

Volume 1
Fourth Edition

PENGWYN

Central Hydraulic Systems

Series 485

Manifolds

PENGWYN CENTRAL HYDRAULIC SYSTEMS

SERIES 485 MANIFOLDS

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Introduction

Thank you for choosing our ground-oriented central hydraulics system. Our goal has always been to provide great customer service and a safe, reliable product that emphasizes:

- **simplicity of operation**
- **operator safety**
- **management control**
- **reduced operating costs**
- **year round usage**

In order to reach our goal of reliability, your new Pengwyn system uses the rugged Autosucker™ on-demand pump. It has a dry valve design with fixed displacement that generates hydraulic flow to a series of poppet-style solenoid cartridge valves. Poppet valves are bang-bang solenoid devices which means they are either on or off. They are reliable, dirt tolerant, inexpensive to repair, contain only static seals, and are not damaged by long periods of sitting idle. These features, as well as the testing done on each system before it leaves the facility, contribute to the overall dependability.

Not only is your new system reliable, but it has been designed to be safe and easy for the operator, as well as the maintenance personnel. The operator has complete control of all the functions with the touch of a switch on the control console. This allows the operator to concentrate on the road. Another feature to help the operator is the system of alarms. The alarms alert the operator to any problems with low material, jams, high oil temperature, low oil level, and internal faults. This again keeps the operator from diverting attention from the roadway. Another safety consideration includes having all the hydraulics on the exterior of the cab and away from the operator.

Other features of your Pengwyn system include running hydraulic tools off the system itself and allowing for management programming of spreader constants. By allowing for management control and year round utilization, your system is cost effective and lowers de-icing material usage. Lowered material usage not only allows money to be used for something else, but helps to limit the damage done to the environment.

Please look to this manual for information on the major features, calibration of the system, and troubleshooting guidelines. This manual will help you calibrate, operate, and maintain your new spreader system. Pengwyn does offer extensive training and we are also available by calling 1-800-233-7568. Please call if you have a problem. We are here to help you.

Caution

DISCONNECT ALL CONNECTORS FROM MANIFOLD, REMOVE CONTROL CONSOLE FROM THE CAB AND DISCONNECT BATTERY BEFORE WELDING ON THE TRUCK.

DO NOT OVER TIGHTEN SOLENOID COIL NUT; THE COIL SPINDLE IS HOLLOW AND EASILY DAMAGED. BE CAREFUL NOT TO PINCH WIRES UNDER COIL WHEN INSTALLING.

TURN THE CONTROL CONSOLE POWER SWITCH OFF BEFORE CONNECTING AND DISCONNECTING BATTERY CABLES, BATTERY CHARGERS, OR JUMPING THE BATTERY.

DO NOT DRILL HOLES IN OR MOUNT AUXILIARY SWITCHES TO THE CONTROL CONSOLE. THIS WILL VOID THE WARRANTY AND RISK PERSONAL INJURY. USE THE CONTROL CONSOLE MOUNTING BRACKET FOR THIS PURPOSE.

Limited Warranty

Pengwyn warrants 485 Series components to be free of defects in material and workmanship, under normal use and service for a period of two (2) years from date of shipment. Pengwyn's obligation under this warranty is limited to repairing or replacing at its factory, or other location designated by Pengwyn, any part or parts thereof which are returned within thirty (30) days of the date when failure occurs or defect is noted, with transportation charges prepaid, and which upon examination appears to Pengwyn's satisfaction to have been defective. **Such free repair or replacement does not include transportation charges, or the cost of installing the new part or any other expense incident thereto. Pengwyn will not be liable for other loss, damage, or expense directly or indirectly arising from the use of its products, nor will Pengwyn be liable for special, incidental or consequential damages.**

Ordinary wear and tear, and damage from abuse, misuse, neglect or alteration are not covered by this warranty. Pengwyn assumes no liability for expenses incurred or repairs made outside Pengwyn's factory except by written consent. Pengwyn's warranty also does not cover the requirement of control box programming. All control box programming is to be performed by the end user after receiving training and with the use of the technical manual. This warranty is null and void if instructions and operating procedures are not followed.

Equipment or parts not manufactured by this company, but which are furnished in connection with Pengwyn products, are covered directly by the warranty of the manufacturer supplying them. However, Pengwyn will assist in obtaining adjustment on such equipment or parts when necessary.

It is recommended that spare parts be purchased for critical items to allow continued operation of equipment during the inspection, evaluation, or repair/replacement process.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED INCLUDING ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE AND OF ANY OTHER OBLIGATION OR LIABILITY OF PENGWYN.

PRODUCT IMPROVEMENT LIABILITY DISCLAIMER

Pengwyn reserves the right to make any changes in or improvements on its products without incurring any liability or obligation whatever and without being required to make any corresponding changes or improvements in products previously manufactured or sold.

Pressure Adjustments

Main Relief

1. Start engine and bring engine speed to 1500 rpm
2. Turn console ON and ensure

Manual Mode is enabled.

3. Scroll to pressure readout.
4. Disconnect the auger pressure hose quick disconnects.
5. Turn **Spreader switch** to MANUAL.
6. Set Auger to position 0 and hold the **Blast Switch**.
7. Read the pressure on the display.

(example: 2580/450) The Pengwyn display will flash "**SPREADER JAM**" every few seconds while blast is held. The first number is the high pressure reading and the second number is the differential pressure reading.

8. Release **Blast Switch**.
If adjustment is necessary:
9. Loosen main relief lock-nut.
10. Use an Allen wrench to adjust the internal/external screw. Rotate it clockwise to increase the pressure setting or counter clockwise to decrease the pressure setting.
11. Tighten lock nut.
12. Repeat above procedure until proper setting is achieved.

Bed/Plow up Relief

1. Start engine and bring engine speed to 1500 rpm
2. Turn Console ON and ensure

Manual Mode is enabled.

3. Using the **Mode Switch**, scroll to pressure readout.
4. Run **Plow UP** until plow stops and hold to "dead-head" plow.
5. Read the pressure on the display. The first number will be the high pressure reading and the second number is the differential pressure reading.
6. Release **Plow UP** control.

If adjustment is necessary:

7. Loosen lock-nut from bed up/plow up relief.

8. Use an Allen wrench to adjust the internal/external screw clockwise to increase pressure setting and counter clockwise to decrease pressure setting.
9. Tighten lock nut.
10. Repeat the above procedure until proper setting is achieved.
(Typical settings are 1800-2000 PSI)

Bed/Plow down Relief

1. Start engine and bring engine speed to 1500 rpm.
2. Turn Console ON and ensure Manual Mode is

enabled.

3. Using the **Mode Switch**, scroll to pressure readout.
4. Run **Plow DOWN** until plow stops and hold to "dead-head" plow.
5. Read the pressure on the display. The first number will be the high pressure reading and the second number is the differential pressure reading.
6. Release **Plow DOWN** control.
If adjustment is necessary;
7. Loosen lock-nut from bed down/plow down relief.
8. Use an Allen wrench to adjust the internal/external screw clockwise to increase pressure setting and counter clockwise to decrease pressure setting.
9. Tighten lock nut.

10. Repeat the above procedure until proper setting is achieved. (Typical settings are 400-800 PSI)

Plow Counterbalance Relief

For trucks equipped with this option the amount of counterbalance desired can be adjusted using the plow counterbalance relief valve

To change the setting:

1. Start engine and bring engine speed to 1500 RPM.
2. Activate plow counterbalance. On some trucks this may be done by use of the **Front Plow Down** switch or an auxiliary switch on or near the control console.
3. Loosen locknut on plow counterbalance relief valve.

4. Increase the amount of counterbalance pressure by turning the relief valve clockwise.
(Typical settings are 300-600 PSI)

5. Decrease the amount of counterbalance by turning the relief valve counter-clockwise.

6. Once the desired amount of counterbalance is reached tighten the locknut on the counterbalance relief valve.

The amount of counterbalance pressure may be different for every truck. The counterbalance relief should be set at a value so that the weight is taken off the plow itself and distributed to the truck suspension.

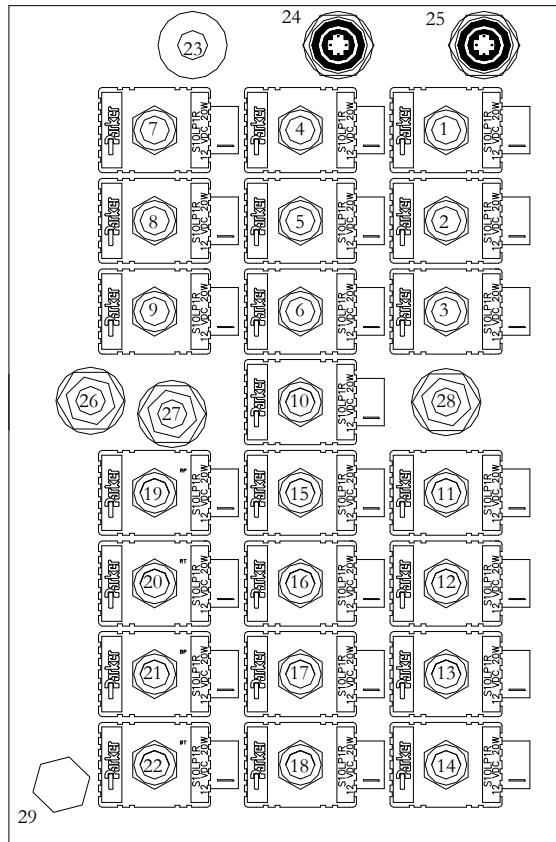
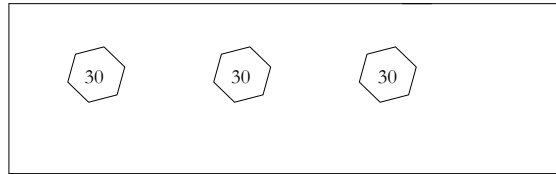
The pressure cannot be read using the PENGWYN control console. A hydraulic pressure gauge can be inserted at the plow lift port if a pressure reading is desired.

Manifold Diagrams

This chapter contains detailed valve function diagrams as well as several manifold component part numbers.

100 Series

Valve Function Diagram – Top/Front



See function chart on following page.

Valve Function Chart – Top/Front

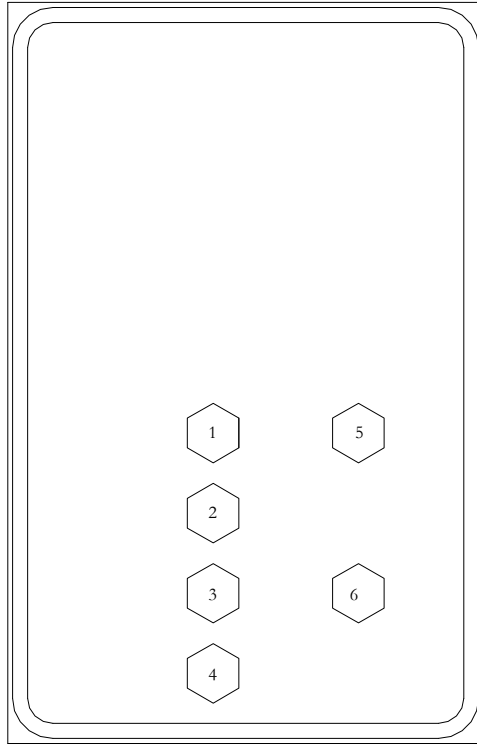
FLAG NUMBER	FUNCTION	WIRE COLOR
1	Auger 1	White
2	Auger 2	White/Yellow
3	Auger 4	White/Green
4	Spinner 1	White/Orange
5	Spinner 2	White/Brown
6	Spinner 4	White/Purple
7	Wetting 1	Pink
8	Wetting 2	White
9	Wetting 4	White/Yellow
10	Pump Bypass Valve	White/Black
11	Plow Left, Tank	Purple CC (Gray OC) *
12	Plow Right, Tank	Gray CC (Purple OC) *
13	Plow Up, Tank	Brown
14	Plow Down, Tank	Brown
15	Plow Left, Pressure	Gray
16	Plow Right, Pressure	Purple
17	Plow Up, Pressure	White/Gray
18	Plow Down, Pressure	Brown
19	Bed Down Slow Rod, pressure	White/Red
20	Bed Up Rod, tank	Orange
21	Bed Up Blind, pressure	Orange
22	Bed Down Slow Blind, tank	White/Red
23	Thermistor	N/A
24	Low Pressure Transducer	N/A
25	High Pressure Transducer	N/A
26	Bed/Plow Relief	N/A
27	Bed Down Relief	N/A
28	Main Relief	N/A
29	Bed Down Compensator	N/A
30	Motor Compensator	N/A

Parts List – Top/Front

FLAG NUMBER	FUNCTION	PART NUMBER
1-9, 11-22	Normally Closed Solenoid Valve Size 10	DSL101C
23-27	Normally Open Solenoid Valve Size 10	DS101N
26,28	2500 PSI Relief Valve	RD-2500
27	800 PSI Relief Valve	RD-800
24,25	Pressure Transmitter with Plug	ML5000
23	Thermistor Assembly	TC-101
29	Bed Down Compensator	FR1-10-F-0-16.00
30	Motor Compensator	10 SLC2-A-75
NO FLAG	Molded Coil	S10LP1RDO12

Valve Function Diagram - Back

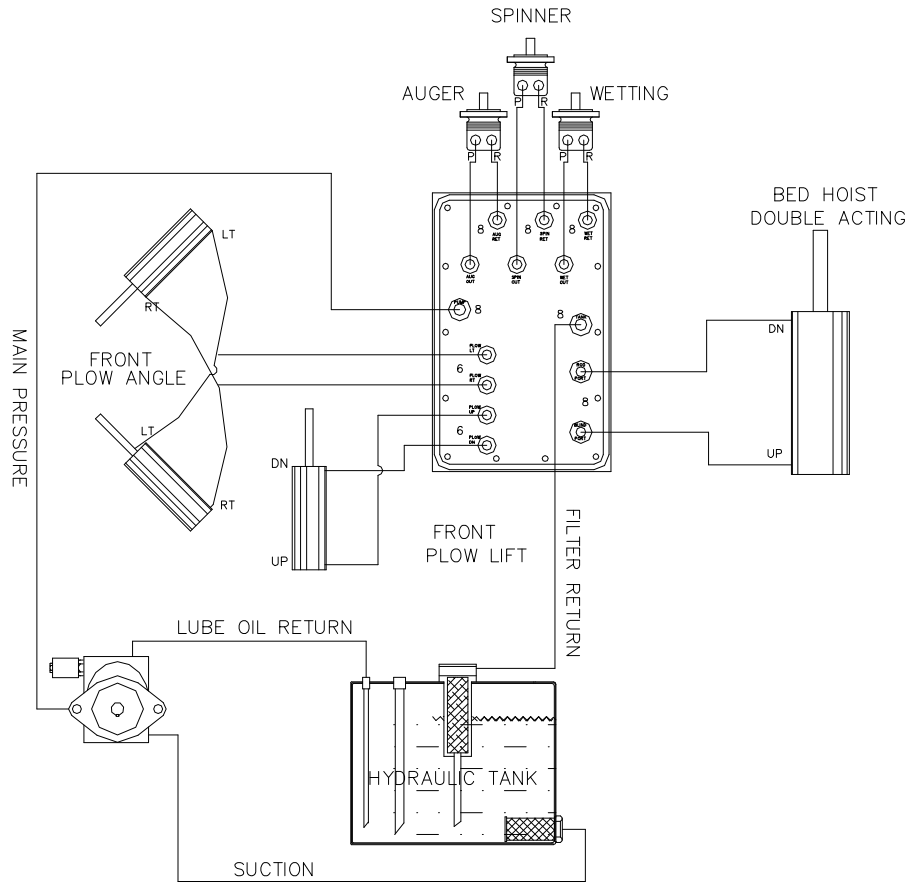
As viewed from driver-side ground, looking upward.



FLAG NUMBER	FUNCTION	PART NUMBER
1-6	Check Valve	CV103P

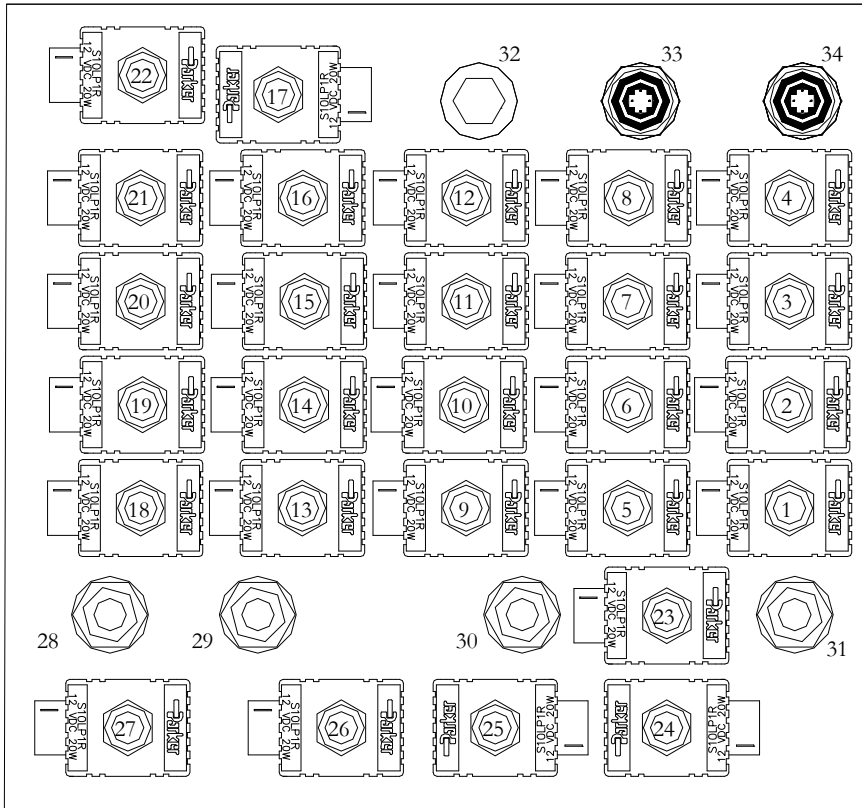
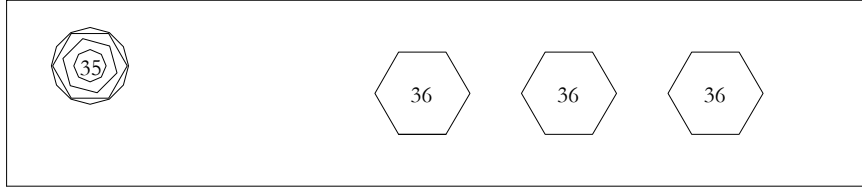
Parts List - Back

Plumbing Diagram



200 Series

Valve Function Diagram – Top/Front



See function chart on following page.

Valve Function Chart – Top/Front

FLAG NUMBER	FUNCTION	WIRE COLOR
1	Auger 1	White
2	Auger 2	White/Yellow
3	Auger 4	White/Green
4	Auger 8	White/Blue
5	Spinner 1	White/Orange
6	Spinner 2	White/Brown
7	Spinner 4	White/Purple
8	Spinner 8	White/Blue
9	Wetting 1	Pink
10	Wetting 2	White
11	Wetting 4	White/Yellow
12	Wetting 8	White/Green
13	Plow Left, Pressure	Gray
14	Plow Right, Pressure	Purple
15	Plow Down, Pressure	Brown
16	Plow Up, Pressure	White/Gray
17	Pump Bypass Valve	White/Black
18	Plow Left, Tank	Purple CC (Gray OC) *
19	Plow Right, Tank	Gray CC (Purple OC) *
20	Plow Down, Tank	Brown
21	Plow Up, Tank	Brown
22	Counter Balance Valve	Blue
23	Bed Down Fast Blind, tank	Yellow
24	Bed Down Slow Blind, tank	White/Red
25	Bed Up Blind, pressure	Orange
26	Bed Down Slow Rod, pressure	White/Red
27	Bed Up Rod, tank	Orange
28	Bed Down Relief	N/A
29	Bed/Plow Relief (optional)	N/A
30	Bed/Plow Relief	N/A
31	Main Relief	N/A
32	Thermistor	N/A
33	Low Pressure Transducer	N/A
34	High Pressure Transducer	N/A
35	Counterbalance Relief Valve	N/A
36	Compensator	N/A

* OC denotes open center plow circuit; CC denotes closed center plow circuit

Parts List – Top/Front

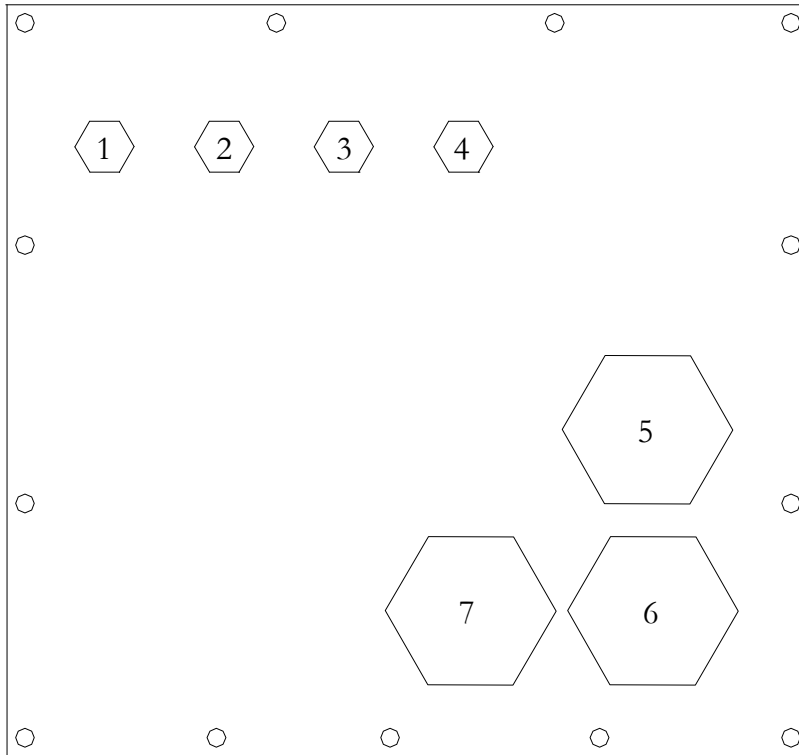
FLAG NUMBER	FUNCTION	PART NUMBER
1-16 (18,19 - CC), 21, 22	Normally Closed Solenoid Valve Size 10	DSL101C
23-27	Normally Closed Solenoid Valve Size 10	DS161C
(18,19 - OC), 20	Normally Open Solenoid Valve Size 10	DSL101N
17	Normally Open Solenoid Valve Size 16	DS161N
31	Main Relief	RD-2500
29,30	Bed/Plow Relief	RD-2500
28,35	Bed Down Relief/ Counterbalance Relief	RD-0800
33,34	Pressure Transmitter with Plug	ML5000
32	Thermistor Assembly	TC-101
NO FLAG	Molded Coil	S10LP1RDO12
36	Motor Compensator	16SLC2-A-75

Note:

Flag numbers 18 and 19 will vary depending on type of plow used. Check valve manufacturer part number before ordering.

Valve Function Diagram - Back

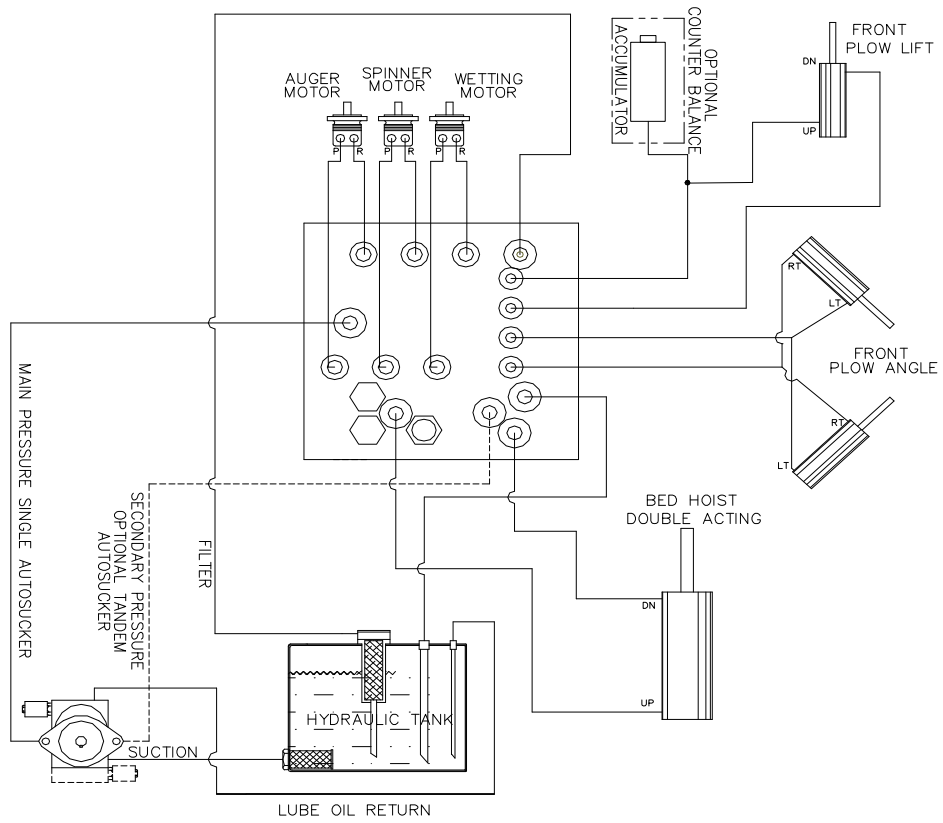
As viewed from driver-side ground, looking upward.



Parts List - Back

FLAG NUMBER	FUNCTION	PART NUMBER
1-4	Check Valve	CV103P
5	Bed Check Valve	CV161P
6	Bed Down Compensator 15 Gal.	PC-501
7	Bed Down Fast Compensator 30 Gal.	PC-601

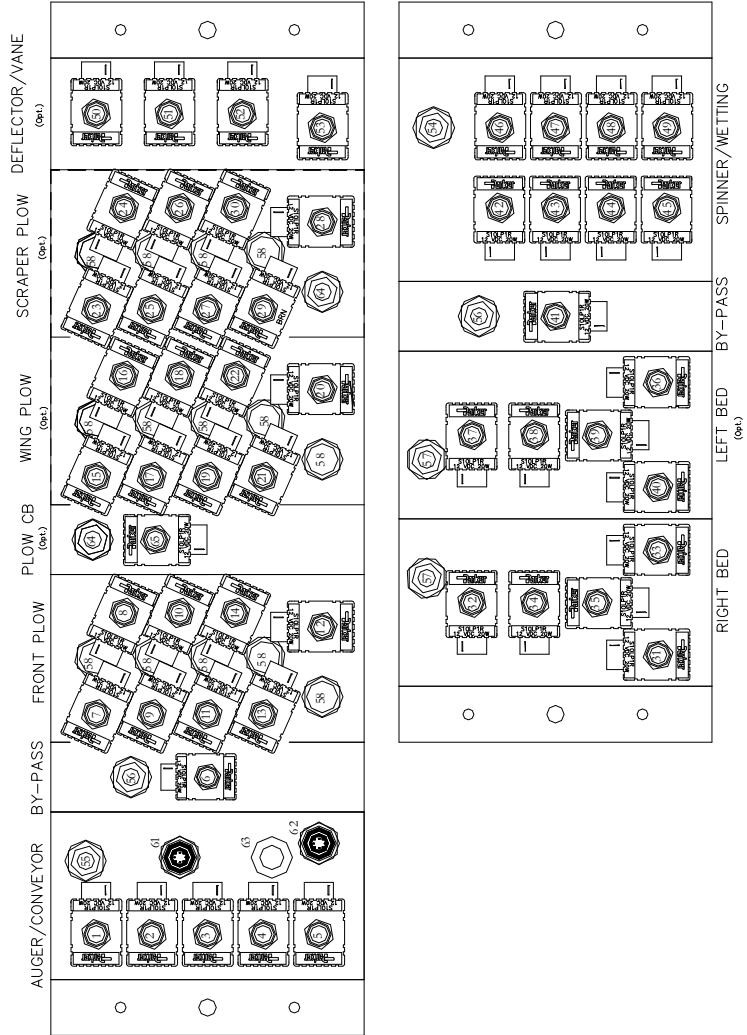
Plumbing Diagram



HOSE SIZE REQUIREMENTS

- 6 - 3/8" ID - Lube oil return for Autosucker
- 8 - 1/2" ID - Plow Hoist/Angle, Spinner and Wetting Motors
- 10 - 5/8" ID - Bed Hoist and Auger Motor
- 12 - 3/4" ID - Pump Pressure and Tank Returns
- 24 - 1 1/2" ID - Pump Suction

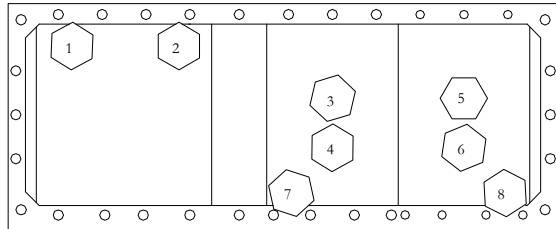
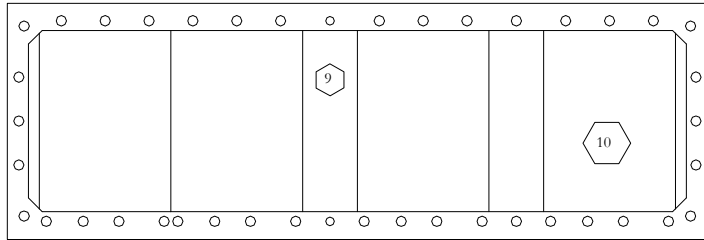
300 Series Valve Function Diagram - Front



Valve Function Chart – Top

BLOCK	FLAG #	FUNCTION	WIRE COLOR	
AUGER	1	Auger .5 GPM	Pink	
	2	Auger 1 GPM	White	
	3	Auger 2 GPM	White/Yellow	
	4	Auger 4 GPM	White/Green	
	5	Auger 8 GPM	White/Blue	
BYPASS	6	Pump Bypass	White/Black	
FRONT PLOW	7	Front plow left (pressure)	Gray	
	8	Front plow left (tank)	Gray (OC)/Purple (CC)	
	9	Front plow right (pressure)	Purple	
	10	Front plow right (tank)	Purple (OC)/ Gray (CC)	
	11	Front plow up (pressure)	White/Gray	
	12	Front plow up (tank)	Brown	
	13	Front plow down (pressure)	Brown	
WING PLOW	14	Front plow down (tank)	Brown	
	15	Wing plow left (pressure)	Gray	
	16	Wing plow left (tank)	Purple	
	17	Wing plow right (pressure)	Purple	
	18	Wing plow right (tank)	Gray	
	19	Wing plow up (pressure)	White/Gray	
	20	Wing plow up (tank)	White/Gray	
	21	Wing plow down (pressure)	Brown	
	22	Wing plow down (tank)	Brown	
SCRAPER PLOW	23	UB plow left (pressure)	Gray	
	24	UB plow left (tank)	Purple	
	25	UB plow right (pressure)	Purple	
	26	UB plow right (tank)	Gray	
	27	UB plow up (pressure)	White/Gray	
	28	UB plow up (tank)	White/Gray	
	29	UB plow down (pressure)	Brown	
RIGHT BED	30	UB plow down (tank)	Brown	
	31	Bed up "R" (pressure)	Orange	
	32	Bed up "R" (tank)	Orange	
	33	Bed down "R" (pressure)	White/Red	
	34	Bed down slow "R" (tank)	White/Red	
LEFT BED	35	Bed down fast "R" (tank)	Yellow	
	36	Bed up "L" (pressure)	Orange	
	37	Bed up "L" (tank)	Orange	
	38	Bed down fast "L" (tank)	Yellow	
	39	Bed down fast "L" (tank)	Yellow	
SPINNER/ WETTING	40	Bed down "L" (pressure)	White/Red	
	BYPASS	41	Pump Bypass (w/Bed "L" only)	White/Black
	42	Spinner 1 GPM	White/Orange	
	43	Spinner 2 GPM	White/Brown	
	44	Spinner 4 GPM	White/Purple	
	45	Spinner 8 GPM	White/Blue	
	46	Wetting 1 GPM	Pink	
	47	Wetting 2 GPM	White	
	48	Wetting 4 GPM	White/Yellow	
49	Wetting 8 GPM	White/Green		
DEFLECTOR/ VANE	50	Left Deflector	White	
	51	Right Deflector	White/Black	
	52	Left Vane	Orange	
	53	Right Vane	White/Blue	
	54	Relief Valve set @ 2500 psi	N/A	
	55	Relief Valve set @ 2350 psi	N/A	
	56	Relief Valve set @ 2000 psi	N/A	
	57	Relief Valve set @ 900 psi	N/A	
	58	Check Valve	N/A	
	59	Bed Down Flow control 30 GPM	N/A	
	60	Bed Down Flow control 15 GPM	N/A	
	61	Pressure Transducer (High)	N/A	
	62	Pressure Transducer (Low)	N/A	
	63	Thermistor	N/A	
	64	Relief Valve set @ approx 300psi	N/A	
	65	Plow Counterbalance	Blue	

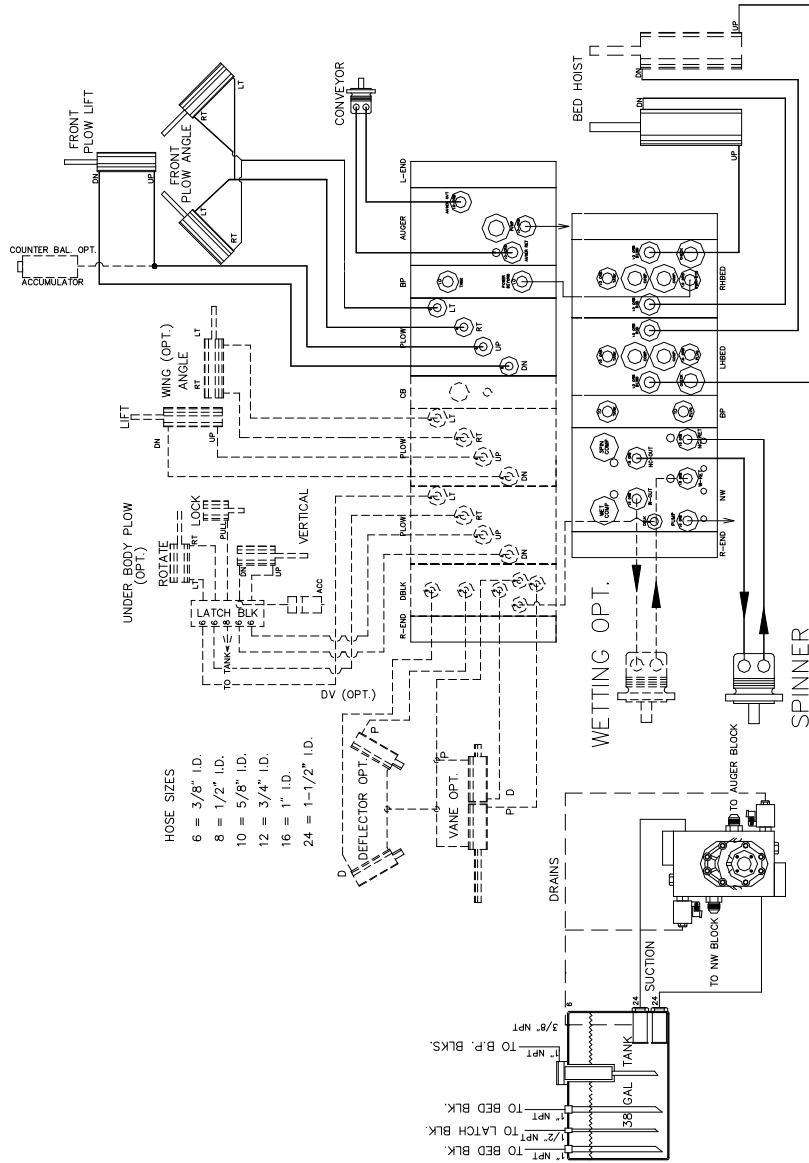
Valve Function Diagram - Back



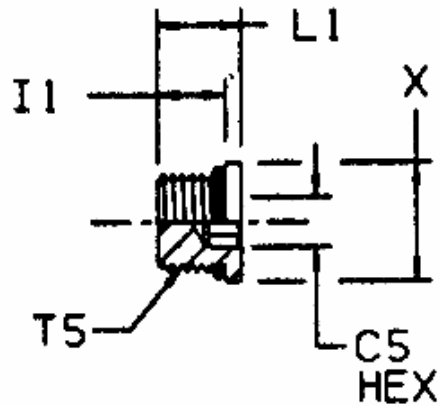
Parts List - Back

FLAG #	FUNCTION	PART NUMBER
1,2,10	Compensator	CP-702
3	Bed Flow control 15 GPM	PC-501
4-6	Bed Flow control 30 GPM	PC-601
7,8	Check Valve	CV-161
9	Check Valve	CV-103

Plumbing Diagram



Torque Specs & O-Ring Numbers



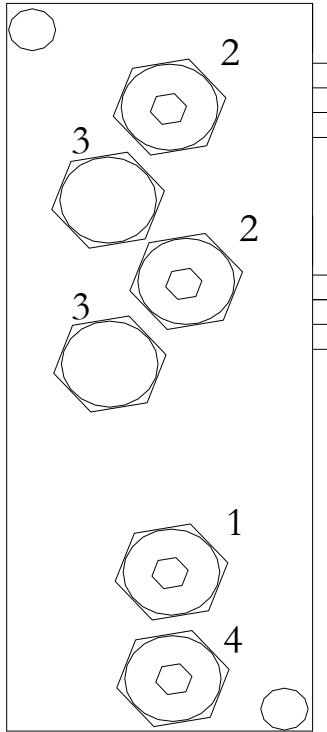
**C5—ACROSS INTERNAL
HEX FLATS**

TUBE FITTING PART #	T5 PORT THD UN / UNF-2A	C5 HEX	I1	L1	X DIA.	ASSEMBLY TORQUE FT. LBS	O-RING NUMBERS
#02 SAE O-Ring Boss	5/16-24	1/8	0.3	0.39	0.44	3 ± .5	902
#03 SAE O-Ring Boss	3/8-24	1/8	0.3	0.39	0.5	5 ± .5	903
#04 SAE O-Ring Boss	7/16-20	3/16	0.37	0.46	0.56	11 ± 1	904
#05 SAE O-Ring Boss	1/2-20	3/16	0.37	0.46	0.63	15 ± 1	905
#06 SAE O-Ring Boss	9/16-18	1/4	0.4	0.49	0.69	18 ± 1	906
#08 SAE O-Ring Boss	3/4-16	5/16	0.44	0.57	0.88	46 ± 2	908
#10 SAE O-Ring Boss	7/8-14	3/8	0.5	0.63	1	75 ± 5	910
#12 SAE O-Ring Boss	1 1/16-12	9/16	0.59	0.75	1.25	85 ± 5	912
#14 SAE O-Ring Boss	1 3/16-12	9/16	0.59	0.75	1.38	130 ± 6	914
#16 SAE O-Ring Boss	1 5/16-12	5/8	0.59	0.75	1.5	135 ± 6	916
#20 SAE O-Ring Boss	1 5/8-12	3/4	0.59	0.75	1.88	225 ± 12	920

Underbody Latch Block

Valve Diagram

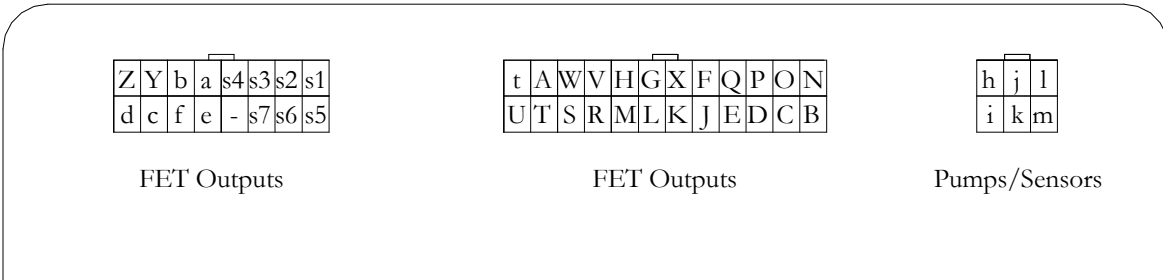
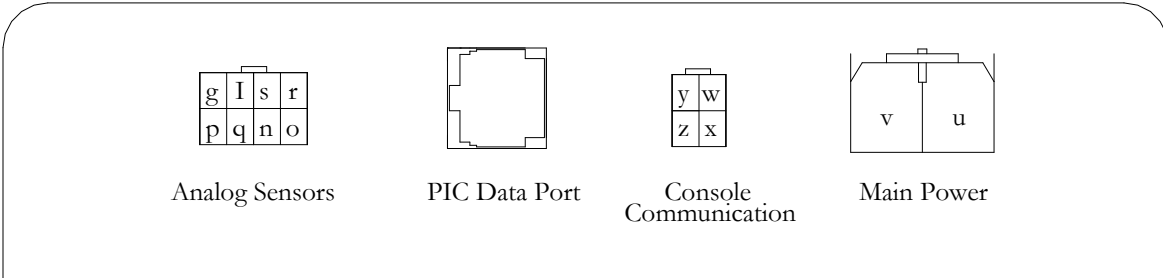
Flag number	Function
1	Underbody Down Relief
2	Lock Sequence Valve
3	Check Valve
4	Underbody Up Relief



Parts List

Flag number	Description	Part number
1,4	Underbody Relief Valve	RV-902
2	Lock Sequence Valve	RV-901
3	Check Valve	CV103P

Driver Board Connections



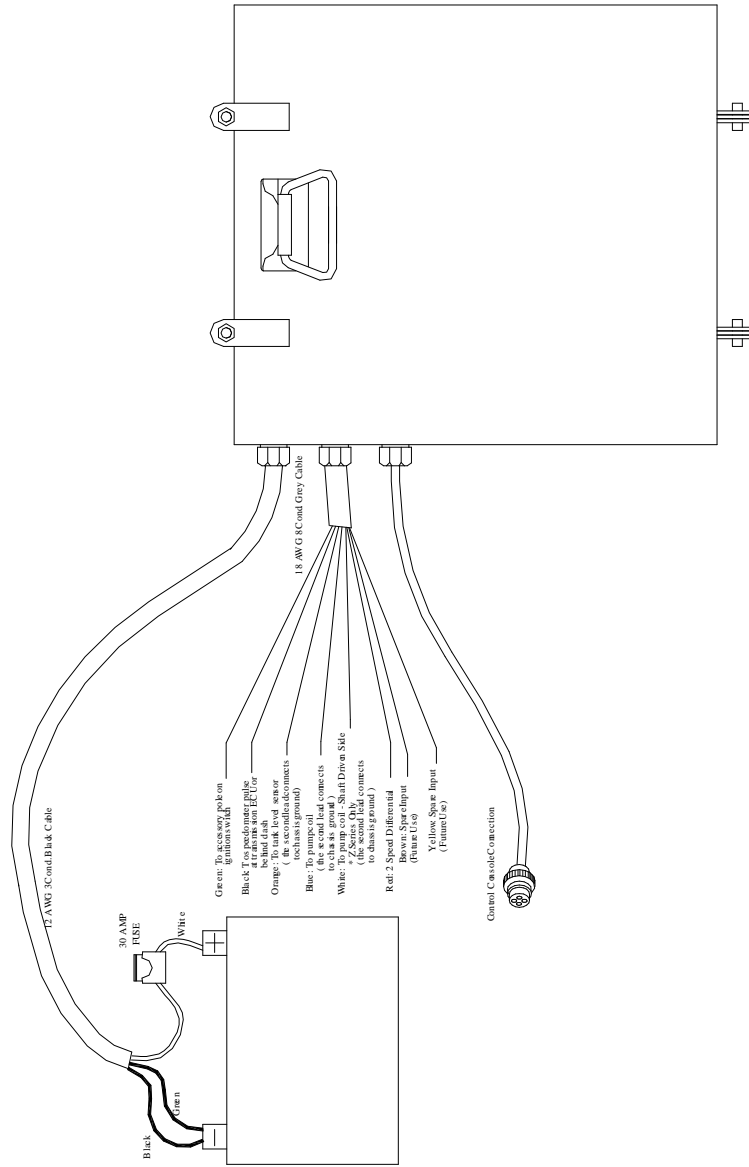
Pin assignments on following page

Pin Assignments

Function	Color	Pin	Function	Color	Pin
* Auger .5 GPM	Pink	A	Wing plow left	Gray	Y *
Auger 1 GPM	White	B	Wing plow right	Purple	Z *
Auger 2 GPM	White/yellow	C	Wing plow up	White/gray	a *
Auger 4 GPM	White/green	D	Wing plow down	Brown	b *
Auger 8 GPM	White/blue	E			
			Underbody plow left	Gray	c *
Bed up "R"	Orange	F	Underbody plow right	Purple	d *
Bed down slow	White/red	G	Underbody plow up	White/gray	e *
Bed down fast	Yellow	H	Underbody plow down	Brown	f *
Ignition	Green (18/8)	I			
			Low oil	Orange (18/8)	g
Spinner 1 GPM	White/orange	J	Thermistor (+)	White (24/6)	h
Spinner 2 GPM	White/brown	K	Thermistor (-)	Yellow (24/6)	i
Spinner 4 GPM	White/purple	L	Low pressure (+)	Red (24/6)	j
Spinner 8 GPM	White/blue	M	Low pressure (-)	Black (24/6)	k
			High pressure (+)	Orange (24/6)	l
Front plow up	White/gray	N	High pressure (-)	Blue (24/6)	m
Front plow down	Brown	O	2 Speed Transmission	Red (18/8)	n
Front plow left	Gray	P	Tachometer	Black (18/8)	o
Front plow right	Purple	Q	Aux. Low Oil	Yellow(18/8)	p
			Plow Position	Brown(18/8)	q
Wetting 1 GPM	Pink	R	Pump 1	Blue (18/8)	r
Wetting 2 GPM	White	S	Pump 2	White (18/8)	s
Wetting 4 GPM	White/yellow	T	Counterbalance	Blue	t
Wetting 8 GPM	White/green	U	12 Volt DC	White (12/3)	u
			Ground	Black (12/3)	v
Pump bypass 1	White/black	V	Console signal (+)	Green (22/4)	w
Pump bypass 2	White/black	W	Console signal (-)	White (22/4)	x
			Console power	Red (22/4)	y
* Bed up "L"	Orange	X	Console ground	Black (22/4)	z

The seven auxiliary outputs labeled s1-s7 are for expansion/custom purposes. These outputs are transistor-driven with the same characteristics as all other outputs. For information on programming, please contact Pengwyn Technical Support.

Truck Wiring



Troubleshooting

Caution

- Disconnect battery before welding on the truck. Failure to do so will damage components and void the warranty.
- Do not over tighten solenoid coil nut - the coil spindle is hollow and easily damaged.
- Be careful not to pinch wires under the coil when installing.
- Turn the control console power switch off before connecting and disconnecting battery cables, battery chargers, jumping the battery or starting the truck.
- Do not drill holes in or mount auxiliary switches to the control console. This will void the warranty.
- Always be sure to carefully wipe off all auger and spinner disconnects before hooking up the spreader.
- Clean the spreader disconnects before hooking up any motors. This will prevent dirt lodging in the valves downstream from the disconnects and causing the auger and/or spinner compensators to hang up. This results in the fluid being blocked from any downstream functions such as bed and plow.
- When the auger and the spinner are disconnected from the truck, the spreader material output selection switch and the spinner/ NaClone™ speed control switch must be set at position 0. The exception to this is when using the control console for main relief pressure measuring. Otherwise the spreader switch should also be in the OFF position.
- Operate the power switch only when all the toggle switches are in the off position. Do not hold the bed and plow switches for long periods after their respective cylinders are completely extended unless warming up the hydraulic fluid for calibration purposes.

Checking Energization

To check if a function is operating properly, touch the 1/2"-20 nut at the top of the coil with a steel tool, such as a screwdriver, while actuating the function on the control console. You should be able to feel the magnetism generated by the coil when it is energized. This is usually done with the ignition switch on and the engine not running. Solenoid 17 (the pump bypass valve for 200's) or solenoid 6 (the pump bypass valve for 300's) are not required to operate the auger and the spinner

The following solenoid charts show which solenoids are energized with each function.

200 Series Energization Charts

Auger (Manual)

RATE	SOLENOID #				PUMP	GPM
	1	2	3	4		
0					E	0
1	E				E	1
2		E			E	2
3	E	E			E	3
4			E		E	4
5	E		E		E	5
6		E	E		E	6
7	E	E	E		E	7
8				E	E	8
9	E			E	E	9
10		E		E	E	10
11	E	E		E	E	11
12			E	E	E	12
13	E		E	E	E	13
14		E	E	E	E	14
15	E	E	E	E	E	15

Wetting (Manual)

RATE	SOLENOID #				PUMP	GPM
	9	10	11	12		
0					E	0
1	E				E	1
2		E			E	2
3	E	E			E	3
4			E		E	4
5	E		E		E	5
6		E	E		E	6
7	E	E	E		E	7
8				E	E	8
9	E			E	E	9
10		E		E	E	10
11	E	E		E	E	11
12			E	E	E	12
13	E		E	E	E	13
14		E	E	E	E	14
15	E	E	E	E	E	15

Spinner (Manual)

RATE	SOLENOID #				PUMP	GPM
	5	6	7	8		
0					E	0
1	E				E	1
2		E			E	2
3	E	E			E	3
4			E		E	4
5	E		E		E	5
6		E	E		E	6
7	E	E	E		E	7
8				E	E	8
9	E			E	E	9
10		E		E	E	10
11	E	E		E	E	11
12			E	E	E	12
13	E		E	E	E	13
14		E	E	E	E	14
15	E	E	E	E	E	15

Bed (Double Acting)

FUNCTION	SOLENOID #						PUMP(S)
	23	24	25	26	27	17	
UP			E		E	E	E
DOWN		E		E		E	E
DOWNFAST	E	E		E		E	E

Front Plow (Open Center)

FUNCTION	SOLENOID #						PUMP		
	17	13	14	15	16	18		19	20
UP	E				E				E
DOWN	E			E				E	E
LEFT	E	E				E			E
RIGHT	E		E				E		E

E = Coil should be energized.

Note: On models equipped with plow counterbalance the **FRONT PLOW DOWN** switch may be used to activate the plow counterbalance solenoid (#22) if Plow CB pulse is activated in the control console.

Front Plow (Closed Center)

FUNCTION	SOLENOID #										PUMP
	17	13	14	15	16	18	19	20	21		
UP	E				E						E
DOWN	E			E				E	E		E
LEFT	E	E					E				E
RIGHT	E		E			E					E

300 Series Energization Charts

Auger (Manual)

RATE	SOLENOID #				PUMP 1	GPM
	2	3	4	5		
0					E	0
1	E				E	1
2		E			E	2
3	E	E			E	3
4			E		E	4
5	E		E		E	5
6		E	E		E	6
7	E	E	E		E	7
8				E	E	8
9	E			E	E	9
10		E		E	E	10
11	E	E		E	E	11
12			E	E	E	12
13	E		E	E	E	13
14		E	E	E	E	14
15	E	E	E	E	E	15

Wetting (Manual)

RATE	SOLENOID #				PUMP 2	GPM
	46	47	48	49		
0					E	0
1	E				E	1
2		E			E	2
3	E	E			E	3
4			E		E	4
5	E		E		E	5
6		E	E		E	6
7	E	E	E		E	7
8				E	E	8
9	E			E	E	9
10		E		E	E	10
11	E	E		E	E	11
12			E	E	E	12
13	E		E	E	E	13
14		E	E	E	E	14
15	E	E	E	E	E	15

Spinner (Manual)

RATE	SOLENOID #				PUMP 2	GPM
	42	43	44	45		
0					E	0
1	E				E	1
2		E			E	2
3	E	E			E	3
4			E		E	4
5	E		E		E	5
6		E	E		E	6
7	E	E	E		E	7
8				E	E	8
9	E			E	E	9
10		E		E	E	10
11	E	E		E	E	11
12			E	E	E	12
13	E		E	E	E	13
14		E	E	E	E	14
15	E	E	E	E	E	15

Bed - Single (Double Acting)

FUNCTION	SOLENOID #					PUMP 1
	31	32	33	34	35	6
UP	E	E				E
DOWN			E	E	E	E
DOWNFAST			E	E	E	E

Bed - Tandem

FUNCTION	SOLENOID #						PUMP 2
	36	37	38	39	40	41	
UP	E	E					E
DOWNFAST			E	E	E	E	E

Front Plow (Open Center)

FUNCTION	SOLENOID #								PUMP 1	
	6	7	8	9	10	11	12	13	14	
UP	E					E				E
DOWN	E						E	E	E	E
LEFT	E	E	E							E
RIGHT	E			E	E					E

E = Coil should be energized.

Front Plow (Closed Center)

FUNCTION	SOLENOID #										PUMP 1
	6	7	8	9	10	11	12	13	14		
UP	E					E					E
DOWN	E						E	E	E		E
LEFT	E	E			E						E
RIGHT	E		E	E							E

Wing Plow

FUNCTION	SOLENOID #										PUMP 1
	6	15	16	17	18	19	20	21	22		
UP	E					E	E				E
DOWN	E							E	E		E
LEFT	E	E			E						E
RIGHT	E		E	E							E

Underbody Plow

FUNCTION	SOLENOID #										PUMP 1
	6	23	24	25	26	27	28	29	30		
UP	E					E	E				E
DOWN	E							E	E		E
LEFT	E	E			E						E
RIGHT	E		E	E							E

E = Coil should be energized.

Note: On models equipped with plow counterbalance the **FRONT PLOW DOWN** switch may be used to activate the plow counterbalance solenoid (#66) if Plow CB pulse is activated in the control console.

Troubleshooting Chart

PROBLEM	CAUSE	SOLUTION
Solenoid valve stays open or closed all the time.	Coil nut too tight and cartridge spindle has been stretched	Replace cartridge.
Noisy Pump	Low on fluid.	Add hydraulic oil.
Pump noisy all the time, especially under load.	Pump solenoid valve stuck.	Clean valve and check operation electrically.
	Main poppet stuck.	Carefully clean poppet bore with fine emery cloth. Check for free movement.
	Suction line or strainer plugged	Clean suction line and sump strainer.
Pump noisy, oil aerated	Pump solenoid cartridge loose allowing air in.	Tighten pump solenoid cartridge.
	Pump check valve cartridge loose.	Tighten pump check-valve cartridge.
	Shaft seal leaking.	Replace shaft seal.
	Suction line loose.	Tighten suction line.
	Dump hoist vent leaking.	Clean, repair or replace vent.
Nothing works, pump runs.	Out of fluid.	Add hydraulic oil. Check for leaks.
	Bad solenoid on pump bypass valve.	Replace coil.
	Suction poppet stuck.	Clean suction poppet.
	Bypass coil nut over tightened.	Replace bypass cartridge.

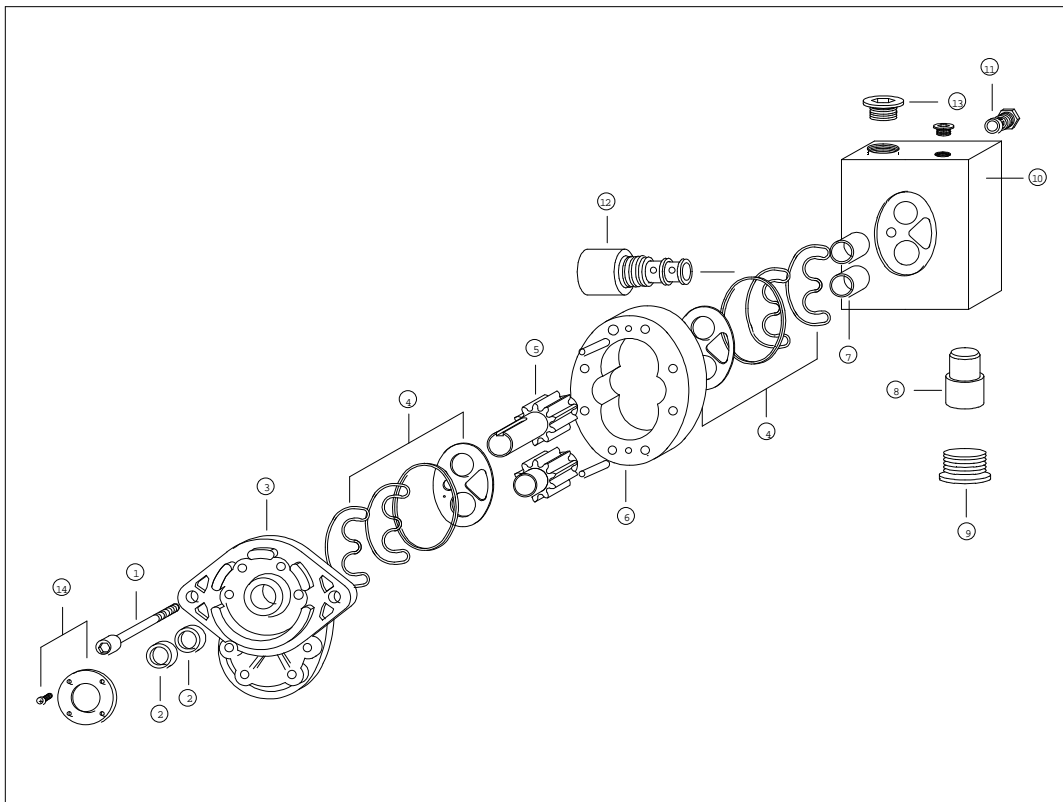
No pump effect.	Bad pump coil or wiring.	Repair or replace.
Solenoid does not magnetize when turned on.	Bad electrical ground.	Remove cartridge, punch threads to make ground path. Replace cartridge.
Auger/spinner does not change speeds smoothly.	One of the auger/spinner solenoids not working.	Use manual mode to determine the bad valve. Repair/replace as needed.
Auger/spinner runs all the time.	Dirt holding one of the auger/spinner valves open.	Clean solenoid valve.
	Dirt in compensator spool.	Remove, clean and reinstall compensator.
Auger/spinner turns on and off but runs too fast when empty and stalls when loaded.	Compensator spool too tight.	Loosen slightly.
Bed won't go up.	Bed down valve stuck open.	Clean bed down valves
	Bed up solenoid failed.	Replace bed up coil.
	Bed-up coil nut over tightened.	Replace bed-up cartridge.
	Pump bypass valve not operating.	Clean or replace.
	Auger or spinner valve leaking when spreader disconnected.	Clean or replace auger or spinner valves.
Bed goes up when plow up is operating.	Dirt in bed-up solenoid valve.	Clean valve.
Bed drifts down	Dirt in any one of the lift-port valves.	Clean all valves. Check poppets for spring action.
Plow won't go up.	Plow-down valve stuck open.	Clean valve.
	Plow-up valve failed.	Clean or replace valve.

Plow won't go up (cont'd).	Plow relief set too low.	Adjust bed/plow relief.
	Plow-up coil over tightened.	Replace plow-up cartridge.
Plow drifts down.	Dirt in plow down valve.	Clean valves.
	Plow valve coil over tightened.	Replace bad valve.
Plow goes up but not down.	Faulty plow quick disconnect.	Clean or replace.
Hydraulic fluid too hot.	Low fluid level.	Add fluid.
	Bypass valve stuck closed.	Clean valve.
	Bypass coil nut over tightened.	Replace bypass cartridge.
Auger will not turn when fully loaded but oil is heard in manifold.	Main relief is set too low.	Check pressures and adjust relief.
Bed/plow will not raise but oil is heard in manifold.	Bed/plow relief is set too low.	Check pressures and adjust relief.
Bed will not lower from maximum height but oil is heard in manifold.	Bed down relief is set too low.	Check pressures and adjust relief.
Pump operates for about 2 minutes, quits, and starts again.	Short in pump wiring.	Repair wiring.
	Bad pump coil.	Replace pump coil.

Pumps

Single Autosucker

Parts Drawing

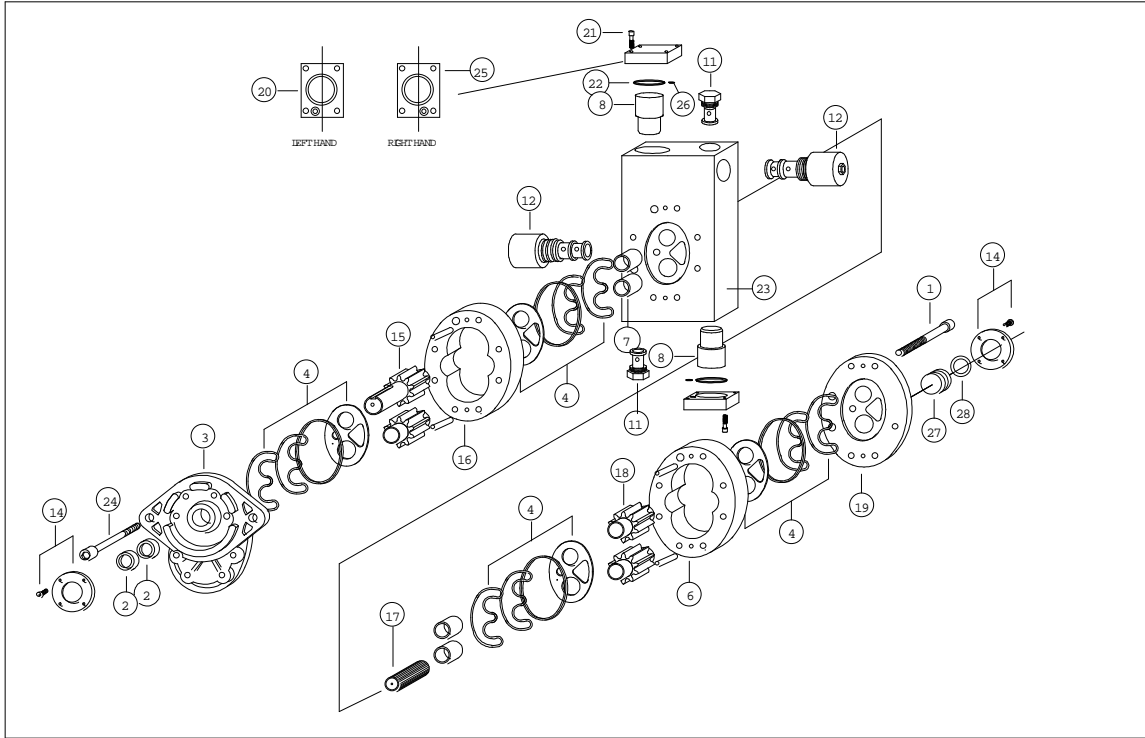


Parts List

1	Bolt Kit (8 pieces)				A-237-10
2	Shaft Seal				A-20
3	Front Cover				A-LH-30
4	Wear Plate Kit				A-40
		Pre-Load Seal			A-45
		Load Seal			A-46
		Seal Ring			A-47
		Wear Ring			A-48
5	Gear Set				A-237-50
6	Gear Housing				A-237-60
7	Shaft Bearing Kit (2 pieces)				A-70
8	Suction Poppet				A-80
9	Suction Poppet Cap				A-90
10	Back Cover				AS-100
11	Check Valve				AS-110
12	Solenoid Valve Assembly				A-129
		Coil Only			A-128
		Nut Only			TN-101
		Valve Only			DSL103A
		Deutsch Plug Assy.			A-129-D
13	Plug				A-150
14	Seal Retainer and Screws (4 pieces)				SRSTB-4
		Seal Retainer			SR-11394
		Screws (4 pieces)			STB-4-1420
	Double Shaft Seal and Retainer Kit				ASRK-237
	Seal Kit				A-140

Double Autosucker

Parts Drawing



Parts List

1	Bolt kit (8 pieces)			A-237-10
2	Shaft Seal			A-20
3	Front Cover			A-LH-30
4	Wear Plate Kit			A-40
		Pre-load Seal		A-45
		Load Seal		A-46
		Seal Ring		A-47
		Wear Plate		A-48
6	Gear Housing			A-237-60
7	Shaft Bearing Kit (2 pieces)			A-70
8	Suction Poppet			A-80
11	Check Valve			A-110
12	Solenoid Valve Assembly			A-129
		Coil Only		A-128
		Nut Only		TN-101
		Valve Only		DSL103A
		Deutsch Plug Assy.		A-129-D
14	Seal Retainer and Screws (4 pieces)			SRSTB-4
		Seal Retainer		SR-11394
		Screws (4 pieces)		STB-4-1420
15	Drive Gear Set - Front Section			A-237-50
16	Gear Housing - Front Section			A-237-60
17	Spline Coupler			A-160
18	Idler Gear Set - Rear Section			A-237-55
19	Rear Cover Assembly			A-170
20	Poppet Cover Left Hand			A-180-LH
21	Cap Screws (4)			A-190
22	O-Ring Seal			A-185
23	Center Section			AS-200
24	Bolt Kit - Front Section			A-237-10
25	Poppet Cover Right Hand			A-180-RH
26	O-ring Seal			OR-011
27	Shaft Plug			A-200
28	O-Ring Seal for Shaft Plug			OR-219

PENGWYN CENTRAL HYDRAULIC SYSTEMS

SERIES 485 MANIFOLDS

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