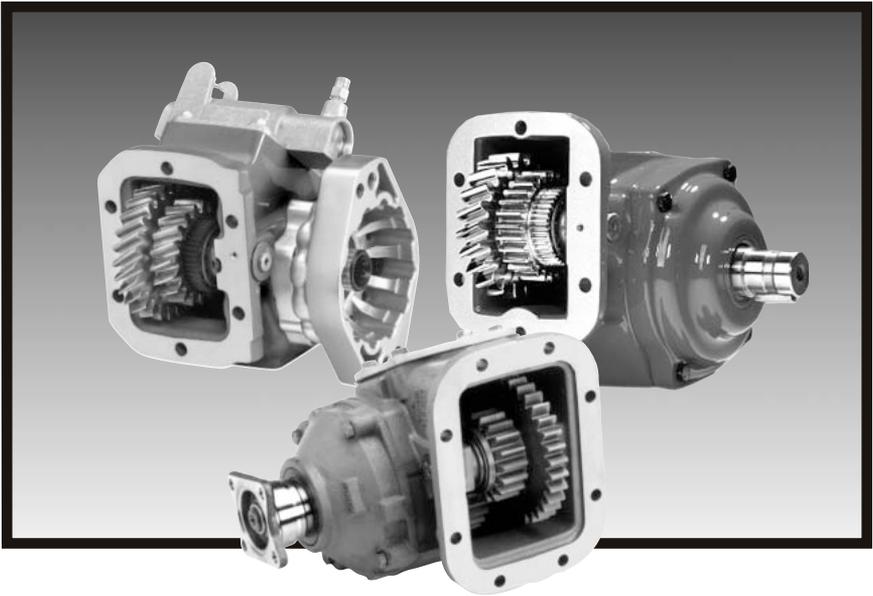


CHELSEA[®]

Bulletin HY25-1670-M1/US

Owner's Manual Adapter Gears

Effective: December 2006
Supersedes: HY25-1670-M1/US
May 2004



**626 Series
628 Series**

**630 Series
645 Series**



WARNING

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

This document and other information from Parker Hannifin Corporation, its subsidiaries and authorized distributors provide product and/or system options for further investigation by users having technical expertise. It is important that you analyze all aspects of your application and review the information concerning the product or system in the current product catalog. Due to the variety of operating conditions and applications for these products or systems, the user, through its own analysis and testing, is solely responsible for making the final selection of the products and systems and assuring that all performance, safety and warning requirements of the application are met.

The products described herein, including without limitation, product features, specifications, designs, availability and pricing, are subject to change by Parker Hannifin Corporation and its subsidiaries at any time without notice.

Offer of Sale

The items described in this document are hereby offered for sale by Parker Hannifin Corporation, its subsidiaries or its authorized distributors. This offer and its acceptance are governed by the provisions stated in the "Offer of Sale".

Patent Information

The Chelsea® Power Take-Off or its components shipped with this owner's manual may be manufactured under one or more of the following U.S. patents:

4610175 5228355 4597301 5645363 6151975 6142274 6260682

Other patents pending.

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Since our major objective is to show you how to get additional and more profitable miles from truck, tractor and trailer components, we want to provide you with information on the installation of Chelsea Power Take-Offs.

We all realize that an inadequate transmission will overwork any Power Take-Off in a very short period of time. In addition, a mismatched transmission/P.T.O. combination can result in unsatisfactory performance of the equipment right from the start.

Before you order new trucks, be sure you're getting the right transmission/P.T.O. combination. It is of vital importance for efficient performance to have adequate power. To help you select the proper type, size and design of P.T.O. it is advisable to discuss your specific requirements with Chelsea P.T.O. specialists. They know the products and have easy access to manufacturers of equipment, transmissions and Power Take-Offs. They can inform you about everything you need to know about power, at the right time, before you specify components.

These instructions are for your safety and the safety of the end user. Read them carefully until you understand them.

General Safety Information

To prevent injury to yourself and/or damage to the equipment:

- Read carefully all owner's manuals, service manuals, and/or other instructions.
- Always follow proper procedures, and use proper tools and safety equipment.
- Be sure to receive proper training.
- Never work alone while under a vehicle or while repairing or maintaining equipment.
- Always use proper components in applications for which they are approved.
- Be sure to assemble components properly.
- Never use wornout or damaged components.
- Always block any raised or moving device that may injure a person working on or under a vehicle.
- Never operate the controls of the Power Take-Off or other driven equipment from any position that could result in getting caught in the moving machinery.

Proper Matching of P.T.O.



WARNING: A Power Take-Off must be properly matched to the vehicle transmission and to the auxiliary equipment being powered. An improperly matched Power Take-Off could cause severe damage to the vehicle transmission, the auxiliary driveshaft, and/or the auxiliary equipment being powered. **Damaged components or equipment could malfunction causing serious personal injury to the vehicle operator or to others nearby.**

To avoid personal injury and/or equipment damage:

- Always refer to Chelsea catalogs, literature, and owner's manuals and follow Chelsea recommendations when selecting, installing, repairing, or operating a Power Take-Off.
- Never attempt to use a power take-off not specifically recommended by Chelsea for the vehicle transmission.
- Always match the Power Take-Off's specified output capabilities to the requirements of the equipment to be powered.
- Never use a Power Take-Off whose range of speed could exceed the maximum safe speed of the equipment to be powered.

 **This symbol warns of possible personal injury.**

Cold Weather Operation of Powershift P.T.O.s



WARNING: During extreme cold weather operation [32°F (0°C) and lower], a disengaged Powershift Power Take-Off can momentarily transmit high torque that will cause unexpected output shaft rotation. This is caused by the high viscosity of the transmission oil when it is extremely cold. As slippage occurs between the Power Take-Off clutch plates, the oil will rapidly heat up and the viscous drag will quickly decrease.

The Power Take-Off output shaft rotation could cause unexpected movement of the driven equipment resulting in serious personal injury, death, or equipment damage.

To avoid personal injury or equipment damage:

- Driven equipment must have separate controls.
- The driven equipment must be left in the disengaged position when not in operation.
- Do not operate the driven equipment until the vehicle is allowed to warm up.

Rotating Auxiliary Driveshafts



WARNING:



- Rotating auxiliary driveshafts are dangerous. You can snag clothes, skin, hair, hands, etc. This can cause serious injury or death. Exposed rotating driveshafts must be guarded.
- Do not go under the vehicle when the engine is running.
- Do not work on or near an exposed shaft when the engine is running.
- Shut off the engine before working on the Power Take-Off or driven equipment.

Guarding Auxiliary Driveshafts



WARNING: We strongly recommend that a Power Take-Off and a directly mounted pump be used to eliminate the auxiliary driveshaft whenever possible. If an auxiliary driveshaft is used and remains exposed after installation, it is the responsibility of the vehicle designer and P.T.O. installer to install a guard.

 This symbol warns of possible personal injury.

Using Set Screws



WARNING: Auxiliary driveshafts may be installed with either recessed or protruding set screws. If you choose a square head set screw, you should be aware that it will protrude above the hub of the yoke and may be a point where clothes, skin, hair, hands, etc. could be snagged. A socket head set screw, which may not protrude above the hub of the yoke, does not permit the same amount of torquing as does a square head set screw. Also, a square head set screw, if used with a lock wire, will prevent loosening of the screw caused by vibration. Regardless of the choice made with respect to a set screw, an exposed rotating auxiliary driveshaft must be guarded.

IMPORTANT: Safety Information and Owner's Manual

Chelsea Power Take-Offs are packaged with safety information decals, instructions, and an owner's manual. These items are located in the envelope with the P.T.O. mounting gaskets. Also, safety information and installation instructions are packaged with some individual parts and kits, such as adapter gear assemblies. **Be sure to read the owner's manual before installing or operating the P.T.O.** Always install the safety information decals according to the instructions provided. Place the owner's manual in the vehicle glove compartment.

Mounting the Adapter Gear Assembly

Because it is impossible to reach the P.T.O. driver gear in the transmission, some P.T.O. applications require adapter assemblies.

A geared adapter assembly changes the rotation of the P.T.O., which may be necessary for driving pumps or other accessory equipment. Using an adapter can some times compensate for obstructions, such as a bulge in the transmission, exhausts pipes, or motor mounts.



Typical Adapter Assembly Configurations

1. Drain the oil from the transmission and remove the P.T.O. aperture cover plate. (See Fig. 1.)

Caution: The exhaust pipes and the oil are hot so avoid contact with them.



Fig. 1

2. Discard the cover plate and cover plate gasket, and then clean the aperture pad using a putty knife or wire brush. (See Fig. 2.)

NOTE: Stuff a rag in the aperture opening to prevent dirt from entering the transmission while you are cleaning it.

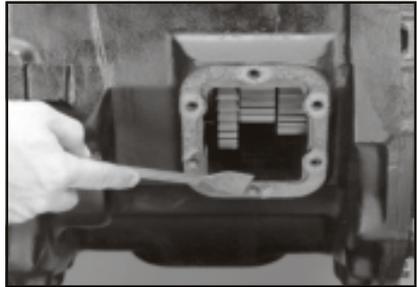


Fig. 2

3. Install the proper studs (furnished with the P.T.O.) in the P.T.O. aperture pad using a stud driver. Studs may have either interference fit threads (plain) or pre-applied locking/sealing compound. (See Fig. 3.)

General Rule:

A Chelsea .010" (.25 mm) gasket will change backlash approximately .006" (.15 mm), and a .020" (.50 mm) gasket changes backlash approximately .012" (.30 mm).

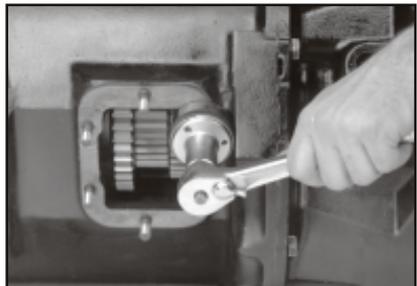


Fig. 3

Mounting the Adapter Gear Assembly

4. Tighten the studs securely and then torque them to 17 - 19 ft. lbs. (2.35 - 2.63 kg. meters) for the 6 bolt, and 19 - 21 Lbs. ft. (2.63 kg. meters) for the 8 bolt. (See Fig. 4.)

Caution: Overtightening the stud may damage the stud and/or transmission threads.

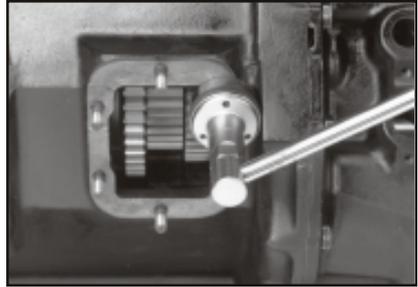


Fig. 4

5. Mount the adapter to the transmission with the gaskets provided. Then check and set backlash between the adapter and the transmission. (See Fig. 5)

NOTE: See page 9 for checking proper backlash.

NOTE: If installing a 630-02 adapter for the Eaton I-Brake, install adapter with the gasket provided (part # 35-P-96) with 630-02. There is no need to set backlash when using this gasket. Torque flange nuts at this time (See page 7 Item 10 for proper torque specs.) After mounting adapter refer to installation instructions (379985) for proper I-Brake installation.

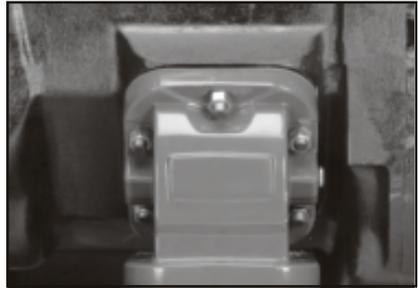


Fig. 5

6. Remove the adapter, gaskets, and filler block, if required, from the transmission. Keep the gaskets and filler block as a package. (See Fig. 6.)
7. Bench mount the adapter to the P.T.O. Install the appropriate length studs in the adapter body. (See Fig. 7.)

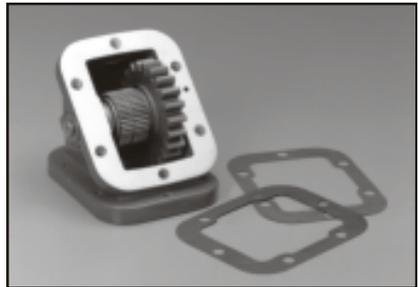


Fig. 6

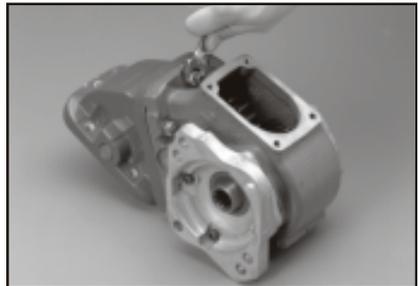


Fig. 7

Mounting the Adapter Gear Assembly

8. Set the proper backlash between the adapter and P.T.O. After backlash is set remove PTO from adapter and set aside PTO and gaskets. See page 9 for setting proper backlash.
(See Fig. 8.)

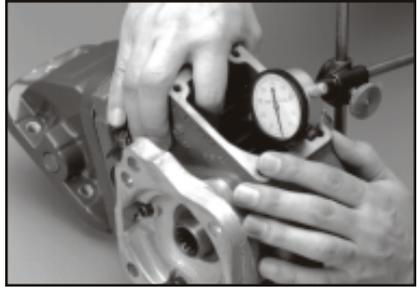


Fig. 8

9. Secure Adapter to the transmission. Use Self Locking nuts provided with Adapter (See Fig. 9). Torque all flange nuts to their proper specifications.

Note: Self Locking nuts do not require lock washers.

Note: See torque specs in step 10.

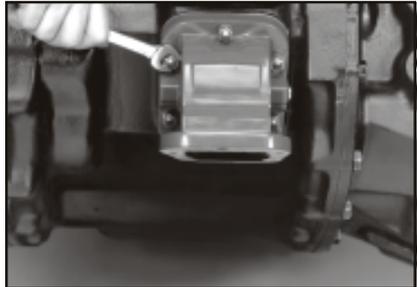


Fig. 9

10. Fasten the P.T.O. to the Adapter.

Torque the self locking nuts to their proper specifications.

- 379744 - 3/8" for 6-Bolt applications
35-40 ft. lbs (4.83-5.52 kg.m.)
- 379745 - 7/16-20 for 8-Bolt applications
55-60 Lbs. ft. (7.59-8.28 kg.m.)

Torque capscrews to their proper specifications.

- 6-Bolt to 30-35 Lbs. ft.
(4.14-4.84 kg.m.)
- 8-Bolt to 45-50 Lbs. ft.
(6.22-6.91 kg.m.) (See Fig 10)

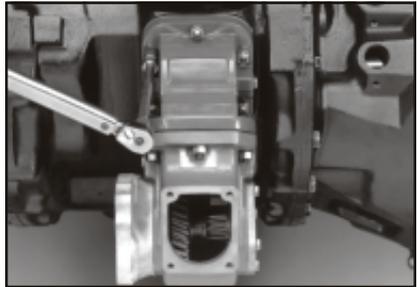


Fig.10

NOTE: If installing the Eaton Inertia Brake, refer to installation instructions (379985).

Mounting the Adapter Gear Assembly

11. Run the P.T.O. momentarily to check for noise.

Caution: The transmission and P.T.O. have no lubrication at this time so running time should be as short as possible.

NOTE: If the P.T.O. whines, it may be mounted too tight - too little backlash. This is an indication that gaskets should be added.

If the P.T.O. clatters, it may be mounted too loose - too much backlash. This is an indication that gaskets should be removed.

12. Refill the transmission to its appropriate fill level. Normally, the addition of a six bolt P.T.O. will require an additional quart of oil.

Checking Backlash

To check for proper backlash on P.T.O.s with shift cover

1. Remove the P.T.O. shift housing and/or inspection plate.
2. Mount the dial indicator so that it registers movement of the input gear (driven gear) of the P.T.O. (Fig. 10).



Fig. 10

NOTE: See Figure 11 for proper location of dial indicator contact point. (Two common type dial indicators shown).

3. Hold the P.T.O. driver gear in transmission with a screwdriver or bar and rock the P.T.O. input gear (driven gear) back and forth with your hand. Note the total movement on the dial indicator.

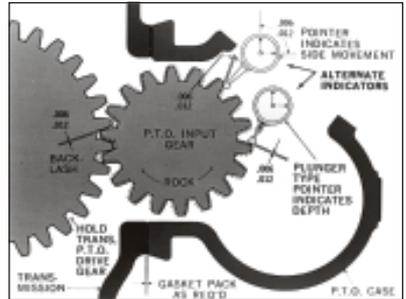


Fig. 11

4. Establish backlash at .006" - .012" [.15mm - .30mm] by adding or subtracting gaskets.

General rule: A Chelsea .010" gasket will change backlash approx. .006". A .020" gasket changes backlash approx. .012".

5. Replace the shift housing and/or inspection plate and retorque (4) four capscrews to 16-20 Lbs. ft. (2.21-2.76 kg meters).

Power Take-Off Maintenance

Due to the normal and sometime severe torsional vibrations that Power Take-Off units experience, operators should follow a set maintenance schedule for inspections. Failure to service loose bolts or Power Take-Off leaks could result in potential auxiliary Power-Take-Off or transmission damage.

Periodic P.T.O. MAINTENANCE is required by the owner/operator to ensure proper, safe and trouble free operation.

Daily: Check all air, hydraulic and working mechanisms before operating P.T.O. Perform maintenance as required.

Monthly: Inspect for possible leaks and tighten all air, hydraulic and mounting hardware, if necessary. Torque all bolts, nuts, etc. to Chelsea specifications. Insure that splines are properly lubricated, if applicable. Perform maintenance as required.

With regards to the direct mounted pump splines, the P.T.O. requires the application of a specially formulated anti-fretting, high pressure, high temperature grease. The addition of the grease has been proven to reduce the effects of the torsional vibrations, which result in fretting corrosion on the P.T.O. internal splines as well as the pump external splines. Fretting corrosion appears as a "rusting and wearing" of the pump shaft splines. Severe duty applications, which require long P.T.O. running times and high torque may require more frequent regreasing. Applications such as Utility Trucks that run continuously and are lightly loaded also require frequent regreasing due to the sheer hours of running time. It is important to note that service intervals will vary for each and every application and is the responsibility of the end user of the product. Chelsea also recommends that you consult your pump owners manuals and technical services for their maintenance guidelines. Fretting corrosion is caused by many factors and without proper maintenance; the anti-fretting grease can only reduce its effects on components.

Chelsea offers the grease to our customers in two packages. The first is a 5/8 fluid ounce tube (379688), which is included with every applicable P.T.O., and the second is a 14-ounce grease cartridge (379831). Chelsea also offers greaseable shafts for most all output designators.

Warranty: Failure to comply entirely with the provisions set forth in the appropriate Owner's Manual will result in voiding of ALL Warranty consideration.

Offer of Sale

The items described in this document and other documents or descriptions provided by Parker Hannifin Corporation, its subsidiaries and its authorized distributors are hereby offered for sale at prices to be established by Parker Hannifin Corporation, its subsidiaries and its authorized distributors. This offer and its acceptance by any customer ("Buyer") shall be governed by all of the following Terms and Conditions. Buyer's order for any such items, when communicated to Parker Hannifin Corporation, its subsidiary or an authorized distributor ("Seller") verbally or in writing, shall constitute acceptance of this offer.

1. Terms and Conditions of Sale: All descriptions, quotations, proposals, offers, acknowledgments, acceptances and sales of Seller's products are subject to and shall be governed exclusively by the terms and conditions stated herein. Buyer's acceptance of any offer to sell is limited to these terms and conditions. Any terms or conditions in addition to, or inconsistent with those stated herein, proposed by Buyer in any acceptance of an offer by Seller, are hereby objected to. No such additional, different or inconsistent terms and conditions shall become part of the contract between Buyer and Seller unless expressly accepted in writing by Seller. Seller's acceptance of any offer to purchase by Buyer is expressly conditional upon Buyer's assent to all the terms and conditions stated herein, including any terms in addition to, or inconsistent with those contained in Buyer's offer. Acceptance of Seller's products shall in all events constitute such assent.

2. Payment: Payment shall be made by Buyer net 30 days from the date of delivery of the items purchased hereunder. Amounts not timely paid shall bear interest at the maximum rate permitted by law for each month or portion thereof that the Buyer is late in making payment. Any claims by Buyer for omissions or shortages in a shipment shall be waived unless Seller receives notice thereof within 30 days after Buyer's receipt of the shipment.

3. Delivery: Unless otherwise provided on the face hereof, delivery shall be made F.O.B. Seller's plant. Regardless of the method of delivery, however, risk of loss shall pass to Buyer upon Seller's delivery to a carrier. Any delivery dates shown are approximate only and Seller shall have no liability for any delays in delivery.

4. Warranty: Seller warrants that the items sold hereunder shall be free from defects in material or workmanship for a period of:
(A) All Power Take-Off units one (1) year from date of installation.
(B) Except 267, 277, 278, 242, 244, 246, 250, 251 and 859 series two (2) years from date of installation.

THIS WARRANTY COMPRISES THE SOLE AND ENTIRE WARRANTY PERTAINING TO ITEMS PROVIDED HEREUNDER. SELLER MAKES NO OTHER WARRANTY, GUARANTEE, OR REPRESENTATION OF ANY KIND WHATSOEVER. ALL OTHER WARRANTIES, INCLUDING BUT NOT LIMITED TO, MERCHANTABILITY AND FITNESS FOR PURPOSE, WHETHER EXPRESS, IMPLIED, OR ARISING BY OPERATION OF LAW, TRADE USAGE, OR COURSE OF DEALING ARE HEREBY DISCLAIMED. NOTWITHSTANDING THE FOREGOING, THERE ARE NO WARRANTIES WHATSOEVER ON ITEMS BUILT OR ACQUIRED WHOLLY OR PARTIALLY, TO BUYER'S DESIGNS OR SPECIFICATIONS.

5. Limitation Of Remedy: SELLER'S LIABILITY ARISING FROM OR IN ANY WAY CONNECTED WITH THE ITEMS SOLD OR THIS CONTRACT SHALL BE LIMITED EXCLUSIVELY TO REPAIR OR REPLACEMENT OF THE ITEMS SOLD OR REFUND OF THE PURCHASE PRICE PAID BY BUYER, AT SELLER'S SOLE OPTION. IN NO EVENT SHALL SELLER BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES OF ANY KIND OR NATURE WHATSOEVER, INCLUDING BUT NOT LIMITED TO LOST PROFITS ARISING FROM OR IN ANY WAY CONNECTED WITH THIS AGREEMENT OR ITEMS SOLD HEREUNDER, WHETHER ALLEGED TO ARISE FROM BREACH OF CONTRACT, EXPRESS OR IMPLIED WARRANTY, OR IN TORT, INCLUDING WITHOUT LIMITATION, NEGLIGENCE, FAILURE TO WARN OR STRICT LIABILITY.

6. Changes, Reschedules and Cancellations: Buyer may request to modify the designs or specifications for the items sold hereunder as well as the quantities and delivery dates thereof, or may request to cancel all or part of this order, however, no such requested modification or cancellation shall become part of the contract between Buyer and Seller unless accepted by Seller in a written amendment to this Agreement. Acceptance of any such requested modification or cancellation shall be at Seller's discretion, and shall be upon such terms and conditions as Seller may require.

7. Special Tooling: A tooling charge may be imposed for any special tooling, including without limitation, dies, fixtures, molds and patterns, acquired to manufacture items sold pursuant to this contract. Such special tooling shall be and remain Seller's property notwithstanding payment of any charges by Buyer. In no event will Buyer acquire any interest in apparatus belonging to Seller which is utilized in the manufacture of the items sold hereunder, even if such apparatus has been specially converted or adapted for such manufacture and notwithstanding any charges paid by Buyer.

Unless otherwise agreed, Seller shall have the right to alter, discard or otherwise dispose of any special tooling or other property in its sole discretion at any time.

8. Buyer's Property: Any designs, tools, patterns, materials, drawings, confidential information or equipment furnished by Buyer or any other items which become Buyer's property, may be considered obsolete and may be destroyed by Seller after two (2) consecutive years have elapsed without Buyer placing an order for the items which are manufactured using such property. Seller shall not be responsible for any loss or damage to such property while it is in Seller's possession or control.

9. Taxes: Unless otherwise indicated on the face hereof, all prices and charges are exclusive of excise, sales, use, property, occupational or like taxes which may be imposed by any taxing authority upon the manufacture, sale or delivery of the items sold hereunder. If any such taxes must be paid by Seller or if Seller is liable for the collection of such tax, the amount thereof shall be in addition to the amounts for the items sold. Buyer agrees to pay all such taxes or to reimburse Seller therefore upon receipt of its invoice. If Buyer claims exemption from any sales, use or other tax imposed by any taxing authority, Buyer shall save Seller harmless from and against any such tax, together with any interest or penalties thereon which may be assessed if the items are held to be taxable.

10. Indemnity For Infringement of Intellectual Property Rights: Seller shall have no liability for infringement of any patents, trademarks, copyrights, trade dress, trade secrets or similar rights except as provided in this Part 10. Seller will defend and indemnify Buyer against allegations of infringement of U.S. Patents, U.S. Trademarks, copyrights, trade dress and trade secrets (hereinafter "Intellectual Property Rights"). Seller will defend at its expense and will pay the cost of any settlement or damages awarded in an action brought against Buyer based on an allegation that an item sold pursuant to this contract infringes the Intellectual Property Rights of a third party. Seller's obligation to defend and indemnify Buyer is contingent on Buyer notifying Seller within ten (10) days after Buyer becomes aware of such allegations of infringement, and Seller having sole control over the defense of any allegations or actions including all negotiations for settlement or compromise. If an item sold hereunder is subject to a claim that it infringes the Intellectual Property Rights of a third party, Seller may, at its sole expense and option, procure for Buyer the right to continue using said item, replace or modify said item so as to make it noninfringing, or offer to accept return of said item and return the purchase price less a reasonable allowance for depreciation. Notwithstanding the foregoing, Seller shall have no liability for claims of infringement based on information provided by Buyer, or directed to items delivered hereunder for which the designs are specified in whole or part by Buyer, or infringements resulting from the modification, combination or use in a system of any item sold hereunder. The foregoing provisions of this Part 10 shall constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for infringement of Intellectual Property Rights.

If a claim is based on information provided by Buyer or if the design for an item delivered hereunder is specified in whole or in part by Buyer, Buyer shall defend and indemnify Seller for all costs, expenses or judgments resulting from any claim that such item infringes any patent, trademark, copyright, trade dress, trade secret or any similar right.

11. Force Majeure: Seller does not assume the risk of and shall not be liable for delay or failure to perform any of Seller's obligations by reason of circumstances beyond the reasonable control of Seller (hereinafter "Events of Force Majeure"). Events of Force Majeure shall include without limitation, accidents, acts of God, strikes or labor disputes, acts, laws, rules or regulations of any government or government agency, fires, floods, delays or failures in delivery of carriers or suppliers, shortages of materials and any other cause beyond Seller's control.

12. Entire Agreement/Governing Law: The terms and conditions set forth herein, together with any amendments, modifications and any different terms or conditions expressly accepted by Seller in writing, shall constitute the entire Agreement concerning the items sold, and there are no oral or other representations or agreements which pertain thereto. This Agreement shall be governed in all respects by the law of the State of Ohio. No actions arising out of the sale of the items sold hereunder or this Agreement may be brought by either party more than two (2) years after the cause of action accrues.

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