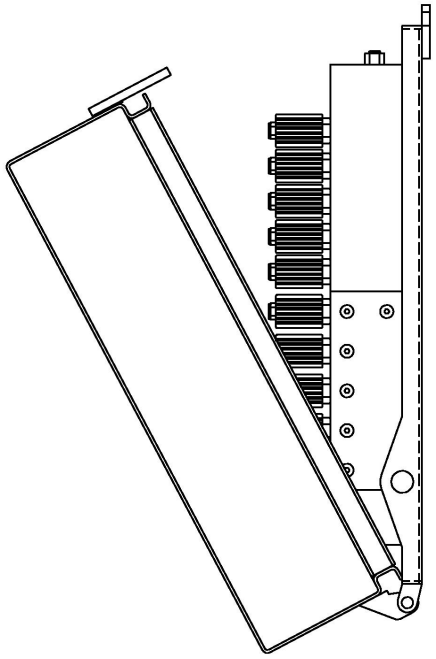
VOLUME 1
FIRST EDITION

PENGWYN

CENTRAL HYDRAULIC SYSTEMS



SERIES 485 MANFIOLDS

TECHNICAL MANUAL

- 100 SERIES
- MBP SERIES
- EBP SERIES

PENGWYN
CENTRAL HYDRAULIC SYSTEMS

SERIES 485 MANIFOLDS

PENGWYN
2550 West Fifth Avenue Columbus, OH 43204
Customer support: Phone 800.233.7568 • Fax 614.488.0019
www.pengwyn.com

Table of Contents

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 a jam on the conveyor, low material on the conveyor, high hydraulic fluid temperature, and low hydraulic fluid level. 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.

Please look to this manual for information on the major features, calibration of the system, and troubleshooting guidelines. This manual will help you operate and maintain your system. Pengwyn does offer training. We are 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 THE PENGWYN MANIFOLD, REMOVE PENGWYN CONTROL CONSOLE FROM THE CAB, AND DISCONNECT TRUCK 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 PENGWYN CONTROL CONSOLE POWER SWITCH OFF BEFORE CONNECTING AND DISCONNECTING BATTERY CABLES, BATTERY CHARGERS, OR JUMPING THE TRUCK BATTERY.

DO NOT DRILL HOLES IN OR MOUNT AUXILIARY SWITCHES TO THE PENGWYN 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.

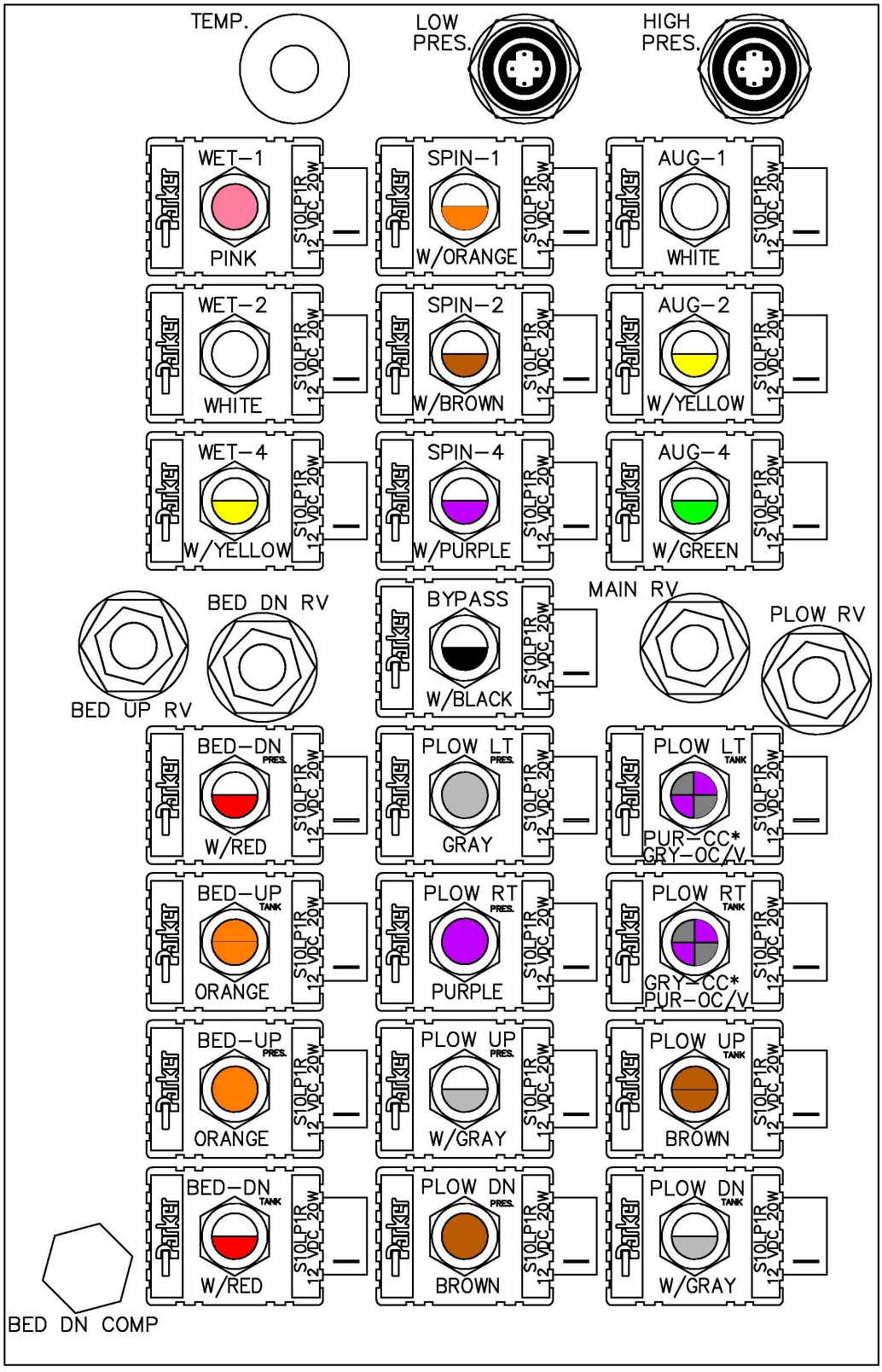
CHAPTER
1

100 SERIES MANIFOLDS

Chapter Includes:

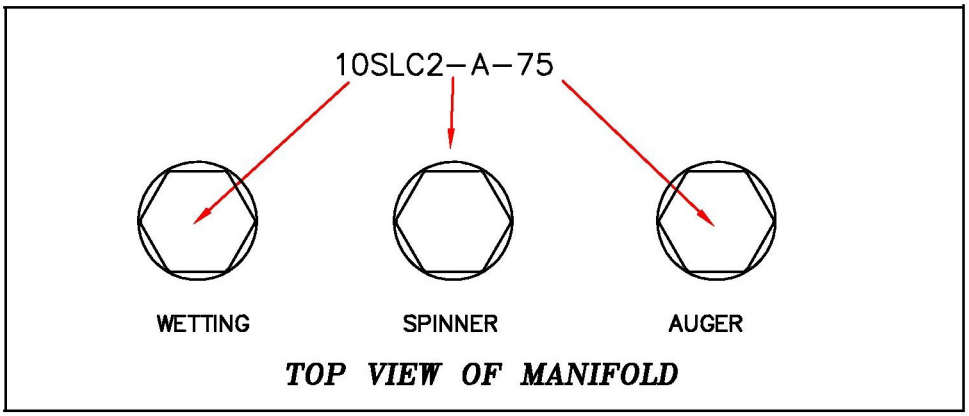
- Valve Function Diagram
- Valve Diagram
- Parts List
- Rear Diagram
- Plumbing Diagram

100 SERIES VALVE FUNCTION DIAGRAM

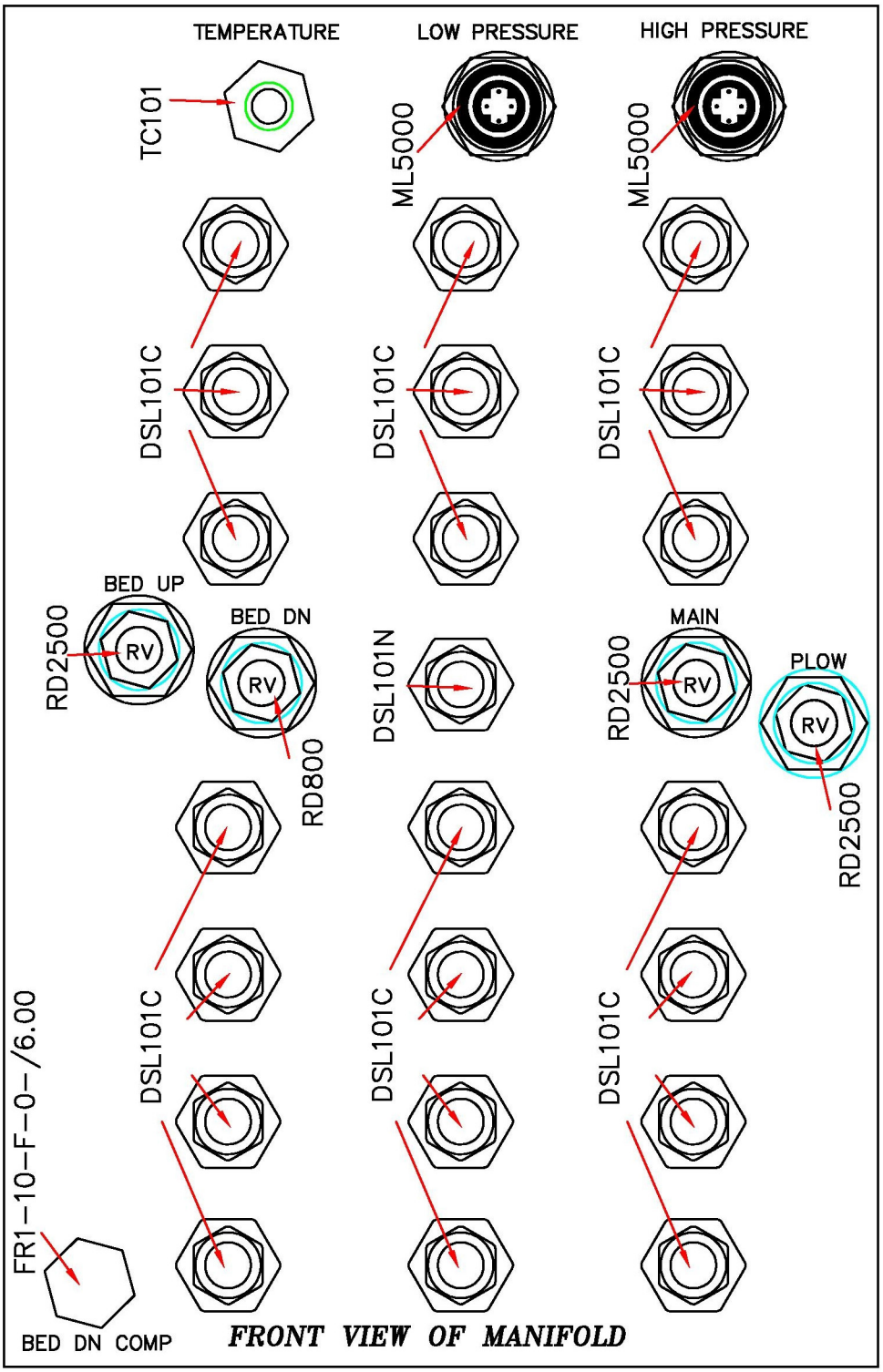


* CC: Closed Center Front Plow
* OC/V: Open Center Front Plow/ V-Plow

100 SERIES VALVE DIAGRAM



TOP VIEW OF MANIFOLD



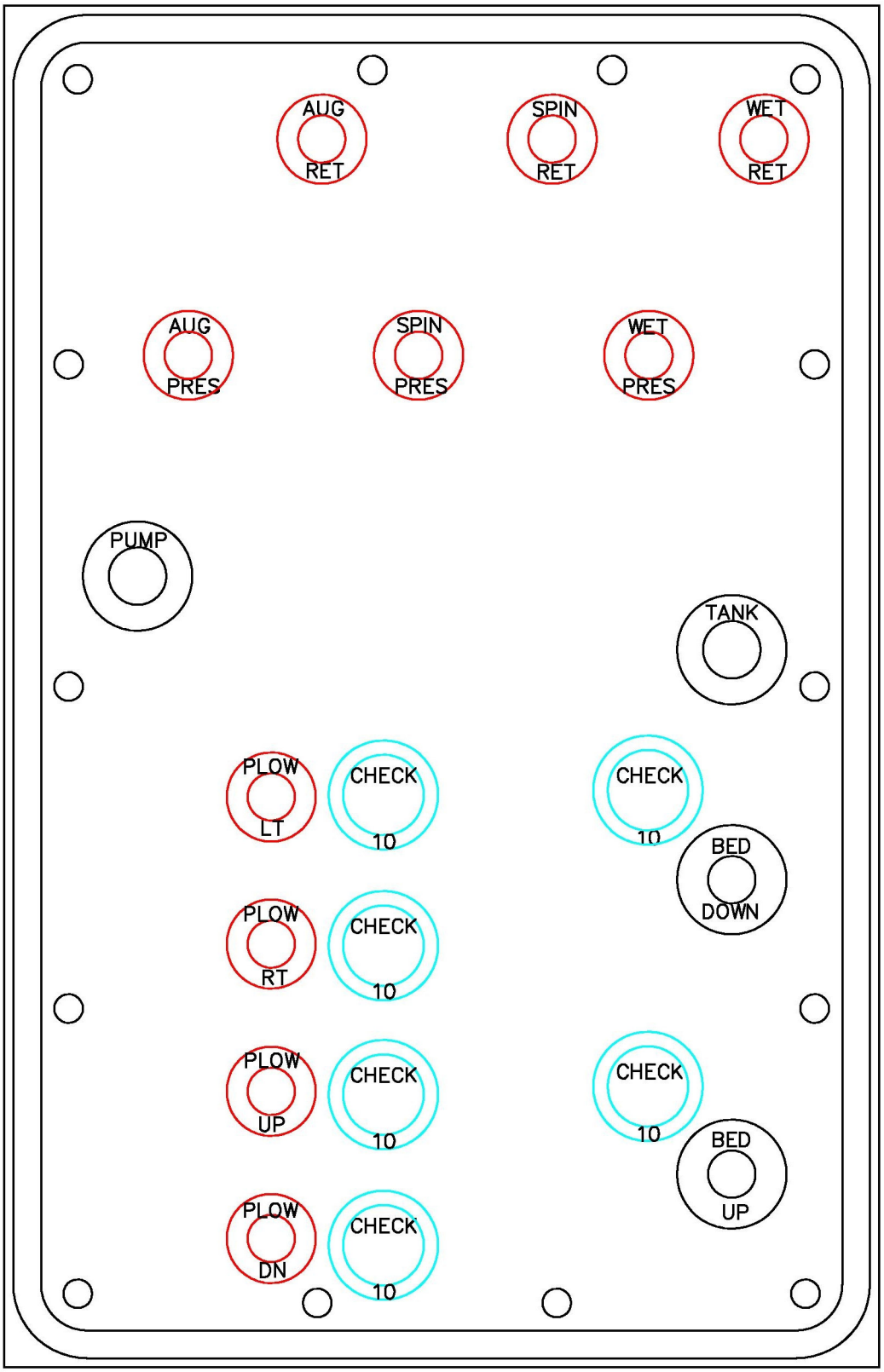
FRONT VIEW OF MANIFOLD

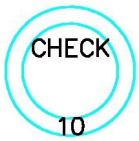
Parts List – Top/Front

LABEL/PART NUMBER	DESCRIPTION
TC101	Thermistor Assembly
ML5000	Pressure Transducer
DSL101C	Normally Closed Solenoid Valve Size 10
DSL161C	Normally Closed Solenoid Valve Size 16
DSL101N	Normally Open Solenoid Valve Size 10
DSL161N	Normally Open Solenoid Valve Size 16
RD-2500	2500 PSI Relief Valve
RD-800	800 PSI Relief Valve
10SLC2-A-75	Motor Compensator
FR1-10-F-0-/6.00	Bed Compensator

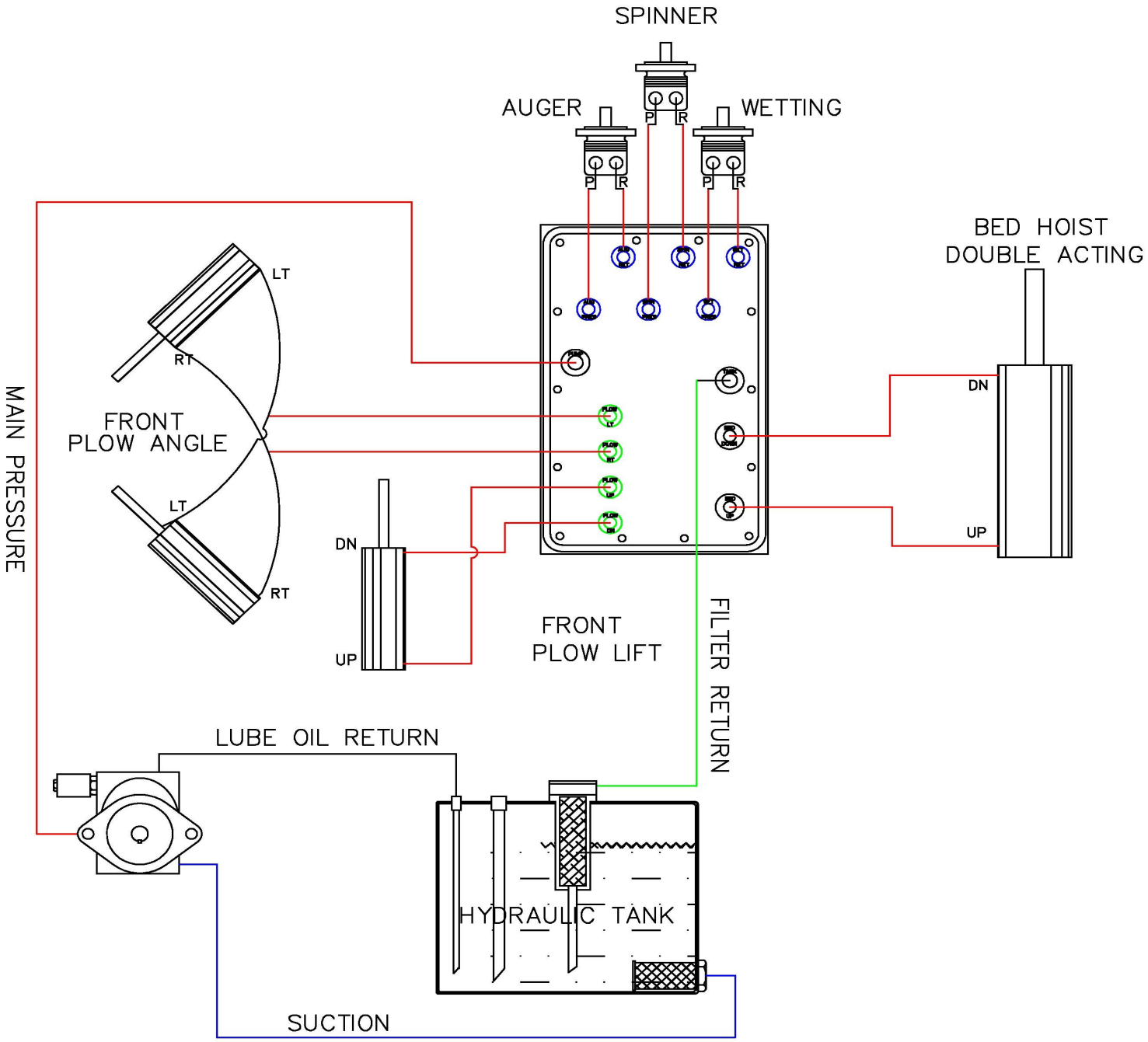
* All solenoid valves are covered by coil S10LP1RDO12.

100 SERIES REAR DIAGRAM



Valve	Description	Part Number
	Check Valve Size 10	CV103P

100 Series Plumbing Diagram



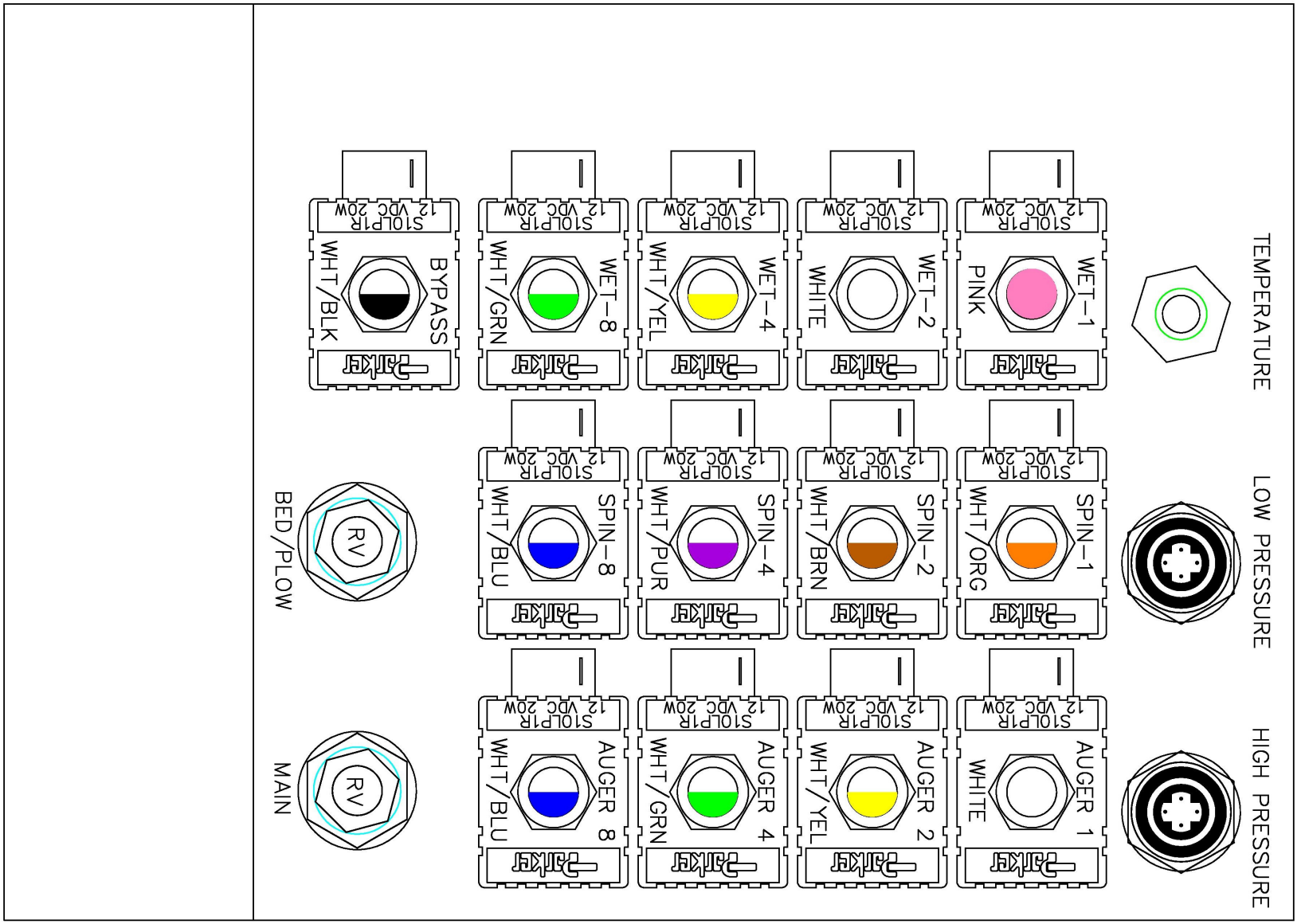
CHAPTER
2

MBP SERIES MANIFOLDS

Chapter Includes:

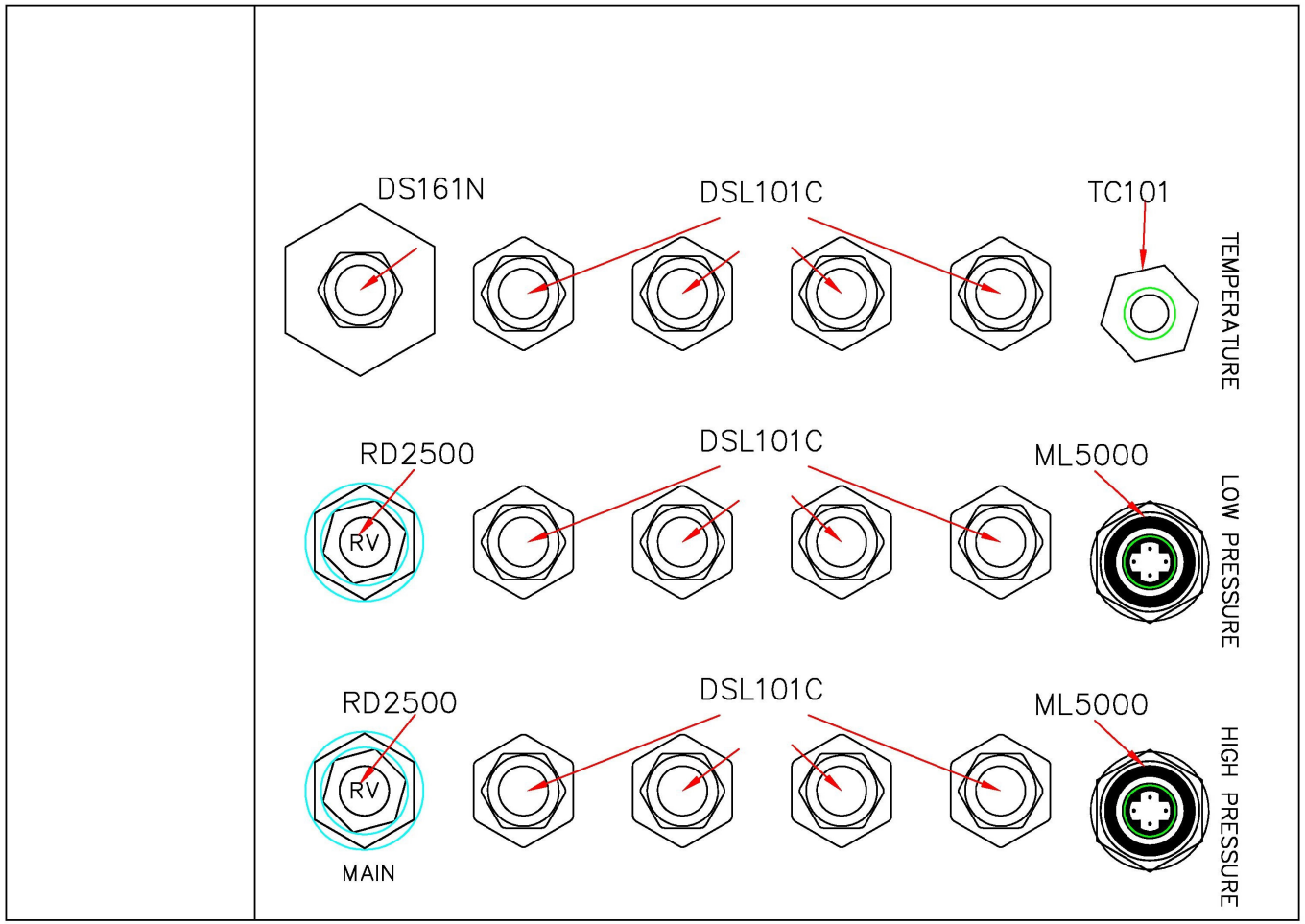
- Valve Function Diagram
- Valve Diagram
- Parts List
- Plumbing Diagram

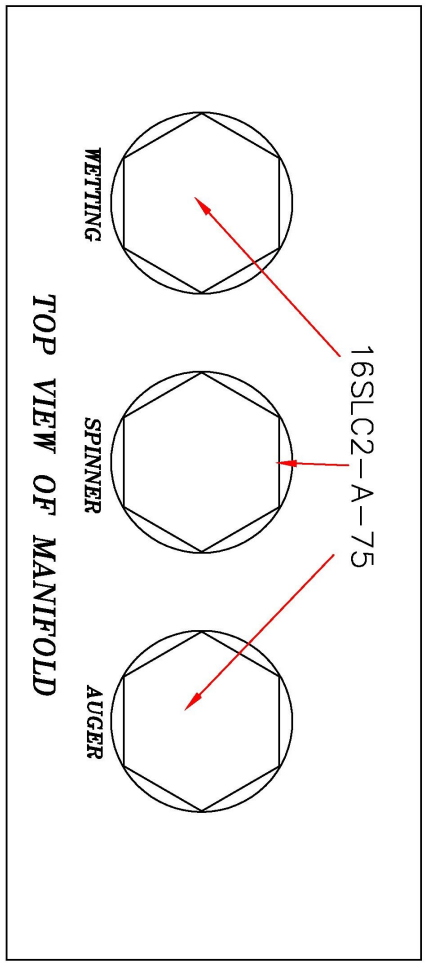
MBP SERIES VALVE FUNCTION DIAGRAM



SPREADER SECTION

MBP SERIES VALVE DIAGRAM





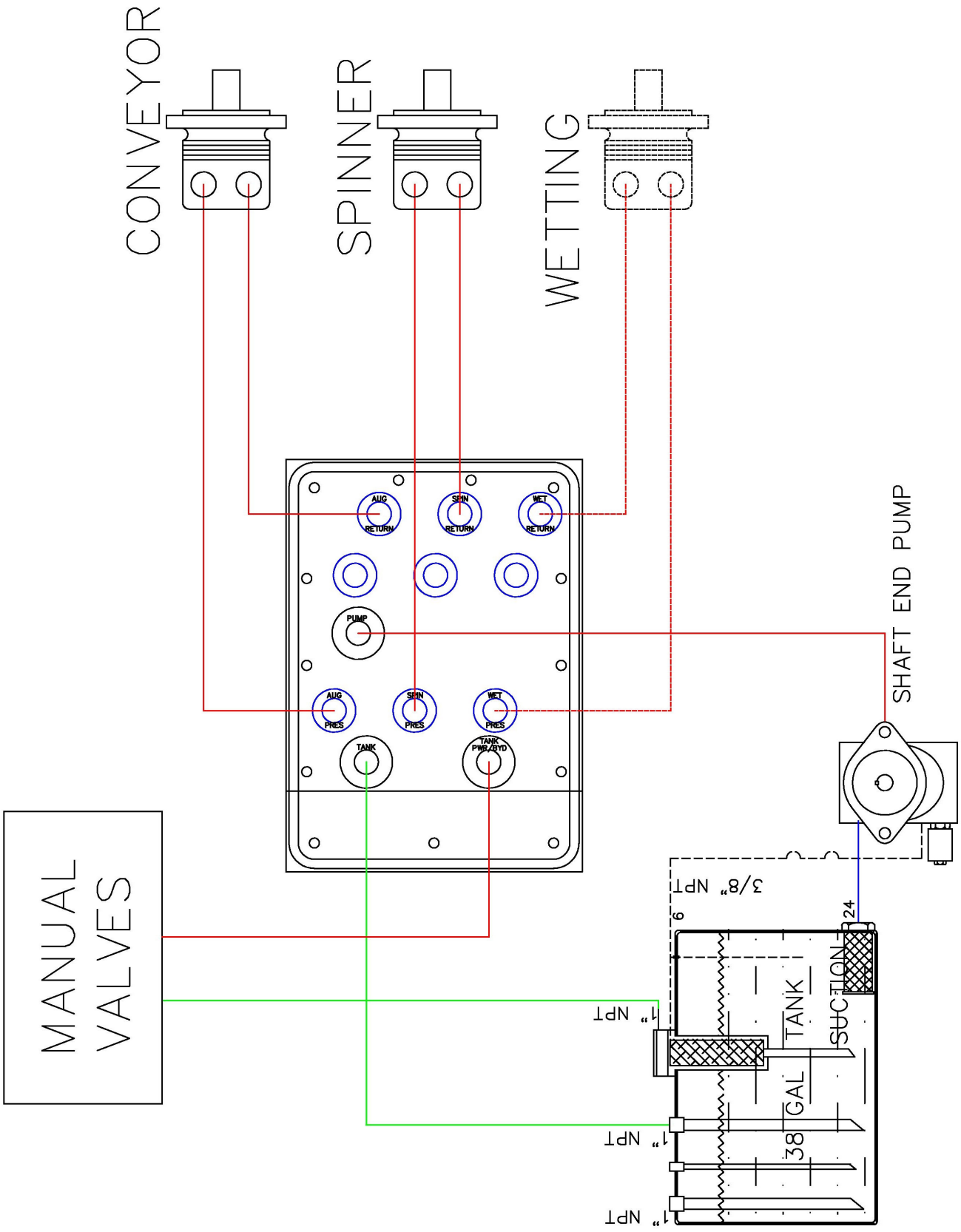
SPREADER SECTION

Parts List – Top/Front

LABEL/PART NUMBER	DESCRIPTION
TC101	Thermistor Assembly
ML5000	Pressure Transducer
DSL101C	Normally Closed Solenoid Valve Size 10
DSL161N	Normally Open Solenoid Valve Size 16
RD2500	2500 PSI Relief Valve
16SLC2-A-75	Motor Compensator Size 16
CV103P	Check Valve Size 10

* All solenoid valves are covered by coil S10LP1RDO12.

MBP Series Plumbing Diagram



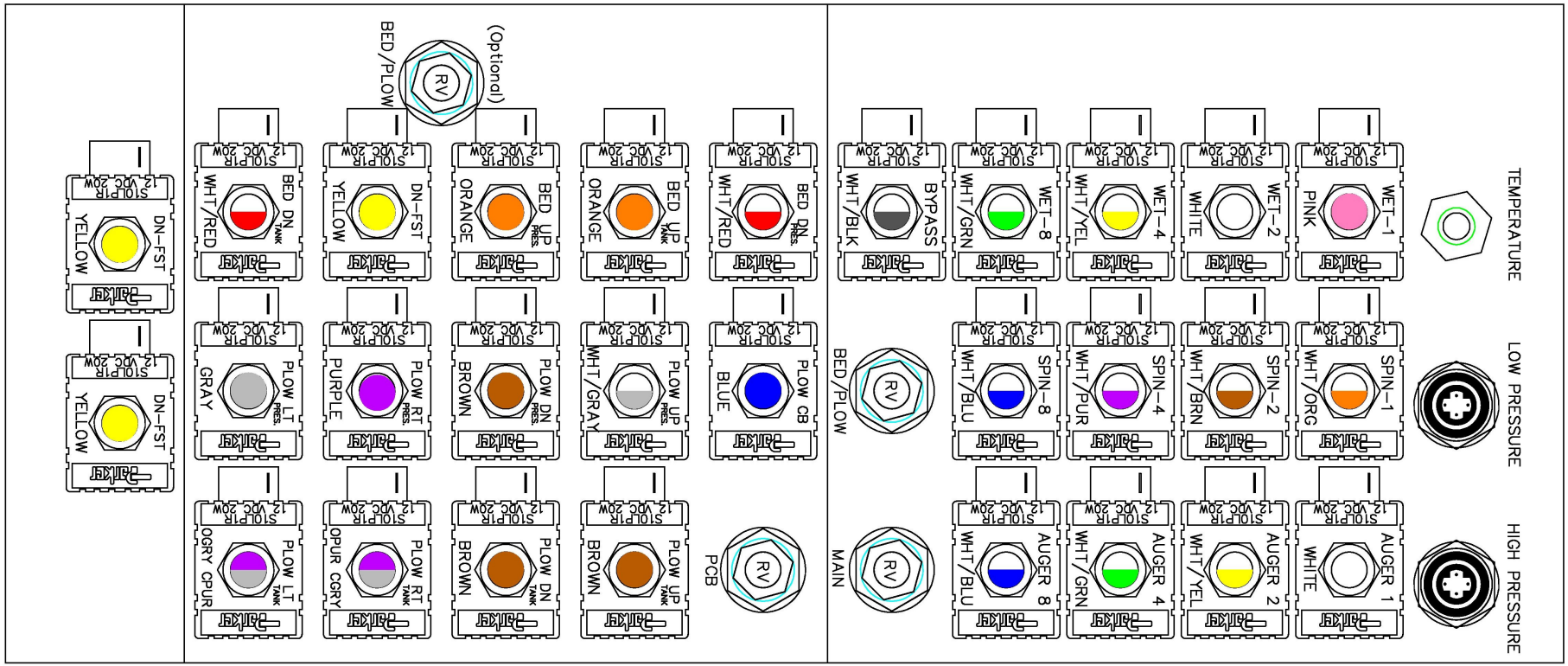
CHAPTER 3

EBP SERIES MANIFOLDS

Chapter Includes:

- Valve Function Diagram
- Valve Diagram
- Parts List - Front/Top
- Rear Diagram
- Parts List - Rear
- Optional Plow Blocks
- UB Latch Block
- Plumbing Diagram

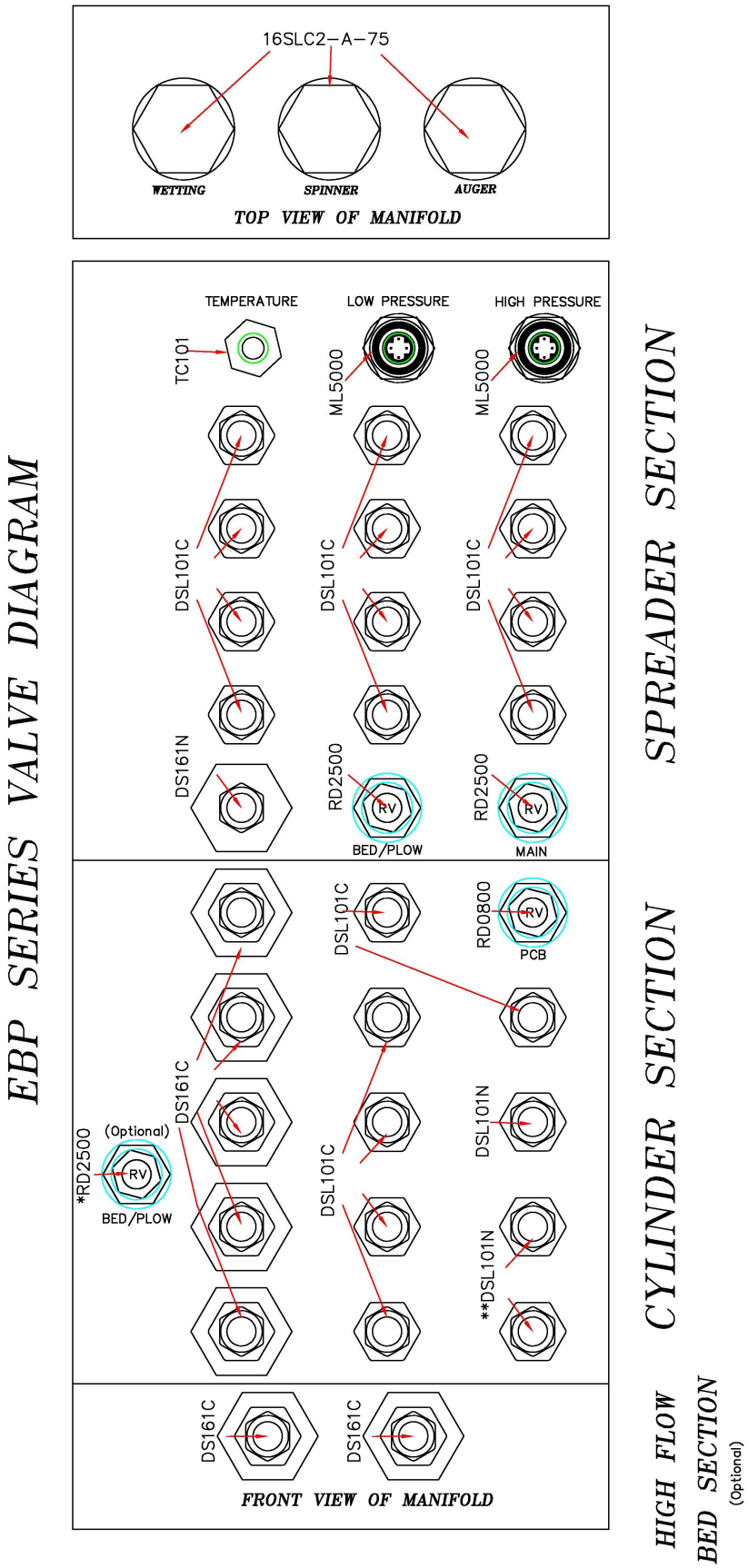
EBP SERIES VALVE FUNCTION DIAGRAM



HIGH FLOW BED SECTION
(Optional)

CYLINDER SECTION

SPREADER SECTION



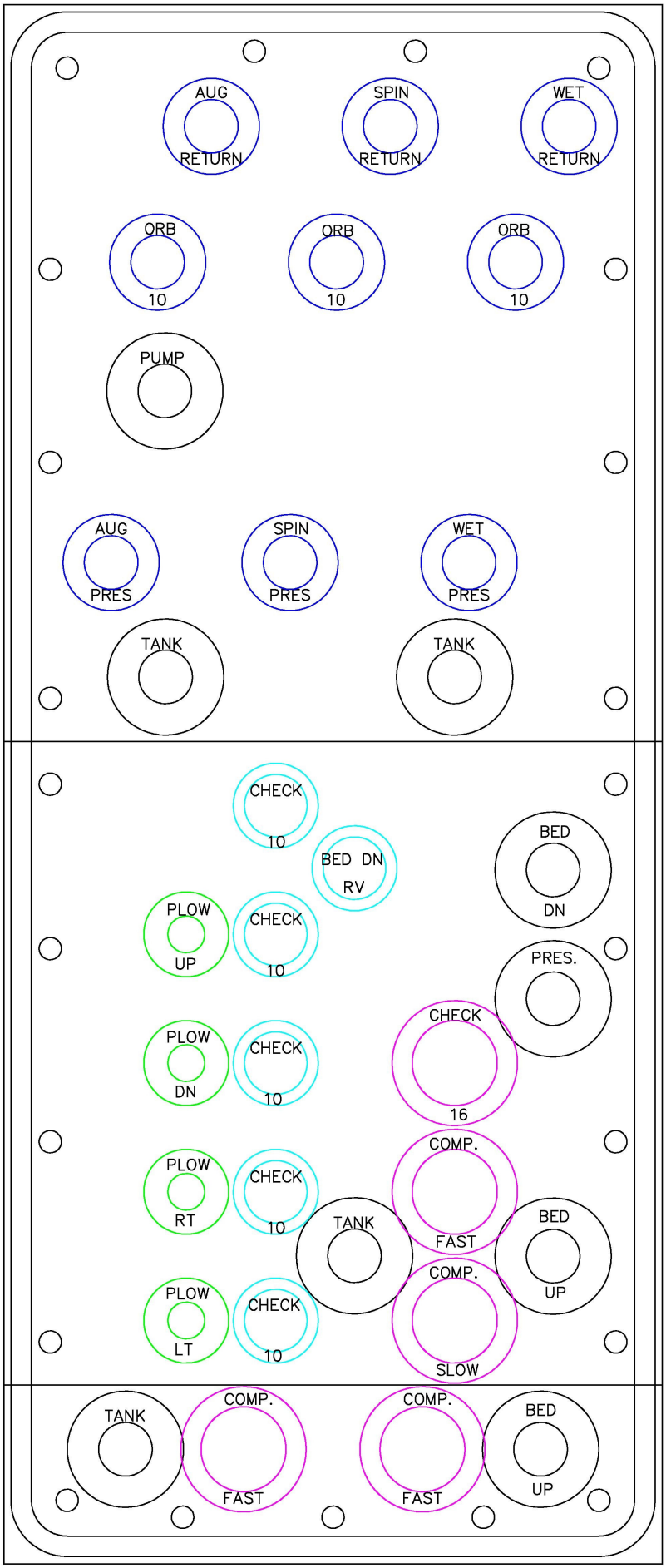
*Bed/Plow Relief Valve is replaced by check valve CV103P if not equipped with a high flow bed section.
** DSL101N valves are used for open center plow circuits on plow left and right. Closed center plow circuits use DSL101C valves.

EBP Series Front/Top Part List

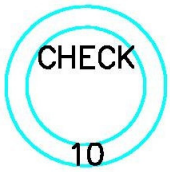
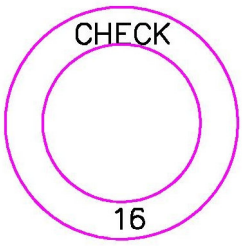
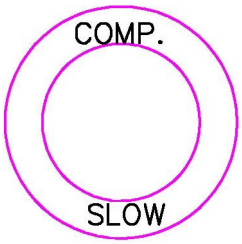
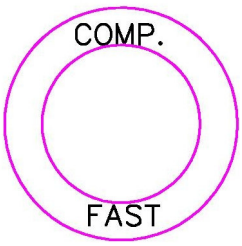
LABEL/PART NUMBER	DESCRIPTION
TC101	Thermistor Assembly
ML5000	Pressure Transducer
DSL101C	Normally Closed Solenoid Valve Size 10
DS161C	Normally Closed Solenoid Valve Size 16
DSL101N	Normally Open Solenoid Valve Size 10
DSL161N	Normally Open Solenoid Valve Size 16
RD2500	2500 PSI Relief Valve
RD800	800 PSI Relief Valve
16SLC2-A-75	Motor Compensator
CV103P	Check Valve Size 10

* All solenoids are covered by coil S10LP1RDO12.

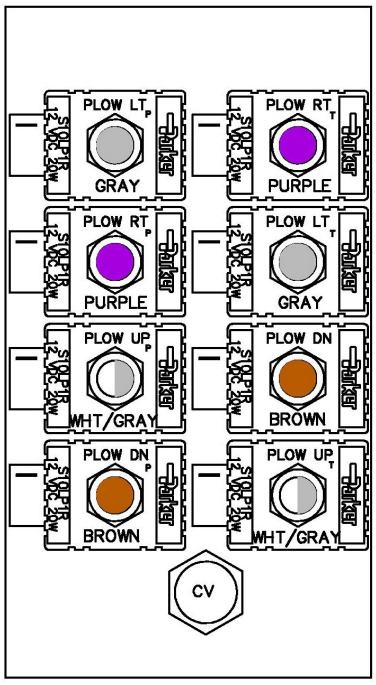
EBP SERIES REAR DIAGRAM



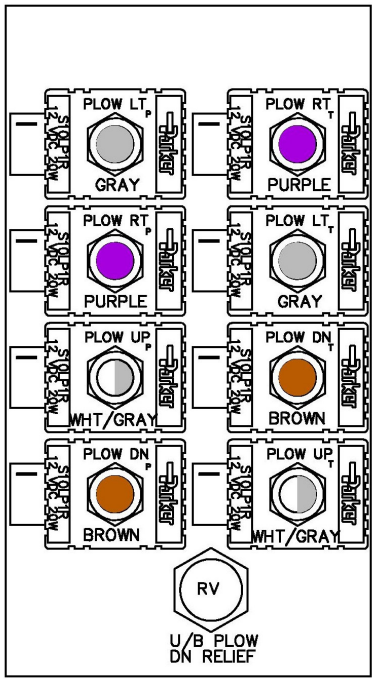
Parts List - Rear

Valve	Description	Part Number
	800 PSI Relief Valve	RD800
	Check Valve Size 10	CV103P
	Check Valve Size 16	CV161P
	15 GPM Compensator	PC-501
	30 GPM Compensator	PC-601

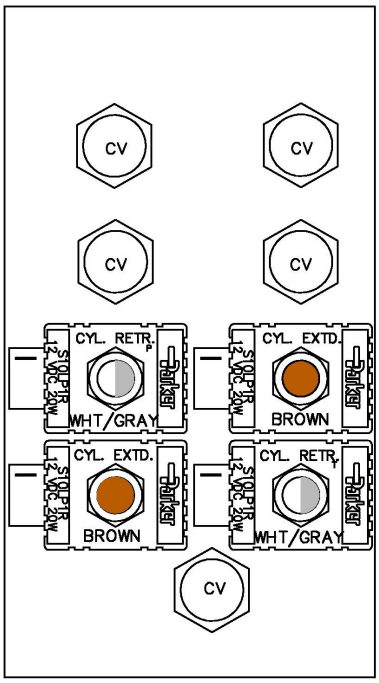
Optional Plow Blocks



WING PLOW SECTION



UB PLOW SECTION



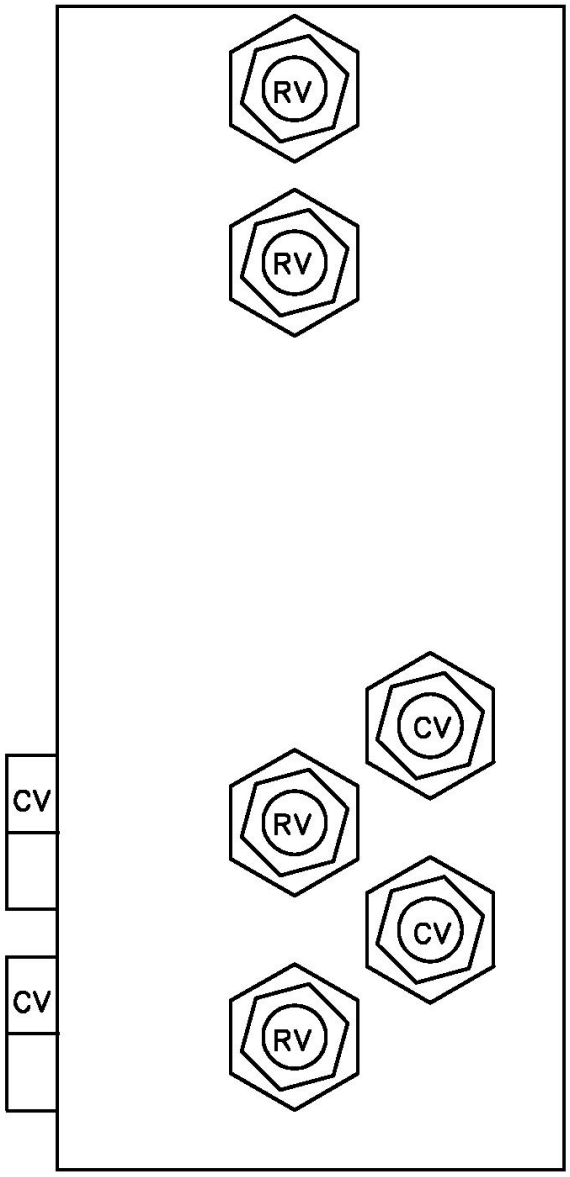
SWAP LOAD SECTION

Part List

Label	Description	Pat Number
CV	Check Valve	CV103P
RV	U/B Plow Down Relief Valve	RD2500
S10LP1R	Coil	S10LP1RDO12
*	Normally Closed Solenoid Valve	DSL101C

* Normally closed solenoid valve DSL101C is used with all coils shown on the diagrams above.

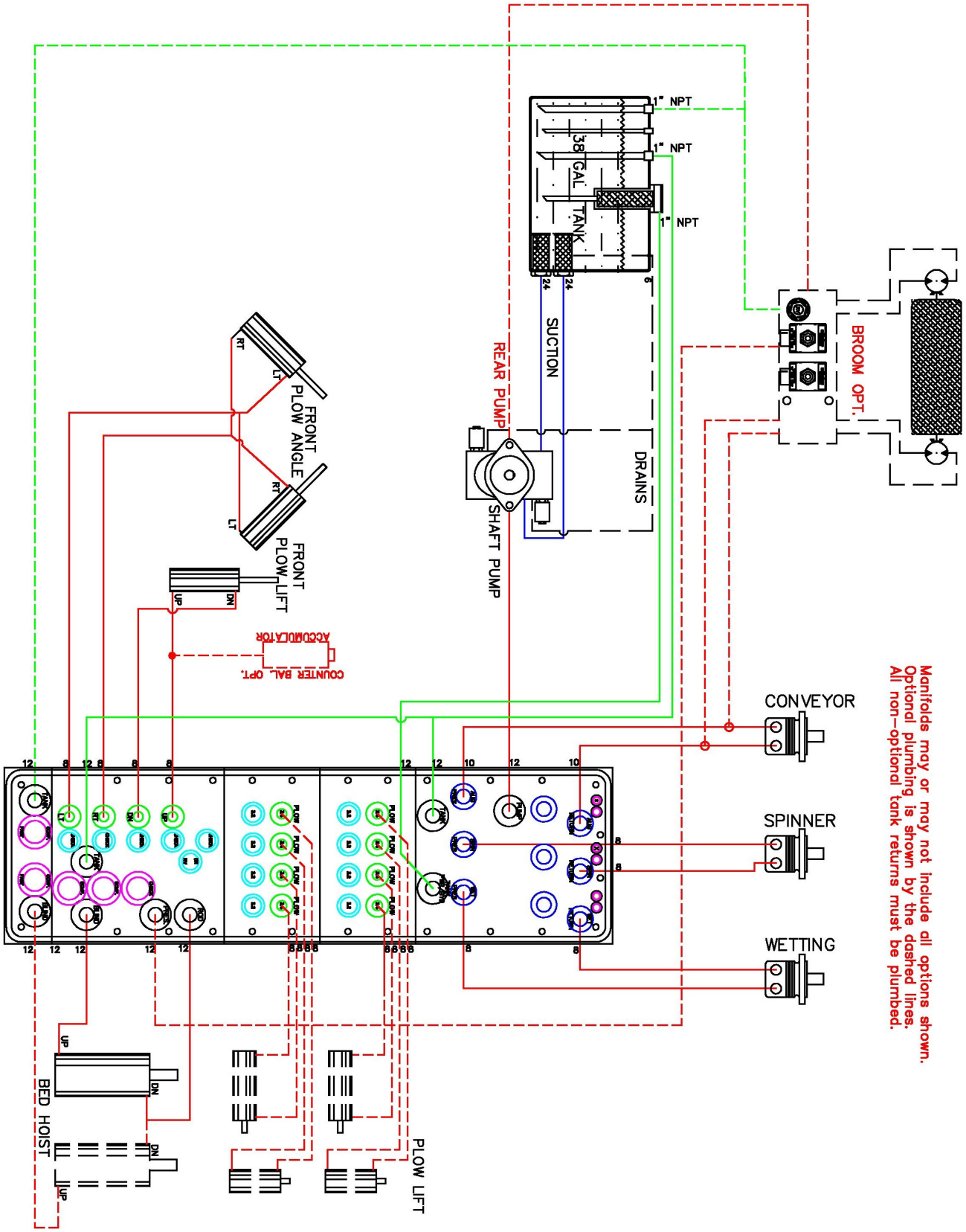
UB LATCH BLOCK



FRONT VIEW OF MANIFOLD

Label	**Description**	**Pat Number**
CV	Check Valve	CV103P
RV	U/B Plow Down Relief Valve	RD800

EBP Series Plumbing Diagram



CHAPTER
4

TROUBLESHOOTING

Chapter Contents

Troubleshooting

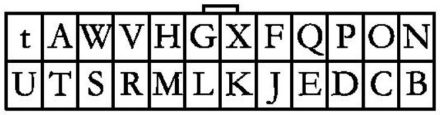
Caution

- Disconnect all connectors from the Pengwyn Manifold, remove Pengwyn Control Console from the cab, and disconnect the truck 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 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 help prevent dirt lodging in the valves downstream from the disconnects 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 to position 0. The only 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 if all the 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.

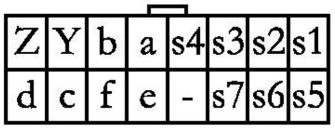
Driver Board Connections

View harness connectors from push side with notch at the top

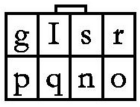
Function	Color	Pin		Function	Color	Pin
Auger .5 GPM	Pink	A		Wing plow left	Gray	Y
Auger 1 GPM	White	B		Wing plow right	Purple	Z
Auger 2 GPM	White/Yellow	C		Wing plow up	White/Gray	a
Auger 4 GPM	White/Green	D		Wing plow down	Brown	b
Auger 8 GPM	White/Blue	E				
				Underbody plow left	Gray	c
Bed up "R"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



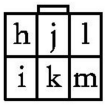
FET Outputs



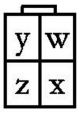
FET Outputs



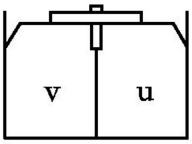
Analog Sensors



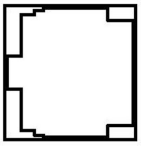
Pumps/Sensors



Console Communication



Main Power



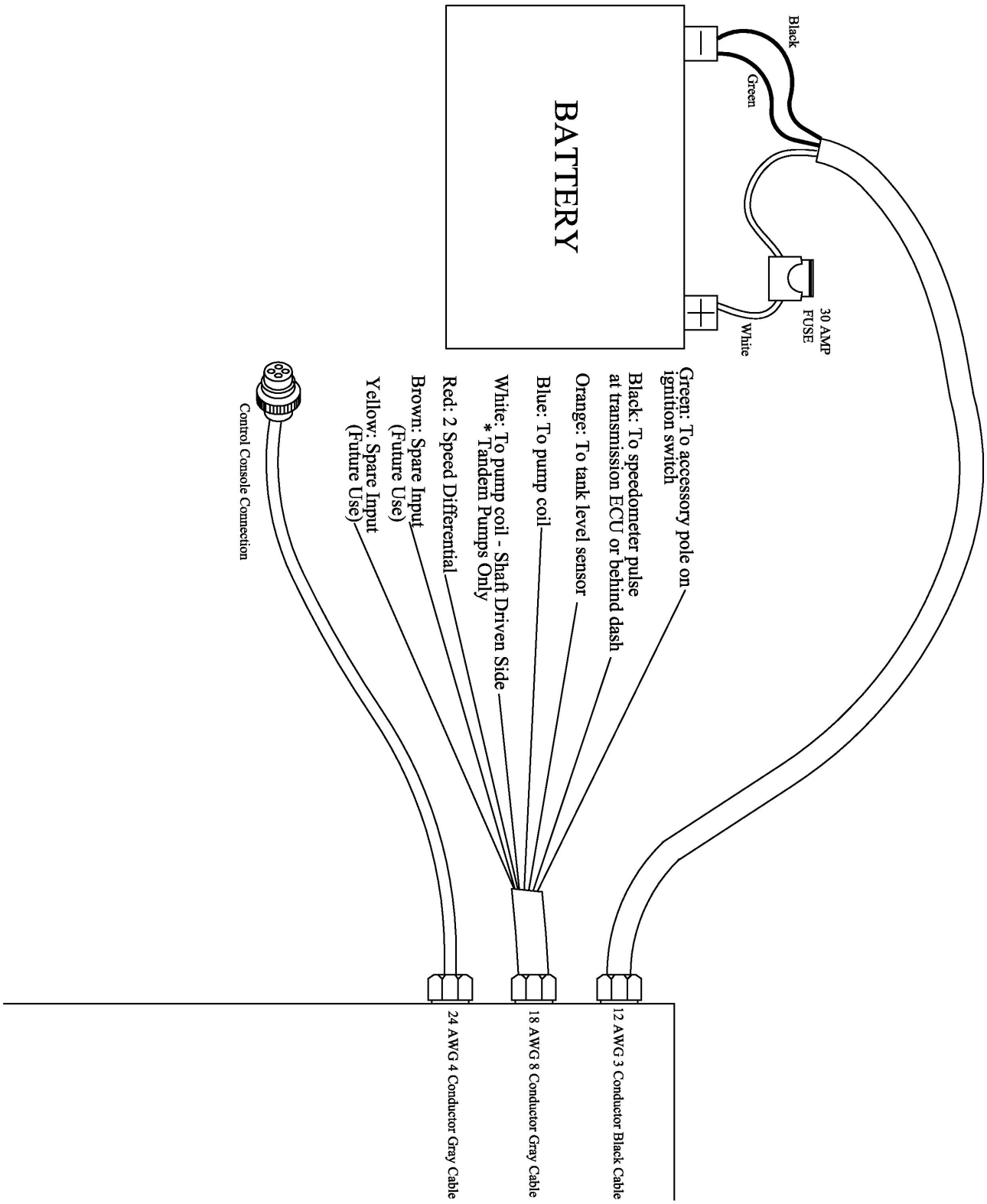
PIC Data Port

`* 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 and can be used for V-plow wiring. For information on programming,

**** V-plow Wiring***

Function	Color	Pin
V-plow left pressure	Gray	s4
V-plow left tank	Gray	s5
V-plow right pressure	Purple	s6
V-plow right tank	Purple	s7

Truck Wiring Diagram



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. Using the **Mode Switch**, 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 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 acquired.

(Typical settings are between 2100 and 2500 PSI)

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 above procedure until proper setting is acquired.

(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 above procedure until proper setting is acquired.

(Typical settings are 400-800 PSI)

Plow Counterbalance Relief

The amount of counterbalance desired can be adjusted using the plow counterbalance relief valve
To change the setting:

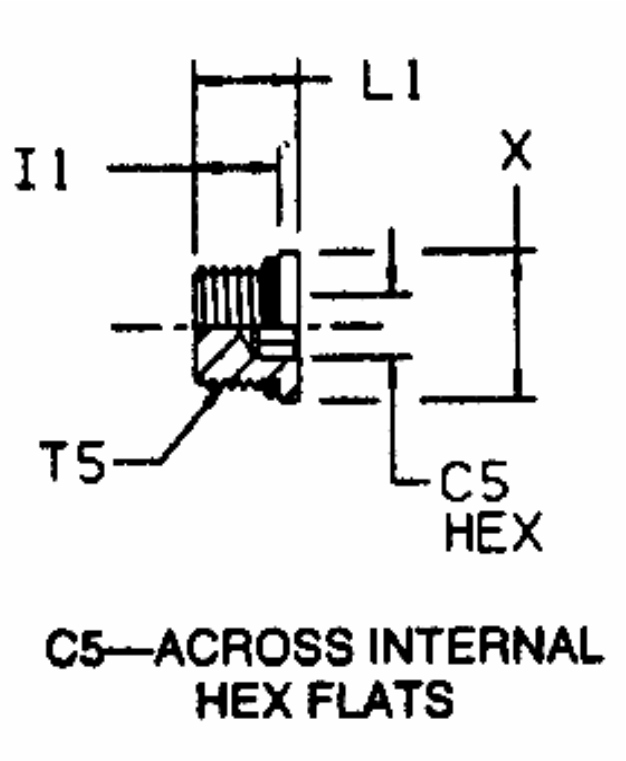
1. Start engine and bring engine speed to 1500 RPM.
2. Activate plow counterbalance. On some trucks this may be done by use of the **Front Plow Down** switch or an auxiliary switch on or near the control console.
   If adjustment is necessary:
3. Loosen locknut on plow counterbalance relief valve.
4. Use an Allen wrench to adjust the internal/external screw clockwise to increase pressure setting and counter clockwise to decrease pressure setting.
5. Tighten lock nut.
6. Repeat above procedure until proper setting is acquired.

(Typical settings are 300-600 PSI)

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.

Torque Specs & O-ring Numbers



C5—ACROSS INTERNAL HEX FLATS

TUBE FITTING	PORT THD	C5			X	TORQUE	O-RING
PART #	UN / UNF-2A	HEX	I1	L1	DIA.	FT. LBS	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

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. The bypass does not need to be energized to run the auger, spinner, or wetting. Refer to the valve

100 Series Energization Charts

AUGER (MANUAL)

RATE	SOLENOID			PUMP1	GPM
	AUGER1	AUGER2	AUGER4		
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

WETTING (MANUAL)

RATE	SOLENOID			PUMP1	GPM
	WET1	WET2	WET4		
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

SPINNER (MANUAL)

RATE	SOLENOID			PUMP1	GPM
	SPIN1	SPIN2	SPIN4		
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

FRONT PLOW

FUNCTION	SOLENOID									
	UP PRES.	UP TANK	DN PRES.	DN TANK	RT PRES.	RT TANK	LT PRES.	LT TANK	BYPASS	PUMP1
UP	E	E							E	E
DOWN			E	E					E	E
RIGHT					E	E			E	E
LEFT							E	E	E	E

V PLOW

FUNCTION	SOLENOID									
	UP PRES.	UP TANK	DN PRES.	DN TANK	RT PRES.	RT TANK	LT PRES.	LT TANK	BYPASS	PUMP1
UP	E	E							E	E
DOWN			E	E					E	E
RIGHT						E	E		E	E
LEFT					E			E	E	E
VEE						E		E	E	E
SCOOP					E		E		E	E

BED

FUNCTION	SOLENOID					
	UP PRES.	UP TANK	DN PRES.	DN TANK	BYPASS	PUMP1
UP	E	E			E	E
DOWN			E	E	E	E

E = Coil should be energized.

EBP & MBP Series Energization Charts

AUGER (MANUAL)

RATE	SOLENOID				PUMP1	PUMP2	GPM
	AUGER1	AUGER2	AUGER4	AUGER8			
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				PUMP1	PUMP2	GPM
	WET1	WET2	WET4	WET8			
0					E	E	0.0
1	E				E	E	0.5
2		E			E	E	1.0
3	E	E			E	E	1.5
4			E		E	E	2.0
5	E		E		E	E	2.5
6		E	E		E	E	3.0
7	E	E	E		E	E	3.5
8				E	E	E	4.0
9	E			E	E	E	4.5
10		E		E	E	E	5.0
11	E	E		E	E	E	5.5
12			E	E	E	E	6.0
13	E		E	E	E	E	6.5
14		E	E	E	E	E	7.0
15	E	E	E	E	E	E	7.5

SPINNER (MANUAL)

RATE	SOLENOID				PUMP1	PUMP2	GPM
	SPIN1	SPIN2	SPIN4	SPIN8			
0					E	E	0
1	E				E	E	1
2		E			E	E	2
3	E	E			E	E	3
4			E		E	E	4
5	E		E		E	E	5
6		E	E		E	E	6
7	E	E	E		E	E	7
8				E	E	E	8
9	E			E	E	E	9
10		E		E	E	E	10
11	E	E		E	E	E	11
12			E	E	E	E	12
13	E		E	E	E	E	13
14		E	E	E	E	E	14
15	E	E	E	E	E	E	15

E = Coil should be energized

FRONT PLOW

FUNCTION	SOLENOID										
	UP PRES	UP TANK	DN PRES.	DN TANK	RT PRES.	RT TANK	LT PRES.	LT TANK	BYPASS	PUMP1	CB
UP	E								E	E	
DOWN		E	E	E					E	E	
RIGHT					E	E			E	E	
LEFT							E	E	E	E	
CB	E								E	E	E

WING PLOW

FUNCTION	SOLENOID									
	UP PRES	UP TANK	DN PRES.	DN TANK	RT PRES.	RT TANK	LT PRES.	LT TANK	BYPASS	PUMP1
UP	E	E							E	E
DOWN			E	E					E	E
RIGHT					E	E			E	E
LEFT							E	E	E	E

UNDERBODY PLOW

FUNCTION	SOLENOID									
	UP PRES	UP TANK	DN PRES.	DN TANK	RT PRES.	RT TANK	LT PRES.	LT TANK	BYPASS	PUMP1
UP	E	E							E	E
DOWN			E	E					E	E
RIGHT					E	E			E	E
LEFT							E	E	E	E

BED

FUNCTION	SOLENOID							
	UP-TNK	UP-PR.	DN-SLOW	DN-PR	DN-FST	BYPASS	PUMP1	PUMP2
UP	E	E				E	E	E
DOWN			E	E		E	E	
DOWN FAST			E	E	E	E	E	E

Notes: 1. The **FRONT PLOW DOWN** switch may be used to activate the plow counterbalance if it is turned on in the control console.

2. **MBP MANIFOLDS** do not have electronically controlled bed or plow functions.

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
	Main poppet stuck	Carefully clean poppet bore with fine emery cloth and ensure the poppet moves freely
Pump noisy, oil aerated	Suction line or strainer plugged	Clean suction line and sump strainer
Nothing works, pump runs	Out of fluid	Add hydraulic oil and 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 will not energize when turned on	Bad electrical ground	Remove cartridge, punch threads to make ground path. Replace cartridge
Auger/spinner/wetting does not change speeds smoothly	One of the auger/spinner/wetting solenoids not working	Use manual mode to determine bad valve and repair or replace
Auger/spinner/wetting runs all the time	Dirt holding one of the auger/spinner/ wetting valves open	Clean solenoid valve
	Dirt in compensator spool	Clean compensator valve
Auger/spinner/wetting turns on and off but runs too fast when empty and stalls when loaded	Compensator spool too tight	Loosen slightly

Bed will not go up	Bed down valve stuck open	Clean bed down valves
	Bed up solenoid failed	Replace bed up coil
	Bed up coil nut too tight	Replace bed up cartridge
	Pump bypass valve not operating	Clean or replace
	Auger or spinner valve leaking when spreader is disconnected.	Clean or replace
Bed goes up when plow is operating	Dirt in bed up solenoid	Clean valve
Bed drifts down	Dirt in one of the lift port valves	Clean valves, check poppets for spring action
Plow will not go up	Plow down valve stuck open	Clean valve
	Plow up valve failed	Clean or replace valve
	Bed/plow relief set too low	Adjust bed/plow relief
	Plow up coil nut too tight	Replace plow up cartridge
Plow drifts down	Dirt in plow down valve	Clean valves
	Plow valve coil nut too tight	Replace cartridge
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 too tight	Replace bypass cartridge
Auger will not turn when fully loaded but oil is heard in the manifold	Main relief is set too low	Check pressures and adjust relief
Bed/plow will not raise but oil is heard in the manifold	Bed/plow relief is set too low	Check pressures and adjust relief
Bed will not lower from max height but oil is heard in the 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

CHAPTER
5

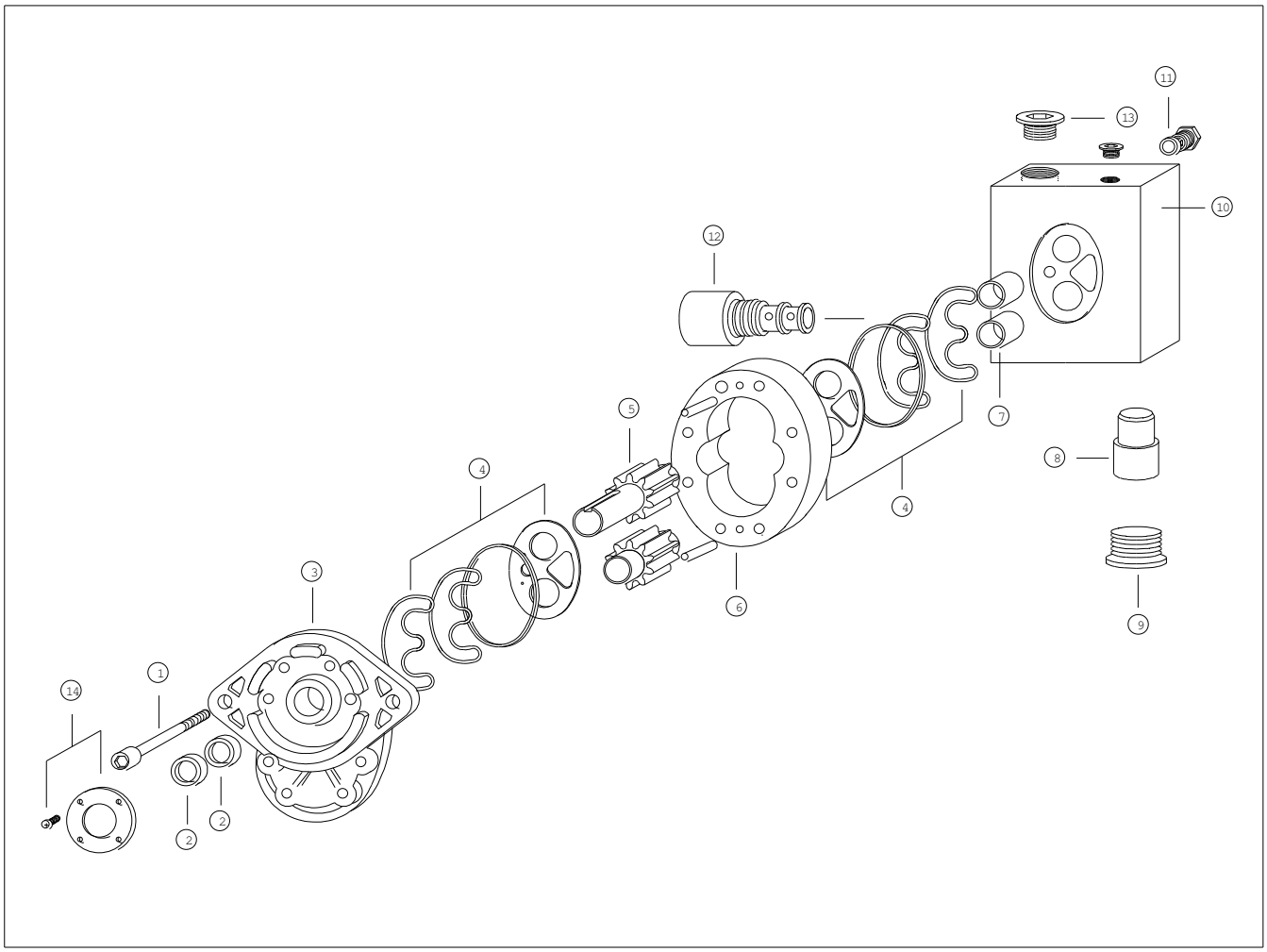
PUMPS

Chapter Includes:

- Single Autosucker Parts Drawing
- Single Autosucker Parts List
- Double Autosucker Parts Drawing
- Double Autosucker Parts List

Single Autosucker

Parts Drawing



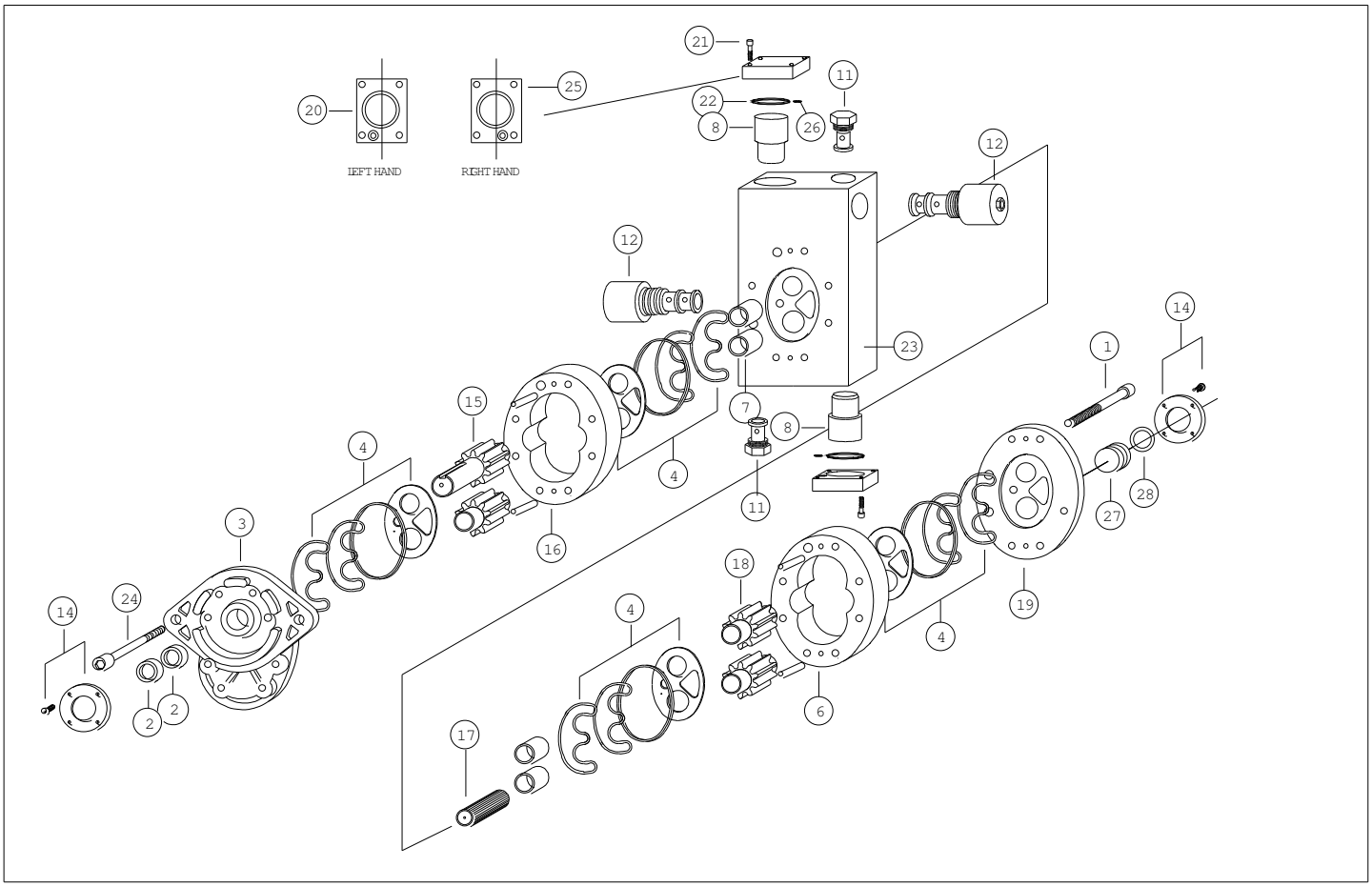
Single Autosucker

Parts List

1	Bolt Kit (8)			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
5	Gear Set			A-237-50
6	Gear Housing			A-237-60
7	Shaft Bearing Kit (2)			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-D
		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)**			SRSTB-4
		Seal Retainer		SR-11394
		Screws (4)		STB-4-1420
	Double Shaft Seal and Retainer Kit			ASRK-237
	Seal Kit			A-140
	Speedi-Sleeve Gold			A-99814
	Complete Pump			AS-23-LH

Double Autosucker

Parts Drawing



Double Autosucker

Parts List

1	Bolt Kit (8)			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)			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)**			SRSTB-4
		Seal Retainer		SR-11394
		Screws (4)		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			PR-219
	Double Shaft Seal and Retainer Kit			ASRK-237
	Seal Kit (2 required)			A-140
	Speedi-Sleeve Gold			A-99814
	Complete Pump			AS-237/237-LH

PENGWYN
CENTRAL HYDRAULIC SYSTEMS

SERIES 485 MANIFOLDS

PENGWYN
2550 West Fifth Avenue Columbus, OH 43204
Customer support: Phone 800.233.7568 • Fax 614.488.0019
www.pengwyn.com