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## **Drift Containment Spray System (DCSS)**

**Models:** WF4500/5000/5500/6000 – High Profile DCSS  
SP5520/6620 – Electric SP Mounts  
SP55/6620; H/ HL/ HV/ HVL – Hydraulic Mounts  
UM000 – Universal Manual Mount



**Parts, Assembly and Operations Manual**

# *Windfoil* High Profile DCSS Boom

Models: WF4500, WF5000, WF5500, and WF6000

Mounts: SP5520 and UM0001

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## Windfoil DCSS Forward

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The DCSS system was developed to give the industry a reliable way to apply liquids to turf. The system designed in a wind tunnel and proven by government tests contains the spray in a shroud sealed to the turf's surface. The tests show the DCSS has better drift control in winds of 24 mph (40 kph) than an open boom in winds of 6 mph (10 kph) which virtually eliminates the wind problem in spraying.

The airfoil on top of the shroud is the key. It eliminates the uplifting eddy from behind the DCSS that flips drops up into the air to become drift on non-airfoil covered booms.

The DCSS is the most environmentally and safety friendly liquid applicator available in the world today. By using it you join the leading professionals around the world and protect the environment.

## Windfoil DCSS Sizes

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<b>WF4500:</b>	3-5.0 ft. (1.5 m) sections, 15.0 ft. (4.5 m) spray width
<b>WF5000:</b>	1-6.6 ft. (2.0 m) center + 2-5.0 ft (1.5 m) wing sections, 16.5 ft (5.0 m) spray width
<b>WF5500:</b>	1-5.0 ft. (1.5 m) center + 2-6.6 ft (2.0 m) wing sections, 18.3 ft (5.5 m) spray width
<b>WF6000:</b>	3-6.6 ft. (2.0 m) sections, 20.0 ft. (6.0 m) spray width
<b>SP5520/H:</b>	Electric or Hydraulic Fold, 55" (1.4 m) wide mount; use on tanks 54" (1.37 m) wide or less
<b>SP6620/H:</b>	Electric or Hydraulic Fold, 66" (1.7 m) wide mount; use on tanks 65" (1.62 m) wide or less
<b>UM000:</b>	Manual Fold, Universal Mount

## Safety

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Whenever pesticides are changed, or before sprayer storage, clean sprayers thoroughly with a Cleaning solution that neutralizes the chemical to prevent cross contamination. The solution used depends on the chemical to be removed from the sprayer. Check the chemical label for cleaning instructions.

Many people die or suffer serious injury in job related accidents every year due to carelessness. Know your machinery and be aware of potential hazards. Put safety first in all your operations.

Review all instructions and procedures outlined in this manual annually. Every operator must familiarize himself with the operating instructions of the sprayer.

### Operational Safety

Shut down sprayer and power unit and wait for all parts to stop before adjusting, cleaning, or lubricating the power unit or sprayer.

- Before spraying a field familiarize yourself with any rocks, debris, trees, ditches or gullies that may be potentially dangerous. Plan the spraying route to avoid these hazards. When spraying, use individual section controls to reduce the amount of double spraying.
- Keep sprayer boom width in mind at all times. When turning, exercise caution and avoid any obstacles or other persons. Remember the boom takes a wider swing going around corners, especially on tractor mounts.

### Assembly Safety

- Clear large area to fold booms out in field position.
- A minimum of two people should be available for assembly of large equipment, especially when lifting or exertion is required.
- Always use clean tools of the proper size and specification to match the hardware and specific job.

## Transport Safety

- Never tow sprayers with castor wheels on the ground faster than 16 km/h (10 mph).
- Reduce speed on rough terrain.
- For all sprayers ensure that booms are folded and/or locked securely for transport.
- If excessive buffeting of airfoil/curtains occurs reduce speed as damage may result.

## Minimize Chemical Drift

The *Windfoil* sprayer has been designed in wind tunnels to control airflow around and behind the sprayer to minimize drift, allowing safe spraying in windy conditions. [See page 3 of brochure.]

Drift can blow off a field after it has been sprayed, especially in high winds. Reasonable caution should be taken, in order to spray effectively and safely.

**For maximum drift control, keep curtain in contact with the canopy to ensure a seal to it. Drift control of the *Windfoil* is less effective when the wind blows the curtain off the turf canopy, breaking the seal between the curtain and the turf.**

## General Spraying Information

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### Application Tips

Always use clean filtered water in the sprayer tank.

Your *Windfoil* DCSS is supplied with API ceramic tips. These tips gave a coefficient of variation of less than 6%, other tips gave 9% in our tests. The ceramic material is one of the hardest materials in the world; it greatly increases the life of your tips. Calibrate frequently to confirm tip accuracy.

Ensure that the pressure on the supply end of the hose used on hose reels is sufficient to deliver the proper pressure at the hand unit on the delivery end of the hose.

Check the flow rate from all nozzles using the capacity calibration technique; see the Calibration section for tables and instructions. Adjust the sprayer pressure to get the proper flow rate. The flow meters are not accurate enough in absolute terms to be used as a flow meter. In relative terms they are very accurate.

**Caution:** Conventional tips are rated at 40 psi. LP tips are rated at 15 psi. A 8004 tip at 40 psi delivers 0.4 US gal/min, but an 8004LP tip delivers 0.4 US gal/min. at 15 psi. These tips can not be mixed or interchanged. Only conventional 80° tips are recommended for the *Windfoil*. XR tips have a wider pattern than 80° and hit the shroud end, and are not recommended.

### Nozzles

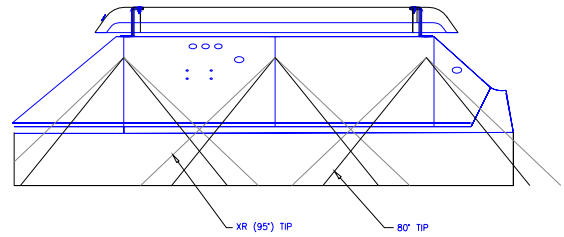
Despite being the most important component for accurate, uniform spraying application, nozzles are often neglected and abused. Nozzle flow rate depends on the effective orifice size and the pressure.

As pressure increases, average droplet size decreases. If droplets are too small, drift may be excessive with conventional sprayers but not with the *Windfoil's* DCSS. With conventional sprayers, large droplets that are used to control drift can roll off plants without sticking. The *Windfoil* DCSS will contain small droplets and allow them to be deposited on target plants. **Small droplets are beneficial in that they increase coverage and not a drift problem with the *Windfoil* DCSS.**

The spray patterns must overlap for even coverage but should not interfere with one another. Nozzles are set at a 10° angle so that one edge of its pattern will be just behind the edge of its adjacent spray pattern, evading interference with each other. The curtain must be in contact with the turf at all times to seal the shroud to the turf surface and contain the drops inside.

Use only a conventional TP or API 80° tips, as these tips will provide the most uniform spray pattern in the *Windfoil* DCSS. **Do not use XR tips as their spray pattern is greater than 80° causing the spray to hit the end of the shroud which causes dripping.**

If you wish to increase coverage to the edge of the shroud, use XR tips. The spray will hit the curtain and some dripping may occur which will not be noticeable with most pesticides. Caution must be exercised with pesticides that burn the turf, as these drops may increase burning.



**Caution:** When spraying next to a flower bed, do not spray over the turf edge as the spray will go under the curtain and onto the flowers.

As a tip wears, the spray pattern distorts, output volumes usually increase, and the droplet characteristics change. Recalibration may correct for output changes, but cannot correct for spray pattern changes or the drop size generated.

To provide a better product to *Windfoil* users the drift containment systems are equipped with ceramic API tips that have much greater durability than stainless steel tips. Tests show that API ceramic tips have a CV of 5.8 where as other tips have a CV of 9.0

## Diaphragm Check Valve Nozzle Bodies

Diaphragm check valves close at 15 psi to prevent excessive dripping. Should the cap on the valve loosen or the check valve diaphragm become misaligned, the body may leak. Stop the leak by, tightening the check valve cap or remove the cap and inspect the seal for damage or improper assembly.

Nozzle caps are attached by engaging the cap and turning clockwise about a third of a turn. Self-aligning caps have a slot to align the tips. Ensure that the tips fit down into the slotted hole before installing caps on the diaphragm nozzle body assembly with the tip screens.

As special order; 200 and 500 mesh screens, 8001 and 800067 tips in stainless steel can be ordered from *Rogers Innovative Inc.*

## Calibration

As a tip wears, the spray pattern distorts, output volumes usually increase and the droplet characteristics change. Recalibration may correct for output changes but cannot correct for spray pattern changes or the drop size generated.

Rotate the DSCC up (SP model only) to calibrate and operate the sprayer at the desired pressure. Collect the output from each nozzle for 60 seconds, using an accurate measuring cup. Record the output from each nozzle. Replace nozzles that are more than 5% above or below the average reading, or has a visibly distorted pattern.

After the nozzles have been individually checked and matched, the sprayer should be calibrated to determine the correct speed for the desired application volume.

Actual sprayer speed, as determined from the tables below, will differ from the sprayer speedometer readings because of wheel slippage. Run a speed test in the field to be sprayed, and have the sprayer tank half full. The sprayer must be at full speed before starting the test run. To determine the speed discrepancy, mark off a distance as found on one of the tables. Run the power unit over this distance, carefully noting the speedometer reading and recording the time to cover the distance. The actual speed traveled can be found for the specific distance and time to travel, using the table.

## Application Rate Tables

**Table 1: American Application Rates of API Tips at 20-inch nozzle spacing**

TIP	Tip	Liquid	FLOW	US Gal/AC – 20" Spacing					US Gal/1000 sq. ft/ - 20" Spacing				
COLOR	(screen)	Pressure	in GPM	3	4	5	6	7	3	4	5	6	7
	80°	in PSI	1 Tip	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH
Green	API 80015 (80 Mesh)	30	0.13	12.9	9.7	7.7	6.4	5.5	0.30	0.22	0.18	0.15	0.13
		35	0.14	13.9	10.4	8.3	6.9	5.9	0.32	0.24	0.19	0.16	0.14
		40	0.15	14.8	11.1	8.9	7.4	6.4	0.34	0.25	0.20	0.17	0.15
		45	0.16	15.9	11.9	9.5	7.9	6.8	0.36	0.27	0.22	0.18	0.16
		60	0.19	18.8	14.1	11.3	9.4	8.1	0.43	0.32	0.26	0.22	0.19
Yellow	API 8002 (50 Mesh)	30	0.17	17.3	13.0	10.4	8.6	7.4	0.40	0.30	0.24	0.20	0.17
		35	0.19	18.7	14.0	11.2	9.3	8.0	0.43	0.32	0.26	0.21	0.18
		40	0.20	20.0	15.0	12.0	10.0	8.6	0.46	0.34	0.28	0.23	0.20
		45	0.21	21.2	15.9	12.7	10.6	9.1	0.49	0.37	0.29	0.24	0.21
		60	0.25	24.4	18.3	14.7	12.2	10.5	0.56	0.42	0.34	0.28	0.24
Blue	API 8003 (50 Mesh)	30	0.26	26.1	19.6	15.7	13.1	11.2	0.60	0.45	0.36	0.30	0.26
		35	0.28	28.3	21.2	16.9	14.1	12.1	0.65	0.49	0.39	0.32	0.28
		40	0.30	30.1	22.6	18.1	15.1	12.9	0.69	0.52	0.42	0.35	0.30
		45	0.32	32.0	24.0	19.2	16.0	13.7	0.73	0.55	0.44	0.37	0.31
		60	0.37	36.9	27.7	22.2	18.5	15.8	0.85	0.64	0.51	0.42	0.36
Red	API 8004 (50 Mesh)	30	0.35	34.8	26.1	20.9	17.4	14.9	0.80	0.60	0.48	0.40	0.34
		35	0.38	37.6	28.2	22.5	18.8	16.1	0.86	0.65	0.52	0.43	0.37
		40	0.41	40.1	30.1	24.1	20.1	17.2	0.92	0.69	0.55	0.46	0.39
		45	0.43	42.5	31.9	25.5	21.3	18.2	0.98	0.73	0.59	0.49	0.42
		60	0.50	49.2	36.9	29.5	24.6	21.1	1.13	0.85	0.68	0.56	0.48
Brown	API 8005 (50 Mesh)	30	0.44	43.3	32.5	26.0	21.7	18.6	0.99	0.75	0.60	0.50	0.43
		35	0.47	46.8	35.1	28.1	23.4	20.1	1.07	0.81	0.65	0.54	0.46
		40	0.51	50.1	37.6	30.0	25.0	21.5	1.15	0.86	0.69	0.57	0.49
		45	0.54	53.1	39.8	31.9	26.6	22.8	1.22	0.91	0.73	0.61	0.52
		60	0.62	61.3	46.0	36.8	30.7	26.3	1.41	1.06	0.84	0.70	0.60
Grey	API 8006 (50 Mesh)	30	0.52	51.5	38.6	30.9	25.7	22.0	1.18	0.89	0.71	0.59	0.51
		35	0.56	55.6	41.7	33.3	27.8	23.8	1.28	0.96	0.76	0.64	0.55
		40	0.60	59.5	44.6	35.6	29.7	25.5	1.36	1.02	0.82	0.68	0.59
		45	0.64	63.1	47.3	37.8	31.5	27.0	1.45	1.09	0.87	0.72	0.62
		60	0.73	72.8	54.6	43.7	36.4	31.2	1.67	1.25	1.00	0.84	0.72

**Table 2: Metric Application Rates for API Tips at 50 cm nozzle spacing**

TIP	Tip	Liquid	FLOW	L/ha - 1/2 m Spacing					
COLOR	(screen)	PRESS.	in LPM	5	6	7	8	9	10
	80°	in kPa	1 Tip	KPH	KPH	KPH	KPH	KPH	KPH
Green	API 80015 (80 Mesh)	207	0.49	116.6	97.2	83.3	72.9	64.8	58.3
		241	0.53	125.0	104.2	89.3	78.1	69.5	62.5
		276	0.57	133.5	111.2	95.3	83.4	74.1	66.7
		310	0.61	143.1	119.2	102.2	89.4	79.5	71.5
		414	0.72	169.5	141.3	121.1	105.9	94.2	84.8
Yellow	API 8002 (50 Mesh)	207	0.64	156.3	130.2	111.6	97.7	86.8	78.1
		241	0.72	168.3	140.3	120.2	105.2	93.5	84.2
		276	0.76	180.3	150.3	128.8	112.7	100.2	90.2
		310	0.79	191.2	159.3	136.5	119.5	106.2	95.6
		414	0.95	220.0	183.3	157.2	137.5	122.2	110.0
Blue	API 8003 (50 Mesh)	207	0.98	235.6	196.4	168.3	147.3	130.9	117.8
		241	1.06	254.9	212.4	182.1	159.3	141.6	127.4
		276	1.14	271.7	226.4	194.1	169.8	150.9	135.9
		310	1.21	288.5	240.5	206.1	180.3	160.3	144.3
		414	1.40	333.0	277.5	237.9	208.1	185.0	166.5
Red	API 8004 (50 Mesh)	207	1.32	313.8	261.5	224.1	196.1	174.3	156.9
		241	1.44	339.0	282.5	242.2	211.9	188.4	169.5
		276	1.55	361.9	301.6	258.5	226.2	201.0	180.9
		310	1.63	383.5	319.6	273.9	239.7	213.1	191.8
		414	1.89	443.6	369.7	316.9	277.3	246.5	221.8
Brown	API 8005 (50 Mesh)	207	1.67	390.7	325.6	279.1	244.2	217.1	195.4
		241	1.78	422.0	351.7	301.4	263.7	234.4	211.0
		276	1.93	452.0	376.7	322.9	282.5	251.1	226.0
		310	2.04	478.5	398.7	341.8	299.1	265.8	239.2
		414	2.35	553.0	460.9	395.0	345.6	307.2	276.5
Grey	API 8006 (50 Mesh)	207	1.97	464.1	386.7	331.5	290.0	257.8	232.0
		241	2.12	501.3	417.8	358.1	313.3	278.5	250.7
		276	2.27	536.2	446.8	383.0	335.1	297.9	268.1
		310	2.42	568.7	473.9	406.2	355.4	315.9	284.3
		414	2.76	656.4	547.0	468.9	410.3	364.7	328.2

**Table 3: American Application Rates of Tee Jet Tips at 20-inch nozzle spacing**

Tip No. (Part No.) [Screen]	Liquid Press Psi	Capacity 1 nozzle gpm	U. S. GALLONS PER ACRE					U. S. GALLONS PER 1000 SQ. FT.					Press bars
			2.5 mph	3 mph	4 mph	5 mph	7 mph	2.5 mph	3 mph	4 mph	5 mph	7 mph	
800067 (05872) [200 mesh]	30	0.06	7.1	5.9	4.5	3.6	2.5	0.16	0.14	0.10	0.08	0.06	2.07
	40	0.07	8.0	6.6	5.0	4.0	2.8	0.18	0.15	0.11	0.09	0.07	2.76
	60	0.08	9.5	7.9	5.9	4.8	3.4	0.22	0.18	0.14	0.11	0.08	4.14
8001 (01369) [100 mesh]	30	0.09	10.7	8.9	6.7	5.3	3.8	0.25	0.20	0.15	0.12	0.09	2.07
	40	0.10	11.9	9.9	7.4	5.9	4.2	0.27	0.23	0.17	0.14	0.10	2.76
	60	0.12	14.3	11.9	8.9	7.1	5.1	0.33	0.27	0.20	0.16	0.12	4.14
80015 (00827) [100 mesh]	30	0.13	15.4	12.9	9.7	7.7	5.5	0.35	0.30	0.22	0.18	0.13	2.07
	40	0.15	17.8	14.9	11.1	8.9	6.4	0.41	0.34	0.26	0.20	0.15	2.76
	60	0.18	21.4	17.8	13.4	10.7	7.6	0.49	0.41	0.31	0.25	0.18	4.14
8002 (05876) [50 mesh]	30	0.17	20.2	16.8	12.6	10.1	7.2	0.46	0.39	0.29	0.23	0.17	2.07
	40	0.20	23.8	19.8	14.9	11.9	8.5	0.55	0.45	0.34	0.27	0.19	2.76
	60	0.25	29.7	24.8	18.6	14.9	10.6	0.68	0.57	0.43	0.34	0.24	4.14
8003 (05877) [50 mesh]	30	0.26	30.9	25.7	19.3	15.4	11.0	0.71	0.59	0.44	0.35	0.25	2.07
	40	0.30	35.6	29.7	22.3	17.8	12.7	0.82	0.68	0.51	0.41	0.29	2.76
	60	0.37	44.0	36.6	27.5	22.0	15.7	1.01	0.84	0.63	0.50	0.36	4.14
8004 (05878) [50 mesh]	30	0.35	41.6	34.7	26.0	20.8	14.9	0.95	0.80	0.60	0.48	0.34	2.07
	40	0.40	47.5	39.6	29.7	23.8	17.0	1.1	0.91	0.68	0.55	0.39	2.76
	60	0.49	58.2	48.5	36.4	29.1	20.8	1.3	1.11	0.84	0.67	0.48	4.14
8005 (05879) [50 mesh]	30	0.43	51.1	42.6	31.9	25.5	18.2	1.2	0.98	0.73	0.59	0.42	2.07
	40	0.50	59.4	49.5	37.1	29.7	21.2	1.4	1.14	0.85	0.68	0.49	2.76
	60	0.61	72.5	60.4	45.3	36.2	25.9	1.7	1.39	1.04	0.83	0.59	4.14
8006 (05880) [50 mesh]	30	0.52	61.8	51.5	38.6	30.9	22.1	1.4	1.18	0.89	0.71	0.51	2.07
	40	0.60	71.3	59.4	44.6	35.6	25.5	1.6	1.36	1.02	0.82	0.58	2.76
	60	0.74	87.9	73.3	54.9	44.0	31.4	2.0	1.68	1.26	1.01	0.72	4.14
8008 (05881) [50 mesh]	30	0.69	82.0	68.3	51.2	41.0	29.3	1.9	1.57	1.18	0.94	0.67	2.07
	40	0.80	95.0	79.2	59.4	47.5	33.9	2.2	1.8	1.36	1.09	0.78	2.76
	60	0.98	116	97.0	72.8	58.2	41.6	2.7	2.2	1.67	1.34	0.95	4.14

**Table 4: Metric Application Rates of Tee Jet Tips at 50 cm nozzle spacing**

Tip No. (Part No.) [Screen]	Liquid Press kPa	Capacity 1 nozzle l/min	L/ha - 1/2 m Spacing						Tip No. (Part No.) [Screen]	Liquid Press kPa	Capacity 1 nozzle l/min	L/ha - 1/2 m Spacing					
			4 km/h	5 km/h	6 km/h	7 km/h	8 km/h	10 km/h				4 km/h	5 km/h	6 km/h	7 km/h	8 km/h	10 km/h
800067 (05872) [200 mesh]	2.0	0.21	63.0	50.4	42.0	36.0	31.5	25.2	8004 (05878)	2.0	1.29	387	310	258	221	194	155
	2.5	0.24	72.0	57.6	48.0	41.1	36.0	28.8		2.5	1.44	432	346	288	247	216	173
	3.0	0.26	78.0	62.4	52.0	44.6	39.0	31.2	11004 (08858)	3.0	1.58	474	379	316	271	237	190
	3.5	0.28	84.0	67.2	56.0	48.0	42.0	33.6		3.5	1.71	513	410	342	293	257	205
	4.0	0.30	90.0	72.0	60.0	51.4	45.0	36.0	[50 mesh]	4.0	1.82	546	437	364	312	273	218
8001 (01369) 11001 (05862) [100 mesh]	2.0	0.32	96.0	76.0	64.0	54.9	48.0	38.4	8005 (05879)	2.0	1.61	483	386	322	276	242	193
	2.5	0.36	108.0	86.0	72.0	61.7	54.0	43.2		2.5	1.80	540	432	360	309	270	216
	3.0	0.39	117.0	93.0	78.0	66.9	58.5	46.8	11005	3.0	1.97	591	473	394	338	296	236
	3.5	0.42	126.0	101.0	84.0	72.0	63.0	50.4		3.5	2.13	639	511	426	365	320	256
	4.0	0.45	135.0	108.0	90.0	77.1	67.5	54.0	[50 mesh]	4.0	2.27	681	545	454	389	341	272
80015 (00827) 110015 (01713) [100 mesh]	2.0	0.48	144.0	115.0	96.0	82.3	72.0	57.6	8006 (05880)	2.0	1.94	582	466	388	333	291	233
	2.5	0.54	162.0	130.0	108.0	92.6	81.0	64.8		2.5	2.16	648	518	432	370	324	259
	3.0	0.59	177.0	142.0	118.0	101.0	88.5	70.8	11006 (05865)	3.0	2.37	711	569	474	406	356	284
	3.5	0.64	192.0	154.0	128.0	110.0	96.0	76.8		3.5	2.56	768	614	512	439	384	307
	4.0	0.68	204.0	163.0	136.0	117.0	102.0	81.6	[50 mesh]	4.0	2.74	822	658	548	470	411	329
8002 (05876) 11002 (05863) [50 mesh]	2.0	0.65	195.0	156.0	130.0	111.0	97.5	78.0	8008 (05881)	2.0	2.58	774	619	516	442	387	310
	2.5	0.72	216.0	173.0	144.0	123.0	108.0	86.4		2.5	2.88	864	691	576	494	432	346
	3.0	0.79	237.0	190.0	158.0	135.0	119.0	94.0	11008 (05866)	3.0	3.16	948	758	632	542	474	379
	3.5	0.85	255.0	204.0	170.0	146.0	128.0	102.0		3.5	3.41	1023	818	682	585	512	409
	4.0	0.91	273.0	218.0	182.0	156.0	137.0	109.0	[50 mesh]	4.0	3.65	1095	876	730	626	548	438
8003 (05877) 11003 (05864) [50 mesh]	2.0	0.96	288.0	230.0	192.0	165.0	144.0	115.0									
	2.5	1.08	324.0	259.0	216.0	185.0	162.0	130.0									
	3.0	1.18	354.0	283.0	236.0	202.0	177.0	142.0									
	3.5	1.27	381.0	305.0	254.0	218.0	191.0	152.0									
	4.0	1.36	408.0	326.0	272.0	233.0	204.0	163.0									

**Table 5: Time in Seconds to Travel a Distance of:**

Km/h	10 (m)	25 (m)	50 (m)	100 (m)	200 (m)
1	36.0	90.0	180.0	360.0	720.0
1.5	24.0	60.0	120.0	240.0	480.0
2	18.0	45.0	90.0	180.0	360.0
2.5	14.4	36.0	72.0	144.0	288.0
3	12.0	30.0	60.0	120.0	240.0
4	9.0	22.5	45.0	90.0	180.0
5	7.2	18.0	36.0	72.0	144.0
6	6.0	15.0	30.0	60.0	120.0

**Table 6: Time in Seconds to Travel Distance of:**

mph	10 (ft)	25 (ft)	50 (ft)	100 (ft)	200 (ft)
1	6.8	17.0	34.1	68.2	136.0
1.5	4.5	11.4	22.7	45.5	90.9
2	3.4	8.5	17.0	34.1	68.2
2.5	2.7	6.8	13.6	27.3	54.5
3	2.3	5.7	11.4	22.7	45.5
4	1.7	4.3	8.5	17.0	34.1
5	1.4	3.4	6.8	13.6	27.3
6	1.1	2.8	5.7	11.4	22.7

## General Maintenance

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### Cleaning

Sprayers need to be cleaned to prevent corrosion, to prevent cross contamination of chemicals, and to prevent crop injury. Trace amounts of one chemical can react with another or carry over to the next spraying and cause crop damage, especially with pesticides. Long exposures with even small amounts of some chemicals can damage sprayer components either by corrosion or deposits of gums, etc. If you spray crops that are very susceptible to injury from the last chemical used, such as vegetables, turf, and ornamentals clean the unit especially well.

Always try to end the day with an empty tank; avoid contamination of water supplies and injury to plants or animals. Wash the sprayer and DCSS in a wash area that properly contains the wash water. Flush with clean water, preferably after each day's operation. However, if you plan to use the same material over several days, most chemicals may be kept in the tank overnight; the label usually indicates which may not. Rinse the outside of the sprayer. Surfactants combined with chemicals, when they are compatible, will provide some cleaning action in the sprayer. Spray the rinse over the application area.

Some chemical combinations (especially if oil is used) may produce a putty type paste (buttering out) in the sprayer tank and components, flushing with water after each load may prevent an accumulation. If water alone does not dissolve and remove the buildup, add a solvent. Allow paste to dissolve, then agitate and flush. Flush with detergent and finally with clean water. Check with your chemical agent.

Whenever pesticides are changed, or before sprayer storage, clean sprayers thoroughly with a cleaning solution that neutralizes the chemical to prevent cross contamination. The solution used depends on the chemical to be removed from the sprayer. Check the chemical label for cleaning instructions.

Remove nozzle tips and screens; clean them in a strong detergent solution or kerosene, using a soft brush such as an old toothbrush. Never use a metal probe to clean the orifice of a spray tip!

Follow the same safety precautions during cleaning as for applications. Use respirator, rubber gloves, or other protective gear as may be directed by label instructions.

### Sunshine

Many plastic sprayer parts are degraded by ultra violet light, especially the nozzle flow indicators. Store the sprayer in the shade to extend the length of service.

### Winterizing

After the sprayer is thoroughly cleaned, put 2 to 5 gallons of rust inhibitor or antifreeze in the tank prior to the final flushing to help prevent corrosion. As the water is pumped from the sprayer, the antifreeze will leave a protective coating on the inside of the tank, pump, and plumbing. Remove nozzle tips, screens and no drip valves (if used) and store them in a can of light oil such as diesel fuel or kerosene to prevent corrosion. Close nozzle openings with tape to prevent dirt, insects, or other contaminants from entering.

During the final cleaning, completely check the sprayer. Look at the hoses, clamps, connections, nozzle tips, and screens for needed replacements and order from your dealer early. Store the sprayer in a reasonably clean and dry building.

## DCSS Mounting and Assembly Instructions

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### General Assembly of the SP5520/6620 Fold System

See General Assembly SP5520/6620 Parts Layout. The specific mount should be installed first, see Mount Adapters section.

#### Side Plate Assembly

Each side plate attaches to the outside of the cross support with 2-2" U-bolts on each side. Ensure that the side plate faces outward and the float arm hinge pin is 31 to 33 inches off the ground - the lower the better.



**Float Arm**

Install the float arm assembly to the side plates with the actuator mount tabs located on the right side. Use 1" diameter by 5" long pins to attach the float arm to the side plate assembly. Secure the 1" diameter pins with a ¼" bolt on the inside of the side plate assembly. Tighten U-bolts holding the side plate assembly to the cross support.

**Mounting Blocks**

Assemble the mounting blocks on the float arm be sure to put the one with the actuator mount on the right side. Put the shim plates in as required to have a firm but not tight fit.

**Main Lift Actuator**

Place the actuator (if electric - the motor end )(if hydraulic - the barrel end) in the mount on the float arm with the motor up and the rod end in the mounting block with the 2 rubber bushings and 2 washers on the outside of the bushing. Do not over tighten the bolts. The roller arms must be resting on the flat section of the side plate when the actuator is closed. The actuator should extend 12 inches. Extension can be accomplished by twisting the rod end.

**Mounting The Wheels on the DCSS Sections**

The castor wheel assemblies are put into place from underneath the boom. One wheel is used for each wing and two wheels for the center section. The shaft of the wheel assembly slips into a swivel bushing.

The castor wheel spacer fits on top of the swivel bushing. A lynch pin holds the shaft of the castor in place. To adjust the height that the boom rides, move the castor wheel spacer to the bottom of the swivel bushing.

Tighten the bolt to slightly pretension the wheel bearings. If the bolt is too tight it will overload the bearings. If too loose, hammering will make the bearings fail.

Grease each swivel bushing every 50 hours of sprayer operation.

A heavy duty bearing kit with tapered wheel bearings is available (12391 c/w wheel or 12025 w/o wheel).

**Mount the Boom Mount Bar to the Centre Section**

Pin the boom mount bar between the tabs of the shroud mount on the center boom using the 1" diameter pin and lock there with the cotter pins. The longer part of the pin bushing goes forward. (Check this) If the float springs make this difficult tighten their bolts to compress them, once assembled loosen the bolts so the spring pushes down on each side equally so the boom stays level when lifted.

**Mount the Center Section to the sprayer**

Attach the center section with the boom mount bar to the mounting blocks with U bolts. Check that the boom is level from the front to the back when the actuator is fully extended. If the boom is not level, adjust the position of the boom mount on the mounting blocks.

**Wing Attachment**

1. Remove the wing pivot bearing caps from the wing section and ensure that the guide rings are in the center of the breakaway arm.
2. With the wings in place replace the bearing caps around the breakaway arm.
3. Push the guide ring against the inside of the 2 bearing caps and locate the wing so that the gap between the centre and wing shrouds at the front is larger than the back. Tighten the set screws on the guide rings on the breakaway arm with the wing down.

Grease wing pivot and breakaway pivot every 50 hours of operation.

**Curtains**

Install the curtain by pulling the curtain edge containing the rope into the curtain hanger, ensure that the lapped part is inside the shroud. When pulling the curtain into the hanger, take care to guide the curtain as it enters the hanger. Use WD40 or a Teflon lubricant to make the curtain slide easier. If the curtain is loose in the hanger put a machine screw through the hanger and the rope. The long curtains go on the wings, the short on the center section.

**Airfoils**

Remove the brass nuts from the top of the appropriate nozzle bodies and attach the airfoil standoffs as indicated. There are right and left airfoil standoffs (00721L/00721R) and the top of the standoff slopes towards the back. Bolt the airfoils on top of the standoffs with the bolt heads and washers on top.

**Monitor Stand**

Mount the monitor stand on the float arm with the flow monitor assembly facing the driver. Usually it is most visible on the extreme right end of the bar.

**Wing Boom Hoses and Routing**

1. Using the 3/4" hose mender and hose clamps, connect the supply line from the center to the supply line that exits from the wing.
2. The connected hose forms a small loop behind the wing hinge and under the bearing mount before entering the wing section.
3. Secure the hose to the bearing mount with a nytie.

**Center Section Hoses and Routing**

Run the center section 1/2" nozzle hoses to the center section nozzle flow monitor ensure that the right side monitor is connected to the right side tip etc. Connect the 3/4" hose to the bottom of the monitor and loop down to the sprayer's solenoids or other control element. Nytie the hoses to the monitor mount neatly. Run the 3/4" feed hoses under the boom mount bar to the solenoids. Cut to length but be sure to leave sufficient length for float and folding to the transport position. Nytie to the boom mount bar.

**Wing Lift Actuator**

Place the actuator motor or barrel end on the center section mounts. Be sure that the clevis is situated such that the hole is closest to the wing, bolt it in, do not over tighten the bolt. The other end is bolted on the wing in the float slot, be sure to put a washer on each side and leave the bolt loose enough for it to slide easily in the float slot.

Ensure that the spring on the wing actuator mount bottom is not fully compressed when the actuator is fully compressed. If the spring is fully compressed the closing of the actuator will twist and eventually break the boom.

On a level surface extend the actuator fully. There should be room for the boom to float up and down on both sides of the actuator mounting slot. Adjust the fold stop so the wing comes up to 90° when the actuator is closed.

**Wire Routing and Connection.**

1. Route the power cable, 14 gauge, 2 conductor to the battery.
2. Connect the white wire, positive, to a 30A circuit breaker.
3. Connect the circuit breaker to the positive terminal of the battery. See the electrical diagram in the appendix.
4. Connect the black wire to the negative terminal of the battery.
5. Route the switched wire cable from the control box to the back of the spray machine.
6. Route the cables to the boom along the frame and near the axis of pin points. Stay clear of pinch points.
7. Route the cable for the transport boom lift actuator near the front pivot of the float arm. It is the short one.
8. Pass the wing's actuator cables near the centre of the shroud mount centre section. Attach the red and green wires to the right hand actuator, the black and white wires to the left actuator and nytie to the motor so the motor wire is not stressed.
9. The cables pass over the center of the boom under the airfoil to each actuator.
10. Tie neatly to hoses where possible.

**Hydraulic Actuator Control Installation**

Locate the 3-way hydraulic valve under the dash near the operator and run the feed hoses similar to the wire for electric actuator to the hydraulic connectors on the truck. Hose lengths have been selected for the JD HD200 and the ProGator; lengths may have to be adjusted by the customer for other trucks. Mount the hydraulic valve similar to the electric control box. Run the hoses the same way as the wiring.

Mount the hydraulic actuators as the electric actuators. Run hoses under the airfoil and boom mount bar along the frame to the front to the 3 way hydraulic valve.

## Transport Catches

The transport arms and catches of the sprayer mount hold the boom in transport position. Mount the transport catches on the front of the boom in the set of holes that line up best with the transport lock catches. The transport catch must rest on the transport arm. Mount the transport arms on the front of the side plate assemblies with 2 U-bolts. The position of the transport catch depends on the type of mount and the position of the mount with respect to the boom. It may have to be sawed off to fit the WF4500/5500 boom.

Each transport arm has a catch in the form of a 'V' to guide the transport catches into place.

1. Mount transport catches after complete sprayer assembly.
2. Fold boom to 2" above the transport position.
3. Mark booms at the proposed Transport Catch location. This point should match up with the catch on the transport arms.
4. Mount the transport catches using 5/16" x 2" bolts provided.

**Note:** Watch closely to avoid damage to the spray monitor when lowering the boom without the transport catches installed.

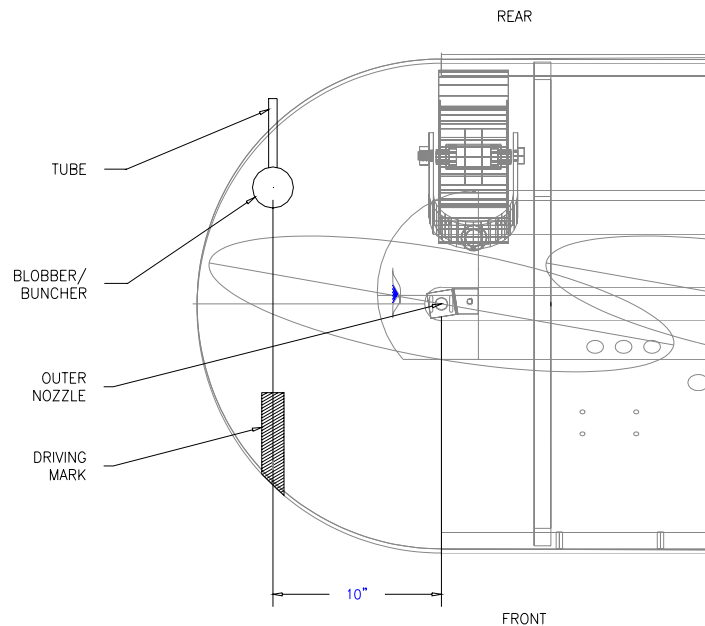
## Mounting Wing Lift Actuator Kits

Mount as described in the above actuator sections

## Foam Marker Installation Considerations

Mount the foam marker tank etc. as instructed by the manufacturer. Run hoses along the spray hoses under the shrouds as much as possible. Be sure to go around the back of the breakaway hinge point and into the wing, along the top of the 2"x2" tube to the end.

**Ensure no plumbing or hardware gets into the spray pattern as dripping or stripping may occur.** If the blobber is small enough, locate it inside the shroud with the tube or buncher going out the back such that it drops the blob just past the lower edge of the curtain. It must be located 10" along the centerline of the shroud from the end tip. This places the blobber where it is protected from branches etc. plus positions the blob where both the front and rear curtain should hit it on the return pass, smearing it out which will help it dissipate. Put a large mark on the front of the shroud the same distance from the tip and drive such that the foam blob lines up with the mark. This will ensure proper overlap and provide even coverage.



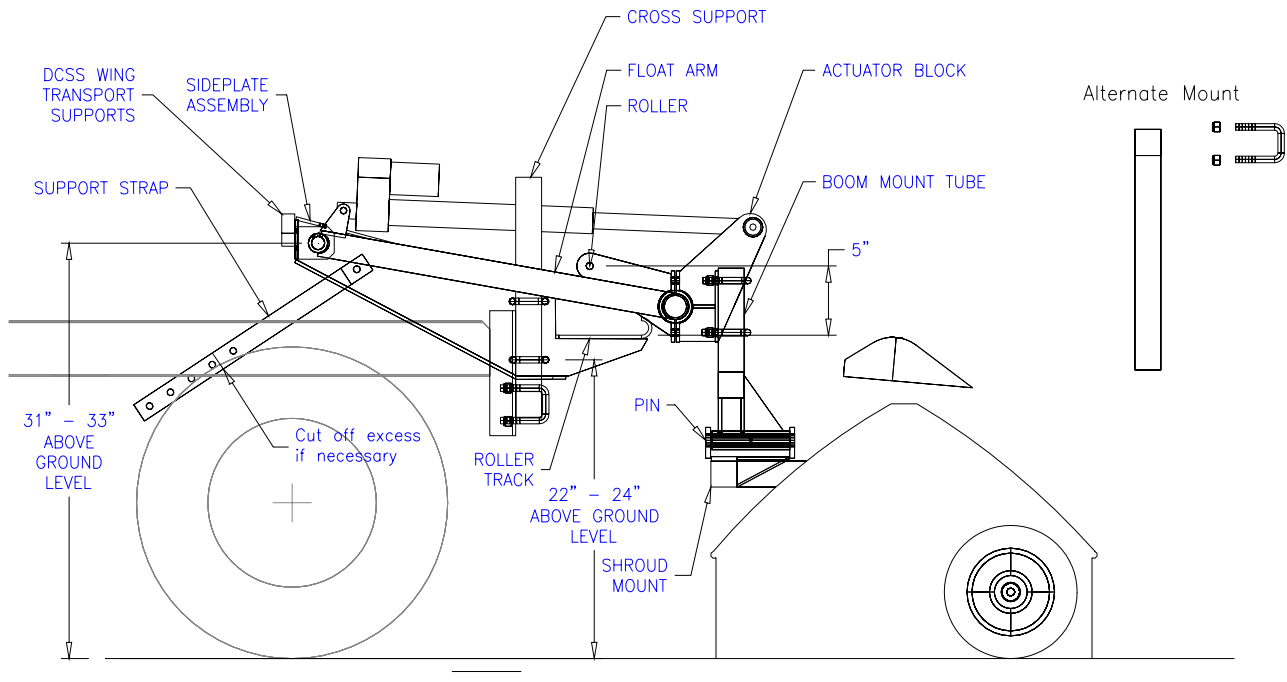
Under certain conditions large foam blobs will suffocate the grass underneath them. This can be minimized by smearing the foam and by using the smallest blob possible. Some operators replace the large blobber supplied with a 1/2" hose running down the back edge of the curtain.

## DCSS Mounting Considerations

### SP Mount

Ideally the hinge point should be located 32 inches above the ground centered over the rear wheel of the prime mover. This maximizes the DCSS ground following abilities. This is especially important in sharp swells or undulations. Especially on tractor mounts where the hinge point must be located behind the wheel.

Mounting over the wheel also mitigates the sideways movement when turning. Obviously this movement makes it harder to maneuver in tight places.



If the mounting area on the prime mover is too high, the cross support can be inverted so the boom hangs below the mounting point. Adjust the U-bolts on the cross bar and on the boom mount so that the boom is level when standing on level ground and there is approximately 4 1/2" between the roller and the track it follows on the sideplate.

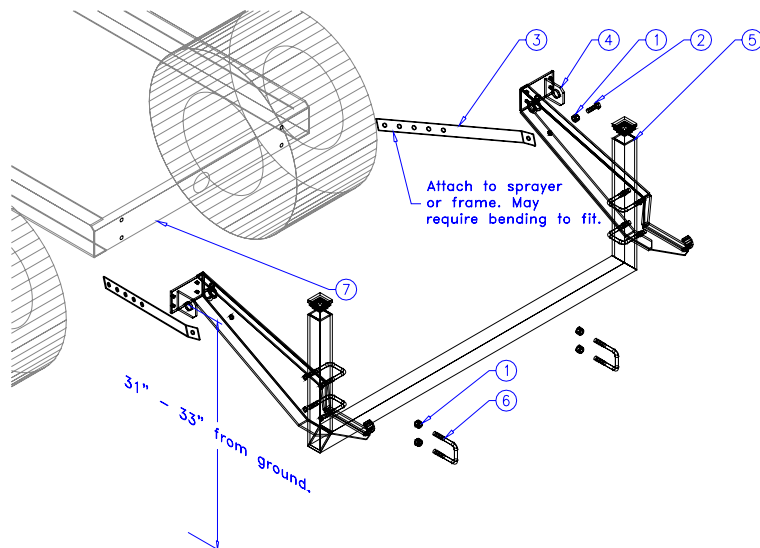
The support strap must be securely attached to the prime mover frame in a manner to oppose the torque on the mount. About 90° to a line running from the cross piece on the Cross Support to the hinge point is ideal. However this can vary considerably. Some mounts, such as the JD HD200 and Cushman Spraymaster do not require the support strap.

The lower the DCSS is in transport the less it will be affected by wind and vibration.

## Mount Adapters

### Broyhill/Cushman 240gal Trailer (#SPBRTR240)

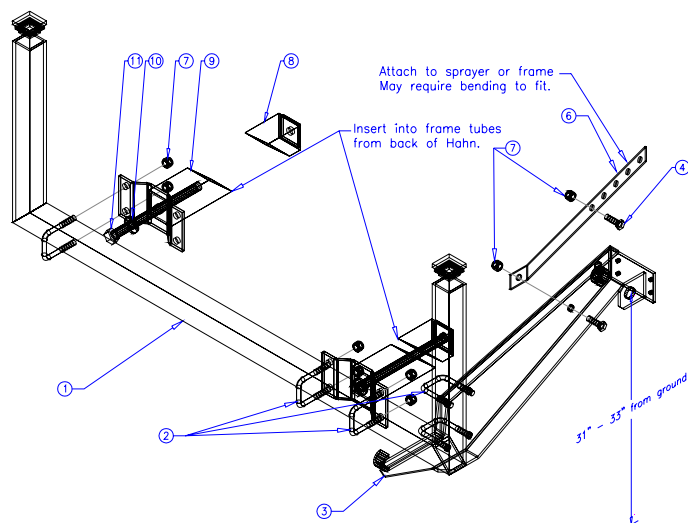
- ⇒ Remove hoses from solenoids and all open boom mounting brackets
- ⇒ Drill holes (refer to drawing) in trailer frame lower cross member (#7) for mounting Cross Support (#5) with U-bolts (#6). Ensure hole spacing matches U-bolt spacing.
- ⇒ Mount Cross Support with U-bolts. Relocate central hose if necessary.
- ⇒ Mount Sideplate Assemblies to cross support and adjust so the pivot is 31"-33" above ground.
- ⇒ Assemble rest of mount, refer to previous section and General Assembly SP5520/6620 Parts Layout.
- ⇒ Connect hoses to solenoid



Item	Part #	Description	Qty
1	00963	Nylock Nut, ½NC, Pld	4
2	01053	Bolt, ½NCX1½, Pld	0
3	01604	Support Strap	0
4	12327R	Sideplate Assembly, Right	0
5	01114	Cross Support	0
6	00962	U-bolt, ½NCX2SqX3¼, Pld	2

### Hahn/Deere Hahn/Toro Hahn/Smithco (#SPHAHN)

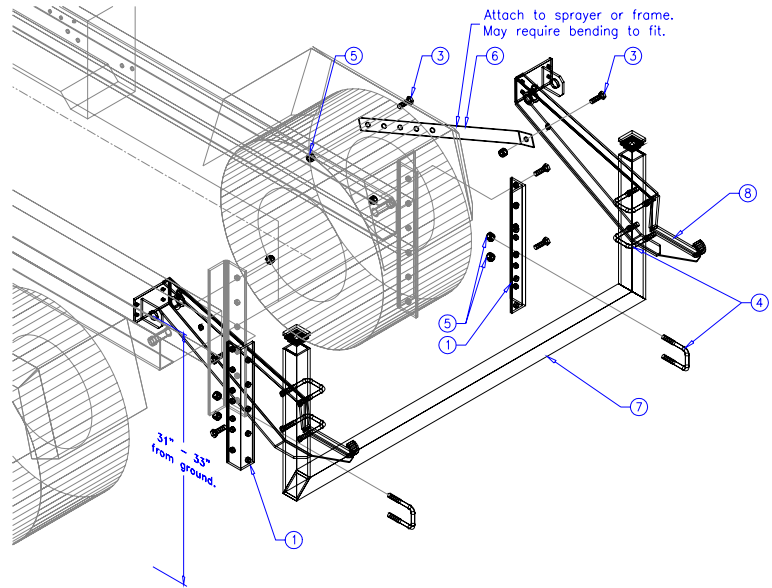
- ⇒ Assemble Frame Mounts ( #'s 8, 9, 10 and 11). Ensure they are not tight, as they will not fit into the frame tubing.
- ⇒ Insert Frame Mounts into frame tubing at back of power unit. Check they are inline front to back so sprayer will mount straight.
- ⇒ Mount Cross Support (#1) to frame mounts with U-bolt (#2) and nuts (#7).
- ⇒ Mount Sideplate Assemblies (#3) to Cross Support. Ensure pivot is 31"-33" above ground for proper sprayer height.
- ⇒ Complete assembly of mount, refer to previous section and General Assembly SP5520/6620 Parts Layout.



Item	Part #	Description	Qty
1	01330	Cross Support	0
2	00962	U-bolt, ½NCX2SqX3¼, Pld	4
3	12327L	Sideplate Assembly, Left	0
3	12327R	Sideplate Assembly, Right	0
4	01053	Bolt, ½NCX1½, Pld	4
6	01604	Support Strap	0
7	00963	Nylock Nut, ½NC, Pld	12
8	02652	Mount Wedge, SPHAHN	2
9	02654	Mount Adapter, Hahn	2
10	05568	Lock Washer, ¾, Pld	2
11	05471	Bolt, ¾NCX10, Pld	2

## Hardi/Toro (#SPHATO)

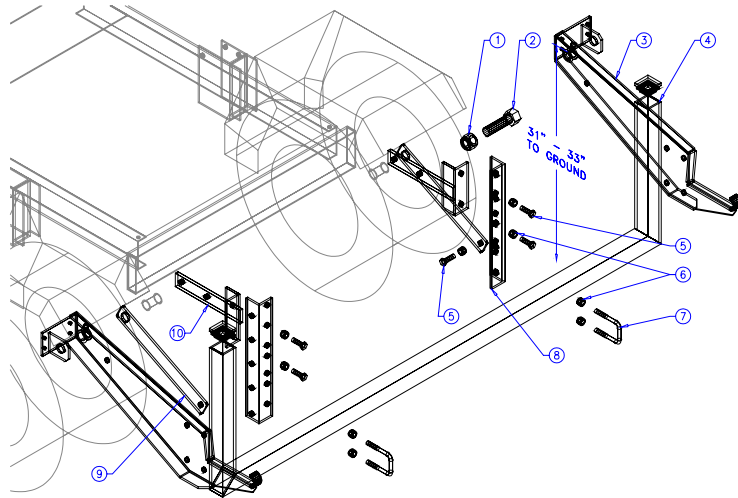
- ⇒ Bolt Mount Angle (#2 in drawing) to angles on the back of the truck frame with bolts (#3) and nuts (#5).
- ⇒ Mount Cross Support (#7) to Mount Angles with U-bolts (#4) and nuts (#5).
- ⇒ Mount the Sideplate Assemblies (#8) to Cross Support. Ensure the pivot is 31"-33" above ground level for proper sprayer height.
- ⇒ Complete assembly of mount, refer to previous section and General Assembly SP5520/6620 Parts Layout.



Item	Part #	Description	Qty
1	13098	Mount Angle	2
3	01053	Bolt, ½NCX1½, Pld	8
4	00962	U-bolt, ½NCX2SqX3¼, Pld	2
5	00963	Nylock Nut, ½NC, Pld	12
6	01604	Support Strap	0
7	01114	Cross Support, SP5520	0
7	01330	Cross Support, SP5120	0
7	04092	Cross Support, SP6620	0
8	12327L	Sideplate Assembly, Left	0
8	12327R	Sideplate Assembly, Right	0

## Cushman/Spraytek DS-175 (#SPCU175)

- ⇒ Bolt Mount Angle (#8 in drawing) to angles on the rear of the truck with bolts (#5) and nuts (#6).
- ⇒ Mount cross support (#4) to Mount Angles with U-bolts (#7) and nuts (#6).
- ⇒ Mount Sideplate Assemblies to Cross Support. Ensure pivot point is 31"-33" above ground level.
- ⇒ Attach Support Braces (#9) to bottom hole in Mount Angles with bolts (#5) and nuts (#6) and to the pin mount on the truck with bolts (#2) and nuts (#1).
- ⇒ Complete assembly of mount, refer to previous section and General Assembly SP5520/6620 Parts Layout.

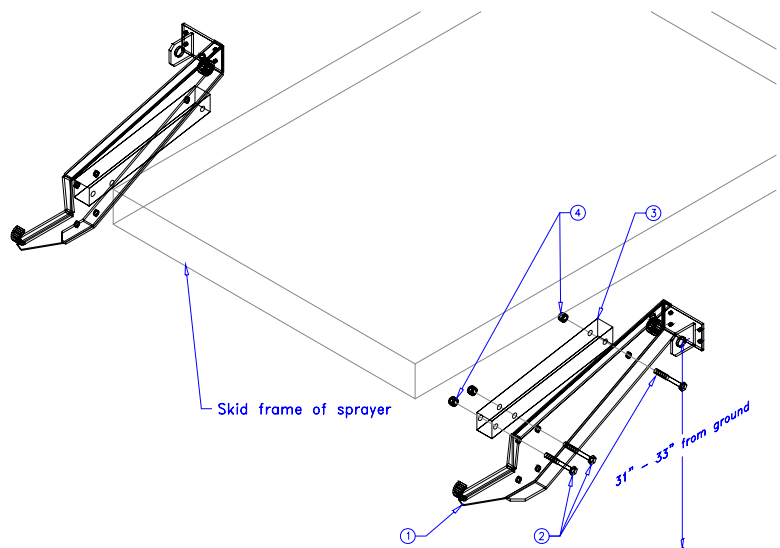


Item	Part #	Description	Qty
1	00953	Nylock Nut, 1NC, Pld	2
2	12901	Bolt, 1NCX3½, Pld	2
3	12327R	Sideplate Assembly, Right	0
4	04092	Cross Support, SP6620	0
5	01053	Bolt, ½NCX1½, Pld	6
6	00963	Nylock Nut, ½NC, Pld	10
7	00962	U-bolt, ½NCX2SqX3¼, Pld	2
8	13098	Mount Angle	2
9	12899	Support Brace	2
10	13107	Mount Adapter, SPCU175	2

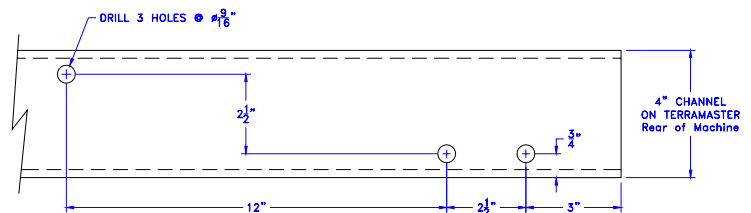
## Cushman TerraMaster (#SPCUSH)

- ⇒ Layout 3 holes on each side frame at the rear of the truck. Use the hole layout shown in drawing). Before drilling holes use Sideplate Assemblies (#1) to check height of the holes. Pivot point should be 31"-33" above ground level.
- ⇒ Bolt Sideplate Assemblies and Mounting Tubes to the outside of the frame with bolts (#2) and nuts (#4).
- ⇒ Complete assembly of mount, refer to previous section and General Assembly SP5520/6620 Parts Layout.

**NOTE:** Cross Support (SP5520/6620) is not used with this mount.

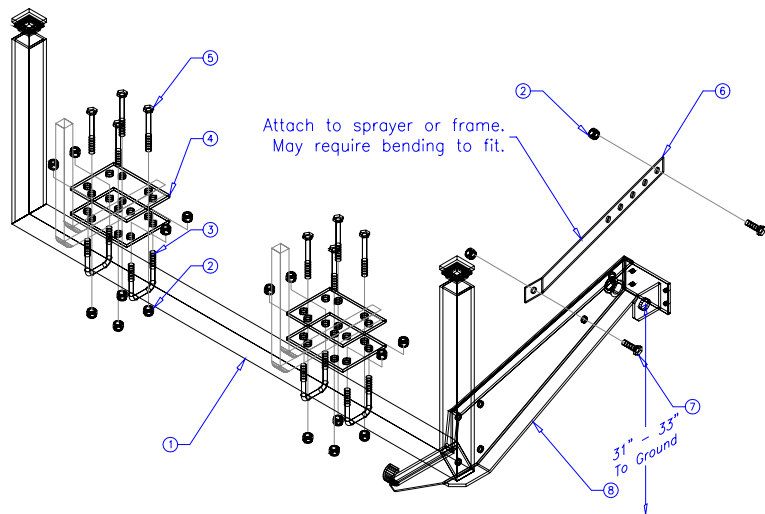


Item	Part #	Description	Qty
1	12327L	Sideplate Assembly, Left	0
1	12327R	Sideplate Assembly, Right	0
2	05398	Bolt, 1/2NCX3 1/2, Pld	6
3	02713	Mounting Tube	2
4	00963	Nylock Nut, 1/2NC, Pld	6



## Smithco 1600 (#SPSM25)

- ⇒ Bolt Mounting Plates (#4 in drawing) onto L-tubing at rear of truck, using bolts (#5) and Nuts (#2).
- ⇒ Mount Cross Support (#1) to bottom plates using U-bolts (#3) and nuts (#2).
- ⇒ Mount Sideplate Assemblies (#8) to Cross Support. Ensure pivot point is 31"-33" above ground level.
- ⇒ Bolt Support Straps (#6) to Sideplate Assemblies and to frame of truck using bolt (#7) and nuts (#2). The Support Straps may need to be bent to fit to frame. Frame may need to be drilled for Support Strap bolts.
- ⇒ Complete assembly of mount, refer to previous section and drawing SP5520/6620.



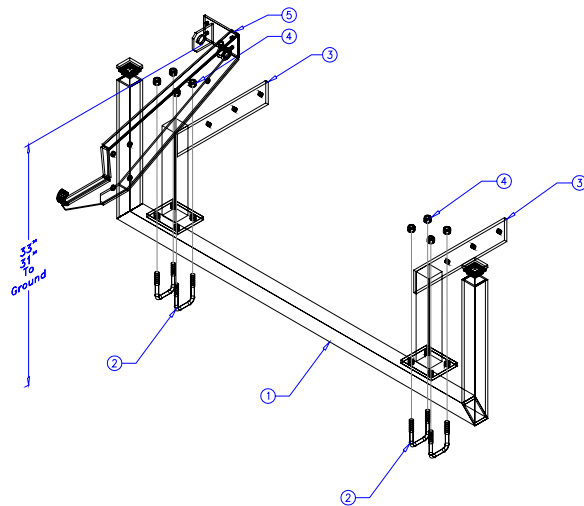
Item	Part #	Description	Qty
1	01330	Cross Support	0
2	00963	Nylock Nut, 1/2NC, Pld	20
3	00962	U-Bolt, 1/2NCX2SqX3 1/4, Pld	4
4	01753	Double Cross Plate	4
5	01052	Bolt, 1/2NCX4, Pld	8
6	01604	Support Strap	0
7	01053	Bolt, 1/2NCX1 1/2, Pld	4
8	12327R	Sideplate Assembly, Right	0



## Smithco 7928 (#SPSMIT)

- ⇒ Bolt Mounts (#3 in drawing) to side of frame at rear of truck.
- ⇒ Mount Cross Support (#1) to Mounts with U-bolts (#2) and nuts (#4). Ensure Cross Support is centered left to right.
- ⇒ Complete assembly of mount, refer to previous section and drawing SP5520/6620.

Item	Part #	Description	Qty
1	01330	Cross Support	0
2	00962	U-Bolt, ½NCX2SqX3¼, Pld	4
3	00020L	Smithco Mount, Left	1
3	00020R	Smithco Mount, Right	1
4	00963	Nylock Nut, ½NC, Pld	8
5	00996L	Sideplate Assembly, Left	0



## UM Mount

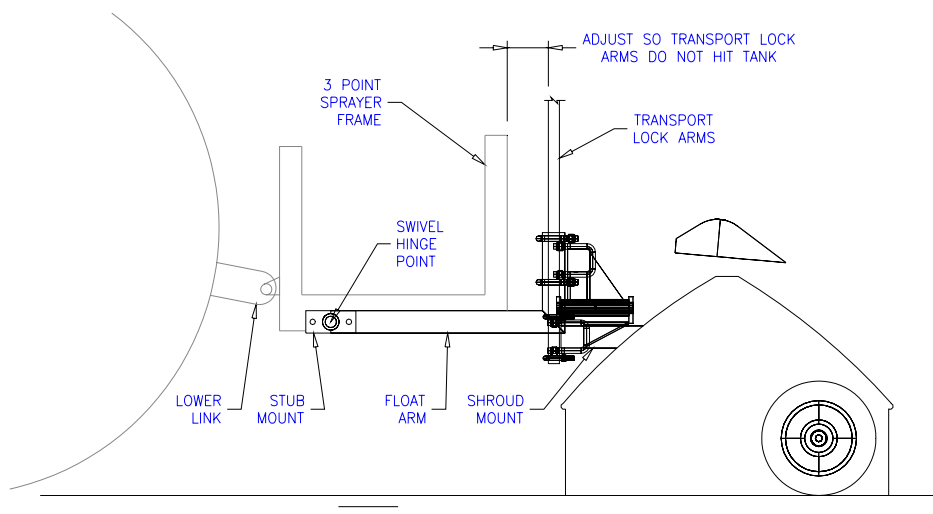
### Truck and Trailer Mounting

Ideally, the swivel hinge point should be located as low as possible and as close to the centre of the prime mover's back wheels as possible to maximize the ground following ability.

On golf trucks with 1 inch holes at the back of the frame just pin the hinge in to those holes, the stub plates are not required. On other trucks or trailers, drill holes in a solid part of the frame following the instructions above and bolt the stub plate to the frame. Ensure that there is clearance for the wing lock up arms when going through a sharp gully. It should be able to lift up to 30° from level. Adjust the float arm so the DCSS is level when the sprayer is on level ground.

### Tractor Mounting

Ideally, the Float Arm hinge point should be mounted as close to the lower linkage points as possible. This reduces sideways movement when turning, increases the DCSS ground following ability and improves the ride. Care should be taken that the wing support arms do not hit anything when the DCSS tilts forward in relation to the tank.



Adjust the float arms on the pivot frame so the boom is level when the 3 point hitch tractor sprayer bottom is 12" – 18" off the ground.

An optional wing lift only actuator kit with electric actuators, #01868, or hydraulic actuators, #12065, will allow the operator to lift the wings over sand traps and for transport.



## 3 Point Hitch Suspension Kit (#12926)

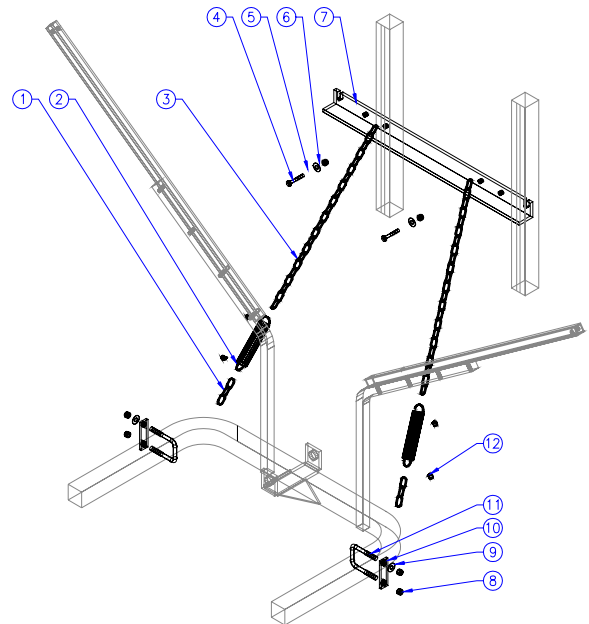
Previously customers have made rigid boom transport lift mounts using the 3-point linkage to lift the boom. This overstresses the boom in several area and may cause damage to the boom. To prevent this the boom must be sprung to provide some float in transport.

### Instructions

Short chain (#1) is bolted to the shroud mount tube with the U-bolts (#11), Plate (#10), nuts (#8) and washer (#9). The spring (#2) is threaded on to the end of the short chain. Long chain (#3) must be hooked through the other end of the spring and bolted to the existing 3 point frame. A slot is provided to adjust the length of chain so that when the 3 point is lifted the boom wheels are lifted sufficiently to clear any obstacles while transporting. The chain must be unhooked when spraying to provide float for the DCSS. If there is no provision for this on your machine a Mounting Angle (#7), bolts (#4), nuts (#6) and washers (#5) are provided. Drilling may be required for mounting on some machines. Hose clamps (#12) are provided to keep spring from slipping off chain while allowing ease of assembly. In retrofit situations a Universal Manual Mount (UM000) must be used.

In retrofitting to existing 3 point sprayers, it is essential to keep the boom as close to the tractor wheels as possible to reduce the swing out when turning. The UM Mount hinge point needs to be as close to the tractor wheels as possible. This will reduce the stress on the boom during transport.

Special steel booms are available for custom operators.



## Final Assembly Checklist

### Mechanism Checks:

#### 1) Boom Level

Sitting on a level pad adjust the height of the boom mount bar with the U-bolts on the actuator arm block and/or the cross support to level the boom front to back with half a load of water in the sprayer.

#### 2) Centre Boom Pivot

Lift the wheels of the centre section off the ground and check that the boom centers itself. Adjust the springs on the boom mount to provide even pressure on the boom when centered. Loosen the nuts on the bolts on either side to obtain good results.

#### 3) Breakaway Catches

The breakaway catch should release with a good push (45lbs) exerted at the transport catch on the end of the boom, (toward the rear). Return the wing to its spray position and the catch should grab firmly. Engage the catch before folding the boom for transport.

The amount of force required for the breakaway catch to operate is adjustable by changing the position of the shim washers on the breakaway bolt from outside to inside to increase spring pressure if required.

#### 4) Wing location on Breakaway Arm

Check the position of the wing on the breakaway arm. Push the wing back for a breakaway test. As you return the boom to normal working position, the shroud of the wing should fit properly around the plastic of the center boom with a little more clearance in the front.

Adjust the wing position by moving the breakaway arm collars if required.

### 5) Wing Folding

Fully extend the actuator. It should stop approximately in the centre of the float slot.

Retract the actuator, the wing should rise 90° and against the fold stop on the center boom section. The fold stop positions the wing and secures it firmly when in the transport position. When lifted, the stop ensures alignment of the transport catches. Adjust the position of the fold stop if necessary.

### 6) The Float arm

The float arm should be free to move up and down without interference. On F103 mounts the float bar will go down until the roller hits on the flat used to lift the boom when in transport. Avoid running hoses, wires, etc. between these moving parts.

Check that the float arm will not hit the solution tank when let down or when lifted up as far as field conditions might lift the boom.

### 7) Curtain

Ensure curtain touches the turf. If not, move the castor wheel spacers from below the boom to on top of the boom mount.

### 8) Check For Leaks

Ensure all connections are leak free. If leaks occur check connection to ensure it is tight.

### Testing after assembly

After assembling the spray boom, check for field readiness. Points to consider are:

- Remove the nozzle body caps with the spray tips and the tip screens. Flush the entire system with clear water. Install the tip screens and nozzle caps with spray tips. Check for proper alignment of the nozzle caps. Pressure test all the booms inspecting hose connections, nozzle caps, spray pattern and diaphragm nozzle bodies.
- Move all hinge or swivel joints through the full arc of movement. Check for interference, ease of movement and grease.
- Check all fasteners to see that they are tightened firmly.
- Calibrate the sprayer and DCSS

### SP Mounts

When retracting an actuator, the float arm will lower until the roller rests on the side plate and the boom lifts into transport position. There must be a clear path for rotational movement about the float arm and for the roller on the side plate. As the wings come to rest on the transport arms, the rollers on the side plate engage under the hooks at the back of the side plate.

Check the clearance between the folded up wings, the valve mount bar, and the solution tank on the SP unit. Adjust the float lockout, the wing fold stops, or the position of the transport arms, if necessary.

## Operating Instructions

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**Note:** Stay clear of the pinch points and areas where the sprayer moves under power.

### Operating the Folding Mechanism

#### Wing Operation (Electric Fold)

Fully extend the actuator mechanism for field operations or retract fully for transport. The slotted guide allows the boom to follow the ground, within a limited range. When spraying, retract the actuator for the boom to lift higher than the allowed operating range. Always use the actuator to lift the wing to transport position. This ensures that the actuator positions properly to hold the boom in place or operate when actuated.

#### Boom Folding to Transport Position

After the wings are up in transport position, operate the actuator to rotate the complete boom into the full transport position. As the boom leaves the ground, check the position of the wings relative to the transport arms on the side plate assemblies. Check that the wings rest on the proper place. Lock the wings into the transport arms for transport with the transport lock pins.

Reverse the procedure to fold the booms out for field position.

Transport position allows convenient access to the spray tips.

## Plumbing System Operation

### Wilger Nozzle Bodies

Nozzle bodies are equipped with diaphragm check valves to prevent dripping. Valves close when system pressure drops below fifteen (15) psi. Valve bodies contain filter screens. Spray tips and screens are retained with quick connect caps. Keep alternate sets of tips in other caps for quick tip changing. See assembly diagram in appendix.

### Spray Monitor Manifold

Each column monitors the flow to each nozzle. Check the Rotometer Assembly page in this manual to change the ball in the column to match the flow rate of the spray tips.

## Breakaway Operation

Should the wing hit a large or fairly heavy object on the field, the wing will pivot back out of the way. Shut off the sprayer immediately. Reset the boom manually after such an incident. Swing the boom forward and the catch mechanism will lock the boom in place.

## Driving Considerations

The four wheels under the boom enable the shroud and the curtain to follow the contours of the land.

## Maintenance

- Grease DCSS wing hinge points every 40 hours.
- Check regularly that all fasteners tight and secure.
- See the General Spraying Information section of this manual.
- Check wheel bearings every 40 hours and adjust if required. Check more often in rougher situations.

## Trouble Shooting

---

### Leaking Nozzles

If 1 or 2 tips drip until the line is empty, check:

- ⇒ For deteriorated diaphragms
- ⇒ For material under the diaphragm
- ⇒ For a weak spring
- ⇒ For a deterioration of the diaphragm sealing surface

If all tips spray for more than 3 seconds after shut off, check:

- ⇒ To see if the sprayer shut off valve is leaking

If all tips spray for less than 3 seconds after shut off, check:

- ⇒ For air accumulation in the line
- ⇒ For swelling of the feed hoses

If the diaphragm leaks out the diaphragm spring body, check:

- ⇒ For loose spring body
- ⇒ For ruptured diaphragms
- ⇒ For missaligned diaphragm
- ⇒ For broken diaphragm body

## Wheel Bearing Failure

Check wheel bearings weekly. If excessive wear is found, replace bearings. If bearings are too tight load will reduce their life, if too loose, hammering will reduce life. If bearings are wearing excessively under your working conditions a heavy duty bearing kit (#12391 c/w wheel or #12025 w/o wheel) is available.

## Spray Hitting End of DCSS/Curtain

The spray booms are designed for true 80° spray tips. If spray is dripping off the end of the curtains, 110° or XR tips may be incorrectly installed. Remove these and install true 80° tips.

## DCSS Does Not Hit the Lock Up Brackets When Folded For Transport

The wings should be vertical and the actuators fully closed when in transport position. If not adjust the DCSS wing stops so the DCSS wing fits into the lock up brackets.

## Wing Actuator Mount Spring

The spring on the bottom of the wing actuator mount is designed to provide tolerance for the actuator to close completely. Under no circumstances should the spring be tightened until it is fully compressed as the full load of the actuator will cause the centre frame to crack.

## DCSS Flops Sideways When Lifted

The bolts that adjust the tension on the DCSS boom mount bar spring may be too tight and are not equally pushing on the shroud mount bar. Put into transport position on level ground and loosen the bolt to increase the tension.

## DCSS Breaks Away Too Easily

Adjust the breakaway tension by putting washers in side the stops to increase spring compression.

## Tracking

The weight of the prime mover and in extreme situations, the boom wheels, will modify the turf and cause it to absorb more fertilizer or chemical. Some fertilizers and fungicides are very susceptible while others are not. The track will disappear within a few days.

## Stripping

At end of Shroud – check;

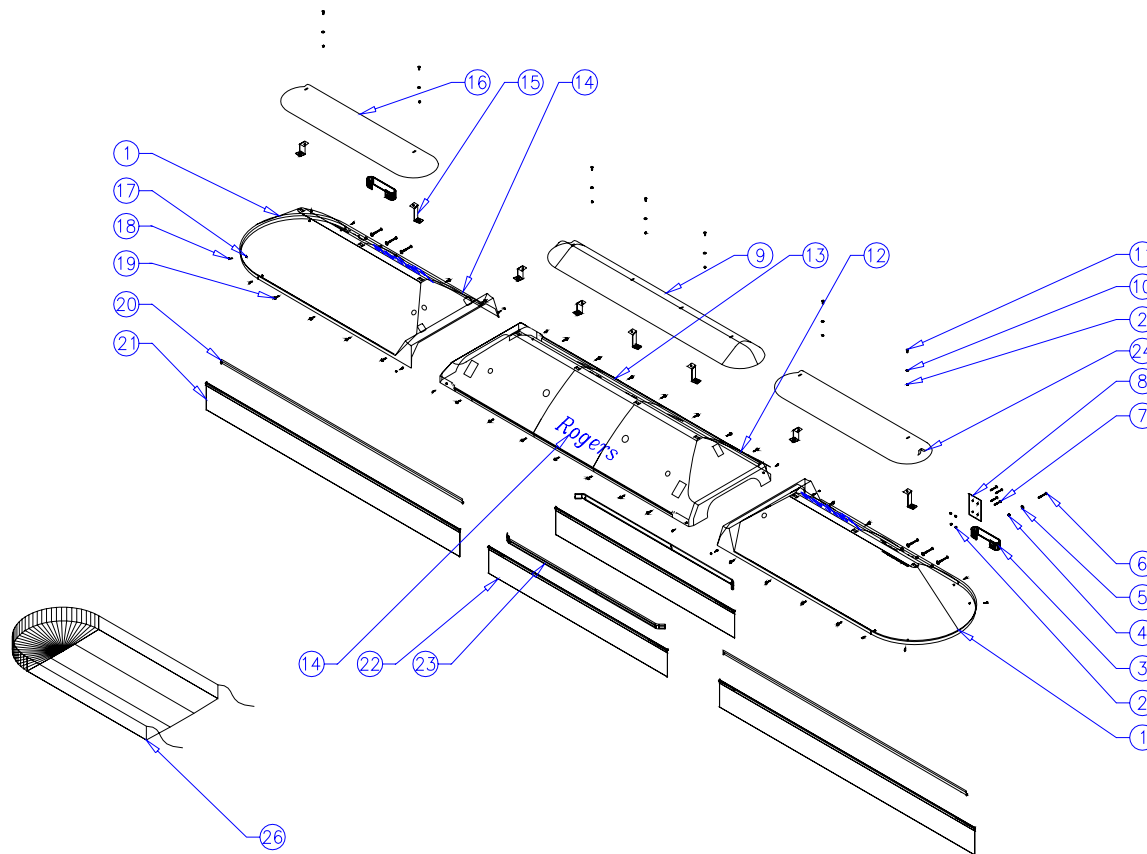
- ⇒ If tips are spraying at a greater angle than 80°, XR 80° tips have a wider than 80° spray pattern.
- ⇒ High tip pressure, over 40psi (2.8 Bar), will cause a wider spray pattern by extending the spray pattern angle.

Between Tips – check;

- ⇒ Low tip pressure will cause a narrower pattern. Actual tip pressure should be between 25 – 40 psi (1.7 - 2.8 bar).
- ⇒ Tip screens to see if they are plugged.

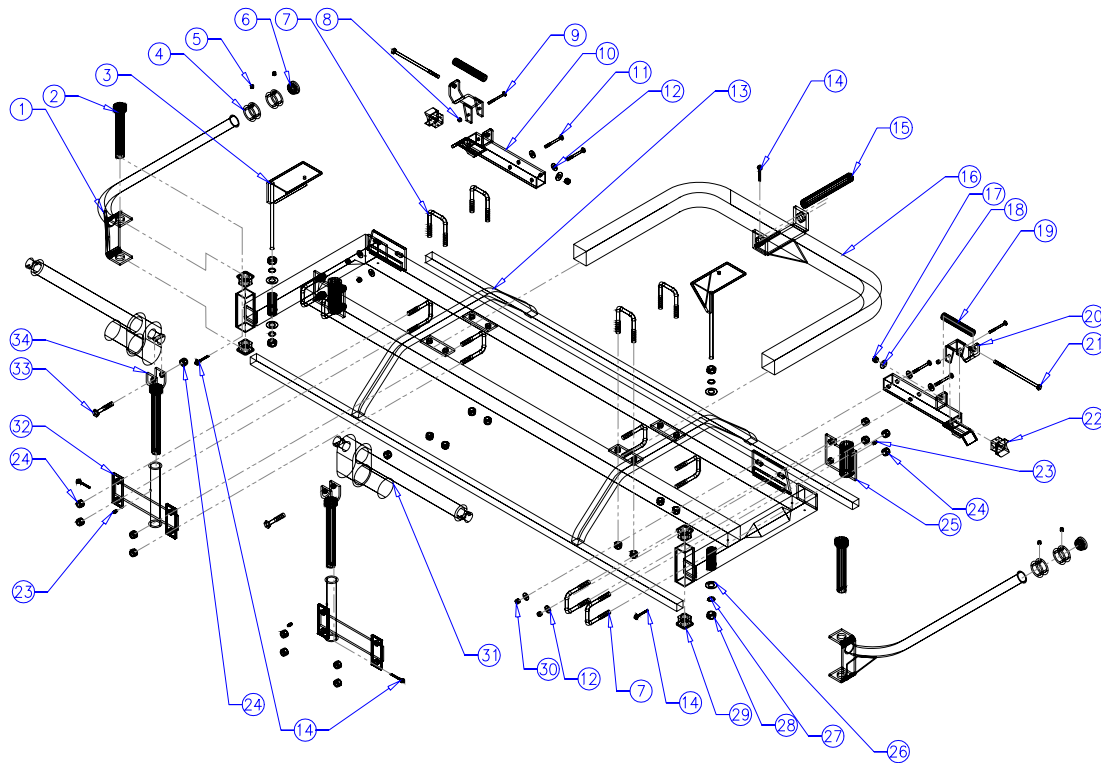
## Drawings and Parts Break Downs

### Shroud Assembly, *Windfoil*, High Profile



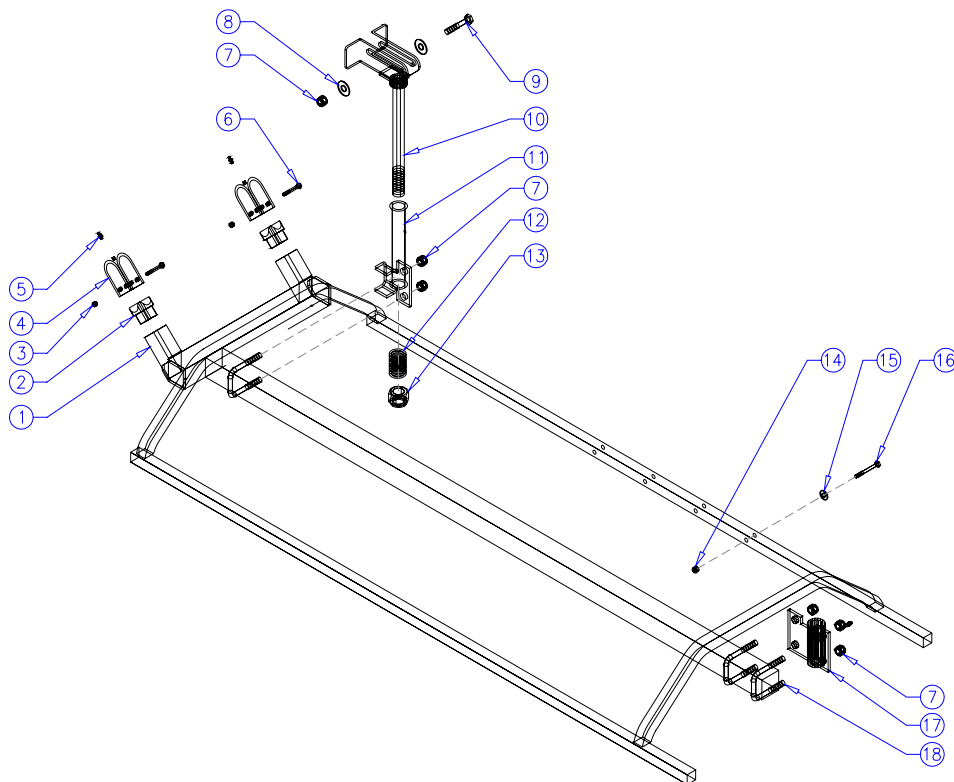
Item	Description	WF4500		WF5000		WF5500		WF6000	
		Part #	Qty	Part #	Qty	Part #	Qty	Part #	Qty
1	Shroud, HP, Wing	01081L	1	01081L	1	01083L	1	01083L	1
1	Shroud, HP, Wing	01081R	1	01081R	1	01083R	1	01083R	1
2	Nut, Nylock, 1/4NC, Pld	00968	10	00968	12	00968	14	00968	16
3	Transport Catch	00720	2	00720	2	00720	2	00720	2
4	Nut, Nylock, 5/16NC, Pld	00969	6	00969	6	00969	8	00969	8
5	Washer, Flat, 5/16, Pld	00970	12	00970	12	00970	16	00970	16
6	Bolt, 5/16NC x 2 1/2, Pld	00971	6	00971	6	00971	8	00971	8
7	Bolt, 1/4NC x 2, Pld	01070	4	01070	4	01070	4	01070	4
8	Backing Plate, Al	12045	0	12045	0	12046	0	12046	0
9	Airfoil, Poly, 60"	01632	N/A	01632	1	01632	2	01632	3
10	Washer, Flat, 1/4, Pld	01157	6	01157	8	01157	10	01157	12
11	Bolt, 1/4NC x 3/4, Pld	01154	6	01154	8	01154	10	01154	12
12	Shroud, HP, Centre	01080	1	01082	1	01080	1	01082	1
13	Serial Number Plate	01398	1	01398	1	01398	1	01398	1
14	ROGERS Decal, White	01397	3	01397	3	01397	3	01397	3
15	Airfoil Standoff, Left, Al	00721L	3	00721L	4	00721L	5	00721L	6
15	Airfoil Standoff, Right, Al	00721R	3	00721R	4	00721R	5	00721R	6
16	Airfoil, Poly, 40"	01582	3	01582	2	01582	1	01582	N/A
17	Nut, Nylock, #10, Pld	01153	16	01153	16	01153	16	01153	16
18	Machine Screw, #10-24 x 3/4	01152	16	01152	16	01152	16	01152	16
19	TEK Screw, #12 x 1 1/4	01156	22	01156	26	01156	30	01156	34
20	Curtain, Black, 8", Wing	01538	2	01161	2	01727	2	01727	2
21	Curtain Hanger, Wing	01161	2	01538	2	01729	2	01729	2
22	Curtain, Black, 8, Centre	07198	2	06709	2	07198	2	06709	2
23	Curtain Hanger, Centre	01148	2	01730	2	01148	2	01730	2
24	"WINDFOIL" Decal, White	01396	6	01396	6	01396	6	01396	6
25	"Front and Back" Decal	12341	1	12341	1	12341	1	12341	1
26	Wing Covers (Optional)	01524	0	12388	0	01524	0	12388	0

## Centre Frame Assembly, *Windfoil*, High Profile



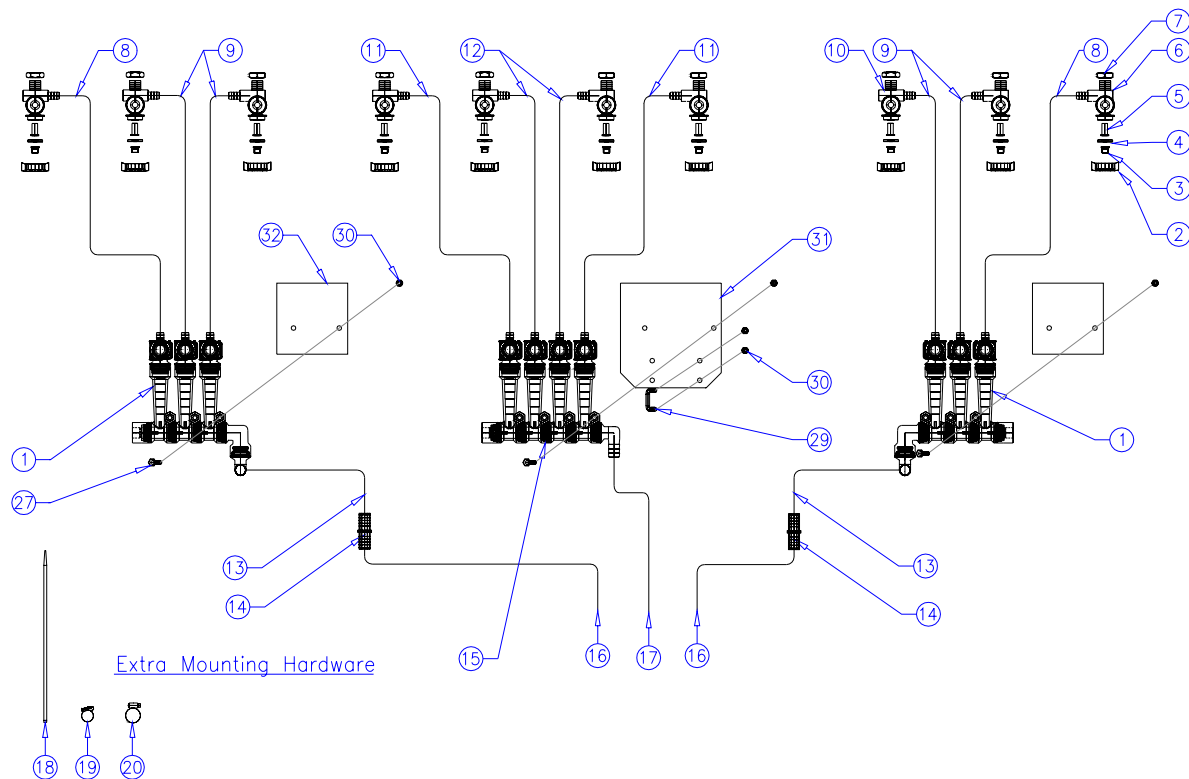
Item	Description	WF4500/5500		WF5500/6000	
		Part #	Qty	Part #	Qty
1	Breakaway Arm, Left	00869L	1	00869L	1
1	Breakaway Arm, Right	00869R	1	00869R	1
2	Pin, 1x6, Pld	00804	2	00804	2
3	Fold Stop, Left	00845L	1	00845L	1
3	Fold Stop, Right	00845R	1	00845R	1
4	Collar, Steel	00805	4	00805	4
5	Set Screw, 3/8NC x 1/2, Square Head	01073	4	01073	4
6	Plug, Round, Plastic, 1 1/4	00961	2	00961	2
7	U-bolt, 1/2 NCx2sqx3 1/4, Pld	00962	12	00962	12
8	Nut, Nylock, 1/4 C, Pld	00968	2	00968	2
9	Bolt, 1/4NC x 2 1/2, Pld	00966	2	00966	2
10	Breakaway Holder, Al	00719	2	00719	2
11	Bolt, 5/16NC x 2 1/2, Pld	00971	4	00971	4
12	Washer, Flat, 5/16, Pld	00970	8	00970	8
13	Frame, Centre, HP, Al	00936	1	01569	1
14	Cotter Pin, 3/16x1 1/2, Pld	00965	6	00965	6
15	Pin, 1x7, Pld	00803	1	00803	1
16	Shroud Mount	00796	1	00796	1
17	Nut, Nylock, 3/8NC, Pld	00956	2	00956	2
18	Washer, Flat, 3/8, Pld	00957	6	00957	6
19	Compression Spring	00955	2	00955	2
20	Breakaway Catch, Steel, Plated	00814	2	00814	2
21	Bolt, 3/8NC x 7, Pld	00954	2	00954	2
22	Bushing, Nylon, Wing Pivot	00130	2	00130	2
23	Grease Nipple, 1/4NF	00972	4	00972	4
24	Nut, Nylock, 1/2NC, Pld	00963	24	00963	24
25	Caster Wheel Mount	00837	2	00837	2
26	Washer, Flat, SAE, 5/8, Pld	07619	4	07619	4
27	Washer, Lock, 5/8, Pld	01150	4	01150	4
28	Nut, 5/8NC, Pld	01313	4	01313	4
29	Bushing, Urethane, Black	00128	4	00128	4
30	Nut, Nylock, 5/16NC, Pld	00969	4	00969	4
31	Electric Actuator	00958	0	00958	0
32	Inner Actuator Mount, Left	00841L	1	00841L	1
32	Inner Actuator Mount, Right	00841R	1	00841R	1
33	Bolt, 1/2NC x 2 1/2, Pld	00967	0	00967	0
34	Actuator Pivot Mount	00802	2	00802	2

## Wing Assembly, *Windfoil*, High Profile



Item	Description	WF4500/5000		WF5500/6000	
		Part #	Quantity	Part #	Quantity
1	Wing Frame, Left	00941L	1	01568L	1
1	Wing Frame, Right	00941R	1	01568R	1
2	Bushing, Nylon	00130	4	00130	4
3	Nut, Nylock, ¼NC, Pld	00968	8	00968	8
4	U-Clamp, Wing Pivot	00951	4	00951	4
5	Grease Nipple, ¼NF	00972	8	00972	8
6	Bolt, ¼NC x 2 ½, Pld	00966	8	00966	8
7	Nut, Nylock, ½NC, Pld	00963	14	00963	14
8	Washer, Flat, ½, Pld	00976	4	00976	4
9	Bolt, ½NC x 2 ½, Pld	00967	2	00967	2
10	Wing Actuator Pivot	00807	2	00807	2
11	Outer Actuator Mount, Left	00848L	1	00848L	1
11	Outer Actuator Mount, Right	00848R	1	00848R	1
12	Compression Spring	00952	2	00952	2
13	Nut, Nylock, 1NC, Pld	00953	2	00953	2
14	Nut, Nylock, 5/16NC, Pld	00969	1	00969	1
15	Washer, Flat, 5/16, Pld	00970	1	00970	1
16	Bolt, 5/16NC x 2 ½, Pld	00971	1	00971	1
17	Castor Wheel Mount	00837	2	00837	2
18	U-bolt, ½NCx2sqx3 ¼,Pld	00962	6	00962	6

## Plumbing Assembly, DCSS, High Profile

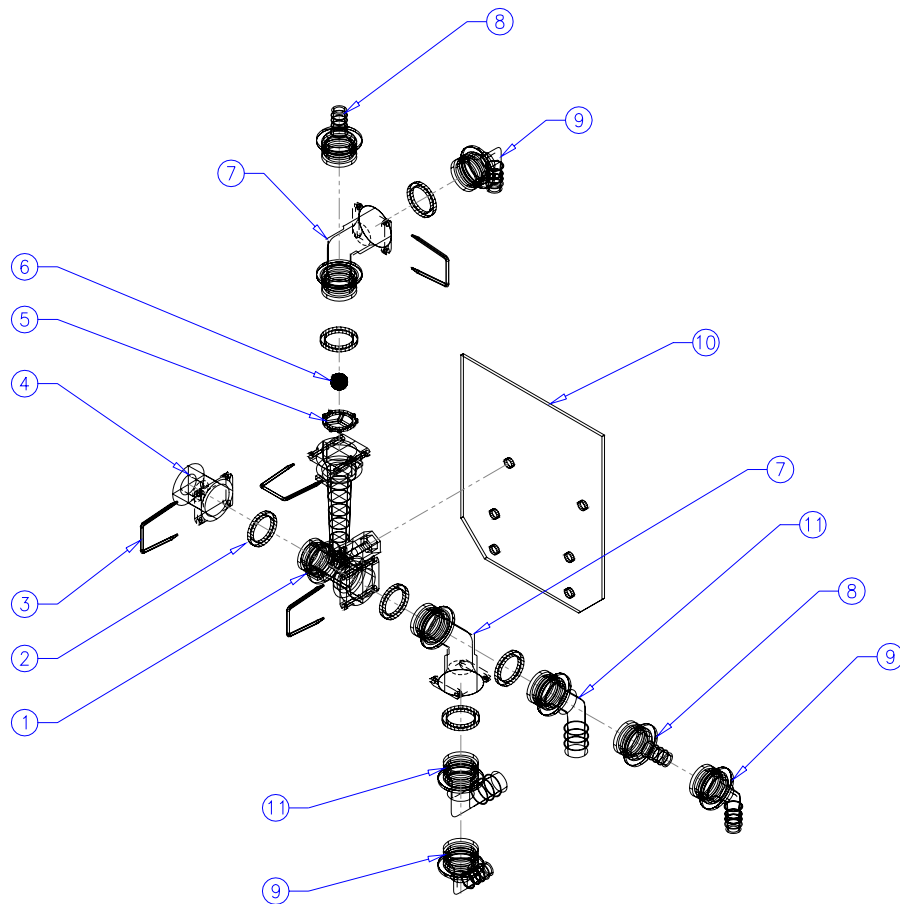


Item	Description	WF4500		WF5000		WF5500		WF6000	
		Part #	Qty	Part #	Qty	Part #	Qty	Part #	Qty
1	ORC Rotometer Assembly, Wing	11996	2	11996	2	11996	2	11997	2
2	Poly Nozzle Cap, Self Aligning	01532	9	01532	10	01532	11	01532	12
3	Tip, Spray, 8004API, Flat Fan, 50 mesh, Red	12423	9	12423	10	12423	11	12423	12
4	Seal, Nozzle Cap, Wilger, 13mm x 3mm	01521	9	01521	10	01521	11	01521	12
5	Screen, Tip, 50 Mesh	04720	9	04720	10	04720	11	04720	12
6	Nozzle Body Assembly, 15psi CV, Left, Wilger	12300	4	12300	5	12300	5	12300	6
7	Nut, Brass, 11/16	12362	9	12362	10	12362	11	12362	12
8	Hose, Red, ½ID, 300PSI	00033	4	01554	2	05338	4	00033	4
9	Hose, Red, ½ID, 300PSI	00072	2	07199	4	00033	4	05338	4
10	Nozzle Body Assembly, 15psi CV, Right, Wilger	12301	5	12301	5	12301	6	12301	6
11	Hose, Red, ½ID, 300PSI	05353	2	05321	2	05353	2	05321	2
12	Hose, Red, ½ID, 300PSI	01740	1	01740	2	01740	2	01740	2
13	Hose, Red, ¾ID, 300PSI	01731	2	01731	2	01731	2	01731	2
14	Poly Hose Mender	05779	2	05779	2	05779	2	05779	2
15	ORC Rotometer Assembly, Centre	11977	1	11978	1	11978	1	11978	1
16	Hose, Red, ¾ID, 300PSI	01743	2	01741	2	01741	2	01741	2
17	Hose, Red, ¾ID, 300PSI	08267	1	08267	1	08267	1	08267	1
18	Nytie, Black UV, 3/16x15 ½	00974	22	00974	22	00974	22	00974	22
19	Clamp, Hose, Plastic, SNP-16	01092	20	01092	26	01092	28	01092	26
20	Clamp, Hose, Gear, HS-12	01091	10	01091	10	01091	10	01091	10
27	Bolt, ¼NC x 2, Pld	01070	6	01070	6	01070	6	01070	6
29	Ublt, ¼NCx1sqx2,Pld	01049	2	01049	2	01049	2	01049	2
30	Nut, Nylock, ¼NC, Pld	00968	10	00968	10	00968	10	00968	10
31	Backing Plate, Al, Centre	12043	1	12044	1	12043	1	12044	1
32	Backing Plate, Al, Wing	12045	2	12045	2	12046	2	12046	2

See application rate tables for a listing of API and Tee Jet tips and their application rates



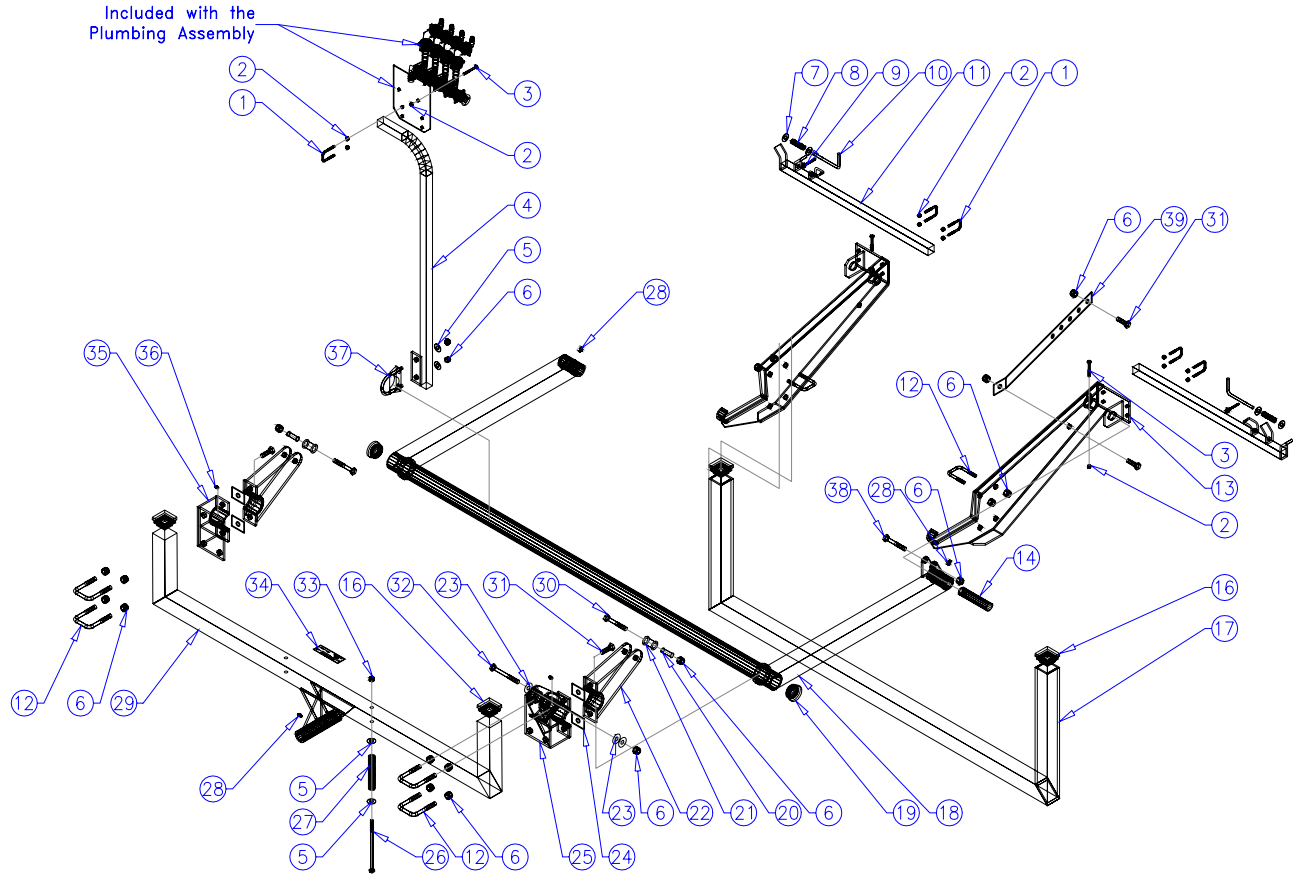
## Rotometer Assembly, DCSS, High Profile



		11996		11997		11977		11978	
Item	Description	Part #	Qty	Part #	Qty	Part #	Qty	Part #	Qty
1	ORC, Rotometer Body	00889	3	00889	4	00889	3	00889	4
2	ORC, O-Ring	11984	11	11984	14	11984	10	11984	13
3	ORC, Clip	11976	11	11976	14	11976	10	11976	13
4	ORC, End Cap	00909	1	00909	1	00909	1	00909	1
5	ORC, Ball, Retainer	11989	3	11989	4	11989	3	11989	4
6	ORC, Ball, Red *	11990	3	11990	4	11990	3	11990	4
6	ORC, Ball, SS (optional)	11991	3	11991	4	11991	3	11991	4
7	ORC, 3/4" Elbow, M/FORC	01115	4	01115	5	01115	3	01115	4
9	ORC, 1/2" H.B. Elbow	00906	3	00906	4	00906	3	00906	4
10	Backing Plate, Al	12045	0	12046	0	12045	0	12044	0
11	ORC, 3/4" H.B. Elbow	00905	1	00905	1	00905	1	00905	1

\* Red plastic ball are for lower flow rates (0.09 – 0.30 US GPM per column); Steel balls are for higher flow rates (0.40 – 1.33 US GPM per column)

## General Assembly, SP5520/6620

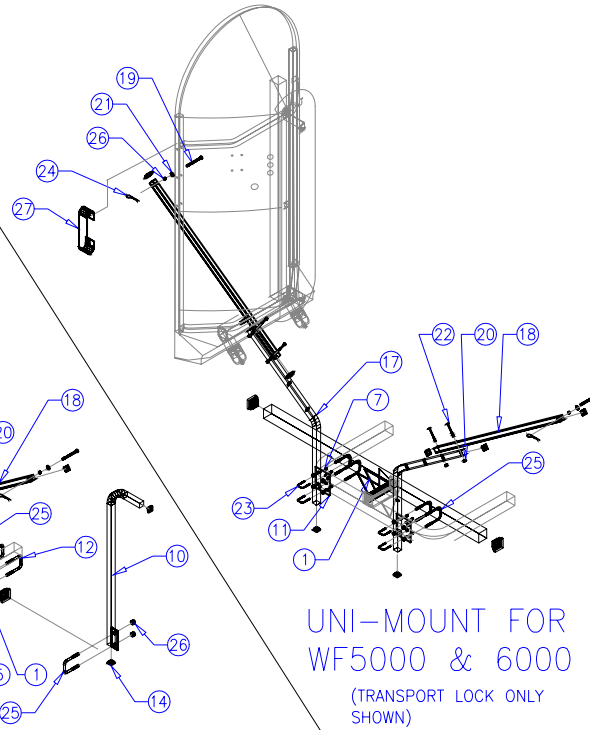
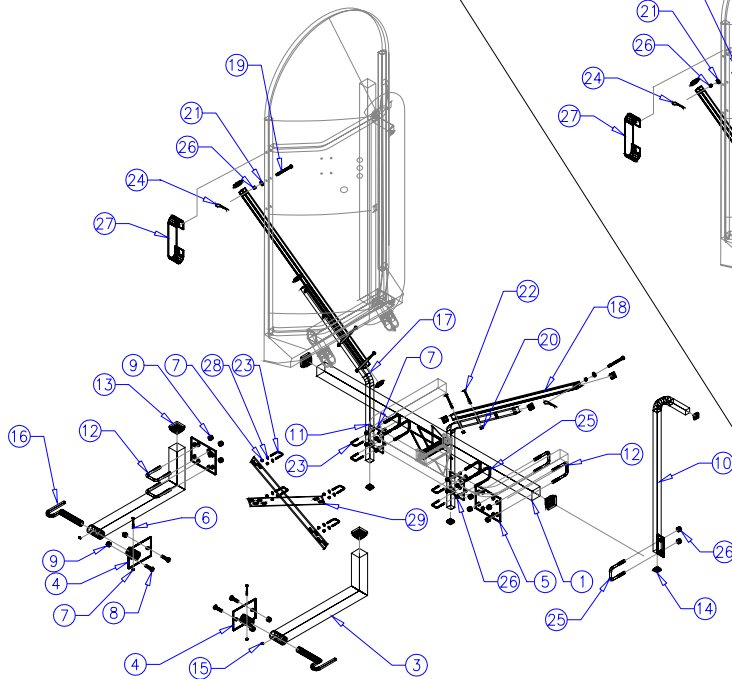


Item	Part #	Description	Qty
1	01049	U-bolt, 1/4NCx1sqx2, Pld	6
2	00968	Nut, Nylock, 1/4NC, Pld	14
3	01070	Bolt, 1/4NC x 2, Pld	2
4	00861	Nozzle Monitor Mount	1
5	00957	Washer, Flat, 3/8, Pld	6
6	00963	Nut, Nylock, 1/2NC, Pld	24
7	07617	Washer, Flat SAE, 3/8, Pld	4
8	01041	Compression Spring, 1/2ODx2lg	2
9	09112	Cotter Pin, 1/8X3/4, Pld	2
10	01040	Transport Lock Pin	2
11	12311	Transport Lock Arm	2
12	00962	U-bolt, 1/2NCx2sqx3 3/4, Pld	8
13	12327L	Sideplate Assembly, Left	1
13	12327R	Sideplate Assembly, Right	1
14	01000	Float Pin Shaft	2
16	01058	Plug, Square, 2"	2
17	01114	Cross Support, SP5520	1
17	04092	Cross Support, SP6620	1
18	01005	Float Arm, SP5520	1
18	04091	Float Arm, SP6620	1
19	01072	Plug, Round, 2"	2

Item	Part #	Description	Qty
20	01071	Brass Bushing, 5/8X 1/2X1 1/2	2
21	01017	Bushing, 1 1/8X5/8X1 3/8	2
22	01016	Roller Arm Block	2
23	00269	Bushing, Plastic	2
24	01043	Spacer Plate	4
25	01020	Arm Mount Block	1
26	11831	Bolt, 3/8NC x 7 1/2, Pld	2
27	00955	Compression Spring	2
28	00972	Grease Nipple, 1/4NF	3
29	01015	Boom Mount, SP5520	1
29	04093	Boom Mount, SP6620	1
30	01055	Bolt, 1/2NC x 3, Pld	2
31	01053	Bolt, 1/2NC x 1 1/2, Pld	8
32	01052	Bolt, 1/2NC x 4, Pld	1
33	00956	Nut, Nylock, 3/8NC, Pld	4
34	01398	Serial Number Plate	1
35	00983	Mounting Block	1
36	01068	Grease Nipple, 1/4NF, 45°	2
37	01048	Saddle Clamp, 3/8NCX2X3	2
38	00967	Bolt, 1/2NC x 2 1/2, Pld	1
39	01604	Support Strap	2

## General Assembly, UM000 & Optional Suspension Kit

UNI-MOUNT FOR  
WF4500 & 5500



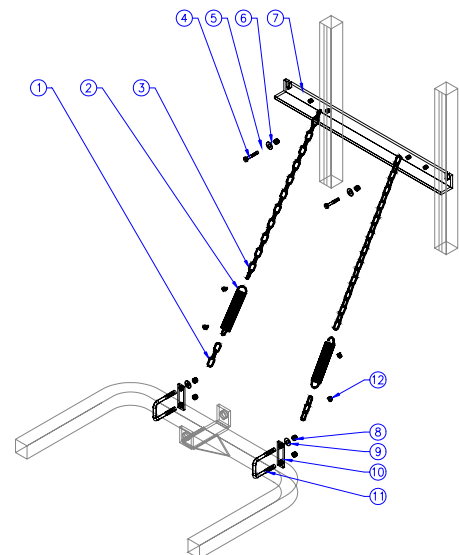
UNI-MOUNT FOR  
WF5000 & 6000  
(TRANSPORT LOCK ONLY  
SHOWN)

Item	Part #	Description	Qty
1	01169	Frame, Pivot, F104	1
3	01173	Float Arm, F104	2
4	12029	Stub Mount Bushing, UM	2
5	01178	Double Cross Plate, 2x2	2
6	01070	Bolt, 1/4NC x 2, Pld	2
7	00968	Nut, Nylock, 1/4NC, Pld	18
8	01053	Bolt, 1/2NC x 1 1/2, Pld	4
9	00963	Nut, Nylock, 1/2NC, Pld	20
10	00861	Monitor Mount	1
11	12064	Double Cross Plate, 2x1	2
12	00962	U-bolt, 1/2NCx2sqx3 1/4, Pld	8
13	01058	Plug, Tube, Square, 2"	4
14	01056	Plug, Tube, Square, 1"	10
15	00972	Grease Nipple, 1/4NF	3

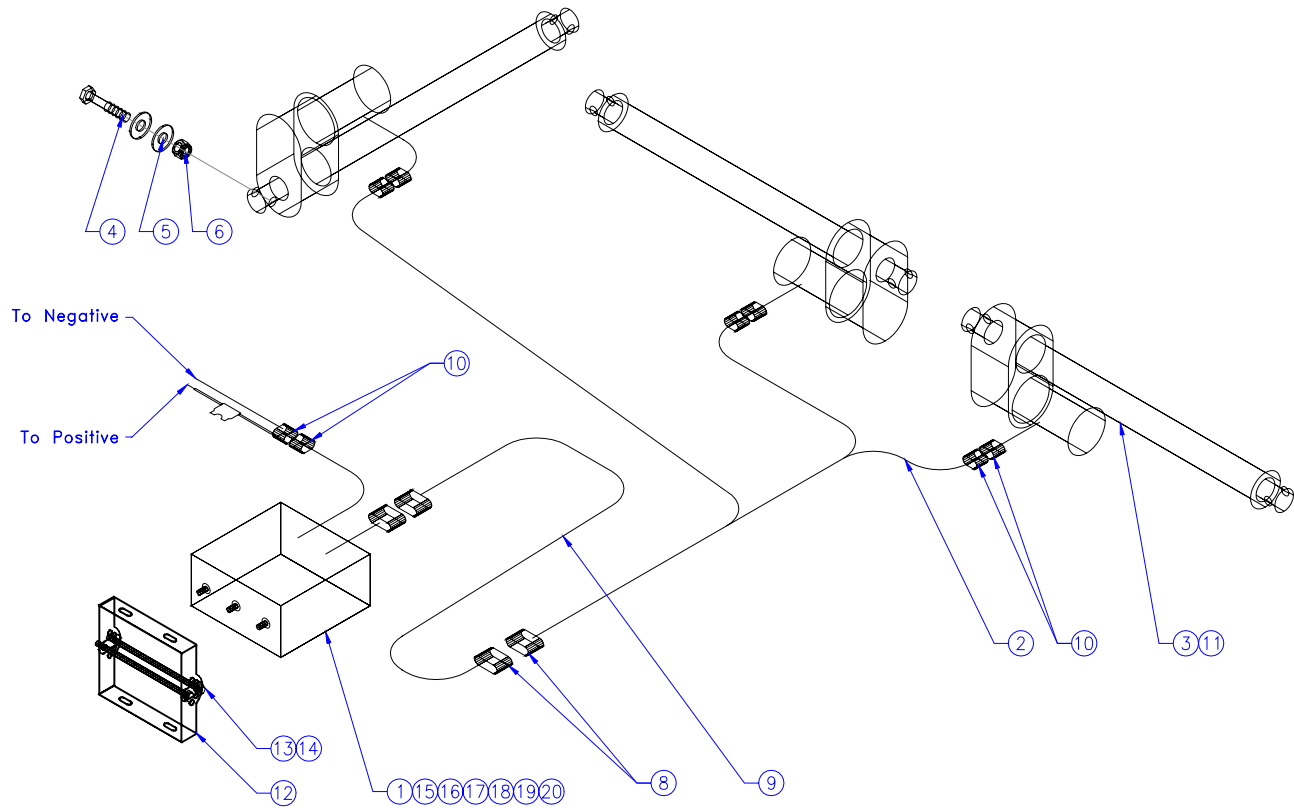
Item	Part #	Description	Qty
16	01177	Float Pin, Plated	2
17	12316	Transport Lock Arm	2
18	12315	Transport Lock Arm Extension	2
19	12022	Bolt, Tap, 3/8x3 1/2 c/w hole	2
20	00969	Nut, Nylock, 5/16NC, Pld	4
21	00957	Washer, Flat, 3/8, Pld	2
22	00971	Bolt, 5/16NC x 2 1/2, Pld	4
23	01049	U-bolt, 1/4NCx1sqx2, Pld	8
24	05167	Hitch Pin, 1/8, Pld	2
25	12587	U-bolt, 3/8NCx2sqx3, Pld	5
26	00956	Nut, Nylock, 3/8NC, Pld	12
27	00720	Transport Catch	0
28	01157	Washer, Flat, 1/4, Pld	8
29	06262	Transport Lock Cross Brace	2

### Optional Suspension Kit (#12926)

Item	Description	Part #	Qty
1	Chain, Welded, 5/16X3, Grade 70	12914	2
2	Extension Spring	12912	2
3	Chain, Welded, 5/16X3, Grade 70	12913	2
4	Bolt, 3/8NCX2, Plated	05435	2
5	Flat Washer, 3/8, Plated	00957	2
6	Nut, Nylock, 3/8NC, Plated	00956	2
7	Angle, Steel, 2X2X3/8	12967	1
8	Nut, Nylock, 1/2NC, Plated	00963	4
9	Flat Washer, 1/2, Plated	00976	2
10	U-bolt Plate, Steel	12957	2
11	U-bolt, 1/2NCX2SqX3 1/4, Plated	00962	2
12	Hose Clamp, Gear, 1/4	05587	4



## Electric Fold Kits



Item	Description	Complete Fold SP (#00785)		Wing Lift Only UM/3 Point (#01868)	
		Part #	Quantity	Part #	Quantity
1	Electric Fold Control Box	01187	1	12464	1
2	Harness, Electric Fold	01210	1	12468	1
3	Actuator, Electric, 12" Stroke, 1500lb	00958	3	00958	2
4	Bolt, ½NCX2 ½, Pld	00967	6	00967	4
5	Washer, Flat, ½, Pld	00976	12	00976	8
6	Nut, Nylock, ½NC, Pld	00963	6	00963	4
7	Nytie, Black, UV, 3/16X15 ½	00974	8	00974	8
8	Weatherpack, 6 Connector, Repair Kit	11005	0	11005	0
9	Electric Fold Extension kit, Optional	F120	0	F120	0
10	Weatherpack, 2 Connector, Repair Kit	11823	0	11823	0
11	Seal Repair Kit, Electric Actuator (Optional)	11974	0	11974	0
12	Control Box Bracket	12679	2	12679	2
13	Bolt, ¼NCX6, Pld	12941	2	12941	2
14	Nut, Nylock, ¼NC, Pld	00968	2	00968	2
15	Switch, Toggle, Double Throw/Pole	01220	3	01220	2
16	Box, Al, Cabinet, Extruded	06406	1	06406	1
17	Gasket, Adhesive 1 Side	08515	2	08515	2
18	Face Plate Screw, Self Threading	08338	8	08338	8
19	Front Plate, Al, Control Box, w/o Decal	00793	1	00793	1
20	Rear Plate, Al, Control Box	00794	1	00794	1

**NOTE:** Extra wiring may be required when installing on a ¼ or ½ ton truck.

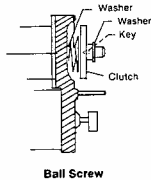
## 12" Actuator and Repair Kits

### Part No. 00958, Electric Actuator, 12" Stroke

#### Repair Kits

#### Part No. 12403, Clutch Replacement Kit [9200-271-012]

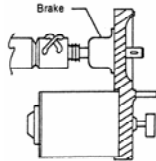
Remove rear housing and intermediate gear. Remove washer on top of clutch. Slide clutch from screw shaft. Remove key. Remove washer underneath clutch. Replace in reverse order.



#### Part No. 08220, 12" Ball Screw Kit (thick wall) [9200-191-481]

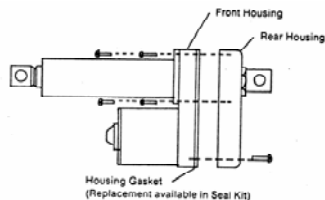
#### Part No. 08221, 12" Ball Screw Kit (thin wall) [9200-191-015]

Remove cover tube, rear housing, intermediate gear and clutch. Slide brake and screw assembly out of front housing. To reassemble, remove clamp from screw replacement kit. Slide screw with brake back through front housing being careful not to lose any brake components. Reassemble in reverse order.



#### Part No. 12404, Rear Housing Kit [9200-536-011]

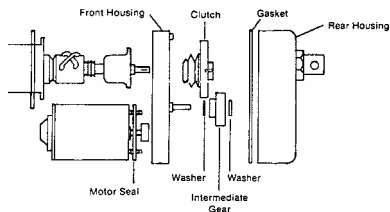
Remove 4 screws from front housing and 1 screw from rear housing. Pull housing free. Install the tin furnished bumper inside the new housing. Only use the thin bumper. Install the new housing in reverse order.



#### Part No. 12405, Front Housing Kit [9200-536-005]

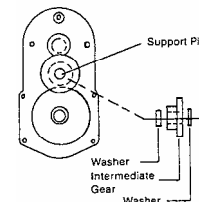
Remove cover tube and holder, rear housing, intermediate gear, clutch, drive screw and motor.

Save all gaskets and seals or replace with new seals with seal kit. Discard front housing. Replace with housing from replacement kit. Reassemble in reverse order.



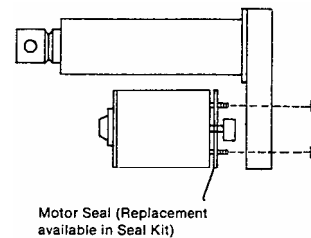
#### Part No. 12407, Intermediate Gear Kit [9200-505-004]

Remove rear housing. Slip washers and gear off of support pin. If you have two different thickness of washers, the thick one goes up against the front housing (goes in first).



#### Part No. 12408, Motor Replacement Kit [9200-635-005]

Remove rear housing. Remove 2 motor nuts from each housing. Pull motor free. Take care not to disturb the gear train. Replace in reverse order.

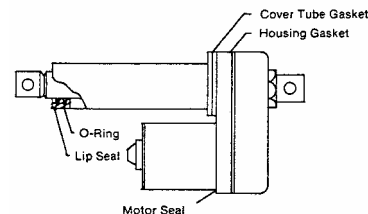


#### Part No. 09644, Seal Kit (thin wall) [9200-795-001]

#### Part No. 11974, Seal Kit (thick wall) [9200-448-001]

It is advisable to replace the appropriate seals whenever the actuator is disassembled.

Seal kit consists of: cover tube seal, gasket between housings, motor seal, o-ring and lip seal.



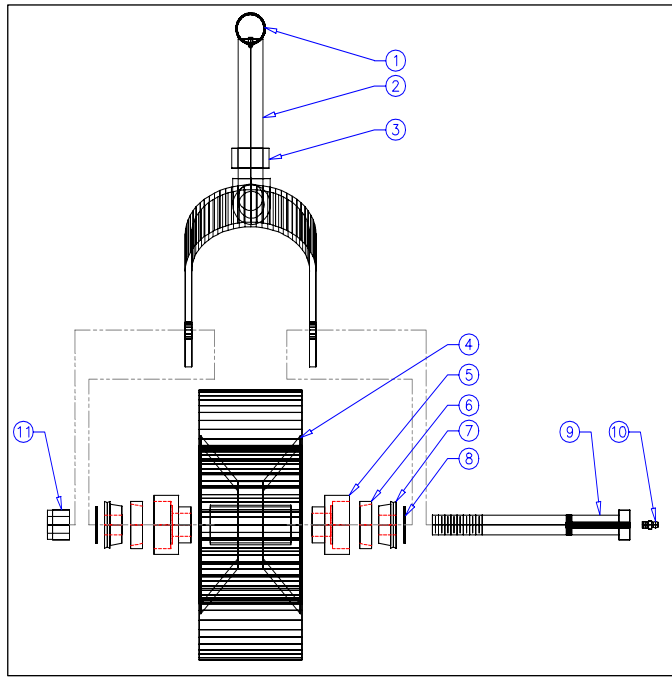
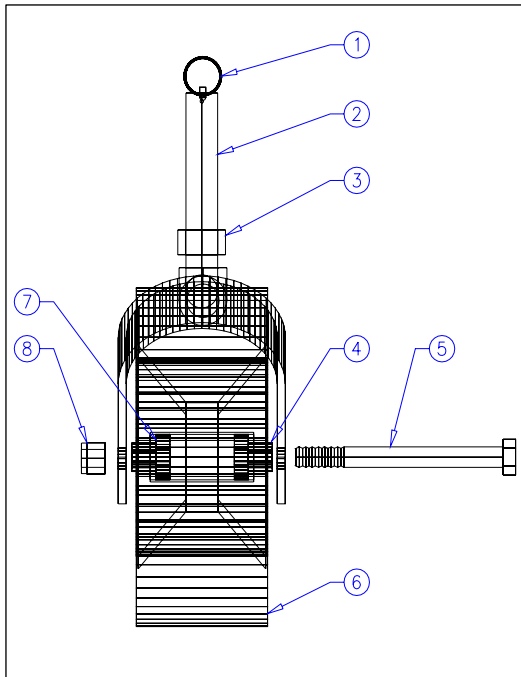
#### Part No. 11823, Connector Kit

Kit consists of 2 male and 2 female Weatherpac connectors.

#### Part No. 12406, Cover Tube Kit [9200-288-156]

**NOTE:** All screws can be replaced with standard machine screws (#12-24 and #10-32). Tighten all screws/nuts to 70 in-lb. upon re-assembly (except single in rear housing – tighten to 30 in-lb.).



**Castor Wheel Assembly,00921****Heavy Duty Castor Wheel Kit**

Item	Part #	Description	Qty
1	05116	Lynch Pin, 0.180x1¼,Pld	1
2	00865	Caster Bracket	1
3	00853	Spacer, Castor Bracket, Pld	1
4	00159	Spacer, Castor Wheel, Pld	2
5	01166	Bolt, 5/8NCX6½ , Pld	1
6	00920	Wheel Assembly, c/w Bearings	1
7	00857	Bearing, 5/8ID X 35mm	1
8	01051	Nut, Nylock, 5/8NC, Pld	1

Item	Part #	Description	12391J	12025J
1	05116	Lynch Pin, 0.180x1¼,Pld	0	0
2	12078	Caster Bracket	1	1
3	00853	Spacer, Castor Bracket, Pld	0	0
4	01960	Wheel Assembly, no Bearings	1	0
5	12309	Hub Adapter, HD Caster Wheel	2	2
6	12028	Bearing, Cup, ¾	2	2
7	12027	Bearing, Cone, ¾ c/w Seal	2	2
8	12026	Washer, Flat	2	2
9	12563	Bolt, ¾NC X 7, Drilled	1	1
10	00972	Grease Nipple, ¼NF	1	1
11	05550	Nut, Nylock, ¾NC, Pld	1	1

**Please Note:**

**Part No. 00920 has been discontinued.**

**It has been replaced with Part No. 13372, HD plastic wheel with sealed bearings or Part No. 13802b, HD wheel assembly with steel hubs, foam tire, greaseable bearings.**