Top Brush

Service Manual

COLEMAN HANNA CARWASH SYSTEMS LLC

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1.0 Introduction

The new Hanna XT Rotary Top Brush (Figure 1-1) represents the *next generation* of Hanna developed and Hanna tested modular and free-standing car wash systems. This side-supported stainless-steel brush offers superior cleaning while gently washing all types and shapes of vehicles. The horizontally mounted rotary brush contains 18 split-ring assemblies that concentrate cleaning motion to the upper grill, hood, windshield, roof, and rear surfaces of the vehicle. The brush is extra wide and utilizes a low pivot point that allows for longer contact with the vehicle. It comes equipped with your choice of soft cloth or foam.

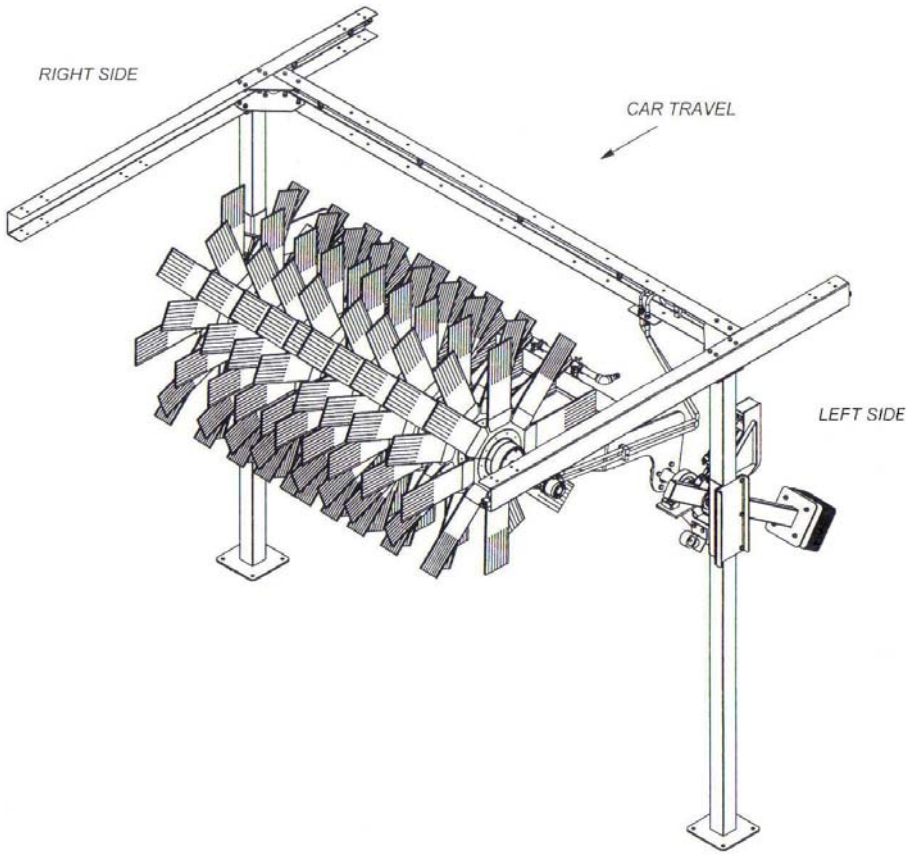

Figure 1- 1 Hanna XT Rotary Top Brush for System Configurations

The XT series of brushes are part of the new Hanna XT modular structure and offers the car wash owner/operator a new option to provide top service and reliability to their customers at an affordable cost. The XT Rotary Top Brush is also available as a free-standing option (Figure 1-2).

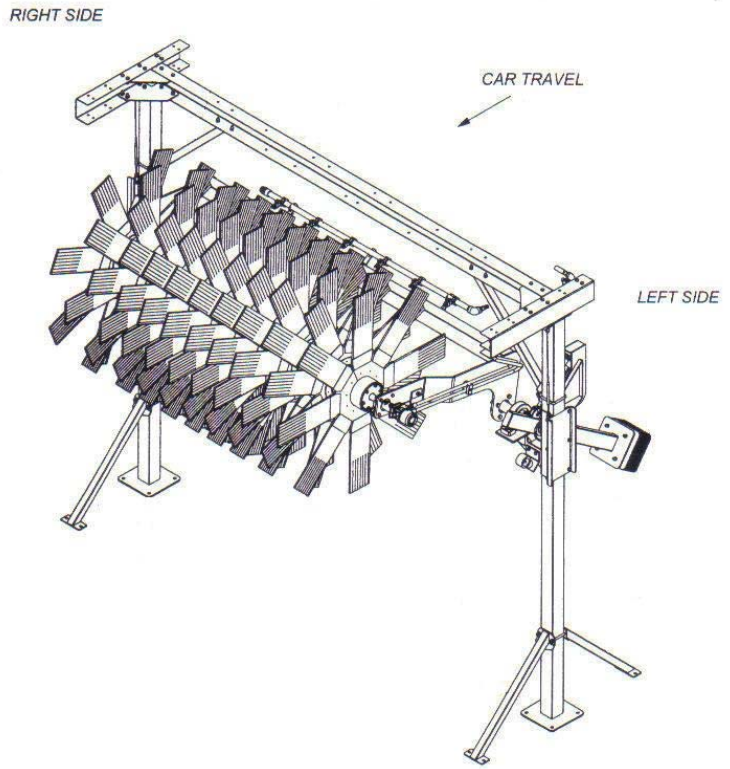

Figure 1- 2 Hanna XT Rotary Top Brush for Free-Standing Configurations

1.1 Design Features

The XT Rotary Top Brush exhibits vertical movement (up and down) while it rotates into the vehicle against the direction of vehicle travel. The custom engineered counter-weight assembly coupled with a retract cylinder and solenoid valve allows the hydraulic-driven brush to gently

glide over the upper grill, hood, windshield, roof, and trunk of a vehicle at consistent penetration to provide superior cleaning.

The brush utilizes a direct-drive hydraulic motor. This drive offers the flexibility of variable-speed adjustments. With the variable speed (by adjusting the hydraulic valve), multi-textured wash material, and staggered split-ring design, these combinations produce the most effective top-brush cleaning in the industry.

1.1.1 Frame

The frame of Hanna's XT Rotary Top Brush is available in two height options — 90 in. and 96 in. Both of these frame heights offer strength, rigidity, and long-life. The framework has three main elements — legs, C-Channel, and mounting brackets.

1.1.2 Legs and C-Channel

The legs (or posts) and C-Channel of the XT Rotary Top Brush are the same sturdy legs and structure used for the rest of Hanna's XT equipment line. They are constructed entirely of high-quality stainless steel and have been designed to maximize strength, rigidity, and long life.

1.1.3 Pivot Bearings

The heavy-duty pivot bearings on the XT Rotary Top Brush are the best available on the commercial market. They have been specifically designed to allow angular alignment for the brush arm system and have been painted for maximum corrosion resistance.

1.1.4 Brush Bearings

The heavy-duty brush bearings on the XT Rotary Top Brush are the best bearings available on the commercial market. They have been specifically designed to allow angular alignment of the rotating brush and have been painted for maximum corrosion resistance.

1.1.5 Arms/Counterweight

The XT Rotary Top Brush arms and counterweights are designed to include the easiest possible method of adjustment. This adjustment is achieved across two ranges of motion (up and down), giving the operator and the installer total flexibility. Both counterweight assemblies must be properly adjusted in order to apply correct brush pressure on the vehicle. The arms are made of high-quality stainless steel with the strength and rigidity needed for years of trouble-free service.

1.1.6 Pneumatic Cylinders

One pneumatic cylinder is located on the driver side. The cylinder utilizes air pressure to lift the brush.

1.1.7 Hydraulic Motors

There is one hydraulic motor mounted on the arm to control the brush rotation.

1.1.8 Hydraulic Power Units

The XT Rotary Top Brush is available for operation with pressure compensated hydraulic power units and fixed displacement hydraulic power units.

1.1.9 Hydraulic Plumbing

Hydraulic tubing for your XT Rotary Top Brush has been installed prior to leaving Hanna's factory. Note that one hydraulic line to the motor is identified by a single band of colored tape while the other line has a double band of colored tape. The single band of colored tape denotes the pressure line and the double band of tape the return line. The hoses have been wrapped to prevent rubbing against each other and chaffing on the adjacent metal edges.

1.1.10 Cloth Material

Both cloth and foam (closed cell) wash materials are available in a wide variety of colors. Please contact your local Hanna distributor for information.

1.2 Basic Operation

The XT Rotary Top Brush is designed to activate as a vehicle approaches and shuts off as the vehicle moves past the rotary brush. This is accomplished with a hydraulic solenoid valve that is included on the hydraulic power unit (if hydraulic power unit is supplied by Hanna). Water to wet down the brush is activated by a solenoid valve and delivered by a manifold.

The Hanna XT Rotary Top Brush features a horizontally positioned rotating brush featuring cloth cleaning panels to give superior cleaning of the horizontal surfaces of a vehicle. The rotating motion gently cleans the vehicle as the soft cloth conforms to the vehicle's shape without incident to the windshield washers and antennas.

The Hanna XT Rotary Top Brush utilizes a direct-drive hydraulic motor. This drive offers the flexibility of variable-speed adjustments. With the combination of variable speed (by adjusting the hydraulic valve), multi-textured wash material, and flexible arms produce the most effective top brush cleaning in the industry.

1.2.1 Hood and Grill of Vehicle

The hood and grill of a vehicle typically has the most irregular surfaces found on the entire vehicle. These surfaces will often require *substantial* brush contact in order to remove the dirt that may be trapped by these irregular surfaces. These surfaces can be thoroughly cleaned by the XT Rotary Top Brush since the brush is capable of reaching the whole width of even the widest vehicles while exerting *substantial* but controllable brush contact.

1.2.2 Windshield and Top of Vehicle

Due to the relative smooth surfaces found on the top of vehicles, it would seem that the top of a vehicle is the easiest to wash. In contrast, the top of a vehicle is usually the most difficult to clean due to highly visible large surfaces. In addition to this, the windshield, wipers, and radio antenna are always a concern. Since these surfaces are often larger and less supported than other parts of a vehicle, they require *gentle* yet *consistent* brush contact in order to remove the dirt. Hanna's XT Rotary Top Brush can effectively wash these surfaces of a vehicle because its brushes are capable of maintaining *gentle* and *consistent* brush contact throughout the entire length of the vehicle.

1.2.3 Rear of Vehicle

The rear of a vehicle is often similar to the front of the vehicle except for one primary difference. This being that the vehicle is traveling away from the brush rather than toward it. To clean this portion of a vehicle, it requires that the brush maintains *substantial* contact while *quickly* covering the entire rear of the vehicle before it leaves the reach of the arms. Hanna's XT Rotary Top Brush accomplishes this mission.

1.2.4 Electrical Controls

Hanna's XT Rotary Top Brush actually has very little in electrical controls. For most applications, the only electrical controls are the three 24 VAC solenoids. They are the hydraulic solenoid (located on the hydraulic unit), water application solenoid, and the retract solenoid.

1.2.5 Computer Controls

The XT Rotary Top Brush is designed to work with any series of tunnel controller. Depending on which tunnel controller you have and how you decide to operate your XT Rotary Top Brush, you will need two functions. One function for the programmable top brush retract and another sequential (every car) function for hydraulics and water.

1.2.6 Water Plumbing

The XT Rotary Top Brush is supplied with a water spray manifold mounted to the arm assembly. This manifold holds six s 6530 pray jets. These jets will apply 3 GPM each at 50 PSI. Optional foamers are available to add lubricity for foam material or extra horizontal soap application.

2.0 Safety

Keep the following safety rules in mind when installing and using Hanna Car Wash Systems Equipment:

NOTE*: Always follow local and national trade codes when installing any equipment.*

- Always disconnect power from any electrical device or component prior to servicing.
- Unplug the unit or use proper lock-out procedures so that no one can inadvertently turn the power on while you are working on that equipment.
- Always power down the control box before unplugging or plugging in quick disconnects.
- Use caution when maintaining any piece of equipment.
- Wear protective clothing and eyewear when using power tools.
- Direct discharge of high-pressure water and chemicals away from you and other persons, or direct it into approved containers.
- Keep equipment clean for proper operation.
- Keep hands or any body parts away from equipment while in operation.
- If you need to disassemble a part for service or repair, re-assemble equipment according to instructions.
- Be sure all components are firmly screwed or latched into position.
- Observe safety and handling instructions of the chemical manufacturers.
- Wear protective clothing and eyewear when dispensing or working with chemicals or other potentially hazardous materials.

2.1 Cautions, Warnings, and Notes

Throughout this manual, there are various messages concerning safety – please heed these warnings! The following sections give some examples of these safety messages.

2.1.1 Cautions

Cautions warn against a potential hazard that, if not avoided, may result in minor or moderate injury. Caution signs also alert against unsafe practices that may cause property damage.

CAUTION: ***DO NOT TOUCH THE BLUE BUTTON! IT IS THE SYSTEM BUTTON AND USED FOR CONFIGURATION.***

2.1.2 Warnings

Warning messages warn against a potential hazard that, if not avoided, may result in serious injury or death.

WARNING: ***DO NOT REMOVE PLUGS UNDER ELECTRICAL POWER. MAIN ELECTRICAL POWER MUST BE SHUT OFF BEFORE DISCONNECTING OR CONNECTING ANY PLUG OR CABLE ON THE SPRAY HEAD.***

2.1.3 Notes

Note means reader take note. Notes contain helpful suggestions.

NOTE: *This parameter should NOT be changed when attempting to make system adjustments.*

3.0 Warranty Information

3.1 Distributor/Customer Delivery Acceptance

Before signing for delivery, the distributor/customer must check the equipment for piece count and damage.

3.1.1 Piece Count

Every packing list has the total number of pieces shipped from Hanna. The number of pieces will vary, but is usually between 1 and 20. Check the bill and count the pieces on the load. Be aware that several large items will only count as one piece if they are banded together. Any discrepancies (shortages) in piece count must be clearly noted on the Bill of Lading.

The installing distributor/customer has 14 days from receipt of the equipment to report any shortages to Jim Coleman Company/Hanna (JCC/H). Because of this time frame, it is important to take a COMPLETE inventory as soon as possible.

3.1.2 Damage

Inspect the load thoroughly before unloading, and make note of any visible damage on the bill of lading before you sign it. This will help later if a freight damage claim is filed against the freight carrier. Remember that the freight carrier is responsible for any damage during transit. Hidden damage may show up later as you uncrate equipment. If so, notify the freight company's nearest office as soon as possible.

3.2 Filing Freight Claims

If damage is discovered during uncrating, immediately call the freight carrier's nearest office for an onsite inspection of damage. Do not throw any crating materials away, save them for the carrier's representative to inspect. To recover damages, mail copies of the carrier's claim form, the invoice for repairs, the delivery receipt, and the inspection report to the carrier within 90 days of the delivery date.

3.3 Pre-Installation

Look for the crates with "Hardware Kit" or "Manuals" stenciled on the sides. These are the only two crates that you want to open immediately. The Hardware Kit provides all the bolts, washers, and nuts that you will need to bolt the equipment together. The manuals and drawings will cover installation, assembly, parts identification, and operation.

At the time of startup, be sure to complete form 1111, "Hanna Start-up Review and Warranty Report" (page 3-5) and return it to:

Jim Coleman Company/Hanna
Attn: Quality Systems Manager
7905 Blankenship Drive
Houston, TX 77055

This report is essential to both Hanna and the distributor. It helps Hanna to review the initial start-up procedures and settings, and it validates the warranty period. This is very important, as no warranty will be allowed until this form is on file at Hanna.

NOTE: *Please be sure to keep a copy of this form for your records.*

3.4 Hanna Warranty Claim Procedure

1. Owner/Customer notifies installer/distributor of warranty claim.
2. Installer/distributor notifies Hanna Quality Systems of a claim.
3. Warranty/Quality Representative at Hanna:
   - Reviews Hanna files to determine applicable warranty period.
   - Discusses with distributor/customer possible reasons for component failure.
   - Issues an order for shipment of a replacement part (as appropriate).
   - Issues a Returned Goods Authorization (RGA) number.
   - Transmits by fax a copy of the RGA and replacement order confirmation to the distributor.

- Attaches a copy of the RGA to the replacement order and sends it to Manufacturing for shipment. Warranty shipments from Hanna will be PREPAID for ground transportation only (UPS-Ground, truck, etc.). All forms of quick shipments will be at the expense of the distributor or customer.

- Distributor/customer submits prepayment via credit card or check prior to shipment of replacement part. Upon acceptance of warranty claim, Hanna will reimburse distributor/ customer for prepayment (see steps number 5 and 6 below for claim processing procedures).

4. The distributor/customer, upon receiving the replacement part, will:

   - Add comments to the RGA included with the shipping ticket to further clarify the problem with the proposed warranted part.

   - Ship the defective part and the RGA to Hanna within 30 days, freight PREPAID.

   - Be sure that the RGA number is plainly visible on the package exterior.

5. The returned part, when received at Hanna, will be logged as received and inspected for validity of claim.

   - If the part is a Hanna manufactured part, evaluation, will be completed within five working days.

   - If the part is a vendor item, evaluation may take up to 45 days or more.

6. When evaluation is completed, a Hanna Warranty/Quality representative will contact the distributor/customer and notify them if their claim has been accepted or rejected.

   - If the warranty claim is rejected, evaluation reports and reason for rejection will be sent. Distributor/customer may elect to have the parts discarded or returned to them freight collect.

   - If the warranty claim is accepted, an appropriate credit will be given to the distributor/ customer.

7. We at Hanna are dedicated to assisting our distributors/customers. Valid warranty claims are welcome. However, parts returned without pre-authorization and/or without a RGA number will not be accepted. We cannot accept shipments that are sent other than freight PREPAID.

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HANNA WARRANTY START-UP REVIEW / CONVEYORIZED SYSTEM

Hanna Distributor_____ Equipment Order # _____
Car Wash Name _____
Owner's Name_____ Phone _____
Address _____
Type of Equipment_____

	YES	NO
CORRELATOR		
Top plate moves freely both ways		
Guide Rails move freely		
CONVEYOR		
Conveyor Speed – cars per hour		
Chain tension set to specs		
Shipping nut removed (RCV)		
Roller-up forks adjusted to specs		
Fork cylinder moves smoothly		
Air/oil pressure adjusted to specs		
Cancel switch properly located		
Trap doors move freely		
Welds between sections ground smooth		
Conveyor hydraulic connections tight		
HYDRAULIC SYSTEM		
All fittings/lines clean & tight		
Oil in tank above "low-level" control		
Low-level control switch operating		
Approved "EP" hydraulic oil used		
RECLAIM SYSTEM		
Suction line piping clean and tight		
Discharge piping clean and tight		
Relief bypass valve free to operate		
Pits free of oil and floating debris		
Barrel screen and foot valve clean		
Inlets to pits unobstructed		
CHEMICAL FEED UNIT		
Air pressure set at 55-60 PSI		
Water pressure set at 50-58 PSI		
All fittings at pump tight and leak-free		
All line fittings tight and leak-free		
All intake lines free from kinks		
ARCHES		
All jets aimed according to specs		
Actuators operating to specs		
Air pressures set to specs		
Foamer – is there adequate foam		
Spray wax operating to specs		
Polish wax operating to specs		
Rinse functioning with drying agent		
Final rinse provides complete coverage		
BRUSHES		
Correct rotation directions		
Brush RPM set to specs		
Proper brush penetration		
Shocks functioning properly		
All couplings and flanges tight		
Proper water application		

	YES	NO
TIRE WASHERS		
Proper brush height		
Base plates level		
CTA treadles as per specs		
Treadles operating freely		
Spring tension set to specs		
Speed set to specs		
MITTERS		
Curtain RPM set to specs		
Curtains installed & trimmed properly		
Basket movements smooth		
Sufficient water on curtains		
All bearings lubricated		
AIR DRYER		
Type/Model of air dryer _____		
Supply voltage and phasing _____		
Amp draw on phase legs _____		
Size of thermals/breakers _____		
MCC provided by HCW		
Checked for proper impeller rotations		
Motors protected from direct water		
Intakes protected and unobstructed		
Cone linkage moves freely		
Checked for leaks and unusual noises		
All bearings lubricated		
COMMON AIR SYSTEM		
Excessive water in air system lines		
Proper oilers installed		
Normal system pressure set at 120 psi		
COMPUTER		
Computer type/model _____		
EPROM chip version number _____		

REPAIRS & ADJUSTMENTS

_____
_____

COMMENTS

_____
_____

CUSTOMER ACCEPTANCE: Owner acknowledges they have received instruction for proper equipment operation & received a full set of manuals.

OWNER:_____
Signature: _____

HCW form 1111, 5/5/2004

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LIMITED WARRANTY

The Manufacturer warrants any component or part of the Jim Coleman Company Car Wash equipment to be free from defects in material and workmanship for a period of one year from date of shipment, with the exception of such parts as are commonly recognized to be subject to wear in normal usage, such as high pressure hoses, swivels, nozzles, safety shut off guns, etc., which are warranted for ninety (90) days. All electrical parts not manufactured by Jim Coleman Company are warranted to be free from defects in material and workmanship for a period of ninety (90) days. Electrical motors shall be covered under manufacturer's warranty for a period of one year, unless otherwise specified. Jim Coleman Company electronic controls, such as timers, coin acceptors and computer monitoring equipment, carry a one-year warranty. Claims under this warranty must be asserted in writing within the one-year period covered by this warranty.

Any component or part alleged to be defective in material or workmanship shall, at option of Manufacturer be returned with shipping cost prepaid. If upon examination, such component or part is found to be defective in workmanship or materials, Manufacturer, at its option will either repair or replace such component or part and shall ship such repaired or replaced component or parts F.O.B. factory, Houston, Texas. The cost of such replacement or repair shall be the exclusive remedy for any breach of any warranty and Manufacturer shall not be liable to any person for consequential damages for injury or commercial loss resulting from any breach of any warranty. This warrant does not cover any labor installation cost, either with respect to the original equipment or with respect to the repaired or replaced component or part defective in workmanship or materials. Jim Coleman Company does not warrant loss of income, should there be any during such time repairs are being made.

This warranty does not apply to components or parts which have been misused, altered, neglected, or not installed, adjusted, maintained, or used in accordance with applicable codes and ordinances and in accordance with Manufacturer's recommendations as to such factors.

This warranty is in lieu of all warranties, express or implied, of either Manufacturer or seller, and Manufacturer makes no warranty against infringement of the like, makes no warranty of merchantability, makes no warranty of fitness for a particular purpose, and makes no other warranty, express or implied, including implied warranty arising from course of dealing or usage of trade.

This warranty does not apply to damage resulting from improper operation or abuse, exceeding the rated capacities of the unit, running foreign particles or non related solutions through pumps or valves, using acidic solutions, improper installation or maintenance, operational neglect, neglect of manufacturers recommended maintenance, use of water containing solids in excess of twenty microns in diameter or 2000 PPM, damage caused by customer, unjustifiable nuisance calls or acts of God.

Compliance with any local governmental laws or regulations relating to the location, use or operation of the equipment, its use in conjunction with other equipment, shall be the responsibility of the purchaser. The rights and obligations of the parties shall be governed by the state of Texas.

JCC form 3334, 2/17/2005

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RETURNED GOODS AUTHORIZATION (RGA)

Customer Account No.: _____ Date: _____
Customer: _____ Ref. Equip No.: _____
_____ Ref. Sales No.: _____
_____ Start Up Date: _____

PARTS TO BE RETURNED

Qty.	Parts #	Description	Reason For Return

Return parts, shipping PREPAID to: **Jim Coleman Company/Hanna**
7905 Blankenship Drive
Houston, TX 77055

Important Note: If the parts listed above are not received within 45 days from the date of shipment of the replacement parts from JCC/H, then credit for the returned parts will be disallowed and the invoice becomes due and immediately payable. This form MUST accompany ALL returned parts.

No Form = No Credit

Do Not Write Below This Line. To Be Completed By Jim Coleman Company/Hanna Customer Service Department Only.

Date Parts Received: _____ Checked In By: _____
Disposition: ☐ Salvage/Discard Comments: _____
☐ Hanna Evaluation _____
☐ Engineering Review _____
☐ Vendor Evaluation _____
Approved: _____ By Whom: _____
Parts Complete: _____ Credit Memo No: _____

HCW form 2222, 3/02/2005

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4.0 Installation

The following information is a suggested means for installation of the XT Rotary Top Brush. It is understandable not all installations are the same, nor accomplished with the same ease. Therefore many of your own ideas, experiences, and installation tricks are encouraged and should be implemented.

WARNING: ***WHEN USING A FORKLIFT TO INSTALL EQUIPMENT MAKE SURE TO FOLLOW OSHA AND GENERAL SAFETY RULES AND REGULATIONS TO ENSURE PERSONAL SAFETY.***

Prior to the actual installation an on-site visit and observations are recommended. This is especially true if the location is other than new and/or not of Hanna design. Check for the local utilities, making sure of proper access location and supply sizing. If anything must be changed, do so prior to the day of installation. Deficiencies discovered at the time of installation will greatly delay the project.

4.1 Installation Requirements

- Water: Customer is to provide and install a ¾ in. fresh or reclaim water line at 60 psi (nominal).

- Hydraulic: Customer is to provide and install proper hydraulic power system.

- Dimensions:
  Outside Height (90 in.) – 10 ft. 6 in. (3.2 m)
  Outside Height (96 in.) – 11 ft. (3.35 m)
  Length (90 in. and 96 in.) – 9 ft. (2.74 m)
  Outside Width (90 in. and 96 in.) – 12 ft. 2 in. (3.71 m)

4.2 General Requirements

Before getting started, you must find the proper location for your new XT Rotary Top Brush. We recommend a minimum for length of 9 ft. (2.74 m) clear area for proper operation of a system or free-standing configuration. The clear area is defined as any space that allows the brush to operate freely, but will not interfere with or be interfered with by other devices.

4.3 Installation

1. Read this manual prior to opening crates or installing equipment.

2. Carefully open crates and identify the individual parts for assembly using the enclosed check list. If there are any missing parts, notify your Hanna distributor immediately (see warranty information in Chapter 3.0).

WARNING: ***WHEN USING A FORKLIFT TO INSTALL EQUIPMENT MAKE SURE TO FOLLOW OSHA AND GENERAL SAFETY RULES AND REGULATIONS TO ENSURE PERSONAL SAFETY.***

3. Place the C-Channel and header assembly in the bay and attach the other assemblies as shown in the system drawing. Make sure the framework is facing the correct direction for vehicle travel. When all pieces for your configuration have been set in place, take the time to recheck all the layout dimensions using your conceptual drawing.

4. Locate and place system parts near where they will be needed. Some parts have brackets attached for hydraulic lines to run down the posts. If you have a HCRP brush, tire brushes, or auto preps under or near the top brush, choose the posts with brackets.

5. Lift the system from each end using two fork lifts or hydraulic lifts. When the correct height is reached, move the posts under the frame and attach each with four 1-1/2 in. bolts. Also attach cable and bracket assemblies as shown in the system drawing.

NOTE: Use *anti-seize or Trim Tap compound with all threads when assembling the stainless steel components to eliminate galling for the threads. Light oil will not work for this application as when parts are disassembled after the oil has dried, galling will occur.*

6. After the system has been aligned, set on centerline (centerline is 26.5 in. from conveyor inside guide rail) and anchor to floor (refer to post assembly drawing for the top brush).

7. Install the post-to-floor gussets (for free-standing configuration).

8. Find the drivers (left) side bearing bracket weldment and post-clamp channel. Attach them at the height shown in the drawing. Also install the bearing weldment security cable and brackets at this time.

9. Install stop brackets to the bearing weldments.

10. Repeat last two steps for passenger (right) side.

11. Prepare the trunion shaft by applying anti-seize and install bearings on each shaft.

12. Install counterweight arms on trunion shafts and insert 5/8 in. keys. Make sure arms can be moved easily on and off the shaft. This will help removing the arms when the bearings are replaced.

13. Raise the top-brush arm assembly with a fork lift and place it on the bearing mounts. Secure the bearings with the 5/8 in. x 3 in. bolts, washers, and nuts. Center the bearings entrance-to-exit and side-to-side and secure.

14. Align the counterweight arms with the bumper stops and secure to the trunion shaft with set bolts.

15. Install four pieces of ½ in. all thread in each counter weight arm flush with welded nut on plate. Install two nuts on all thread tightening one against plate to secure all thread and leave the others about 1-1/2 in. from the plate. Install these nuts on each all thread.

16. Attach the brush on the brush spindles and install six 3/8 in. x 1-1/2 in. bolts with lock washers through spindle and into brush core.

17. Rotate and secure the top brush in a position so that the counterweight arms are parallel to the floor. Install 11 counterweight plates on each arm (for foam brush) and 18 (for a cloth brush). Secure the plates with a ½ in. nut on each all thread (Figure 4-1).

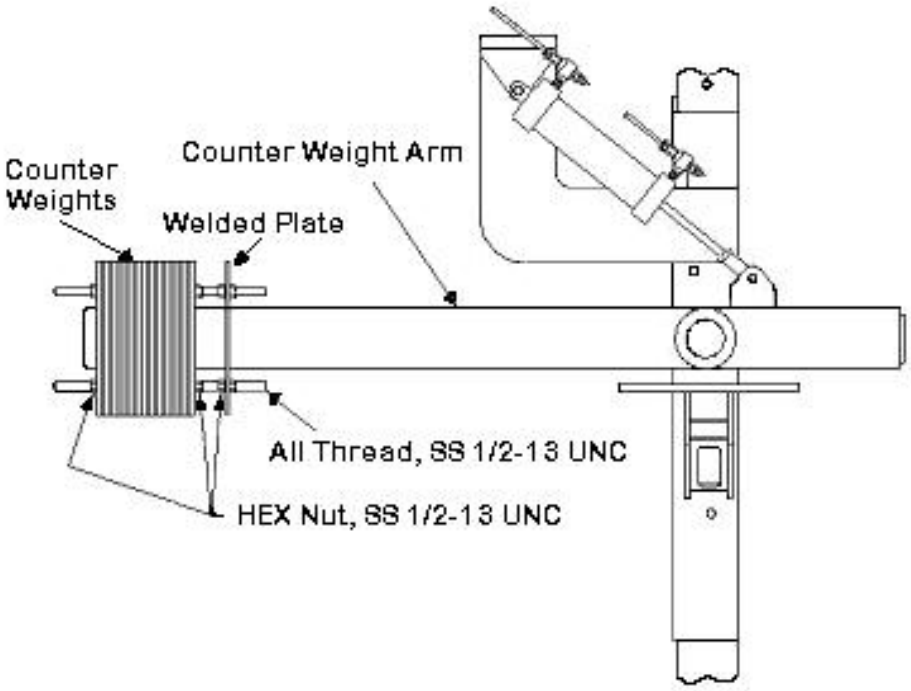

Figure 4-1 Counterweight Assembly

18. Install the air cylinder base to the bearing-bracket weldment and the rod end to the counterweight arm.

19. Attach ¼ in. ploy flow to the fitting on the rod end and run it to the control solenoid. Attach ¼ in. poly flow to the base-end fitting and route it up to the c-channel and secure it. Leave this poly flow open to the atmosphere in a dry area of the c-channel. Only the poly flow from the rod end will have air pressure in it and then only when the brush is retracted. During wash operation the brush should be adjusted with water being applied to weigh 6 to 8 lbs when running. It is not uncommon for the brush to rise as it loses water and dries.

WARNING: ***FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF HOSE, TUBING, FITTINGS, ASSEMBLIES, OR RELEATED ACCESSORIES CAN CAUSE DEATH, PERSONAL INJURY, AND PROPERTY DAMAGE.***

20. Connect hydraulic lines to your hydraulic pump.

21. Connect the hydraulic lines to the motor.

22. Operate the brush. Check for hydraulic leaks and smooth operation. Recommended speed for hydraulic motor is 35 to 45 rpm for cloth, 60 to 70 rpm for foam.

4.4 Hydraulic Fitting Assembly and Remake (A-LOK™) for Pressure Compensated Hydraulic Power Units

Stainless Steel A-LOK (non-flared) fittings are used on Hanna's pressure compensated hydraulic power units. These fittings consist of four precision engineered parts designed to provide secure leak-proof joints capable of handling high-pressure applications. The tube fittings are completely assembled and ready for immediate use. Simply insert the tube until it bottoms in the fitting body. (If the fitting is disassembled, note that the small tapered end of the ferrule(s) go into the fitting body.)

WARNING: ***FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF HOSE, TUBING, FITTINGS, ASSEMBLIES, OR RELEATED ACCESSORIES CAN CAUSE DEATH, PERSONAL INJURY, AND PROPERTY DAMAGE.***

If you need to assemble the A-LOK fitting, follow these steps:

1. Tighten nut finger tight.

2. Then tighten nut (with wrench) an additional 1-1/4 turns for ¼ in. to 1 in. size fittings (6 mm to 25 mm). For 1/16 in., 1/8 in., 3/16 in., 2 mm, 3 mm, and 4 mm size tube fittings only wrench ¾ turn from finger tight position. Be sure to hold the fitting body with a second wrench to prevent body from turning. It is also helpful to mark the nut to accurately count the number of turns.

3. If you have an inspection gauge, select the proper size inspection gauge and try to place it between the nut and the body hex. If gauge does not fit at any point between them, you have correctly tightened the nut. If you can slip the gauge into the space, the fitting is not properly made up, and you must repeat the assembly procedure.

4. For maximum number of remakes, mark the fitting and nut before disassembly. Before, retightening, make sure the assembly has been inserted into the fitting until the ferrule seals in the fitting. Retighten the nut by hand. Rotate the nut with a wrench to the original position as indicated by the previous marks lining up. (A noticeable increase in mechanical resistance will be felt indicating the ferrule is being re-sprung into sealing position.)

A disassembled joint can be remade simply by retightening the nut to the position of the original make up. If you need to remake the A-LOK fitting, follow these steps:

1. A disassembled joint can be remade simply by retightening the nut to the position of the original make up. For maximum number of remakes, mark the fitting and nut before disassembly.

2. Before retightening, make sure the assembly has been inserted into the fitting until the ferrules(s) seats in the fitting.

3. Retighten the nut by hand.

4. Rotate the nut with a wrench to the original position as indicated by the previous marks lining up. (A noticeable increase in mechanical resistance will be felt indicating the ferrule is being re-sprung into sealing position.)

5. Then snug the nut 1/4 turn as shown from A to B (Figure 4-2), past the original position. Only after several remakes will it become necessary to advance the nut slightly past the original position.

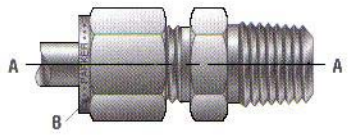

Figure 4-2 A-LOK Fitting Remake

NOTE: *A-LOK™ tube fitting part numbers use symbols to identify the size, style, and material. Tube and pipe thread sizes begin with a number indicating their size in sixteenths of an inch. For example, 4=4/16 in. or ¼ in., 16=16/16 in. or 1.*

4.5 Hydraulic Fitting Torque (Triple-LOK™) for Fixed Displacement Hydraulic Power Units

Stainless Steel Triple-LOK (37° JIC or commonly referred to as flared) fittings are mainly used on Hanna's Fixed Displacement Hydraulic Power Units. The fittings are completely assembled and ready for immediate use. Table 4-1 gives the torque values for Triple-LOK (JIC) fittings.

Table 4-1 Triple-Lok Assembly Torques and FFWR

SAE Dash Size	Thread Size	Assembly Torque[1] (+10% -0)		Tube Connection FFWR[2]	Swivel Nut or Hose Connection FFWR[2]
		in. lb.	ft. lb.		
-2	5/16-24	35	2	--	--
-3	3/8-24	65	5	--	--
-4	7/16-20	130	11	2	2
-5	½-20	165	14	2	2
-6	9/16-18	235	20	1-1/2	1-1/4
-8	¾-16	525	43	1-1/2	1
-10	7/8-14	650	55	1-1/2	1
-12	1-1/16-12	950	80	1-1/4	1
-14	1-3/16-12	1200	100	1	1
-16	1-5/16-12	1400	115	1	1
-20	1-5/8-12	1900	160	1	1
-24	1-7/8-12	2250	185	1	1
-32	2-1/2-12	3000	250	1	1
-40	3-12	--	--	1	1

1. Torque values are for unlubricated carbon steel components and properly lubricated stainless steel components. For brass fittings, use approximately 65% of the torque values shown, unlubricated. For stainless steel, a lubricant such as Permatex Anti-Seize is recommended to prevent galling.
2. The "Flats from Wrench Resistance" or "Flats" method is recommended for steel, stainless steel, and brass components.

4.6 Hanna Hydraulic Tubing Color Code

Hanna uses colored tape on all hydraulic tubing at the factory. Figure 4-3 shows the color code on all Hanna hydraulic operated equipment.

Figure 4-3 Hanna Hydraulic Tubing Color Code

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5.0 Parts and Maintenance

Because close attention to maintenance is the key to satisfactory wash results, Hanna recommends that one individual at each location be assigned complete responsibility for seeing that the maintenance program contained in this manual is carried out.

WARNING: ***TO ENSURE THAT DRIVEN EQUIPMENT IS NOT UNEXPECTEDLY STARTED, TURN OFF, LOCK OUT, AND TAG POWER SOURCE BEFORE WORKING NEAR THE EQUIPMENT. FAILURE TO OVSERVE THESE PRECAUTIONS COULD RESULT IN BODILY INJURY OR PROPERTY DAMAGE.***

5.1 General Maintenance

The XT Rotary Top Brush requires periodic inspection and maintenance. It is subject to constant moisture and chemicals, such as its own detergent used for cleaning and the salt that cars pick up from winter roads. Therefore, to keep the system in optimal running condition, it is extremely important that you adhere to a maintenance schedule.

5.2 Daily Maintenance

5.2.1 Ball Bearings

There are two brush bearings and two pivot bearings. One of the most important parts of the maintenance program is lubrication of the ball bearings. This is because bearings rust if water is allowed to stay in them. To keep these bearings free from rust, lubricate once per week.

When you lubricate a bearing, pump the grease gun TWICE. Then move the part by hand. By doing this, you clean the water out of the bearing and ensure that it is properly lubricated. After lubrication, wipe away excess grease.

5.2.2 General Mechanical System Maintenance

Wash the posts, brush supports, counterweight arms, and the general area frequently. If chemicals are apt to be present, such as in the winter in cold regions, wash it more often.

As the system repeats its cleaning cycle over and over, screws, bolts, etc., tend to work loose. Therefore, check all nuts, bolts, brush fittings, set screws, etc., each day to make sure that they are tight.

5.3 Weekly Maintenance

5.3.1 Counterweight

The top brush counterweight (Figure 5-1) is field adjusted, while wet, during setup. However, if you find during the weekly check that the top brush is not exerting 6 to 8 lb of downward pressure on the cars (measured with a spring scale hooked on the brush shaft when the brush is wet) it will need to be adjusted. The weights must be moved toward the brush if the brush is exerting less than 6 lb., or farther away if the brush is exerting more than 8 lb.

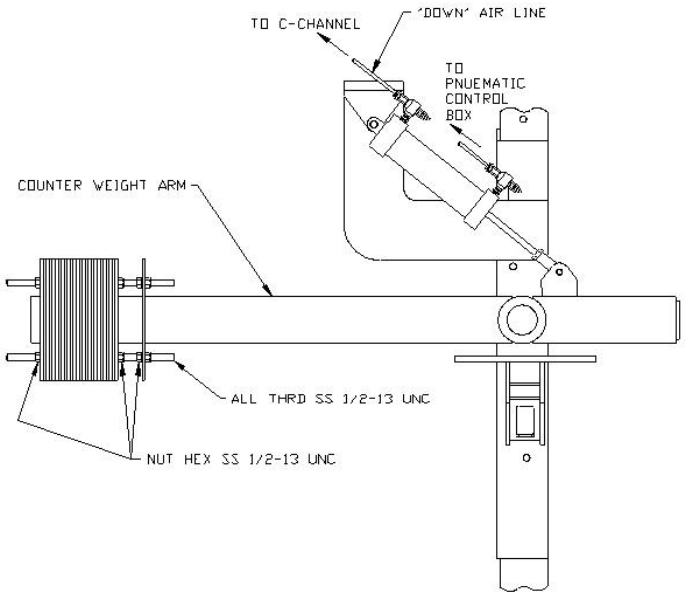

Figure 5-1 Rotary Top Brush Counterweight

Moving the top brush counterweights is accomplished by loosening the retaining screws, repositioning the counterweights as required and securing the retaining screw. Then recheck the top brush pressure to make sure that it is 6 to 8 lb.

5.3.2 Brushes

Under normal circumstances, the scrubbing action of the brushes against the cars should keep the brushes clean if you are using an adequate amount of detergent and water. However, for maximum brush life, you should inspect the brushes each week for dirt and wear.

To clean the brushes use a mild detergent (the same one you use to wash cars is satisfactory). For unusually dirty brushes the manufacturers recommend using petrochemical solvent as a cleaning agent, but under no circumstances should steam or hot water (above 110°F) be applied to a brush either for washing cars or for cleaning the brush.

5.3.3 Pneumatic System

Except for a few items, the maintenance of the pneumatic system consists of a weekly inspection for leaks and damaged parts. (Take corrective actions if they are indicated – fix leaks, replace faulty valves, etc.)

5.3.4 Nozzles

As part of the weekly inspection, check to see that none of the nozzles are plugged. If any are plugged, clear them.

Cleaning should be done carefully and on a regular basis. Use materials that are softer than the spray nozzle orifice such as plastic bristle brushes, wooden probes, or plastic probes. Never use wire brushes or metal probes (this can change the size of the opening in the nozzle and result in improper nozzle action). If a nozzle is difficult to clean, soak the orifice in a non-corrosive chemical cleaner to dissolve the clogging.

5.4 Monthly Maintenance

5.4.1 Hydraulic Motor

There is one hydraulic motor on the Rotary Top Brush. The only periodic maintenance required is to check for hydraulic leaks around the fittings.

5.5 Pneumatic Control Panel

The XT Rotary Top Brush Pneumatic Control Panel (Figure 5-2) has specific set-up procedures to ensure proper operation. Follow these steps for proper setup:

1. Mount the pneumatic control panel (Figure 5-2) on a wall in a convenient area close to your top brush.

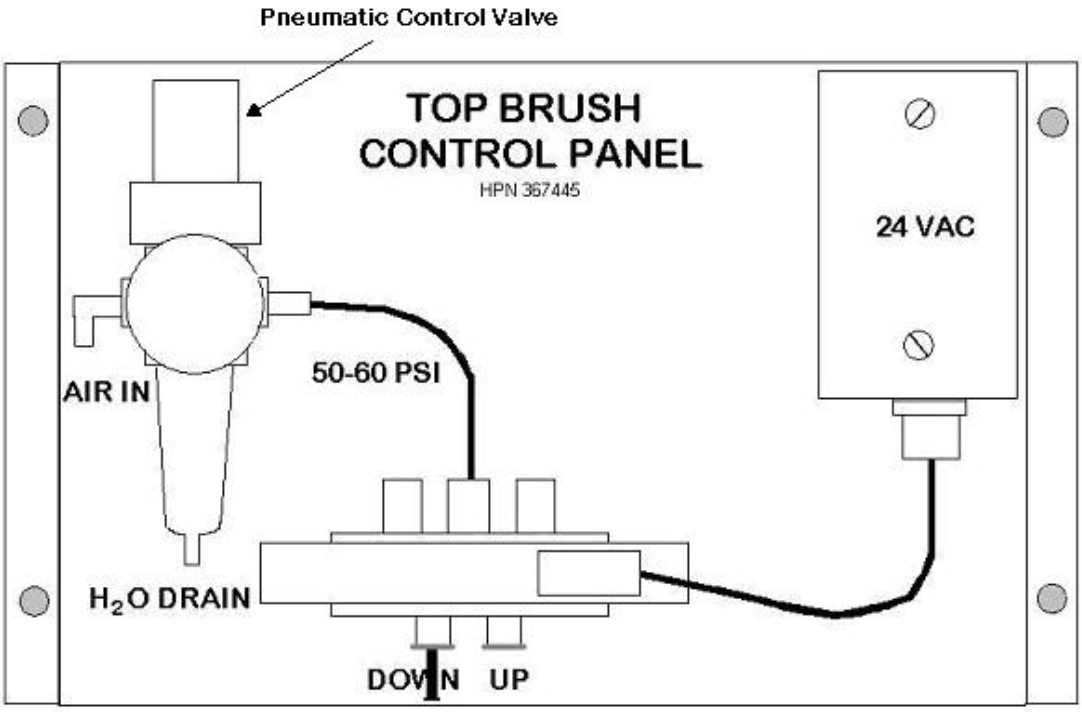

Figure 5-2 Pneumatic Control Box

2. On the pneumatic control panel, make sure the pneumatic control valve is in the fully closed position by lifting the knob and turning to the negative (-) position.

3. Connect the panel junction box to a 24 VDC power source in your "system" control panel. Make sure the power is in the "OFF" position when you make your connection.

4. Note that the "Down" regulator port on the pneumatic control panel is plugged. If it is not plugged, you will need to plug it.

5. Connect the air line from the top brush cylinder to the "Up" connector on the pneumatic control panel.

6. The "down" air line (Figure 5-3) is cut and fastened to the C-Channel. Do not plug the line. It must remain open to the atmosphere. Do not cut the line near the cylinder as water may enter the system.

7. Connect your pneumatic system to the "Air In" connector on the pneumatic control panel.

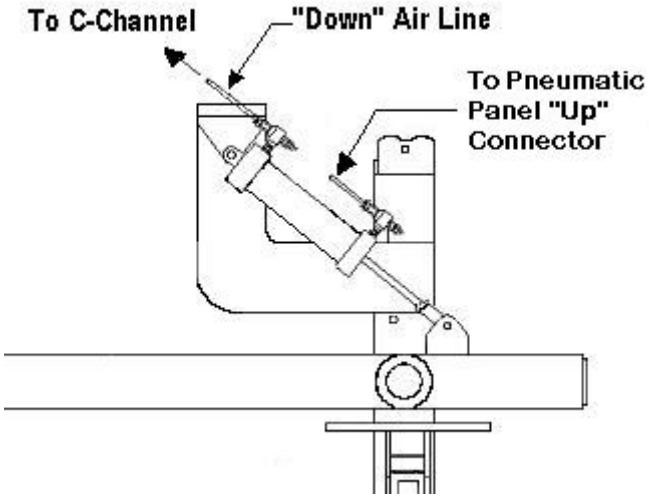

Figure 5-3 Rotary Top Brush Air Cylinder

8. Apply electrical power to the pneumatic control panel.

9. Open the pneumatic control valve to add system air pressure.

10. Increase the air pressure to 50 to 60 psi by lifting the control knob and turning to the positive (+) position

11. With brush rotating and water applied; adjust counterweight to achieve 6 to 8 lbs of down pressure on the brush. Check pressure with hand scale.

5.6 Spare Parts List

Table 5-1 shows the recommended spare parts to be kept on hand by the Distributor and Owner/Operator.

Table 5-1 Recommended Spare Parts List

Recommended Parts	Part Number	Distributor Carries Part In Stock	Owner/Operator[1] (Distributor Support) Carries Part In Stock	Owner/Operator[2] (No Distributor Support) Carries Part In Stock
Cylinder, Pneumatic	341270	NO	NO	NO
Bearing, Pivot Arm	010454	NO	NO	NO
Bearing, Brush	010363	NO	NO	NO
Motor, Hydraulic For Pressure Comp. Units	366906	YES	NO	YES
Motor, Hydraulic For Fixed Displacement. Units	366067	YES	NO	YES
Bumper, Stop	366991	YES	NO	YES
Jet, Nylon	363265	YES	NO	YES

1. Recommends what spare parts should be kept on hand by the Car Wash Owner/Operator if there is close support from the distributor and parts are quickly obtainable.
2. Recommends what spare parts should be kept on hand by the Car Wash Owner/Operator if there is NOT close support from the distributor and parts are NOT quickly obtainable.

5.7 Recommended Tool Kit

Table 5-2 shows the recommended tools for installation and maintenance.

Table 5-2 Recommended Installation Tools

1/2 in.	Open-End Box Wrench
9/16 in.	Open-End Box Wrench
12 in.	Adjustable Wrench
1/8 in.	Ball-End Hex Bit T-Wrench
5/32 in.	Ball-End Hex Bit T-Wrench
3/16 in.	Ball-End Hex Bit T-Wrench
¼ in.	Ball-End Hex Bit T-Wrench
12 in.	Adjustable Wrench
10 oz	“Dead Blow” Plastic Mallet
	Roto Hammer & Bits, ½ in. & 5/8 in.

5.8 Replacement Parts

See Assembly drawings in Appendix A for replacement parts.

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6.0 Troubleshooting

This chapter helps you solve common system problems. If you are still unable to find a solution after reading through this section, please call your distributor for technical assistance.

6.1 Brush Problems

Problem	Possible Solutions
▪ BINDING OR JUMPING	▪ Check bearings for wear ▪ Check brush weight ▪ Check brush RPM ▪ Check hydraulic motor ▪ Check air cylinder movement
▪ UNIT WILL NOT – STOP/START	▪ Check for bearing wear ▪ Check computer functions ▪ Check hydraulic motor ▪ Check hydraulic solenoid valve
▪ WATER WILL NOT SHUT-OFF	▪ Check water solenoid valve for sticking ▪ Check for contamination in water solenoid valve
▪ SQUEAKING	▪ Apply grease to bearings ▪ Replace bearing
▪ BRUSH ROTATES IN WRONG DIRECTION	▪ Hydraulic pressure and return lines reversed

6.2 Hydraulic Fitting Problems

▪ TUBE NUT CONTINUES TO BACK OFF OR LOOSEN	▪ Excessive vibration can cause the 37^{O} tube flare nut to back off from the fitting body. Consider better tube line routing and clamping to protect the fitting/tube union or control the system vibration.
▪ FLARE ON TUBE FITTING IS COLLAPSED	▪ 37^{O} fittings are susceptible to over torque. Once the tube fitting has been over torqued the sealing capability is nearly gone. Additional tightening on the tube/hose joint will only cause additional leakage. Replace fitting and retighten with appropriate torque or FFWR method.
▪ DAMAGED FITTING	▪ Due to repeated use, abuse, handling, etc., the 37^{O} flare fittings are susceptible to damage on the flare end of the fitting. These problems can often be avoided by proper handling and storage, including keeping plastic fitting caps and plugs on until fitting is used.
▪ TUBE IS OVER FLARED OR UNDER FLARED	▪ If tube is over flared the tube nut will not be able to engage fitting body or not be able to swivel freely. If tube is under flared, the possibility for tube blow off is greatly increased and the sealing area is greatly reduced. Re-flare to appropriate flare O.D. specifications as outlined in this catalog.
▪ POCK MARKS ON FLARE I.D.	▪ Tube end not deburred or cleaned properly before flaring.

▪ LEAKAGE – TUBE MISALIGNMENT OR IMPROPER FIT	▪ Align the flared tube end and the connecting tube fitting before tightening the tube nut. Ensure that the tubing is bent to the appropriate bend angles. Do not "force" the tube assembly into position. Use two wrenches during assembly.
▪ LEAKAGE – IMPROPER TIGHTENING	▪ Check the joint for appropriate tightness. Re-torque or use the FFWR method of assembly to ensure appropriate joint makeup. If leakage persists, it could be a problem listed below.
▪ LEAKAGE – TUBE CRACKED ALONG FLARE	▪ Poor quality tube, work-hardened tube, or faulty tube preparation can cause the tube to crack. Re-flare while addressing the aforementioned issues. Do not use a tube cutter with steel and stainless steel tube, as tube cutters tend to "work harden" the tube before flaring.
▪ LEAKAGE – TUBE SEALING SURFACE HAS IMPERFECTION CAUSING LEAKAGE BETWEEN TUBE FITTING AND TUBE FLARE	▪ Low quality welding tube often will leave a weld bead causing a leak path between the fitting and tube flare. Use a high-quality seamless or welded and redrawn type of tube. Problems with the flaring tooling can also cause a surface imperfection on the sealing surface of the tube flare as well. Flare cones/burnishing heads, when damaged can cause these imperfections in the mating tube flare. Re-flare while addressing the aforementioned problem areas.

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Appendix A

Table of Drawings

System Components

425934, XT Rotary Top Brush Assembly, 90 in. Clearance, Fixed Displ - Foam, 1 of 3
425934, XT Rotary Top Brush Assembly, 90 in. Clearance, Fixed Displ - Foam, 2 of 3
425934, XT Rotary Top Brush Assembly, 90 in. Clearance, Fixed Displ - Foam, 3 of 3

425936, XT Rotary Top Brush Assembly, 96 in. Clearance, Pressure Comp - Foam, 1 of 3
425936, XT Rotary Top Brush Assembly, 96 in. Clearance, Pressure Comp - Foam, 2 of 3
425936, XT Rotary Top Brush Assembly, 96 in. Clearance, Pressure Comp - Foam, 3 of 3

812847, XT Rotary Top Brush, Hydraulic Assembly, Pressure Compensated
812991, XT Rotary Top Brush, Hydraulic Assembly, Fixed Displacement

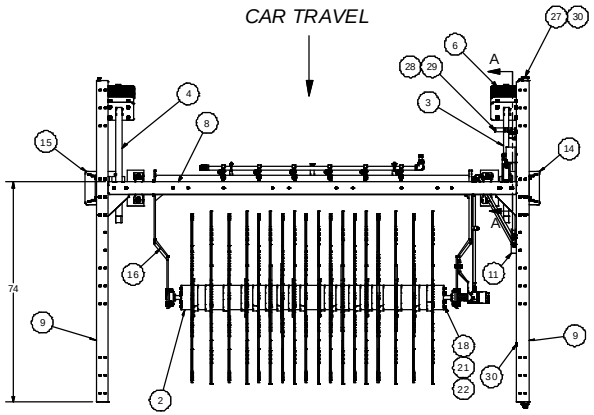
Freestanding Components

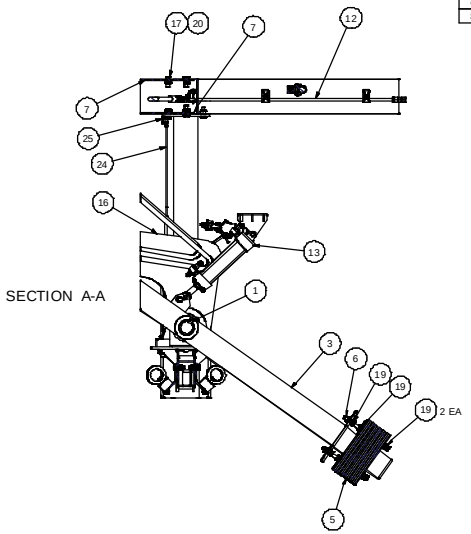
426086, XT Rotary Top Brush Assembly, 90 in. Clearance, Pressure Comp - Foam, 1 of 3
426086, XT Rotary Top Brush Assembly, 90 in. Clearance, Pressure Comp - Foam, 2 of 3
426086, XT Rotary Top Brush Assembly, 90 in. Clearance, Pressure Comp - Foam, 3 of 3

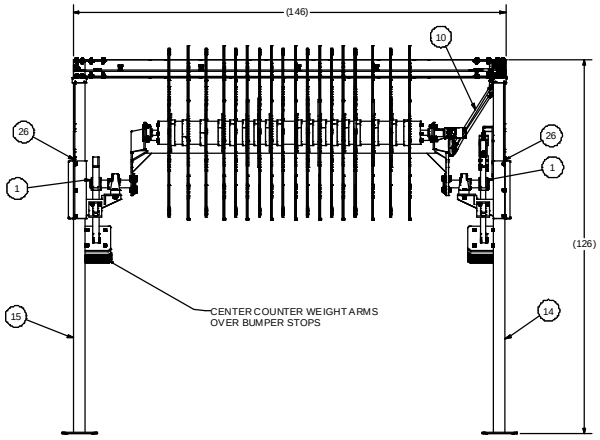
426092, XT Rotary Top Brush Assembly, 96 in. Clearance, Fixed Displ - Foam, 1 of 3
426092, XT Rotary Top Brush Assembly, 96 in. Clearance, Fixed Displ - Foam, 2 of 3
426092, XT Rotary Top Brush Assembly, 96 in. Clearance, Fixed Displ - Foam, 3 of 3

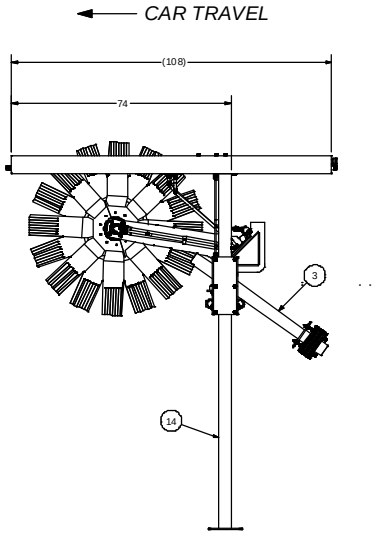
812848, XT Rotary Top Brush Assembly, Cylinder Assembly, 1 of 1

810579, XT Rotary Top Brush Assembly, Pneumatic Panel, 1 of 2
810579, XT Rotary Top Brush Assembly, Pneumatic Panel, 2 of 2









REVISIONS

C/N	SYM	DESCRIPTION	DATE	APRV
8017	1	ADDED ITEMS 27-30	091004	JDO
8243	2	ITEM 11 P/N WAS 812845; ITEM 8 MOVED 6" W/CAR TRAVEL	1/7/05	RGR
8243	2	ITEM 11 WAS LOCATED ON ITEM 8; ITEM 12 P/N WAS 812991	1/7/05	RGR

ITEM	PART NO.	DESCRIPTION	QTY
30	361151	PLUG PVC SCH 80 3/4" MPT	1
29	312256	HOSE, DOUBLE BRAIDED 3/4" (7 FT)	1
28	812900	WATER VALVE ASSY - SINGLE W/HOSE BARB	1
27	812510	WATER MANIFOLD ASSY STD 9 FT	1
26	813028	BRKT, BOTTOM CABLE STOP	2
25	813029	BRKT, TOP CABLE STOP	2
24	813030	CABLE ASSY SS 3/16" X 26"	2
23	810579	PNEUMATIC PANEL - ROTARY TOP BRUSH	1
22	623040	WSHR FLAT SS 3/8"	12
21	362805	WSHR SPLT LOCK SS 3/8"	12
20	622709	NUT ESNA HEX SS 1/2"-13 UNC	29
19	362795	NUT HEX SS 1/2-13 UNC	32
18	622947	SCR HEX CAP SS 3/8"-16 UNC X 1-1/2"	12
17	622934	SCR HEX CAP SS 1/2"-13 UNC X 1 1/2"	26
16	813033	ARM ASSY - XT ROTARY TOP BRUSH	1
15	812916	POST ASSY RH - XT ROTARY TOP BRUSH	1
14	812915	POST ASSY LH - XT ROTARY TOP BRUSH	1
13	812848	CYL ASSY - XT ROTARY TOP BRUSH	1
12	812847	HYDRAULIC ASSY - SYSTEM	1
11	803868	BULKHEAD MTG PLATE	1
10	812586	HOSE ASSY 1/2" X 78" STR FJIC X STR FJIC	1
10	812586	HOSE ASSY 1/2" X 78" STR FJIC X STR FJIC	1
9	812454	C-CHANNEL XT 9 FT	2
8	812451	HEADER CROSSMEMBER	1
7	812399	HEADER MOUNTING PLATE	4
6	811958	ALL THRD SS 1/2"-13 UNC X 9"	8
5	810688	COUNTER WEIGHT	38
4	810638	COUNTER WEIGHT ARM - RH	1
3	810631	COUNTER WEIGHT ARM - LH	1
2	810529	BRUSH ASSY - FOAM	1
1	807207	KEY SS 5/8" X 5/8" X 2"	2

Parts List

NEXT ASSY:

SHEET 1 OF 3

ALL DIMENSION IN INCHES

FIRST STAGE

CHECKED BY

DRAWN BY: WRK

XT ROTARY TOP BRUSH ASSEMBLY - SYSTEM

HYD DR - 90° CLR - FIXED DISPL - FOAM

REV: 2

RN

CADD: 425934.idw

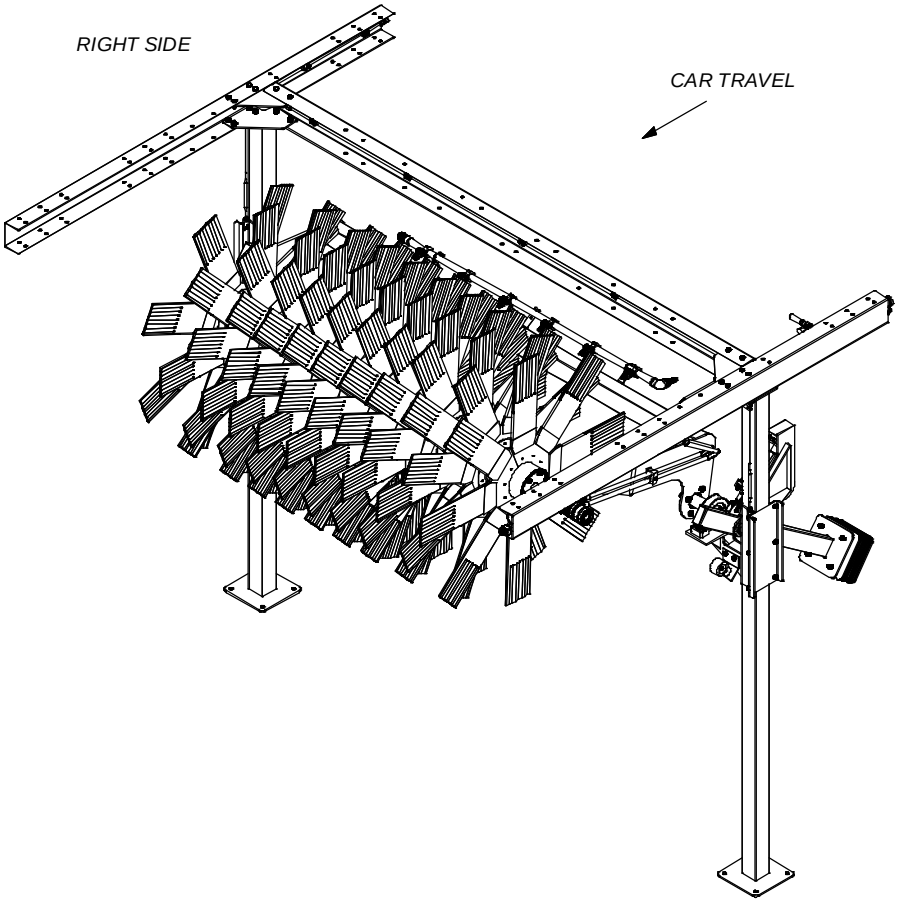
DWG NO: D - 425934

SCALE: 1 : 20

DATE: 7/15/2004

HANNA CAR WASH SYSTEMS INTERNATIONAL, LLC

18120 N.E. WILKES ROAD, PORTLAND, OREGON, 97230 USA



NEXT ASSY:

SHEET 2 OF 3

ALL DIMENSION IN INCHES

FINISH:

CHECKED BY:

DRAWN BY: WRK

XT ROTARY TOP BRUSH ASSEMBLY - SYSTEM
HYD DR - 90° CLR - FIXED DISPL - FOAM

REV: 2

P/N:

CADD: 425934.idw

DWG NO: D - 425934

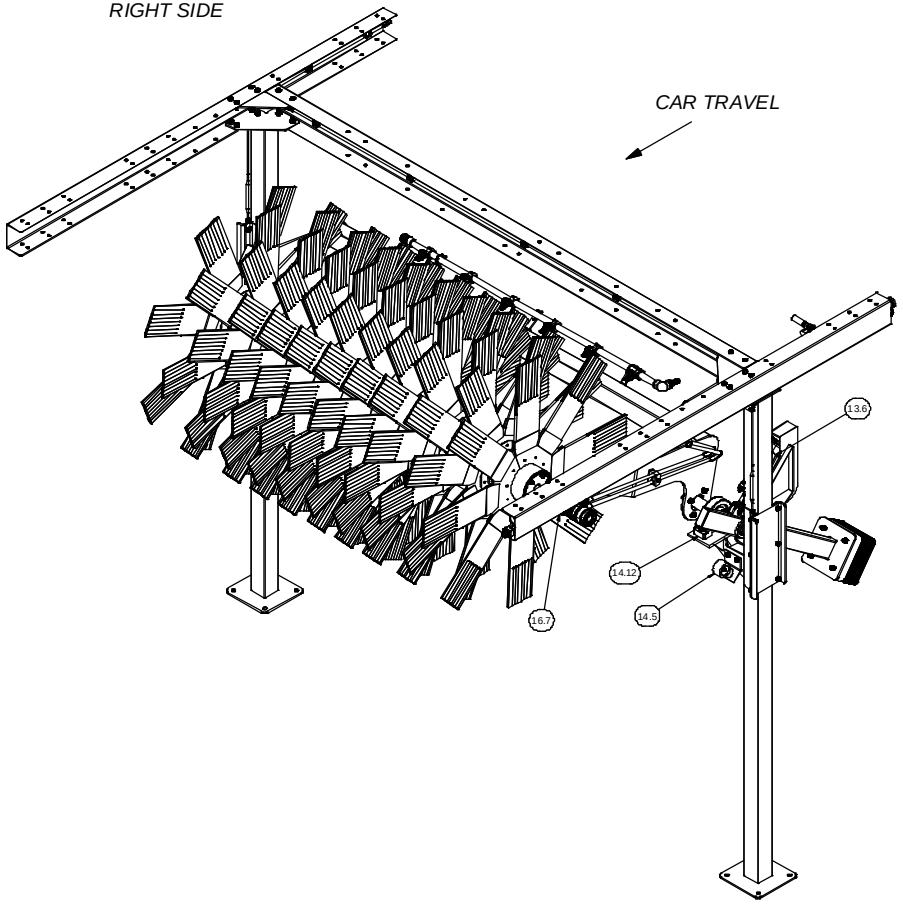
SCALE: 1:12

DATE: 7/15/2004

HANNA CAR WASH SYSTEMS INTERNATIONAL, LLC
18120 N.E. WILKES ROAD, PORTLAND, OREGON, 97230 USA

RIGHT SIDE

CAR TRAVEL



LEFT SIDE

NOTES:

1. ITEMS 15.4 AND 15.12 NOT SHOWN IN THIS VIEW. REFER TO ITEMS 14.5 AND 14.12 FOR SIMILIAR LOCATION ON RIGHT HAND SIDE.

SPARE PARTS

ITEM	PART NO.	DESCRIPTION	QTY
16.19	366067	MTR HYD PARKER # TE0230FP100AAAA	1
16.7	010363	BRG FLANGE 4 BOLT 1-1/2" SCM DODGE # 126188	2
15.12	010454	BRG PB 2-1/2" SCM DODGE # 126819	1
15.4	366991	BUMPER STOP	2
14.12	010454	BRG PB 2-1/2" SCM DODGE # 126819	1
14.5	366991	BUMPER STOP	2
13.6	341270	CYL AIR 2-1/2" X 7"	1

Parts List

NEXT ASSY:

SHEET 3 OF 3

ALL DIMENSION IN INCHES

FINISH

CHECKED BY

DRAWN BY: WRK

XT ROTARY TOP BRUSH ASSEMBLY - SYSTEM
HYD DR - 90° CLR - FIXED DISPL - FOAM

REV: 2

P/N

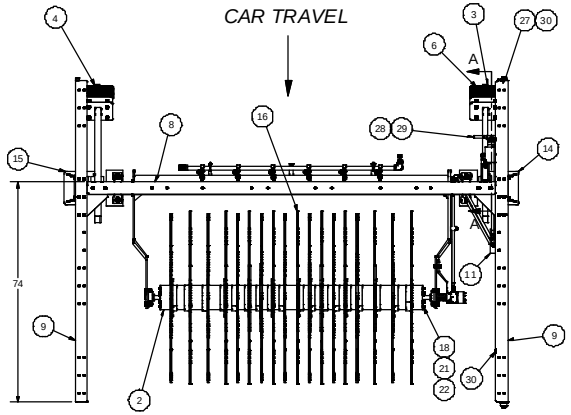
CADD: 425934.idw

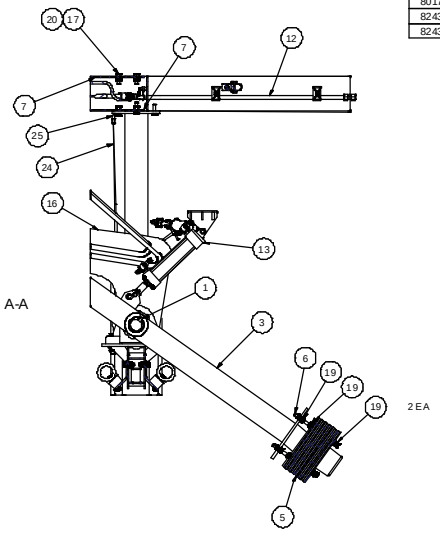
DWG NO: D - 425934

SCALE: 1:12

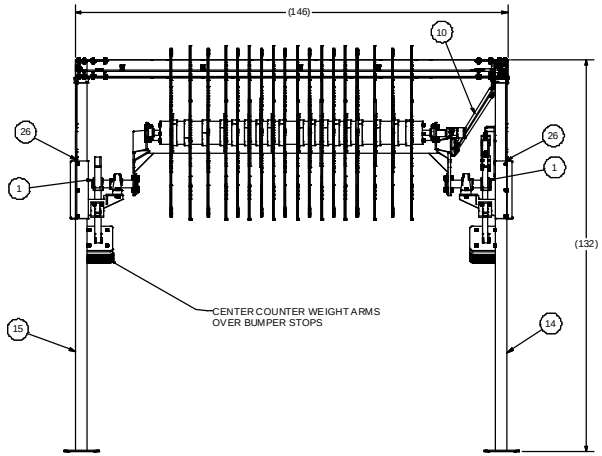
DATE: 7/15/2004

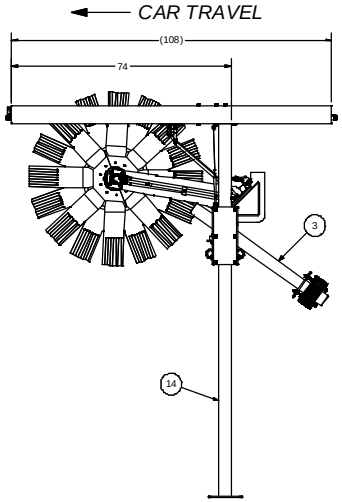
HANNA CAR WASH SYSTEMS INTERNATIONAL, LLC
18120 N.E. WILKES ROAD, PORTLAND, OREGON, 97230 USA





SECTION A-A





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REVISIONS

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28	812900	WATER VALVE ASSY - SINGLE W/HOSE BARB	1
27	812510	WATER MANIFOLD ASSY STD 9 FT	1
26	813028	BRKT, BOTTOM CABLE STOP	2
25	813029	BRKT, TOP CABLE STOP	2
24	813030	CABLE ASSY SS 3/16" X 26"	2
23	810579	PNEUMATIC PANEL - ROTARY TOP BRUSH	1
22	623040	WSHR FLAT SS 3/8"	12
21	362805	WSHR SPLT LOCK SS 3/8"	12
20	622709	NUT ESNA HEX SS 1/2"-13 UNC	27
19	362795	NUT HEX SS 1/2-13 UNC	32
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17	622934	SCR HEX CAP SS 1/2"-13 UNC X 1 1/2"	30
16	812917	ARM ASSY - XT ROTARY TOP BRUSH	1
15	813032	POST ASSY RH - XT ROTARY TOP BRUSH	1
14	813031	POST ASSY LH - XT ROTARY TOP BRUSH	1
13	812848	CYL ASSY - XT ROTARY TOP BRUSH	1
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6	811958	ALL THRD SS 1/2"-13 UNC X 9"	8
5	810688	COUNTER WEIGHT	38
4	810638	COUNTER WEIGHT ARM - RH	1
3	810631	COUNTER WEIGHT ARM - LH	1
2	810529	BRUSH ASSY - FOAM	1
1	807207	KEY SS 5/8" X 5/8" X 2"	2

Parts List

NEXT ASSY:

SHEET 1 OF 3

ALL DIMENSION IN INCHES

PROJ ENGR

CHECKED BY

DRAWN BY: WRK

XT ROTARY TOP BRUSH ASSEMBLY - SYSTEM
HYD DR - 96" CLR - PRESS COMP - FOAM

REV: 2

RN

CADD: 425936.idw

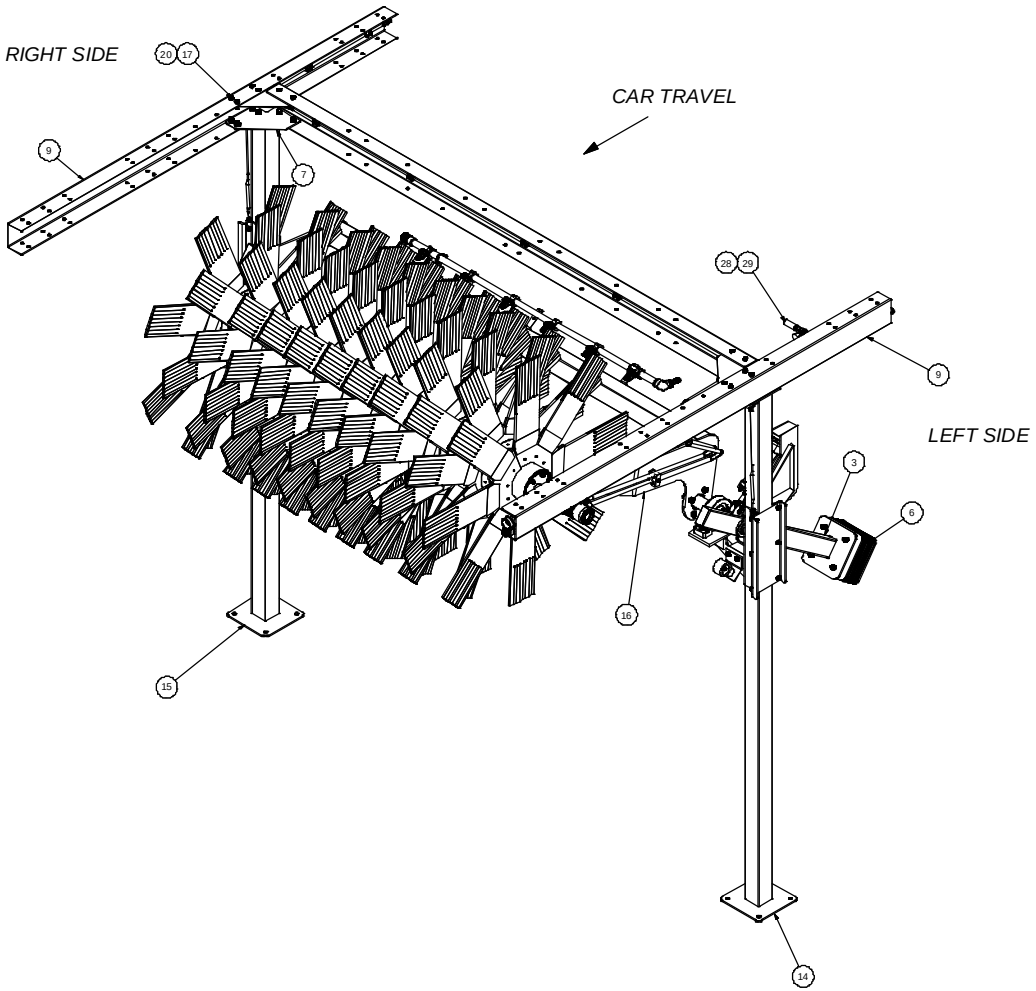
DWG NO: D - 425936

SCALE: 1 : 20

DATE: 7/15/2004

HANNA CAR WASH SYSTEMS INTERNATIONAL, LLC

18120 N.E. WILKES ROAD, PORTLAND, OREGON, 97230 USA



NEXT ASSY:

SHEET 2 OF 3

ALL DIMENSION IN INCHES

PRESS ENGR

CHECKED BY

DRAWN BY: WRK

XT ROTARY TOP BRUSH ASSEMBLY - SYSTEM
HYD DR - 96" CLR - PRESS COMP - FOAM

REV: 2

RN

CADD: 425936.idw

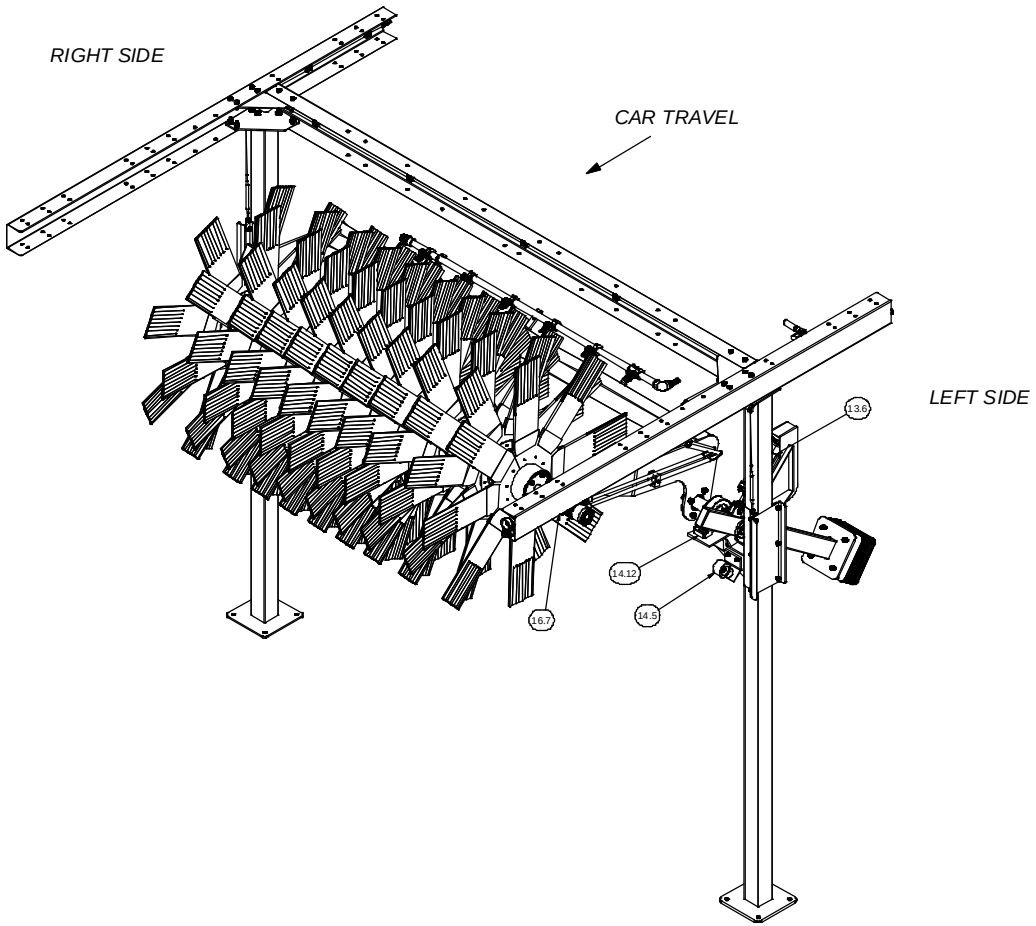
DWG NO: D - 425936

SCALE: 1:12

DATE: 7/15/2004

HANNA CAR WASH SYSTEMS INTERNATIONAL, LLC

18120 N.E. WILKES ROAD, PORTLAND, OREGON, 97230 USA



NOTES:

1. ITEM 15.4 AND 15.12 NOT SHOWN THIS VIEW. REFER TO ITEMS 14.5 AND 14.12 FOR SIMILIAR LOCATION ON RIGHT HAND SIDE.

SPARE PARTS

ITEM	PART NO.	DESCRIPTION	QTY
16.19	366906	MTR HYD PARKER # TE0130FS100AAAA	1
16.7	010363	BRG FLANGE 4 BOLT 1-1/2" SCM DODGE # 126188	2
15.12	010454	BRG PB 2-1/2" SCM DODGE # 126819	1
15.4	366991	BUMPER STOP	2
14.12	010454	BRG PB 2-1/2" SCM DODGE # 126819	1
14.5	366991	BUMPER STOP	2
13.6	341270	CYL AIR 2-1/2" X 7"	1

Parts List

NEXT ASSY: | SHEET 3 OF 3

ALL DIMENSION IN INCHES

PRESS ENGR:

CHECKED BY:

DRAWN BY: WRK

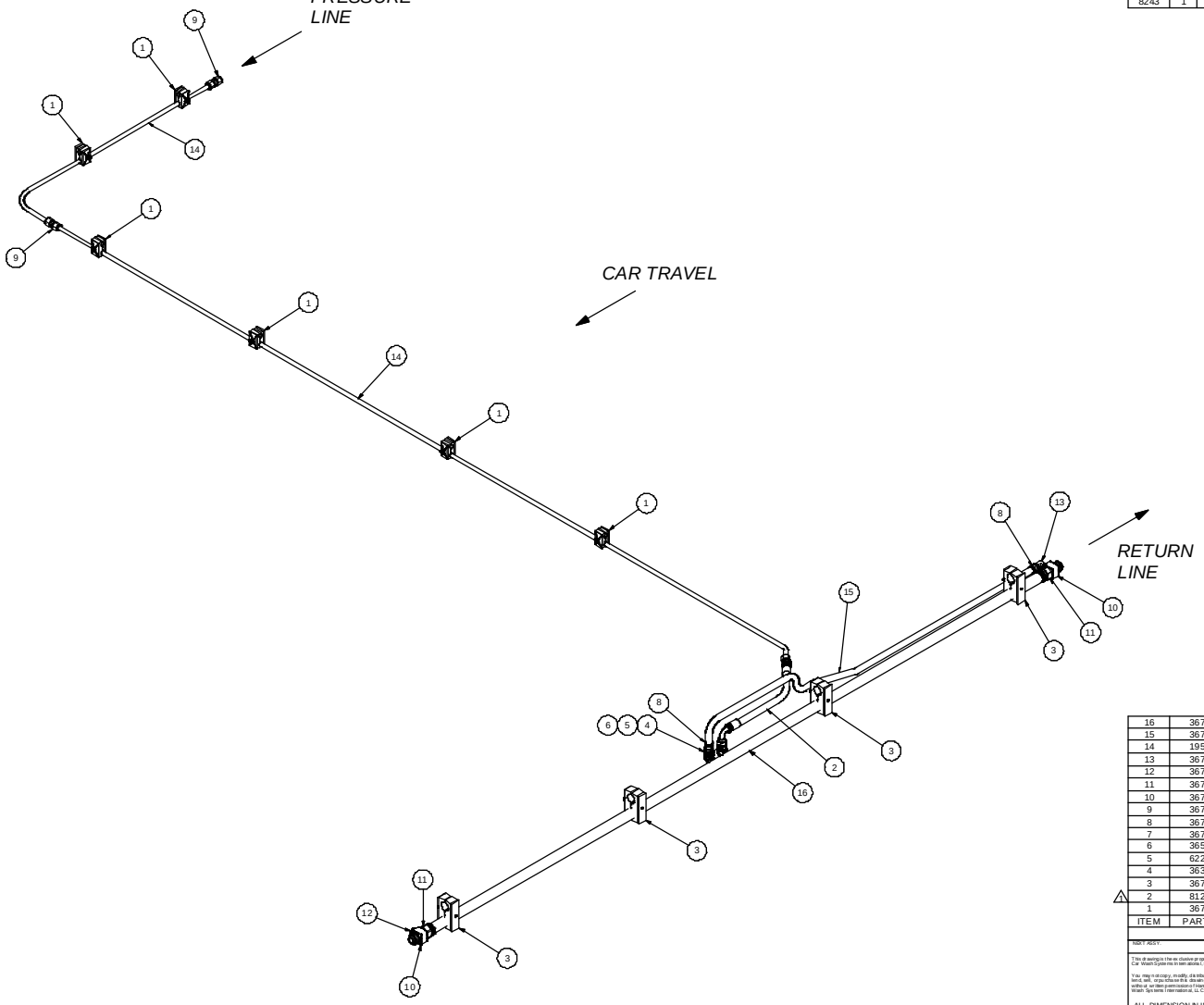
XT ROTARY TOP BRUSH ASSEMBLY - SYSTEM
HYD DR - 96" CLR - PRESS COMP - FOAM

REV: 2

RN: | CADD: 425936.idw | DWG NO: D - 425936

SCALE: 1:12 | DATE: 7/15/2004

HANNA CAR WASH SYSTEMS INTERNATIONAL, LLC
18120 N.E. WILKES ROAD, PORTLAND, OREGON, 97230 USA



REVISIONS

C/N	SYM	DESCRIPTION	DATE	APRV
8243	1	DEL. 367570 & 367102; ADDED 812819	1/7/05	JDO

ITEM	PART NO.	DESCRIPTION	QTY
16	367612	HOSE HYD 1" PUSH-LOK BLUE (9 FT)	1
15	367611	HOSE HYD 1/2" PUSH-LOK BLUE (5 FT)	1
14	195701	TU HYD SS 1/2" X 0.035 WALL T316 (10 FT)	1
13	367289	FTG HYD EL90 STL NI PL 3/4"-16 O-RING X 1/2" MJIC	1
12	367616	PLUG STL NI PL 3/4"-16 UNF O-RING	1
11	367566	FTG HYD STR BR NI PL 1" HOSE BARB X 1" FJIC	2
10	367565	FTG HYD TEE BR NI PL 1" MJIC X 1" MJIC X 3/4"-14 O-RING	2
9	367099	FTG HYD STR UNION SS 1/2" X 1/2" TU A-LOK	2
8	367608	FTG HYD STR BR NI PL 1/2" HOSE BARB X 1/2" FJIC	2
7	367101	FTG HYD STR SS 1/2 MJIC X 1/2" TU A-LOK	1
6	365159	NUT HEX JAM SS 3/4"-16 UNF	2
5	622987	WSHR INT STAR SS 3/4"	2
4	363482	FTG BKHD UNION 1/2" MJIC X 1/2" MJIC	2
3	367572	CLAMP TWIN SS 1" HOSE	4
2	812819	HOSE ASSY 1/2" X 24" FJIC X FJIC 90 EL	1
1	367568	CLAMP TWIN SS 1/2 " TUBE	6

Parts List

NEXT ASSY: SHEET 1 OF 1

ALL DIMENSION IN INCHES

PROG ENGR

CHECKED BY

DRAWN BY: JDO

HYDRAULIC ASSY - SYSTEM
HOSE RETURN - XT ROTARY TOP BRUSH - PRESS. COMP.

REV: 1

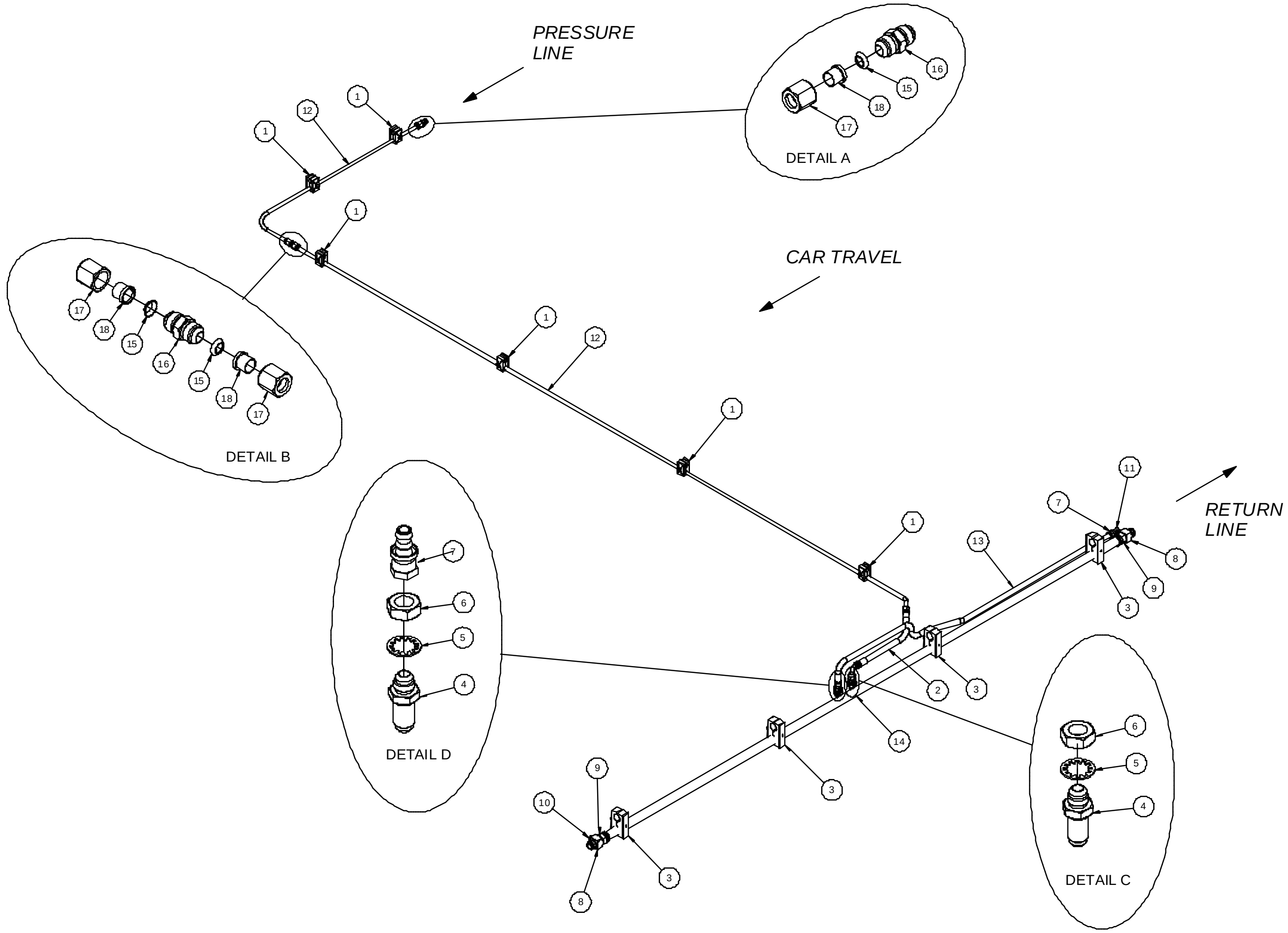
RN | CADD: 812847.idw | DWG NO: D - 812847

SCALE | DATE: 7/28/2004

HANNA CAR WASH SYSTEMS INTERNATIONAL, LLC
18120 N.E. WILKES ROAD, PORTLAND, OREGON, 97230 USA

REVISIONS

C/N	SYM	DESCRIPTION	DATE	APRV
8243	1	DEL. 367570; ADDED 813136	1/7/05	JDO



ITEM	PART N0.	DESCRIPTION	QTY
18	363484	FTG TUBE SLEEVE SS 1/2" PARKER # 8-TX-SS	4
17	363483	FTG TUBE NUT SS 1/2" FJIC PARKER # 8-BTX-SS	4
16	363481	FTG HYD STR UNION SS 1/2" MJIC X 1/2" MJIC	2
15	351791	FTG HYD SEALING SLV CU 1/2"	4
14	367612	HOSE HYD 1" PUSH-LOK BLUE (9 FT)	1
13	367611	HOSE HYD 1/2" PUSH-LOK BLUE (5 FT)	1
12	195701	TU HYD SS 1/2" X 0.035 WALL T316 (10 FT)	1
11	367289	FTG HYD EL90 STL NI PL 3/4"-16 O-RING X 1/2" MJIC	1
10	367616	PLUG STL NI PL 3/4"-16 UNF O-RING	1
9	367566	FTG HYD STR BR NI PL 1" HOSE BARB X 1" FJIC	2
8	367565	FTG HYD TEE BR NI PL 1" MJIC X 1" MJIC X 3/4"-14 O-RING	2
7	367608	FTG HYD STR BR NI PL 1/2" HOSE BARB X 1/2" FJIC	2
6	365159	NUT HEX JAM SS 3/4"-16 UNF	2
5	622987	WSHR INT STAR SS 3/4"	2
4	363482	FTG BKHD UNION 1/2" MJIC X 1/2" MJIC	2
3	367572	CLAMP TWIN SS 1" HOSE	4
1 2	813136	HOSE ASSY 1/2" X 24" MJIC X FJIC 90 EL	1
1	367568	CLAMP TWIN SS 1/2" TUBE	6

Parts List

NEXT ASSY. SHEET 1 OF 1

HYDRAULIC ASSY - SYSTEM

HOSE RETURN - XT ROTARY TOP BRUSH - FIXED DISPL.

REV. 1

ALL DIMENSION IN INCHES

RN | CADD 812991.idw | DWG NO D − 812991

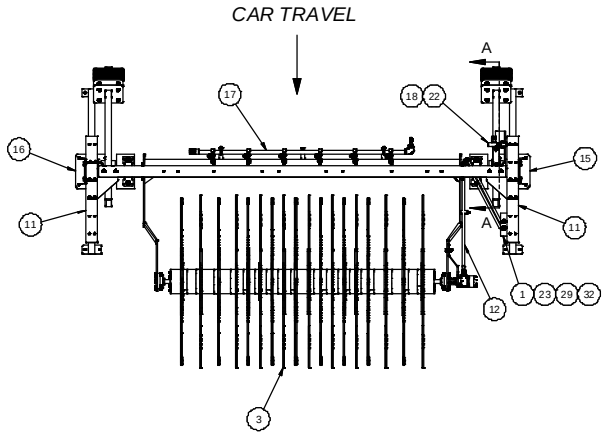
PROJ. ENGR. | SCALE 1:8 | DATE 8/20/2004

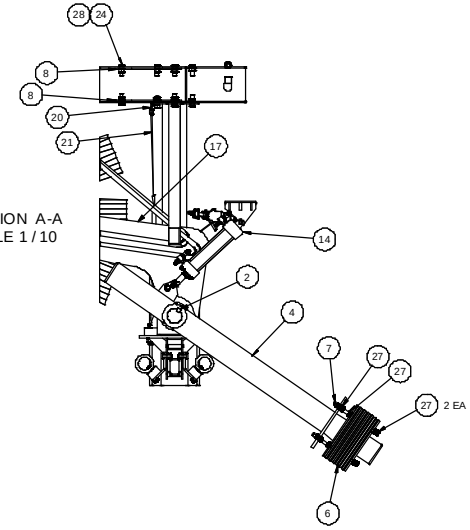
CHECKED BY

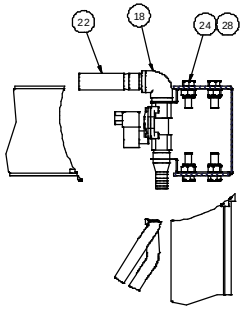
DRAWN BY JDO

HANNA CAR WASH SYSTEMS INTERNATIONAL, LLC

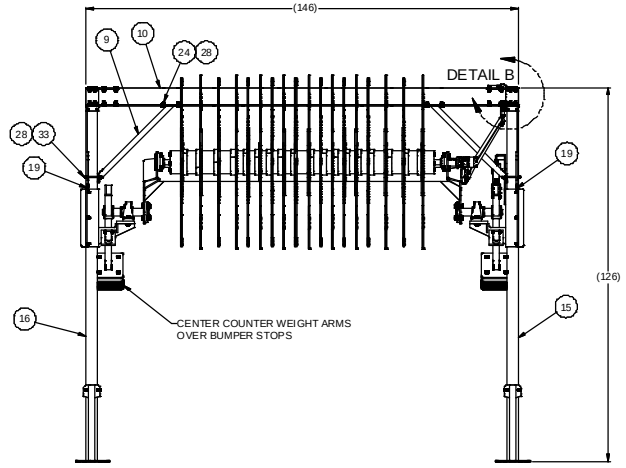
18120 N.E. WILKES ROAD, PORTLAND, OREGON, 97230 USA

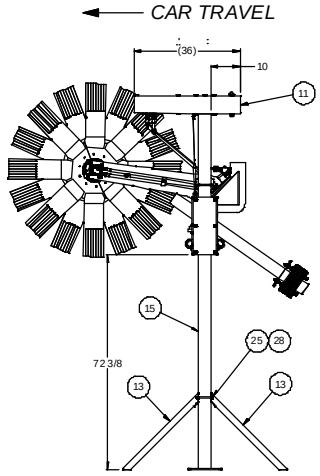






DETAIL B
SCALE 1 / 4





ITEM	PART NO.	DESCRIPTION	QTY
33	363057	BOLT U SQ SS 1/2"-13 UNC X 4" X 5-1/2"	2
32	622987	WSHR INT STAR SS 3/4"	2
31	623040	WSHR FLAT SS 3/8"	12
30	362805	WSHR SPLT LOCK SS 3/8"	12
29	365159	NUT HEX JAM SS 3/4"-16 UNF	2
28	622709	NUT ESNA HEX SS 1/2"-13 UNC	49
27	362795	NUT HEX SS 1/2-13 UNC	32
26	622947	SCR HEX CAP SS 3/8"-16 UNC X 1-1/2"	12
25	622936	SCR HEX CAP SS 1/2"-13 UNC X 5 1/2"	4
24	622934	SCR HEX CAP SS 1/2"-13 UNC X 1 1/2"	42
23	363482	FTG BKHD UNION 1/2" MJIC X 1/2" MJIC	2
22	312256	HOSE, DOUBLE BRAIDED 3/4" (7 FT)	1
21	813030	CABLE ASSY SS 3/16" X 26"	2
20	813029	BRKT, TOP CABLE STOP	2
19	813028	BRKT, BOTTOM CABLE STOP	2
18	813021	WATER VALVE ASSY	1
17	812917	ARM ASSY - XT ROTARY TOP BRUSH	1
16	812916	POST ASSY RH - XT ROTARY TOP BRUSH	1
15	812915	POST ASSY LH - XT ROTARY TOP BRUSH	1
14	812848	CYL ASSY - XT ROTARY TOP BRUSH	1
13	812630	GUSSET - POST TO FLOOR	4
12	812586	HOSE ASSY 1/2" X 78" STR FJIC X STR FJIC	1
12	812586	HOSE ASSY 1/2" X 78" STR FJIC X STR FJIC	1
11	812460	C-CHANNEL XT 3 FT	2
10	812451	HEADER CROSSMEMBER	1
9	812404	GUSSET - POST TO HEADER	2
8	812399	HEADER MOUNTING PLATE	4
7	811958	ALL THRD SS 1/2"-13 UNC X 9"	8
6	810688	COUNTER WEIGHT	38
5	810638	COUNTER WEIGHT ARM - RH	1
4	810631	COUNTER WEIGHT ARM - LH	1
3	810529	BRUSH ASSY - FOAM	1
2	807207	KEY SS 5/8" X 5/8" X 2"	2
1	803868	BULKHEAD MTG PLATE	1

Parts List

NEXT ASSY:

SHEET 1 OF 3

ALL DIMENSION IN INCHES

PRESS ENGR

CHECKED BY

DRAWN BY JDO

XT ROTARY TOP BRUSH ASSY -FREESTANDING
HYD DR - 90° CLR - PRESS COMP - FOAM

REV: 0

RN

CADD 426086.idw

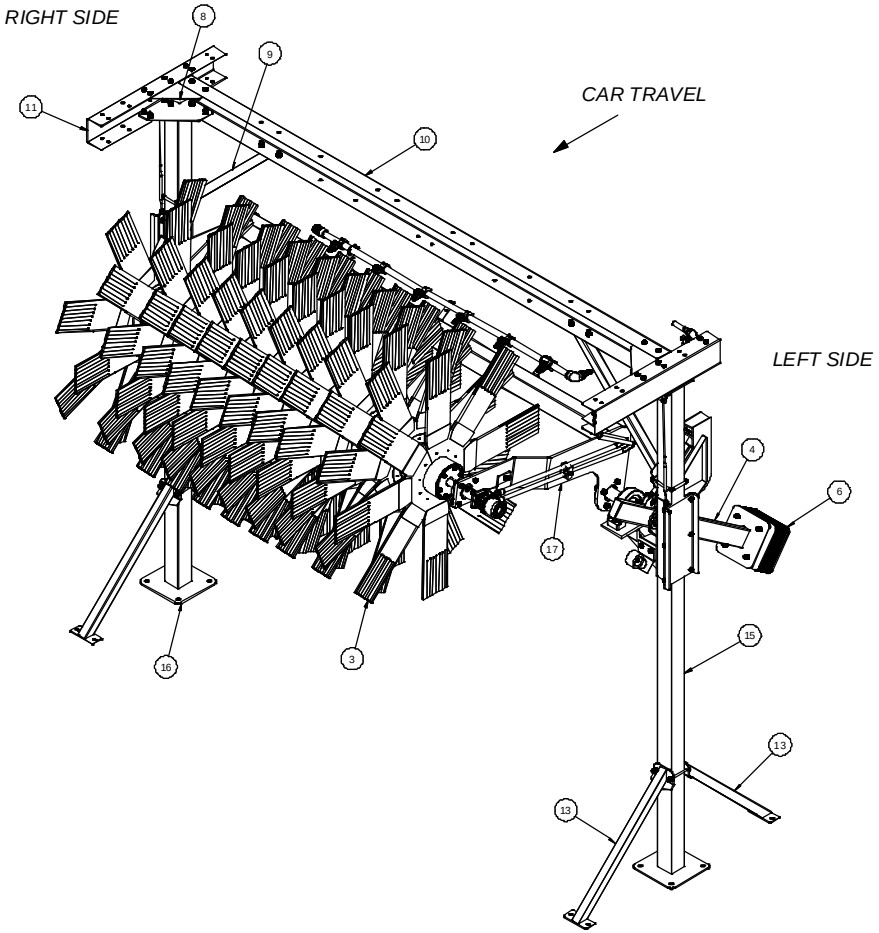
DWG NO D - 426086

SCALE 1:20

DATE 2/3/2005

HANNA CAR WASH SYSTEMS INTERNATIONAL, LLC

18120 N.E. WILKES ROAD, PORTLAND, OREGON, 97230 USA



NEXT ASSY:

SHEET 2 OF 3

ALL DIMENSION IN INCHES

PRESS ENGR

CHECKED BY

DRAWN BY JDO

XT ROTARY TOP BRUSH ASSY -FREESTANDING
HYD DR - 90° CLR - PRESS COMP - FOAM

REV: 0

RN

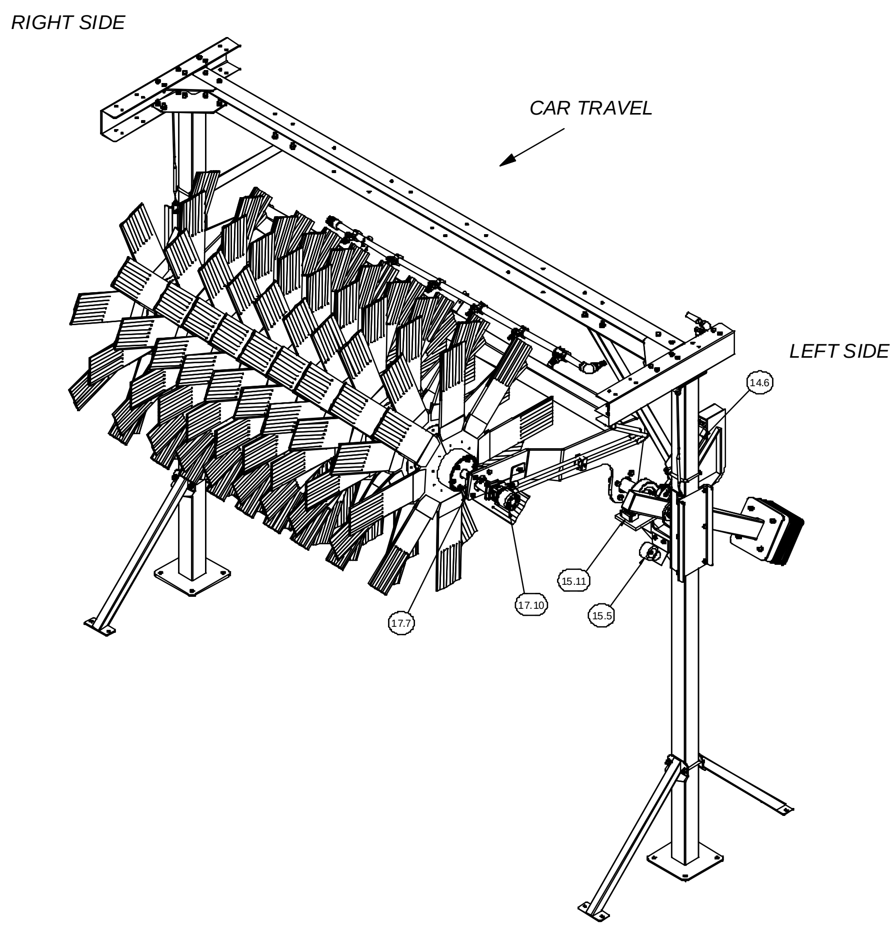
CADD 426086.idw

DWG NO D - 426086

SCALE 1:12

DATE 2/3/2005

HANNA CAR WASH SYSTEMS INTERNATIONAL, LLC
18120 N.E. WILKES ROAD, PORTLAND, OREGON, 97230 USA



SPARE PARTS

ITEM	PART N0.	DESCRIPTION	QTY
17.10	366906	MTR HYD PARKER # TE0130FS100AAAA	1
17.7	010363	BRG FLANGE 4 BOLT 1-1/2" SCM DODGE # 126188	2
15.11	010454	BRG PB 2-1/2" SCM DODGE # 126819	1
15.5	366991	BUMPER STOP	2
14.6	341270	CYL AIR 2-1/2" X 7"	1

Parts List

NEXT ASSY.

SHEET 3 OF 3

XT ROTARY TOP BRUSH ASSY -FREESTANDING

HYD DR - 90" CLR - PRESS COMP - FOAM

REV. 0

ALL DIMENSION IN INCHES

RN

CADD 426086.idw

DWG NO D − 426086

PROJ. ENGR.

SCALE 1:12

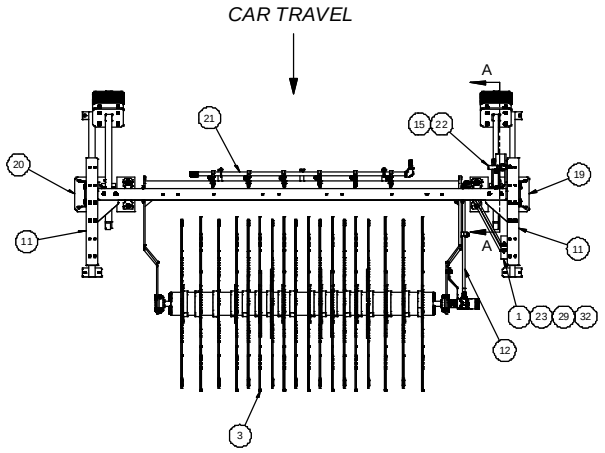
DATE 2/3/2005

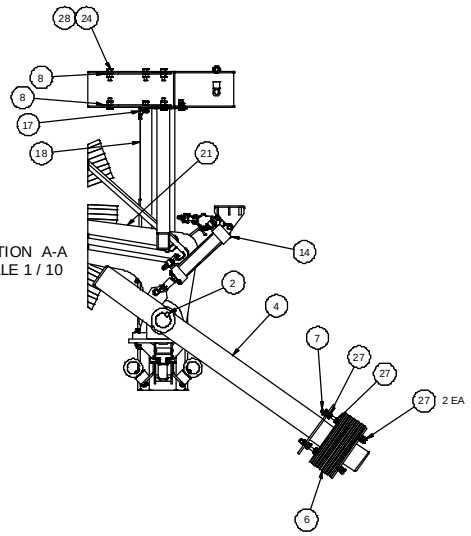
CHECKED BY

DRAWN BY JDO

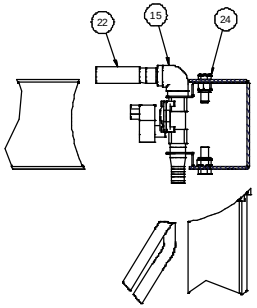
HANNA CAR WASH SYSTEMS INTERNATIONAL, LLC

18120 N.E. WILKES ROAD, PORTLAND, OREGON, 97230 USA

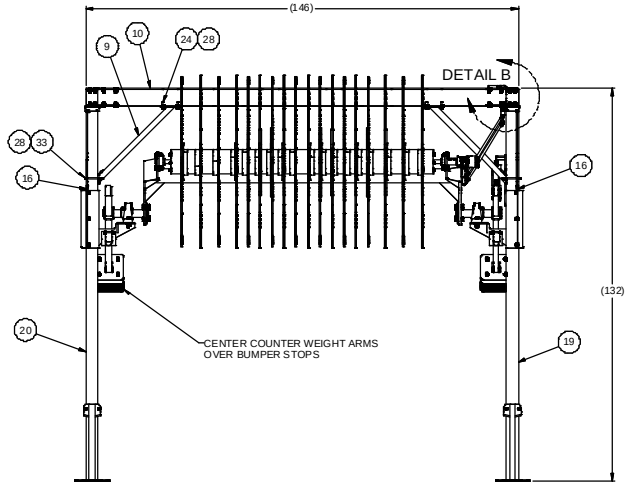


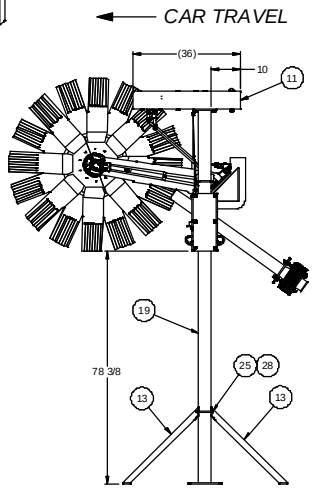


SECTION A-A
SCALE 1 / 10



DETAIL B
SCALE 1 / 4





ITEM	PART NO.	DESCRIPTION	QTY
33	363057	BOLT U SQ SS 1/2"-13 UNC X 4" X 5-1/2"	2
32	622987	WSHR INT STAR SS 3/4"	2
31	623040	WSHR FLAT SS 3/8"	12
30	362805	WSHR SPLT LOCK SS 3/8"	12
29	365159	NUT HEX JAM SS 3/4"-16 UNF	2
28	622709	NUT ESNA HEX SS 1/2"-13 UNC	45
27	362795	NUT HEX SS 1/2-13 UNC	32
26	622947	SCR HEX CAP SS 3/8"-16 UNC X 1-1/2"	12
25	622936	SCR HEX CAP SS 1/2"-13 UNC X 5 1/2"	4
24	622934	SCR HEX CAP SS 1/2"-13 UNC X 1 1/2"	36
23	363482	FTG BKHD UNION 1/2" MJIC X 1/2" MJIC	2
22	312256	HOSE, DOUBLE BRAIDED 3/4" (7 FT)	1
21	813033	ARM ASSY - XT ROTARY TOP BRUSH	1
20	813032	POST ASSY RH - XT ROTARY TOP BRUSH	1
19	813031	POST ASSY LH - XT ROTARY TOP BRUSH	1
18	813030	CABLE ASSY SS 3/16" X 26"	2
17	813029	BRKT, TOP CABLE STOP	2
16	813028	BRKT, BOTTOM CABLE STOP	2
15	813021	WATER VALVE ASSY	1
14	812848	CYL ASSY - XT ROTARY TOP BRUSH	1
13	812630	GUSSET - POST TO FLOOR	4
12	812586	HOSE ASSY 1/2" X 78" STR FJIC X STR FJIC	1
12	812586	HOSE ASSY 1/2" X 78" STR FJIC X STR FJIC	1
11	812460	C-CHANNEL XT 3 FT	2
10	812451	HEADER CROSSMEMBER	1
9	812404	GUSSET - POST TO HEADER	2
8	812399	HEADER MOUNTING PLATE	4
7	811958	ALL THRD SS 1/2"-13 UNC X 9"	8
6	810688	COUNTER WEIGHT	38
5	810638	COUNTER WEIGHT ARM - RH	1
4	810631	COUNTER WEIGHT ARM - LH	1
3	810529	BRUSH ASSY - FOAM	1
2	807207	KEY SS 5/8" X 5/8" X 2"	2
1	803868	BULKHEAD MTG PLATE	1

Parts List

NEXT ASSY:

SHEET 1 OF 3

ALL DIMENSION IN INCHES

FIRST ENGR

CHECKED BY

DRAWN BY JDO

XT ROTARY TOP BRUSH ASSY -FREESTANDING
HYD DR - 96" CLR - FIXED DISPL - FOAM

REV 0

RN

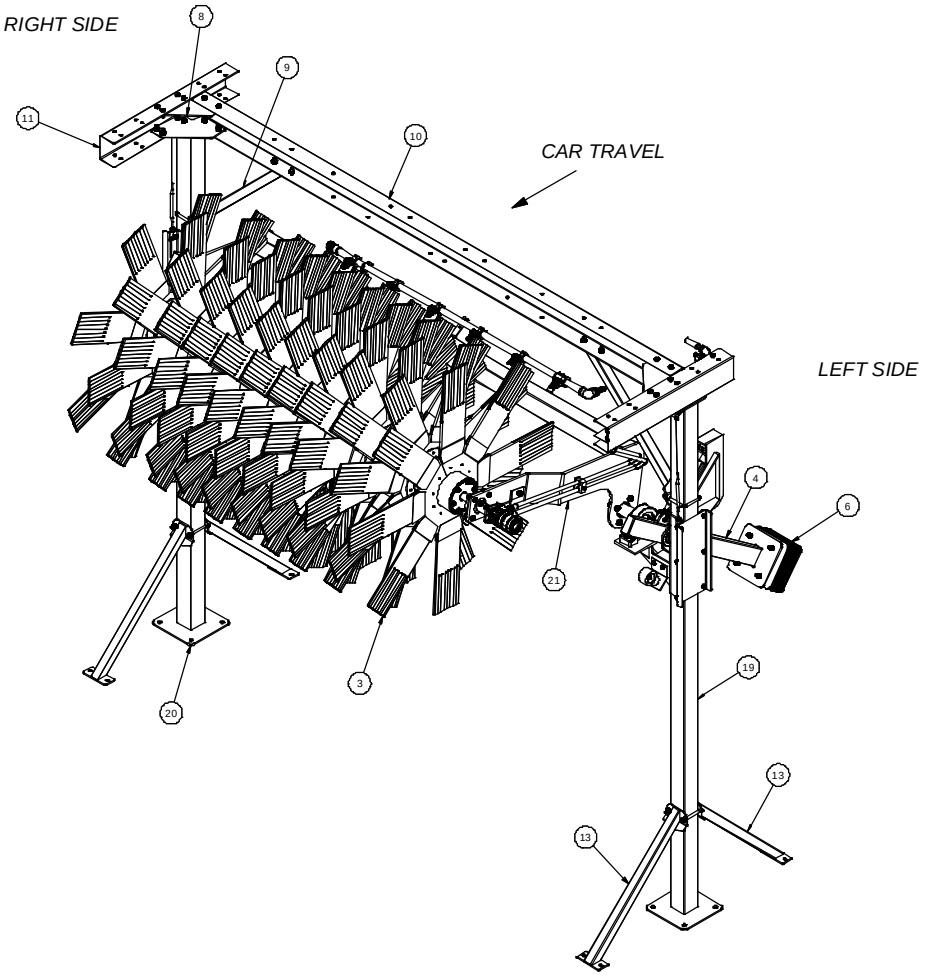
CADD 426092.idw

DWG NO D - 426092

SCALE 1:20

DATE 2/4/2005

HANNA CAR WASH SYSTEMS INTERNATIONAL, LLC
18120 N.E. WILKES ROAD, PORTLAND, OREGON, 97230 USA



NEXT ASSY:

SHEET 2 OF 3

ALL DIMENSION IN INCHES

FINISH

CHECKED BY

DRAWN BY JDO

XT ROTARY TOP BRUSH ASSY -FREESTANDING
HYD DR - 96" CLR - FIXED DISPL - FOAM

REV 0

RN

CADD 426092.idw

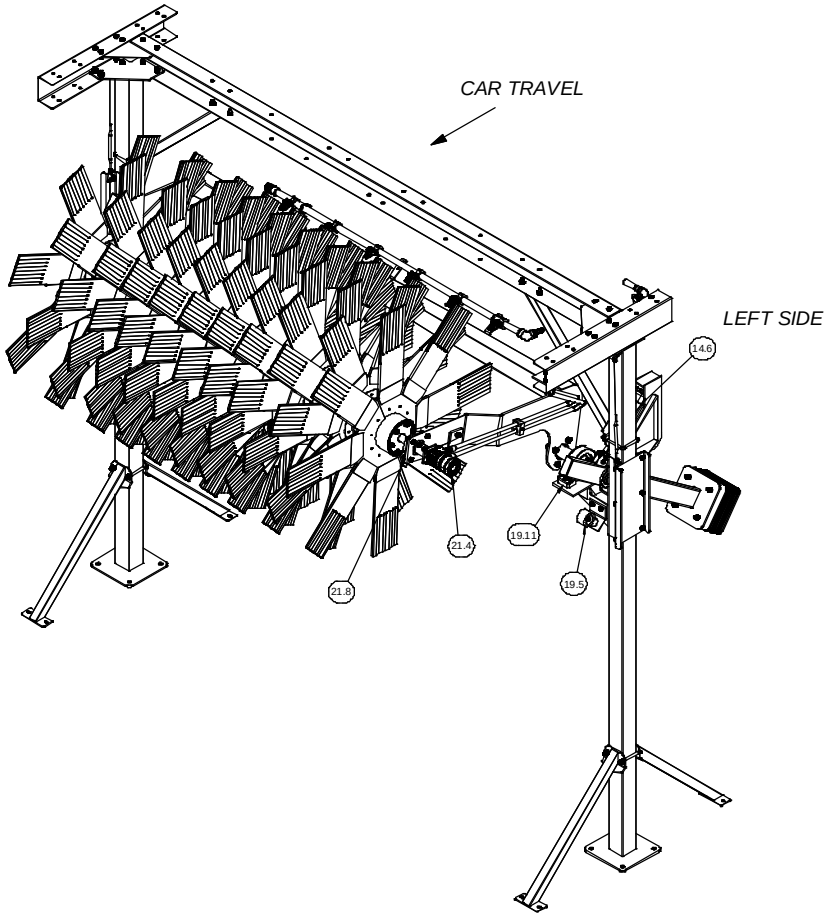
DWG NO D - 426092

SCALE 1:12

DATE 2/4/2005

HANNA CAR WASH SYSTEMS INTERNATIONAL, LLC
18120 N.E. WILKES ROAD, PORTLAND, OREGON, 97230 USA

RIGHT SIDE



SPARE PARTS

ITEM	PART NO.	DESCRIPTION	QTY
21.8	010363	BRG FLANGE 4 BOLT 1-1/2" SCM DODGE # 126188	2
21.4	366067	MTR HYD PARKER # TE0230FP100AAAA	1
19.11	010454	BRG PB 2-1/2" SCM DODGE # 126819	1
19.5	366991	BUMPER STOP	2
14.6	341270	CYL AIR 2-1/2" X 7"	1

Parts List

NEXT ASSY: | SHEET 3 OF 3

ALL DIMENSION IN INCHES

FINISH ENGR

CHECKED BY

DRAWN BY: JDO

XT ROTARY TOP BRUSH ASSY -FREESTANDING
HYD DR - 96" CLR - FIXED DISPL - FOAM

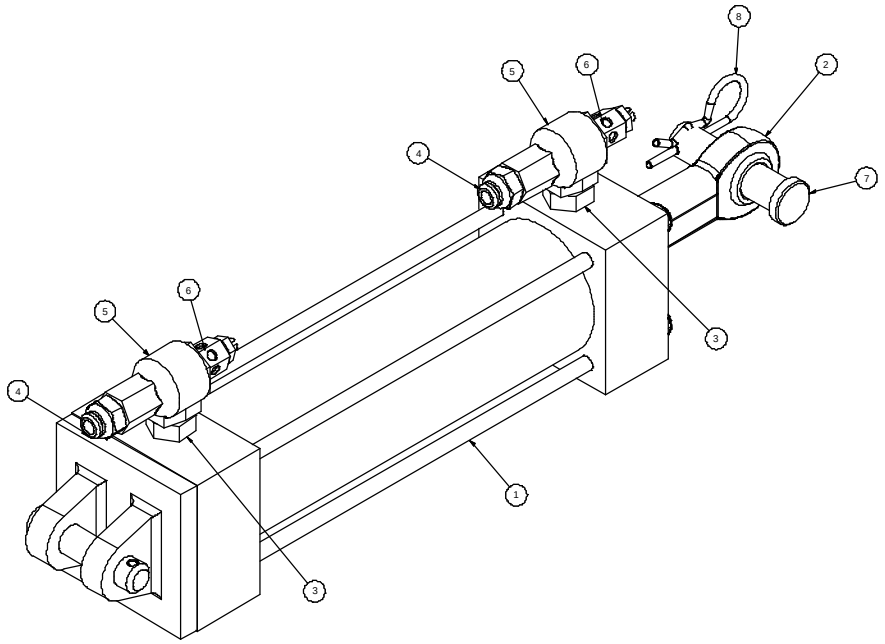
REV: 0

RN | CADD: 426092.idw | DWG NO: D - 426092

SCALE: 1:12 | DATE: 2/4/2005

HANNA CAR WASH SYSTEMS INTERNATIONAL, LLC
18120 N.E. WILKES ROAD, PORTLAND, OREGON, 97230 USA

REVISIONS				
C/N	SYM	DESCRIPTION	DATE	APRV
8155	1	DESCR. "CYL 2-1/2 X 7" WAS "CYL 2-1/2 X 10-3/4" (PN 341270)	111904	JDO
8243	2	ITEM 2 P/N WAS 367094; ITEM 4 P/N WAS 341594	1/5/5	RGR



ITEM	PART NO.	DESCRIPTION	QTY
8	339853	PIN HAIRPIN COTTER STL ZC PL 1/8"	1
7	341263	PIN CLEVIS STL ZC PL 5/8" X 2-1/2"	1
6	366900	FLOW CONTROL MUFFLER ADSEN # SCM-28	2
5	366899	VLV QUICK EXHAUST HUMPHREY # SQE-2	2
4	341586	CONN BR 1/4" PF X 1/4" NPT PARKER # W68PL-4-4	2
3	064303	FTG HYD NPL HEX 3/8" MPT X 1/4" MPT	2
2	340448	BRG ROD END - 5/8"-18 UNF FEM RH	1
1	341270	CYL AIR 2-1/2" X 7"	1

Parts List

NEXT ASSY: | SHEET 1 OF 1

CYL ASSY - XT ROTARY TOP BRUSH

REV: 2

ALL DIMENSION IN INCHES

FINISH ENGR:

P/N: CADD: 812848.idw DWG NO: D - 812848

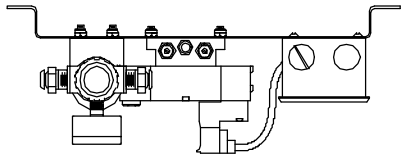
SCALE: 1:1 DATE: 7/28/2004

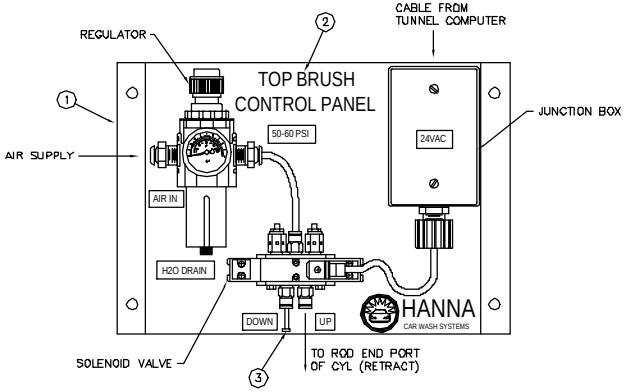
CHECKED BY:

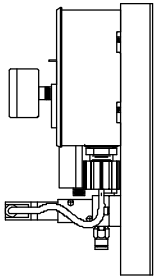
DRAWN BY: JDO

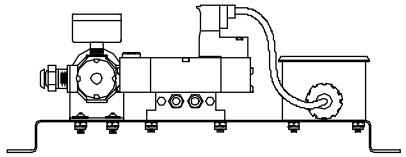
HANNA CAR WASH SYSTEMS INTERNATIONAL, LLC
18120 N.E. WILKES ROAD, PORTLAND, OREGON, 97230 USA

REVISIONS				
C/N	SYM	DESCRIPTION	DATE	APRV
8040	1	367161 WAS 367278(ITEM1)	092704	JDO
8040	1	ADDED 367484 (ITEM 3)	092704	JDO
8040	1	UPDATED INSTALL INSTR.	092704	JDO









⚠ INSTALLATION INSTRUCTIONS –

1) MOUNT PNEUMATIC PANEL ON EQUIPMENT ROOM WALL.
2) RUN 24VAC CABLE FROM TUNNEL COMPUTER TO JUNCTION BOX.
3) CONNECT POLYFLOW LINE FROM ROD END PORT CYLINDER (RETRACT) TO SOLENOID VALVE "UP".
4) CONNECT POLYFLOW LINE FROM PIVOT END PORT OF CYLINDER (EXTEND) UP TO C-CHANNEL AND FASTEN LINE TO CHANNEL LEAVING END OF TUBING OPEN TO ATMOSPHERE.
5) ATTACH AIR LINE TO INPUT OF REGULATOR.
6) TURN ON AIR SUPPLY.
7) SET AIR REGULATOR TO 50-60 PSI.
8) OPERATE THE BRUSH "UP" VIA THE MANUAL OVERIDE 3-4 TIMES AND RE-ADJUST PRESSURE IF NECESSARY.
9) USE BRASS EXHUAST/FLOW CONTROLS ON CYLINDER PORTS TO ADJUST BRUSH UP AND DOWN SPEED.
10) TEST SIGNAL FROM TUNNEL COMPUTER.

ITEM NO	PART NO.	DESCRIPTION	REQ'D
⚠ 3	367484	PLUG PUSH-IN 1/4" PLASTIC	1
2	367279	LABEL KIT - TOP BRUSH	1
⚠ 1	367161	VALVE/BOARD ASS'Y	1

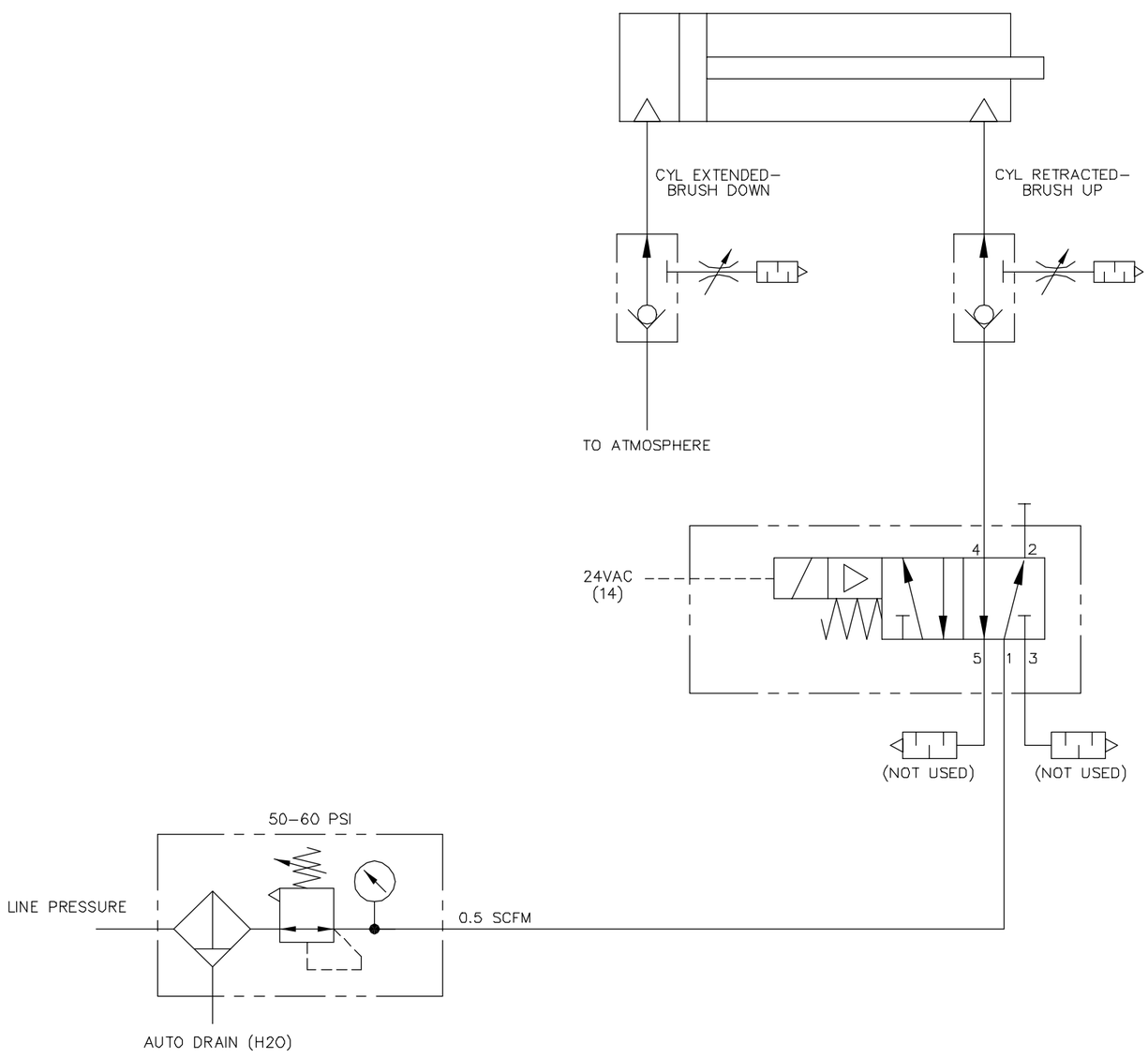
NEXT ASSY. | SHT 1 OF 2

PNEUMATIC PANEL
TOP BRUSH
REV. 1

FINISH | DWG 810579PG1R1.DWG | DWG NO. D-810579
SCALE 1:2 | DATE 12/19/03
PROJ. ENGR. JDO
CHECKED BY
DRAWN BY JDO

Hanna Car Wash Systems International, LLC
18120 N.E. WILKES ROAD, PORTLAND, OREGON 97230 USA

REVISIONS				
C/N	SYM	DESCRIPTION	DATE	APRV
8040	1	367161 WAS 367278(ITEM1)	092704	JDO
8040	1	ADDED 367484 (ITEM 3)	092704	JDO
8040	1	UPDATED INSTALL INSTR.	092704	JDO



ITEM NO.	PART NO.	DESCRIPTION	REQ'D
NEXT ASSY.		SHT 2 OF 2	

TOLERANCES UNLESS OTHERWISE NOTED
ANGLES = ±1°
.X = ±.015
.XX = ±.005
.XXX = ±.002
FRACTIONS = ±1/16
FINISHES ARE BEST COMMERCIAL PRACTICE UNLESS OTHERWISE NOTED.

PNEUMATIC PANEL – SCHEMATIC
TOP BRUSH

REV. 1

PROJ. ENGR. JDO	SCALE NTS	DWG NO. D–810579	
CHECKED BY	RN	CADD 810579PG2R1.dwg	DATE 12/19/03
DRAWN BY JDO			

Hanna Car Wash Systems International, LLC
18120 N.E. WILKES ROAD, PORTLAND, OREGON 97230 USA