

AUTOHANDWASH

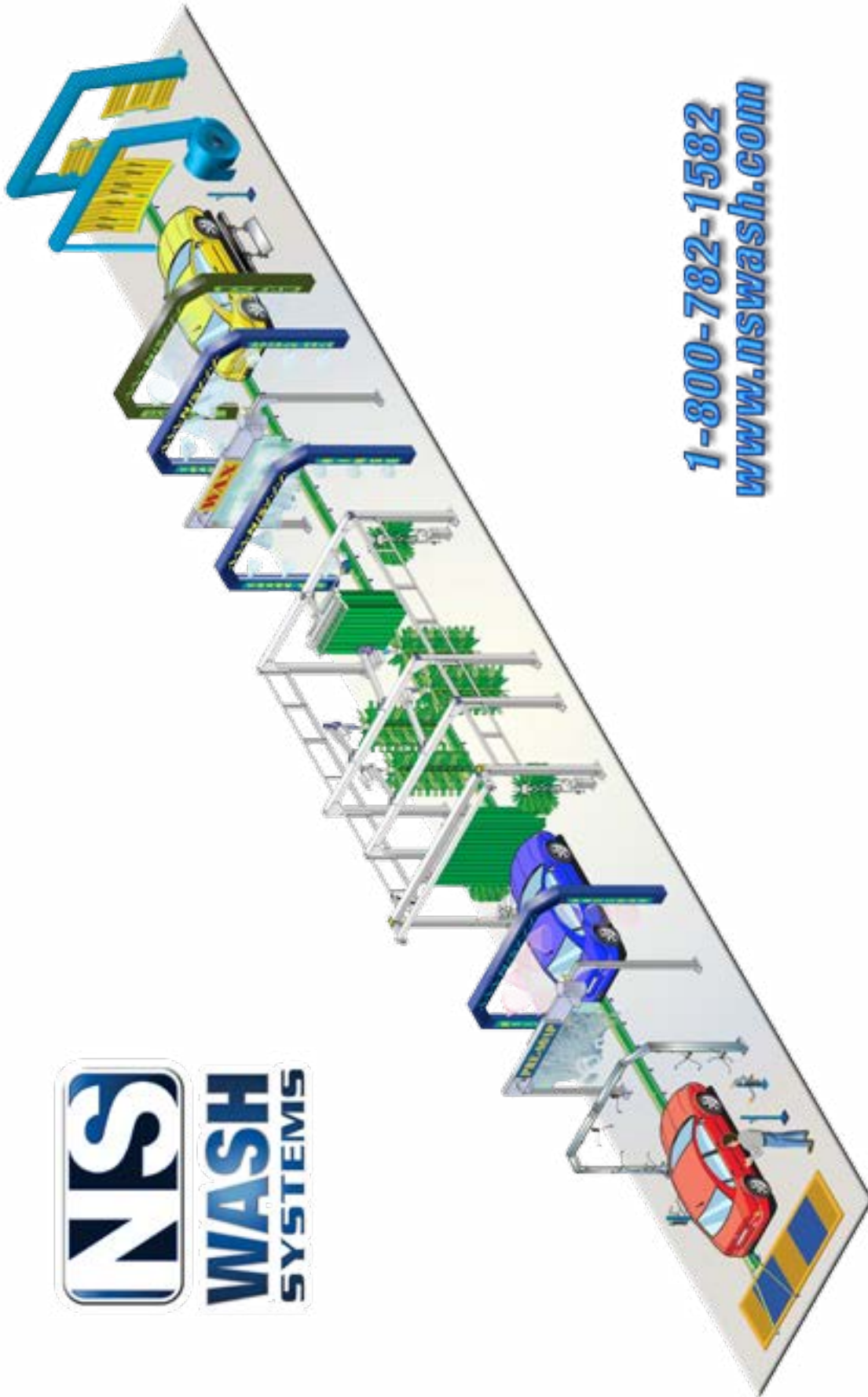
Maintenance & Parts Manual



MINI *express* WASH



Rev
A1113



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Optional Activation Plates &
Support legs



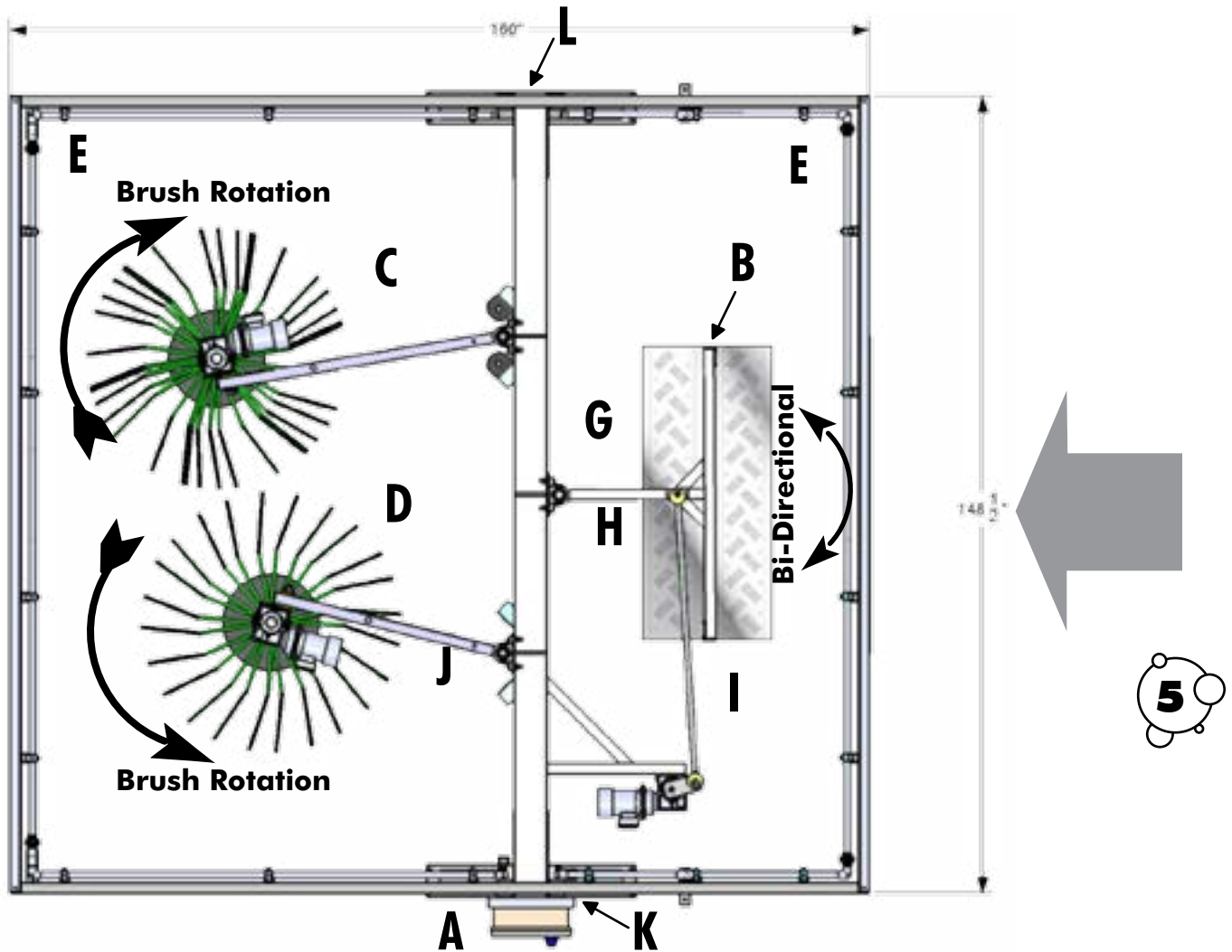
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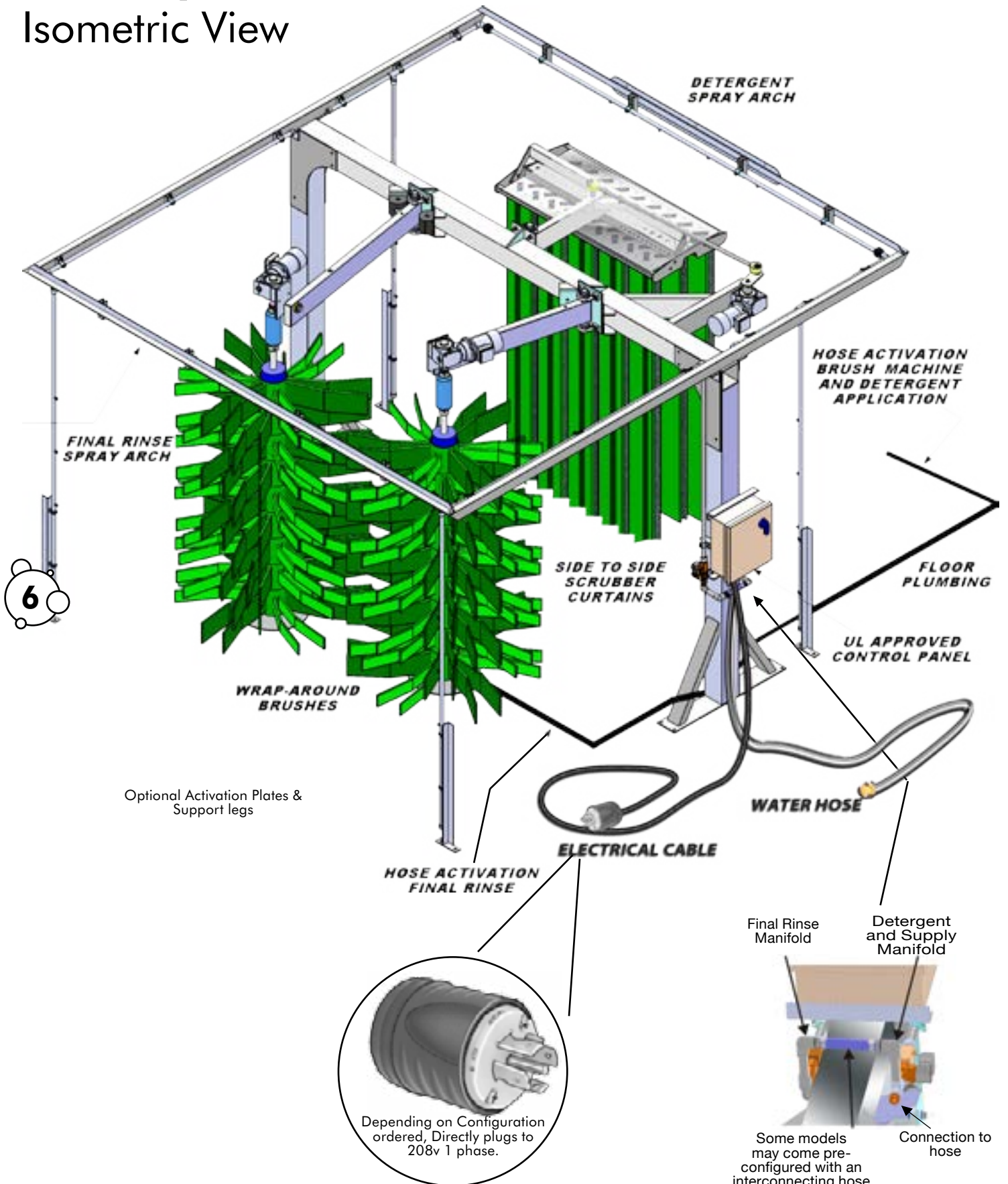
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<i>Item</i>	<i>Part Number</i>	<i>Description</i>	<i>Page</i>
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K	900-0260	Driver Side Middle Leg	17
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Mini Express

Isometric View



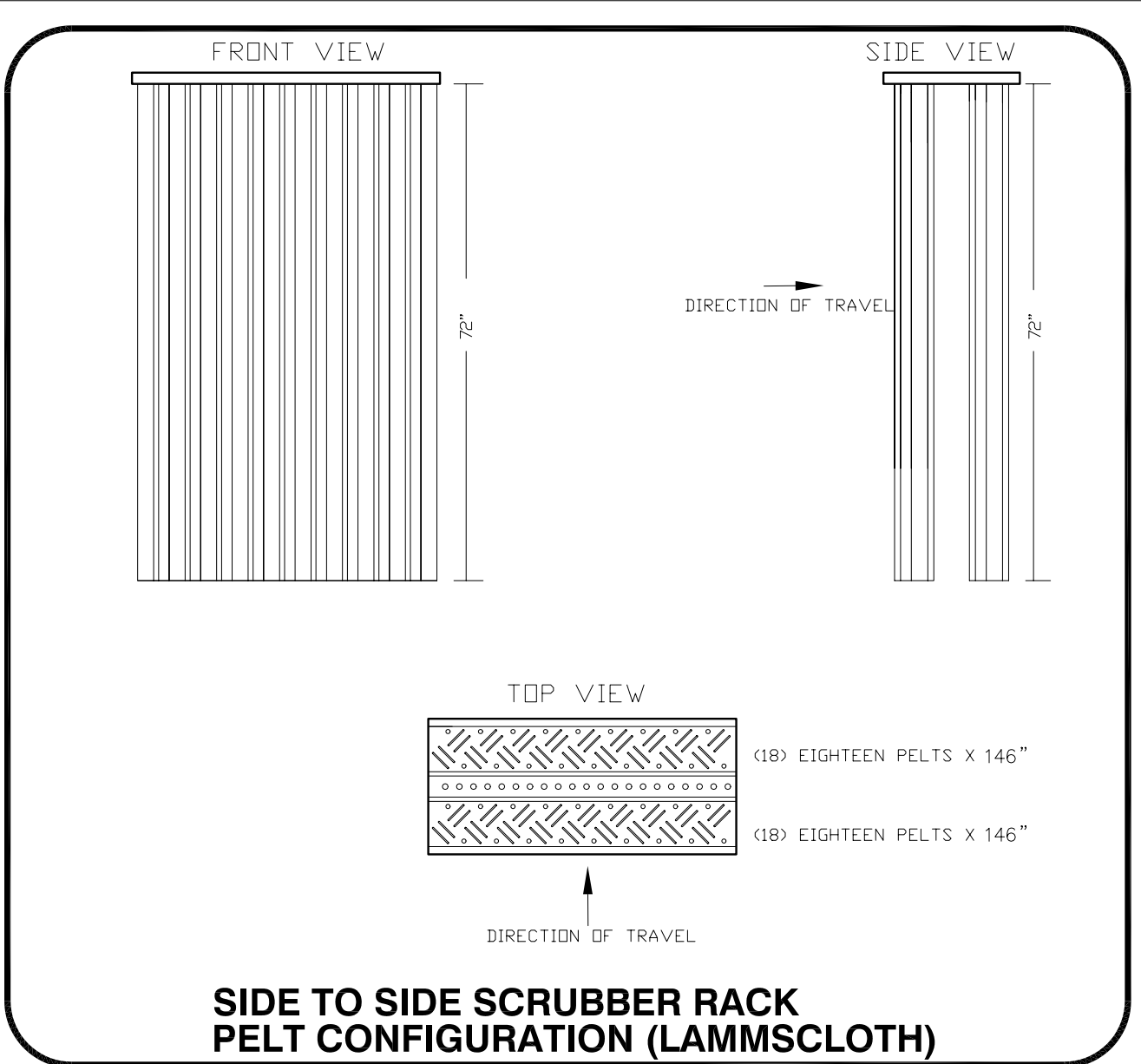
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Curtain Rack

Side to Side Loop Style



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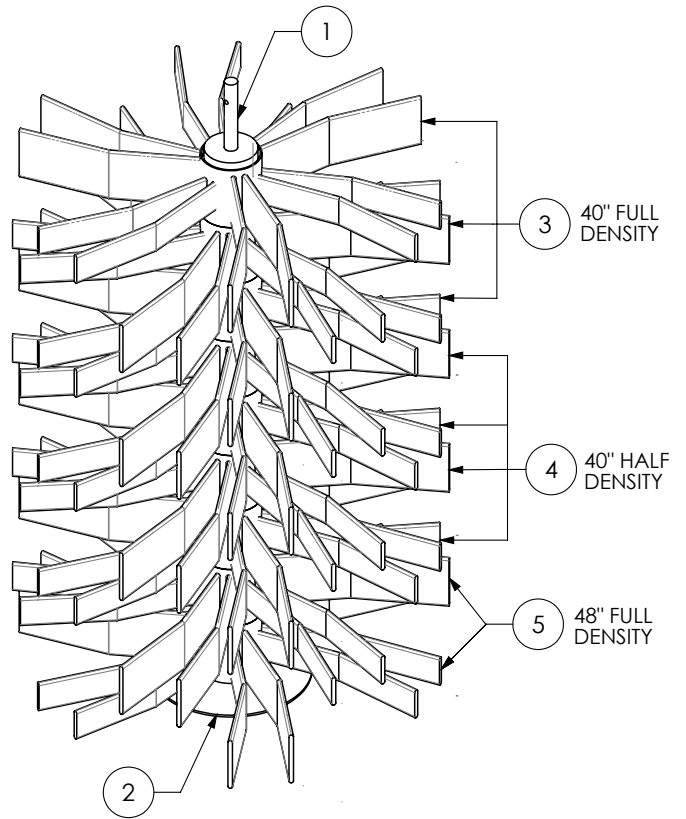
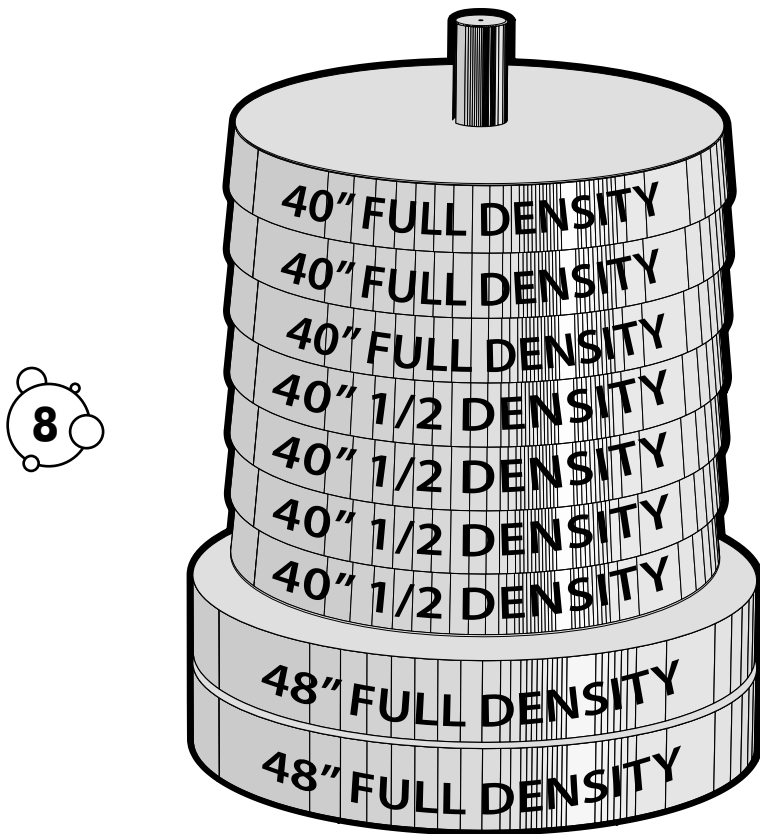
SIDE TO SIDE SCRUBBER RACK PELT CONFIGURATION (LAMMSCLOTH)

SYSTEM	EQUIPMENT	SIZE	TYPE	QTY.	PART NO.
90" CLEARANCE	SINGLE SIDE TO SIDE SCRUBBER	8" X 146"	LAMMSCLOTH	18	LCC-8X174
		8" X 146"	LAMMSCLOTH	18	LCC-8X182

EACH LAMMSCLOTH PELT IS FOLDED IN HALF THEN LOOPED AROUND THE TOP FRAME ASSEMBLY THE FINAL RESULT IS A PELT THAT IS 4" WIDE
THE 146" PELT BECOMES 72" LONG

Wrap Brush

Fiber Pelt Configuration



Item	Part Number	Description	Qty
1	900-0212	Brush Shaft	1
2	710-1006	Disk Protector	1
3	630-1266	40" Full Density Lammscloth	3
4	630-1269	40" Half Density Lammscloth	4
5	630-1280	48" Full Density Lammscloth	2

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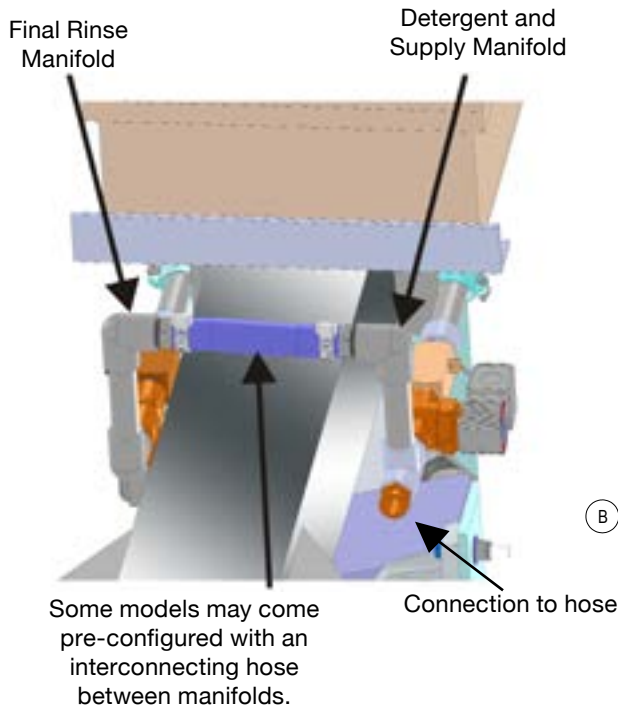
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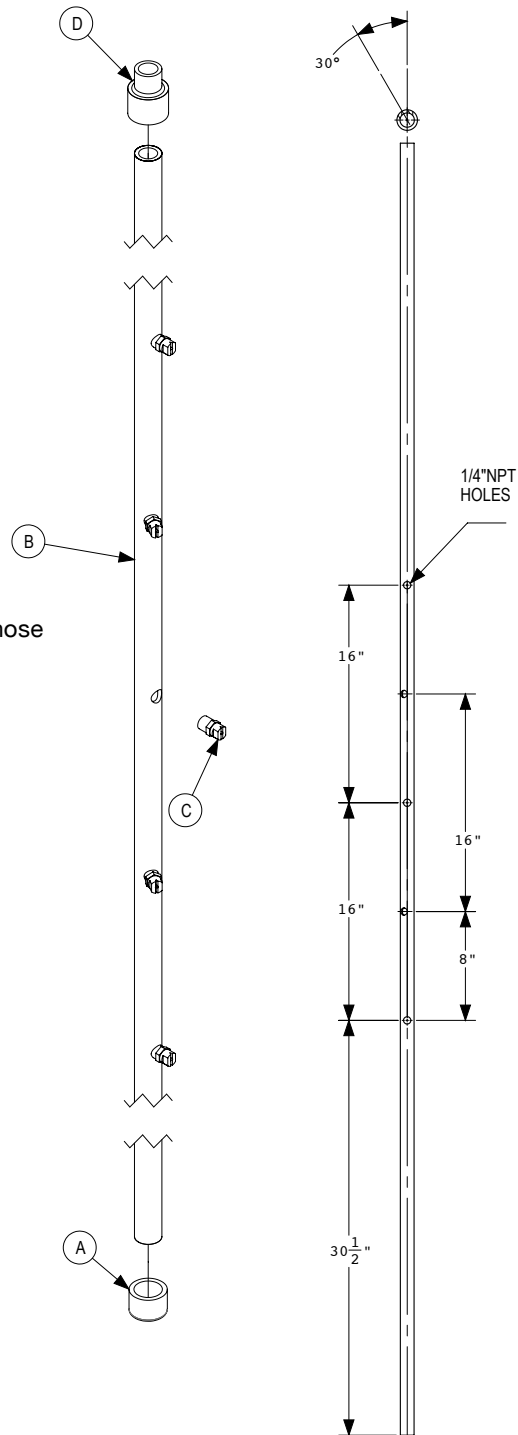
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PVC Plumbing Manifold

Detergent Vertical Section



**DETERGENT
SUPPLY MANIFOLD
WITH SOLENOID
VALVE AND DEMA
INJECTOR**



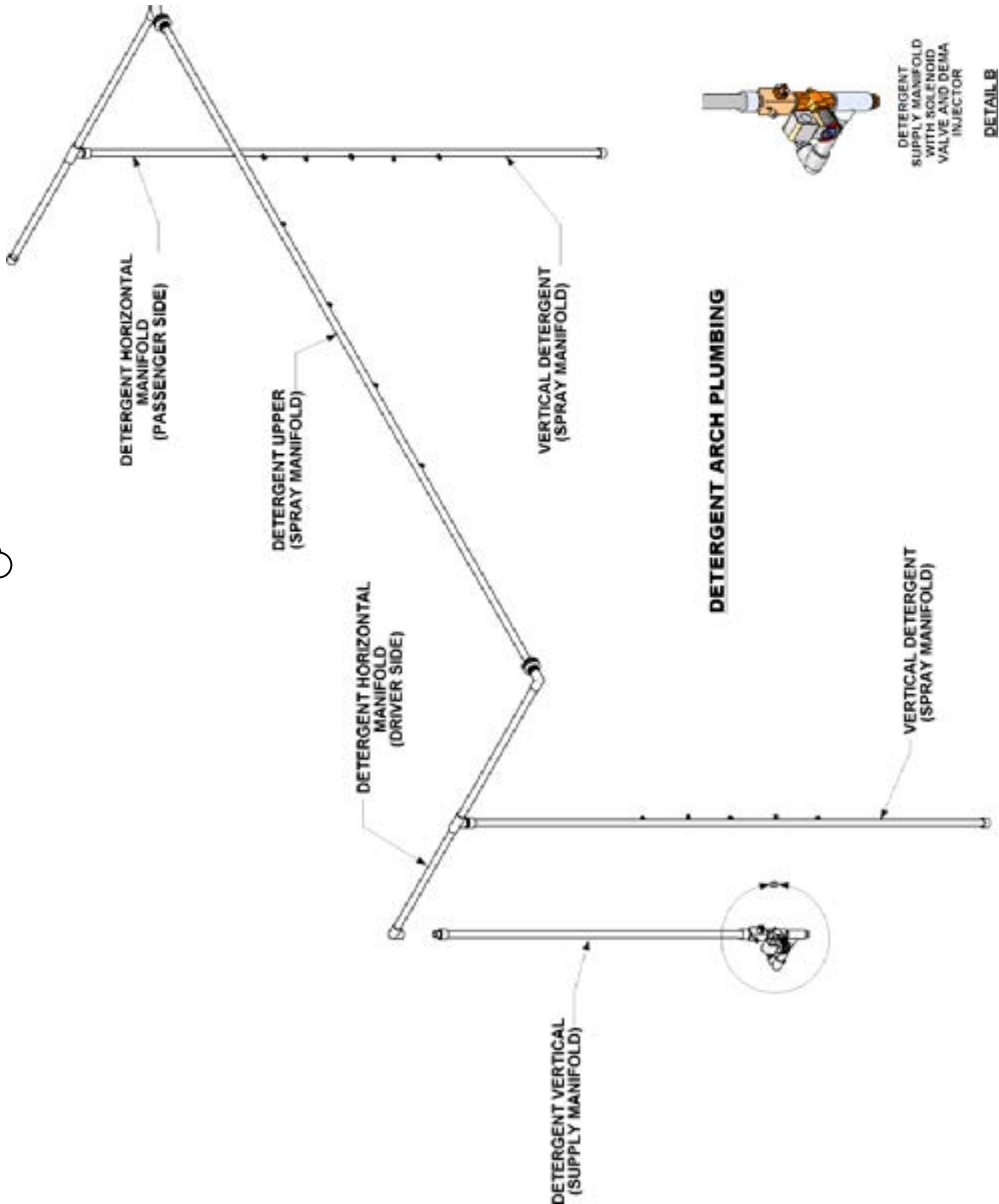
Item	Part Number	Description	Qty
A	415-1505	CAP, 3/4" PVC SCH80	1
B	150-2100	PIPE, 3/4" PVC SCH 80 X 95" 1	
C	510-0031	NOZZLE, 4010 BRASS VEEJET	5
D	400-0030	MALE ADAPTER, 3/4" PVC SCH 80 (S X T)	1



PVC Plumbing

Detergent Arch

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DETERGENT ARCH PLUMBING

DETAIL B

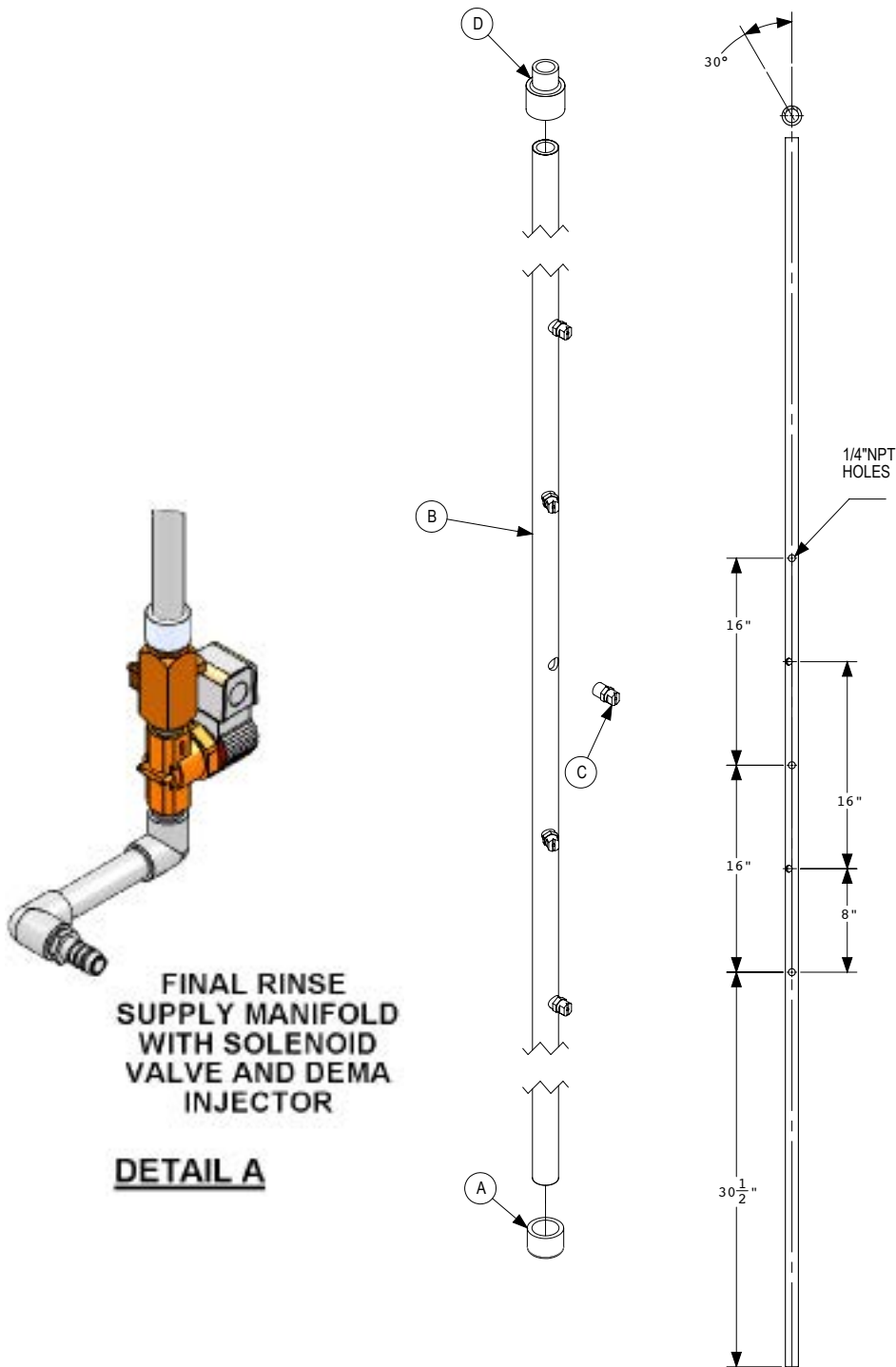
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PVC Plumbing Manifold

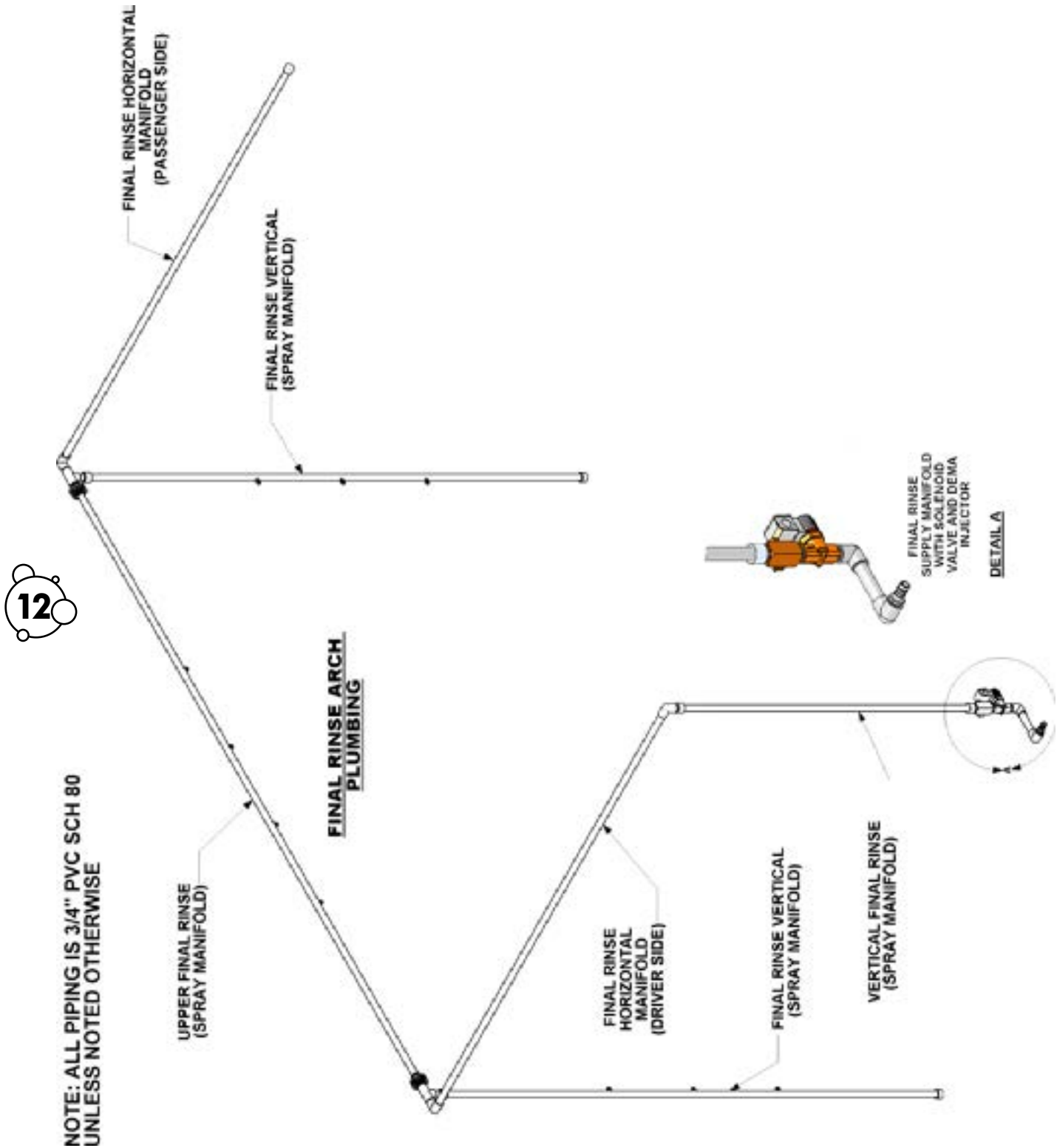
Final Rinse Vertical Section



Item	Part Number	Description	Qty
A	415-1505	CAP, 3/4" PVC SCH80	1
B	150-2100	PIPE, 3/4" PVC SCH 80 X 95" 1	1
C	510-0031	NOZZLE, 4010 BRASS VEEJET	5
D	400-0030	MALE ADAPTER, 3/4" PVC SCH 80 (S X T)	1

PVC Plumbing

Final Rinse



NOTE: ALL PIPING IS 3/4" PVC SCH 80 UNLESS NOTED OTHERWISE

FINAL RINSE ARCH PLUMBING



FINAL RINSE SUPPLY MANIFOLD WITH SOLENOID VALVE AND DEMA INJECTOR
DETAIL A



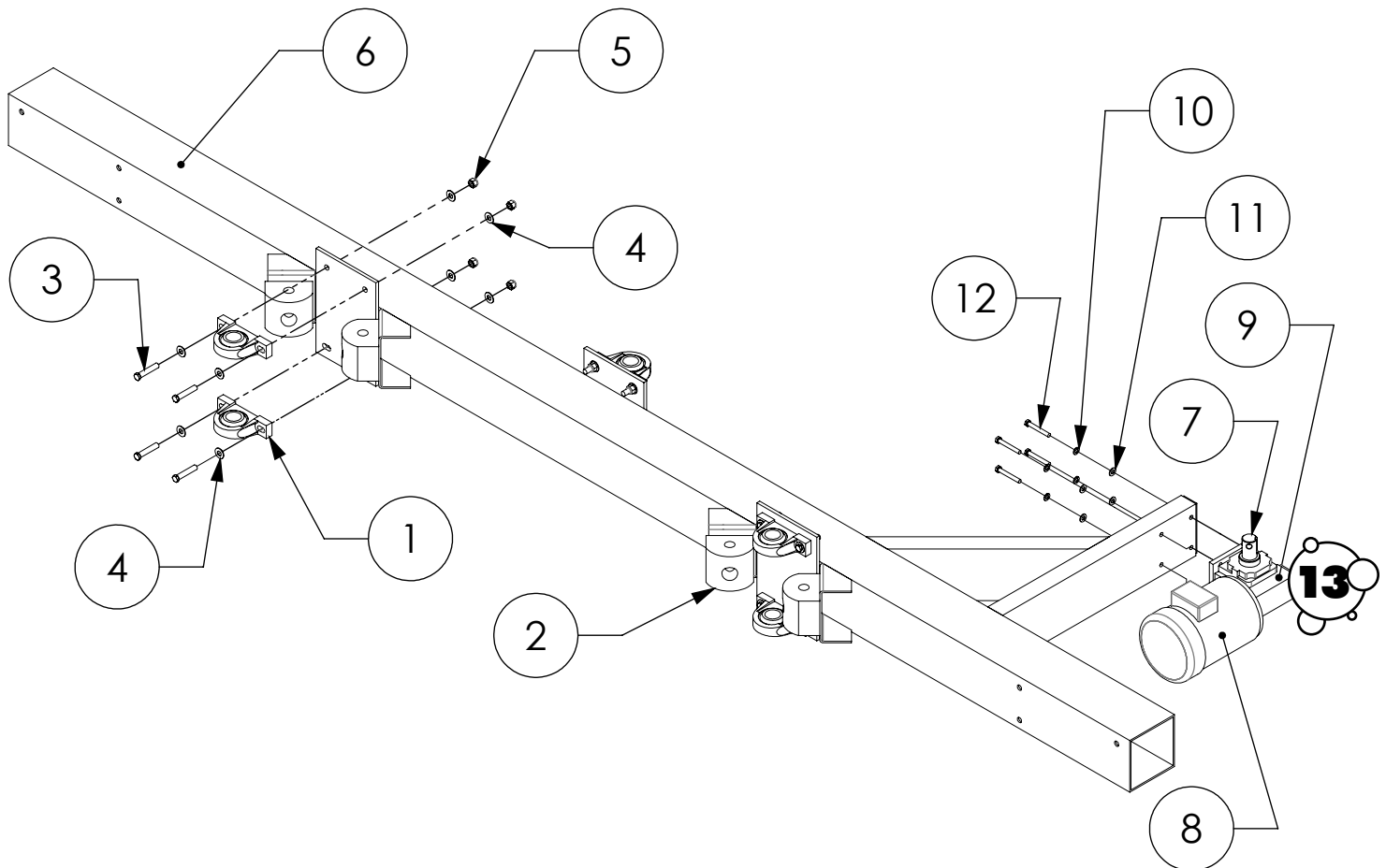
VERTICAL FINAL RINSE (SPRAY MANIFOLD)

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Top Bulkhead Assembly



Item	Part Number	Description	Qty
1	610-1710	1-1/2" Uhmw Bearing	6
2	640-1603	Rubber, 4-3/4" Sq. Bumper	4
3	820-1535	Cap Screw, 1/2 X 2 1/2"	12
4	870-1400	Flat Washer, 1/2" X 1 1/6"	24
5	840-2000	1/2" Lock Nut Nylon Insert	12
6	900-0449	Brush & Scrubber Bulkhead 3/16"x6"x6"x150" -Al	1
7	235-2132a	Hollow Shaft	1
8	212-1004	Motor, 1/2 Hp 3/4" Shaft	1
9	235-2134	Gearbox - (40 : 1 Ratio)	1
10	870-1350	Lock Washer, 3/8"	4
11	870-1300	3/8" Flat Washer	4
12	820-1445	Cap Screw, 3/8 X 2 3/4"	4

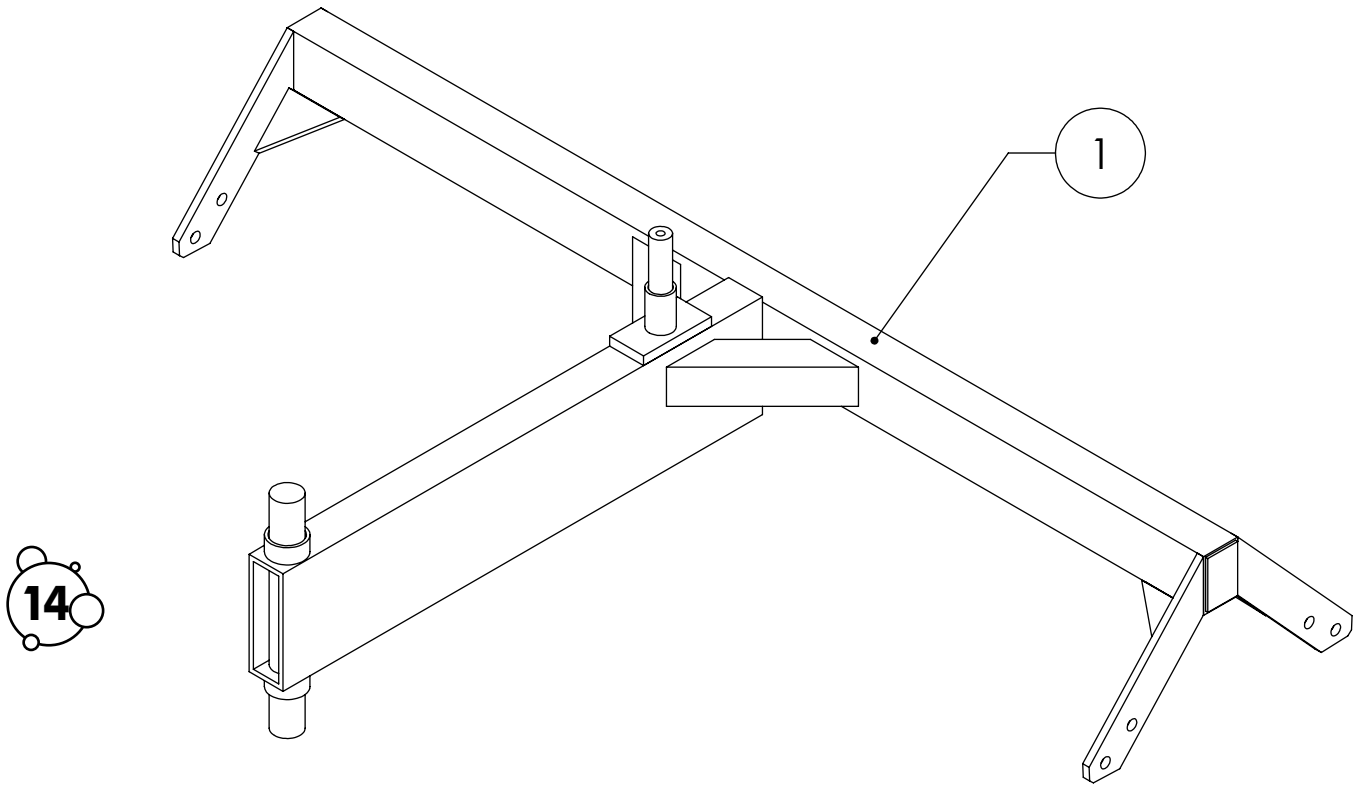
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Mitter Arm Assembly



<i>Item</i>	<i>Part Number</i>	<i>Description</i>	<i>Qty</i>
1	900-0471	Mitter Rack Arm	1

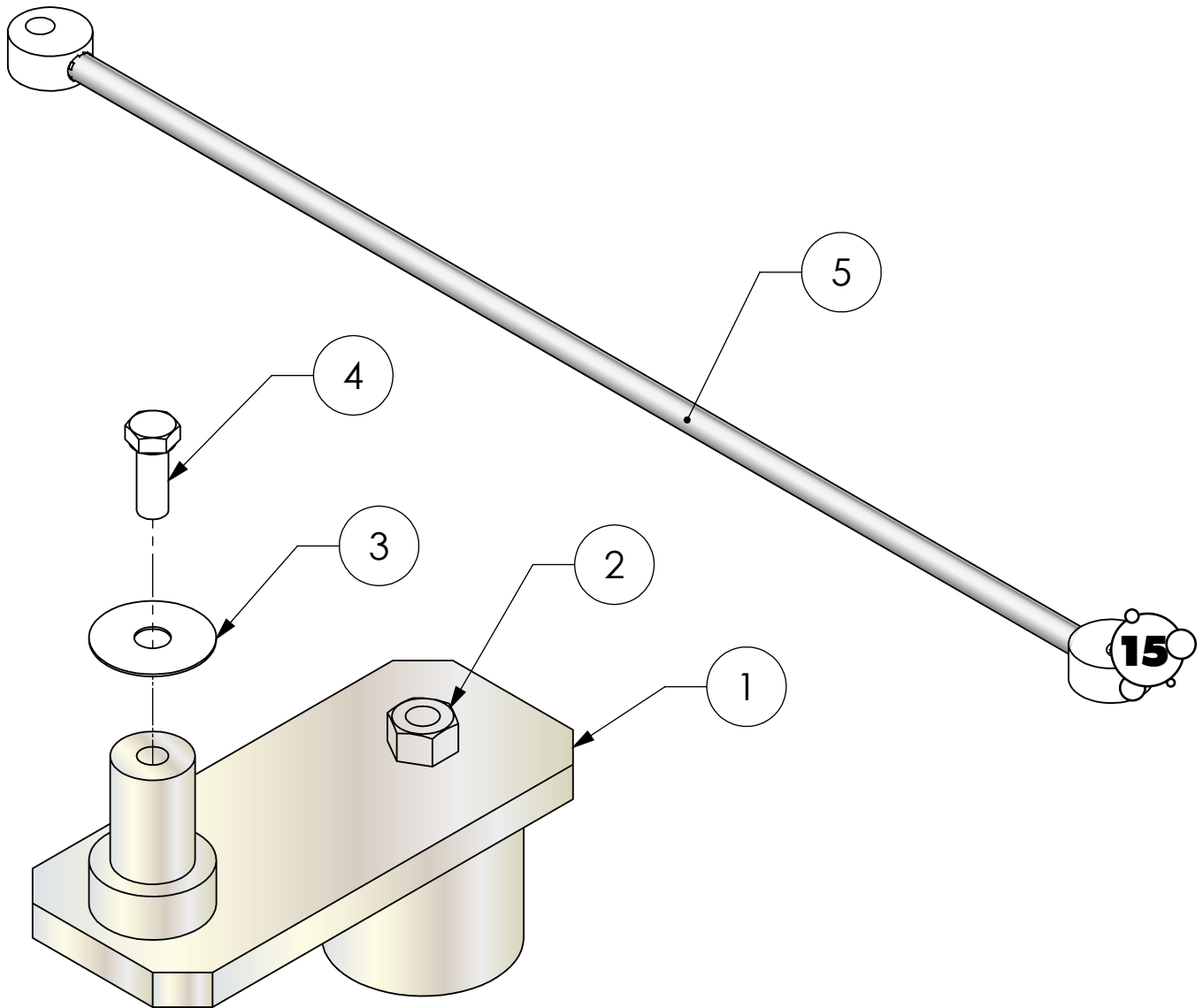
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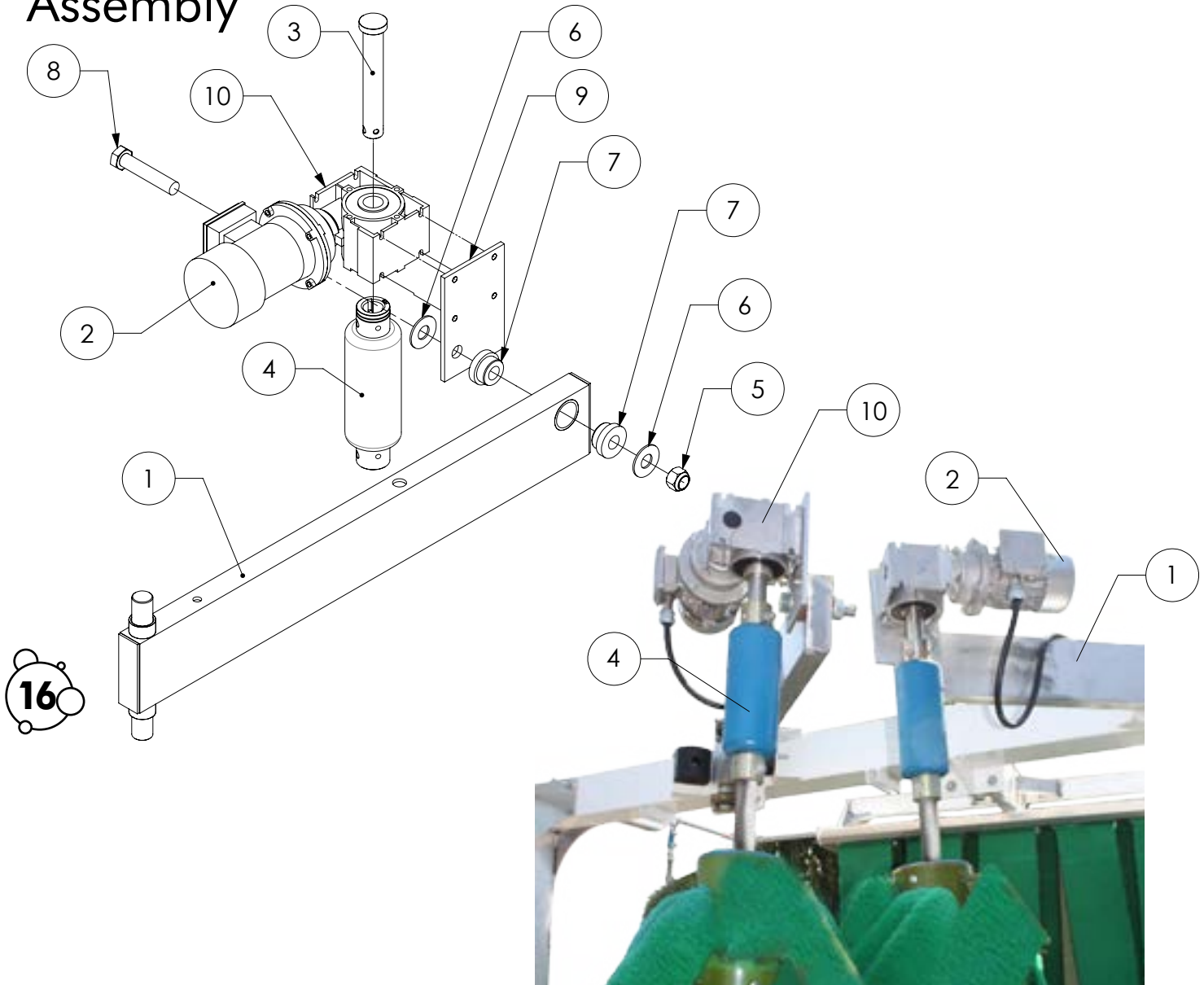
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Crank Arm Miter Assembly



Item	Part Number	Description	Qty
1	900-0550	CRANK, MITTER SIDE TO SIDE	1
2	840-1300	1/2"-13 HEX NUT ZINC PLATED	1
3	870-1311	WASHER, 3/8" X 1 1/2" O.D.	1
4	820-1410	CAP SCREW, 3/8 X 1"	1
5	900-0462	CRANK LINKAGE W/ UHMW BEARING	1

Wrap Brush Arm Assembly



Item	Part Number	Description	Qty
1	630-1043	PASSENGER WRAP ARM	1
1	630-1044	DRIVER WRAP ARM	1
2	212-1004	1/2HP MOTOR	1
3	235-2132B	HOLLOW SHAFT	1
4	766-1000	PASSENGER COUPLING	1
4	766-2000	DRIVER COUPLING	1
5	840-5003	NUT LOCK, 1" NYLON INSERT	1
6	870-1700	FLAT WASHER, 1"	2
7	900-0006	BUSHING - UHMW - 2-1/2" O.D. x 1-1/16" I.D. x 1-1/4" LG.	2
8	820-1561	CAP SCREW, 1" X 5-1/2"	1
9	630-1029	BREAK PLATE - NORD	1
10	235-2133	GEAR REDUCER 30:1 (FOR LAMMSCLOTH)	1
10	235-2132	GEAR REDUCER 15:1 (FOR FIBER)	1

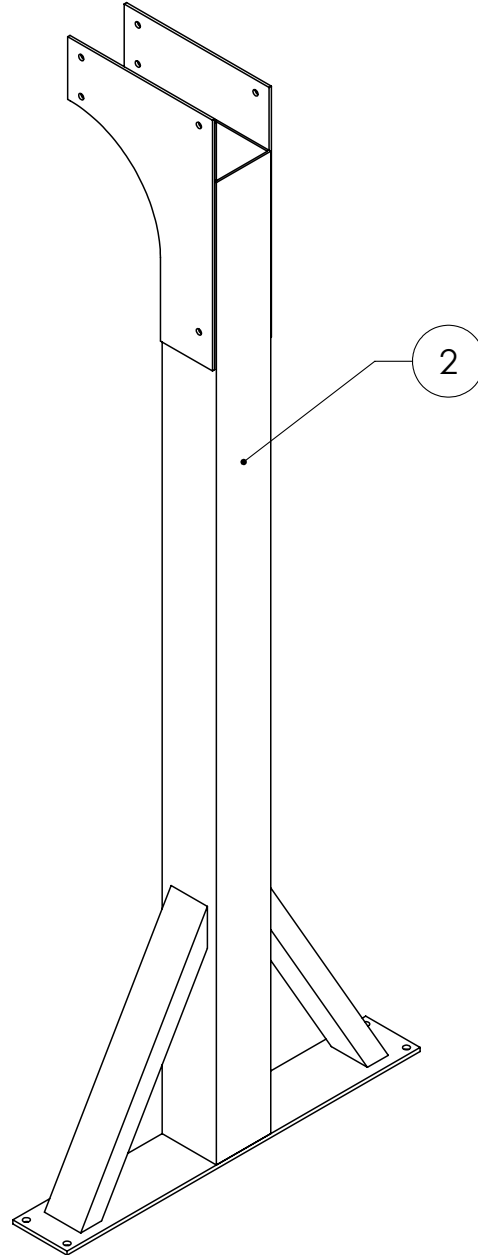
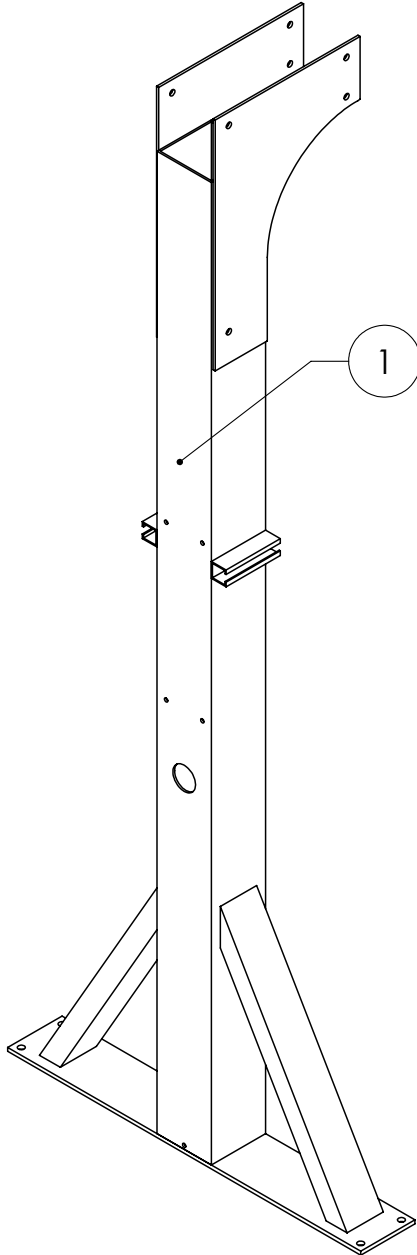
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Unit Leg Assembly

Passenger & Driver Sides



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<i>Item</i>	<i>Part Number</i>	<i>Description</i>	<i>Qty</i>
1	900-0260	Driver's Side Leg	1
2	900-0261	Passenger's Side Leg	1

Electrical Schematics

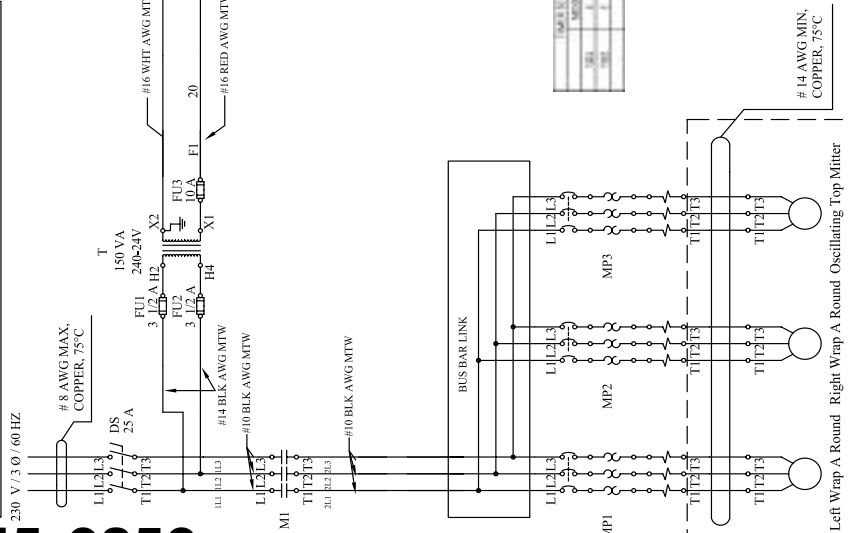
Fuse Chart

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FUSE CHART	
FU1	3 1/2 A, 600 V
FU2	3 1/2 A, 600 V
FU3	10 A, 250 V

Notes:
 a) FU1 & FU2 (Primary Fuses) to be Time Delay Rejection Type Littelfuse Class "CC", KLDOR or Equal from Other Manufacturer.
 b) FU3 (Secondary Fuse) to be Time Delay, Supplementary Fuse, Littelfuse FLM or Equal from Other Manufacturer.
 Notes:
 1) All wires lead to Terminal Blocks takes Terminal Block Number.
 2) Use copper wire 75 degrees Celsius typical.

Provide branch short circuit and ground fault protection per NEC 450-53C follow the main fuse or main circuit breaker selection. Main Disconnect Provided BY OTHERS



WIRE	SIZE	COLOR	TERMINAL
1	#14 AWG	BLK	1
2	#14 AWG	BLK	2
3	#14 AWG	BLK	3
4	#14 AWG	BLK	4
5	#14 AWG	BLK	5
6	#14 AWG	BLK	6
7	#14 AWG	BLK	7
8	#14 AWG	BLK	8
9	#14 AWG	BLK	9
10	#14 AWG	BLK	10
11	#14 AWG	BLK	11
12	#14 AWG	BLK	12
13	#14 AWG	BLK	13
14	#14 AWG	BLK	14
15	#14 AWG	BLK	15
16	#14 AWG	BLK	16
17	#14 AWG	BLK	17
18	#14 AWG	BLK	18
19	#14 AWG	BLK	19
20	#14 AWG	BLK	20

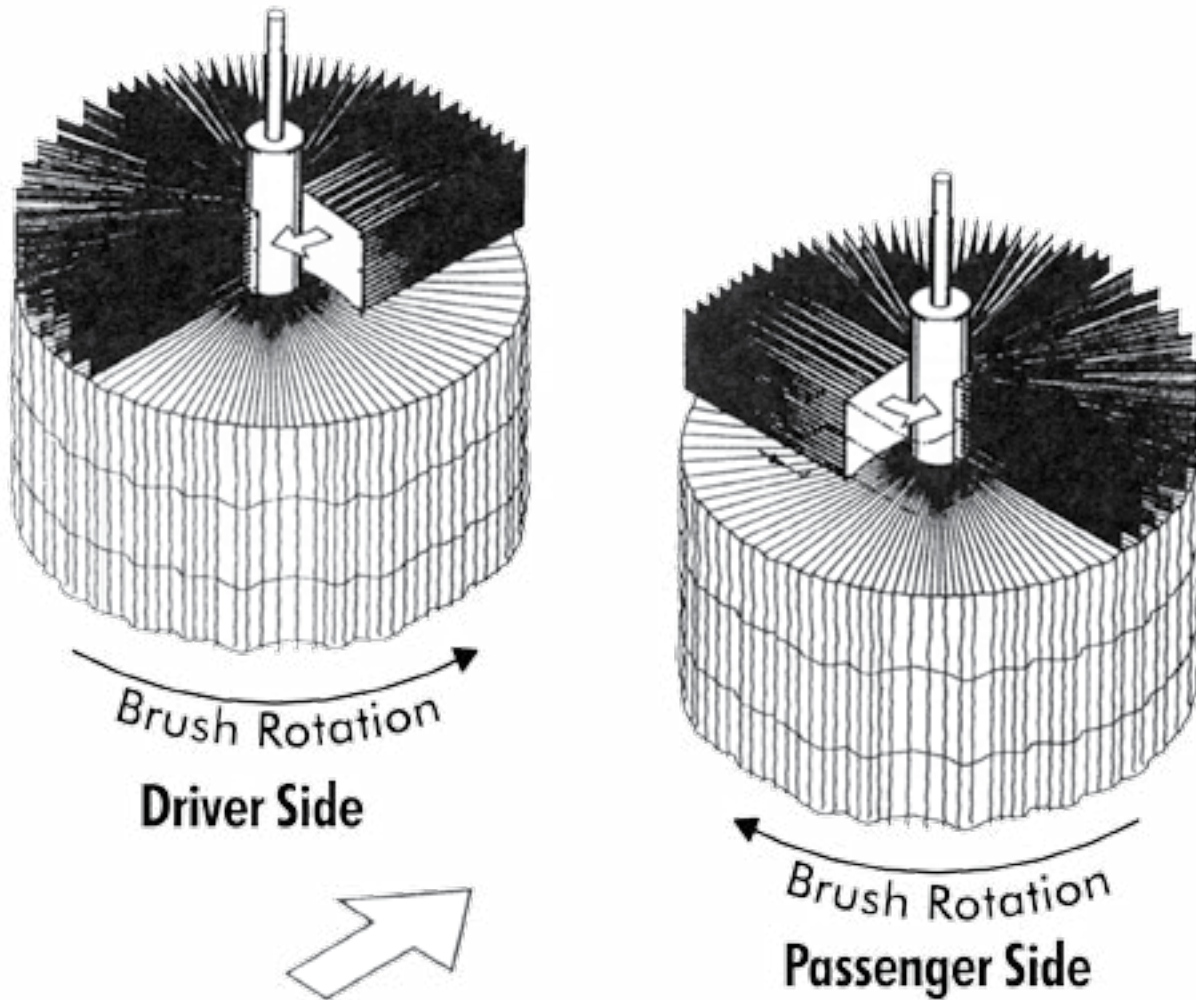
#14 AWG MIN. COPPER, 75°C

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Flex-A-Round Brush Pelt Installation

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*P*elt Installation Procedure

1. Insert an ice pick or similar tool into center hole on thick end of pelt and into corresponding hole in shaft
2. Wrap Pelt around shaft in direction indicated in diagram
3. Slip thin end of pelt under thick end and insert pick through the center hole and back into the shaft
4. Fasten rivets into top and bottom holes. Remove pick and fasten center rivet.

IMPORTANT

Pelt Will Rip Off if Not installed in direction as shown above.

Prior to Start Up

Check List

Turn off power to machine

Check brush drive system

This is accomplished by placing a hand on each side of the brush and slowly turning one way and then the other. There should be no free play between the motor gear reducer and brush.

Check brush arm movement

Be sure the arm mount bearing bolts are tight and the arms move freely.

Check brush gear reducers

Be sure to check that:

All motor mount bolts are tight and motors are not leaking oil excessively some leakage can occur. This oil should be wiped off periodically to prevent it from getting into the brush or on the vehicle. Excessive leakage can cause gear reducer damage.

Visually check brush pads

N/S brushes are assembled in sections called pads or pelts; if something catches the brush it will remove the pad rather than cause damage to the vehicle.

If a pad is missing, it should be replaced immediately.

Never operate the wash with missing pads, vehicle or equipment damage can occur.

It should be noted that a torn pad is abnormal. If it occurs frequently, we recommend an investigation of the vehicles being washed to determine what is catching the pad.

Visually check brush for entangled objects

Objects entangled in a brush can cause severe damage.

Visually check all plumbing lines

Any missing nozzles should be replaced immediately. Plugged nozzles should be cleared.

Check all flexible electric lines & Plumbing

Be sure no line is in a position to rub during machine operation.

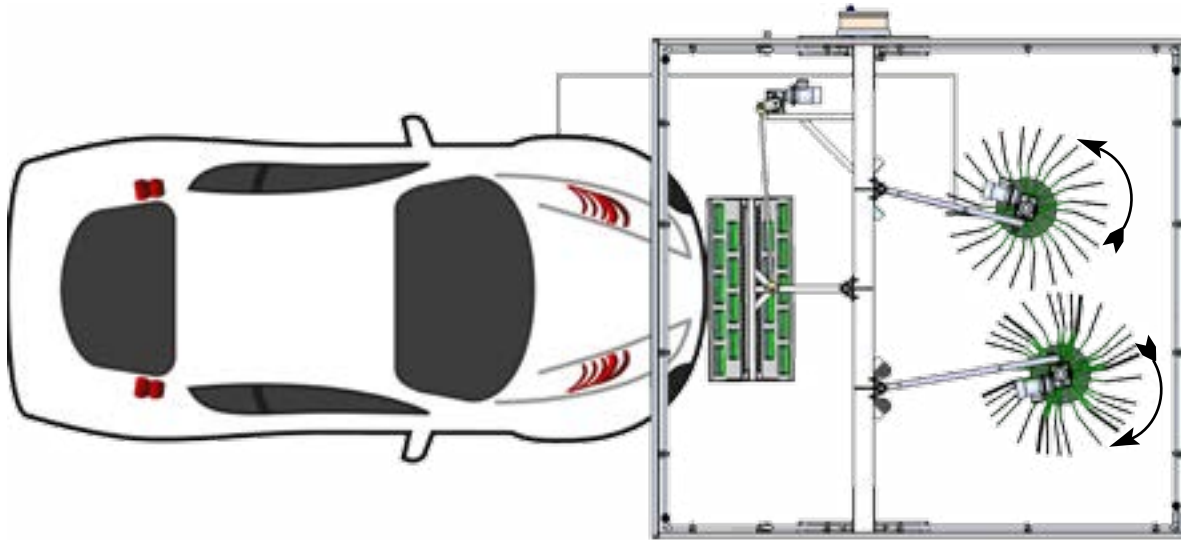
Vent plugs and weep holes

All vent plugs must be located at the top position on the gear reducers. All weep holes in motor housing must be at the lowest point to provide proper drainage of consideration.



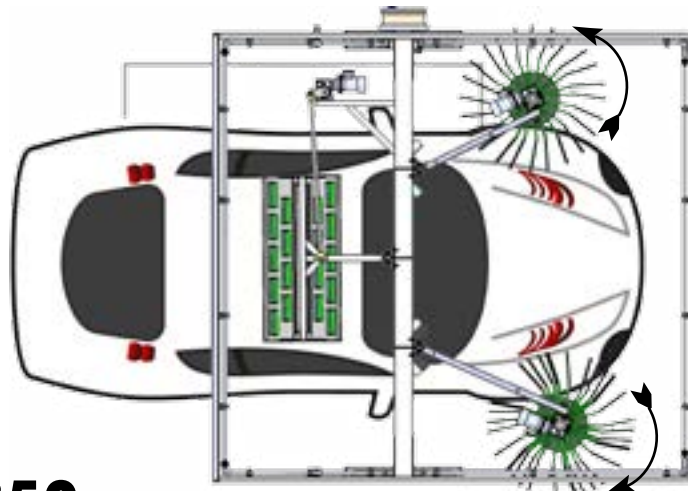
Drive thru the wash system very slowly.

Keep the tire of the vehicle between the guide rails. When activated, the system will start and the detergent will be sprayed over the vehicle. If water pressure is low it may take a few seconds for the detergent water to start flowing thru the entry arch. Do not proceed into wash until detergent water is flowing properly onto the vehicle, covering hood, roof and rear deck area. After going through the detergent arch proceed to the brushes.

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When the vehicle comes in contact with brushes

Stop for a moment to allow more time for the brushes to clean the front grill area then proceed very slowly to allow the brushes to move slowly around the front corner of the fenders. The left brush will move around the corner first then the right brush. A momentary stop as each brush rounds the corner will aid front fender cleaning. The brushes are designed to clean around extended mirrors and other protrusions, however, it is not advised to let brushes linger on mirrors, antennas or exhaust stacks.

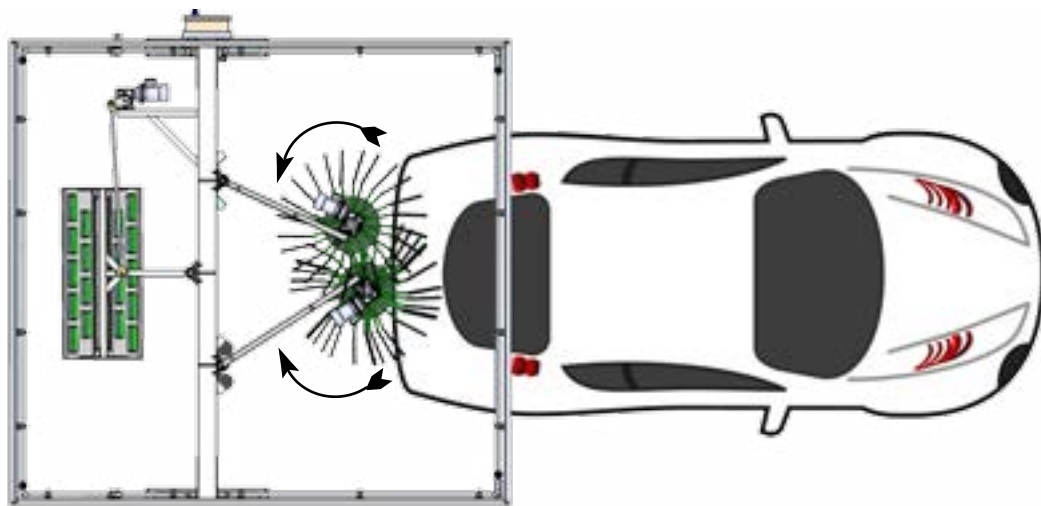


Wash Procedure

Continued

Continue through system slowly.

The front/rear mitter will clean the hood, roof and rear deck area and the rocker panel brushes will clean the rocker panel area of the vehicle while the Flex-A-Round brushes are moving along the side of the vehicle. As the brushes move around the rear corner of the vehicle, a momentary stop is advised first as the left brush rounds the corner then again as the right brush rounds the corner, this will aid in cleaning the rear of the vehicle.



The vehicle should proceed slowly through the rinse arch
Allowing the rinse to thoroughly cover the hood area before proceeding through and on out of the system. The time of the wash process will vary depending on the size of the vehicle and driver speed. Although driver speed should vary slightly on condition of the vehicle, the recommended wash time for a standard automobile is 60 to 90 seconds and for vans, 90 to 120 seconds.

Daily Walk-Through Inspection

A Daily walk through inspection must be performed on the wash system (preferably by the same individual) each day.

Turn Off The Power To The Machine

Check Brush Drive And Arm Movement

This is accomplished by placing a hand on each side of the brush and slowly turning one way and then the other. *There should be very little play between the brush and motor gearbox.* The BRUSH ARMS should open freely.

Checking Motors And Bearings

Be sure all motor mounts and bearing bolts are tight and motors are not leaking oil excessively; some leakage does occur. This oil should be wiped off periodically to prevent it from getting into the brush.

Visually Check Brush Pads

N/S brushes are assembled in sections called pads or pelts. If something catches the brush, it will remove the pad rather than cause damage to the vehicle. If a pad is missing, it should be replaced immediately (never operate the wash with missing pads.)



Check The Bay For Cleanliness

The bay area should be presentable and clean. Clean out trench and sand trap as required. Also, sweep out debris in bay area and pick up any foreign objects.

Visually Check For Foreign Objects

All debris and tools, including extension cords, should be cleared from the wash area. Note: When brushes start spinning, they can pick up any loose item and turn it into a projectile.

Check Soap Level

Inspect soap container to be sure there is an adequate supply. Add as necessary, being sure to use an approved soap. Proper soap and soap application is important in assuring the best cleaning and longest brush life possible.

Daily Walk-Through Inspection

Continued

Turn Power On/ Start Wash System

Visually Check Brush System

Brushes should turn smoothly. There should be no unusual noises (not present the day before). There should be no missing brush pads.

Visually Check Detergent And Rinse Arches

Water and detergent flow to the detergent arch, brush applicators and the rinse arch should be even and unimpaired. Plugged nozzles should be cleared.

Run Vehicle Through Wash System

Check proper brush movement on vehicle and proper wash solution and rinse solution flow on vehicle. It is recommended that the same person performing maintenance put the first vehicle through to test the system. Note: If a problem is spotted at an early stage, it will probably require nothing more than a minor adjustment. If not attended to, a minor problem can turn into a major problem and an expensive service call.



Turn Power On.

Activate Wash System

Visually Check Brush System
Brushes should turn smoothly. Check brush rotation. There should be no unusual noises. There should be missing brush pads.

Visually Check Detergent And Rinse Arches.
Water and detergent flow to the detergent arch, brush applicators and the rinse arch should be even and unimpaired. (No plugged nozzles).

Check Vehicle Through Wash System.
Check proper brush movement on vehicle and proper wash solution and rinse solution flow on vehicle.



NOTE:
If a problem is spotted at an early stage it will probably require nothing more than a minor adjustment. If not attended to, a minor problem can turn into a major breakdown and an expensive service call.

Preventive Maintenance Recommendations

Maintain all electric motor units, gear reducer units and any pumping units as prescribed in their perspective catalogs, located at the end of this section.

Tighten all nuts, bolts and set screws, daily for the first two weeks and weekly thereafter.

On a weekly basis: Check seals on gear reducers for any visible leakage. Check oil level in gear reducers monthly. *Change the oil in the gear reducer every 3-4 months depending on usage.* Do not overfill gear reducer. Use 90W gear oil or manufacturers recommendations. See recommendations located at the end of this section that have high usage it is recommended that the chemical be checked twice a day. On a daily basis check the guide rails for free movement. Prior to start-up of equipment. The guide rails should be able to rotate freely. Read this manual carefully, as it is important to know the general workings of the machine to facilitate overall good maintenance and proper operation of the machine.

It is recommended that all bearings be checked for free movement prior to start-up of equipment.



All electrical components are subject to damaging moisture and corrosion. To prevent premature failure of electrical parts the factory recommends spraying a non-conductive water displacing solution in all junction boxes, motor terminal blocks and on all components in the electrical panel box. All electrical parts are sprayed with a moisture displacing compound at the factory and are ready for operation. Electrical parts should coat or sprayed at the end of three months following the initial start-up of the system and every six months thereafter.

It is recommended that the chemical be checked once a day for locations that have normal usage, for locations that have high usage it is recommended that the chemical be checked twice a day.

On a daily basis check the guide rails for free movement. Prior to start-up of equipment. The guide rails should be able to rotate freely.

Read this manual carefully, as it is important to know the general workings of the machine to facilitate overall good maintenance and proper operation of the machine.

Note: Before doing any electrical work on the system, deactivate unit by turning the safety lock control breaker located on the front of the panel to the off position.

No water to Pre-Applicator Cause:

Possible Causes:

- System is not turned on
- Activator hose broken or plugged
- Activation switch is not operating
- Wire leads to solenoid valve are broken
- Solenoid controlling water to pre-rinse section is not operating.
- Electric eyes are not working

No soap to Pre-Applicator

Possible Causes:

- No soap/chemical in chemical tank
- Spray nozzles are plugged
- Chemical line leading to injector is plugged
- Metering screw on injector is not open
- Injector is not operating

Brushes or curtains not operating when system is on

Possible Causes:

- Motor rotation is being interfered with.
- Motor switch in panel box is not on
- Motor starter needs to be reset
- Motor starter needs new heaters
- Motor starter is failing
- Wire leads are broken between starter and motor
- Motor is failing
- Drive linkage between motor and component is broken

No water to rinse arch section

Possible Causes:

- System is not on
- Activator is not operating
- Activator switch is not operating
- Wire leads to or from switch are broken
- Wire leads to solenoid valve are broken
- Solenoid valve controlling water to rinse section is not operating



Daily Maintenance

Schedule

Month

MONDAY
TUESDAY
WEDNESDAY
THURSDAY
FRIDAY
SATURDAY
SUNDAY

Wands/ Electric Eyes

Electric Eyes	Inspect/clean	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Limit Switch	Inspect/clean	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Nozzles

All Arches	Inspect/clean	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Hoses

All Arches	Inspect	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Air Cylinder

Wrap Around Brushes	Inspect	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Brush Operation

Wrap Around Brushes	Inspect	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Front To Rear Top Mitter	Inspect	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Top Brush Inspect		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rocker Panel Brushes	Inspect	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Side To Side Top Mitter	Inspect	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Pump Operation

Wash Pumps	Inspect	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rinse Pumps	Inspect	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Transfer Pumps	Inspect	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chemical Pumps	Inspect	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Air Panels

Air Regulators		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Completed By:

Comments:

- Before performing any electrical work on the system lock out the system by turning the main disconnect switch located on the front of the appropriate panel to the "off" position.
- For spare parts and lubricant recommendations refer to DW 245-0350-47

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Weekly Maintenance

Schedule

Month

Gearboxes

	WEEK of	WEEK of	WEEK of	WEEK of
Oil Seals Inspect/clean	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Couplings Inspect	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Pneumatic System

Air Cylinder Lines	Inspect	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Air Limit Switch Lines	Inspect	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Hydraulic Power Pacs

Oil Level	Inspect/ fill	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Oil Filter	Inspect/clean	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hoses/ lines/ fittings	Inspect/clean	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Brush Operation

Gearbox Oil Seals	Inspect/fill	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Couplings	Inspect/clean	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bearings	Inspect	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Float Switches

Sump Pit	Inspect	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Storage Tanks	Inspect	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Air Panels

Air Regulators	Inspect/adjust	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Completed By:

- Before performing any electrical work on the system lock out the system by turning the main disconnect switch located on the front of the appropriate panel to the "off" position.
- For spare parts and lubricant recommendation refer to "OM Catalogs" pages 33-47

Comments:

Monthly Maintenance Schedule

YEAR

Month of

Solenoid Valves

Water Lines	Inspect	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chemical Lines	Inspect	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Air Lines	Inspect	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Anchor Bolts

Brush Machine Columns	Tighten	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
All Spray Arches	Tighten	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Brush Operation

Gear Box Oil Level	Inspect/Refill	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bearings	Lubricate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coupling	Inspect	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Air Panels

Air Oil Lube System	Inspect/Refill	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Air Regulators	Inspect/Adjust	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Completed By:

- Before performing any electrical work on the system lock out the system by turning the main disconnect switch located on the front of the appropriate panel to the "off" position.
- For spare parts and lubricant recommendation refer to "OM Catalogs" pages 33-47

Comments:

Biyearly Maintenance Schedule

YEAR

Month of

Wash Pumps

Motor	Lubricate	<input type="radio"/>	<input type="radio"/>
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Rinse Pumps

Motor	Lubricate	<input type="radio"/>	<input type="radio"/>
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Transfer Pumps

Motor	Lubricate	<input type="radio"/>	<input type="radio"/>
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Brush Operations

Motor	Lubricate	<input type="radio"/>	<input type="radio"/>
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Gearbox Oil	Replace	<input type="radio"/>	<input type="radio"/>
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VEHICLE WASH COUNTER	<input type="radio"/>	<input type="radio"/>
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Completed By:

Comments:

- Before performing any electrical work on the system lock out the system by turning the main disconnect switch located on the front of the appropriate panel to the "off" position.
- For spare parts and lubricant recommendation refer to "OM Catalogs" pages 33-47

Baldor AC Induction Motors

Re-lubrication & Recommendations

WARNING: UL Listed motors must only be serviced by UL Approved Authorized Baldor Service Centers if these motors are to be returned to a hazardous and/or explosive atmosphere.

General Inspection Inspect the motor at regular intervals, approximately every 500 hours of operation or every 3 months, whichever occurs first. Keep the motor clean and the ventilation openings clear. The following steps should be performed at each inspection:

WARNING: Do not touch electrical connections before you first ensure that power has been disconnected. Electrical shock can cause serious or fatal injury. Only qualified personnel should attempt the installation, operation and maintenance of this equipment.

1. Check that the motor is clean. Check that the interior and exterior of the motor is free of dirt, oil, grease, water, etc. Oily vapor, paper pulp, textile lint, etc. can accumulate and block motor ventilation. If the motor is not properly ventilated, overheating can occur and cause early motor failure.
2. Use a "Megger" periodically to ensure that the integrity of the winding insulation has been maintained. Record the Megger readings. Immediately investigate any significant drop in insulation resistance.
3. Check all electrical connectors to be sure that they are tight.

Relubrication & Bearings Bearing grease will lose its lubricating ability over time, not suddenly. The lubricating ability of a grease (over time) depends primarily on the type of grease, the size of the bearing, the speed at which the bearing operates and the severity of the operating conditions. Good results can be obtained if the following recommendations are used in your maintenance program.

Type of Grease A high grade ball or roller bearing grease should be used. Recommended grease for standard service conditions is **Polyrex EM (Exxon Mobil)**. Do not mix greases unless compatibility has been checked and verified.

Equivalent and compatible greases include:
Texaco Polystar, Rykon Premium #2, Pennzoil Pen 2 Lube and Chevron SRI.



Relubrication Intervals Recommended relubrication intervals are shown in Table 3-1. It is important to realize that the recommended intervals of Table 3-1 are based on average use.

Refer to additional information contained in Tables 3-2, 3-3 and 3-4.

Table 3-1 Relubrication Intervals *

NEMA / (IEC) Frame Size	Rated Speed - RPM					
	10000	6000	3600	1800	1200	900
Up to 210 incl. (132)	**	2700 Hrs.	5500 Hrs.	12000 Hrs.	18000 Hrs.	22000 Hrs.
Over 210 to 280 incl. (180)		**	3600 Hrs.	9500 Hrs.	15000 Hrs.	18000 Hrs.
Over 280 to 360 incl. (225)		**	* 2200 Hrs.	7400 Hrs.	12000 Hrs.	15000 Hrs.
Over 360 to 5800 incl. (300)		**	*2200 Hrs.	3500 Hrs.	7400 Hrs.	10500 Hrs.

* Relubrication intervals are for ball bearings.

For vertically mounted motors and roller bearings, divide the relubrication interval by 2.

** For motors operating at speeds greater than 3600 RPM, contact Baldor for relubrication recommendations.

Baldor AC Induction Motors Re-lubrication & Recommendations

Severity of Service	Hours per day of Operation	Ambient Temperature Maximum	Atmospheric Contamination
Standard	8	40° C	Clean, Little Corrosion
Severe	16 Plus	50° C	Moderate dirt, Corrosion
Extreme	16 Plus	>50° C* or Class H Insulation	Severe dirt, Abrasive dust, Corrosion, Heavy Shock or Vibration
Low Temperature		<-29° C **	

* Special high temperature grease is recommended (Dow Corning DC44). Note that Dow Corning DC44 grease does not mix with other grease types. Thoroughly clean bearing & cavity before adding grease.

** Special low temperature grease is recommended (Aeroshell 7).

Table 3-3 Relubrication Interval Multiplier

Severity of Service	Multiplier
Standard	1.0
Severe	0.5
Extreme	0.1
Low Temperature	1.0

Some motor designs use different bearings on each motor end. This is normally indicated on the motor nameplate. In this case, the larger bearing is installed on the motor Drive endplate. For best relubrication results, only use the appropriate amount of grease for each bearing size (not the same for both).

Table 3-4 Bearings Sizes and Types

Frame Size NEMA (IEC)	Bearing Description (These are the "Large" bearings (Shaft End) in each frame size)			
	Bearing	Weight of Grease to add * oz (Grams)	Volume of grease to be added	
			in ³	teaspoon
56 to 140 (90)	6203	0.08 (2.4)	0.15	0.5
140 (90)	6205	0.15 (3.9)	0.2	0.8
180 (100-112)	6206	0.19 (5.0)	0.3	1.0
210 (132)	6307	0.30 (8.4)	0.6	2.0
250 (160)	6309	0.47 (12.5)	0.7	2.5
280 (180)	6311	0.61 (17)	1.2	3.9
320 (200)	6312	0.76 (20.1)	1.2	4.0
360 (225)	6313	0.81 (23)	1.5	5.2
400 (250)	6316	1.25 (33)	2.0	6.6
440 (280)	6319	2.12 (60)	4.1	13.4
5000 to 5800 (315-450)	6328	4.70 (130)	9.2	30.0
5000 to 5800 (315-450)	NU328	4.70 (130)	9.2	30.0
360 to 449 (225-280)	NU319	2.12 (60)	4.1	13.4
AC Induction Servo				
76 Frame 180 (112)	6207	0.22 (6.1)	0.44	1.4
77 Frame 210 (132)	6210	0.32 (9.0)	0.64	2.1
80 Frame 250(160)	6213	0.49 (14.0)	0.99	3.3



* Weight in grams = .005 DB of grease to be added

Note: Not all bearing sizes are listed. For intermediate bearing sizes, use the grease volume for the next larger size bearing.

Baldor AC Induction Motors

Re-lubrication & Recommendations

Caution: To avoid damage to motor bearings, grease must be kept free of dirt. For an extremely dirty environment, contact your Baldor distributor or an authorized Baldor Service Center for additional information.

Relubrication Procedure Be sure that the grease you are adding to the motor is compatible with the grease already in the motor. Consult your Baldor distributor or an authorized service center if a grease other than the recommended type is to be used.

Caution: Do not over-lubricate motor as this may cause premature bearing failure.

With Grease Outlet Plug

1. With the motor stopped, clean all grease fittings with a clean cloth.
2. Remove grease outlet plug.

Caution: Over-lubricating can cause excessive bearing temperatures, premature lubrication breakdown and bearing failure.

3. Add the recommended amount of grease.
4. Operate the motor for 15 minutes with grease plug removed.
This allows excess grease to purge.
5. Re-install grease outlet plug.

Without Grease Provisions

Note: Only a Baldor authorized and UL or CSA certified service center can disassemble a UL/CSA listed explosion proof motor to maintain it's UL/CSA listing.

1. Disassemble the motor.
2. Add recommended amount of grease to bearing and bearing cavity. (Bearing should be about 1/3 full of grease and outboard bearing cavity should be about 1/2 full of grease.)
3. Assemble the motor.

Sample Relubrication Determination

Assume - NEMA 286T (IEC 180), 1750 RPM motor driving an exhaust fan in an ambient temperature of 43° C and the atmosphere is moderately corrosive.

1. Table 3-1 list 9500 hours for standard conditions.
2. Table 3-2 classifies severity of service as "Severe".
3. Table 3-4 shows that 1.2 in³ or 3.9 teaspoon of grease is to be added.

Note: Smaller bearings in size category may require reduced amounts of grease.



Table 3-5 Troubleshooting Chart

Symptom	Possible Causes	Possible Solutions
Motor will not start	Usually caused by line trouble, such as, single phasing at the starter.	Check source of power. Check overloads, fuses, controls, etc.
Excessive humming	High Voltage.	Check input line connections.
	Eccentric air gap.	Have motor serviced at local Baldor service center.
Motor Over Heating	Overload. Compare actual amps (measured) with nameplate rating.	Locate and remove source of excessive friction in motor or load. Reduce load or replace with motor of greater capacity.
	Single Phasing.	Check current at all phases (should be approximately equal) to isolate and correct the problem.
	Improper ventilation.	Check external cooling fan to be sure air is moving properly across cooling fins. Excessive dirt build-up on motor. Clean motor.
	Unbalanced voltage.	Check voltage at all phases (should be approximately equal) to isolate and correct the problem.
	Rotor rubbing on stator.	Check air gap clearance and bearings. Tighten "Thru Bolts".
	Over voltage or under voltage.	Check input voltage at each phase to motor.
	Open stator winding.	Check stator resistance at all three phases for balance.
	Grounded winding.	Perform dielectric test and repair as required.
	Improper connections.	Inspect all electrical connections for proper termination, clearance, mechanical strength and electrical continuity. Refer to motor lead connection diagram.
	Bearing Over Heating	Misalignment.
Excessive belt tension.		Reduce belt tension to proper point for load.
Excessive end thrust.		Reduce the end thrust from driven machine.
Excessive grease in bearing.		Remove grease until cavity is approximately $\frac{3}{4}$ filled.
Insufficient grease in bearing.		Add grease until cavity is approximately $\frac{3}{4}$ filled.
Dirt in bearing.		Clean bearing cavity and bearing. Repack with correct grease until cavity is approximately $\frac{3}{4}$ filled.
Vibration	Misalignment.	Check and align motor and driven equipment.
	Rubbing between rotating parts and stationary parts.	Isolate and eliminate cause of rubbing.
	Rotor out of balance.	Have rotor balance checked and repaired at your Baldor Service Center.
	Resonance.	Tune system or contact your Baldor Service Center for assistance.
Noise	Foreign material in air gap or ventilation openings.	Remove rotor and foreign material. Reinstall rotor. Check insulation integrity. Clean ventilation openings.
Growling or whining	Bad bearing.	Replace bearing. Clean all grease from cavity and new bearing. Repack with correct grease until cavity is approximately $\frac{3}{4}$ filled.



AC Induction Motors

Resistance Temperature Detectors

Suggested bearing and winding RTD setting guidelines

Most large frame AC Baldor motors with a 1.15 service factor are designed to operate below a Class B (80°C) temperature rise at rated load and are built with a Class H winding insulation system. Based on this low temperature rise, RTD (Resistance Temperature Detectors) settings for Class B rise should be used as a starting point. Some motors with 1.0 service factor have Class F temperature rise.

The following tables show the suggested alarm and trip settings for RTDs. Proper bearing and winding RTD alarm and trip settings should be selected based on these tables unless otherwise specified for specific applications.

If the driven load is found to operate well below the initial temperature settings under normal conditions, the alarm and trip settings may be reduced so that an abnormal machine load will be identified.

The temperature limits are based on the installation of the winding RTDs imbedded in the winding as specified by NEMA. Bearing RTDs should be installed so they are in contact with the outer race on ball or roller bearings or in direct contact with the sleeve bearing shell.

Winding RTDs – Temperature Limit In °C (40°C Maximum Ambient)

Motor Load	Class B Temp Rise ≤ 80°C (Typical Design)		Class F Temp Rise ≤ 105°C		Class H Temp Rise ≤ 125°C	
	Alarm	Trip	Alarm	Trip	Alarm	Trip
≤ Rated Load	130	140	155	165	175	185
Rated Load to 1.15 S.F.	140	150	160	165	180	185

Note: • Winding RTDs are factory production installed, not from Mod-Express.

• When Class H temperatures are used, consider bearing temperatures and relubrication requirements.

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Bearing RTDs – Temperature Limit In °C (40°C Maximum Ambient)

Bearing Type Oil or Grease	Anti-Friction		Sleeve	
	Alarm	Trip	Alarm	Trip
Standard*	95	100	85	95
High Temperature**	110	115	105	110

Note: * Bearing temperature limits are for standard design motors operating at Class B temperature rise.

** High temperature lubricants include some special synthetic oils and greases.

Greases that may be substituted that are compatible with Polyrex EM (but considered as “standard” lubricants) include the following:

- Texaco Polystar
- Mobilith SHC-100
- Darmex 707
- Rykon Premium #2
- Pennzoil Pennzlube EM-2
- Darmex 711
- Chevron SRI #2
- Chevron Black Pearl
- Petro-Canada Peerless LLL

See the motor nameplate for replacement grease or oil recommendation.

Contact Baldor application engineering for special lubricants or further clarifications.

Winsmith Speed Reducers Installation

I. SELECTION

The selection of the appropriate speed reducer for a given application requires that all factors affecting the operation of the unit be given careful consideration. Service factors must be applied to catalog ratings depending on the type of prime mover used, severity of the application and duration of daily service. If you have any questions relative to the suitability of your WINSMITH® speed reducer for your particular application, refer to the selection section of the appropriate WINSMITH catalog, or contact your WINSMITH representative or distributor.

II. INSTALLATION

1. Shaft Alignment

- A.** The various drive members (motor, speed reducer, couplings, sprockets, sheaves, gears, etc.) should be aligned as accurately as possible to guard against unusual stresses and overloads imposed by misalignment.
- B.** If a prime mover shaft is to be directly connected to the high speed (input) shaft or if the slow speed (output) shaft is to be directly connected to the driven shaft, flexible couplings should be used. It should be remembered that even flexible couplings have limited ability to accommodate misalignment. Care must be taken at installation to insure that shaft alignments are within the limits recommended by the coupling manufacturer. Use of a rigid coupling to connect speed reducer shafts to other drive components is not recommended as it is almost impossible to obtain exact alignment between two shafts.
- C.** A common base plate supporting the motor and reducer will help preserve the original alignment between reducer and motor shafts. If a structural steel base is used, the plate should be at least equal in thickness to the diameter of the bolts used to fasten the speed reducer to the base plate. Also, for sufficient rigidity, the design in general including angle or channel members should be substantial enough to prevent flexing under vibration. After the first week or two of operation all of the bolts and nuts used to fasten the reducer and motor, pedestal, etc., to the base plate should be retightened. Vibration tends to loosen the nuts even if tight initially. Dowelling the motor and speed reducer to the base plate will help insure that alignment is maintained.

2. Mounting Positions

- A.** Single reduction units are designed to accommodate most standard mounting positions. Figure

1 illustrates the utility plug locations for each based on model. All standard single reduction models are equipped with an internal splash shield located near the worm. This shield deflects the oil from the vent, preventing leakage when the vent plug is adjacent to the worm (as on the DT or DV standard mounting). When this location is used as a drain (as on the DV sidewall, worm under), drainage will be better facilitated if done at or near the operating temperature. Filling from this location is not recommended, as the shield will impede the oil flow rate. Bearings are splash lubricated provided the input speed is 1160 RPM or greater. Contact the factory when input speeds fall below this.

- B.** Double reduction models are built to accommodate one mounting position as specified during order entry. Standard mounting positions, furnished unless otherwise specified, are shown in Figure 2 which also illustrates the utility plug locations. Note that the mounting position relates to the main housing orientation. Standard units have an oil level common to both housings and do not use an intermediate oil seal. The vent plug is located in the main housing where the slower worm speed eliminates the need for a vent shield. Grease fittings (not shown in Figure 2) are used to lubricate bearings when oil splash does not serve this purpose (as with the DV or DL upper slow speed bearing).

3. Venting

During operation, the heat generated by the gearbox will cause the air and lubricant inside the unit to expand. A vent plug is used to equalize the resulting pressure, the location of which is dependent on the model and mounting position. Before putting the unit into service, review Figures 1 and 2 and relocate the vent plug (if necessary) as shown for the appropriate model and mounting position. Double reduction models (Figure 2) are vented in the main housing only. To prevent loss of oil during shipment, the vent plug includes a brass pin which must be removed prior to operation. If a speed reducer is installed in an atmosphere containing exceptional amounts of moisture or dust, a shielded or hooded vent plug should be used. For intermittent duty applications, where the operating temperature does not rise more than about 20 degrees F, internal pressure build-up is minimal and venting is not necessary. Some models are available with an optional internal expansion chamber allowing units to be totally sealed. Contact us for more details.



Speed Reducers

Continued - Lubrication

4. C-Flange Motor Mounting Procedures

A. Mounting Motor to C-Flange Reducer With Hollow Input Shaft

Check motor and reducer mounting registers for nicks that would interfere with assembly. Remove if necessary.

Remove protective plastic plug from reducer input shaft. The bore has been coated with an anti-seize compound.

Align the motor shaft and key with keyway in bore and slide motor up to flange.

Position the motor conduit box as desired.

Using the fasteners supplied, secure the motor to the reducer. Draw down evenly so as not to bend the motor shaft. Tighten fasteners to 200 inch pounds.

B. Mounting Motor to C-Flange Reducer With Coupling Adaptor

Check motor and reducer mounting registers for nicks that would interfere with assembly. Remove if necessary.

When assembling the motor and coupling, the coupling halves should be equally spaced on each shaft to insure adequate engagement. The following describes a method for doing this.

First determine the assembled shaft clearance by measuring the distance from the C-Flange face to the reducer shaft end and subtracting the motor shaft length. Mount and secure the motor shaft coupling half with the spider end extending one half the clearance distance beyond the motor shaft. Mount the reducer coupling half and coupling spider on reducer shaft in its approximate position but do not secure.

Locate the motor conduit box in the desired position and secure the motor to the reducer flange using the fasteners provided. Tighten to about 200 inch pounds.

Using the access hole in the flange, slide the coupling together and tighten the set screw.

5. Unit Assembly/Disassembly Instructions

Contact the factory for an instruction manual.

III. LUBRICATION & MAINTENANCE

1. Factory Filling

WINSMITH speed reducers are oil filled at the factory to the proper level for the standard mounting

position as shown in Figures 1 or 2. **The oil level should be checked and adjusted (if necessary) prior to operation, using the oil level plug provided and while the unit is oriented in its operating position.**

2. Ambient Temperature

If the operating ambient temperature is other than 51-95°F, then refer to lubrication chart and refill the unit with the correct grade based on actual ambient temperatures and operating speed. See item 3 for additional information regarding oil changes.

3. Oil Changing

When changing oil for any reason, it should be remembered that oils of various types may not be compatible. Therefore, when changing to a different oil, it is recommended that the housing be completely drained and thoroughly flushed with a light flushing oil prior to refilling with the appropriate lubricant. The oil level should be rechecked after a short period of operation and adjusted, if necessary. When changing double reduction models, each housing should be drained and filled independently, even though there may be a common level.

A. Initial Oil Change

The oil in a new speed reducer should be changed at the end of 250 hours of operation. (30 days for 8 hour per day service, 15 days for 16 hour service, 10 days for 24 hour service).

B. Subsequent Oil Changes

Under normal conditions, after the initial oil change, the oil should be changed after every 2500 hours of operation, or every six months, whichever occurs first. Under severe conditions (rapid temperature changes, moist, dirty or corrosive environment) it may be necessary to change oil at intervals of one to three months. Periodic examination of oil samples taken from the unit will help establish the appropriate interval.

C. Synthetic Oils

Synthetic lubricants can be advantageous over mineral oils in that they generally are more stable, have a longer life, and operate over a wider temperature range. These oils are appropriate for any application but are especially useful when units are subjected to low start-up temperatures or high operating temperatures. However, continuous operation above 225°F may cause damage to seals or other components. It is recommended that the initial oil be changed or filtered after the first 1500 hours of operation to remove metal particles that accumulate during break-in. Subsequent oil



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NS Wash Systems engages in continuous improvements in all its products. Any dimensions, capacities, capabilities and drawings are subject to change without notice.

Speed Reducers Continued - Maintenance

changes should be made after 5000 hours operation if units are operating in a clean environment. This can be extended to 10,000 hours if using new reformulated Mobil SHC lubricants (orange in color) and the lubricant remains free of contamination over this period. See comments under 3B for more severe ambient conditions.

4. Long Term Storage or Infrequent Operation

If a speed reducer is to stand idle for an extended period of time, either prior to installation or during use, it is recommended that the unit be filled completely with oil to protect interior parts from rust corrosion due to internal condensation. Be sure to drain the oil to the proper level before placing the speed reducer in service. A long term storage option is available on new units. Contact us for details.

5. Grease Fittings

Some units are equipped with grease fittings to lubricate bearings not adequately lubricated by the oil splash. These fittings must be lubricated every 3-6 months depending on operating conditions. Bearing greases must be compatible with the type of gear lubricant being used (ie. mineral, synthetic, food grade, etc.) For mineral oils, use a high quality lithium base NLGI #2 bearing grease. For synthetic oils, use a synthetic bearing grease such as Mobil Synthetic Universal grease, Mobilith SHC 100 or a suitable equivalent. For food grade lubricants, use Chevron FM grease, NLGI 2, or equivalent.

6. Low Input Speeds (Under 1160 RPM)

When input speeds are less than 1160 RPM, grease fittings will be required to lubricate any bearings not partially covered by the normal oil level. Such units are considered non-standard and necessitate factory modification. If this low speed operating condition exists and units are without the appropriate grease fittings, please contact the factory.

7. Oil Temperature

Speed reducers in normal operation can generate temperatures up to 200°F depending on the type of reducer and the severity of the application (loading, duration of service, ambient temperatures). Excessive oil temperatures may be the result of one or more of the following factors:

A. Overloads

Overloads may be due to the original unit selection being too small for the application, or increased loads on the speed reducer to a point where its rating is exceeded after it has been in service for a period of time. Always check the speed reducer rating when increasing driven loads or increasing the horsepower rating of the motor or other prime mover.

B. Overfilling or Underfilling

If a speed reducer is overfilled with oil, the energy used in churning the excessive oil can result in overheating. If this occurs, shut down the drive, remove the oil level plug and allow oil to drain until oil ceases to drain from the level hole, reinstall the oil level plug and restart the drive. If the speed reducer is underfilled, the resultant friction can cause overheating and possible damage. If this occurs, fill the speed reducer to the oil level plug hole and check the gearing for excessive wear.

C. Inadequate Cooling

In order to dissipate internally generated heat, the speed reducer must be installed in such a way that air can circulate freely. Tightly confined areas (inside cabinets, etc.) should be avoided. If this is not possible, forced air cooling by means of a separate blower should be used.



8. Oil Seals

Although WINSMITH uses high quality oil seals and precision ground shafts to provide a superior seal contact surface, it is possible that circumstances beyond WINSMITH's control can cause oil seal leakage (damage during shipment or installation, etc.). When replacing a shaft oil seal, using the following suggestions will help to insure leak-free operation and long seal life.

A. When installing a new seal, cover the keyway and any other surface discontinuity with smooth tape to protect the seal lip from being damaged.

B. A sealant should be used between the O.D. of the seal and the I.D. of the bore into which the seal is installed. The seal bore should also be free of any burrs, nicks, or scratches.

C. Be sure that the seal is not cocked in the seal bore. The outer face of the seal should be flush with the surface into which it is mounted.

Speed Reducers Continued- Lubricants

Lubricants

Worm Gear Reducers

For special applications that involve severe ambient temperature extremes or a seasonal oil requirement, WINSMITH, based on extensive testing and field experience, recommends the use of Mobil SHC synthetic lubricants.

Ambient Temperature	-30 to 15°F	16 to 50°F	51 to 95°F	51 to 95°F	96 to 131°F	96 to 131°F
Final Stage Worm Speed*	up to 2000 FPM	up to 2000 FPM	up to 450 FPM	above 450 FPM	up to 450 FPM	above 450 FPM
ISO Viscosity Grade	220	460	680	460	680	460*
AGMA Lubricant No.	5S**	#7 Compounded***	#8 Compounded***	#7 Compounded***	8 S**	7S**

Mobil	SHC 630	600W Super Cylinder	Extra Hecla Super	600W Super Cylinder	SHC 636	SHC 634
American Lubricants	SHC-90W	AGMA #7 Gear Oil	AGMA #8 Gear Oil	AGMA #7 Gear Oil	N/A	N/A
Castrol	Tribol 800/220	Tribol 1105-7C	Tribol 1105-8C	Tribol 1105-7C	Tribol 800/680	Tribol 800/460
Chevron	Tegra 220	Cylinder Oil W460	Cylinder Oil W680	Cylinder Oil W460	Tregra 680	Tegra 460
Conoco	Syncon R & O 220	Inca Oil 460	Inca Oil 680	Inca Oil 460	N/A	Syncon R & O 460
Exxon (Esso)	Teresstic SHP 220	Spartan EP 460	Spartan EP 680	Spartan EP 460	Teresstic SHP 680	Teresstic SHP 460
Fiske Brothers	SPO-MG	SPO-277	SPO-288	SPO-277	N/A	N/A
Shell	Omala RL 220	Valvata J 460	Valvata J 680	Valvata J 460	Omala RL 680	Omala RL 460
Texaco	Pinnacle 220	Vanguard 460	Vanguard 680	Vanguard 460	Pinnacle 680	Pinnacle 460

**synthetic oil

***3% to 10% fatty or synthetic oils or mild EP additives

Lubricant selections are provided by the lubricant manufacturer based on AGMA recommended viscosity grades.

Viscosity grades are based on Lubrication Standard ANSI/AGMA 9005-D94.

*The sliding velocity in feet per minute (FPM) for standard ratios is determined by multiplying the speed of the worm in RPM by the factor from the following table. For selecting the proper lubricant, use the speed of the worm in the final stage (input RPM divided by the first stage ratio).



SIZE	Nominal Ratio											
	5	7.5	10	15	20	25	30	40	50	60	80	100
910	0.153	—	0.137	0.133	0.122	0.116	0.132	0.121	0.115	—	—	—
913	0.231	0.189	0.183	0.179	0.171	0.165	0.178	0.169	0.164	0.161	—	—
917	0.303	0.229	0.201	0.193	0.180	0.172	0.189	0.176	0.170	0.166	0.161	0.133
920	0.347	0.263	0.225	0.216	0.202	0.191	0.215	0.200	0.188	0.182	0.164	0.161
924	0.412	0.312	0.261	0.256	0.236	0.223	0.249	0.231	0.216	0.210	0.201	0.196
926	0.455	0.345	0.283	0.276	0.254	0.238	0.269	0.249	0.234	0.225	0.215	0.210
930	0.520	0.395	0.327	0.317	0.291	0.273	0.307	0.285	0.269	0.258	0.246	0.241
935	0.607	0.461	0.427	0.412	0.373	0.349	0.403	0.367	0.345	0.330	0.311	0.299
943	0.633	0.588	0.568	0.553	0.507	0.558	0.544	0.501	0.475	0.457	0.435	0.422

WINSMITH



PEERLESS-WINSMITH, INC.

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DEMA Adjustable Injectors

Single Stage B Series

MODELS 202B, 202BP, 202 BT, 203B, 203BP, 203 BT, 204B, 204BP, 204 BT, 206B, 206BP, 206BT

INSTALLATION INSTRUCTIONS

1. PARTS

- A. Injector
- B. Ceramic Weight.
- C. Plastic tubing 8' long with foot strainer.

2. INSTALLATION

The injector may be installed in any position in the water line with the arrow in the direction of flow. Drop end of plastic tubing with strainer into fluid product container. Cut tubing to convenient length, and slip open end over injector fitting.

3. OPERATION

Warning: Use care when handling hazardous chemicals.

See Fig. 1 for location of water bypass screw and fine metering adjustment screw. Turn on water supply valve. The injector may draw momentarily as the system is filling but normally will stop as the system builds up to full pressure. To actuate injector, turn the bypass screw clockwise until product begins to be drawn from the container. After the fluid reaches the injector, the feed rate may be adjusted to the desired rate by turning the bypass screw. The maximum injection rates are shown in Table 2. For low injection rates, it is advisable to set the bypass screw for more injection than required; then turn the fine metering screw clockwise to reduce injection to the desired rate. Table 1 shows the operation range of the injector. If the injector will not draw with the bypass screw full in, then the water flow is below the range of the injector. If the injector draws with the screw full out but pressure loss is excessive, then flow is above the range of the injector. Table 3 shows the injection rates for models 202 BT, 203 BT, 204 BT, and 206 BT using metering tips at various viscosities. Table 4 shows the appropriate pipe size used for each injector.

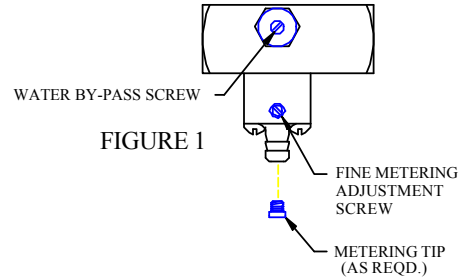


TABLE 1

Water Pressure (psi)	Operating Range - Gallons Per Minute			
	Model 202 B	Model 203 B	Model 204 B	Model 206 B
10	0.25 - 2.00	0.50 - 3.50	2.00 - 6.40	3.60 - 11.00
20	0.30 - 2.30	0.55 - 4.40	2.30 - 7.50	4.20 - 13.00
40	0.37 - 2.90	0.70 - 5.40	2.90 - 9.50	5.30 - 17.00
60	0.43 - 3.40	0.80 - 6.40	3.40 - 11.00	6.20 - 19.00
100	0.54 - 4.20	1.00 - 8.00	4.20 - 14.00	7.70 - 24.00
200	0.73 - 5.70	1.40 - 11.00	5.70 - 19.00	11.00 - 33.00
400	1.00 - 7.90	1.90 - 15.00	7.90 - 26.00	15.00 - 46.00
500	1.20 - 8.90	2.10 - 17.00	8.90 - 29.00	17.00 - 51.00
* 700	1.40 - 11.00	2.50 - 20.00	11.00 - 35.00	20.00 - 60.00
* 1000	1.60 - 13.00	3.00 - 23.00	13.00 - 41.00	23.00 - 70.00
* 1500	2.00 - 16.00	3.50 - 28.00	16.00 - 50.00	28.00 - 87.00
* 2000	2.20 - 18.00	4.70 - 37.00	18.00 - 58.00	33.00 - 100.00
* 3000	2.70 - 20.00	5.00 - 45.00	20.00 - 70.00	40.00 - 100.00

* SPECIFY – S Stainless Steel Knob – Part No. 24-32S or Part No. 24-32ST (for tips) for pressure exceeding 700 PSI.

DEMA Adjustable Injectors

Single Stage B Series

MODELS 202B, 202BP, 202 BT, 203B, 203BP, 203 BT, 204B, 204BP, 204 BT, 206B, 206BP, 206BT
INSTALLATION INSTRUCTIONS

TABLE 2

Fluid Viscosity (cps)	Maximum Injection (Oz/Min)			
	Model 202 B	Model 203 B	Model 204 B	Model 206 B
1	8	20	40	48
75	5	8	8	9
200	3	4	4	4

TABLE 3

Metering Tip Color	202BT			203BT			204BT			206BT		
	Injection Rates (Oz/Min)											
	Viscosity (cps)			Viscosity (cps)			Viscosity (cps)			Viscosity (cps)		
	1	75	200	1	75	200	1	75	200	1	75	200
Tan	1.0	1.0	0.6	1.1	0.8	0.5	1.1	0.8	0.5	1.0	0.7	0.6
Orange	1.5	1.2	0.7	1.4	1.0	0.7	1.4	0.9	0.6	1.4	1.0	0.8
Turquoise	1.8	1.4	1.2	2.0	1.4	1.0	1.9	1.2	0.9	1.9	1.3	1.0
Pink	2.5	2.0	1.4	2.7	1.8	1.3	2.6	1.7	1.3	2.6	1.8	1.3
Clear	3.3	2.7	1.7	3.5	2.4	1.6	3.4	2.4	1.6	3.5	2.3	1.7
Brown	3.2	2.9	1.9	4.0	2.7	1.7	4.0	2.4	1.9	4.0	2.6	1.8
Red	4.2	3.0	2.1	4.9	3.3	2.0	4.9	2.9	2.2	5.0	3.1	2.0
White	4.8	3.5	2.1	6.0	3.9	2.3	6.0	3.4	2.4	6.2	3.7	2.4
Green	5.2	3.7	2.3	6.8	4.4	2.5	6.8	3.8	2.5	7.1	4.1	2.6
Blue	6.2	4.0	2.4	7.8	4.9	2.7	8.4	4.3	3.1	8.9	4.8	2.9
Yellow	7.1	4.3	2.7	10.3	5.9	2.9	13.1	5.2	3.4	13.5	5.9	3.2
Black	7.0	4.4	2.8	13.2	6.7	3.0	18.2	6.1	3.5	20.1	6.7	3.5
Purple	7.4	4.6	2.9	17.1	6.7	3.1	27.5	6.8	3.5	31.3	7.5	3.6
Gray	7.8	4.7	3.1	19.0	7.1	3.3	32.9	7.0	3.5	38.3	8.0	3.8
No Tip	7.9	4.7	3.3	20.0	8.0	3.7	39.8	7.9	3.7	48.1	9.2	4.4

All induction rates are based on a water inlet pressure of 40 psi and operating at a full vacuum.

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DEMA Adjustable Injectors Single Stage B Series

MODELS 202B, 202BP, 202 BT, 203B, 203BP, 203 BT, 204B, 204BP, 204 BT, 206B, 206BP, 206BT
INSTALLATION INSTRUCTIONS

TABLE 4

Model	Pipe Size
202 B	3/8 NPT
203 B	3/8 NPT
204 B	1/2 NPT
206 B	3/4 NPT

4. SERVICING

CAUTION: Turn off water supply before servicing.

The check valve parts are in the metering knob and can be cleaned by removing the four screws. The knob may be rotated if it is more convenient to have the adjusting screw on another side of the injector. As with any injector, if spray jets become clogged or downstream restriction increases in any manner, the injector will stop drawing fluid. If it is inconvenient to remove the restriction immediately, the injector may be put back into operation by turning the water bypass screw further clockwise; this adjusts the injector to the lower flow rate. The bypass screw should be reset once the restriction is removed.

CAUTION: When servicing, make sure that replacement parts have been installed according to drawing. Be certain to check valve parts are in place.



RETURNS: NO MERCHANDISE MAY BE RETURNED FOR CREDIT WITHOUT DEMA'S WRITTEN PERMISSION. RETURN MERCHANDISE AUTHORIZATION NUMBER REQUIRED IN ADVANCE OF RETURN.

WARRANTY: DEMA products are warranted against defective material and workmanship under normal use and service for one year from the date of manufacture. This limited warranty does not apply to any products which have a normal life shorter than one year or failure and damage caused by chemicals, corrosion, improper voltage supply, physical abuse, or misapplication. Rubber and synthetic rubber parts such as "o"-rings, diaphragms, squeeze tubing and gaskets are considered expendable and are not covered under warranty. This warranty is extended only to the original buyer of DEMA products. If products are altered or repaired without prior approval of DEMA, this warranty will be void.

Defective units or parts should be returned to the factory with transportation prepaid. If inspection shows them to be defective, they will be repaired or replaced without charge, F.O.B. factory. DEMA assumes no liability for damages. Return merchandise authorization number, to return units for repair or replacement, must be granted in advance of return.

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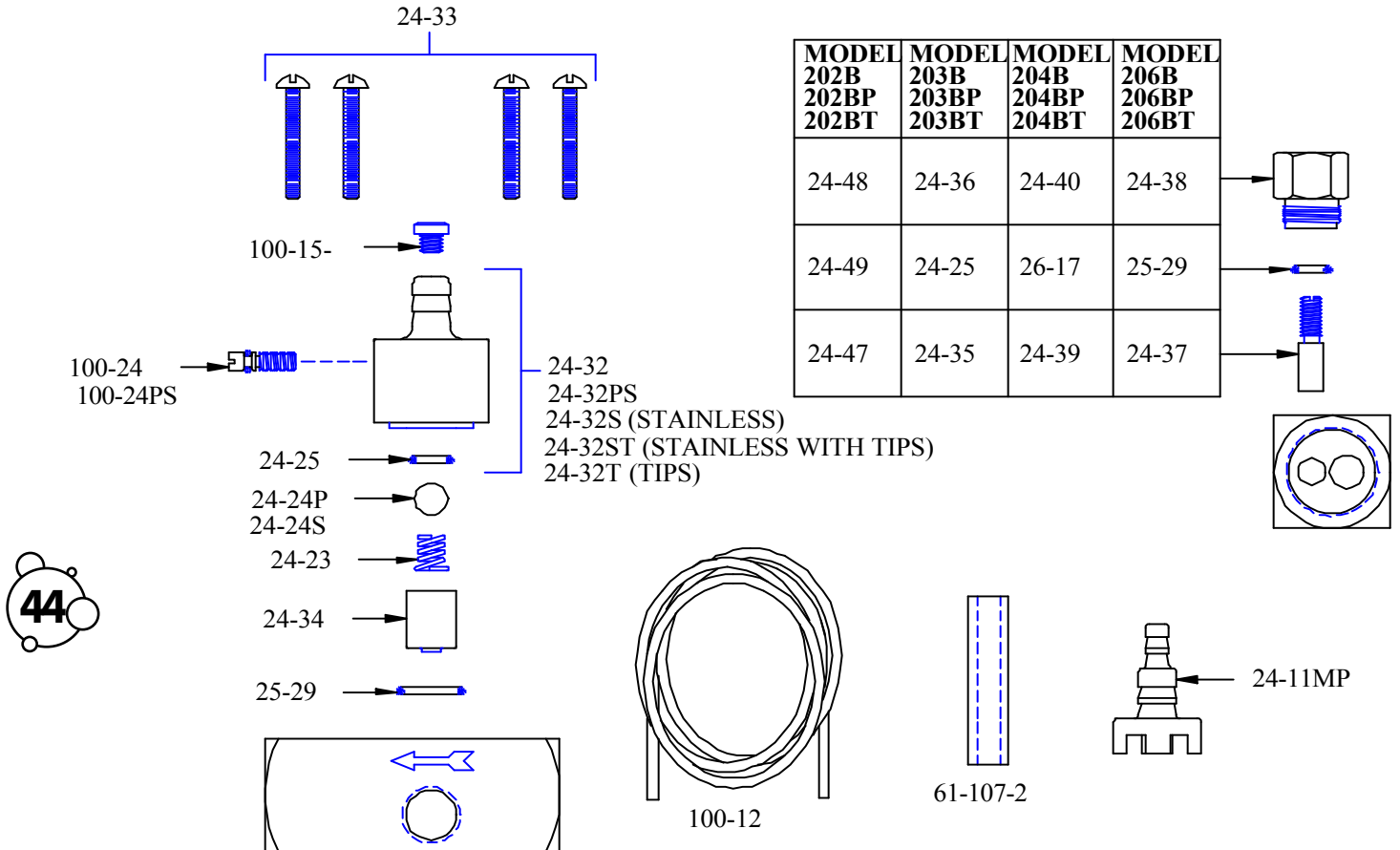
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DEMA Adjustable Injectors

Parts Descriptions

MODELS: 202B, 202BP, 202BT, 203B, 203BP, 203BT, 204B, 204BP, 204BT, 206B, 206BP, 206BT

MODEL #'S MAY ALSO INCLUDE S, E, C AND/OR -2.



PART NO.	DESCRIPTION	PART NO.	DESCRIPTION
24-11MP	FOOT STRAINER	24-39	BY-PASS SCREW
24-23	CHECK VALVE SPRING	24-40	BY-PASS SCREW RETAINER
24-24P	CHECK VALVE BALL (TEFLON)	24-47	BY-PASS SCREW
24-24S	CHECK VALVE BALL (STAINLESS)	24-48	BY-PASS SCREW RETAINER
24-25	CHECK VALVE O-RING	24-49	O-RING
24-32	METERING KNOB ASSY.	25-29	O-RING
24-32PS	METERING KNOB ASSY. (BP INJECTORS)	26-17	O-RING
24-32S	METERING KNOB ASSY.	61-107-2	CERAMIC WEIGHT
24-32ST	METERING KNOB ASSY.	100-12	VINYL TUBING (3/8" O.D. X 8' LG)
24-32T	METERING KNOB ASSY.	100-15-	METERING TIP (SPECIFY COLOR)
24-33	SCREW #8-32 X 7/8 LG. (4-REQD.)	100-15K	METERING TIP KIT (14 PCS.)
24-34-	CHECK VALVE CORE (SPECIFY MODEL NO.)	100-24	METERING SCREW
24-35	BY-PASS SCREW	100-24PS	METERING SCREW (-BP INJECTORS)
24-36	BY-PASS SCREW RETAINER		
24-37	BY-PASS SCREW		
24-38	BY-PASS SCREW RETAINER		

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Standard Manufacturer's Limited Warranty

EXPRESSED WARRANTY: N/S Corporation's manufactured vehicle wash equipment is guaranteed for one (1) year commencing the first day following installation, or thirty (30) days from the original invoice date, which ever occurs first. Equipment not manufactured by N/S Corporation and electrical parts are guaranteed for ninety (90) days. The equipment is guaranteed against manufacturing defects on material and workmanship, which develop in the service for which it was designed, provided that the equipment is installed and used in accordance with all applicable instructions and limitations as issued by N/S Corporation.

Pursuant to the above expressed warranty, N/S Corporation at its sole discretion, will repair goods or replace defective materials, free of charge excluding labor, provided that such goods or materials are returned as specified by N/S Corporation and found to be defective based upon N/S Corporation's inspection process. This limited warranty is non-cumulative.

N/S Corporation does not warrant: (1) labor; (2) transportation, charges, which shall be submitted to the carrier of damaged product; (3) installation, adjustment, or other expenses which may arise in connection with such equipment or parts; (4) site related/ operation based problems; (5) damage due to accident; (6) damage due to misuse, negligence, or overloading; (7) lack of proper maintenance; (8) maintenance items, including but not limited to lubricating grease/oils, filters, cloth, materials, bearings, rollers, etc; (9) nor any items therein which show signs of neglect. Repairs and service provided by unauthorized N/S personnel voids warranty.

LIMITED LIABILITY: N/S Corporation shall not be liable (1) for any incidental, special, consequential, or exemplary damages; (2) for commercial loss; (3) for inconvenience; or (4) for any service not expressly provided for herein related to or arising from the vehicle wash equipment. N/S Corporation makes no further warranties and no implied warranties of merchantability or fitness for a specific purpose.

All terms and conditions apply unless otherwise specified in the contract. This warranty given in lieu of all other expressed warranties on the part of the Manufacturer, Distributors, or Dealers. No Dealer or Distributor (nor any agent, representative or employee thereof) is authorized to extend or enlarge this warranty.

If there are any questions regarding these procedures or you need additional assistance, please contact our **Director of Customer Service at (310) 330-1250.**

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F: CS-013 Revision Date: 9/26/13

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Warranty Procedures

Claims

1 Before commencing any warranty work, the N/S Customer Service Department must be contacted and advised that a problem was encountered, which location, and an estimate must be given for any labor cost. The Customer Service Department will then advise the customer as to what action is to be taken.

2 If replacement parts are required, the Customer Service Department will advise the customer where the needed parts can be obtained.

3 All of parts supplied under warranty will be shipped via UPS ground by N/S Corporation. If a more expeditious means are requested, the customers will incur the extra charges.

4 Returned Good Authorization (RGA) will be issued by the N/S Customer Service Department at the time that credit for the replacement parts is requested. All parts returned under an RGA number must be returned within 20 days, freight prepaid and the RGA number must be plainly visible on the outside of the packaging.

5 No Credit will be issued for motors or reducers that do not have the original name plates affixed.

6 If there are any questions regarding the clarification of these procedures, this may be directed to the N/S Director of Customer Service at (800) 782-1582





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Parts or Service

800-245-0350

310-330-1239

310-330-1275

310-412-2367 fax