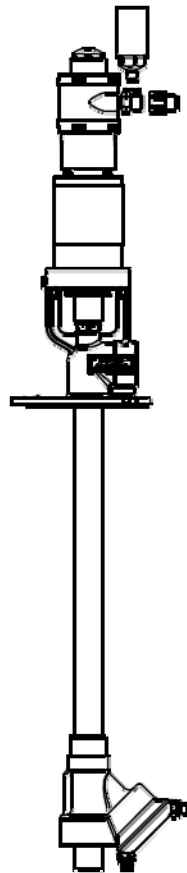




***Spraying Systems Co.***<sup>®</sup>

Experts in Spray Technology

# AA190DAG/DAGH SERIES AIR MOTOR-DRIVEN TANK CLEANER



**OWNER'S MANUAL**

**MI-AA190DAG/DAGH**

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**IMPORTANT: PLEASE READ ALL INSTRUCTIONS BEFORE INSTALLING OR OPERATING UNIT.**  
**SAVE FOR FUTURE REFERENCE**

## **PROPRIETARY NOTICE**

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## **FORWARD**

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
THE EQUIPMENT AND/OR PARTS DESCRIBED IN THIS DOCUMENT WERE MANUFACTURED AND ASSEMBLED WITH QUALITY AND HIGH RELIABILITY, WHICH HAVE BECOME SYNONYMOUS WITH THE NAME SPRAYING SYSTEMS CO. THE DESCRIPTION AND SPECIFICATIONS CONTAINED HEREIN WERE EFFECTIVE ON THE REVISION DATE OF THIS MI. SPRAYING SYSTEMS CO. RESERVES THE RIGHT TO ALTER OR MODIFY ANY UNIT SPECIFICATION ON SPRAYING SYSTEMS CO. PRODUCT WITHOUT NOTICE OR OBLIGATION.

## **INTRODUCTION**

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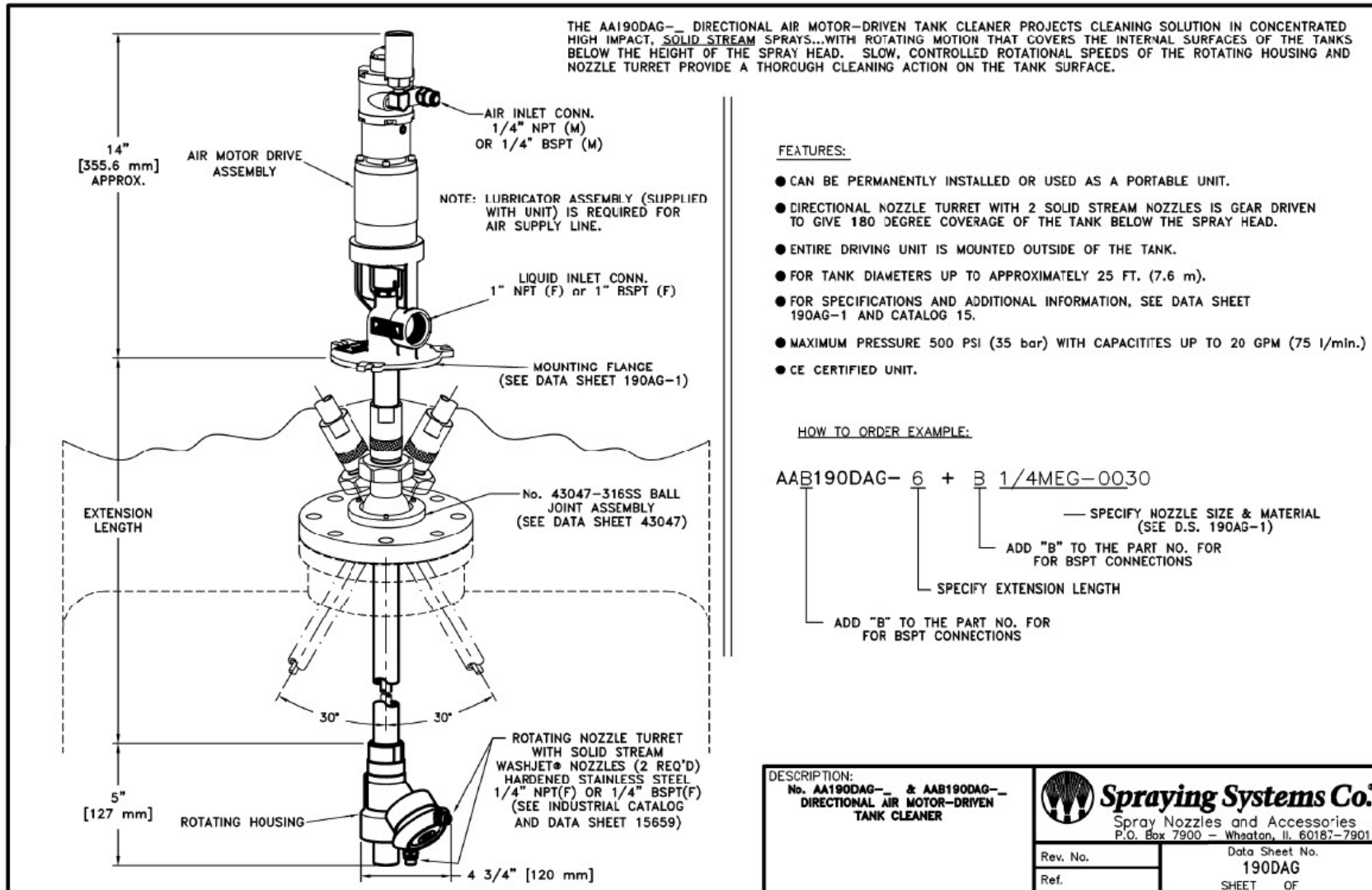
THIS TANK CLEANER MEETS THE REQUIREMENTS SET FORTH IN EC DIRECTIVE 2006/42/EC. THE LATEST MOTOR MANUFACTURER'S OPERATION & MAINTENANCE MANUAL IS INCLUDED WITH THIS TANK CLEANER AS A SEPARATE MANUAL SINCE IMPORTANT SAFETY PRECAUTIONS PERTAINING TO THE INSTALLATION AND OPERATION OF THE MOTOR ITSELF ARE INCLUDED.

# SPECIFICATIONS & OPERATING CONDITIONS

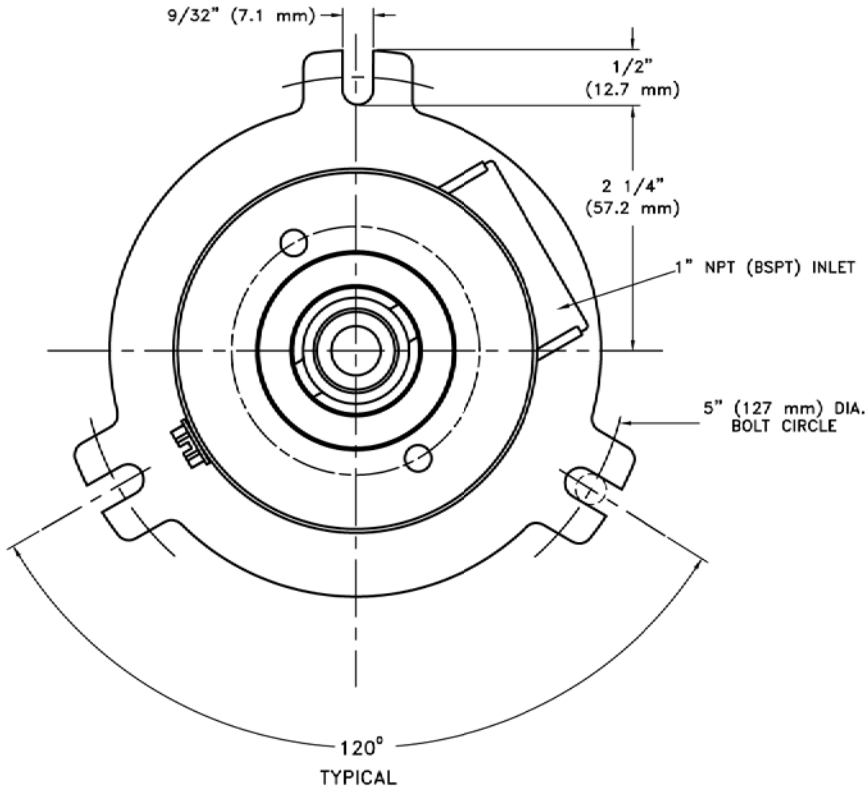
- LIQUID PRESSURE: 500 PSI (35 BAR) MAX FOR AA190DAG  
1000 PSI (69 BAR) MAX FOR AA190DAGH
- FLOW RATES: UP TO 20 GPM (76 L/M)
- PRESSURE DROP AT MAX. FLOW: 40 PSI (2.8 BAR)
- LIQUID TEMPERATURE: 200 DEGREES F (93 DEGREES C) MAX.
- AIR PRESSURE TO MOTOR: 16 PSI (0.69 BAR) MAX.
- AMBIENT TEMPERATURE: 104 DEGREES F (40 DEGREES C) MAX.
- TANK DIAMETER:  
FOR AA190DAG 25 FEET (7.6 M) MAX RECOMMENDED  
FOR AA190DAGH 34 FEET (10.4 M) MAX RECOMMENDED
- TANK COVERAGE  180 DEGREES DOWN COVERAGE
- SPRAY HEAD AND NOZZLES FIT THROUGH A 4 3/4" (127 MM) DIA. OPENING

TANKS OVER THE SPECIFIED DIAMETERS COULD POSSIBLY BE CLEANED ADEQUATELY DEPENDING ON THE MAXIMUM TANK DIMENSION, CLEANING SOLUTIONS BEING USED, TEMPERATURES, SPRAY PRESSURES, FLOW RATES AND THE MATERIAL BEING CLEANED FROM THE TANK.

THE TANK CLEANER MAY BE USED WITH PLAIN WATER OR WITH A VARIETY OF CHEMICALS (COMPATIBLE WITH 316 SS, ETHYLENE PROPYLENE RUBBER, AND CARBON GRAPHITE FILLED TEFLON®). HOWEVER, IF CHEMICALS ARE USED, REVIEW MSDS SHEETS AND CHEMICAL COMPATIBILITY WITH MATERIAL USED TO CONSTRUCT THIS PRODUCT. ALSO, THE UNIT SHOULD BE FLUSHED WITH CLEAN WATER AT THE END OF THE DAY BEFORE THE UNIT IS STORED. A LIQUID LINE STRAINER AHEAD OF THE UNIT IS RECOMMENDED TO REMOVE LARGE PARTICLES WHICH MAY DAMAGE THE UNIT.



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**MOTOR END VIEW OF INLET BODY MOUNTING FLANGE**

**SPECIFICATIONS**

- MAXIMUM PRESSURE - 500 PSI (35 bar).
- MAXIMUM RECOMMENDED FLOW - 20 GPM (76 l/min).
- MAXIMUM LIQUID TEMPERATURE - 200°F (93°C).
- PRESSURE LOSS - 40 PSI (2.8 bar) AT 20 GPM (76 l/min).
- SPRAY HEAD FITS THROUGH A 4 3/4" (127 mm) DIAMETER HOLE.

**FLOW RATE DATA**

NOZZLE SIZE	U.S. UNITS					METRIC UNITS				
	TOTAL FLOW FOR 2 NOZZLES (EQUAL CAPACITY)									
	GALLONS PER MINUTE					LITERS PER MINUTE				
	LIQUID INLET PRESSURE (PSI)					LIQUID INLET PRESSURE (bar)				
	100	200	300	400	500	7	15	20	30	35
1/4MEG-0010	3.1	4.4	5.4	6.3	7.0	11.8	17.3	20	24	26
1/4MEG-0015	4.7	6.6	8.1	9.4	10.5	17.9	26	30	37	40
1/4MEG-0020	6.2	8.8	10.8	12.4	13.9	24	35	40	49	53
1/4MEG-0025	7.7	10.9	13.3	15.4	17.2	29	43	50	61	66
1/4MEG-0030	9.1	12.9	15.8	18.2	20.4	35	51	59	72	78
1/4MEG-0035	10.5	14.8	18.1	20.9		40	59	68	83	
1/4MEG-0040	11.8	16.7	20.4			45	66	76		
1/4MEG-0050	14.2	20.1				54	79			
1/4MEG-0060	16.4					63				
1/4MEG-0070	18.3					70				
1/4MEG-0080	19.9					76				

NOTE: FLOW RATES TABULATED ABOVE INCLUDE EFFECT OF PRESSURE DROP THROUGH UNIT.

DESCRIPTION:  
 FLOW AND MOUNTING SPECIFICATIONS FOR  
 No. AA190DAG- & No. AAB190DAG-  
 DIRECTIONAL, AIR MOTOR-DRIVEN  
 TANK CLEANER



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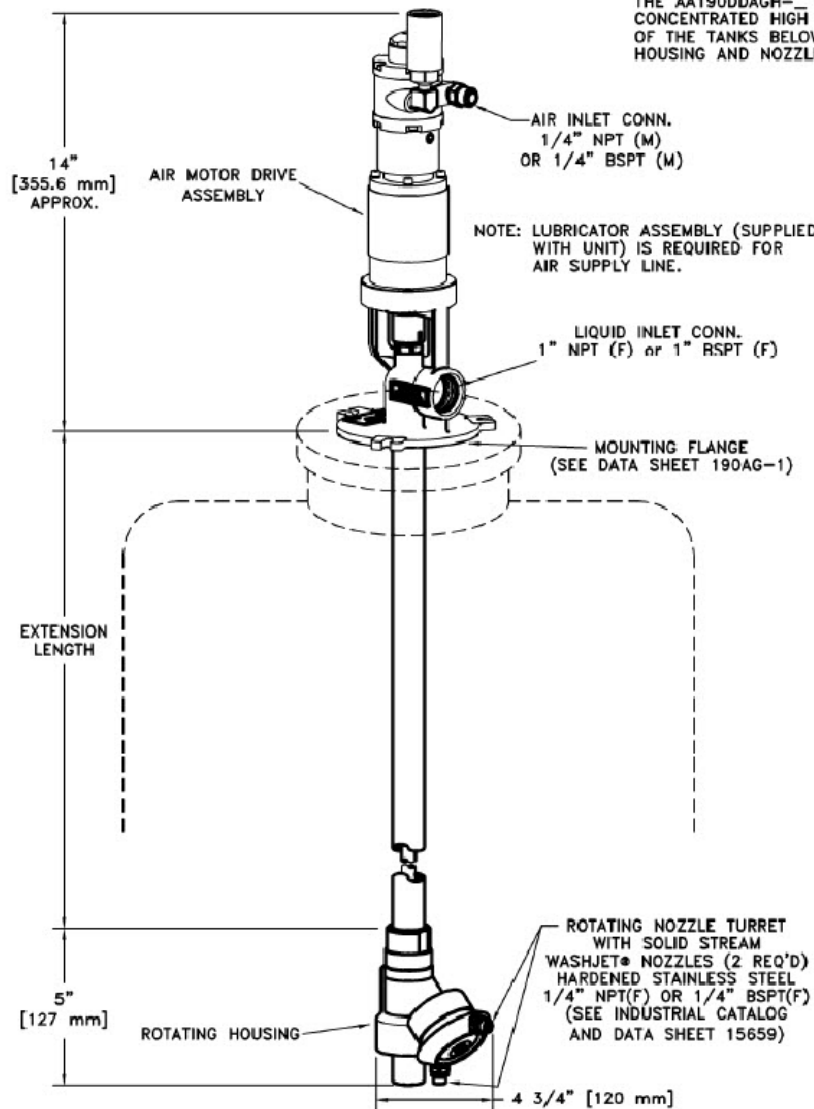
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**190DAG-1**

SHEET OF

THE AA190DDAGH— HIGH PRESSURE DIRECTIONAL AIR MOTOR-DRIVEN TANK WASHER PROJECTS CLEANING SOLUTION IN CONCENTRATED HIGH IMPACT, SOLID STREAM SPRAYS...WITH ROTATING MOTION THAT COVERS THE INTERNAL SURFACES OF THE TANKS BELOW THE HEIGHT OF THE SPRAY HEAD. SLOW, CONTROLLED ROTATIONAL SPEEDS OF THE ROTATING HOUSING AND NOZZLE TURRET PROVIDE A THOROUGH CLEANING ACTION ON THE TANK SURFACE.




**FEATURES:**

- CAN BE PERMANENTLY INSTALLED OR USED AS A PORTABLE UNIT.
- DIRECTIONAL NOZZLE TURRET WITH 2 SOLID STREAM NOZZLES IS GEAR DRIVEN TO GIVE 180 DEGREE COVERAGE OF THE TANK BELOW THE SPRAY HEAD.
- ENTIRE DRIVING UNIT IS MOUNTED OUTSIDE OF THE TANK.
- FOR TANK DIAMETERS UP TO APPROXIMATELY 34 FT. (10.4 m).
- FOR SPECIFICATIONS AND ADDITIONAL INFORMATION, SEE DATA SHEET 190DAGH-1 AND CATALOG 15.
- FOR USE AT PRESSURES UP TO 1000 PSI (69 bar) AND CAPACITIES OF UP TO 20 GPM (75 l/min).
- CE CERTIFIED UNIT

**HOW TO ORDER EXAMPLE:**

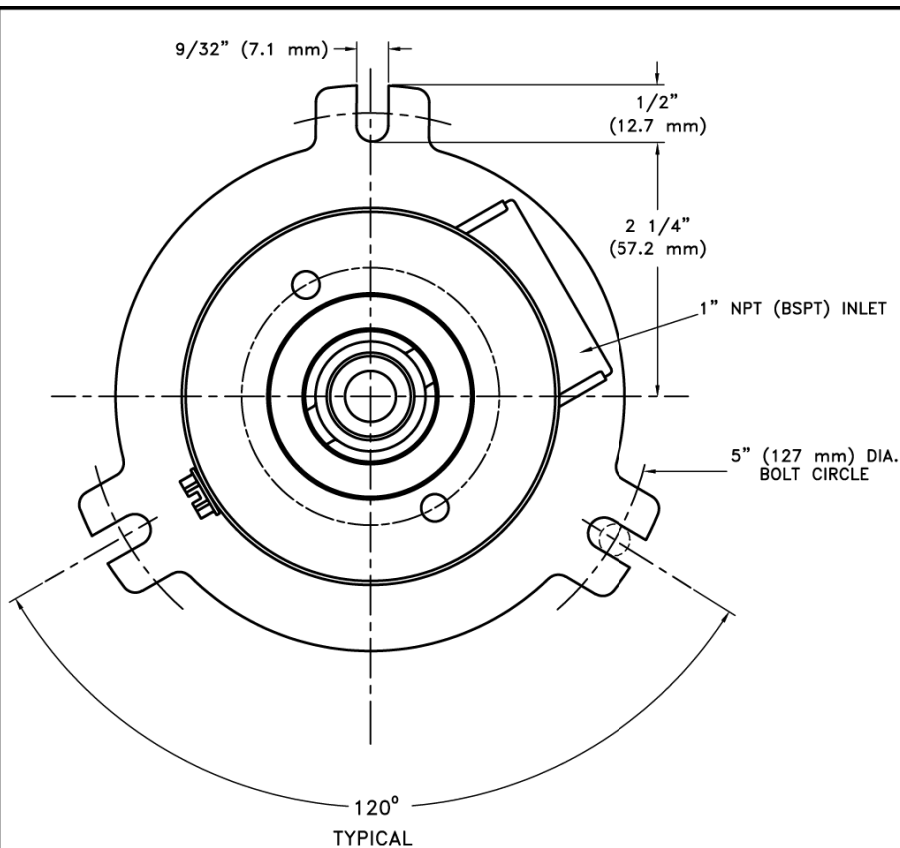
AA190DAGH-6 + B 1/4MEG-0030  
(SEE D.S. 190AGH-1)  
 SPECIFY NOZZLE SIZE & MATERIAL  
 ADD "B" TO THE PART NO. FOR FOR BSPT CONNECTIONS  
 SPECIFY EXTENSION LENGTH  
 ADD "B" TO THE PART NO. FOR FOR BSPT CONNECTIONS

**DESCRIPTION:**  
 No. AA190DAGH— & AAB190DAGH—  
 HIGH PRESSURE DIRECTIONAL  
 AIR MOTOR-DRIVEN TANK CLEANER

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		190DAGH	
Rev. No.		SHEET OF	
Ref.			

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**MOTOR END VIEW OF INLET BODY MOUNTING FLANGE**

**SPECIFICATIONS**

- MAXIMUM PRESSURE - 1000 PSI (69 bar).
- MAXIMUM RECOMMENDED FLOW - 20 GPM (76 l/min).
- MAXIMUM LIQUID TEMPERATURE - 200°F (93°C).
- PRESSURE LOSS - 40 PSI (2.8 bar) AT 20 GPM (76 l/min).
- SPRAY HEAD FITS THROUGH A 4 3/4" (127 mm) DIAMETER HOLE.

**FLOW RATE DATA**

**U.S. UNITS**

NOZZLE SIZE	TOTAL FLOW OF 2 NOZZLES (EQUAL CAPACITY) GALLONS PER MINUTE									
	INLET PRESSURE (PSI)									
	100	200	300	400	500	600	700	800	900	1000
1/4MEG-0010	3.1	4.4	5.4	6.3	7.0	7.6	8.2	8.8	9.3	9.8
1/4MEG-0015	4.7	6.6	8.1	9.4	10.5	11.5	12.4	13.3	14.1	14.9
1/4MEG-0018	5.6	7.9	9.7	11.2	12.5	13.7	14.8	15.8	16.8	17.7
1/4MEG-0020	6.2	8.8	10.8	12.4	13.9	15.2	16.4	17.5	18.6	19.6
1/4MEG-0025	7.7	10.9	13.3	15.4	17.2	18.8	20.3	---	---	---
1/4MEG-0030	9.1	12.9	15.8	18.2	20.4	---	---	---	---	---
1/4MEG-0035	10.5	14.8	18.1	20.9	---	---	---	---	---	---
1/4MEG-0040	11.8	16.7	20.4	---	---	---	---	---	---	---
1/4MEG-0050	14.2	20.1	---	---	---	---	---	---	---	---
1/4MEG-0060	16.4	---	---	---	---	---	---	---	---	---
1/4MEG-0070	18.3	---	---	---	---	---	---	---	---	---
1/4MEG-0080	19.9	---	---	---	---	---	---	---	---	---

**METRIC UNITS**

NOZZLE SIZE	TOTAL FLOW OF 2 NOZZLES (EQUAL CAPACITY) LITERS PER MINUTE									
	INLET PRESSURE (bar)									
	7	15	20	30	35	40	50	55	60	70
1/4MEG-0010	11.8	17.3	20	24	26	29	32	34	35	38
1/4MEG-0015	17.9	26	30	37	40	43	48	50	52	57
1/4MEG-0020	24	35	40	49	53	57	63	66	69	75
1/4MEG-0025	29	43	50	61	66	70	78	---	---	---
1/4MEG-0030	35	51	59	72	78	---	---	---	---	---
1/4MEG-0035	40	59	68	83	---	---	---	---	---	---
1/4MEG-0040	45	66	76	---	---	---	---	---	---	---
1/4MEG-0050	54	79	---	---	---	---	---	---	---	---
1/4MEG-0060	63	---	---	---	---	---	---	---	---	---
1/4MEG-0070	70	---	---	---	---	---	---	---	---	---
1/4MEG-0080	76	---	---	---	---	---	---	---	---	---

NOTE: FLOW RATES TABULATED ABOVE INCLUDE EFFECT OF PRESSURE DROP THROUGH UNIT.

**DESCRIPTION:**  
FLOW RATE & MOUNTING SPECIFICATIONS FOR  
No. AA190DAGH-- & No. AAB190DAGH--  
HIGH PRESSURE  
DIRECTIONAL, AIR MOTOR-DRIVEN  
TANK CLEANER



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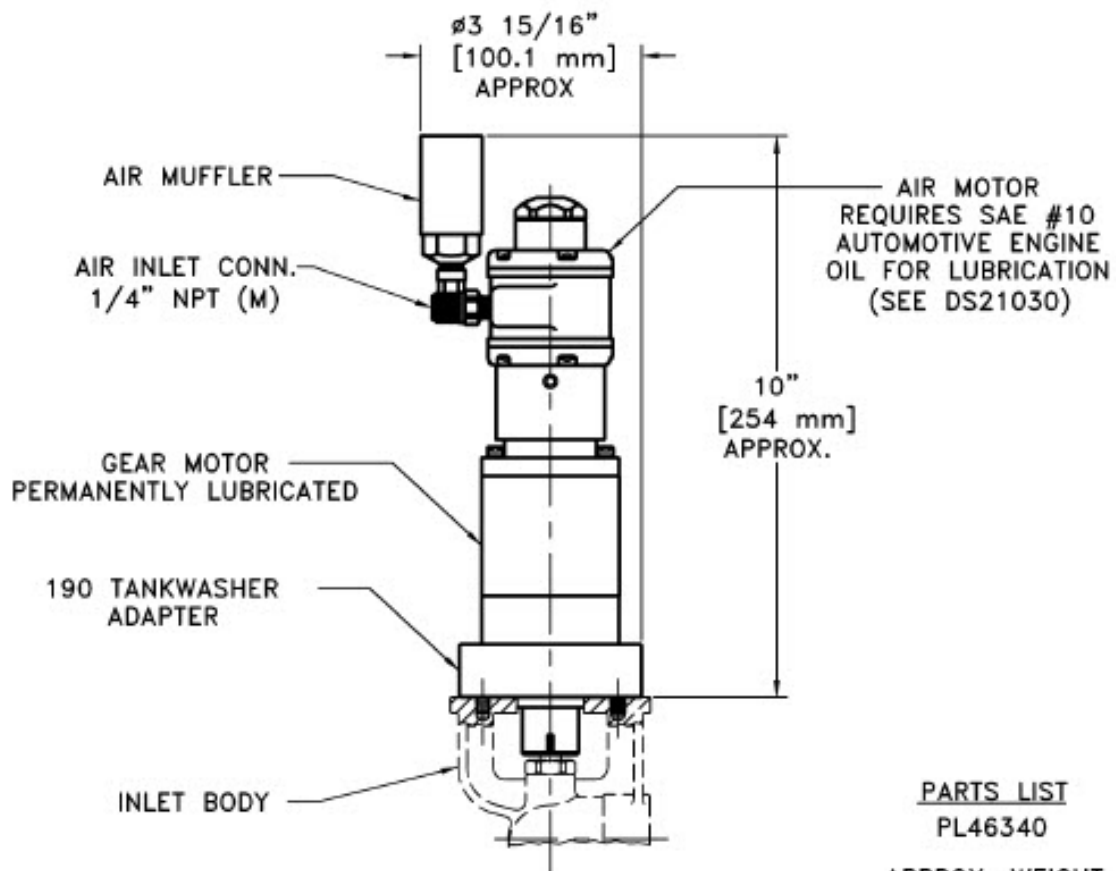
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**190DAGH-1**

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SHEET OF





AIR MOTOR  
REQUIRES SAE #10  
AUTOMOTIVE ENGINE  
OIL FOR LUBRICATION  
(SEE DS21030)

GEAR MOTOR  
PERMANENTLY LUBRICATED

190 TANKWASHER  
ADAPTER

INLET BODY

PARTS LIST  
PL46340

APPROX. WEIGHT  
6.25 lbs [2.8 kg]

AIR PRESSURE AT MOTOR		APPROX. SPEED (RPM)			APPROX. TIME FOR ONE COMPLETE CYCLE (MINUTES)			REVOLUTIONS REQUIRED FOR 1 COMPLETE CYCLE
		190AG		190AGH	190AG		190AGH	
PSI	bar	50 PSI (3.45 bar)	500 PSI (34.48 bar)	1000 PSI (68.97 bar)	50 PSI (3.45 bar)	500 PSI (34.48 bar)	1000 PSI (68.97 bar)	35
8	0.55	4.0	3.3	2.1	8.8	10.5	16.3	
10	0.69	5.5	5.0	4.1	6.4	7.0	8.5	
12	0.83	6.9	6.7	6.1	5.1	5.3	5.7	
14	0.97	8.0	7.9	7.1	4.4	4.4	4.9	
16	1.10	9.1	9.1	8.5	3.9	3.9	4.1	

\*THESE VALUES ARE TYPICAL. CYCLE TIME WILL VARY WITH APPLICATION.

**DESCRIPTION:**

No. 46340-190 AIR DRIVEN  
MOTOR ASSEMBLY  
FOR 190  
AIR MOTOR-DRIVEN  
TANK CLEANERS



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Data Sheet No.

**46340-190**

SHEET OF

# SAFETY PRECAUTIONS

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*CERTAIN ATMOSPHERES WITHIN THE TANK BEING CLEANED COULD BECOME EXPLOSIVE, SUCH AS DUST PARTICLES IN FLOUR SILO, OR FUMES IN PAINT MIXING TANKS. FOR THIS REASON, THE FOLLOWING SAFETY PRECAUTIONS SHOULD BE OBSERVED.*

**YOUR SAFETY AND THE SAFETY OF OTHERS IS EXTREMELY IMPORTANT.**

**WE HAVE PROVIDED IMPORTANT SAFETY MESSAGES IN THIS MANUAL FOR YOUR PRODUCT. ALWAYS READ AND OBEY ALL SAFETY MESSAGES.**



**THIS IS THE SAFETY ALERT SYMBOL. THIS SYMBOL ALERTS YOU TO HAZARDS THAT CAN KILL OR HARM YOU AS WELL AS OTHERS. THE SAFETY ALERT SYMBOL AND THE WORDS “DANGER” AND “WARNING” WILL PRECEDE ALL SAFETY MESSAGES. READ THE FOLLOWING WORDS AND WHAT THEY SIGNIFY:**



## **DANGER**

**YOU MAY BE KILLED OR SERIOUSLY INJURED IF YOU DON'T FOLLOW THESE INSTRUCTIONS.**



## **WARNING**

**YOU MAY BE SERIOUSLY INJURED IF YOU DON'T FOLLOW THESE INSTRUCTIONS.**

**ALL SAFETY MESSAGES WILL IDENTIFY THE HAZARD, TELL YOU HOW TO REDUCE THE CHANCE OF INJURY AND TELL YOU WHAT CAN HAPPEN IF THE SAFETY INSTRUCTIONS ARE NOT FOLLOWED.**

# INSTALLATION

---

QUALIFIED PERSONNEL MUST PERFORM ALL WORK REQUIRED TO ASSEMBLE, INSTALL, OPERATE, MAINTAIN AND REPAIR THIS EQUIPMENT. IMPROPER INSTALLATION AND OPERATION CAN RESULT IN SEVERE PERSONAL INJURY AND/OR DAMAGE TO PROPERTY. CORRECT INSTALLATION IS YOUR RESPONSIBILITY.



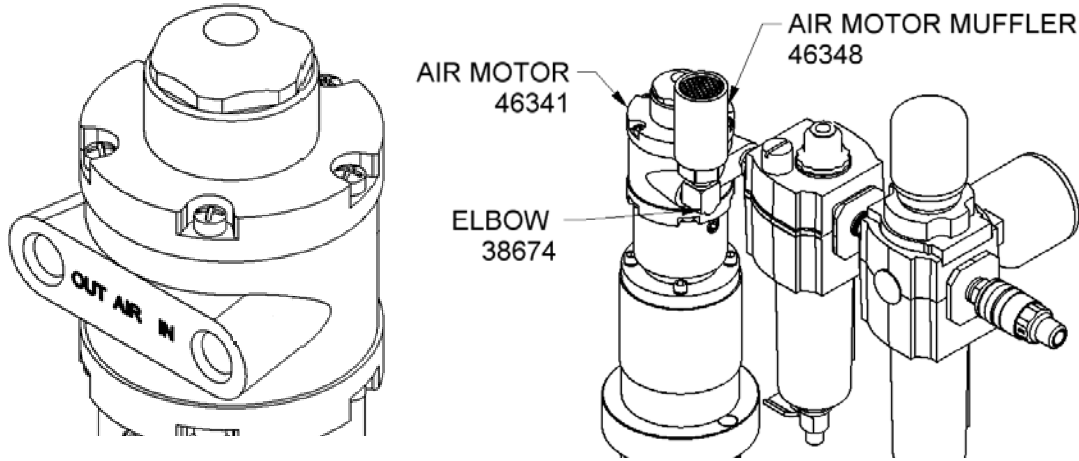
## **WARNING**

INSTALL PROPER GUARDS AS NEEDED. FOLLOW BASIC LIFTING GUIDES WHEN TRANSPORTING OR HANDLING THIS PRODUCT. FAILURE TO FOLLOW THIS INSTRUCTION CAN RESULT IN BACK INJURY, BURNS OR OTHER SERIOUS INJURY.

## **CONNECTIONS**

CONNECT THE AIR MUFFLER (SHIPPED LOOSE) TO THE AIR MOTOR EXHAUST CONNECTION.

**IMPORTANT!** EXHAUST CONNECTION IS THE THREADED CONNECTION ON THE LEFT AS YOU FACE THE MOTOR OPENINGS (MARKED “**OUT**”). CONNECT THE LUBRICATOR SUB-ASSEMBLY TO THE AIR INLET CONNECTION OF THE AIR MOTOR. THE INLET CONNECTION IS THE THREADED CONNECTION ON THE RIGHT AS YOU FACE THE MOTOR OPENINGS (MARKED “**AIR IN**”). LUBRICATOR SUB-ASSEMBLY SHOULD BE LOCATED NO FURTHER THAN 20 INCHES FROM AIR MOTOR.



ATTACH A COMPRESSED AIR LINE TO THE QUICK CONNECT FITTING OF THE PRESSURE REGULATOR AND VERIFY THAT THE NOZZLE HUB **ROTATES CLOCKWISE** WHEN VIEWED FROM THE NOZZLE HUB END BY APPLYING AIR PRESSURE TO THE MOTOR. CONNECT THE LIQUID LINE TO THE INLET CONNECTION OF THE LIQUID INLET BODY.

### **MOUNTING**

BOLT OR CLAMP THE UNIT TO THE TANK TO BE CLEANED AS DICTATED BY THE MOUNTING FLANGE PROVIDED. ADJUSTABLE FLANGES ALLOW EASY POSITIONING OF THE TANK CLEANING UNIT TO VARIOUS SPRAY DEPTHS FOR MAXIMUM CLEANING EFFECTIVENESS.

### **LIQUID INLET CONNECTION**

PROPER INSTALLATION REQUIRES LIQUID SUPPLY LINE (PIPE, HOSE, ETC.) MEET OR EXCEED MAXIMUM WORKING PRESSURE. USE OF PTFE PIPE TAPE OR OTHER APPROPRIATE SEALANT COMPATIBLE WITH YOUR PROCESS FLUIDS IS HIGHLY RECOMMENDED FOR LEAK FREE CONNECTIONS.



### **DANGER**

INSTALLATION THE TANK CLEANER WITH INSUFFICIENT CONNECTIONS COULD RESULT IN LEAKS AND/OR EXPLOSION. IF YOU DO NOT FOLLOW THESE INSTRUCTIONS, YOU MAY BE KILLED OR SERIOUSLY INJURED.

### **MECHANICAL CLEARANCES**

PROPER INSTALLATION REQUIRES THAT SUFFICIENT CLEARANCE BE MAINTAINED BETWEEN THE ROTARY HOUSING AND NOZZLES OF THE TANK CLEANING UNIT AND ANY INTERNAL BAFFLES OR THE WALLS OF THE TANK BEING CLEANED.



## DANGER

IT IS YOUR RESPONSIBILITY TO ENSURE THAT THERE IS NO POSSIBILITY OF THE MOVING PARTS COMING IN CONTACT WITH FIXED OBJECTS. FAILURE TO INSTALL THE TANK CLEANER WITH SUFFICIENT CLEARANCES COULD RESULT IN THE GENERATION OF SPARKS WITH A RESULTANT EXPLOSION OR FIRE. IF YOU DO NOT FOLLOW THESE INSTRUCTIONS, YOU MAY BE KILLED OR SERIOUSLY INJURED.

### GROUNDING

A GROUND SCREW IS PROVIDED ON THE LIQUID INLET BODY MARKED WITH A GROUND SYMBOL. A GROUND WIRE SHOULD BE CLAMPED UNDER THE SCREW HEAD AND CONNECTED TO EARTH GROUND VIA AN APPROVED GROUNDING METHOD. LIKEWISE, A GROUND WIRE SHOULD BE AFFIXED TO THE TANK AND TERMINATED AT AN EARTH GROUND.



## DANGER

IT IS NOT SUFFICIENT TO GROUND ONLY THE TANK CLEANER OR THE TANK ITSELF BECAUSE THE ELECTRICAL CONTINUITY BETWEEN THE TANK CLEANING UNIT AND TANK CANNOT BE GUARANTEED. A SEPARATE GROUND CONNECTION FROM BOTH THE TANK CLEANING UNIT AND THE TANK ITSELF SHOULD BE MADE. FAILURE TO FOLLOW THIS INSTRUCTION CAN RESULT IN BUILDUP OF STATIC CHARGE BETWEEN THE TANK AND THE TANK CLEANER PARTS WHICH COULD CAUSE A SUDDEN DISCHARGE OF CURRENT WITH A RESULTANT EXPLOSION OR FIRE.

**YOU MAY BE KILLED OR SERIOUSLY INJURED IF YOU DO NOT FOLLOW THESE INSTRUCTIONS.**

### HIGH IMPACT SPRAYS

THIS TANK CLEANER MAY BE EQUIPPED WITH SOLID STREAM NOZZLES WHICH CONCENTRATE THE FLOW ENERGY INTO A SMALL AREA FOR MAXIMUM IMPACT AND CLEANING EFFICIENCY. OPERATION AT HIGH PRESSURE INCREASES THEIR EFFECTIVENESS BUT ALSO CREATES A HAZARD IF THE PROPER PRECAUTIONS ARE NOT FOLLOWED.



## WARNING

### INJURY HAZARD FROM HIGH IMPACT SPRAYS.

HIGH IMPACT SPRAYS CAN CAUSE SEVERE INJURY. THE LIQUID PRESSURE TO THE TANK CLEANER SHOULD NEVER BE TURNED ON WHILE THE UNIT IS OUTSIDE THE TANK. **FAILURE TO FOLLOW THIS INSTRUCTION CAN RESULT IN FLUID PENETRATION THROUGH CLOTHING AND INTO THE HUMAN SKIN CAUSING SEVERE INJURY, POSSIBLY RESULTING IN AMPUTATION OR DEATH.** IF ANY PART OF THE BODY COMES IN CONTACT WITH THE SPRAY STREAM, IMMEDIATELY CONSULT A PHYSICIAN.

## **AIR MOTOR LUBRICATION**

USE DETERGENT SAE #10 AUTOMOTIVE ENGINE OIL. CONSULT WITH YOUR LOCAL SUPPLIER OF LUBRICANTS OR CONTACT YOUR LOCAL SPRAYING SYSTEMS CO. SALES OFFICE.

## **AUTOMATIC LUBRICATION**

INLINE AIR LUBRICATOR SHOULD BE ADJUSTED TO FEED 1 DROP OF OIL PER MINUTE (60 SEC). DO NOT OVER-FEED OIL AS CONTAMINATION OF EXHAUST AIR MAY RESULT.

***NOTE: THE AIR SOURCE MUST BE WATER-FREE AND PROPERLY LUBRICATED TO PREVENT RUST AND EXCESSIVE FRICTION FROM WEARING OUT THE MOTOR PREMATURELY. IF THE AIR MOTOR IS TAKEN CARE OF PROPERLY IT SHOULD LAST MANY CLEANING CYCLES BEFORE REPAIR OR REPLACEMENT IS NECESSARY.***

# OPERATION

**IT IS YOUR RESPONSIBLY TO OPERATE THIS PRODUCT AT RECOMMENDED SPEEDS, LOADS AND TEMPERATURES.**

RUN THE UNIT WITHIN THE SPECIFIED PRESSURES AND FLOW RATES FOR THE LIQUID AND AIR MOTOR TO ENSURE SAFETY. TO MAINTAIN PROPER OPERATIONS DO NOT RUN THE UNIT DRY, ALWAYS KEEP LIQUID FLOW ON BEFORE STOPPING THE AIR MOTOR.



## **WARNING**

DO NOT USE COMBUSTIBLE GASES TO DRIVE THE AIR MOTOR. SOUND LEVEL FROM MOTOR MAY EXCEED 85DB(A). CHECK COMPATIBILITY OF SERVICE FLUID WITH MATERIALS USED TO CONSTRUCT THIS PRODUCT. USE A PRESSURE GAUGE TO MONITOR LIQUID PRESSURE (SEE 190DAG-1 FOR FLOW RATE DATA). ENSURE THAT THE PUMPING SYSTEM HAS MONITOR CONTROLS AND EMERGENCY SHUT OFF SYSTEM IN CASE OF PRESSURE SPIKE WHICH CAN CAUSE HARM TO THIS PRODUCT. FAILURE TO FOLLOW THIS INSTRUCTION CAN RESULT IN BURNS, EYE INJURY OR OTHER SERIOUS INJURY.



## **DANGER**

SPRAYING SYSTEMS CO. STRONGLY RECOMMENDS THE USE OF APPROPRIATE SAFETY EQUIPMENT WHEN WORKING WITH POTENTIALLY HAZARDOUS CHEMICALS. SEE YOUR CHEMICAL'S MSDS SHEET FOR ALL SAFETY MEASURES RELATING TO YOUR CHEMICAL.

THIS EQUIPMENT INCLUDES BUT IS NOT LIMITED TO:

- ❖ PROTECTIVE HAT
- ❖ SAFETY GLASSES OR FACE SHIELD
- ❖ CHEMICAL-RESISTANT GLOVES AND APRON
- ❖ LONG SLEEVE SHIRT AND LONG PANTS

ALWAYS REMEMBER TO CAREFULLY READ THE CHEMICAL MANUFACTURER'S LABEL AND FOLLOW ALL DIRECTIONS.

# MAINTENANCE

**IT IS YOUR RESPONSIBILITY TO REGULARLY INSPECT AND MAKE NECESSARY REPAIRS TO THIS PRODUCT IN ORDER TO MAINTAIN PROPER OPERATION. IT IS RECOMMENDED THAT THE BUSHINGS AND SEALS BE INSPECTED EVERY 1000 HOURS OF OPERATION OR SOONER IF EXCESSIVE LEAKAGE OF THE SEALS OCCURS.**

## **REMOVAL AND REPLACEMENT OF SPRAY NOZZLES (ITEM 17 ON PARTS LIST DRAWING PL 190DAG & PL 190DAGH)**

Make sure the unit is completely disconnected from the air source before attempting to service nozzles.

1. Unscrew spray nozzles (17) from nozzle hub (16) and inspect for plugging and wear.
2. If a nozzle is plugged or partially plugged, clean out the orifice and inlet area with a wooden toothpick or other relatively soft probe. Screwdrivers, wire or other hard metal items should not be used since they may scratch and severely damage the orifice.
  - a. If the nozzles need replacement, obtain new nozzles.
3. Replace spray nozzles (17) in nozzle hub (16) by tightly screwing them in.

## **REMOVAL AND REPLACEMENT OF NOZZLE HUB BUSHINGS (ITEM 15 ON PARTS LIST PL 190DAG & PL 190DAGH)**

1. Unscrew (counter-clockwise - right hand thread) nozzle hub post (18), and slide nozzle hub bushings (15) and nozzle hub (16) off the rotary Y-housing (14) and nozzle hub post (18).
2. Remove any foreign material from nozzle hub gear teeth.
3. To replace parts, slide one nozzle hub bushing (15) over the end of the rotary Y-housing (14) up to the shoulder.
4. Install second nozzle hub bushing (15) onto nozzle hub post (18) and push nozzle hub onto rotary Y-housing end.
5. Apply Loctite 243 or 242 to threads of nozzle hub post (18) and screw (clockwise) into rotary Y-housing (14) until it seats firmly.
6. Torque to 20 lb-ft (27 Nm).

## **REMOVAL OF #46340 AIR MOTOR DRIVE (SEE PARTS LIST DRAWING PL 46340-190)**

1. First make sure the unit is completely disconnected from the air source.
2. Using a 4 mm Allen wrench, unscrew and remove both 5 mm socket head cap screws (1) and respective spring washers (2).
3. You should now be able to lift the air motor drive

## **REMOVAL/REPLACEMENT OF AIR MOTOR DRIVE COUPLING (ITEM 8 ON PARTS LIST PL 46340-190)**

1. If it is necessary to remove the coupling (5) from the gear motor sub-assembly (11) shaft, tap the coupling with a rubber or plastic mallet until it releases from the shaft.
  2. To reassemble, align the keyway on the coupling (5) with the key (6) on the gear motor sub-assembly (11) shaft and lightly tap the coupling (5) until it bottoms on the shaft.
- Note:** The coupling (5) on the gear motor sub-assembly (11) shaft has a press fit so the coupling (5) does not inadvertently come apart during removal or installation of the gear motor sub-assembly.

## **REMOVAL OF THE UPPER SHAFT SEAL BODY SUB-ASSEMBLY (4) AND PINION GEAR BUSHING RETAINER SUB-ASSEMBLY (22) ON PARTS LIST (PL 190DAG & PL 190DAGH) REPAIR KIT (AB-190DAG-KIT)**

1. If it has not already been done, the air motor sub-assembly should be removed as described in the **Removal of #46340 air motor drive** section above.
2. Next, tap out the groove pin (9), unscrew the upper shaft seal body sub-assembly (4) and slide off the shaft (10).
3. Remove gasket (5) from shaft (10).
4. Now unscrew the 5/16" hex head cap screw (19), remove the lower screw shield (20) and drive plate (21).
5. Unscrew the pinion gear bushing retainer sub-assembly (22) and slide off the shaft (10).
6. Pull the rotary Y-housing (14) and bushings (13 & 23) off the stem (12).

7. Inspect O-Rings inside the upper shaft seal body sub-assembly (4) and seals inside pinion gear bushing retainer sub-assembly (22).
8. If damaged or worn, replace with new sub-assemblies.
9. Remove any foreign material from gear teeth of the pinion gear bushing retainer sub-assembly (22) before reassembly.

**REASSEMBLY OF THE UNIT (SEE PARTS LIST PL 190DAG & PL 190DAGH)**

1. Install one new bushing (23) into the lower end of the rotary Y-housing (14) and one new bushing (13) onto the stem (12) up to shoulder.
2. Slide the rotary Y-housing (14) and bushing (23) back onto the stem (12).
3. Reassemble the pinion gear bushing retainer sub-assembly (22) onto shaft (10) by slowly rotating it as you slide it onto the shaft. *This procedure will help prevent damage to the shaft seals inside.* Also, be sure the nozzle hub gear assembly (14) and pinion gear bushing retainer sub-assembly (22) mesh properly.
4. Torque pinion gear bushing retainer sub-assembly (22) to 40 lb-ft (54 Nm).
5. Replace the drive plate (21) and lower screw shield (20).
6. The bottom of the shaft should pass through the drive link so it is about flush with the bottom of the drive link.
7. Apply Loctite 243 or 242 to threads of hex head cap screw (19) and thread into shaft (10).
8. Holding the rotary Y-housing (14), torque hex head cap screw (19) to 5 lb-ft (7 Nm).
9. Install gasket (5) onto shaft (10) at the upper end of the shaft.
10. Apply Loctite 243 or 242 to threads of the upper shaft seal body sub-assembly (4) and reassemble onto shaft (10) by slowly rotating it as you slide it onto the shaft.
11. This procedure will help prevent damage to the shaft seals inside.
12. Torque upper shaft seal body sub-assembly (4) to 50 lb-ft (68 Nm).
13. Complete the reassembly by installing the groove pin (9) into shaft (10).

**REPLACEMENT OF #46340 AIR MOTOR DRIVE (SEE PARTS LIST DRAWING PL 46340-190)**

1. If it is not already attached, align the keyway on the coupling (5) with the key (6) on the gear motor sub-assembly (11) shaft and lightly tap the coupling (5) until it bottoms on the shaft.
2. Insert the coupling (5) through the hole in the top of the 190 inlet casting.
3. The slot on the coupling (5) should be aligned and indexed over the groove pin and drive shaft on the 190 assembly.
4. The air motor drive assembly can now be rotated until the through holes on inlet body align with the M5 female threaded inlet holes on the air motor drive assembly.
5. Using a 4 mm hex Allen wrench, secure the gear motor sub-assembly (11) to the inlet body using two M5 bolts (1) and spring lock washers(2).
6. ***BEFORE RE-INSTALLING IN A TANK, CONNECT AN AIR LINE TO THE AIR MOTOR DRIVE TO MAKE SURE THE UNIT WORKS PROPERLY.***

Parts List		
ITEM	PART NUMBER	DESCRIPTION
1	46340-190	Air Motor-Driven Assembly
*	2	CP7717-2-124-VI O-Ring, Viton®
*	3	CP7717-2-214-VI O-Ring, Viton®
*	4	18330-316EPR Upper Bushing Retainer Assembly, Type 316 Stainless Steel, PTFE, Carbon/Graphite Filled & EPR
*	5	CP58362-NY Gasket, Nylon
	7	18335-2-SS CE Nameplate & Inlet Body Sub-Assembly, Stainless Steel, Steel & Viton®
	7	B18335-2-SS CE Nameplate & Inlet Body Sub-Assembly, Stainless Steel, Steel & Viton® (BSPT Version)
	8	CP26404 Adapter, 1/4NPT (F) X 1/4BSPT (M), Brass
*	9	CP19109-SS Groove Pin, Stainless Steel
	10	CP50350- -316SS Shaft, Type 316 Stainless Steel
	11	CP50351- -316SS Extension Tube, Type 316 Stainless Steel
**	12	CP50355-316SS Stem, Type 316 Stainless Steel
*	13	50352-2-CGRTEF Bushing, PTFE, Carbon/Graphite Filled
	14	CP50348-316L Rotary Y-Housing, Type 316L Stainless Steel
*	15	CP50352-1-CGRTEF Bushing, PTFE, Carbon/Graphite Filled
**	16	50353-316SS Nozzle Hub Gear Assembly, Type 316 Stainless Steel
	17	*** Nozzle, Solid Stream WashJet® Nozzle, Hardened Stainless Steel (1/4" NPT or 1/4" BSPT Conn.) (2 Req'd) See Industrial Catalog & D.S. 15659 (WashJet®)
**	18	CP50354-316SS Nozzle Hub Post, Type 316 Stainless Steel
	19	CP18328-SS Cap Screw, Hex Hd. #10-32, Stainless Steel
	20	CP19103-1-316SS Lower Screw Shield, Type 316 Stainless Steel
	21	CP50349-316SS Drive Plate, Type 316 Stainless Steel
*	22	18332-1-316EPR Pinion Gear Bushing Retainer Assembly, Type 316 Stainless Steel, PTFE, Carbon/Graphite Filled & EPR
*	23	CP50352-3-CGRTEF Bushing, PTFE, Carbon/Graphite Filled

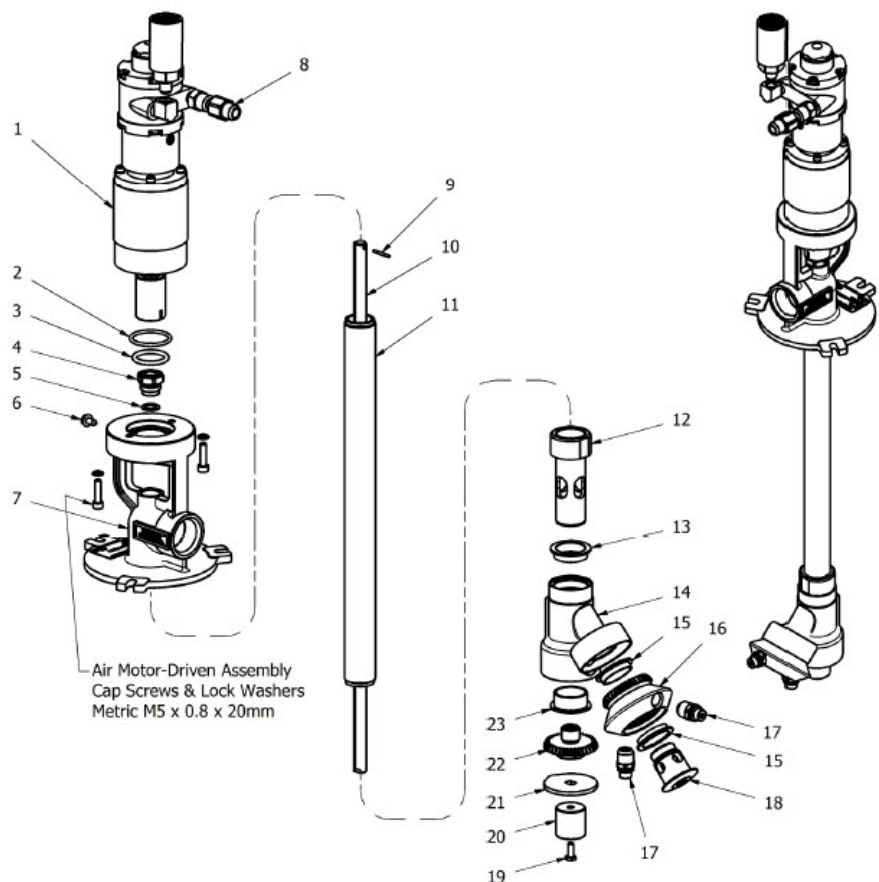
\* AB-190DAG-SEALS, Spare Seal Parts Kit (Includes All Items Marked with "\*\*")

\*\* AB-190DAG-KIT, Spare Parts Kit (Includes All Items Marked with "\*" & "\*\*")

\*\*\* Specify Spray Nozzle Number and Material:

Example: 1/4MEG-0020, Hardened Stainless Steel WashJet® Nozzle

Torque & Loctite® Requirements			
ITEM	POUND-FT	NEWTON METER	LOCTITE USED
4	50 lb-ft	68 N-m	242 or 243
18	20 lb-ft	27 N-m	242 or 243
19	5 lb-ft	7 N-m	242 or 243
22	40 lb-ft	54 N-m	242 or 243



DESCRIPTION:

NO. AA190DAG- & NO. AAB190DAG-  
Directional Air Motor-Driven Tank Cleaner



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Spray Nozzles and Accessories  
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REVISION NO.

Parts List

REFERENCE:

**PL 190DAG**

SHEET: 1 OF 1

DRWG SIZE: B

PART LISTS

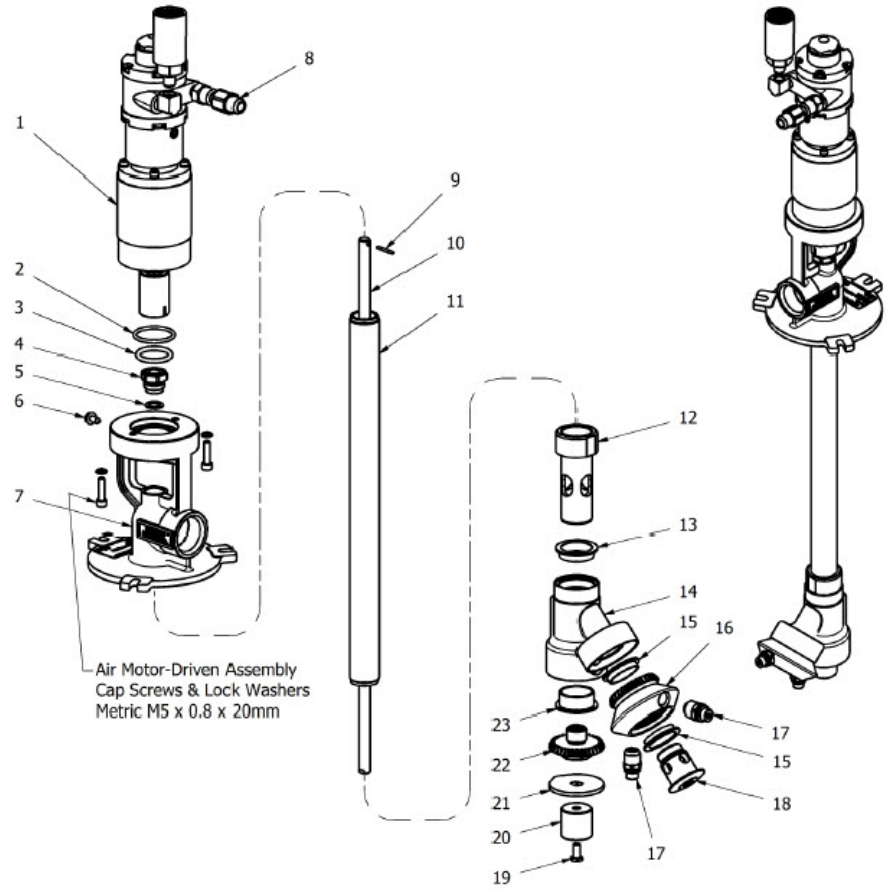


Parts List		
ITEM	PART NUMBER	DESCRIPTION
	1	46340-190 Air Motor-Driven Assembly
*	2	CP7717-2-124-VI O-Ring, Viton®
*	3	CP7717-2-214-VI O-Ring, Viton®
*	4	18330-316EPR Upper Bushing Retainer Assembly, Type 316 Stainless Steel, PTFE, Carbon/Graphite Filled & EPR
*	5	CP58362-NY Gasket, Nylon
	7	18335-2-SS CE Nameplate & Inlet Body Sub-Assembly, Stainless Steel, Steel & Viton®
	7	B18335-2-SS CE Nameplate & Inlet Body Sub-Assembly, Stainless Steel, Steel & Viton® (BSPT Version)
	8	CP26404 Adapter, 1/4NPT (F) X 1/4BSPT (M), Brass
*	9	CP19109-SS Groove Pin, Stainless Steel
	10	CP50350-_-316SS Shaft, Type 316 Stainless Steel
	11	CP50351-_-316SS Extension Tube, Type 316 Stainless Steel
**	12	CP50355-316SS Stem, Type 316 Stainless Steel
*	13	50352-2-CGRTEF Bushing, PTFE, Carbon/Graphite Filled
	14	CP50348-316L Rotary Y-Housing, Type 316L Stainless Steel
*	15	CP50352-1-CGRTEF Bushing, PTFE, Carbon/Graphite Filled
**	16	50353-316SS Nozzle Hub Gear Assembly, Type 316 Stainless Steel
	17	*** Nozzle, Solid Stream WashJet® Nozzle, Hardened Stainless Steel (1/4" NPT or 1/4" BSPT Conn.) (2 Req'd) See Industrial Catalog & D.S. 15659 (WashJet®)
**	18	CP50354-316SS Nozzle Hub Post, Type 316 Stainless Steel
	19	CP18328-SS Cap Screw, Hex Hd. #10-32, Stainless Steel
	20	CP19103-1-316SS Lower Screw Shield, Type 316 Stainless Steel
	21	CP50349-316SS Drive Plate, Type 316 Stainless Steel
*	22	18332-1-316EPR Pinion Gear Bushing Retainer Assembly, Type 316 Stainless Steel, PTFE, Carbon/Graphite Filled & EPR
*	23	CP50352-3-CGRTEF Bushing, PTFE, Carbon/Graphite Filled


- \* AB-190DAG-SEALS, Spare Seal Parts Kit (Includes All Items Marked with "\*")
- \*\* AB-190DAG-KIT, Spare Parts Kit (Includes All Items Marked with "\*" & "\*\*")

\*\*\* Specify Spray Nozzle Number and Material:  
Example: 1/4MEG-0020, Hardened Stainless Steel WashJet® Nozzle

Torque & Loctite® Requirements			
ITEM	POUND-FT	NEWTON METER	LOCTITE USED
4	50 lb-ft	68 N-m	242 or 243
18	20 lb-ft	27 N-m	242 or 243
19	5 lb-ft	7 N-m	242 or 243
22	40 lb-ft	54 N-m	242 or 243



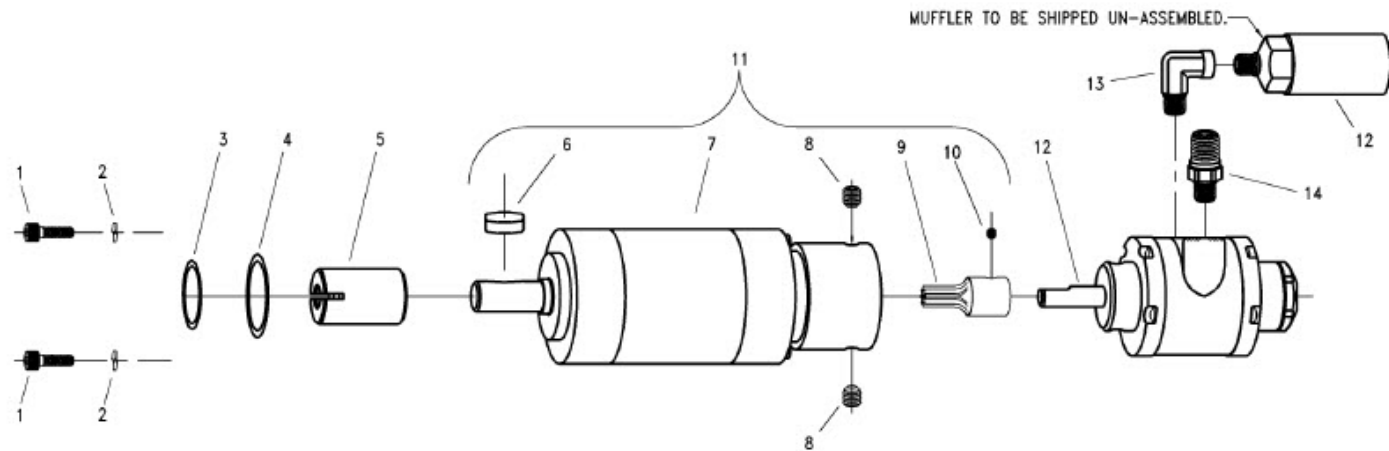
DESCRIPTION:  
NO. AA190DAGH- & NO. AAB190DAGH-  
Directional Air Motor-Driven Tank Cleaner



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REVISION NO.	Parts List	
REFERENCE:	<b>PL 190DAGH</b>	
SHEET: 1 OF 1	DWG SIZE:	B

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ITEM	PART NO.	DESCRIPTION
1	CP46766-20-316SS	METRIC SOCKET HEAD CAP SCREW, M5 x 0.8 x 20 mm LG. TYPE 316 STAINLESS STEEL (2 REQ'D)
2	CP46352-5-316SS	METRIC SPRING WASHER, 5 mm, STAINLESS STEEL TYPE 316 (2 REQ'D)
3	CP7717-2-214-VI	O-RING, VITON
4	CP7717-2-124-VI	O-RING, VITON
5	CP46343-316SS	COUPLING, 316 STAINLESS STEEL (FOR MODEL #AA090AG-- OR AA190AG--)
	CP46343-290-316SS	COUPLING, 316 STAINLESS STEEL (FOR MODEL #AA290AG--)
6	CP46349-4-IBO	METRIC KEY, 5 mm THICK, STEEL
7	CP46342	GEAR MOTOR
8	CP46344-8-IBO	METRIC SET SCREW, CUP POINT, M8 x 1.25 x 8 mm LG. ALLOY STEEL, BLACK OXIDE COATING (2 REQ'D)
9	CP46347-I	MOTOR PINION, STEEL
10	CP46346-4-IBO	METRIC SET SCREW, CUP POINT, M4 x 0.7 x 4 mm LG. ALLOY STEEL, BLACK OXIDE COATING
11	46351	GEAR MOTOR SUB-ASSEMBLY (CONSISTS OF THE FOLLOWING ITEMS 9, 10, 11, 12, & 13)
12	46350	AIR MOTOR, GAST 1UP-NRV-10 & AIR MOTOR MUFFLER, GAST AF350, CE CERTIFIED
13	CP38674-7	90° STREET ELBOW, 1/8 NPT (M) x 1/8 NPT (F), BRASS
14	CP26396-1	HEX PIPE NIPPLE, 1/4 NPT (M) x 1/8 NPT (M), BRASS

NO. 46340-190 AIR MOTOR ASSEMBLY (FOR MODEL #AA090AG-- OR AA190AG--)

NO. 46340-290 AIR MOTOR ASSEMBLY (FOR MODEL #AA290AG--)

**INCLUDED TOOLS:**

3/16" HEX ALLEN WRENCH FOR ITEM 5 (1/4-20 SOCKET HEAD CAP SCREW)

2 mm HEX ALLEN WRENCH FOR ITEM 13 (M4 SET SCREW)

4 mm HEX ALLEN WRENCH FOR ITEM 1 (M5 SOCKET HEAD CAP SCREW) & ITEM 11 (M8 SET SCREW).

**DESCRIPTION:**

No. 46340-190  
AIR MOTOR-DRIVEN ASSEMBLY



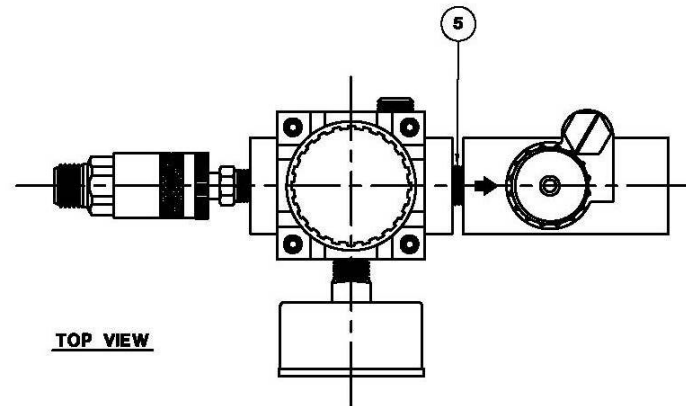
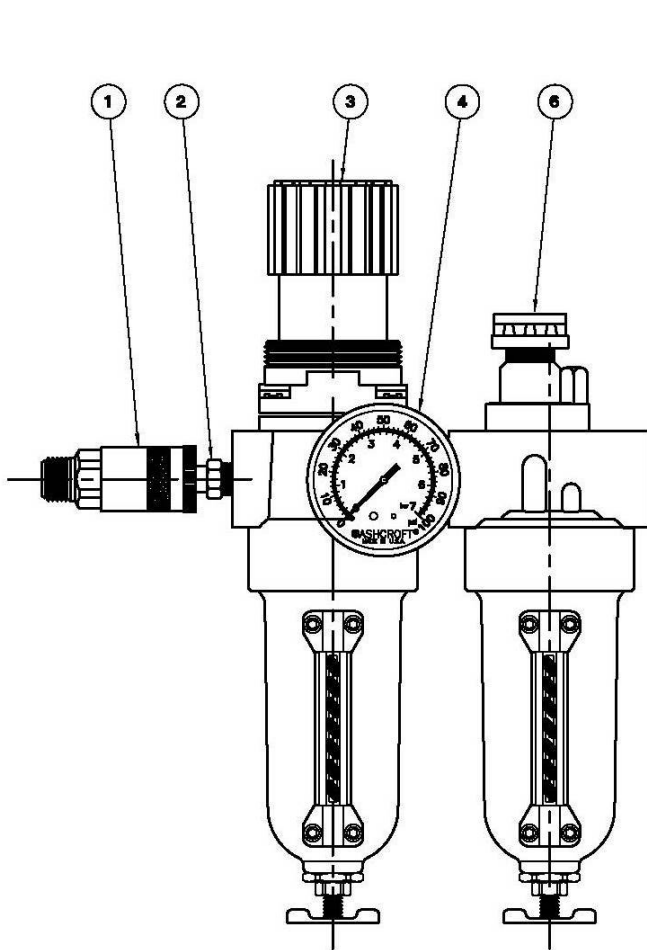
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P.O. Box 7900 - Wheaton, IL 60187-7901


Rev. No. 1

Ref.

Parts List No.  
**PL 46340-190**  
SHEET OF



ITEM	PART NO.	DESCRIPTION
1	CP22023	Coupler, Brass
2	CP22024-1	Coupler Nipple, Steel
3	CP22025	Filter / Regulator
4	26383-1/4-100	Gauge
5	CP7998-7/8	Close Nipple, Brass
6	CP22027	Lubricator
No. 21030 Lubricator Assembly		

<b>DESCRIPTION:</b> No. 21030 LUBRICATOR ASSEMBLY		 <b>Spraying Systems Co.<sup>®</sup></b> Spray Nozzles and Accessories P.O. Box 7900 - Wheaton, IL 60187-7900
Rev. No. Ref.	Parts List No. <b>PL 21030</b> SHEET OF	

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# WARRANTY

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## SPRAYING SYSTEMS CO. WARRANTY

SELLER WARRANTS THAT ITS PRODUCTS WILL CONFORM TO AND PERFORM IN ACCORDANCE WITH THE PRODUCTS' SPECIFICATIONS. SELLER WARRANTS THAT THE PRODUCTS DO NOT INFRINGE UPON ANY COPYRIGHT, PATENT OR TRADEMARK. THE FOREGOING WARRANTIES ARE IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THOSE CONCERNING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

BECAUSE OF THE DIFFICULTY OF ASCERTAINING AND MEASURING DAMAGES HEREUNDER, IT IS AGREED THAT, EXCEPT FOR CLAIMS FOR BODILY INJURY, SELLER'S LIABILITY TO THE BUYER OR ANY THIRD PARTY, FOR ANY LOSSES OR DAMAGES, WHETHER DIRECT OR OTHERWISE, ARISING OUT OF THE PURCHASE OF PRODUCT FROM SELLER BY BUYER SHALL NOT EXCEED THE TOTAL AMOUNT BILLED AND BILLABLE TO THE BUYER FOR THE PRODUCT HEREUNDER. IN NO EVENT WILL SELLER BE LIABLE FOR ANY LOSS OF PROFITS OR OTHER SPECIAL OR CONSEQUENTIAL DAMAGES, EVEN IF SELLER HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

# MAINTENANCE RECORD

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DATE	PROCEDURE PERFORMED

September 22, 2010  
Wheaton, Illinois, USA

## EC DECLARATION OF CONFORMITY

We,



**Spraying Systems Co.<sup>®</sup>**  
Experts in Spray Technology

North Avenue and Schmale Road, P.O. Box 7900,  
Wheaton, IL 60187-7901

Tel: 1.800.95.SPRAY

Intl. Tel: 1.630.665.5000

Fax: 1.888.95.SPRAY

Intl. Fax: 1.630.260.0842

Visit our Website at <http://www.spray.com> for local representatives

***in accordance with the following directive(s):***

2006/42/EC

The Machinery Directive

***hereby declare that:***

Equipment

Tank Cleaning Devices

Model number

AA190DAG, AA190DAGH

***is in conformity with the applicable requirements of the following documents:***

Ref. no.	Title	Edition/date
EN 982	Safety requirements for fluid power systems and their components – hydraulics	1996
EN12100-1	Safety of machinery – Basic concepts, general principles for design: Part 1: Basic terminology, methodology	2003
EN12100-2	Safety of machinery – Basic concepts, general principles for design: Part 2: Technical principles	2003
EN ISO 14121-1	Safety of machinery – Risk assessment Part 1: Principles	2007
ASME- B31.1	ASME Boiler and Pressure Vessel Code	2001

I hereby declare that the equipment named above has been designed to comply with the relevant sections of the above referenced specifications. The unit complies with all applicable Essential Requirements of the Directives.

Signed by:

A handwritten signature in black ink, appearing to read 'Robert J. Adams', followed by a horizontal line.

Robert J. Adams, P.E.  
Director of Engineering-Industrial Division  
Spraying Systems Co.<sup>®</sup>



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Experts in Spray Technology

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