main Gate Cylinder Installation

1. Check to make sure that a washer is on the main gate stud.
2. Position the rod end of the cylinder onto the main gate stud.
3. Pivot the cylinder so that the cylinder mounting hole is lined up with the holes in the mounting bracket on the spout.
4. Insert the bolt through the cylinder mounting bracket and cylinder mounting hole.
5. Install and tighten the nut on the cylinder mounting bolt.
6. Install a washer on the main gate stud.
7. Install the bulk flow adjustment rod end on the main gate stud.
8. Install and tighten the nut on the stud.
9. Connect the air supply lines to the quick connect fittings on the cylinder.
10. Connect the main electrical and pneumatic connections.
11. Turn the GN Series on and test for proper operation.

7.3.8 Main Gate Replacement

Due to the abrasiveness of some products, the main gate may require periodic replacement.

7.3.8.1 Main Gate Removal

1. Turn the GN Series off.
2. Disconnect the main electrical and pneumatic connections.
3. Open the access panel.
4. Remove the main gate cylinder. Refer to 7.3.7 Main Gate Cylinder Replacement.
5. Loosen the two main gate to spout mounting bolts.
6. While holding the main gate, remove the two mounting bolts.
7. Remove the main gate.

7.3.8.2 Main Gate Installation

1. Position the main gate and loosely install the main gate mounting bolts.
2. Once both mounting bolts have been started, tighten the bolts.
3. Install the main gate cylinder. Refer to 7.3.7 Main Gate Cylinder Replacement.
4. Close the access panel.
5. Connect the main electrical and pneumatic connections.
6. Turn the GN Series on and test for proper operation.

7.3.9 Main Gate Pivot Bearing Replacement

In the event that one or both of the bearings mounted in the main gate becomes worn so that it no longer allows free movement, follow the procedures below to replace it.

7.3.9.1 Main Gate Bearing Removal

1. Remove the main gate. Refer to 7.3.8 Main Gate Replacement.
2. Stand the main gate on its side so that the bearing being replaced is located at the top.
3. Heat the area immediately surrounding the bearing being replaced to approximately 480°F (250°C).
4. Place a clean metal container against the main gate, just below the bearing being replaced.
5. Use a screwdriver or punch to push the bearing out of the hole into the metal catch container.
6. Repeat Steps 3, 4, and 5 for all bearings that need replaced.

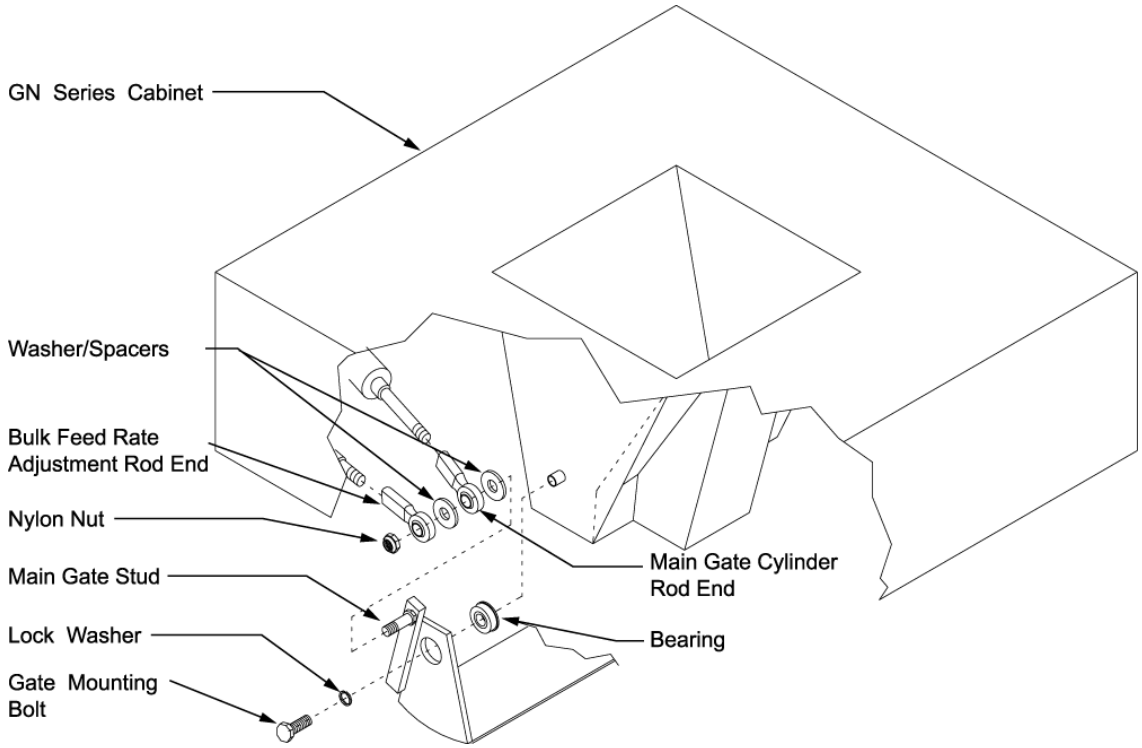


Figure 7-10. Main Gate Exploded View

7.3.9.2 Main Gate Bearing Installation

1. Position the main gate so that the metal surfaces with the bearing holes are vertical.
2. Apply a small bead of LOCTITE® 680 Retaining compound around the outer surface of the bearing.

> **CAUTION** Do not allow any of the LOCTITE® 680 to penetrate into the actual bearing. This would likely cause the bearing to seize, or at the very least would adversely affect the operation of the bearing.

3. Insert the bearing into the bearing hole in the main gate.
4. The bearing is slightly thicker than the main gate itself. Center the bearing in the hole.
5. Repeat steps 1, 2, and 3 until all of the bearings have been installed.
6. Set the main gate aside for a couple of minutes to allow the LOCTITE® 680 to setup.
7. Install the main gate. Refer to 7.3.8 Main Gate Replacement.

7.3.10 Bag Clamp Pad (V-Type Bag Clamp) Replacement

Over time, the rubber bag clamps may become worn or may get damaged. Use the following steps to replace them.

7.3.10.1 Bag Clamp Pad (V-Type Bag Clamp) Removal

1. Turn the GN Series off.
2. Disconnect the main electrical and pneumatic connections.
3. Remove the four nuts that secure the bag clamp pad to the bag clamp arm.
4. Remove the four lock nuts from the bag clamp pad studs.
5. Remove the bag clamp pad.

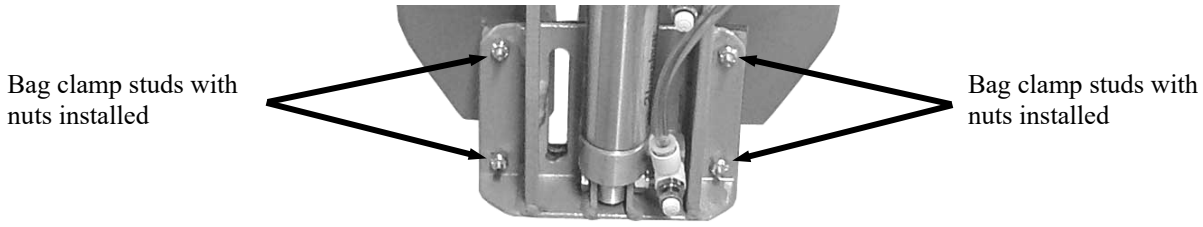


Figure 7-11. Bag Clamp Pad Mounting

7.3.10.2 Bag Clamp Pad (V-Type Bag Clamp) Installation

1. Position the new bag clamp pad so that the studs go through the four mounting holes in the bag clamp arm.
2. Install the lock washer and nut on each bag clamp stud.
3. Once all of the washers and nuts have been installed, tighten them.
4. Connect the main electrical and pneumatic connections.
5. Turn the GN Series on and test for proper operation.

7.3.11 Bag Clamp (V-Type Bag Clamp) Cylinder Replacement

If one of the bag clamp cylinders fails to operate or develops a leak, use the steps below to replace it.

7.3.11.1 Bag Clamp Cylinder (V-Type Bag Clamp) Removal

1. Turn the GN Series off.
2. Disconnect the main electrical and pneumatic connections.
3. Label and disconnect the air supply lines from the bag clamp cylinder.
4. Loosen and remove the nut from the cylinder to bag clamp arm bolt.
5. Remove the cylinder to bag clamp arm bolt.
6. Use a wrench to back the jam nut off about ¼ turn. Back the jam nut off just enough to allow the cylinder rod to turn in the pivot block.
7. While holding the cylinder with one hand, back the rod end out of the pivot block with the other.
8. Remove the cylinder from the GN Series.

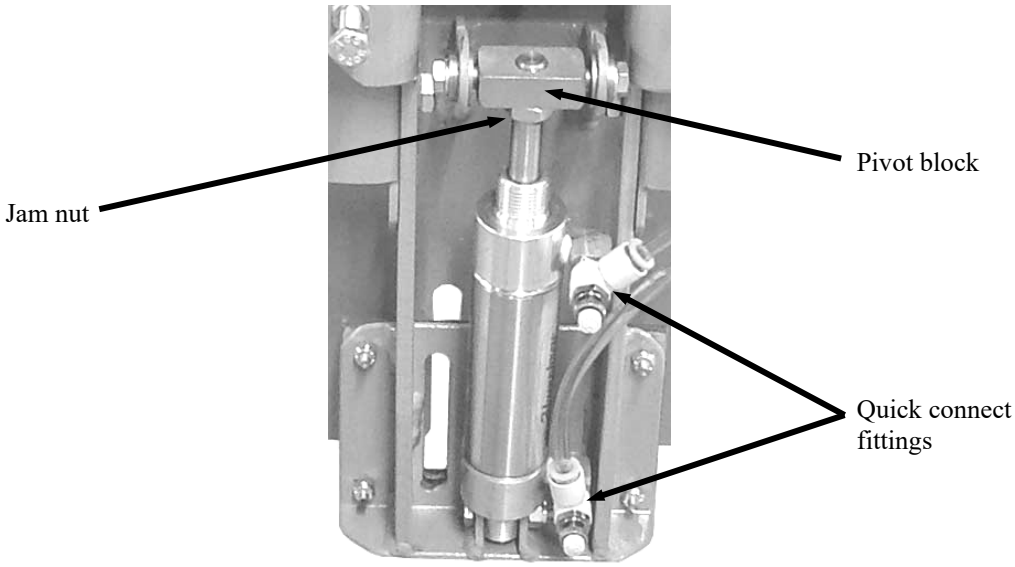


Figure 7-12. Bag Clamp Cylinder (1 of 2 shown)

7.3.11.2 Bag Clamp Cylinder (V-Type Bag Clamp) Installation

1. Lay the new bag clamp cylinder next to the old cylinder.
2. Remove the air fittings from the old cylinder and transfer them to the new cylinder. Make sure that the fitting on the rod end of the old cylinder is installed in the rod end of the new cylinder. Refer to 7.3.20 Pneumatic Quick Connect Fitting Replacement.
3. Set the jam nut on the new cylinder to match the position of the jam nut on the old cylinder.
4. Thread the cylinder rod into the pivot block until the jam nut just touches the pivot block. Then back the cylinder rod off about ¼ turn.
5. Pivot the cylinder end into the cylinder mounting bracket on the bag clamp arm.
6. Insert the cylinder to bag clamp arm mounting bolt.
7. Install and tighten the nut on the cylinder to bag clamp arm mounting bolt.
8. Connect the air supply lines to the cylinder quick connect fittings.
9. Connect the main electrical and pneumatic connections.
10. Turn the GN Series on and test for proper operation.

7.3.12 Bag Clamp Pad Arm (V-Type Bag Clamp) Replacement

If one of the bag clamp pad arms is damaged, use the steps below to replace it.

7.3.12.1 Bag Clamp Pad Arm (V-Type Bag Clamp) Removal

1. Turn the GN Series off.
2. Disconnect the main electrical and pneumatic connections.
3. Remove the bag clamp cylinder. Refer to 7.3.11 Bag Clamp Cylinder (V-Type Bag Clamp) Replacement.
4. Remove the two bag clamp pad arm to spout mounting bolts.
5. Remove the bag clamp pad arm.
6. If the arm is being replaced, remove the bag clamp pad from the arm. Refer to bag clamp pad replacement.

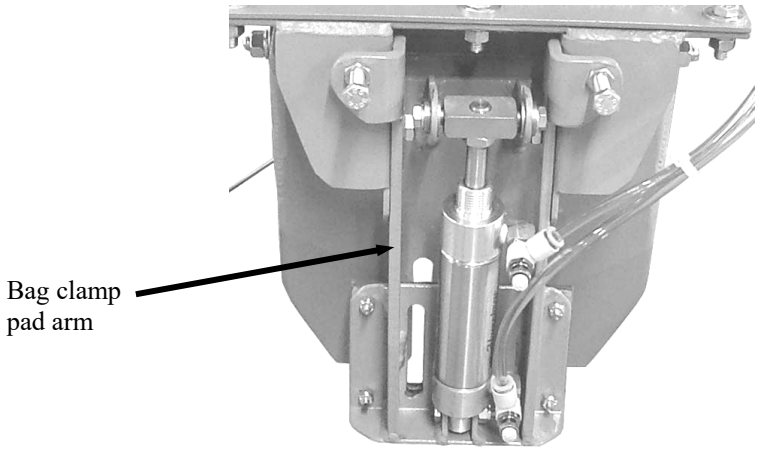


Figure 7-13. Bag Clamp Pad Arm

7.3.12.2 Bag Clamp Pad Arm (V-Type Bag Clamp) Installation

1. Position the bag clamp pad arm so the mounting holes are lined up with the mounting holes in the spout.
2. Install and tighten the mounting bolts.
3. Install the bag clamp cylinder. Refer to 7.3.11 Bag Clamp Cylinder (V-Type Bag Clamp) Replacement.
4. Connect the main electrical and pneumatic connections.
5. Turn the GN Series on and test for proper operation.

7.3.13 Bag Clamp Jaw Replacement

In the event that one of the bag clamp jaws becomes worn or damaged, use the steps below to replace it.

7.3.13.1 Bag Clamp Jaw Removal

1. Turn the GN Series off.
2. Disconnect the main electrical and pneumatic connections.
3. Remove the mounting hardware (nuts, washers, and bolts) at the two bag clamp jaw to spout mounting points.
4. Remove the bag clamp jaw.

7.3.13.2 Bag Clamp Jaw Installation

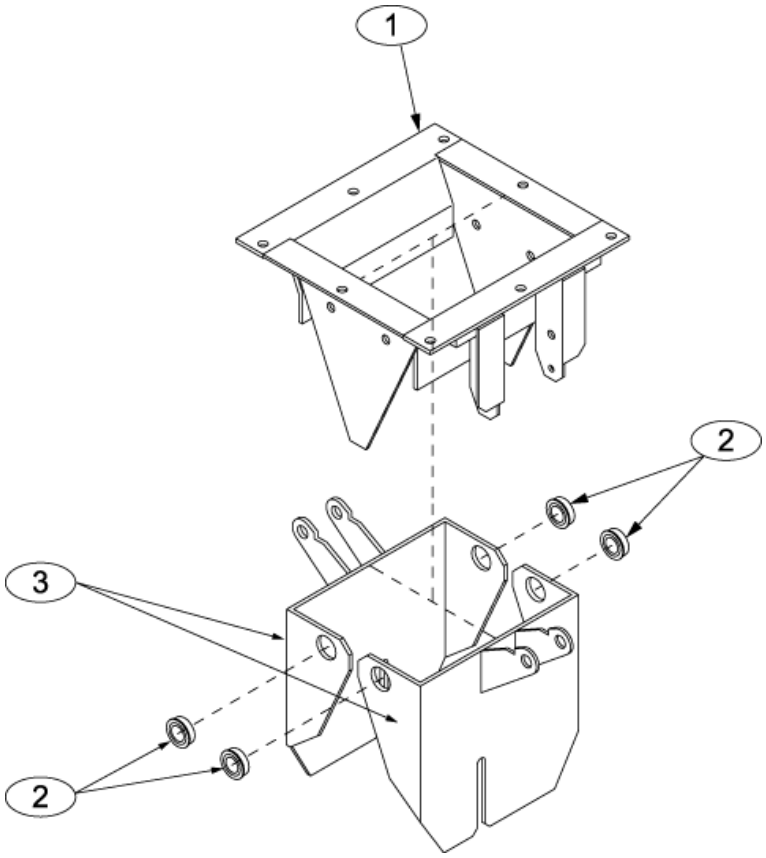
1. Position the bag clamp jaw.
2. Insert the bag clamp jaw mounting bolts.
3. Install the washers on the bag clamp jaw mounting bolts.
4. Install and tighten the bag clamp jaw mounting nuts. DO NOT over tighten the nuts, as this may inhibit the operation of the bag clamp jaw.
5. Connect the main electrical and pneumatic connections.
6. Turn the GN Series on and test for proper operation.

7.3.14 Bag Clamp Jaw Bearing Replacement

In the event that one or both of the bag clamp jaw bearings becomes worn so that it no longer allows free movement, follow the procedures below to replace it.

7.3.14.1 Bag Clamp Jaw Bearing Removal

1. Turn the GN Series off.
2. Disconnect the main electrical and pneumatic connections.
3. Remove the bag clamp cylinder. Refer to 7.3.11 Bag Clamp Cylinder (V-Type Bag Clamp) Replacement.
4. Remove the bag clamp arm. 7.3.12 Bag Clamp Pad Arm (V-Type Bag Clamp) Replacement.
5. Stand the bag clamp arm on its side so that the bearing being replaced is located at the top.
6. Heat the area immediately surrounding the bearing being replaced to approximately 480°F (250°C).
7. Place a clean metal container against the main gate, just below the bearing being replaced.
8. Use a screwdriver or punch to push the bearing out of the hole into the metal catch container.
9. Repeat steps 3, 4, and 5 for all bearings that need replaced.



Item #	Description	Item #	Description
1	Spout	3	Bag Clamp Jaw
2	Bag Clamp Arm Bearings		

Figure 7-14. Main Gate Bearings

7.3.14.2 Bag Clamp Jaw Bearing Installation

1. Position the bag clamp arm so that the metal surfaces with the bearing holes are vertical.
2. Apply a small bead of LOCTITE® 680 Retaining compound around the outer surface of the bearing.

> **CAUTION** Do not allow any of the LOCTITE® 680 to penetrate into the actual bearing. This would likely cause the bearing to seize, or at the very least would adversely affect the operation of the bearing.

3. Insert the bearing into the bearing hole in the main gate.
4. The bearing is slightly thicker than the main gate itself. Center the bearing in the hole.
5. Repeat Steps 1, 2, and 3 until all of the bearings have been installed.
6. Set the main gate aside for a couple of minutes to allow the LOCTITE® 680 to setup.
7. Install the bag clamp arm. 7.3.11 Bag Clamp Pad Arm (V-Type Bag Clamp) Replacement.
8. Install the bag clamp cylinder. Refer to 7.3.11 Bag Clamp Cylinder (V-Type Bag Clamp) Replacement.
9. Connect the main electrical and pneumatic connections.
10. Turn the GN Series on and test for proper operation.

7.3.15 Spout (V-Type Bag Clamp) Replacement

If the spout becomes damaged or worn, use the following steps to replace it.

7.3.15.1 Spout (V-Type Bag Clamp) Removal

1. Turn the GN Series off.
2. Disconnect the main electrical and pneumatic connections.
3. Remove the bag clamp cylinders. Refer to 7.3.11 Bag Clamp Cylinder (V-Type Bag Clamp) Replacement.
4. Remove the bag clamp pad arms. Refer to 7.3.12 Bag Clamp Pad Arm (V-Type Bag Clamp) Replacement.
5. Loosen the nuts on the mounting bolts around the flange of the spout. Remove all of the nuts, washers and bolts from the flange, except for the ones on two opposite corners of the spout.
6. While supporting the spout, remove the remaining nuts, washers and bolts from the flange.
7. Lower the spout.

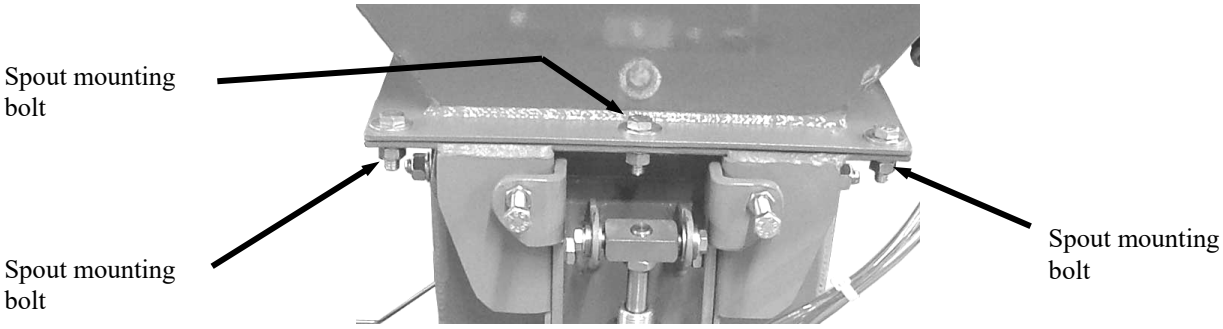


Figure 7-15. Spout Mounting Bolts

7.3.15.2 Spout (V-Type Bag Clamp) Installation

1. Position and support the spout.
2. Install a flat washer on each of the mounting bolts.
3. Install two mounting bolt, from the top, through the flange on the cabinet and spout on opposite corners.
4. Install the lock washer and nut on the two bolts. Do not tighten at this time.
5. Install the remaining bolts, from the top, through the flange on the cabinet and spout.
6. Install the lock washers and nuts on each of the bolts.
7. Tighten each bolt/nut a little at a time, working around the perimeter until all bolts/nuts are tight.
8. Install the bag clamp pad arms. Refer to 7.3.12 Bag Clamp Pad Arm (V-Type Bag Clamp) Replacement.
9. Install the bag clamp cylinders. Refer to 7.3.11 Bag Clamp Cylinder (V-Type Bag Clamp) Replacement.
10. Connect the main electrical and pneumatic connections.
11. Turn the GN Series on and test for proper operation.

7.3.16 Inflatable Bladder Replacement

On GN Series machines that are equipped with an inflatable bag clamp, use the steps below to replace a damaged inflatable bladder.

7.3.16.1 Inflatable Bladder Removal

1. Turn the GN Series off.
2. Disconnect the main electrical and pneumatic connections.
3. Label and disconnect the air supply line from the quick connect fitting on the spout.
4. Fold the flap up to expose the tabs and setscrews on the top compression ring.

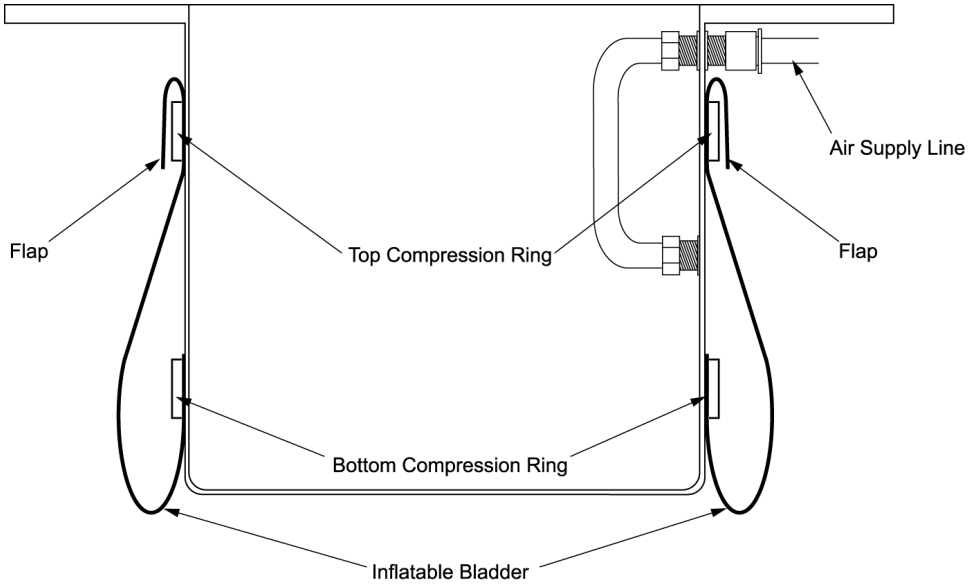


Figure 7-16. Section View of Open Mouth Bag Spout and Inflatable Bladder

5. Using C-clamp style locking pliers, apply pressure to the tabs of the top compression ring.

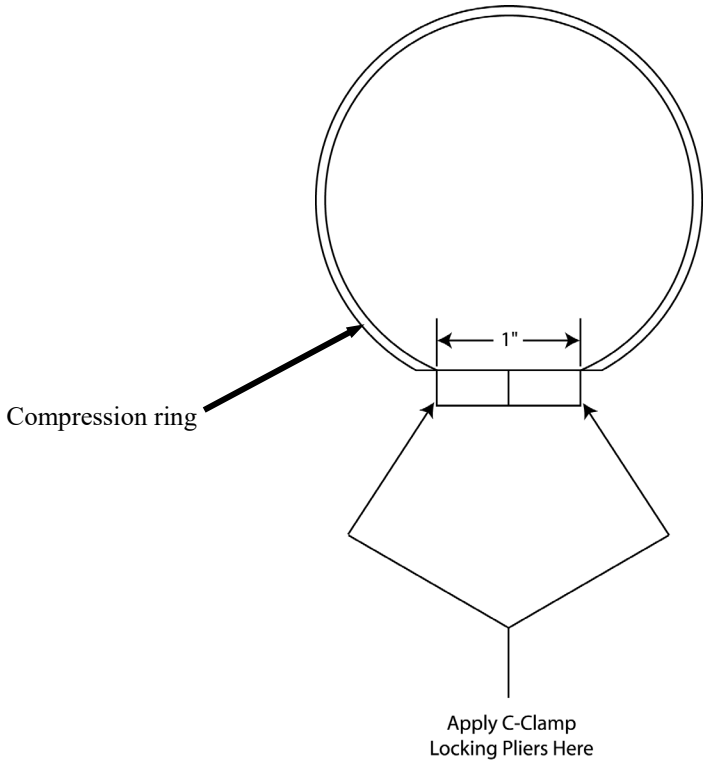


Figure 7-17. Inflatable Bladder Compression Ring

6. Remove the setscrews from the top compression ring.
7. Remove the C-clamp style locking pliers.
8. Slide the top compression ring off of the spout
9. Pull the bladder straight down to expose the second compression ring.
10. Using C-clamp style locking pliers, apply pressure to the tabs on the bottom compression ring.
11. Remove the setscrews from the bottom compression ring.
12. Remove the C-clamp style locking pliers.
13. Slide the bottom compression ring off of the spout.

    Note: *The two compression rings are different sizes and cannot be interchanged.*

    Note: *Make note of how the bladder is positioned. The new bladder will need to be positioned in the same manner as the one that is being removed.*

14. Remove the bladder.
15. Inspect the compression rings for damage or wear. If they are damaged or worn, discard them and install new ones with the new bladder.

7.3.16.2 Inflatable Bladder Installation

1. Turn the new bladder inside out.
2. Slide the new inflatable bladder on to the spout. Position it on the spout in the same position as the old bladder.

   Note: *The two compression rings are different sizes and cannot be interchanged.*

3. Position the bottom compression ring.
4. Using C-clamp style locking pliers, apply pressure to the tabs on the bottom compression ring.
5. Install and tighten the setscrews for the bottom compression ring.
6. Remove the C-clamp style locking pliers.
7. Grasp the edge of the bladder at the bottom. Roll the edge outward and upward, creating a flap. This motion will begin the process of turning the bladder right side out.

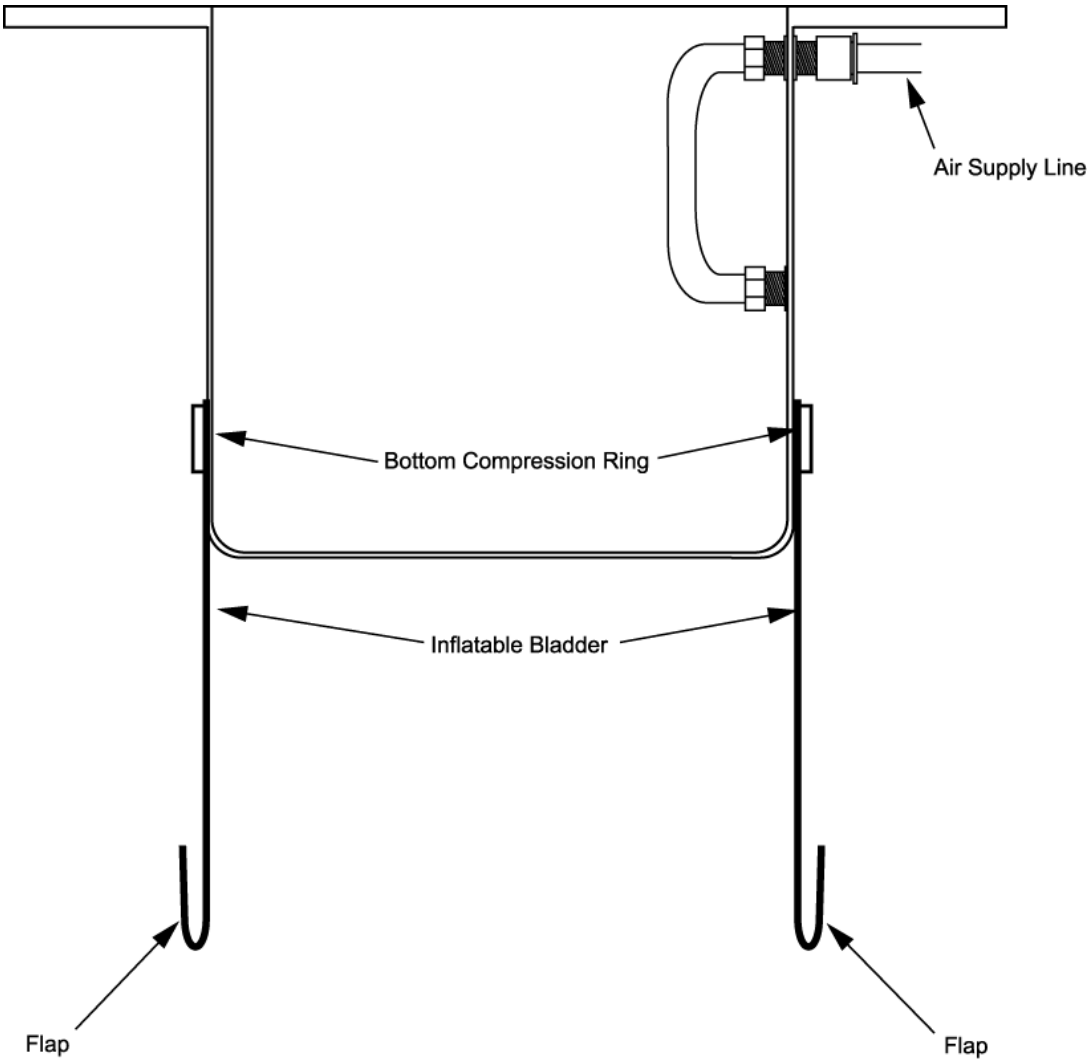


Figure 7-18. Creating the Flap

8. Using the flap, pull the bladder up to the top of the spout and roll the edge outward and downward, creating a new flap.

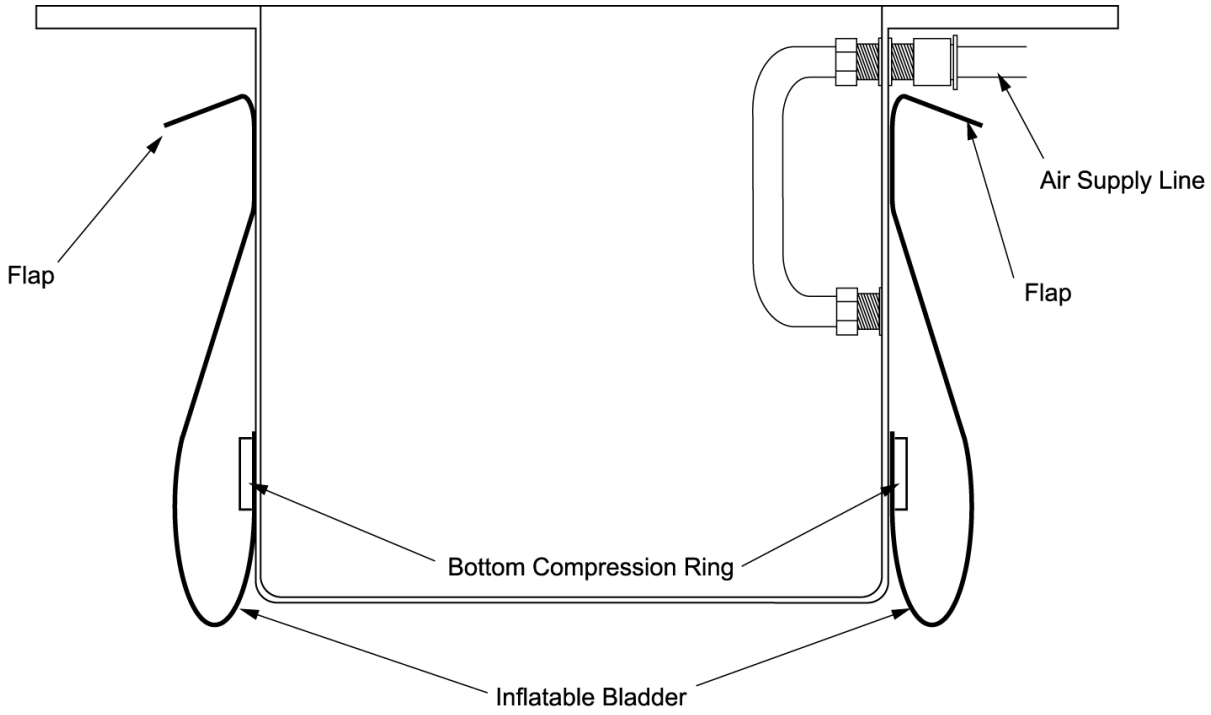


Figure 7-19. Pulling the Bladder Up, and Creating the Upper Flap

9. Slide the top compression ring into position.
10. Using C-clamp style locking pliers, apply pressure to the tabs on the top compression ring.
11. Install and tighten the setscrews for the top compression ring.
12. Remove the C-clamp style locking pliers.
13. Pull the flap down to cover the top compression ring.
14. Install the air supply line into the quick connect fitting.
15. Connect the main electrical and pneumatic connections.
16. Turn the GN Series on and test the bladder for proper operation.

7.3.17 MAC Valve Replacement

In the event that a MAC valve becomes damaged, or fails to function, or develops a leak, follow the procedure below to replace the MAC valve.

7.3.17.1 MAC Valve Removal

1. Turn the GN Series off.
2. Disconnect the main electrical and pneumatic connections.
3. Disconnect the air line from the quick connect fitting on the MAC valve.
4. Remove the four mounting screws.
5. Unplug and remove the MAC valve.

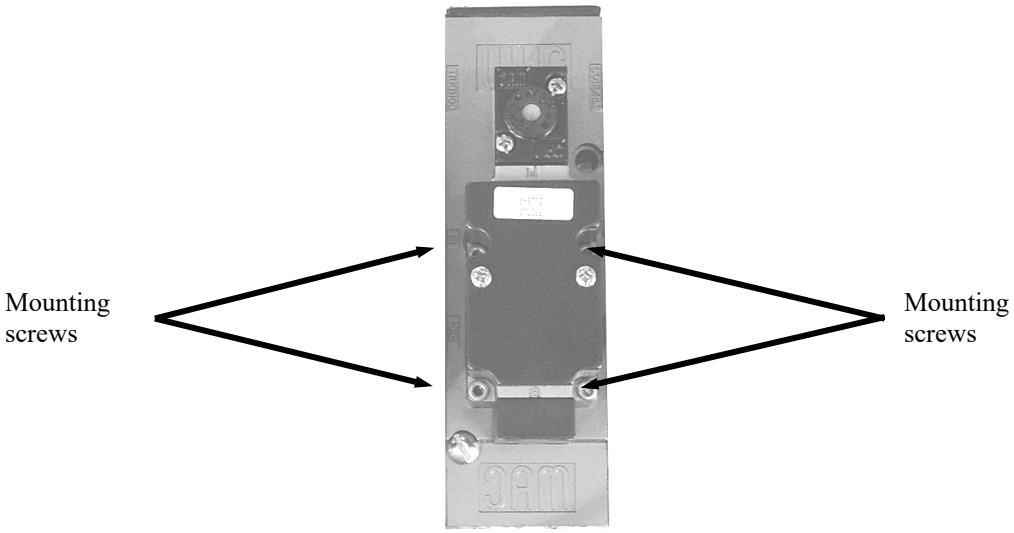


Figure 7-20. MAC Valve Solenoid Mounting Screws

7.3.17.2 MAC Valve Installation

1. Position the valve gasket securely in the groove in the valve base.
2. Position the new MAC valve and plug it in.

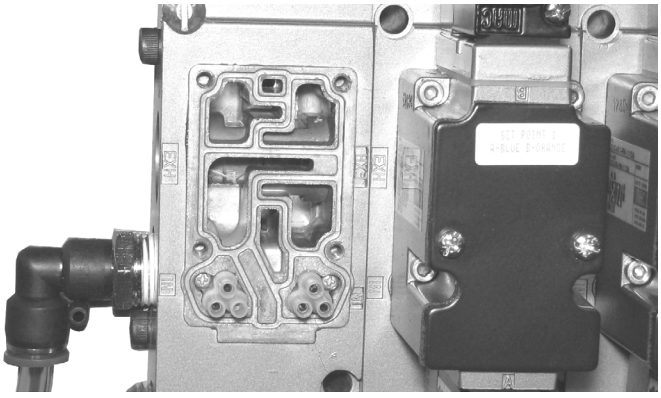


Figure 7-21. MAC Valve (Solenoid Removed)

3. Install and tighten the four mounting screws.
4. Connect the air line to the quick connect fitting on the MAC valve.
5. Connect the main electrical and pneumatic connections.
6. Turn the GN Series on and test for proper operation.

7.3.18 Bag Clamp Actuator Switch Replacement

If the bag clamp actuator switch fails to function and troubleshooting techniques have determined that the switch must be replaced, use the following steps to replace the switch.

7.3.18.1 Bag Clamp Actuator Switch Removal

1. Turn the GN Series off.
2. Disconnect the main electrical and pneumatic connections.
3. Open the control box.
4. Trace the cable from the bag clamp actuator switch to the point where it is connected to the controller.
5. Label the wires to indicate how they were connected.
6. Disconnect the switch cable from the controller.
7. Pull the cable free from the control box.
8. Remove any tie wraps that may secure the cable to the GN Series.
9. Pull the cable free of the machine, all the way up to the bag clamp actuator switch.
10. Remove the mounting screws that mount the bag clamp actuator switch to the mounting bracket.
11. Remove the bag clamp actuator switch.

7.3.18.2 Bag Clamp Actuator Switch Installation

1. Position the bag clamp actuator switch so that the mounting holes in the bracket are aligned with the mounting holes in the bag clamp actuator switch.
2. Insert and tighten the mounting screws.
3. Route the bag clamp actuator switch cable to the control box in the same manner as the cable from the bag clamp actuator switch that was removed.
4. Insert the end of the cable through the grommet into the control box.
5. Connect the wires to the controller in the same fashion as the connections from the bag clamp actuator switch that was installed previously.
6. Close the control box.
7. Secure the bag clamp actuator switch cable to the frame of the GN Series using tie straps.
8. Connect the main electrical and pneumatic connections.
9. Turn the GN Series on and test for proper operation.

7.3.19 Bag In Place Switch Replacement

If the bag in place switch fails to function and troubleshooting techniques have determined that the switch must be replaced, use the following steps to replace the switch.

7.3.19.1 Bag In Place Switch Removal

1. Turn the GN Series off.
2. Disconnect the main electrical and pneumatic connections.
3. Open the control box.
4. Trace the cable from the bag in place switch to the point where it is connected to the controller.
5. Label the wires to indicate how they were connected.
6. Disconnect the bag in place switch cable from the controller.
7. Pull the cable free from the control box.
8. Remove any tie wraps that may secure the cable to the GN Series.
9. Pull the cable free of the machine, all the way up to the bag in place switch.
10. Remove the mounting screws that mount the bag in place switch to the mounting bracket.
11. Remove the bag in place switch.

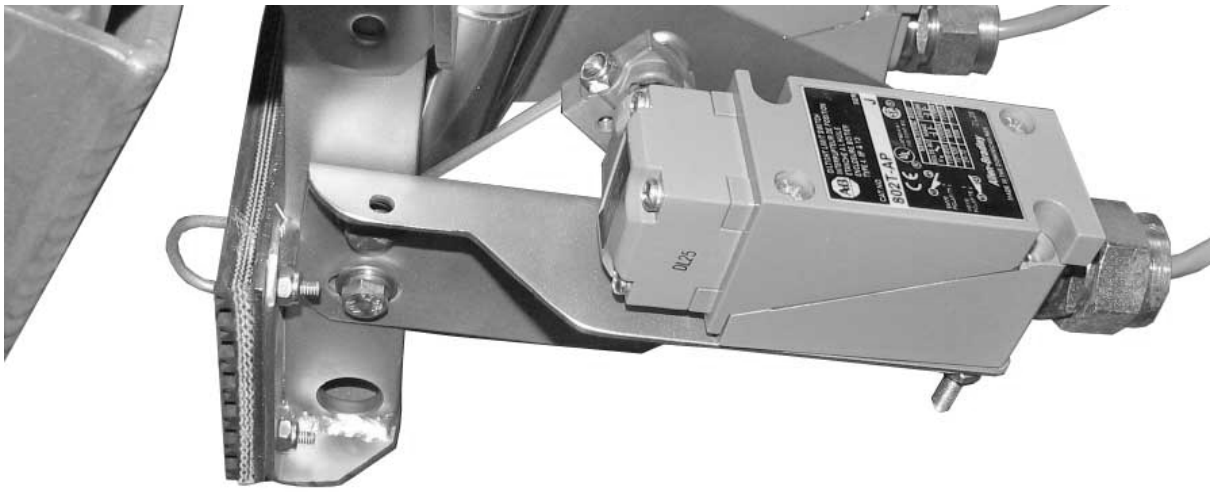


Figure 7-22. Bag In Place Switch

7.3.19.2 Bag In Place Switch Installation

1. Position the bag in place switch so that the mounting holes in the bracket are aligned with the mounting holes in the bag in place switch.
2. Insert and tighten the mounting screws.
3. Route the switch cable to the control box in the same manner as the cable from the bag in place switch that was removed.
4. Insert the end of the cable through the grommet into the control box.
5. Connect the wires to the controller in the same fashion as the connections from the bag in place switch that was installed previously.
6. Close the control box.
7. Secure the bag in place switch cable to the frame of the GN Series using tie straps.
8. Connect the main electrical and pneumatic connections.
9. Turn the GN Series on and test for proper operation.

7.3.20 Pneumatic Quick-Connect Fitting Replacement

In the event that a quick connect fitting becomes damaged and requires replacement, use the following procedures to replace the quick-connect fitting.

7.3.20.1 Pneumatic Quick-Connect Fitting Removal

1. Turn the GN Series off.
2. Disconnect the main electrical and pneumatic connections.
3. Disconnect the air supply line from the fitting by pressing in on the collar while pulling out on the air supply line.
4. Using a wrench, unscrew the fitting.

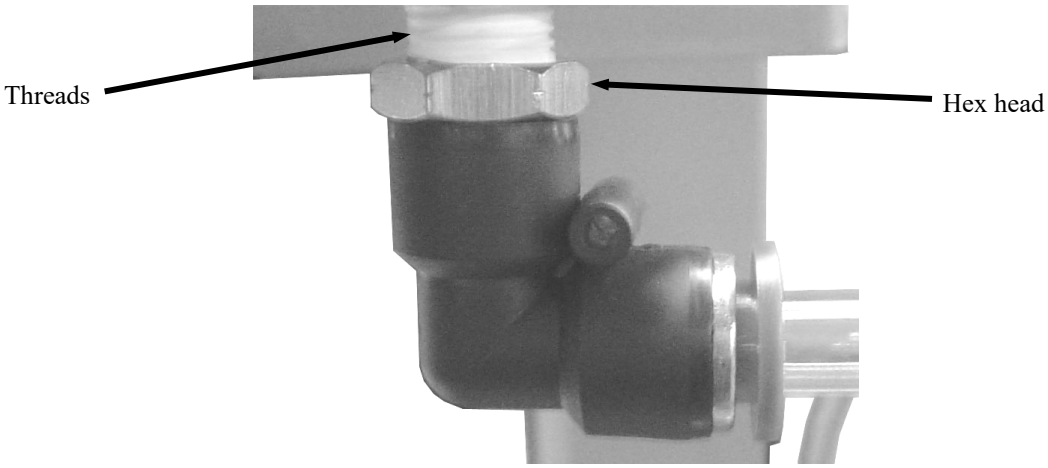


Figure 7-23. Pneumatic Quick-Connect Fitting

7.3.20.2 Pneumatic Quick-Connect Fitting Installation

1. Using Teflon® tape, wrap the threads of the new fitting, starting at the bottom of the thread working toward the hex head in the same direction as the threads.
2. Screw the new fitting into the threads and use a wrench to carefully tighten the fitting.

CAUTION Over tightening the fitting can damage the fitting, or the component that it is being threaded into.

3. Reconnect the air supply line to the fitting.
4. Reconnect the main pneumatic connection and check for any leaks. If a leak is found, disconnect the main pneumatic connection and then disconnect/reconnect the air connections, then reconnect the main pneumatic connection. Repeat as necessary, until no leaks are present.
5. Reconnect the main electrical connection.
6. Turn the GN Series on and test for proper operation.

7.3.21 T3000 Interface Card Replacement

If the T3000 Interface Card becomes damaged or fails to function, use the following procedures to remove it and install a new one.

ESD NOTICE

To protect against ESD damage to the T3000 Interface Card, follow Standard ESD Prevention Procedures. Failure to use recommended protective measures could result in permanent equipment damage, either immediate or latent, when handling components.

7.3.21.1 T3000 Interface Card Removal

1. Turn the GN Series off and disconnect it from its power source.
2. Open the control box.
3. Label each wire for easy identification.
4. Disconnect each wire from the module.
5. While holding the module, remove the mounting screws and the module.

7.3.21.2 T3000 Interface Card Installation

1. Hold the new module in position and install the mounting screws.
2. Reconnect each wire to the module. Take care to be sure that each wire is connected to the appropriate terminal.
3. Close the control box.
4. Reconnect the GN Series power cords to their respective power sources.
5. Turn the GN Series on and check for proper operation.

7.3.22 Hardy Summing Board Replacement

If the Hardy summing board becomes damaged or fails to function, use the following procedures to remove it and install a new one:

ESD NOTICE

To protect against ESD damage to the Hardy summing board, follow Standard ESD Prevention Procedures. Failure to use recommended protective measures could result in permanent equipment damage, either immediate or latent, when handling components.

7.3.22.1 Hardy Summing Board Removal

1. Turn the GN Series off and disconnect it from its power source.
2. Open the control box.
3. Label each wire that is connected to the Hardy summing board for easy identification.
4. Disconnect each wire from the Hardy summing board.
5. While holding the Hardy summing board, remove the mounting screws and the Hardy summing board.

7.3.22.2 Hardy Summing Board Installation

1. Hold the new module in position and install the mounting screws. DO NOT over tighten the mounting screws, as over tightening could damage the new summing board.
2. Reconnect each wire to the module. Take care to be sure that each wire is connected to the appropriate terminal.
3. Close the control box.
4. Reconnect the GN Series power cords to their respective power sources.
5. Turn the GN Series on and check for proper operation.

This Page Intentionally Left Blank

Glossary

TERM	DEFINITION
AC	Alternating Current
Bag clamp	A paddle like device that has a rubberized pad. A set of two bag clamps are applied and released via pneumatic cylinders. When applied, the two bag clamps hold the bag in place while it is being filled.
Bag clamp actuator switch	A rotary type switch that is used to indicate that the operator is ready for the machine to apply the bag clamps.
Bag clamp pad	One rubberized pad is mounted on each bag clamp arm. These pads provide the grip required to hold a bag while it is being filled.
Bagging cycle	A series of functions that describe the packaging process, from beginning to end, for one package of product.
Bag in place switches	A pair of switches that are used to determine whether a bag is in place and properly positioned and ready to receive product.
Balancing load cells	The process of combining the inputs from each load cells and producing a single output for the weight display.
Cabinet	The main structure of the VN Series. Serves as the backbone of the machine.
Calibration	The process of adjusting the weighing system to make sure that the load cells matches the weight of the known weight.
Checkweigh	A function that the operator can use to check the weight of the product prior to the product being released from the weigh bucket.
Component	An item of hardware as commonly supplied complete by manufacturers.
Counter	A function of the control system that counts how many specific events occur to complete a process. For example, if the desired package weight is higher than the capacity of the weigh bucket, multiple cycles of filling and emptying the weigh bucket must occur. The counter will keep track of the cycles.
Cubic Feet/Minute (CFM)	A unit of measure that is used to describe the amount of compressed air that is used by a machine.
DC	Direct Current
De-energize	To deprive an electro-receptive device of its operating current.
Display select switch	Used on machines with analog controls. This switch allows the operator to check and adjust SP1 and SP2. When making adjustments, the switch is used in conjunction with adjustment knobs.
Dribble gate	Flow control device that opens to allow product to flow into the weigh bucket. This gate is open during the bulk and dribble portion of the fill cycle and is only closed when not filling the weigh bucket.
Dump gates	Two metal gates that are positioned at the bottom of the weigh bucket. When closed, they seal the weigh bucket, allowing the bucket to fill with product for weighing. Once the product has reached the desired weight, the dump gates will be opened by a pair of pneumatic cylinders, allowing the product to fall into the package
ESD	Electrostatic Discharge
FRL	Filter/Regulator/Lubricator assembly. This device filters incoming compressed air, regulates the pressure, and introduces a lubricant to protect downstream pneumatic components from wear.
Ground	Ground (Electrical). A conducting connection, whether intentional or accidental, between an electrical circuit or equipment and the earth, or some other conducting body at a reference potential.
kg	Kilogram
lb or lbs	Pound or pounds

TERM	DEFINITION
Load cells	Electronic components that change their output based on how much weight is applied to them. The weighing system combines the outputs from the two load cells and converts them to weight reading.
MAC valve	A device that combines an electric solenoid and a pneumatic valve. Voltage is applied or removed from the solenoid to cause the pneumatic valve to move. Used to control the pneumatic cylinders.
Main gate	Flow control device that opens to allow product to flow into the weigh bucket. This gate is open during the bulk portion of the fill cycle and is closed at all other times.
Manual drop	A button on the control panel that allows the operator to force the bag clamps to release.
Manual dump	A button on the control panel that allows the operator to force the dump gates on the weigh bucket open.
Pivot block	Threads on to the end of a pneumatic cylinder rod and is connected to a bag clamp pad arm. It allows the pneumatic cylinder to pivot slightly as it applies the bag clamp pad.
Power supply	Converts incoming 120VAC power in a usable power for the control components.
Product	Refers to the material that is being packaged by the machine.
Programmable Logic Controller (PLC)	A microprocessor-based industrial control system. It receives inputs from devices, such as switches and control buttons. The internal processor uses a program to analyze the inputs and will drive outputs based on the results.
Spout	The mounting point for the bag clamp mechanism. The bags are placed on the spout for filling.
Spout transition	A funnel shaped device that mounts to the bottom of the cabinet. It serves as the mounting point for the spout. As product falls from the weigh bucket, this device guides the product to the spout.
SP1	Setpoint 1. This is the dribble point. This is the point where the machine stops filling the weigh bucket at the bulk rate and starts filling it at the dribble rate.
SP2	Setpoint 2. This is the cutoff point. This is the point where the machine stops filling the weigh bucket. SP2 is typically set slightly below the target weight.
Surge	A sudden rise of current or voltage.
Surge Hopper	A reservoir where product is stored for packaging.
T3000 control panel	This is an optional controller for the GN Series. It is used to monitor and program the functions of the GN Series.
T4000 control panel	This is the standard controller for the GN Series. It is used to monitor and program the functions of the GN Series.
Weigh bucket	A vessel that is used to capture product for weighing, prior to placing the product in the bag.
Weight Display	An electronic panel that is used to display the package weight during the fill process and system settings during the setup process.

Index

Adjusting Bag Clamp Cylinder Actuation Speed, ... 7-2
Air Pressure Adjustments, ... 7-1
Allen-Bradley MicroLogix 1000, ... 4-9
Bag Clamp (V-Type Bag Clamp) Cylinder Replacement, ... 7-13
Bag Clamp Actuator Switch, ... 1-6
Bag Clamp Actuator Switch Replacement, ... 7-23
Bag Clamp Jaw Bearing Replacement, ... 7-16
Bag Clamp Jaw Replacement, ... 7-15
Bag Clamp Pad (V-Type Bag Clamp) Replacement, ... 7-13
Bag Clamp Pad Arm (V-Type Bag Clamp) Replacement, ... 7-14
Bag Clamps, ... 1-3
Bag In Place Switch, ... 1-6
Bag In Place Switch Replacement, ... 7-24
Basic Fill Process, ... 4-2
Bulk Gate Adjustment, ... 4-4
Calibration, ... 3-8
Check Calibration, ... 5-1
Cleaning, ... 5-1
Conventions, ... i
Daily Maintenance Procedures, ... 5-1
Determining Hopper Size, ... 3-1
Determining The Height Of The GN Series Feeder System, ... 3-1
Drain Water From the FRL, ... 5-1
Dribble Gate Cylinder Replacement, ... 7-7
Dribble Gate Pivot Bearing Replacement, ... 7-8
Dribble Gate Replacement, ... 7-8
Dry Cycle, ... 3-7
Dump Gate Cylinder Replacement, ... 7-4
Dump Gate Cylinders, ... 1-6
Dump Gate Replacement, ... 7-6
Dump Gates, ... 1-5
Electrical Controls, ... 4-5
Electrical Requirements, ... 1-1
Electro-static Discharge (ESD) Prevention Procedures, ... ii
Establishing Security Settings, ... 3-3
Establishing T4000 Security Settings, ... 3-3
Field Service, ... iii
Flow Gate Cylinders, ... 1-3
Flow Gates, ... 1-2
General Fill Cycle Information, ... 4-1
Glossary, ... 7-1
GN Series Cabinet Assembly, ... 1-2
Hardy Summing Board Replacement, ... 7-26
Important/Notable Information, ... ii
Inflatable Bladder Replacement, ... 7-18
Initial Setup, ... 4-11
List of Figures, ... xi
List of Tables, ... xiii
Load Cell Replacement, ... 7-3
Load Cells, ... 1-7
Lubrication Requirements, ... 1-1
MAC Valve Replacement, ... 7-21
MAC Valves, ... 1-7
Machine Controls, ... 1-8
Main Gate Cylinder Replacement, ... 7-9
Main Gate Pivot Bearing Replacement, ... 7-11
Main Gate Replacement, ... 7-11
Major Systems and Components, ... 1-2
Making Electrical Connections, ... 3-2
Making Network Connections – T3000, ... 3-3
Making Pneumatic Connections, ... 3-2
Mechanical Setup, ... 3-1
Monthly Maintenance, ... 5-2
Mounting the GN Series, ... 3-1
Operation, ... 4-1
Operational Controls, ... 4-4
Optional Inflatable Bladder Bag Clamp, ... 1-4
Optional T3000 Control Set, ... 3-12
Optional T3000 Electronic Control Components, ... 1-12
Optional T3000 Operator Control Box, ... 1-11
Pneumatic Component Lubrication Requirements, ... 3-2
Pneumatic Flow Control Adjustments for Flow and Dump Gates, ... 7-2
Pneumatic Quick-Connect Fitting Replacement, ... 7-25
Pneumatic Requirements, ... 1-1
Preventive Maintenance, ... 5-1
Product Description, ... 1-1
PV300 Control Panel, ... 4-9
PV300 Menus, ... 4-10
Receiving Equipment, ... 2-1

Remove the Shipping Bracket, ... 3-1
Repair and Adjustment, ... 7-1
Safety Alert Symbols, ... i
Setting Up a GN Series With T3000 Controls to Fill, ... 4-13
Setting Up a GN Series with T4000 Controls, ... 4-11
Setup/Installation, ... 3-1
Spout (V-Type Bag Clamp) Replacement, ... 7-17
Standard Electronic Control Components, ... 1-9
Standard T4000 Control Box, ... 1-8
Standard V-Type Bag Clamps, ... 1-3
Starting the Unit,..... 4-15
Static Sensitive Symbols for Equipment Handling Instructions, ... i
System Adjustments, ... 7-1
System Alarms, ... 6-4
System Repairs, ... 7-3
T3000 Alarms, ... 6-5
T3000 Control Panel, ... 4-8
T3000 Interface Card Replacement, ... 7-26
T3000 Security Settings, ... 3-6
T4000 Alarms, ... 6-4
T4000 Control Panel, ... 4-5
T4000 Control Panel Calibration, ... 3-9
T4000 Control Panel Pre-Calibration Mechanical Checks, ... 3-8
Table of Contents, ... v
The Troubleshooting Process, ... 6-1
Timer and Counter Programming, ... 3-14
Trouble Symptoms, ... 6-1
Troubleshooting, ... 6-1
Typical Fill Cycle, ... 4-2
Uncrating the Equipment, ... 2-1
Using the T3000 to Set Up A Product From Scratch, ... 4-14
Warranty Information, ... iii
Weekly Maintenance, ... 5-2
Weigh Bucket Assembly, ... 1-5

Appendix A
Safety Procedures, Cautions, Warnings, and Notices

- General safety precautions must be observed during all phases of operation, service and repair of the GN Series. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture and intended use of the GN Series.
- The manufacturer assumes no liability for customer's failure to comply with the following requirements:
- Qualified technicians and maintenance personnel should service the equipment described in this manual.
- Do not attempt internal service or adjustments unless another person, capable of rendering first aid and resuscitation, is available.
- Do not substitute parts or modify equipment. This practice could, in some cases, introduce the danger of additional hazards
- The GN Series contains some electrostatic-sensitive components. Therefore, always ground yourself with a proper wrist strap before handling any modules or printed circuit boards so that static charges are removed from the person. Use static suppressive packaging to protect electronic assemblies removed from the GN Series.
- Observe all procedural cautions and warnings located on the equipment and throughout this manual.
- Read and follow all instructions
- Follow all warnings and instructions marked on the units and listed in manuals.

This Page Intentionally Left Blank

Appendix B
Spare Parts

Table B-1. GN Series Spare Parts List

	Part Description	Part Number
1	Bearings (used for main and dribble gates, and bag clamp arms)	50-7011
2	Bag clamp cylinder	50-1104
3	Bag clamp cylinder pivot block	60-0193
4	Bag clamp pad arm	60-0190
5	Bag clamp pad	60-0196
6	Dump gate	60-0680
7	Main gate adjuster rod	60-0555
8	Main gate adjuster nut	60-0566
9	Main gate	60-0684
10	Dribble gate	60-0685
11	Load cell	50-1544
12	Load cell rod end	50-7054
13	Dump gate cylinder	50-1104
14	Dump gate bearing	50-7039
15	Dump gate mounting plates	60-0682
16	Dribble and main gate cylinders	50-1151
17	Dribble and main gate rod ends	50-7056
18	12 VDC power supply	50-7629
19	157 interface board (used with T3000 machines only)	53-2077
20	Allen-Bradley MicroLogix™ PLC	50-1909
21	Allen-Bradley PV300 control panel	50-7630
22	Weigh bucket	60-0678
23	Transition	60-3024

This Page Intentionally Left Blank

Appendix C
Mechanical Drawings

Table C-1. GN Series Mechanical Drawings

	Drawing Title	Dwg. Name
1	Control Panel with T3000	GN T4000-1-401-00
2	Control Panel with T3000 – Internals	GN T4000-1-402-00
3	Control Panel with T3000	28748-1-401-00
4	Control Panel with T3000 – Internals	28748-1-402-00
5	Gate Assembly	big gate
6	Exploded View of Inflatable Spout	Inflatable Spout Callout
7	Spout with V-type Bag Clamps	Istva
8	Manual Adjustment of Main Gate	manual-1
9	Manual Main Gate Adjustment	manual-2
10	Side Top	SIDETOP
11	Front, Side, & Plan	GN Series-CALLOUT
12	Exploded View	GN Series-ISO-00
13		
14		
15		
16		
17		
18		
19		
20		

This Page Intentionally Left Blank

Appendix D
Electrical Drawings

Table D-1. GN Series Electrical Drawings

	Drawing Title	Part Number
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

This Page Intentionally Left Blank

Appendix E
Control Panel User Guide

This Page Intentionally Left Blank

Appendix F
Custom Features

The documents included in Appendix F will provide information regarding any custom features that were ordered and included in the equipment purchase.

This Page Intentionally Left Blank

The equipment that accompanies this manual was not ordered with any custom features, thus no custom documentation is included.

This Page Intentionally Left Blank