

Pre-wetting System

Installation and Operations Manual
Module 9C

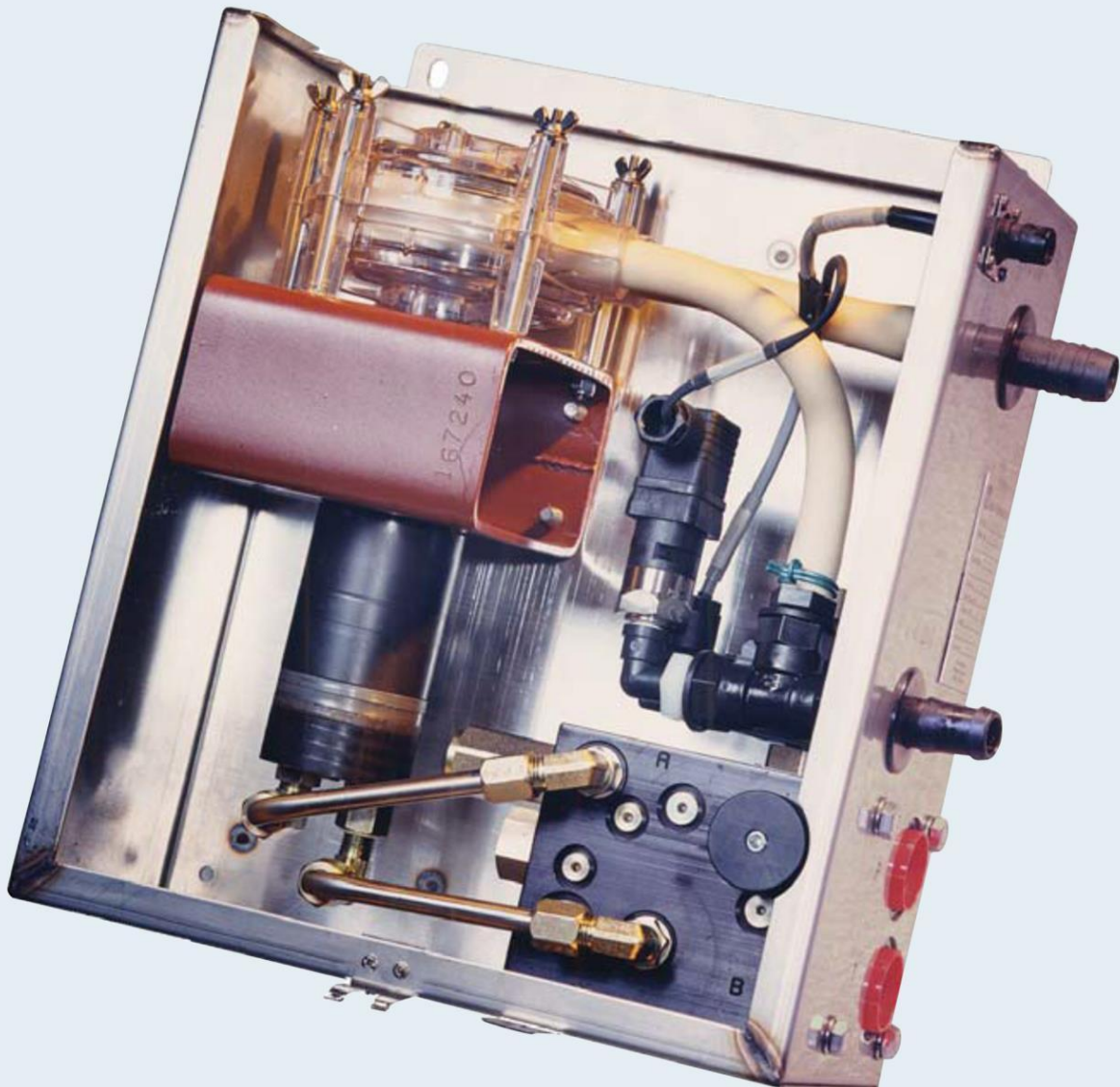


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1 Features

Flow Control

Diverts between 10% to 60% of oil to the motor allowing for pinpoint ratio adjustment following the unit to apply a constant ratio of liquid to solid up to a 12% Ratio.

Peristaltic Pump

Has excellent suction characteristics for worry free priming and out of the way placement. It delivers the liquid through a unique fixed displacement design, therefore the corrosive or abrasive material will not come into contact with metal parts. It allows for years of low cost and low maintenance operation.

Spray Bar

Is designed to withstand corrosive materials and to deliver the liquid accurately at a consistent low pressure. Large orifices and strainers minimize the potential for clogging.

Control Panel

Fits directly on top of the Compu-Spread controller for ease of operation and centralized placement of snow fighting controls. The control panel consists of an illuminated rocker switch to activate the system and a system monitor light to indicate the system is under pressure and operating.

Pump Unit

Is assembled with weather resistant components and fasteners. The pump enclosure is manufactured out of stainless steel. Care was taken to ensure that in the event of maintenance that all components are accessible and may be serviced with minimal effort.

Relief Valve

Is inserted into the main pressure line. This is in case the pressure rises to an unsafe level. The unit will open limiting the pressure to a safe level. This will protect the system against any unwanted breaks in lines and prolong the life of the unit.

2 Functional Purpose

The Compu-Spread, Pre-wetting System, (CS-PWS) is used as a deicing system for Winter Road Maintenance Spreaders. This Pre-wetting System achieves a consistent ratio of liquid to solid. The user, at the point of commissioning can adjust this ratio. The design of this system will allow 0.2 to 13 liters per minute at a pressure of 20 PSI max. to be sprayed directly onto the material as it is spread from the truck. The Spray Bar supplied with this system will apply large liquid droplets that minimize drift in turbulent air and maximize the usage of the chemical. Proper adjustment and knowledge of the liquid used is imperative in the correct operation of the unit.

Note: Pre-wet power units are designed to be durable and reliable; however they do operate in harsh environments and require regular maintenance to continue performing at peak efficiencies.

As well the material they are required to handle may have a severe effect on the performance and reliability of the unit. Pre-wet solutions are for the most part inherently corrosive and must be handled with care. Slight leakage within the power unit may cause damage over the long term and should be addressed as soon as possible to restore proper performance.

The pre-wet material itself may also be a factor effecting power unit performance, in that viscosity can increase sharply with temperature drop, and material may precipitate or crystallize out of solution. Please follow the manufacturer's recommendations with regards to material storage and handling. Materials that exhibit sharp increases in viscosity may cause back pressure that exceeds the operating pressure of the Pre-wet system leading in some cases to pump or hose failure.

Pre-wet materials are constantly changing and new products appear regularly on the market. If in doubt as to the suitability of a specific material to work with your power unit, please consult with your dealer, or contact Bosch Rexroth Canada directly.

Bosch Rexroth Canada warrants the power unit to be free of defects in workmanship and materials, but cannot be responsible for damage caused by improper application or selection of inappropriate Pre-wet materials.

3 Specifications

The main features of the Pre-wetting System are the design of the Power Unit, Spray Bar assemblies and Pre-wetting System Controllers. To support these main components Compu-Spread, has in its supply a line of 75-gallon (US) Tank Kits and associated Plumbing Kits.

3.1 Power Unit

The design of the power unit includes the following:

	Geroler Style Hydraulic Motor
Displacement	.79 in ³ /r
Max. Flow	5.5 GPM
Max. Pressure	2030 PSI
Max. Speed	1562 RPM

	Peristaltic Liquid Pump
Displacement	1.23 in ³ /r
Max. Flow	3.5 GPM or 13 LPM
Max. Pressure	30 PSI
Max. Speed	650 RPM
Temperature	-60 to 275 Degree F & UV treated
Estimated life span	2,000 hours at 300 RPM or 1.75 GPM

	Cartridge Style Flow Control Manifold
Max. Flow	30 GPM or 114 LPM
Max. Pressure	3000 PSI or 207 BAR

	Stainless Steel Pressure Switch
	5 AMP. 12 VDC
Adjustment Range	5 to 30 PSI
Max. Overpressure	350 PSI

- 14 x 12.5 x 6.25 stainless steel enclosure
- Hose barb fittings for customer connection to liquids
- Weather tight connector for electrical connection

3.2 Spray Bar

There are three styles of spray bars. A Standard 2 Nozzle Unit, a Sequential 3 Nozzle Unit and a Small 2 Nozzle Unit. Either of the three can be used for the application that is desired.



Sequential 3 Nozzle Unit



Small 2 Nozzle Unit



Standard 2 Nozzle Unit

They include the following features:

- Stainless steel flood jet nozzle tips
- Ceramic Orifice Disc and Core
- Sequentially arranged diaphragm checked nozzle bodies
- Sequentially arranged ball checked nozzle bodies
- Multi positional mounting bracket

3.2.1 Standard 2 Nozzle Spray Bar

Part Number	Description	Liquid Pressure	Capacity 1 Nozzle
175778	Nozzle TPTKSS-20	10 PSI	2.00 GPM

3.2.2 Sequential 3 Nozzle Spray Bar

Part Number	Description	Liquid Pressure	Capacity 1 Nozzle
140774	Nozzle TKSS-1.5	20 PSI	0.21 GPM
144955	Nozzle TKSS-15	20 PSI	2.12 GPM

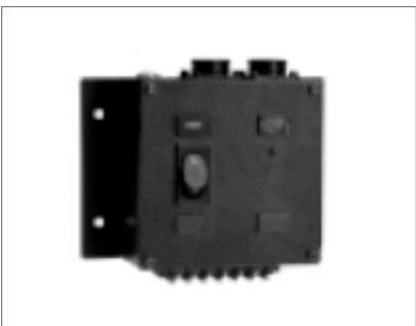
3.2.3 Small 2 Nozzle

Part Number	Description	Liquid Pressure	Capacity 1 Nozzle
153435	Orifice DC56-8	20 PSI	1.36 GPM

Note: For the sequential spray bars at low flow rates only the center nozzle will spray. As the pump speeds up, an increase in pressure will cause the outer nozzles to open. Once the system reaches a steady pressure of 10 PSI or more, then all nozzles will spray constantly. As the pump slows down, the outer nozzles will shut off first then the center last. Due to the design of the total spray system (pump and spray components) it is critical to note that: (a) the pump should not turn over 650 RPM or 3.5 GPM and (b) the pressure in the system should always be below 20 PSI, therefore DO NOT USE pressure regulators or flow dividers of any sort. Always use the hydraulic flow divider to regulate flow, not the nozzles.

3.3 Control Console

There are two styles of Controller: A stand-alone unit and a piggy back unit that mounts on top of the CS-230.



They include the following features:

- Illuminated rocker switch for system activation
- System monitor light
- Integrates with CS-230 controller for material change functionality

3.4 Cables

There are cable kits available to connect both controller options we offer. There are also extender cables. They include the following features:

- Weather tight connectors
- Scuff resistant cables

3.5 Tank Kits

There are two styles of liquid tank kits. A tailgate mounted kit and a V-body fender mounted kit, which can be ordered as a single or double kit. They include the following features:

- 75 gallon (US) capacity
- Polyethylene construction
- 1½" tank bung on each side to make it left or right application
- Threaded clean out lid
- Rugged steel constructed frames
- Vacuum protection vent
- Pressure protection vent

3.6 Plumbing Kits

There are several options in plumbing kits: a kit for the single style tanks, a kit for the double style and two different prefill options. They include the following features:

- Easy release cam lever couplers
- Non-corrosive line shut off valves
- Non-corrosive fittings and hoses

4 System Installation

4.1 Step 1: Tank Kits

Part #210610, CS-PWS-RES-75G-TG-05-KIT

Tailgate kit c/w mounting hardware and 75 gallon tank (plumbing kits not included). Simply hang the 4" mounting channel over the top edge of the truck body tailgate and tighten down the 5/8 x 3" hex head bolts to lock it into place. On the bottom of the mounting portion of the tank frame, you will find two 3/4" holes drilled through the 6" channel. These can be used for shackles and chains or bolt through mounting.



Part # 210611, CS-PWS-RES-75G-VBF-SINGLE-05-KIT

The above style of tank kits can be mounted directly to the V-Body Hopper's decking plate or the truck's fenders. You will find five 9/16" holes drilled through the bottom of the tank frame.

4.2 Step 2: Power Unit

V-Body Application

Using the 5/16" holes provided on the back cover of the enclosure, mount the power unit in a safe and central location on the Spreader, preferably close to the front of the Spreader.

Tailgate Application

Using the 5/16" holes provided on the back cover of the enclosure, mount the power unit on the mounting plate provided on the tank cradle.



See attached Pump General Assembly drawing (47-CSC-172612-0-C) at the back of the manual for complete layout of the power unit connections.

Note: The suction strainer is equipped with a 50 mesh strainer designed MAINLY for Liquid Calcium Chloride. The use of a more viscose material such as "Magic" or "Ice Ban" through this power unit requires appropriate filtration before it is loaded into the on board tanks. Viscosity is the thickness of the liquid that offers resistance to flow due to the existence of internal friction within the fluid. If the viscosity is too high or there is dirt in the liquid it would results in the suction strainer blockage. Regular cleaning of the suction strainer is essential to prevent the blockage.

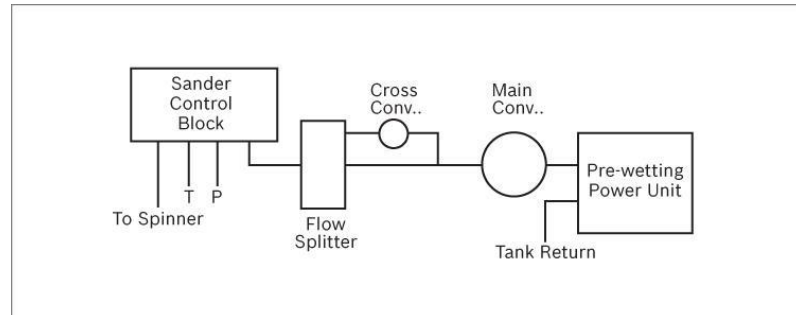
Caution: We assume no responsibility for any damage to the power unit pump tubing and/or housing due to highly viscose material selection and/or contamination.

Hydraulic Connection

Plumb the "exhaust" oil or tank line from the conveyor motor to the hydraulic pressure port on the Pre-Wetting System Power Unit. Plumb the tank port on the power unit to the hydraulic oil reservoir on the truck.

Caution: The pump assembly is powered from the hydraulic return oil from the conveyor or auger motor. To install, run the return oil from the conveyor or auger directly into the pump assembly. Do not run the spinner oil through the flow control; send it to the hydraulic reservoir. This will cause erroneous calibration of the pump assembly.

Hydraulic Arrangement

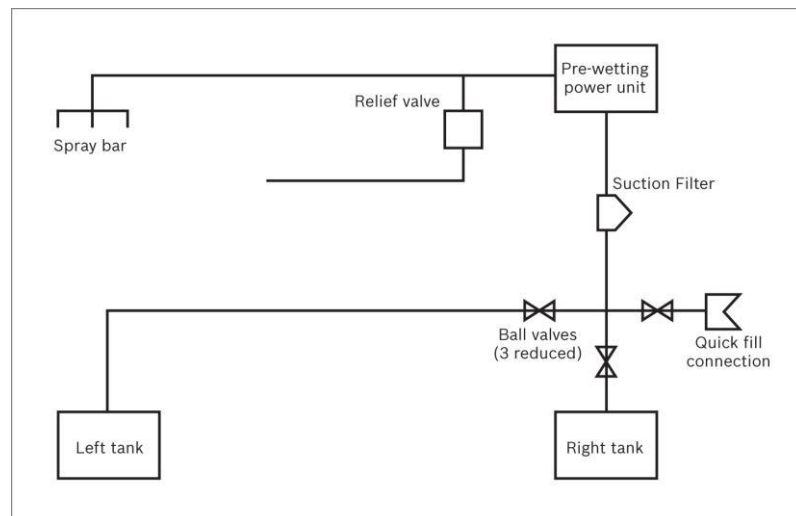


Liquid Connection

- Plumb the tank outlet port to the pump suction port of the Pre-wetting System Power Unit
- Plumb the pump outlet port to the spray bar

See the diagram below:

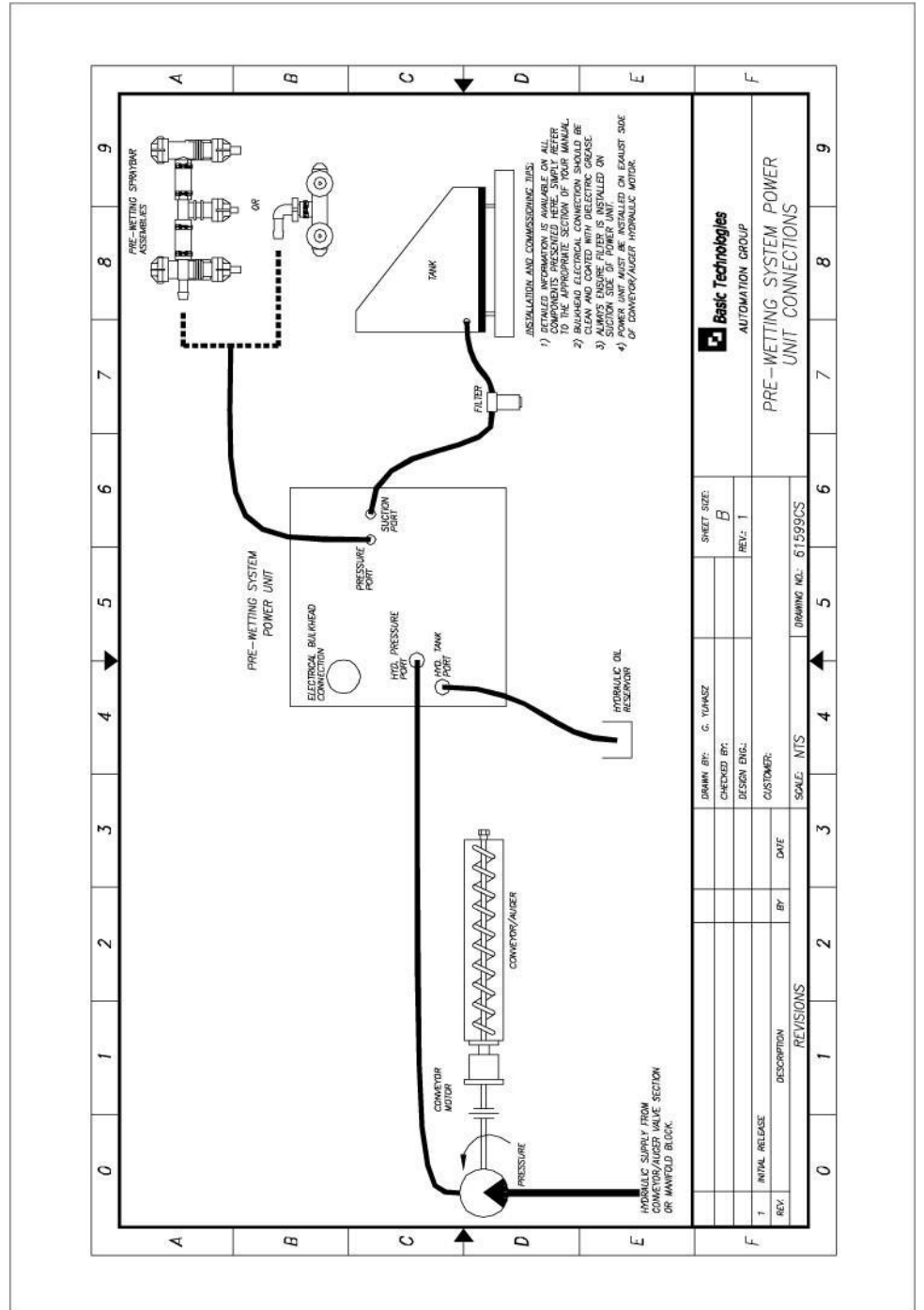
Pre-wetting Plumbing Arrangement



(For detailed plumbing drawings see pages 11-16)

Electrical Connection

- Connect Pre-wetting System Controller to the System Power Unit
- Connect material change cable to the CS-230 (if applicable)



4.3 Step 3: Spray Bar

4.3.1 Standard 2 Nozzle Spray Bar

Part#177979, CS-PWS-SB-2 TIP-A1

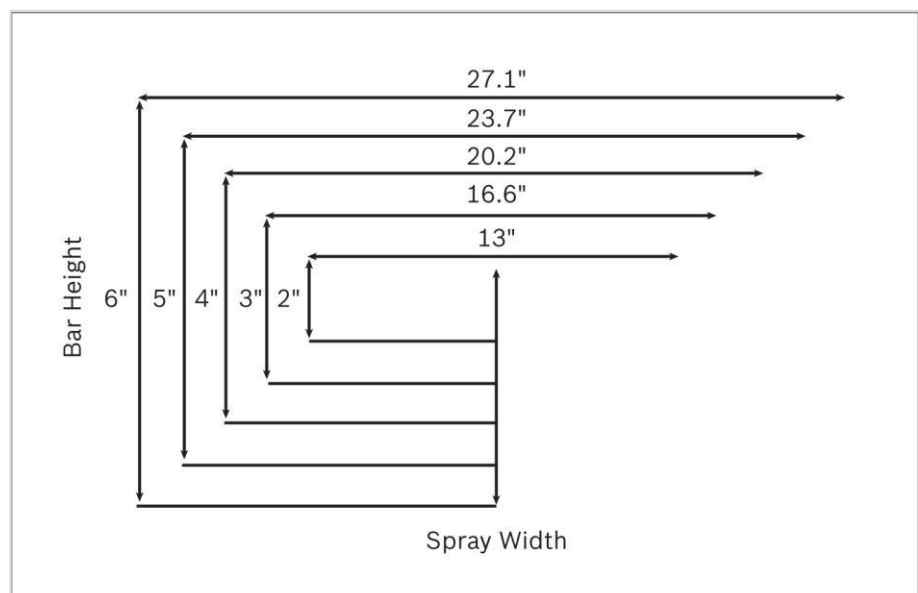


There are several possible choices as to where to mount the spray bar. One choice would be to mount it to the hopper gate. This would allow the spray bar to move up or down with the gate to allow for a proportionate spray pattern when the gate is adjusted to different heights. It is also a safe location, as the material moving on the conveyor would not normally come into contact with the spray bar. Another choice would be to mount it on the conveyor frame just before the material drops to the spinner. The advantage to this would be that the liquid would not have the chance to dry or evaporate before it hits the road. Also the liquid would be less likely to sit on the conveyor table and cause corrosion. The location of mounting will vary extremely depending on the style of the spreader body being used.

Mount the Spray Bar at the designated height according to the apron width and the gate setting. For example with a 20" apron the spray bar should be 4" above the material being spread. Thus if the gate setting is 5", then the height of the spray bar should be: $4" + 5" = 9"$ above the apron.

If possible the ideal location would be to mount the spray bar directly to the gate. In the preceding example that would be 4" above the bottom of the gate. This would provide an ideal spray pattern at each gate setting as well as to protect the spray bar from excess material during loading and unloading.

See the following figure for the spray pattern:





4.3.2 Sequential 3 Nozzle Spray Bar

Part#137650, CS-PWS-SB-VB-01-A

Mount the Spray Bar at the designated height according to the apron width and the gate setting. For example with a 20" apron the spray bar should be 4" above the material being spread. Thus if the gate setting is 5", then the height of the spray bar should be: $4" + 5" = 9"$ above the apron.

If possible the ideal location would be to mount the spray bar directly to the gate. In the preceding example that would be 4" above the bottom of the gate. This would provide an ideal spray pattern at each gate setting as well as to protect the spray bar from excess material during loading and unloading.



4.3.3 Tailgate Spray Bar

Part# 138109, CS-PWS-SB-TG-01-A

Mount it wherever the spray pattern will best cover the material coming off of the auger before it hits the spinner.

Caution:

- Only change nozzles after initial calibration failure to do so may damage the system.
- Regulate the output of the hydraulic system only with the hydraulic flow divider.
- Never downsize nozzles to the next smaller size of a nozzle (this will negatively affect the performance of the spray pattern and could cause unnecessary wear on the pump tubing).

4.4 Step 4: Plumbing Kits

Caution: This liquid system is to operate only at low pressure of 20 PSI or less.

Therefore, **DO NOT** use liquid flow regulators or flow divider of any sort. Doing so would void any warranties offered by the manufacturer.

4.5 Step 5: Control Console



4.5.1 CS-230/220 Mounted Console

Part# 169891, CS-PWS-CB-200-03-A

Cable kit Part # 180710, CS-PWS-CK-05-200

Mount the unit on top of the CS-230/220. Remove the existing CS-230 or CS-220 from the mounting bracket it is currently sitting in. Place the Pre-wetting System control console on top of the spreader console so that the slotted holes line up over the mounting lugs on the spreader console. Remount both units in the original mounting bracket.



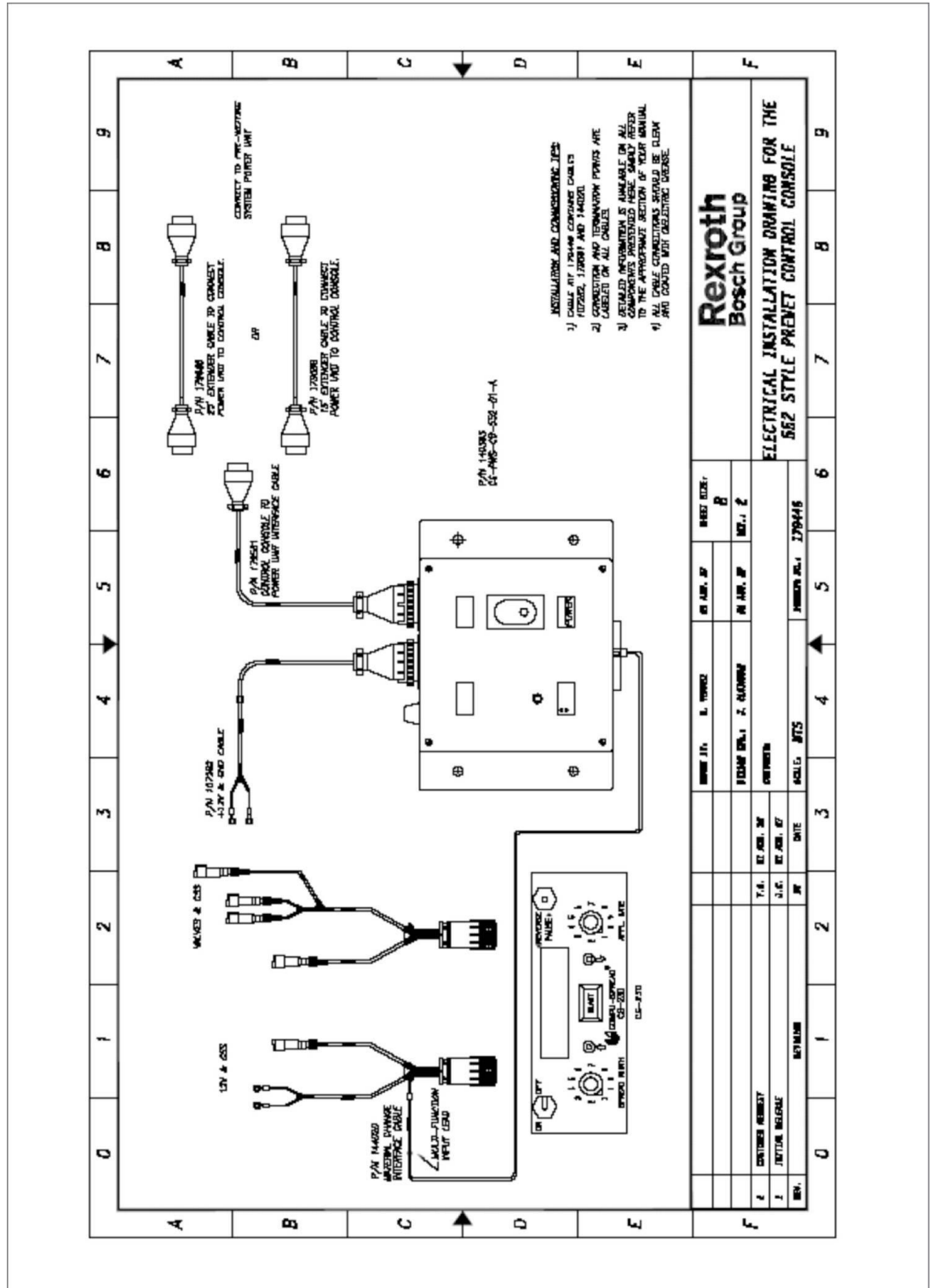
4.5.2 Stand Alone Mounted Console

Part# 175911, CS-PWS-CB-552-01-A2

Cable kit consists of Part# 179446, CS-PWS-CK-02-552

This console can be mounted in any convenient location in the cab of the spreader vehicle.

Caution: Dielectric grease should be used on all electrical connections outside the cab of the truck. This will reduce the amount of corrosion that may appear due to high concentrations of salt. Failure to do this may result in cable failures.

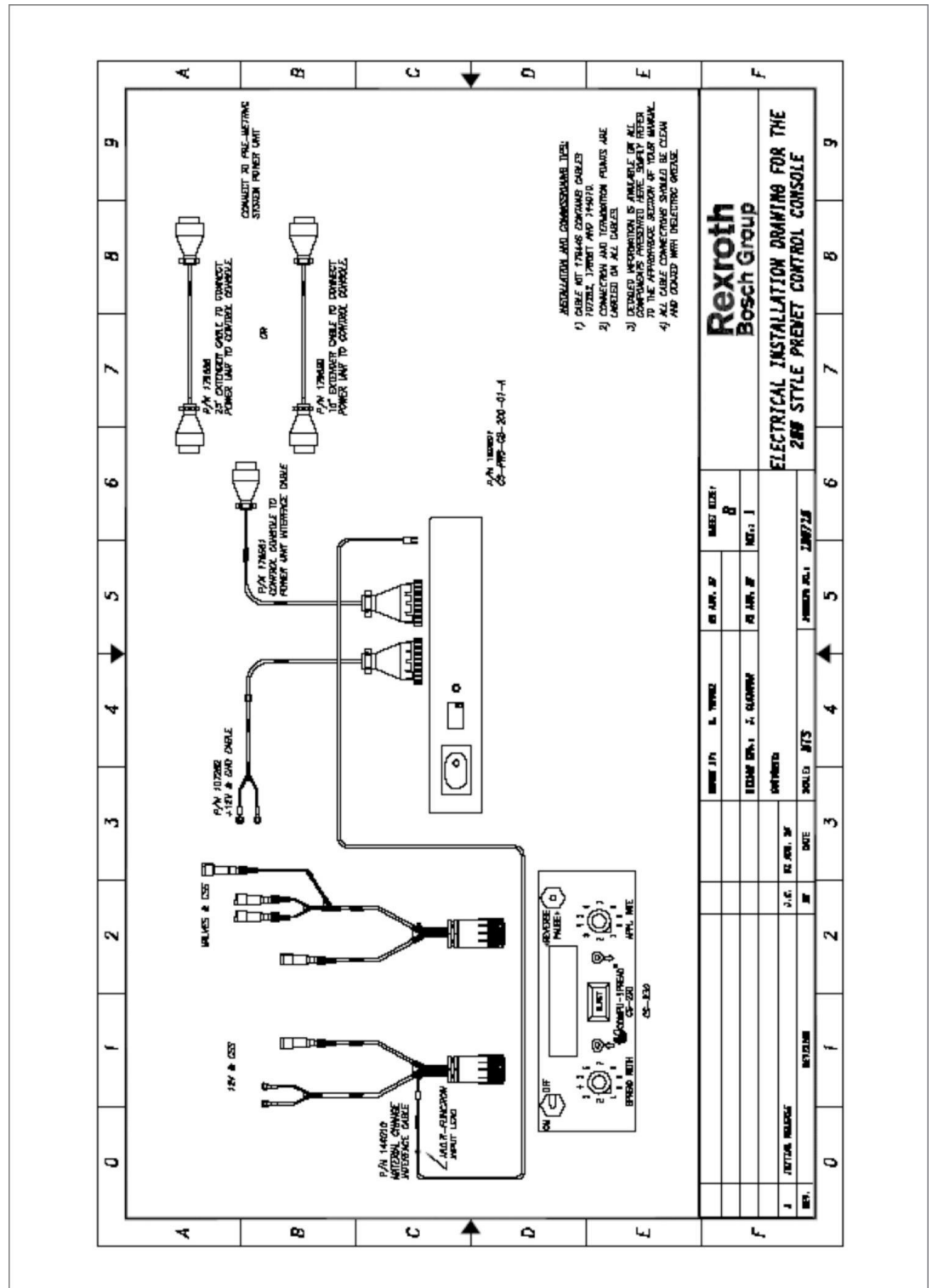


- INSTALLATION AND CONNECTIONS TIPS:**
- 1) CABLE KIT 179488 CONTAINS CABLES P/N 179488, 179489 AND 179490.
 - 2) CONNECTION AND TERMINATION POINTS ARE IDENTIFIED ON ALL CABLES.
 - 3) CABLES ARE IDENTIFIED AS AVAILABLE ON ALL COMPANIES' IDENTIFIED AS AVAILABLE REFER TO THE APPROPRIATE SECTION OF YOUR MANUAL.
 - 4) ALL CABLE CONNECTIONS SHOULD BE CLEAN AND COATED WITH DIELECTRIC GREASE.

Rexroth
Bosch Group

ELECTRICAL INSTALLATION DRAWING FOR THE 562 STILLE PRENET CONTROL CONSOLE

REV. NO.	DATE	BY	CHK.	DESCRIPTION
1				
2				
3				
4				
5				
6				
7				
8				
9				



5 Calibration

The pre-wetting system can be calibrated based on either solution weight or solution volume.

If the ratio of liquid to solid is determined based on Gallon/Ton or Liter/Kg, the following steps should be taken to calibrate the pre-wetting system:

Step 1: Check if the conveyor is operating within the proper operation range, and see if there is enough oil for the liquid pump. The maximum oil flow required for liquid application is 4 GPM. If the maximum oil flows of the valve section is able to provide 15 GPM the conveyor should be operating between 3 to 11 GPM. Should the conveyor operate outside the range adjustments must be made to ensure that the system is able to support the liquid pump.

Step 2: Determine a ratio of liquid to solid, (Gallon/Ton or Liter/Kg).

Step 3: Determine a typical application rate, (Lbs. /Mi. or Kg/Km) and gate setting.

Step 4: Determine average speed of operation (Km/Hr. or Mi. /Hr.).

Step 5: Determine the flow rate required.

Calibrate the system at a normal usage point.

For example:

Ratio = 7 Gal/Ton, Rate = 500 Lbs. /Mi., Speed = 25 MPH.

The liquid rate = Rate x Speed / 60 x Ratio / 2000

In GPM = 500 Lbs. /Mi. * 25 Mi. /Hr. /60 Min * 7 Gallon / 2000 Lbs. = 0.729 GPM

For example:

Ratio = 30 Liters/Ton, Rate = 500 Kg/Km, Speed = 25 KPH.

The liquid rate = Rate x Speed /60 x Ratio / 907

In LPM = 360 Kg/km * 50 Km/Hr. /60 Min * 30 Liters / Tone / 907 Kg = 9.92 LPM

The liquid rate can also be looked up in calibration charts as shown from Table 1 - Table 7.

Table 1: Calibration Chart for Ratio of 6 Gallon/Ton
 Seconds required to apply 1 gallon at a ratio of 6 Gal/Ton

		Application Rate in Lbs/Mi										
		200	300	400	500	600	700	800	900	1000		
MPH	20	300	200	150	120	100	86	75	67	60	32	HdK
	21	286	190	143	114	95	82	71	63	57	34	
	22	273	182	136	109	91	78	68	61	55	35	
	23	261	174	130	104	87	75	65	58	52	37	
	24	250	167	125	100	83	71	63	56	50	39	
	25	240	160	120	96	80	69	60	53	48	40	
	26	231	154	115	92	77	66	58	51	46	42	
	27	222	148	111	89	74	63	56	49	44	43	
	28	214	143	107	86	71	61	54	48	43	45	
	29	207	138	103	83	69	59	52	46	41	47	
	30	200	133	100	80	67	57	50	44	40	48	
31	194	129	97	77	65	55	48	43	39	50		
32	188	125	94	75	63	54	47	42	38	51		
33	182	121	91	73	61	52	45	40	36	53		
34	176	118	88	71	59	50	44	39	35	55		
35	171	114	86	69	57	49	43	38	34	56		
36	167	111	83	67	56	48	42	37	33	58		
37	162	108	81	65	54	46	41	36	32	60		
38	158	105	79	63	53	45	39	35	32	61		
39	154	103	77	62	51	44	38	34	31	63		
40	150	100	75	60	50	43	38	33	30	64		
		91	136	181	227	272	318	263	408	454		
		Application Rate in Kg/Km										

Table 2: Calibration Chart for Ratio of 7 Gallon/Ton
 Seconds required to apply 1 gallon at a ratio of 7 Gal/Ton

		Application Rate in Lbs/Mi										
		200	300	400	500	600	700	800	900	1000		
MPH	20	257	171	129	103	86	73	64	57	51	32	KPH
	21	245	163	122	98	82	70	61	54	49	34	
	22	234	156	117	94	78	67	58	52	47	35	
	23	224	149	112	89	75	64	56	50	45	37	
	24	214	143	107	86	71	61	54	48	43	39	
	25	206	137	103	82	69	59	51	46	41	40	
	26	198	132	99	79	66	57	49	44	40	42	
	27	190	127	95	76	63	54	48	42	38	43	
	28	184	122	92	73	61	52	46	41	37	45	
	29	177	118	89	71	59	51	44	39	35	47	
	30	171	114	86	69	57	49	43	38	34	48	
	31	166	111	83	66	55	47	41	37	33	50	
	32	161	107	80	64	54	46	40	36	32	51	
	33	156	104	78	62	52	45	39	35	31	53	
	34	151	101	76	61	50	43	38	34	30	55	
	35	147	98	73	59	49	42	37	33	29	56	
	36	143	95	71	57	48	41	36	32	29	58	
	37	139	93	69	56	46	40	35	31	28	60	
	38	135	90	68	54	45	39	34	30	27	61	
	39	132	88	66	53	44	38	33	29	26	63	
	40	129	86	64	51	43	37	32	29	26	64	
		91	136	181	227	272	318	263	408	454		
		Application Rate in Kg/Km										

Table 3: Calibration Chart for Ratio of 8 Gallon/Ton
 Seconds required to apply 1 gallon at a ratio of 8 Gal/Ton

		Application Rate in Lbs/Mi										
		200	300	400	500	600	700	800	900	1000		
MPH	20	225	150	113	90	75	64	56	50	45	32	KPH
	21	214	143	107	86	71	61	54	48	43	34	
	22	205	136	102	82	68	58	51	45	41	35	
	23	196	130	98	78	65	56	49	43	39	37	
	24	188	125	94	75	63	54	47	42	38	39	
	25	180	120	90	72	60	51	45	40	36	40	
	26	173	115	87	69	58	49	43	38	35	42	
	27	167	111	83	67	56	48	42	37	33	43	
	28	161	107	80	64	54	46	40	36	32	45	
	29	155	103	78	62	52	44	39	34	31	47	
	30	150	100	75	60	50	43	38	33	30	48	
	31	145	97	73	58	48	41	36	32	29	50	
	32	141	94	70	56	47	40	35	31	28	51	
	33	136	91	68	55	45	39	34	30	27	53	
	34	132	88	66	53	44	38	33	29	26	55	
	35	129	86	64	51	43	37	32	29	26	56	
	36	125	83	63	50	42	36	31	28	25	58	
	37	122	81	61	49	41	35	30	27	24	60	
	38	118	79	59	47	39	34	30	26	24	61	
	39	115	77	58	46	38	33	29	26	23	63	
40	113	75	56	45	38	32	28	25	23	64		
		91	136	181	227	272	318	263	408	454		
		Application Rate in Kg/Km										

Table 4: Calibration Chart for Ratio of 9 Gallon/T
 Seconds required to apply 1 gallon at a ratio of 9 Gal/Ton

		Application Rate in Lbs/Mi										
		200	300	400	500	600	700	800	900	1000		
MPH	20	200	133	100	80	67	57	50	44	40	32	KPH
	21	190	127	95	76	63	54	48	42	38	34	
	22	182	121	91	73	61	52	45	40	36	35	
	23	174	116	87	70	58	50	43	39	35	37	
	24	167	111	83	67	56	48	42	37	33	39	
	25	160	107	80	64	53	46	40	36	32	40	
	26	154	103	77	62	51	44	38	34	31	42	
	27	148	99	74	59	49	42	37	33	30	43	
	28	143	95	71	57	48	41	36	32	29	45	
	29	138	92	69	55	46	39	34	31	28	47	
	30	133	89	67	53	44	38	33	30	27	48	
	31	129	86	65	52	43	37	32	29	26	50	
	32	125	83	63	50	42	36	31	28	25	51	
	33	121	81	61	48	40	35	30	27	24	53	
	34	118	78	59	47	39	34	29	26	24	55	
	35	114	76	57	46	38	33	29	25	23	56	
	36	111	74	56	44	37	32	28	25	22	58	
	37	108	72	54	43	36	31	27	24	22	60	
	38	105	70	53	42	35	30	26	23	21	61	
	39	103	68	51	41	34	29	26	23	21	63	
40	100	67	50	40	33	29	25	22	20	64		
		91	136	181	227	272	318	263	408	454		
		Application Rate in Kg/Km										

Table 5: Calibration Chart for Ratio of 10 Gallon/Ton
 Seconds required to apply 1 gallon at a ratio of 10 Gal/Ton

		Application Rate in Lbs/Mi									
		200	300	400	500	600	700	800	900	1000	
	10	360	240	180	144	120	103	90	80	72	16
	11	327	218	164	131	109	94	82	73	65	18
	12	300	200	150	120	100	86	75	67	60	19
	13	277	185	138	111	92	79	69	62	55	21
	14	257	171	129	103	86	73	64	57	51	23
	15	240	160	120	96	80	69	60	53	48	24
	16	225	150	113	90	75	64	56	50	45	26
	17	212	141	106	85	71	61	53	47	42	27
	18	200	133	100	80	67	57	50	44	40	29
	19	189	126	95	76	63	54	47	42	38	31
	20	180	120	90	72	60	51	45	40	36	32
	21	171	114	86	69	57	49	43	38	34	34
	22	164	109	82	65	55	47	41	36	33	35
	23	157	104	78	63	52	45	39	35	31	37
MPH	24	150	100	75	60	50	43	38	33	30	39
	25	144	96	72	58	48	41	36	32	29	40
	26	138	92	69	55	46	40	35	31	28	42
	27	133	89	67	53	44	38	33	30	27	43
	28	129	86	64	51	43	37	32	29	26	45
	29	124	83	62	50	41	35	31	28	25	47
	30	120	80	60	48	40	34	30	27	24	48
	31	116	77	58	46	39	33	29	26	23	50
	32	113	75	56	45	38	32	28	25	23	51
	33	109	73	55	44	36	31	27	24	22	53
	34	106	71	53	42	35	30	26	24	21	55
	35	103	69	51	41	34	29	26	23	21	56
	36	100	67	50	40	33	29	25	22	20	58
	37	97	65	49	39	32	28	24	22	19	60
	38	95	63	47	38	32	27	24	21	19	61
	39	92	62	46	37	31	26	23	21	18	63
	40	90	60	45	36	30	26	23	20	18	64
		91	136	181	227	272	318	263	408	454	
		Application Rate in Kg/Km									

Table 6: Calibration Chart for Ratio of 12 Gallon/Ton
 Seconds required to apply 1 gallon at a ratio of 12 Gal/Ton

		Application Rate in Lbs/Mi										
		200	300	400	500	600	700	800	900	1000		
MPH	20	150	100	75	60	50	43	38	33	30	32	KPH
	21	143	95	71	57	48	41	36	32	29	34	
	22	136	91	68	55	45	39	34	30	27	35	
	23	130	87	65	52	43	37	33	29	26	37	
	24	125	83	63	50	42	36	31	28	25	39	
	25	120	80	60	48	40	34	30	27	24	40	
	26	115	77	58	46	38	33	29	26	23	42	
	27	111	74	56	44	37	32	28	25	22	43	
	28	107	71	54	43	36	31	27	24	21	45	
	29	103	69	52	41	34	30	26	23	21	47	
	30	100	67	50	40	33	29	25	22	20	48	
	31	97	65	48	39	32	28	24	22	19	50	
	32	94	63	47	38	31	27	23	21	19	51	
	33	91	61	45	36	30	26	23	20	18	53	
	34	88	59	44	35	29	25	22	20	18	55	
	35	86	57	43	34	29	24	21	19	17	56	
	36	83	56	42	33	28	24	21	19	17	58	
	37	81	54	41	32	27	23	20	18	16	60	
	38	79	53	39	32	26	23	20	18	16	61	
	39	77	51	38	31	26	22	19	17	15	63	
	40	75	50	38	30	25	21	19	17	15	64	
		91	136	181	227	272	318	263	408	454		
		Application Rate in Kg/Km										

Table 7: Calibration Chart for Ratio of 14 Gallon/Ton
 Seconds required to apply 1 gallon at a ratio of 14 Gal/Ton

		Application Rate in Lbs/Mi											
		200	300	400	500	600	700	800	900	1000			
	10	257	171	129	103	86	73	64	57	51	16		
	11	234	156	117	94	78	67	58	52	47	18		
	12	214	143	107	86	71	61	54	48	43	19		
	13	198	132	99	79	66	57	49	44	40	21		
	14	184	122	92	73	61	52	46	41	37	23		
	15	171	114	86	69	57	49	43	38	34	24		
	16	161	107	80	64	54	46	40	36	32	26		
	17	151	101	76	61	50	43	38	34	30	27		
	18	143	95	71	57	48	41	36	32	29	29		
	19	135	90	68	54	45	39	34	30	27	31		
	20	129	86	64	51	43	37	32	29	26	32		
	21	122	82	61	49	41	35	31	27	24	34		
	22	117	78	58	47	39	33	29	26	23	35		
	23	112	75	56	45	37	32	28	25	22	37		
MPH	24	107	71	54	43	36	31	27	24	21	39	KPH	
	25	103	69	51	41	34	29	26	23	21	40		
	26	99	66	49	40	33	28	25	22	20	42		
	27	95	63	48	38	32	27	24	21	19	43		
	28	92	61	46	37	31	26	23	20	18	45		
	29	89	59	44	35	30	25	22	20	18	47		
	30	86	57	43	34	29	24	21	19	17	48		
	31	83	55	41	33	28	24	21	18	17	50		
	32	80	54	40	32	27	23	20	18	16	51		
	33	78	52	39	31	26	22	19	17	16	53		
	34	76	50	38	30	25	22	19	17	15	55		
	35	73	49	37	29	24	21	18	16	15	56		
	36	71	48	36	29	24	20	18	16	14	58		
	37	69	46	35	28	23	20	17	15	14	60		
	38	68	45	34	27	23	19	17	15	14	61		
	39	66	44	33	26	22	19	16	15	13	63		
	40	64	43	32	26	21	18	16	14	13	64		
		91	136	181	227	272	318	263	408	454			
		Application Rate in Kg/Km											

Once the ratio has been decided, refer to the corresponding calibration chart for the correct flow rate. Follow the columns down for the application rate until it meets a speed in which you wish to calibrate.

Refer to Table 2 for above example. From the table it is seen that it would take 82 seconds (1min 22 seconds) to fill a 1 gallon container if the truck is traveling 25 MPH and applying 500 Lbs /Mi.

Step 7: Insert a one-gallon container into the pressure line. Using a speed simulator, operate the truck at normal spreading conditions. Once speed is obtained, turn on the Pre-Wetting System control console and maintain the selected speed for the specified time, (in the example this was 82 seconds). Check the container to determine if the application rate is correct, if not adjust the flow control, (clockwise to decrease) on the power unit and lock in place with the jam nut. Repeat procedure until unit is accurately calibrated.

If the liquid required is calculated based on the percentage of liquid pre-wetting solution to solid material, the following steps should be taken to calibrate the pre-wetting system:

Step 1: Determine the percentage of liquid to solid desired.

Step 2: Operate the spreader at a normal application rate and vehicle speed.

Step 3: Determine the flow rate required.

Step 4: Calibrate the system at a normal usage point.

For example:

Ratio of liquid to solid = 6%

Rate = 130 Kg/Km

Speed = 20 Km/Hr

CaCL₂ in solution = 29.8%; Solution Weight = 1.27 Kg/Liter

The liquid rate = Rate x Speed / 60 x Ratio / solution weight

= 130 Kg/Km X 20 Km/Hr / 60 Min X 6% / 1.27

= 2.04 LPM

The liquid rate can also be looked up in calibration charts as shown from Table 8 - Table 12. Once the ratio has been decided refer to the corresponding calibration chart for the correct flow rate. Follow the columns down for the application rate until it meets a speed in which you wish to calibrate.

Refer to Table 8 for the above example. From the table it is seen that the flow rate is 2.0 LPM. With this rate, it will take 1 minute to fill a 2 liter container or 2 min to fill a 4 liter container, with the truck traveling at 20 KPH and spreading at 130 Kg/Km.

Step 5: Disconnect the spray bar and hose and insert the spray bar into a calibration container.

Step 6: Using a speed simulator operate the vehicle at normal spreading conditions: 20 KPH, 130 Kg/Km.

Step 7: Once the spread rate is stable, turn on the Pre-Wetting System control console and while maintaining the selected speed and spread rate operate the pre-wetting system for the specified time, say 1 minute.

Step 8: Check the container to determine if the application rate is correct, if not adjust the flow control, (clockwise to decrease) on the power unit and lock in place with the jam nut. Repeat this procedure until the unit is accurately calibrated.

Table 8: Calibration Chart for Ratio of 6% with 29.8% CaCL₂ Solution
Calcium Chloride rates at a ratio of 6%:

		Application Rate in Kg/Km			
		90	130	170	210
KPH	10	0.7	1.0	1.3	1.7
	15	1.1	1.5	2.0	2.5
	20	1.4	2.0	2.7	3.3
	25	1.8	2.6	3.3	4.3
	30	2.1	3.1	4.0	5.0
	35	2.5	3.6	4.7	5.8
	40	2.8	4.1	5.4	6.6
	45	3.2	4.6	6.0	7.4
	50	3.5	5.1	6.7	8.3
	55	3.9	5.6	7.4	9.1
	60	4.3	6.1	8.0	9.9

Table 9: Calibration Chart for Ratio of 8% with 29.8% CaCL₂ Solution
Calcium Chloride rates at a ratio of 8%:

		Application Rate in Kg/Km			
		90	130	170	210
KPH	10	0.9	1.4	1.8	2.2
	15	1.4	2.0	2.7	3.3
	20	1.9	2.7	3.6	4.4
	25	2.4	3.4	4.5	5.5
	30	2.8	4.1	5.4	6.6
	35	3.3	4.8	6.2	7.7
	40	3.8	5.5	7.1	8.8
	45	4.3	6.1	8.0	9.9
	50	4.7	6.8	8.9	11.0
	55	5.2	7.5	9.8	12.1
	60	5.7	8.2	10.7	13.2

Table 10: Calibration Chart for Ratio of 10% with 29.8% CaCL₂ Solution
Calcium Chloride rates at a ratio of 10%:

		Application Rate in Kg/Km			
		90	130	170	210
KPH	10	1.2	1.7	2.2	2.8
	15	1.8	2.6	3.3	4.1
	20	2.4	3.4	4.5	5.5
	25	3.0	4.3	5.6	6.9
	30	3.5	5.1	6.7	8.3
	35	4.1	6.0	7.8	9.6
	40	4.7	6.8	8.9	11.0
	45	5.3	7.7	10.0	12.4
	50	5.9	8.5	11.2	13.8
	55	6.5	9.4	12.3	15.2
	60	7.1	10.2	13.4	16.5

Table 11: Calibration Chart for Ratio of 12% with 29.8% CaCL₂Solution Calcium Chloride rates at a ratio of 12%:

		Application Rate in Kg/Km			
		90	130	170	210
KPH	10	1.4	2.0	2.7	3.3
	15	2.1	3.1	4.0	5.0
	20	2.8	4.1	5.4	6.6
	25	3.5	5.1	6.7	8.3
	30	4.3	6.1	8.0	9.9
	35	5.0	7.2	9.4	11.6
	40	5.7	8.2	10.7	13.2
	45	6.4	9.2	12.0	14.9
	50	7.1	10.2	13.4	16.5
	55	7.8	11.3	14.7	18.2
	60	8.5	12.3	16.1	19.8

6 Spare Parts

6.1 Spare Parts for Power Unit

Part Number	Description
140866	Peristaltic Pump
157814	Field Adjustable Pressure Switch
177851	Hydraulic Motor
180542	Enclosure Lid Seal
176215	Manifold Assembly Complete
124112	Directional Control Valve
124115	Coil for Directional Valve
124114	Proportional Flow Divider
121730	Needle Valve
004895	Directional Control Valve Pilot Operated
176218	Priority Flow Control Cartridge

6.2 Spray Bar Assemblies

Part Number	Description
177979	Standard 2 Nozzle
137650	Sequential 3 Nozzle
138109	Small 2 Nozzle

6.3 Spare Parts for Spray Bar Assemblies Standard 2 Nozzle

Part Number	Description
177236	¾ In Tee Spray Nozzle
177238	¾ In 90 Deg Spray Nozzle
175778	Flat Spray Nozzle
151654	Nozzle Cap and Gasket
177240	¾ In Pipe Clamp

6.4 Sequential 3 Nozzle

Part Number	Description
146817	5 PSI Ball Check Valve Insert
153430	½ In Swivel Nozzle Body
153432	½ In Elbow Nozzle Body
153434	Nozzle Cap and Gasket
153435	Spray Tip Disc
153436	Spray Tip Cone

6.5 Small 2 Nozzle

Part Number	Description
140774	½ In Center Nozzle Spray Tip
144955	End Nozzle Spray Tip
151654	Nozzle Cap with Gasket
151655	Single Nozzle Body
151656	Center Nozzle Body
151657	Double Nozzle Body

6.6 Tailgate Mount Style

Part Number	Description
210610	284 Liters / 75 Gallons

6.7 V-Body Mount Style

Part Number	Description
2110611	Single Fender Mounted Kit

6.8 Spare Parts Tank Assembly Kits

Part Number	Description
210609	Left or Right Mount 284 Liter / 75 Gallon Tank

6.9 Plumbing Kits

Part Number	Description
178882	Standard Plumbing Kit
178883	2nd Tank Plumbing Kit
178884	1½ In Prefill Plumbing Kit
178885	1 In Prefill Plumbing Kit
180310	Pre-wet Flushing Kit

6.10 Spare Parts for Plumbing Kits

Part Number	Description
167839	1½ In. Bulkhead
167831	1½ In. Street Elbow
167833	1½ In. Nipple
167834	1½ In. Ball Valve
167835	1 ½ In. NPT to 1 ½ In Hose Barb
167842	1½ In. Clear Hose
170281	1½ In. Barbed Tee
167838	1½ In. Female Tee
167847	1½ In. to ¾ In Reducer Bushing
162833	¾ In. NPT to ¾ In Hose Barb
167236	¾ In. Clear Hose

153290	¾ In. Female Tee
153289	¾ In. NPT to ½ In Barb
171134	½ In. Clear Hose
178865	¾ In. Pressure Relief Valve
162806	¾ In. Suction Strainer
169515	1½ In. Cam Lever Coupler
167220	1½ In. Cam Lever Coupler Plug
155856	# 14 Single Jack Chain
178861	1½ In. to 1 In Reducer Bushing
153260	1 In. Pipe Nipple
147975	1 In. Ball Valve
147976	1 In. Cam Lever Coupler
147977	1 In. Cam Lever Coupler Plug

6.11 Pre-wetting System Controllers

Part Number	Description
169891	200 Style Controller (Directly Mounted to CS-230)
175911	552 Style Controller (Standalone Controller)

6.12 Pre-wetting System Controller Cable Assembly Kits

Part Number	Description
179446	Stand Alone Control 552 Style
180710	Direct Mounted Controller 200 Style

6.13 Individual Cables for Pre-wetting System Controllers

Part Number	Description
107262	Power Cable
179561	Cable to Prewet Control

6.14 Material Change Cables

Part Number	Description
144010	Cable for Style 200
144020	Cable for Style 552

6.15 Extender Cables

Part Number	Description
179688	25 Foot Ext Cable
179689	15 Foot Ext Cable

7 Troubleshooting

Symptoms	Probable Cause	Corrective Action
Does not prime	Undersized tubing	Use the correct tubing, part number 173605. Pour a few drops of vacuum oil into the tubing within the pump.
Does not pull vacuum	Undersized tubing	Use the correct tubing, part number 173605. Pour a few drops of vacuum oil into the tubing within the pump.
Tubing fails too soon	Fluid or material being pumped is too coarse or contaminated. Jammed roller in the rotor assembly. Too much eccentricity in the system. Oversized tubing thickness. Bad tubing. Restricted nozzle flow.	Pre-filter fluid or material before loading it into the tanks. Check all 3 rollers. If seized roller is found, replace rotor. Check pump mounting, coupling, pump seating, etc. Use the correct tubing, part number 173605. Replace with new tubing. Check Nozzle for contamination or incorrect nozzle size.
Tubing moves inside of pump	Seized roller in the rotor. Undesirable lubrication inside. Undersized tubing O.D.	Check rotor assembly. Repair assembly or replace as required. Remove pump to clean both of pump halves and rotor. Use the correct tubing, part number 173605.
Does not attain required application rate	Improper calibration. Vehicle speed too fast.	Redo calibration. Reduce Vehicle speed. Check gate setting.

Symptoms	Probable Cause and Corrective Action
Ruptured Tubing	<p>It is possible that over-fatigued tubing may rupture within the pump head. Depending on the fluid being pumped, the pump parts may be contaminated or damaged and may require cleaning or replacement.</p> <p>The plastic pump head material is polycarbonate. The rotor assembly should be cleaned thoroughly if it becomes contaminated. The bearings in the rotor assembly and pump head are high carbon chrome steel with seals of synthetic rubber.</p>
Symptoms	Probable Cause and Corrective Action
No Liquid Discharge	<p>The rotating unit is turning in the wrong direction.</p> <p>Valves are closed or there is an obstruction in the inlet or outlet line.</p> <p>A strainer or filter is clogged.</p> <p>A bypass valve is open.</p> <p>There is an air leak somewhere in the inlet line. Air can come in through gaskets or valves above the fluid line.</p> <p>The pump is worn. The critical clearances have increased.</p> <p>Something is broken. Check the shaft, coupling, internal parts, etc.</p> <p>There is no oil flow to the pump.</p>
The pump is putting out a low capacity.	<p>The pump's internal clearances have increased. It is time to change some parts.</p> <p>A strainer or filter is partially clogged.</p> <p>The speed is too low. Check the voltage.</p> <p>The tank vent is partially frozen shut.</p> <p>A bypass line is partially open.</p> <p>The inlet piping is damaged. Something ran over it.</p>
The pump loses its prime after running for a while	<p>The liquid supply is exhausted. Check the tank level; sometimes the float is stuck, giving an incorrect level reading.</p> <p>The liquid velocity has increased dramatically.</p> <p>An air leak has developed in the suction piping.</p>
Excessive noise and vibration	<p>Foundation or anchor bolts have come loose.</p> <p>The pump and driver are misaligned.</p> <p>The piping is not supported properly.</p> <p>The liquid viscosity is too high. The pump is starving. Check to see if the supply tank is empty.</p>
You are experiencing rapid pump wear	<p>There are abrasives in the liquid you are pumping causing erosion problems.</p> <p>There is some corrosion in one or more of the pump elements.</p> <p>There is a lack of lubrication - preventing maintenance at end of season.</p> <p>Too much misalignment.</p> <p>The pump is running dry.</p>

8 Maintenance

Item/Job	Actions
Pump Maintenance	<p>Bearings within the pump head and rotor assembly are permanently lubricated and require no maintenance. The pump head should be periodically disassembled and cleaned, particularly if the tubing within the head has ruptured during pump operation. While the head is disassembled, inspect all parts for obvious damage or wear and replace where necessary.</p> <p>Apply ANTI-SEIZE on both ends of pump shaft.</p> <p>Check to see if through drive cover is affixed if not re- glues.</p> <p>It is strongly recommended that the system is cleaned with clean water after each use.</p>

9 Warranty Policy

Bosch Rexroth Canada Corp. warrants all products manufactured and distributed by it, to be free from defects in material and workmanship under normal operating conditions and proper application in accordance with the specifications for operation as described in the appropriate Engineering Data Sheet or its equivalent for the periods as specified below.

Compu-Spread®

- All hydraulic products including; pre-wetting power units, manifold assemblies as manufactured by Bosch Rexroth Canada Corp., axial piston equipment, MP18 style stacking valves, all special in-line valves not part of a main assembly, valve assemblies (pneumatic and electrical), and all rebuilt products. Twelve (12) months after delivery date or six (6) months after the equipment is placed in service, whichever comes first, provided the products have been properly prepared for long term storage when applicable, i.e. greater than 3 months.
- Twelve (12) months after delivery date for all GTS hardware.
- Twenty-four (24) months after delivery date or twelve (12) months after equipment is placed in service, whichever comes first, for CS 130 manual controllers, CS 230 microprocessors, CS-105 joystick consoles, and all pre-wetting system controllers.
- Ninety (90) days after delivery date for ground speed and conveyor speed sensors, oil level and temperature sensors, electric cable assemblies, hydraulic motors, pre-wetting tanks, metal fabricated equipment and tanks, and all other accessories not listed above.

10 Limitations on Warranty

This warranty is expressly in lieu of any other warranties expressed or implied, including any warranty of merchantability or fitness of use for a particular application.

Buyer's sole and exclusive remedy under this warranty shall be limited to the repair or exchange of warranted products at our option.

Equipment and accessories not of our manufacture are warranted to the extent of the warranty of the original manufacturer.

No special, incidental, consequential or other damage shall be recoverable. Bosch Rexroth Canada Corp. shall not be liable for consequential damages or contingent liabilities including, but not limited to, loss of life, personal injury, loss of crops, loss due to fire or water damage, loss of business income, downtime costs and trade or other commercial loss arising out of the failure of the product. Bosch Rexroth Canada Corp. will in no event be liable for any sum in excess of the price received by it for the product for which liability is claimed or associated.

No products shall be returned without prior authorization from Bosch Rexroth Canada Corp.

Buyer shall prepay all transportation charges for the return of such products to seller's factory or branch office location. There will be no acceptance of any charges for labour and/or parts incidental to the removal and remounting of products repaired or replaced under this warranty.

The above warranty does not cover conditions over which we, Bosch Rexroth Canada Corp., have no control, including without limitation, contamination, pressures in excess of recommended maximum, products damaged or subjected to accident, abuse or misuses after shipment from our factory, products altered or repaired by anyone other than Bosch Rexroth Canada Corp. personnel, Authorized Factory Service Center personnel or persons so designated in writing by Bosch Rexroth Canada Corp. prior to commencement of said work.

Bosch Rexroth Canada Corp. will not be held liable in case of requested pre-setting of any pressure-related components.

Systems should be started with 0 pressure and the pressure should be increased slowly to assure system function avoiding harm or damage to people and/or equipment.

Damage or failures which are not attributable to defects in materials and/or workmanship which are not considered by Bosch Rexroth Canada Corp. to be covered under warranty include, but are not limited to:

- Damages due to deterioration during periods of storage by the purchaser prior to installation and operation
- Damage of any kind from erosive or corrosive action of any gases, solids, liquids or hydraulic fluid
- Lack of or incorrect type of hydraulic fluid
- Contamination of the hydraulic fluid
- Damage attributable to accident, abuse, or neglect
- Stripped splines or keyways on drive shaft
- Incorrect mounting of external gears, pulley, etc.
- Operating beyond the recommended maximum speeds, pressure and temperatures. Use of the product in a manner or purpose for which it was not designed or intended by Bosch Rexroth Canada Corp.
- Repairs by unauthorized personnel
- Misalignment
- Tampering or destruction of the factory seal. Damage due to inappropriate fusing, over/under voltage application, static discharge, etc.

Notes: