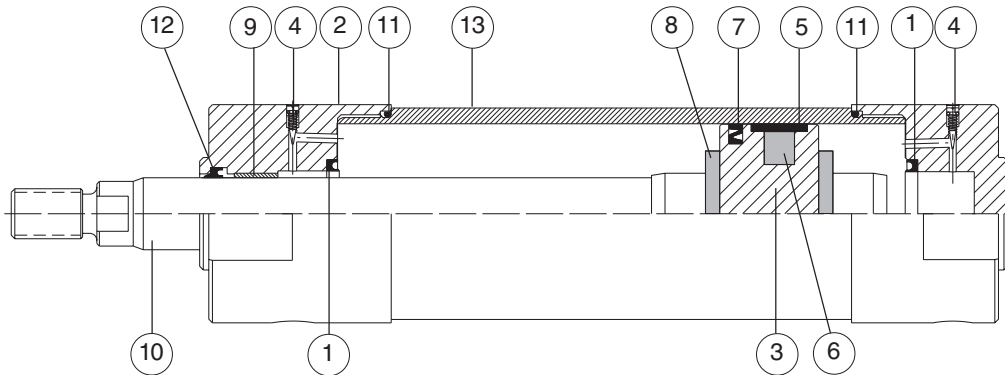


P1L Series Parts Identification



Material Specifications

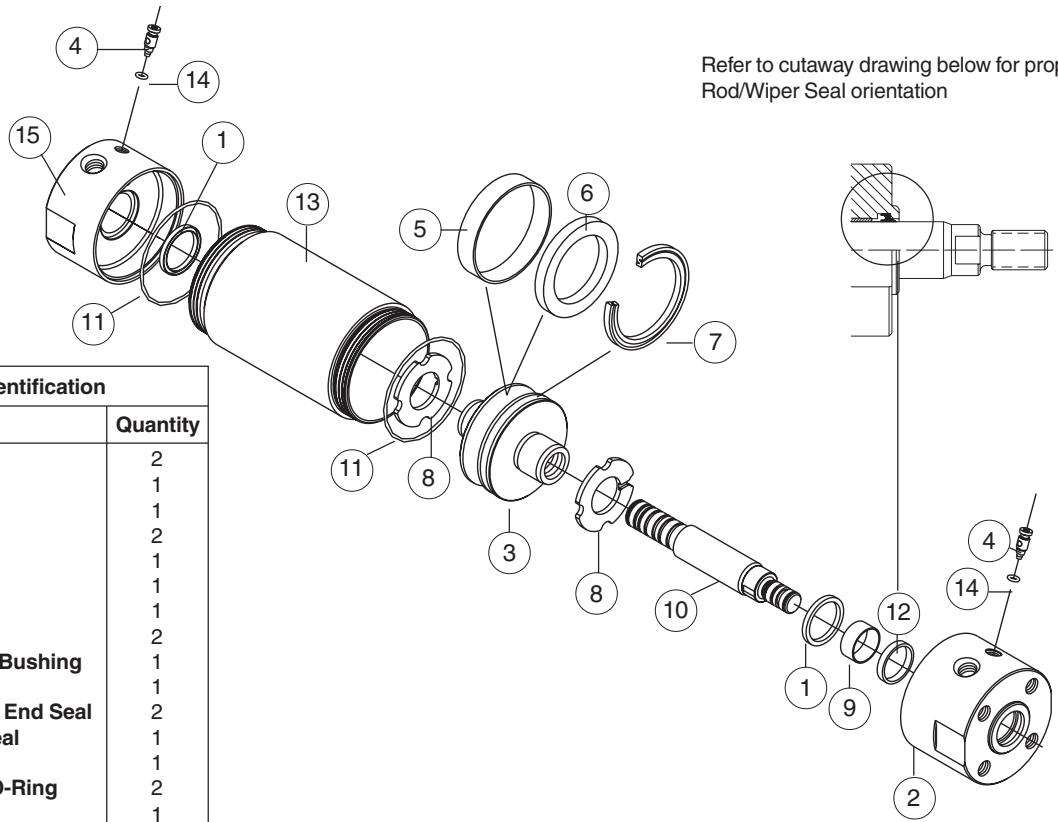
Symbol	Description	Material Specification
1	Cushion Seals	Nitrile, Fluorocarbon ³
2	Head and Cap	Black Anodized Aluminum Alloy
3	Piston	Aluminum Alloy
4	Adjustable Cushion Needle Valves	Brass, Carbon Steel ²
5	Wear Ring	Nylon
6	Magnet	Plastic Coated Magnetic Material
7	Piston Seal	Nitrile, Fluorocarbon ³
8	Bumpers	Urethane
9	Rod Bearing / Bushing	Sintered Bronze Metal with PTFE Coating on the ID
10	Piston Rod	Stainless Steel, Chrome Plated Carbon Steel ¹
11	O-Rings / Cylinder Body End Seals	Nitrile, Fluorocarbon ³
12	Rod / Wiper Seal	Urethane, Fluorocarbon ³
13	Cylinder Body	Clear Anodized Aluminum Alloy (OD & ID Barrel)

- 1 Stainless Steel Rod is Standard on 20 - 25 mm bores and optional on 32 to 100mm.
 Chrome Plated Steel Rod is not available on 20 - 25 mm bores.
- 2 Cushion needle valves are brass on sizes 20-40mm bores and carbon steel on 50-100mm bores.
- 3 Fluorocarbon is used in the high temperature option : - 23° C. to + 121° C. (- 10° F. to + 250° F.)

Repair Kits

Bore Size	Single Rod Cylinder Repair Kits		Double Rod Cylinder Repair Kits	
	Class 1 Seals, Std. Service	Class 5 Seals, High Temp.	Class 1 Seals, Std. Service	Class 5 Seals, High Temp.
	Consisting of: 1 ea. Symbol #5, 7, 12, & 2 ea. Symbol #1, 8, 11, 14		Consisting of: 1 ea. Symbol #5, 7, & 2 ea.Symbol #1, 8, 11, 12, 14	
mm	Part No.	Part No.	Part No.	Part No.
20	P1L020D001	P1L020D005	P1L020K001	P1L020K005
25	P1L025D001	P1L025D005	P1L025K001	P1L025K005
32	P1L032D001	P1L032D005	P1L032K001	P1L032K005
40	P1L040D001	P1L040D005	P1L040K001	P1L040K005
50	P1L050D001	P1L050D005	P1L050K001	P1L050K005
63	P1L063D001	P1L063D005	P1L063K001	P1L063K005
80	P1L080D001	P1L080D005	P1L080K001	P1L080K005
100	P1L100D001	P1L100D005	P1L100K001	P1L100K005

P1L Series Exploded Assembly View



Refer to cutaway drawing below for proper Rod/Wiper Seal orientation

Parts Identification		
Symbol	Description	Quantity
1	Cushion Seal	2
2	Head	1
3	Piston	1
4	Needle Valve	2
5	Wear Ring	1
6	Magnet	1
7	Piston Seal	1
8	Bumper	2
9	Rod Bearing / Bushing	1
10	Piston Rod	1
11	Cylinder Body End Seal	2
12	Rod / Wiper Seal	1
13	Cylinder Body	1
14	Needle Valve O-Ring	2
15	Cap	1

Maintenance Instructions

- 1 Disconnect the cylinder and piston rod from the machine members, following every safety procedure as directed by the machine manufacture.
- 2 If necessary, remove the mounting brackets or flanges from the cylinder.
- 3 On both the head and cap, scribe a line across the end caps and the cylinder body so as to record their original relative position.
- 4 Place the flats of the cap in a vice with soft jaws.
- 5 Using a wrench across the flats on the cylinder head, unthread the head.
- 6 If the cylinder body unthreads from the cap, place the head in the vice and unthread the cylinder body from the head using a strap wrench.
- 7 Slip the cylinder head over the piston rod. Remove the rod/wiper seal (item 12). Thoroughly clean the head and seal grooves. Inspect the rod bearing for wear. If the rod bearing is worn out-of-round by more than about 0.15 mm (.006"), then replace cylinder.
- 8 Clean the inside diameter of the cylinder body and inspect it for evidence of scoring. Light scratch marks generally do not pose a problem.
- 9 Remove the piston seal (item 7) and the wear ring (item 5) from the piston. Also, remove the two bumpers from the assembly (item 8). Clean and inspect the piston. If the piston is worn, replace the piston and rod assembly. Note that the piston is locked and held to the piston rod with an anaerobic adhesive. For safety reasons, disassembly of the piston-to-rod connection must be done only by factory trained persons.
- 10 Lubricate the inside diameter of the bumpers (item 8) and install on piston. Lubricate piston seal (item 7) and install in piston. Install wear ring (item 5). Lubricate the outside of the wear ring, piston and the inside of the cylinder body. Be careful not to damage the piston seal while installing the piston rod assembly into the cylinder body.
- 11 Lubricate and install the rod/wiper seal (item 12) in the orientation as shown on the assembly drawing into the cylinder head.
- 12 If the cylinder is cushioned, then remove the old cushion seals using needle-nose pliers. Lubricate and install new cushion seals (item 1) in the same location from which the original seals were removed. Please note the proper cushion seal orientation from the parts I.D. drawing. Cushion seals should be pressed securely in the groove.
- 13 Remove the old cylinder body end seals (item 11) from the cylinder. The seals will be located in the end caps on bore size 32mm and smaller. On the larger bore sizes, the seals will be located on the cylinder body. Lubricate the new end seals and install in the same location from which the original seals were removed. Make sure that after installation the seals are not twisted.
- 14 Lubricate the rod bearing in the cylinder head. Slip the head assembly over the piston rod, being careful not to damage the rod/wiper seal. Thread the head on to the cylinder body. Thread the cap on to the cylinder body.
- 15 Hold the flats of the cap in a vice. With a strap wrench and an open end wrench, line-up the scribe marks made in step 3 on both the head and cap with the cylinder body.
- 16 For all mounts, except style F, tighten the end caps an additional 2 degrees beyond the original position using the table below as a guide to torquing the cylinder.
- 17 Reattach the mounting accessories following the Mounting Kit Installation procedures.

Head and Cap Assembly Torque Table

Bore (mm)	Assembly torque (in-lbs)			Assembly torque (N-m)		
	Target	Min	Max	Target	Min	Max
20	250	100	500	28	11	57
25	250	100	500	28	11	57
32	300	200	600	34	23	68
40	500	300	800	57	34	90
50	600	400	1000	68	45	113
63	600	400	1000	68	45	113
80	600	400	1000	68	45	113
100	800	600	1200	90	68	136

P1L Series Mounting Kits

Single or Double Rear Clevis Mounting Kits—Style A or B (Fig. 1)

Align the rear clevis with the port location as desired. Insert the four (4) screws through the bracket and thread them into the end caps until they are hand tight. Torque the screws to the values listed in the table below.

Single Clevis Kit, bracket and pivot pin are ordered separately. Please see How To Order information for part numbers.

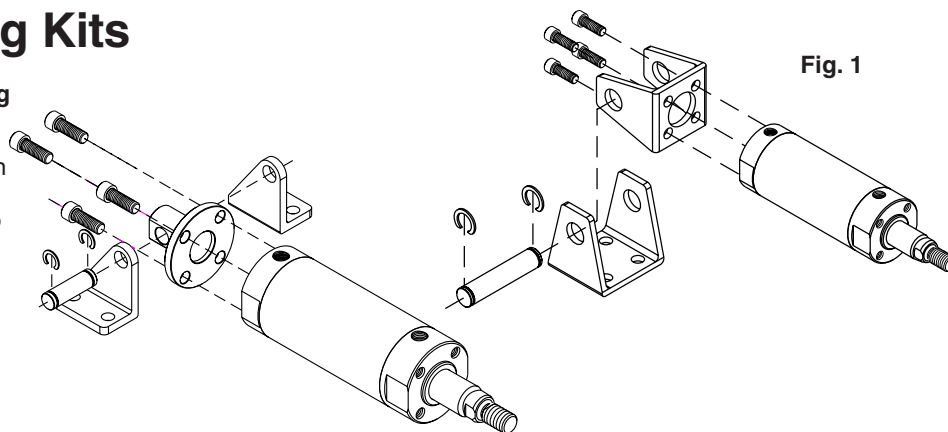


Fig. 1

Foot Mounting Kits—Style F (Fig. 2)

Align each of the foot brackets with the port location as desired. Insert the four (4) screws through the foot mounts and thread them into the end caps until they are hand tight. Place the cylinder assembly on to a flat surface and torque screws to the values listed in the table below. Make sure the foot mounts rest properly on a flat surface.

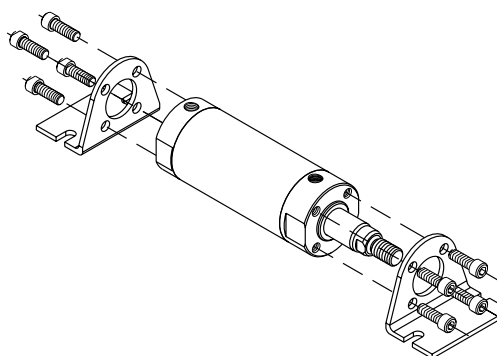


Fig. 2

Flange Mounting Kits—Style J and H (Fig. 3)

Insert the four (4) screws through the nose mount or the flange mounts and thread them into the cylinder head or cap until they are hand tight. Torque the screws to the values listed in the table below.

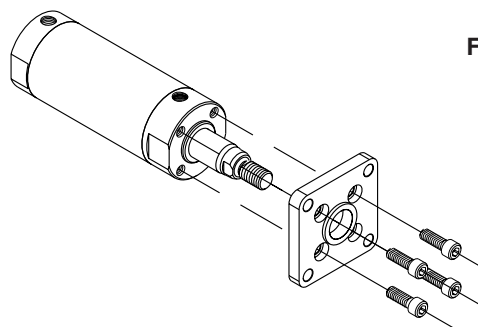


Fig. 3

Bore Size	FOOT MTG		FLANGE		SINGLE CLEVIS		DOUBLE CLEVIS		FASTENER SIZE		TORQUE	
	(Inch)	(Metric)	(Inch)	(Metric)	(Inch)	(Metric)	(Inch)	(Metric)				
20	L077440075	L077550020	L077450075	L077560020	L077470075	L077570020	L077480075	L077580020	8-32	M4x0.7	10-12 in-lbs	1.1-1.4 N-m
25	L077440100	L077550025	L077450100	L077560025	L077470100	L077570025	L077480100	L077580025	10-32	M5x0.8	12-14 in-lbs	1.4-1.6 N-m
32	L077440125	L077550032	L077450125	L077560032	L077470125	L077570032	L077480125	L077580032	10-32	M5x0.8	12-14 in-lbs	1.4-1.6 N-m
40	L077440150	L077550040	L077450150	L077560040	L077470150	L077570040	L077480150	L077580040	1/4-28	M6x1	32-36 in-lbs	3.6-4.1 N-m
50	L077440200	L077550050	L077450200	L077560050	L077470200	L077570050	L077480200	L077580050	5/16-24	M8x1.25	72-82 in-lbs	8.1-9.3 N-m
63	L077440250	L077550063	L077450250	L077560063	L077470250	L077570063	L077480250	L077580063	3/8-24	M10x1.5	18-19 ft-lbs	24-26 N-m
80	L077440312	L077550080	L077450312	L077560080	L077470312	L077570080	L077480312	L077580080	3/8-24	M10x1.5	18-19 ft-lbs	24-26 N-m
100	L077440400	L077550100	L077450400	L077560100	L077470400	L077570100	L077480400	L077580100	1/2-20	M12x1.75	40-44 ft-lbs	54-60 N-m

P1L Series Trunnion Mount Assembly Instructions

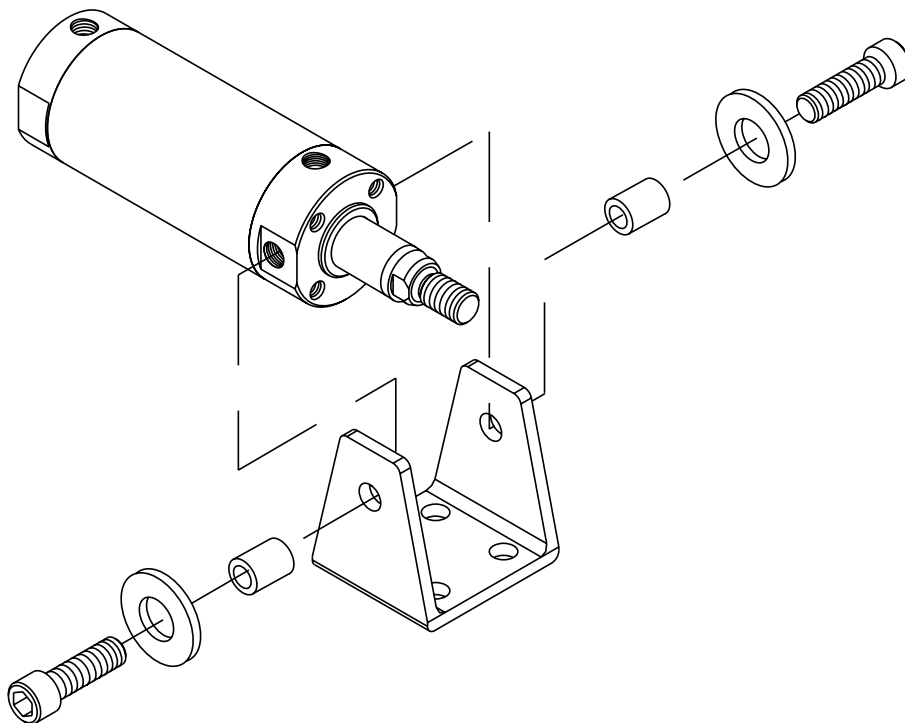
Align the bracket on the machine member providing cylinder rotation as desired. Securely mount the bracket to the machine member. Align the cylinder head or cap with the bracket. Insert the bearing, washer and pivot bolt on to each side of the cylinder as shown. Torque the pivot bolts to the values listed in the table below. Use only bolts provided, as they have a special adhesive coating for secure fastening.

Cylinder Bore	Trunnion Pivot Bolt	Torque	
20	M5x0.8	12-14 in-lbs	1.4-1.6 N-m
25	M6x0.75	32-36 in-lbs	3.6-4.1 N-m
32	M8x1	72-82 in-lbs	8.1-9.3 N-m
40	M10x1.25	18-19 ft-lbs	24-26 N-m
50	M12x1.25	40-44 ft-lbs	54-60 N-m
63	M14x1.5	70-74 ft-lbs	95-100 N-m

Front and Rear Trunnion Mounts Style E and D (Fig. 1)

Order trunnion mounts by specifying “E” for front trunnion or “D” for rear trunnion in the “Mounting Style” digit of the model code. The bearings, washers and pivot bolts will be supplied with the cylinder. The trunnion bracket must be ordered as a separate item.

Fig. 1



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 item, when communicated to Parker Hannifin Corporation, its subsidiary or an authorized distributor ("Seller") verbally or in writing, shall constitute acceptance of this offer.

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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 18 months from date of shipment from Parker Hannifin Corporation. **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.**

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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: Buyers 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 of 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 non-infringing, 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 Right.

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 judgements 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 of this Agreement may be brought by either party more than two (2) years after the cause of action accrues.