

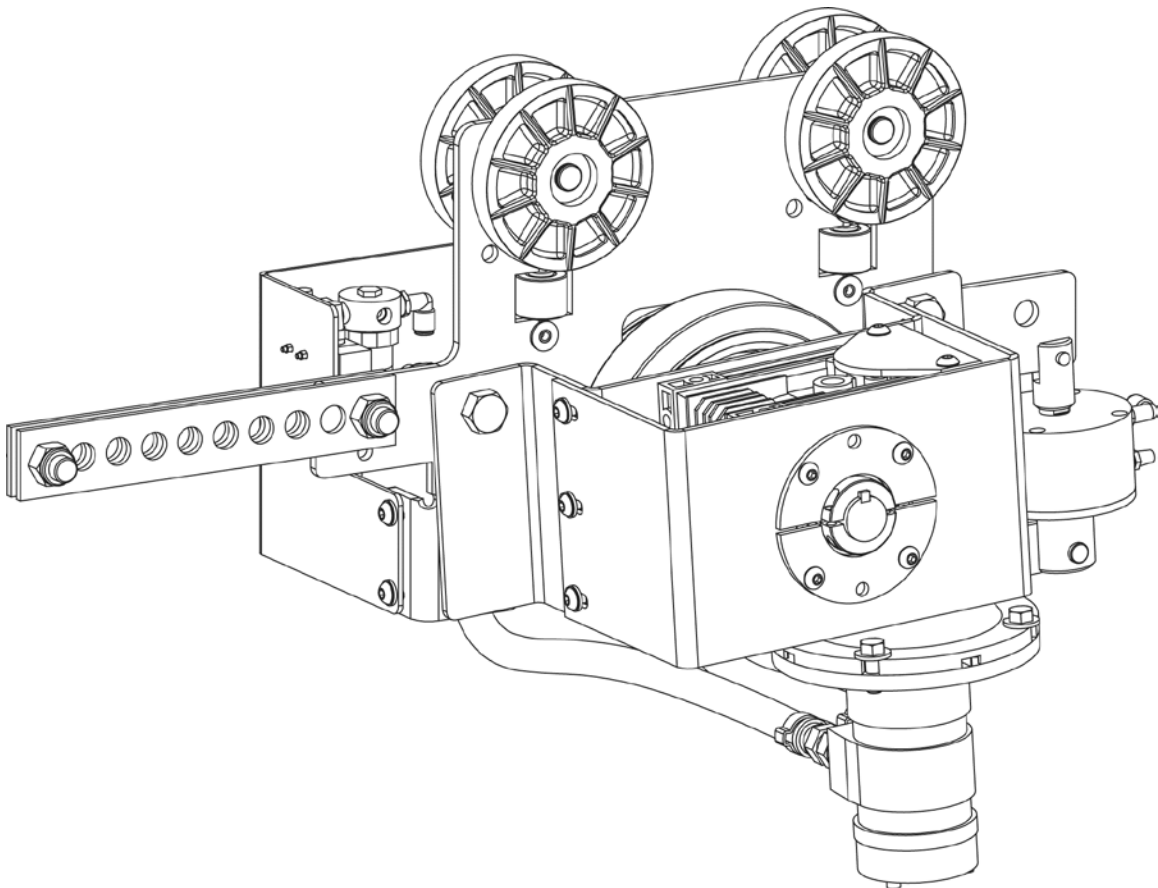


# KNIGHT

## GLOBAL

# Pneumatic Tractor

## Operation, Installation, and Maintenance Manual



THIS MANUAL CONTAINS IMPORTANT INFORMATION REGARDING INSTALLATION, SAFETY, MAINTENANCE, AND OPERATION OF KNIGHT GLOBAL PNEUMATIC AIR TRACTORS AND SHOULD BE AVAILABLE TO ALL PERSONNEL RESPONSIBLE FOR USING THE AIR TRACTOR.

March 2015

This manual provides important information for all personnel involved in the installation, operation and maintenance of the Knight Global pneumatic air tractor. All personnel must read this document before operating the equipment.

Every effort has been made to provide complete and accurate product information in this manual. However, due to product improvements and changes, discrepancies and omissions may be present. Visit our website at [www.knightglobal.com](http://www.knightglobal.com) for the updated information on all our products.

It is the responsibility of the end user to exercise common sense and judgment when performing the tasks described in this manual. If any procedure seems inaccurate, incomplete or unsafe please put the equipment in a safe condition and contact Knight Global service department for assistance.

Throughout this manual there are steps and procedures that if not performed correctly can result in personal injury or equipment damage. The following signal words are used to identify the level of potential hazard.



Indicates a hazard which will cause severe injury, death or substantial equipment damage.



Indicates a hazard which can or will cause injury or equipment damage.

**NOTE**

Notifies personnel of installation, operation or maintenance information which is important but not hazard related.

1.	SAFETY .....	1
	A. General Safety Precautions.....	1
2.	INSTALLATION .....	2
	A. Connecting Main Air .....	3
3.	OPERATION.....	4
	A. Principle of Operation .....	4
	B. Operation Adjustments .....	4
4.	MAINTENANCE .....	6
	A. Inspection Record Requirements .....	6
	B. Inspections .....	6
5.	SPARE PARTS LIST .....	9
6.	DECOMMISSIONING AN AIR TRACTOR.....	9
	A. Decommissioning Pneumatic Air tractors: .....	9
7.	KNIGHT'S PERFORMANCE WARRANTY .....	10



# 1. SAFETY

Knight Global recognizes that most companies have a safety program in place at their facility. The Safety Section, Notes, Cautions and Warnings in this manual are intended to supplement and not supersede any existing plant or company safety guidelines or regulations.

Knight Global cannot be aware of or provide for all the procedures by which the air tractor operations or repairs may be conducted and the hazards which may result from each method. If operation or maintenance not specifically recommended by Knight Global is conducted, it must be ensured that product or personnel safety is not endangered by these actions. Personnel should place the air tractor in a safe condition and contact a supervisor and/or Knight Industry's service department for technical support if they are not sure of an operation, maintenance procedure, or step.

## A. General Safety Precautions

Safe operating instructions are provided to make the operator aware of hazards to avoid and are not necessarily limited to the following list:

- Only allow personnel trained in safety and operation of this Pneumatic Tractor to operate.
- If Pneumatic Tractor is locked out or a "DO NOT OPERATE" sign is on Pneumatic Tractor, do not operate Pneumatic Tractor until lock or sign is removed by designated personnel.
- Before each shift or prior to use, inspect Pneumatic Tractor in accordance with procedures defined in maintenance section of this manual.
- Pay attention to the load at all times when operating the Pneumatic Tractor.
- Ensure no personnel are in load path.
- Do not lift a load over personnel.
- Never use a Pneumatic Tractor for lifting, lowering or transporting people.
- Do not allow anyone to stand on a suspended load.
- Never leave a suspended load on Pneumatic Tractor unattended.
- Never cut or weld a suspended load.
- Do not operate Pneumatic Tractor when damaged or malfunctioning.
- Ensure that end stop is in place.
- Ensure that festooning cannot be entangled or pinched during operation of Pneumatic Tractor.
- Do not field modify Pneumatic Tractor in any way. Any modifications without written consent of Knight Global will void all warranties.

## 2. INSTALLATION

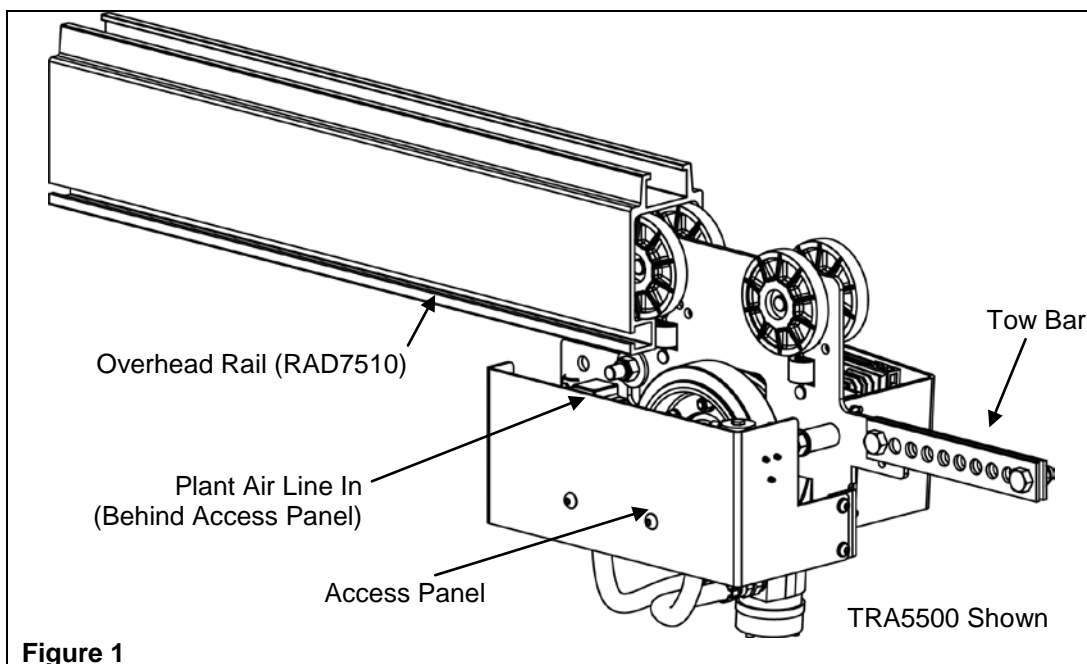
Prior to installation, visually inspect the air tractor for signs of damage.



**CAUTION!**  
Prior to placing this unit into service the owners and user are advised to examine specific local and/or other regulations, including ANSI and OSHA regulations that may apply to the use of this product.

Follow the appropriate steps below to install the air tractor for a rail system (refer to Figure 1):

- Step 1. Remove end caps from the rails.
- Step 2. Lift the air tractor to proper rail height.
- Step 3. Roll trolley(s) into rail.
- Step 4. Replace end caps.
- Step 5. Manually push the air tractor back and forth to ensure it moves freely. Movement problems may indicate that damage occurred during shipping and should be reported to the Knight Customer Service Department at 248-377-4950 extension 162.
- Step 6. (For TRA1500, TRA4000, and TRA5000 only) Fill the in-line oiler with SAE10W non-detergent oil. Air tractor is shipped with in-line oiler empty.
- Step 7. Connect the plant air supply to the hard pipe air inlet. (Refer to Connecting Main Air)
- Step 8. Connect the pendant control air lines (marked 1, 50, and 51) to fittings marked with the same number on the air tractor.
- Step 9. Connect a safety cable on the pendant control to a secure location (usually a trolley) or fixture mount.
- Step 10. Press the forward and reverse buttons on the pendant control to test the movement of the unit.
- Step 11. Attach the tow bars to the trailing device, typically a trolley.
- Step 12. Set the speed control and wheel pressure regulator. (Refer to Air Tractor Adjustments section)



## **A. Connecting Main Air**

The air supply is to be connected after the air tractor is installed to the supporting structure.

Adequate flow and pressure are also required. Inadequate flow will cause sluggish performance.

- Step 1. Purge air lines and ensure they are free of all contaminants before connecting to the air tractor.
- Step 2. Connect a clean, filtered, oil free air supply to the air inlet on the regulator.
  - a. Plant Air supply must be at least 60 psi.
- Step 3. Open air supply valves and/or lockout valves.
- Step 4. Set air regulator to at least 60 psi [4.1 bar]. (Not to exceed 95 psi)
- Step 5. Inspect system for loose fittings or leaks. Repair as necessary.
- Step 6. Follow operation adjustment procedures in the Maintenance Section of this manual to adjust the air tractor for proper operation.

### 3. OPERATION

#### A. Principle of Operation

The air tractor is designed to provide horizontal movement within a specific range of motion. The trolley provides horizontal movement when inserted into/onto a rail system.

#### B. Operation Adjustments



#### WARNING!

Before performing operational adjustments, ensure air supply is off and the air tractor is not under load.



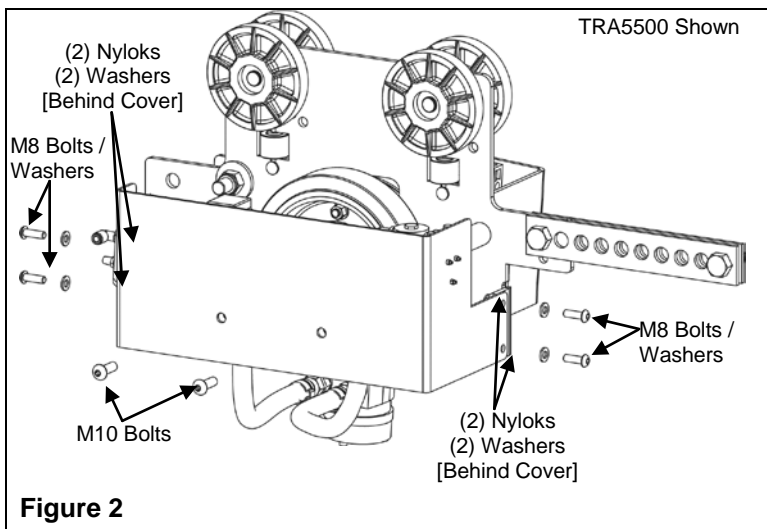
#### CAUTION!

Do not use the reverse action as a brake. Using the air tractor as a brake will damage the pinion gear in the speed reducer.

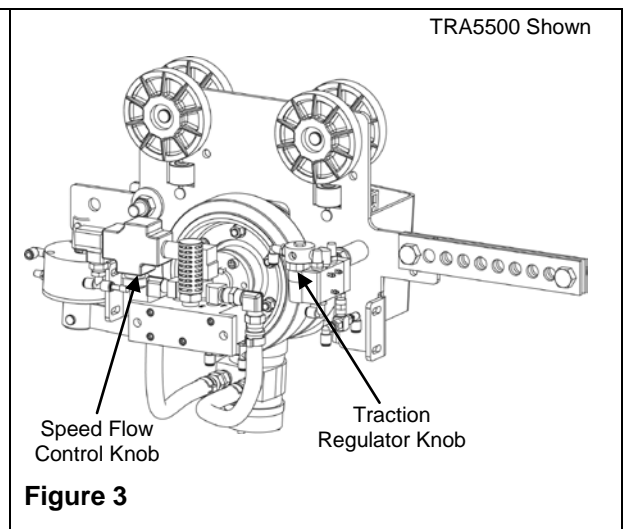
#### **Access Panel Removal** (TRA1500 series do not have access panels)

It may be necessary to remove the access panel to access the speed flow control knob and traction regulator knob.

- Step 1. Remove the (2) two M10 front access cover bolts and (2) two Nyloks. (See Figure 2 on page 4)
- Step 2. Remove the (4) four M8 side access cover bolts, (8) eight flat washers, and (4) four Nyloks. (See Figure 2 on page 4)
- Step 3. Carefully remove the access cover panel. The adjustment knobs are now accessible for adjustment.



**Figure 2**



**Figure 3**



### **Speed Adjustments**

The speed of the air tractor is adjusted using the flow control knob. Knob is accessible from underneath the air tractor's access panel cover. If there is difficulty reaching the adjustment knob, refer to removing the access cover panel.

- Step 1. Turn the adjustment flow control knob (see Figure 3) clockwise until it stops.
- Step 2. Turn on air supply.
- Step 3. Turn flow control knob counter-clockwise to increase speed.
- Step 4. Test air tractor speed. Turn the flow control knob counter-clockwise to increase speed and counter clockwise to decrease speed of air tractor.

### **Traction Adjustment**

Adjust the traction if the wheels of the air tractor begin to slip during movement or if excessive wear is evident. Wheel slippage during initial movement is required to prevent damage to the speed reducer. Traction is adjusted by turning the regulator knob. Knob is accessible from underneath the air tractor's access panel cover. If there is difficulty reaching the adjustment knob, refer to removing the access cover panel.

- Step 1. Turn the adjustment regulator knob (see Figure 3) clockwise until it stops.
- Step 2. Turn on air supply.
- Step 3. Turn regulator knob counter-clockwise to increase traction.
- Step 4. Test air tractor movement. Turn the flow control knob counter-clockwise to increase traction and counter clockwise to decrease traction of air tractor.

### **In-line Oiler for Motor Adjustment** (For TRA1500, TRA4000, and TRA5000 series only)



Disconnect air supply before removing filler cap from lubricator.

Periodically check oil level of in-line oiler; ensure that level is 1/2 inch (13 mm) above siphon tube. Fill as required with SAE10W detergent oil. The in-line oiler is factory set to deliver 1 (ONE) drop of oil for every SCFI of air (approximately 1 (one) drop every (5) five seconds). If lubrication needs to be changed, adjust level by turning adjustment knob on inline oiler.

- Turn adjustment knob to a higher number to increase frequency of drip.
- Turn adjustment knob to a lower number to decrease frequency of drip.

## 4. MAINTENANCE

### A. Inspection Record Requirements

#### Duty Rating

Inspection frequency should be determined by a qualified person and is based duty service as defined below. Each air tractor should be rated individually and inspections performed in accordance with rating.

Inspections can be performed by the operator or qualified personnel.

#### Duty Service

Normal - Operation with uniform loads less than 65% of rated load for not more than 25% of the time.

Heavy - Operation within the rated load limit, which exceeds normal service.

Severe - Service that involves normal or heavy service with abnormal conditions.

#### Frequency of Documentation

Frequent Inspection (Non-Documented):

- Normal Service - quarterly
- Heavy Service – monthly.
- Severe Service - daily

Periodic Inspection (Documented):

- Normal Service - annually.
- Heavy Service – semi-annually.
- Severe Service - quarterly.

Documentation should be made available to personnel for review.

### B. Inspections

#### **Frequent Inspections**

Additionally, the operator should check the system continually during operation to ensure that no malfunctions are occurring.

#### Air tractor:

- Visually inspect the air tractor, ensure that it is in good general working order. Repair or replace any broken or missing parts.
- Ensure fasteners are secure. Tighten any loose fasteners or replace any broken fasteners.

#### Pneumatic System:

- Visually inspect all connections, fittings, hoses, valves, regulators and filters. Verify connections are intact without leaks.

**Periodic Inspections (Documented)**

Perform the items listed in the Frequent Inspection section in addition to the items listed below. All findings from this inspection should be recorded.

If any of the conditions listed below are evident, the air tractor should be placed out of service and corrective actions can be taken.

Supporting Structure:

- Check for distortion, wear and continued ability to support the load. Refer to manufacturers' instructions for overhead rail systems.

Rail Trolley (if applicable):

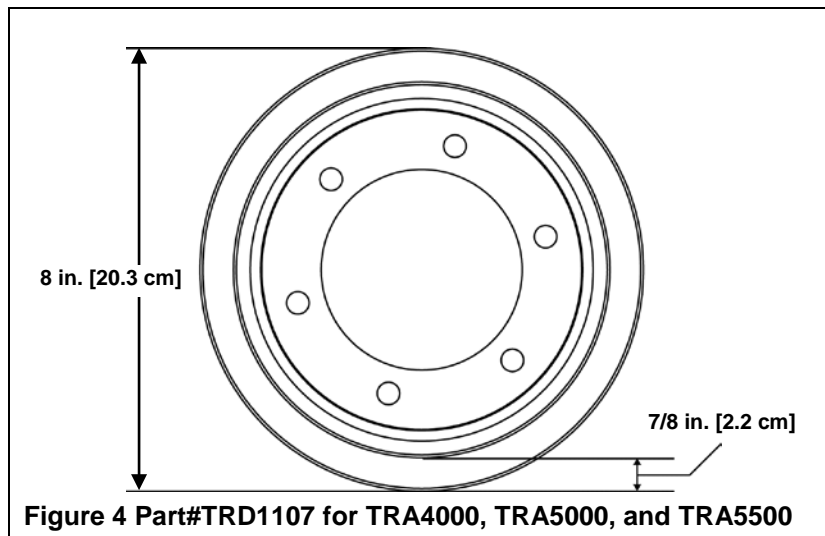
- Ensure wheels and side rollers run smoothly and are not excessively worn. Replace the wheels and side rollers as necessary.
- Check all fasteners, ensure they are intact and properly tightened.
- Visually check the nylon at the bearing and along the face of the wheel for cracks.

I-Beam Trolley (if applicable):

- Ensure wheels run smoothly and are not excessively worn. Replace as necessary.
- Ensure the wheels track the beam properly.
- Check the side plates for spreading. Repair or replace the trolley as required.

Air tractor:

- Check all fasteners for security. Torque fasteners to recommended torque levels.
- Bushings and Bearings: Check for smooth operation. Replace if damaged or binding occurs.
- Check rubber traction wheels. Replace wheel if more than 5/8" of wear is present. Some cracking and material loss is allowable. Continued use past the recommended level will cause damage to the track or system in operation. (See Figure 4)



Air tractor Wheel Replacement: (Part#TRD1107 for TRA4000, TRA5000, and TRA5500)

- Step 1. Turn main air supply off to the air tractor and lock out.
- Step 2. Disconnect the blue 1/4" air lines at both ends.
- Step 3. Remove the two (2) 5/8" lock nuts from the inner trolley bolts.



Do not remove the trolley bolts from the air tractor. This could cause the air tractor to fall.

- Step 4. Remove the clamp collar from the pivot shaft.
- Step 5. Remove the clamp collar from the in-line oiler hard pipe.
- Step 6. (For TRA4000 and TRA5000 series only) Push the in-line oiler downward to allow for the removal of the access panel.
- Step 7. Remove access panel. (Refer to page 4 for Access Panel Removal)
- Step 8. Remove the six (6) 3/8" nuts from the wheel assembly.
- Step 9. Remove both wheels and wheel spacer.
- Step 10. Place spacer between the new wheels.
- Step 11. Reassembly the air tractor in reverse order.

Air tractor Wheel Replacement: (Part#TRD1552 for TRA1500)

- Step 1. Turn main air supply off to the air tractor and lock out.
- Step 2. Disconnect the blue 1/4" air lines at both ends.
- Step 3. Remove the four (4) set screws located on the flat wheel axle shaft. [(2) screws per side].



Do not remove the trolley bolts from the air tractor. This could cause the air tractor to fall.

- Step 4. Remove wheel from axle.
- Step 5. Replace new wheel onto flat axle.
- Step 6. Connect the blue 1/4" air lines at both ends.

## 5. SPARE PARTS LIST

Because Knight is continuously improving and updating its products, all product drawings and spare parts lists for the Air Tractors can be requested by visiting our website and filling out the contact page at <https://knightglobal.com/contact>.

## 6. DECOMMISSIONING AN AIR TRACTOR

Knight air tractors contain various materials which, at the end of the service life, must be disposed of or recycled (where appropriate), in accordance with statutory regulations.

### A. Decommissioning Pneumatic Air tractors:



Knight Air tractors must only be dismantled by qualified personnel.

- Depressurize air line(s).
- Detach the control hose(s) from the air tractor.
- Remove the tow bars to the trailing device, typically a trolley.
- Remove air tractor from rail by removing end caps and rolling tractor out of rail.

## 7. KNIGHT'S PERFORMANCE WARRANTY

Knight warrants that its products and parts shall meet all applicable specifications, performance requirements, and be free from defects in material and workmanship for one year, (Servo Systems for two years), from the date of invoice, unless otherwise noted. One exclusion would include any purchased components not manufactured by Knight and their specific individual warranties. Paint defects, scratches and marring from shipping are also excluded.

This warranty shall not cover failure or defective operation caused by inadequate training provided by customer regarding the operation and / or maintenance of the tool, misuse, negligence, misadjustment, or alteration not approved by Knight. Knight's obligation is limited to the replacement or repair of Knight's products at a location designated by Knight. Buyer is responsible for all associated internal removal and reinstallation costs as well as freight charges to and from Knight Industries. Knight's maximum liability shall not in any case exceed the contract price for the products claimed to be defective.

On a design & build job, the customer is the owner of the equipment once they authorize shipment. The equipment cannot be returned for reimbursement or credit.

Knight warranties servo hoists, servo arms, and servo tractors to be free from defects in material or workmanship for a period of two years or 6000 hours use from date of shipment.

Knight distributors/agents are not authorized to circumvent any of the terms and conditions of this warranty unless approved in writing by Knight Management. Statements made by Knight distributors/agents do not constitute warranties.

Unauthorized changes to any of Knight's products voids our performance warranty and any potential liabilities. If changes are necessary, please contact Knight for authorization to continue.

Disclaimers: OTHER THAN AS SET FORTH HEREIN, NO OTHER EXPRESS WARRANTIES, AND NO IMPLIED WARRANTIES, ORAL AND WRITTEN, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE MADE BY KNIGHT WITH RESPECT TO ITS PRODUCTS AND ALL SUCH WARRANTIES ARE HEREBY SPECIFICALLY DISCLAIMED. KNIGHT SHALL NOT BE LIABLE UNDER ANY CIRCUMSTANCES FOR ANY INCIDENTAL, SPECIAL AND/OR CONSEQUENTIAL DAMAGES WHATSOEVER, WHETHER OR NOT FORESEEABLE, INCLUDING BUT NOT LIMITED TO DAMAGES FOR LOST PROFITS AND ALL SUCH INCIDENTAL, SPECIAL AND / OR CONSEQUENTIAL DAMAGES ARE HEREBY ALSO SPECIFICALLY DISCLAIMED.





# **KNIGHT** **G L O B A L**

KNIGHT GLOBAL  
2705 Commerce Parkway  
Auburn Hills, MI 48326  
Phone 248-377-4950 | Fax 248-377-2135  
[www.knightglobal.com](http://www.knightglobal.com)