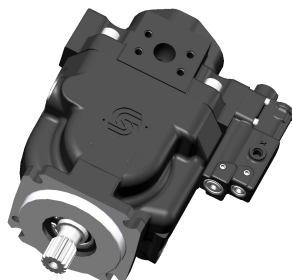
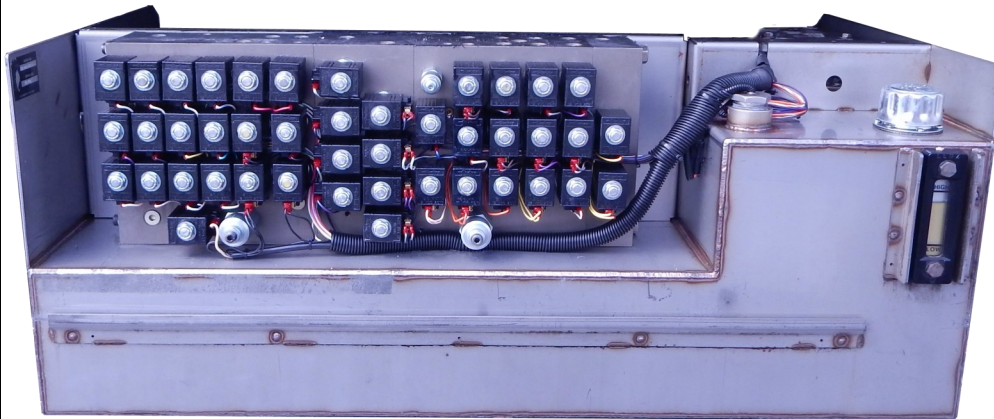




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LS485-75cc Manifold Technical Manual



PENGWYN

2550 W. FIFTH AVENUE
COLUMBUS, OH 43204



PENGWYN

CENTRAL HYDRAULIC SYSTEMS

LS485-75cc MANIFOLDS

PENGWYN

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www.pengwyn.com

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Introduction

Thank you for choosing our ground-oriented Load Sense 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 a rugged high volume load sense pump. Its variable displacement design 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 sitting idle for long periods. These features, as well as the testing done on each system before it leaves the facility, contribute to 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 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.

Using this Manual

This Hydraulic manual covers all the options and configurations available with your LS485 Hydraulic System. Be sure that the diagrams being referred to contain the options you have on your system. Extra options can be ignored if they are not installed (for example, all valve function diagrams include a wing block section. If you do not have a wing plow installed, that portion of the drawing can be ignored.) Systems that are installed must be present in the drawing, example: Plumbing diagram is different if you have a drag chain instead of a Hopper. Each set of diagrams is further broken down to individual sections for clarity. Be sure to check the color coded diagram title to ensure you are using the correct section.

For ease of reference, drawings specific to the truck are secured to the inside of the enclosure lid, and provided in an upfit packet to the installer. If these drawings become damaged or difficult to read, contact Pengwyn technical support and a new set can be provided.

The lid drawings include truck specific:

- **Plumbing Diagram** that details PENGWYN recommended installation hosing
- **Coil Diagram** that shows coil functions/names, part numbers, and wire connections (by wire color)

The up-fit document package has the above drawings as well as:

- **Circuit Diagram** that shows valve function and circuit layout for troubleshooting
- **Front Valve diagram** that shows part numbers and placement for better readability
- **Rear Valve/Fitting Diagram** for plumbing installation
- **Truck wiring Diagram** (Not truck specific, also located in this manual)
- **Driver Board Connection Diagram** (Not truck specific, also located in this manual)

Electronic control systems for your LS485 are covered in the control box manual, which is included with your hydraulic system, and can also be obtained by scanning the QR code on the drawing, or at www.PENGWYN.com/Manuals.aspx.

For technical assistance please contact PENGWYN at:

PENGWYN

2550 West Fifth Avenue Columbus, OH 43204

Customer Support:

Phone 614.488.2861 or 800.233.7568

Fax 614.488.0019

www.pengwyn.com

System Overview

WARNING!: If activated by the control box, the Bed and Plow(s) will move down even without hydraulic flow . If these functions are being troubleshot, make sure they are in the DOWN position before starting your troubleshooting procedure.

Poppet Valves:

LS485 Manifolds use poppet valves to control hydraulic flow. These poppet valves are bang-bang valves that are either fully open or fully closed. This makes for a reliable, dirt tolerant manifold, and allows for simple troubleshooting and repair. In order to check if a solenoid is operating properly, turn the ignition to the ON position without starting the truck. Operate a function on the control box, and touch the 1/2"-20 nut at the top of the coil with a steel tool (a Small wrench or screwdriver works well). You should be able to feel the magnetism generated by the coil when it is energized. Refer to the "Solenoid Energization Table", "Coil Diagram", and "Circuit Diagram" in this manual to determine which valves should be energized for each function.

Parallel Circuit:

The LS485 is a parallel motor circuit, Load Sense configuration of the PENGWYN 485 Hydraulic system. Because of this, there are a few differences in troubleshooting the manifold as compared to the PENGWYN IT485. Unlike the IT485, which places the motors in series (i.e. the auger motor return feeds the spinner motor pressure, the spinner return feeds the wetting pressure, and so on), each motor return in the LS goes back to tank (through the filter). This means that a "deadhead" condition at any one motor will not affect the other motors and cylinders in an LS485 system. Because of this, loopback hoses are not required for unused circuits (i.e. if wetting is not required, wetting pressure and return can just be capped off).

Load Sense:

Because the pump is load sense, there are no pump solenoid valves or wires to go bad. The manifold sends flow requirements to the pump, hydraulically, through the load sense line. If the pump is not activating, or producing too little flow, it will need to be evaluated differently than an AutoSucker pump.

The load sense pump in the LS485 system is a variable displacement piston pump controlled by a load sense line. The pump is "biased" by its load sense adjustment (factory set to 290PSI). The flow of the pump is adjusted using a hydraulically controlled swash plate to maintain a pressure drop of 290PSI from the pump output to the load sense line. The Pressure Compensator (PC) sets the maximum pressure the pump will provide, and is preset to 2200PSI at the factory. See the "Series 45 J Frame Service Manual" included with your LS485 Documentation for additional information and troubleshooting assistance.

Priority Flow Control Valve:

While the same electronic control signals are used as in an IT485 system (i.e. the "Bypass" wire still provides flow to the cylinder section), activation of the cylinder section in the LS485 operates in a different way hydraulically. When a Cylinder function is activated, full flow is demanded from the pump through the Full Stroke (FS) enable valve. Opening the FS valve increases flow from the pump to maximum by requiring the swash plate to go to Full Stroke" (note that pump absolute maximum flow is determined by engine RPM). The sequence valve will only open when pressure is above its' setting (this is factory set and should not be adjusted without contacting PENGWYN technical support). The additional flow demanded by the FS valve increases the pressure on the sequence valve, which opens it. As long as pressure is maintained at the sequence valve, it holds a high flow logic valve open that provides full system flow to the cylinder block. If pressure drops below the sequence valve setting (either from the FS valve closing, or an issue with the cylinder section), it closes the logic valve blocking flow to the cylinder section, and ensuring that the motors get the flow they need to continue operating.

System Overview

Spreader Block:

The Spreader Block in the LS485 uses a parallel poppet valve arrangement to precisely control spreader and wetting motors. The poppet valves send oil through specifically sized orifices that work with the compensators to send from .25 to 15.75 GPM of oil to the motors. Just as with the IT485, the LS485's digital setup allows for precise salt control without feedback sensors, or sticky spool valves.

Cylinder Block:

The LS485 Cylinder Block uses large #16 valves to increase cylinder speeds, and uses the same type of circuit that makes the IT485 reliable and easy to troubleshoot.

Plow Speed Controls:

The LS incorporates plow up and down flow controls into the manifold that allow you to set the plow speeds as required for each truck.

High Speed Bed Block:

High Speed bed function is standard on all LS485 Manifolds, and allows for Bed Down speeds from 60 to 120GPM.

Plow Counterbalance:

PENGWYN Hydraulic Plow Counterbalance comes standard with the LS485. With this system a portion of the weight of the plow is hydraulically shifted onto the Truck Suspension. This provides for longer plow blade life, better handling, and quieter plowing.

Wing Block:

Option block used to control additional plows that do not require additional pressure controls. This block uses #16 Poppet Valves that can flow up to 40GPM, and are generally used for Wing Plows. When this block is installed additional control circuits are required, and a Wing equipped control box is required for operation.

UB/SL Block:

Option Block used to control cylinders that require additional pressure relief, such as underbody plows. #10 Valves are used to allow for an additional relief valve to be installed. The most common use for this block is an underbody plow that requires limited pressure for the UB Plow down function. When this block is installed additional control circuits are required, and a Wing equipped control box is required for operation.

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 CAN BE 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, corrosion, 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.

LS485-1-75cc MANIFOLDS

Chapter Includes:

ALL OPTION DRAWINGS

- All options represented
 - Valve Function Diagram
 - Valve Diagram
 - Fitting/Rear Diagram
 - Plumbing Diagram
- Block Detail Drawings
 - Spreader Block
 - Cylinder Block
 - Wing Block
 - Underbody/Swap loader Block
- Parts List/Description
- Block Details

NOTE: Proper auger plumbing is based on the spreader arrangement. Make sure to reference arrangements listed in the Plumbing Diagram below. Installation specific diagrams are also located in the lid of the hydraulic enclosure, and the up-fit document package.

Valve Function Diagram

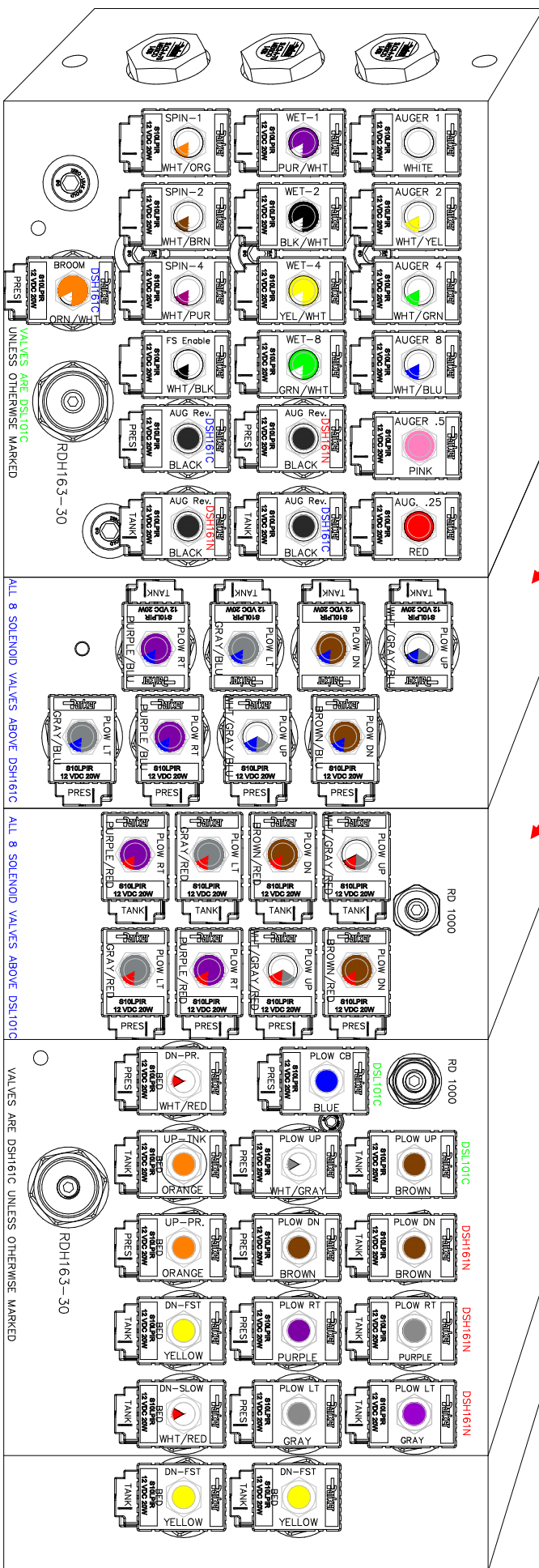
PRIMARY WIRE COLOR
WIRE STRIPE COLOR

SPREADER SECTION

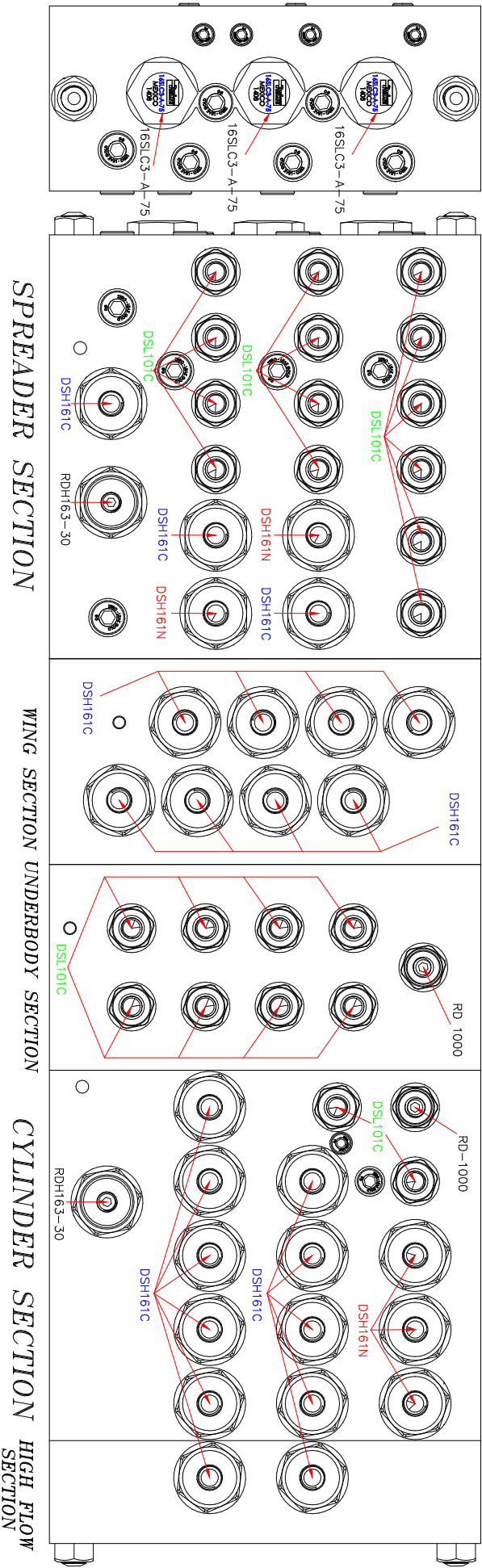
WING SECTION

UNDERBODY

CYLINDER SECTION



Valve Diagram Front/Left



[illegible]

SPREADER SECTION

DETAIL DRAWINGS

(All Options)

Drawings with all options installed can be hard to read in this format, so the following drawings are included in this manual for clarity and readability. The Specific drawings for your manifold are attached inside the lid of your **PENGWYN** hydraulic system. If they are missing or damaged, please contact **PENGWYN** technical assistance for replacements.

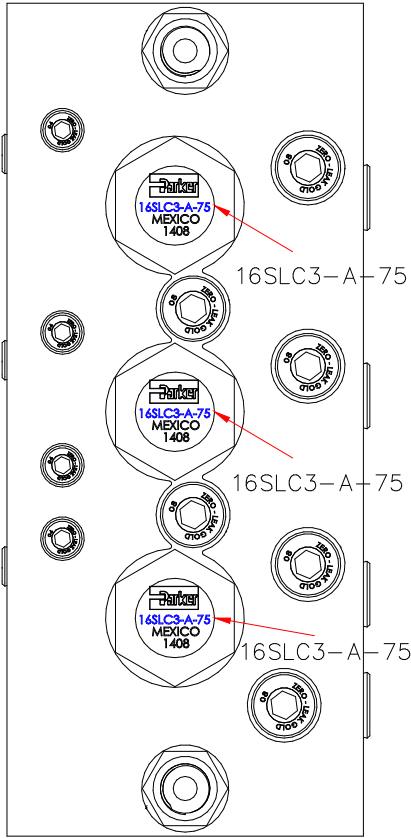
- **Spreader Block Details**
 - Coil (Front) Diagram
 - Fitting/Valve (Rear) Diagram
- **Cylinder Block Details**
 - Coil (Front) Diagram
 - Fitting/Valve (Rear) Diagram
- **Wing Block Details**
 - Coil (Front) Diagram
 - Fitting/Valve (Rear) Diagram

Underbody/Swap Loader Block Details

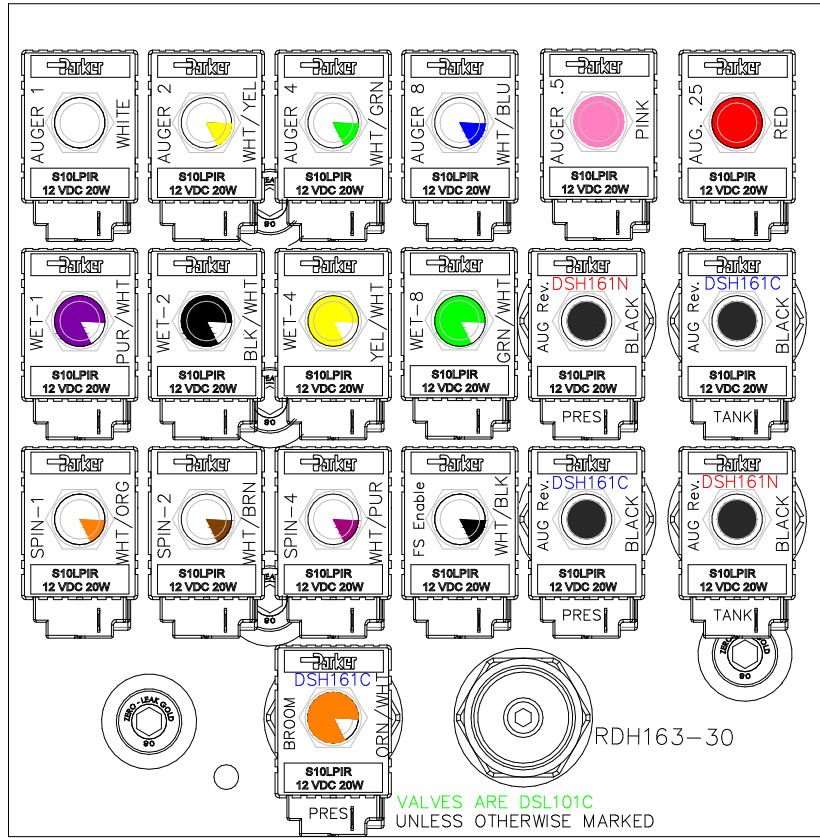
- Coil (Front) Diagram
- Fitting/Valve (Rear) Diagram

Spreader Block Details

Left



Front

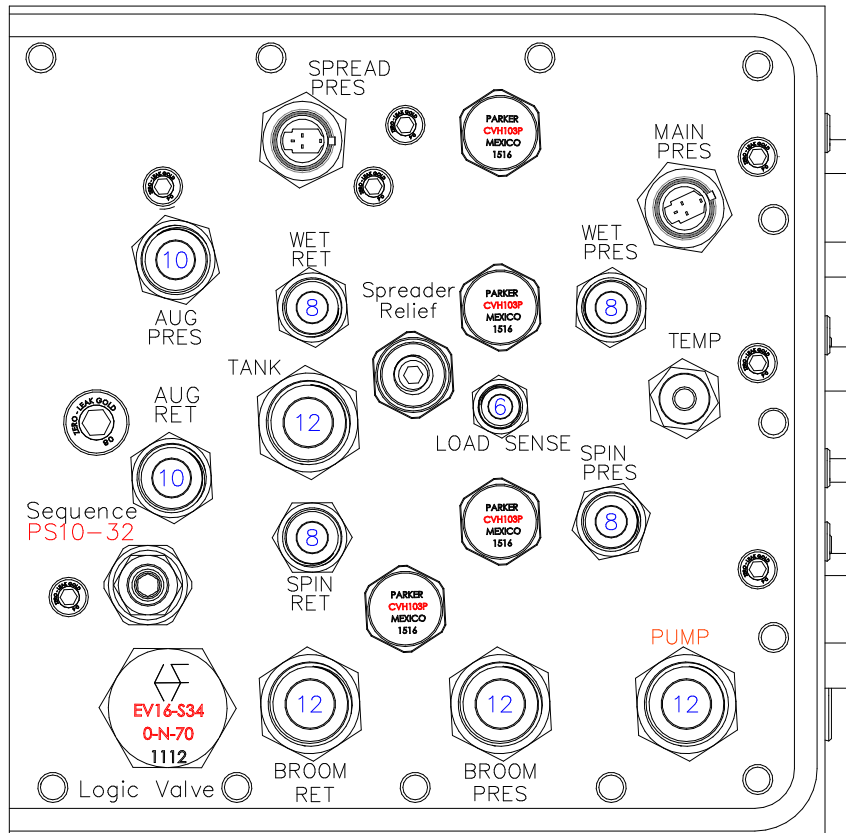


PRIMARY WIRE COLOR



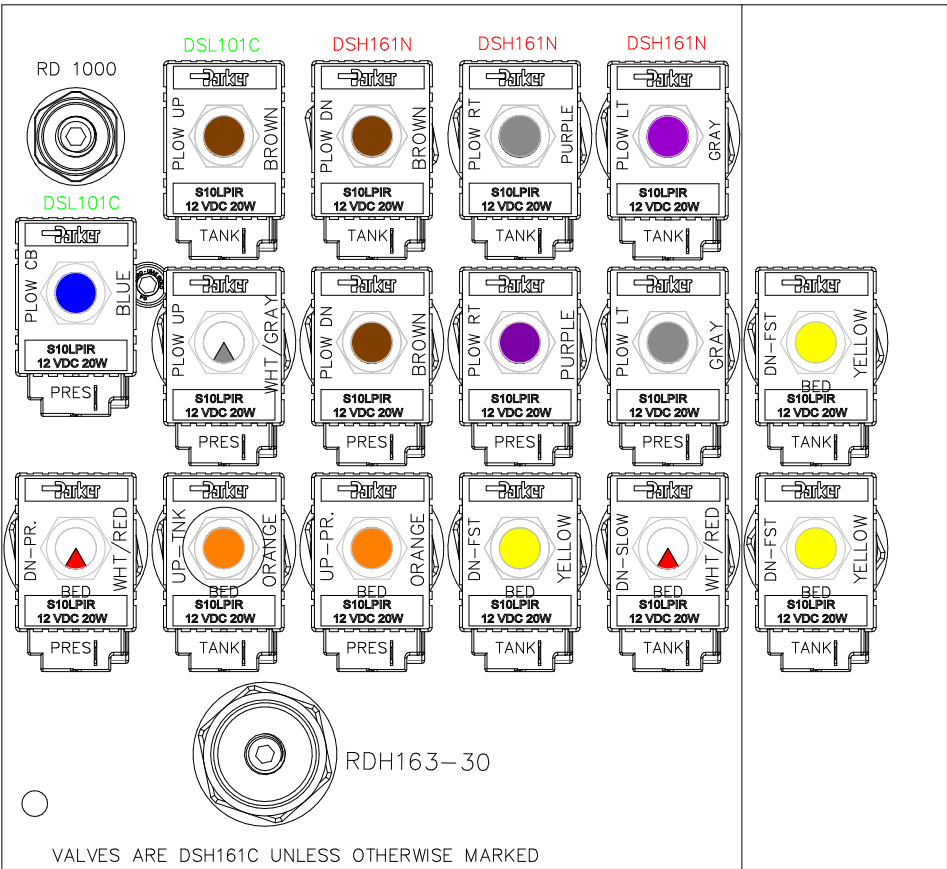
WIRE STRIPE COLOR

Back

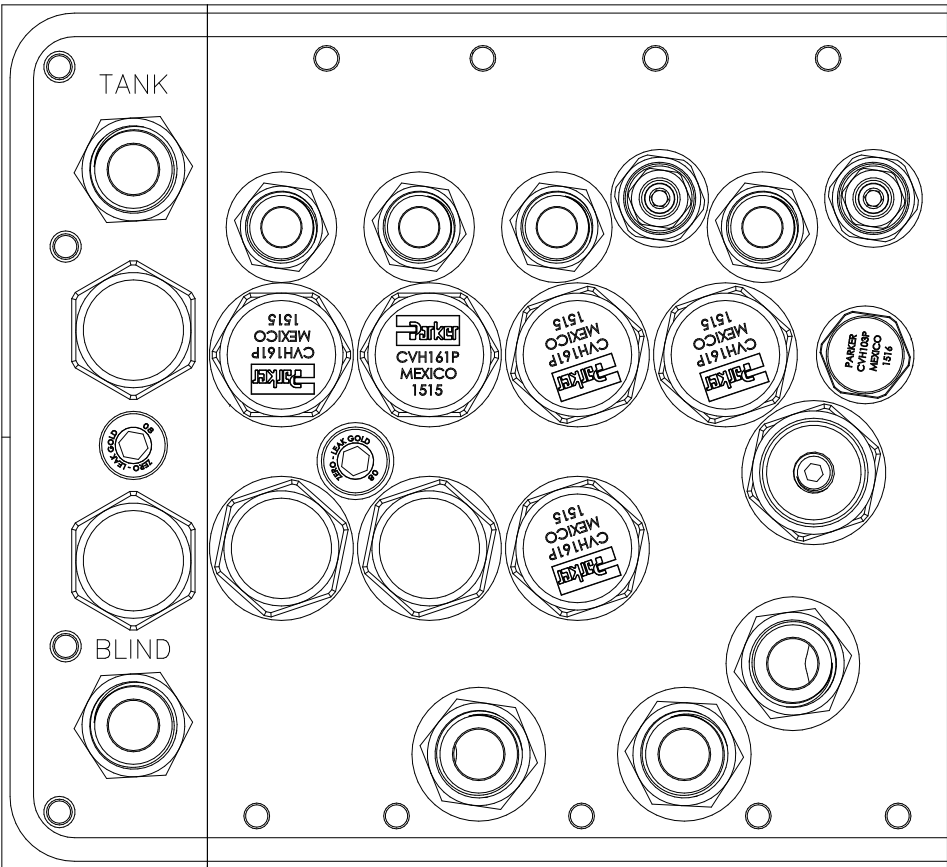


CYLINDER BLOCK Details

Front

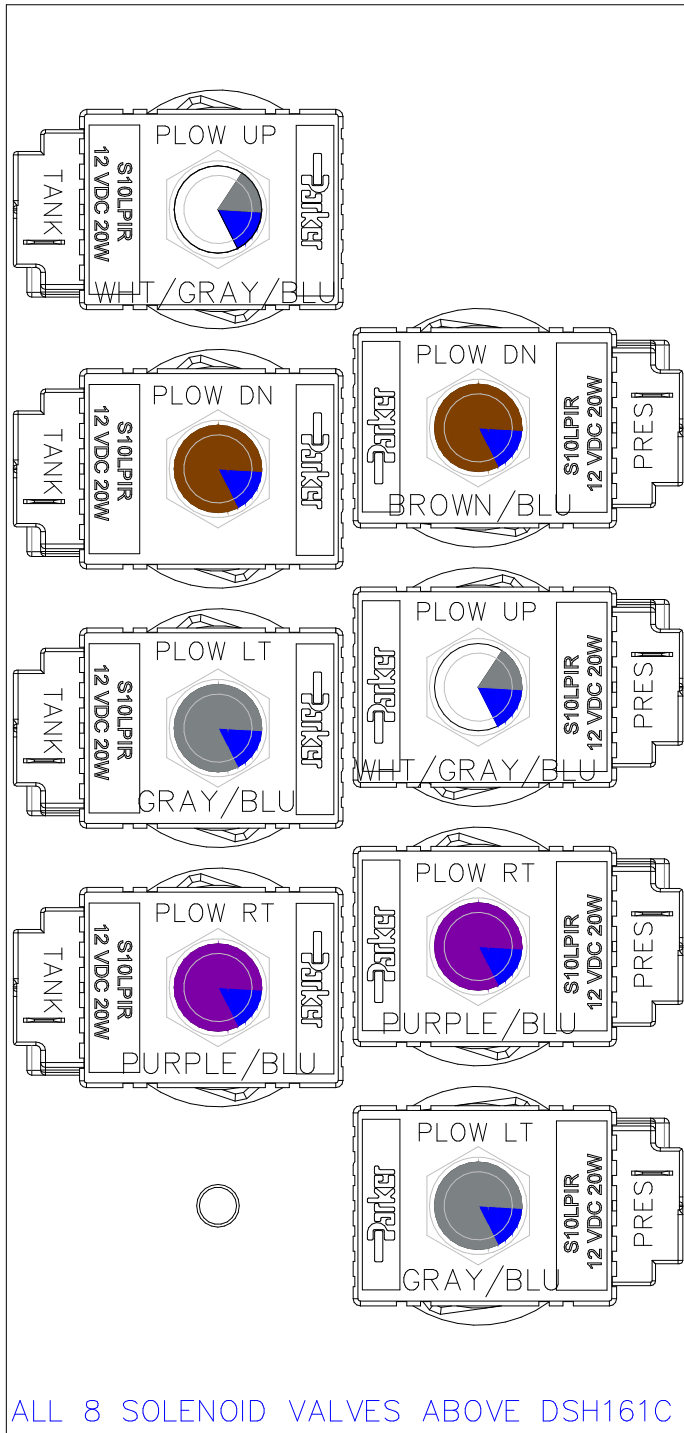


Rear



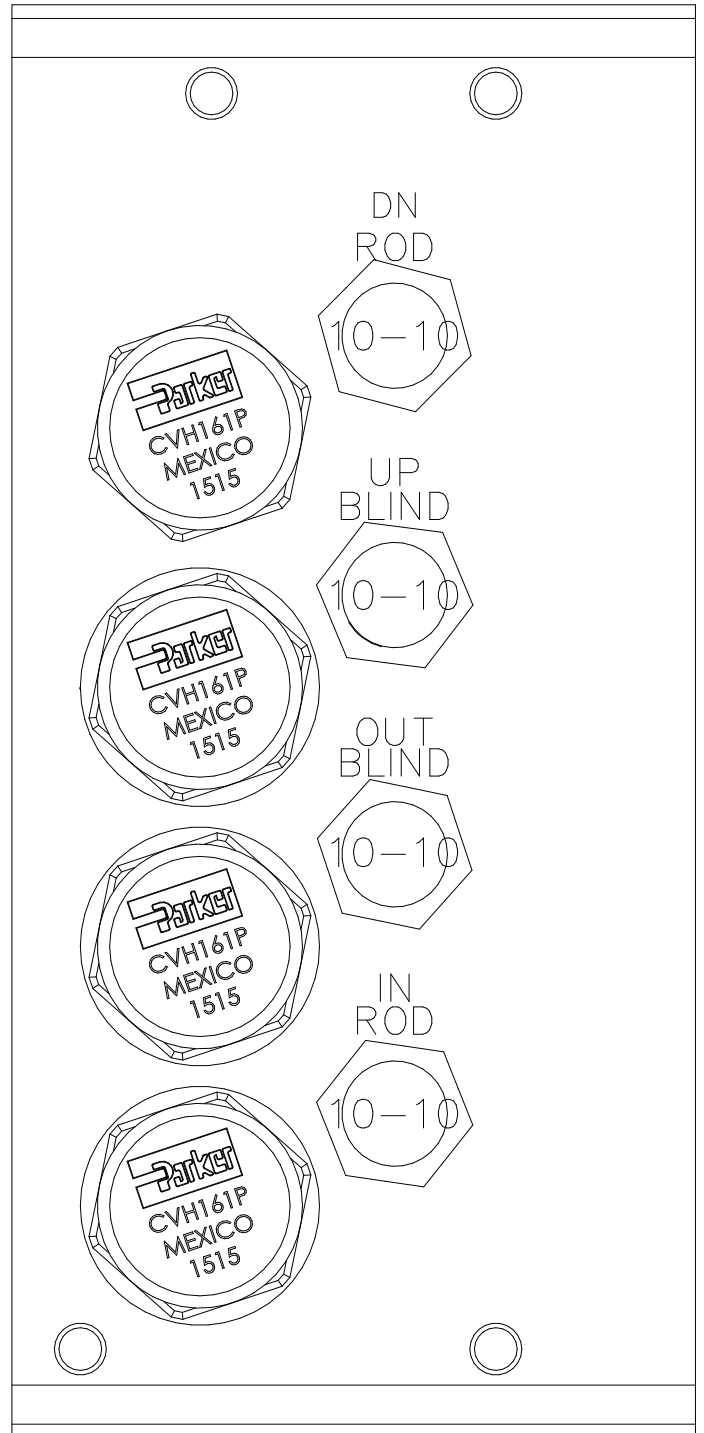
Wing Block Details

Front

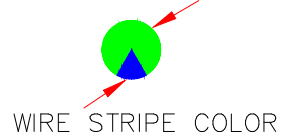


ALL 8 SOLENOID VALVES ABOVE DSH161C

Back



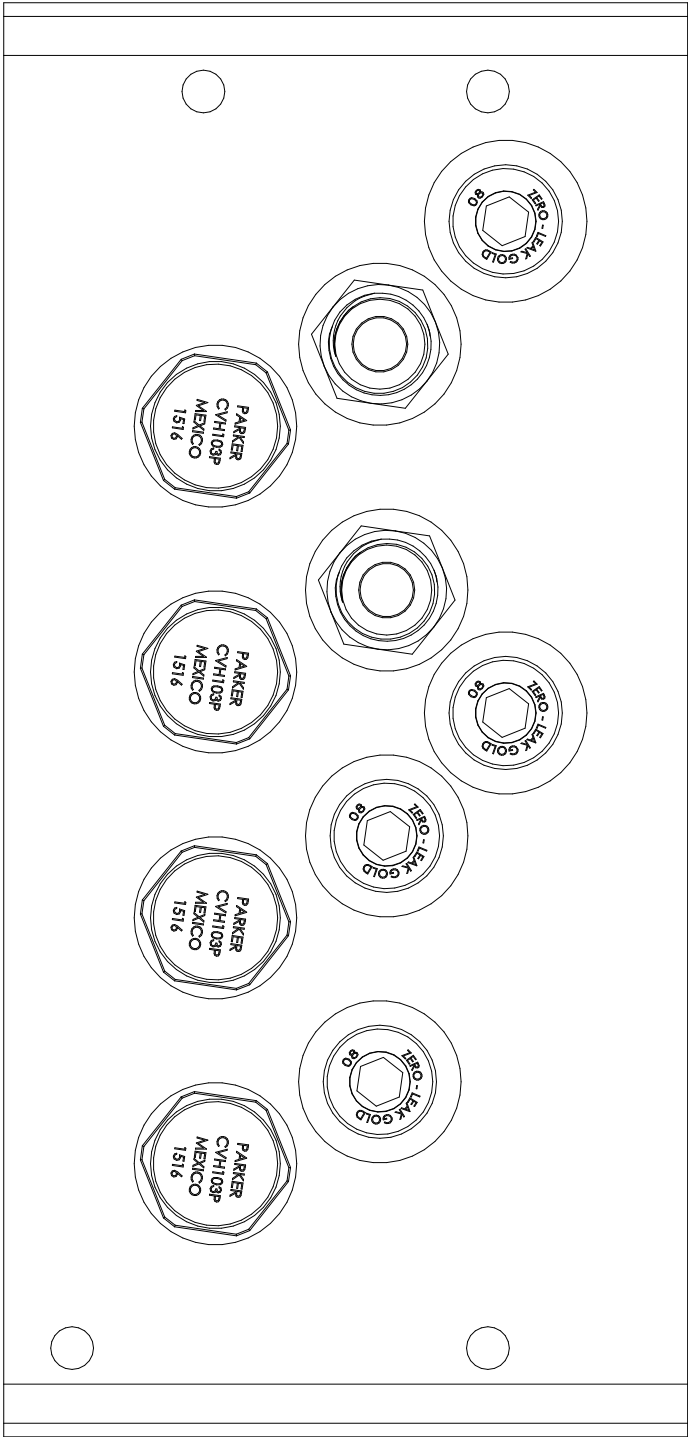
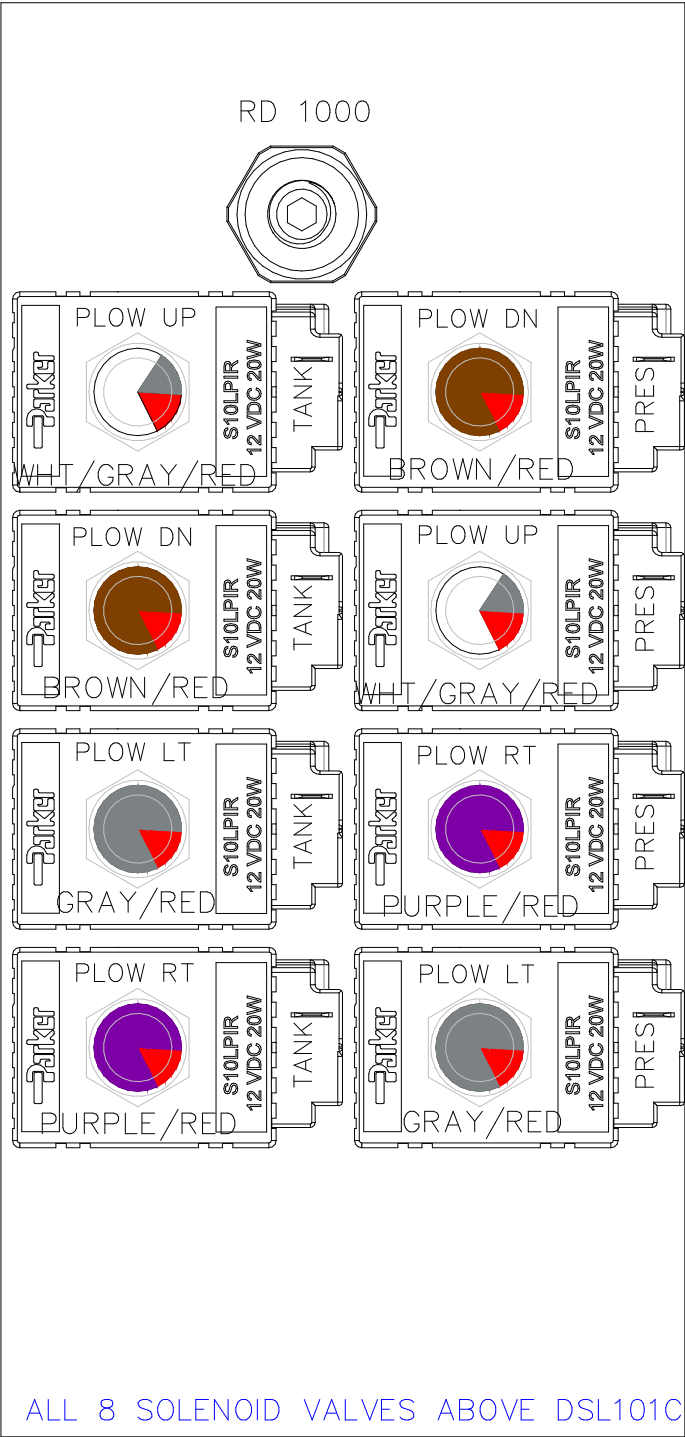
PRIMARY WIRE COLOR



UNDERBODY/SWAP LOADER Block Details

Front

Back



UNDERBODY SECTION

PRIMARY WIRE COLOR



WIRE STRIPE COLOR

Parts List/Description

<u>LABEL/PART NUMBER</u>	<u>DESCRIPTION</u>
TC101	Thermistor Assembly
ML5001 W/6410-08-04	Pressure Transducer
* DSL101C	Normally Closed Solenoid Valve Size 10
* DSH161C	Normally Closed Solenoid Valve Size 16
* DSH161N	Normally Open Solenoid Valve Size 16
RDH- 163-30	600 - 3000 PSI #16 Relief Valve
RD1000	1000 PSI Relief Valve
16SLC3-A-75	Parallel Circuit Motor Compensator
CVH103P	Check Valve Size 10
RC-S10L	Manifold Solenoid Coil (used on valves marked with *)
PS10-32	Sequence Valve for Spreader Priority control (Switching Element)
EV16-S34	#16 Logic Valve for Spreader Priority Control. Switched by Sequence valve (High Flow element)
RDH- 163-30	600—3000 PSI Bed Down Relief Valve
CVH103P	Check Valve Size 10
CVH161P	Check Valve Size 16
PC-501	15 GPM Compensator
PC-601	30 GPM Compensator

Identifying Specific Applications

- **TAILGATE/HOPPER**

- This set of drawings is for an under tailgate or hopper install. These units use either one motor, or one set of hydraulic inputs designed and installed by the manufacturer with one set of pressure & return hydraulic connections. Because of this, the Tailgate/Hopper drawings represent the auger/conveyor drive requirements as a single motor.

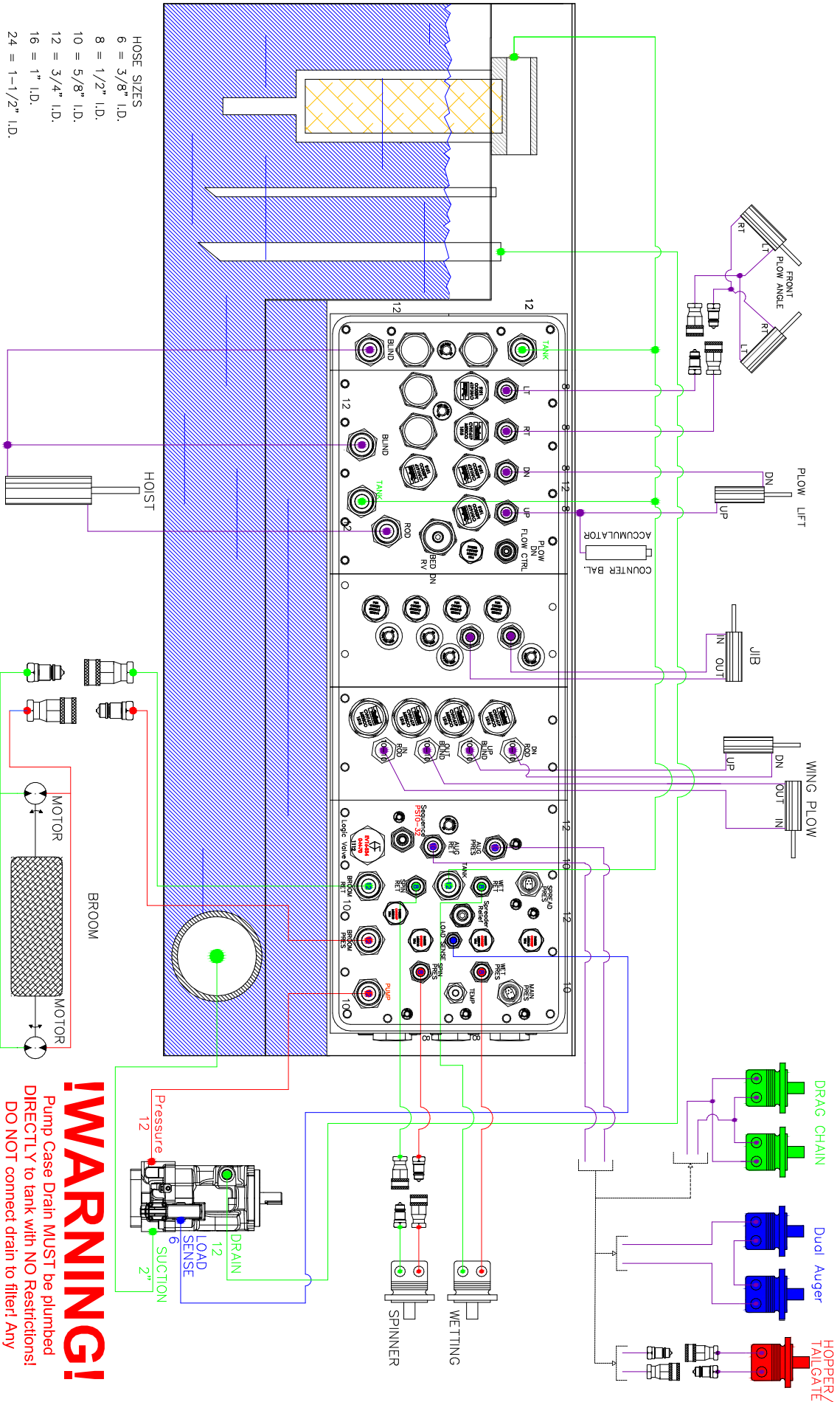
- **DUAL AUGER**

- This set of drawings is for a dual auger live bottom bed. The augers are plumbed in series to ensure that the augers move equal amounts of salt without the need of a flow divider.

- **DRAG CHAIN**

- A drag chain uses two motors turning in opposite directions on either side of the conveyor. These motors are to be plumbed in parallel. This Provides the motors with more torque, and lower speeds.

Plumbing Diagram



TROUBLESHOOTING

Chapter Contents

- Caution
- Driver Board Connections
- Truck Wiring
- Pressure Adjustments
- Torque Specs and O-ring Numbers
- Checking Energization
- Troubleshooting Chart

Troubleshooting

CAUTION

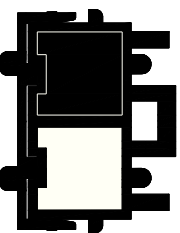
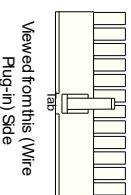
- Disconnect all connectors from the Pengwyn Manifold, remove Pengwyn Control Console from the cab, and disconnect the truck battery before welding on the truck. Failure to do so will damage components and void the warranty.
- Do not over tighten solenoid coil nut. The coil spindle is hollow and can be damaged by overtightening.
- 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.
- Clean the spreader disconnects before hooking up any motors. This will help prevent dirt lodging in the valves downstream from the disconnects.
- When the auger and the spinner are disconnected from the truck, the “SPREAD” switch must be in the OFF position. The spreader material output and spinner settings should also be set to 0. This will prevent overheating if the “SPREAD” switch is accidentally set to “ON” or “AUTO”.
- **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.

LS485 Harness Connector Pinout

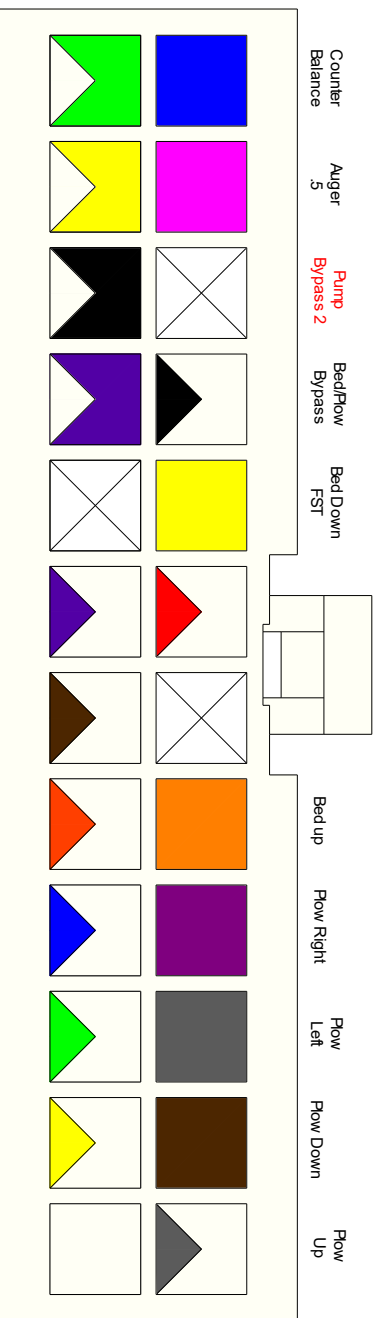
Wire Plug-in Side Tab-Up

BLACK 14 GA wire (no FET Board Connection, Wires to Ground Bus) Ground
 BLACK 18 GA wire (no FET Board Connection, Wires to Dash Switch) Auger Reversing

Bed Down
 Slow Bed Up 2

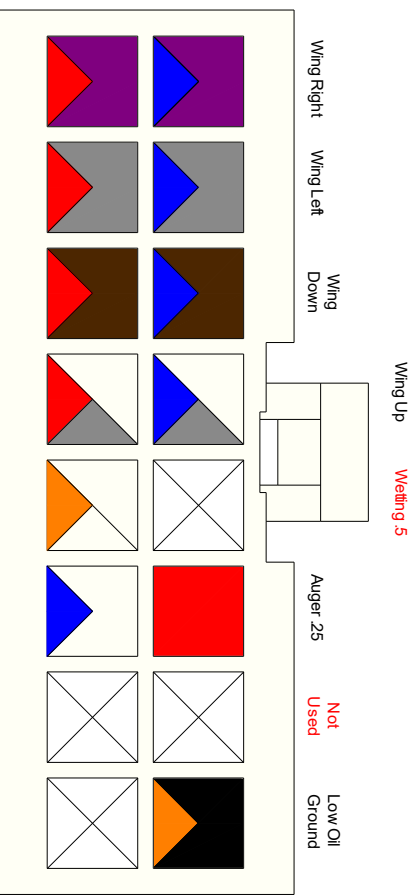
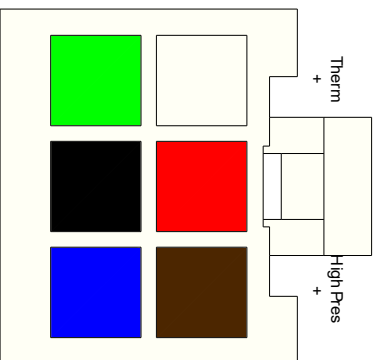


Main Power
 Ground +12VDC
 Connector: ECN42816-0212
 PIN: ECN42815-0011

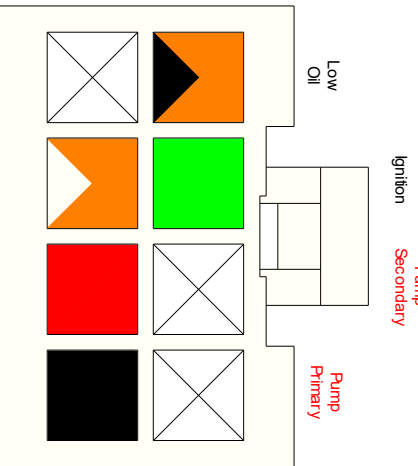


CONNECTOR: ECN3901-2240
 PIN: ECN44476-1112

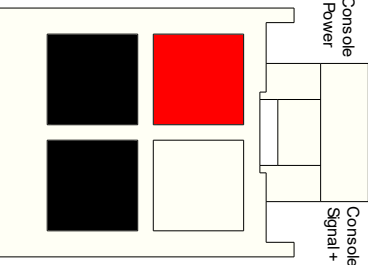
CONNECTOR#: ECN3901-2060
 PIN#: ECN44476-1112



CONNECTOR: ECN3901-2160
 PIN: ECN44476-1112



CONNECTOR: ECN3901-2080
 PIN: ECN44476-1112

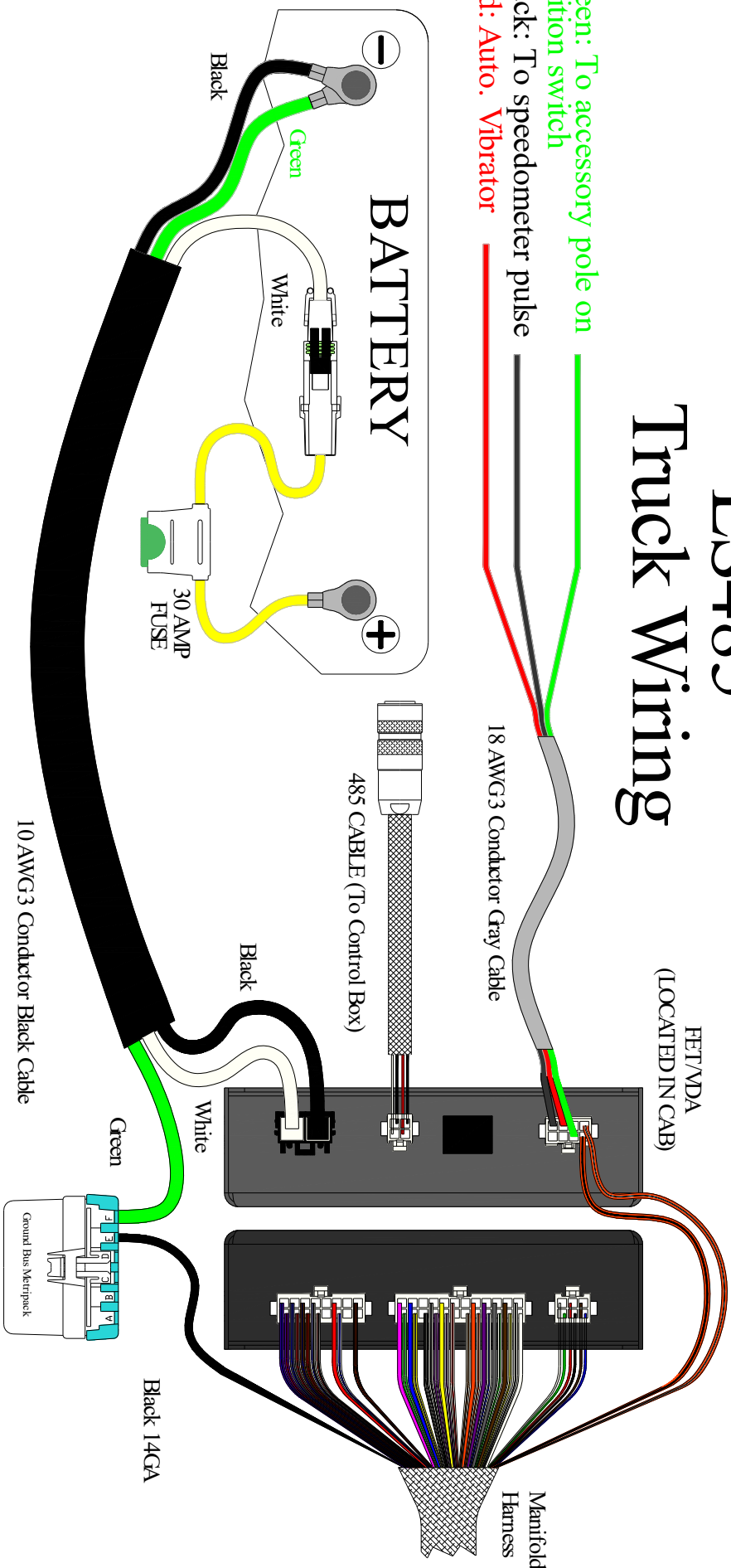


CONNECTOR: ECN3901-2040
 PIN: ECN44476-1112



LS485 Truck Wiring

Green: To accessory pole on Ignition switch
Black: To speedometer pulse
Red: Auto. Vibrator



Pressure Adjustments

Main Relief

1. Disconnect the Spinner or Wetting hose quick disconnects.
2. Start engine and bring engine speed to 1500 rpm.
3. Turn console ON and ensure Manual Mode is enabled.
4. Set Auger to 0.
5. Set Spinner or wetting >1
6. Using the **MODE** switch, scroll to pressure (Mode 9).
7. Set **Spread** switch to MANUAL.
8. Read the MAIN pressure ("M:") on the display.
Example: **M:XXXX S:XXXX PSI**
"M:" is the **MAIN** pump pressure reading
"S:" is the **SPREADER** circuit pressure reading.
9. Set "**SPREAD**" switch to OFF.

FACTORY SETTING is 2200PSI

If adjustment is necessary:

1. Loosen main relief lock-nut.
2. Use an Allen wrench to adjust the Relief Valve screw.
3. 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.

Spreader Relief

1. Disconnect the Auger hose quick disconnects.
2. Start engine and bring engine speed to 1500 rpm.
3. Turn console ON and ensure Manual Mode is enabled.
4. Set Auger to 0.
5. Using the **MODE** switch, scroll to pressure (Mode 9).
6. Set **SPREAD** switch to MANUAL.
7. Press **BLAST** switch
8. Read the SPREADER pressure ("S:") on the display.
Example: **M:XXXX S:XXXX PSI**
"M:" is the Main pump pressure reading
"S:" is the Spreader circuit pressure reading.
9. Release **Blast Switch**.

FACTORY SETTING is 1200 to 2500PSI

Check conveyor motor specs. If adjustment is needed:

1. Loosen Spreader relief lock-nut (On back of manifold).
2. Use an Allen wrench to adjust the Relief Valve screw.
3. 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.

Bed/Plow Up Relief

1. Start engine and bring engine speed to 1500 rpm.
2. Using the **Mode Switch**, scroll to pressure readout.
4. Run **Plow UP** until plow stops and hold to "dead-head" plow.
5. Read the main pressure ("M:") on the display.
6. Release **Plow UP** control.

FACTORY SETTING is 2000PSI

If adjustment is necessary:

1. Loosen lock-nut from bed up/plow up relief.
2. Use an Allen wrench to adjust the Relief Valve Setting screw clockwise to increase pressure setting and counter clockwise to decrease pressure setting.
3. Tighten lock nut.
4. Repeat above procedure until proper setting is acquired.

Bed Down Relief

1. Start engine and bring engine speed to 1500 rpm.
2. Using the **Mode Switch**, scroll to pressure readout.
3. Run **Bed DOWN** until it stops; hold to "dead-head".
4. Read the main pressure ("M:") on the display.
5. Release **Bed DOWN** control.

FACTORY SETTING : Less than 800 PSI

FOR UNDERBODY HOISTS

FACTORY SETTING : 1800 PSI

FOR DOUBLE ACTING TELESCOPIC HOIST

If adjustment is necessary:

1. Loosen lock-nut on bed down relief (Back of manifold).
2. Use an Allen wrench to adjust the screw clockwise to increase pressure setting, and counter clockwise to decrease pressure setting.
3. Repeat above procedure until proper setting is acquired.
4. Tighten lock nut.

Plow Counterbalance Relief

Counterbalance must be adjusted for each truck.

To adjust:

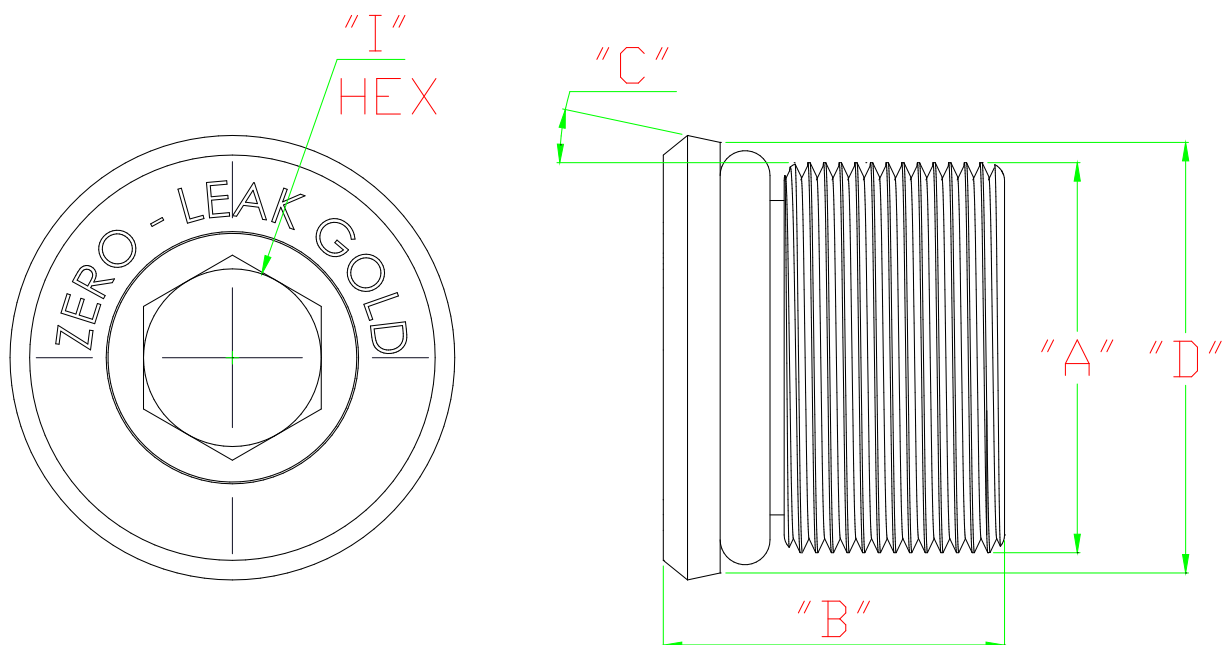
1. Start engine and bring engine speed to 1500 RPM.
2. Press Plow Down until Front plow is all the way on the ground. Plow counterbalance is automatically activated if it is enabled. If it is not enabled see control box manual to see how to do this.
3. If plow weight is not transferring to the truck suspension (the weight will cause the front of the truck to "squat" and the plow will shift forward slightly, but not come off of the pavement), use an Allen wrench to adjust the Relief valve adjustment screw clockwise to increase pressure lift pressure.
4. If plow is lifting off of the pavement, use an Allen wrench to adjust the Relief valve adjustment screw counter clockwise to decrease lift pressure.
5. Repeat above procedure until proper setting is acquired.
6. Tighten lock nut.

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



TUBE FITTING	PORT THD "A"	"B"	"C"	"D"	I	TORQUE	O-RING
PART #	UN / UNF-2A	±.01	+0°, -.5°	±.003	+.005, -0	±2%	NUMBERS
#2 SAE O-Ring Boss	5/16-24	0.38"	12°	0.348"	1/8"	28 INCH LBS	902
#4 SAE O-Ring Boss	7/16-20	0.45"	12°	0.477"	3/16"	168 INCH LBS	904
#6 SAE O-Ring Boss	9/16/2018	0.48"	12°	0.606"	1/4"	168 INCH LBS	906
#8 SAE O-Ring Boss	3/4/2016	0.56"	15°	0.8"	5/16"	46 FT LBS	908
#10 SAE O-Ring Boss	7/8/2014	0.63"	15°	0.93"	3/8"	46 FT LBS	910
#12 SAE O-Ring Boss	1 1/16-12	0.75"	15°	1.13"	9/16"	70 FT LBS	912
#16 SAE O-Ring Boss	1 5/16-12	0.75"	15°	1.385"	5/8"	70 FT LBS	916
#20 SAE O-Ring Boss	1 5/8-12	0.75"	15°	1.697"	3/4"	70 FT LBS	920
#24 SAE O-Ring Boss	1 7/8-12	0.75"	15°	1.946"	3/4"	70 FT LBS	920

CARTRAGES / SPECIAL	TORQUE	O-RING
DSH161	70 FT LBS	916
CP-16SL	70 FT LBS	916
PC-601 / PC-501	70 FT LBS	916
CVH161	70 FT LBS	916
DSL101	46 FT LBS	910
RD-XX00	46 FT LBS	910
CVH103	46 FT LBS	910
ILC-10	46 FT LBS	910
TC101	46 FT LBS	908
6410-08-04 (ML5001 FITTING)	46 FT LBS	908
ML-5001	168 INCH LBS	904
S10LPIR (Coil) NUT	70 INCH LBS	N/A
THREADED ROD INTO BLOCK	46 FT LBS	N/A
THREADED ROD NUT	70 FT LBS	N/A

LS485 Energization Charts

X = Coil should be energized

(NON-ODOT)

Front Plow	SOLENOID ENERGIZED									
	UP PRES	UP TANK	DN PRES	DN TANK	RT PRES	RT TANK	LT PRES.	LT TANK	FS ENABLE	CB
UP	X								X	
DOWN		X	X	X					X	
RIGHT					X			X	X	
LEFT						X	X		X	
CB									X	X

BED	SOLENOID MAGNETIZED					
	UP PRES	UP TANK	DN-SLOW	DN PRES	DN-FAST	FS ENABLE
UP	X	X				X
DOWN			X	X		X
DOWN FAST			X	X	X	X

Notes: 1. The **FRONT PLOW DOWN** switch activates the plow counterbalance if it is turned on in the control console.

Auger (manual)

Rate GPM	AUGER 1	AUGER 2	AUGER 4	AUGER 8
0				
1	X			
2		X		
3	X	X		
4			X	
5	X		X	
6		X	X	
7	X	X	X	
8				X
9	X			X
10		X		X
11	X	X		X
12	X		X	X
13	X		X	X
14		X	X	X
15	X	X	X	X

Wetting (manual)

Rate GPM	WET 1	WET 2	WET 4	WET 8
0				
1	X			
2		X		
3	X	X		
4			X	
5	X		X	
6		X	X	
7	X	X	X	
8				X
9	X			X
10		X		X
11	X	X		X
12	X		X	X
13	X		X	X
14		X	X	X
15	X	X	X	X

Spinner (manual)

Rate GPM	AUGER 1	AUGER 2	AUGER 4
0			
1	X		
2		X	
3	X	X	
4			X
5	X		X
6		X	X
7	X	X	X

Auger Reversing

Setting	FW Pres. NC	FW Pres. NO	FW Return NC	Return NO
Forward				
Reverse	X	X	X	X

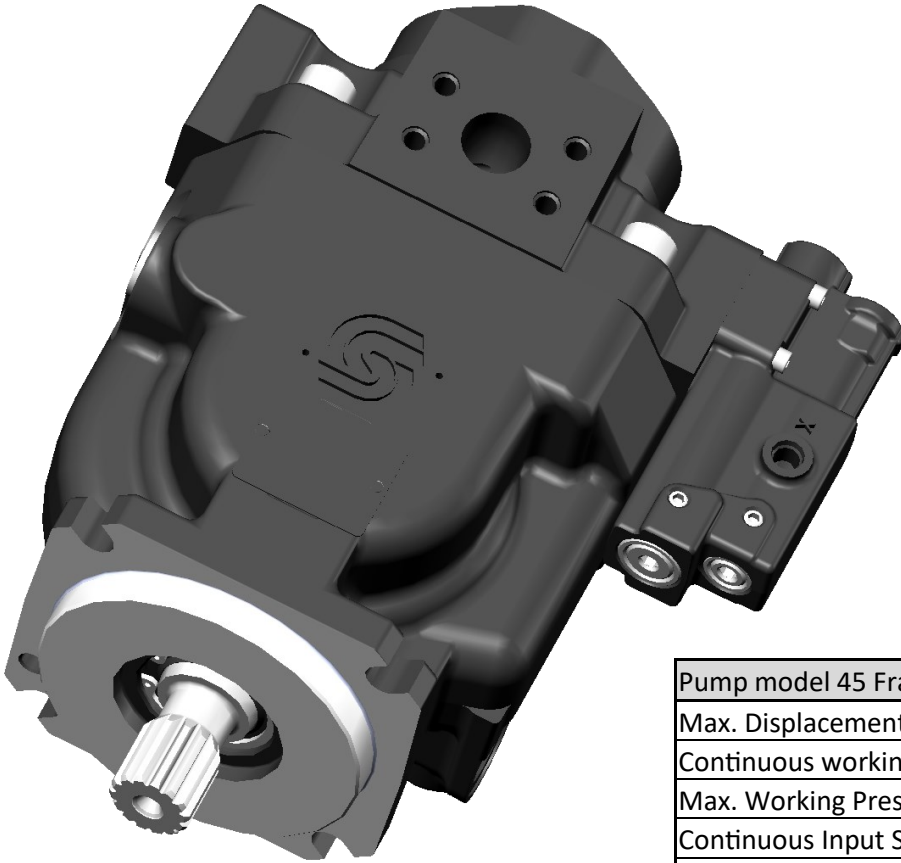
Troubleshooting Chart

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	Load Sense Valve (on Pump) dirty	Clean valve and check operation
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 FS valve	Replace coil
	Bypass coil nut over tightened	Replace Full Stroke cartridge
No pump effect	No pressure on Load Sense Line	Check that load sense line is tight and not leaking
	Dirt in Load Sense Valve	Clean Pump Load Sense Valve
Solenoid will not energize when turned on	Bad Solenoid/coil	Replace solenoid/coil
	Bad electrical ground	Check Ground wire for damage/Corrosion (at the manifold and the ground/battery connection)
		Check that Ground lug on manifold is tight
Auger/spinner/wetting does not change speeds smoothly		Remove cartridge, tap threads to make ground path. Replace cartridge
	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 or replace solenoid valve

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
	Dirt in bed up solenoid valve	Clean valve
Bed goes up when plow is operating	Dirt in one of the lift port valves	Clean valves, check poppets for spring action
Bed drifts down	Bed down valve/valves stuck open	Clean valve
Plow will not go up	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
	Faulty plow quick disconnect	Clean or replace
Plow goes up but not down	Low fluid level	Add fluid
Hydraulic fluid too hot	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
	Auger Disconnects worn	Replace Auger disconnects
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

LOAD SENSE PUMP

Series 45 J Frame



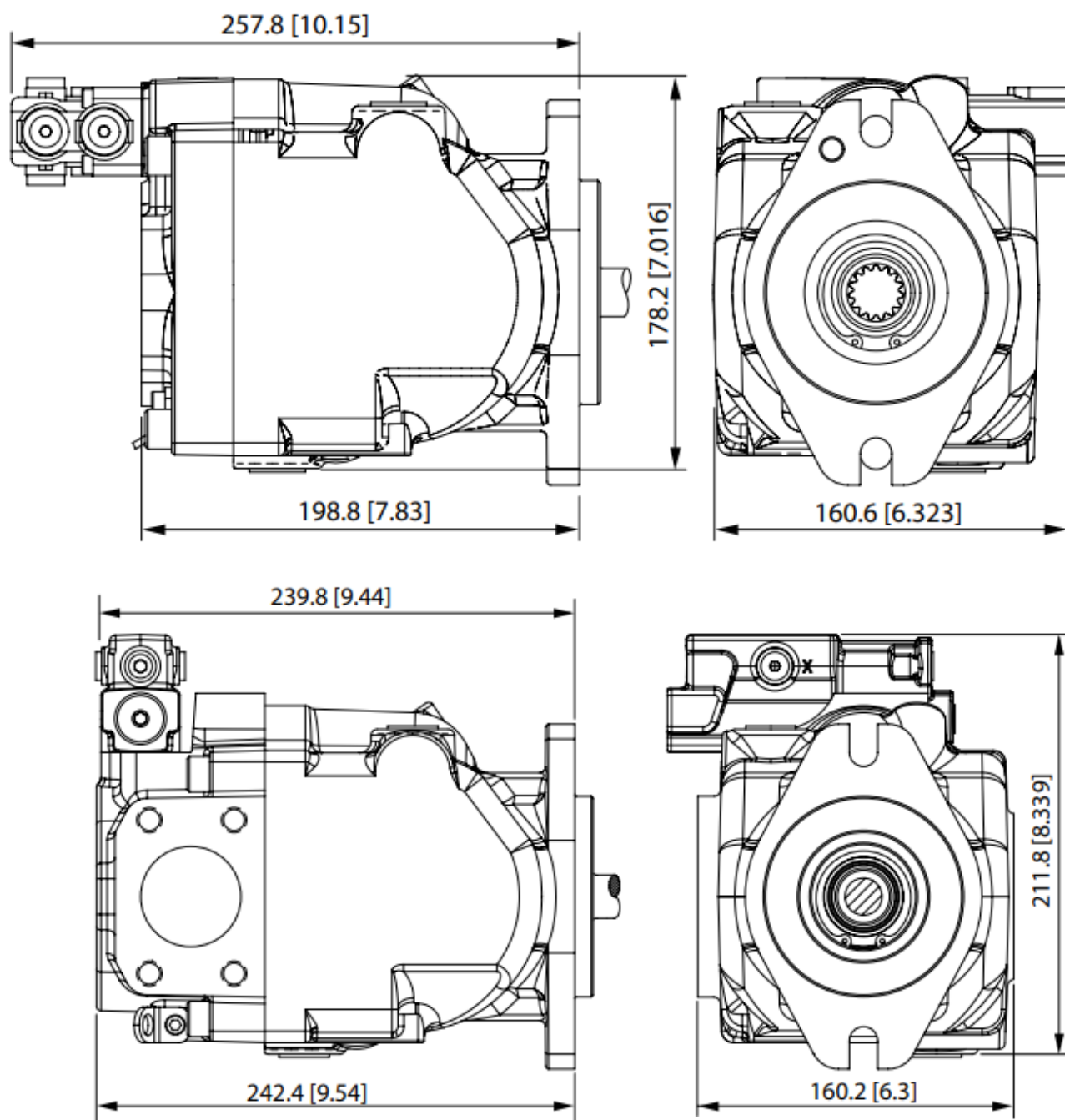
Pump model 45 Frame J	
Max. Displacement	75cc
Continuous working Pressure	3770 PSI
Max. Working Pressure	5075 PSI
Continuous Input Speed	2400 RPM
Theoretical flow	42.9 GPM
Weight	60.2 lbs.

!WARNING!

When installing a Load Sense pump, the case drain **MUST** be plumbed **DIRECTLY** to tank with **NO RESTRICTIONS!**

DO NOT connect drain to filter! Any back pressure on this line can damage the pump.

Frame J Axial (top) and Radial (bottom)



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PENGWYN

CENTRAL HYDRAULIC SYSTEMS

LS485-75cc MANIFOLDS

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