

Volume 1

Fourth Edition

PENGWYN

Central Hydraulic Systems

Series 485

Control Consoles

PENGWYN CENTRAL HYDRAULIC SYSTEMS

SERIES 485 CONTROL CONSOLES

Pengwyn
2550 West Fifth Ave.
Columbus, OH 43204
Phone 800.233.7568 • Fax 614.488.0019

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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.

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, damage from abuse, misuse, neglect and 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

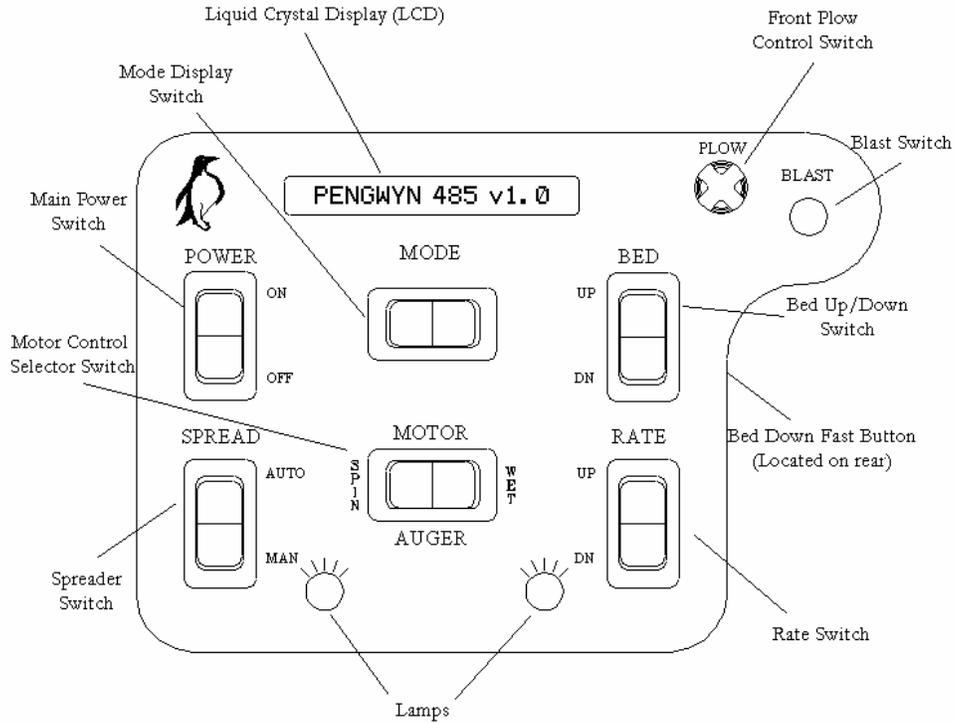
Pengwyn reserves the right to make any changes in or improvements on its products without incurring any liability or obligation whatever and without being required to make any corresponding changes or improvements in products previously manufactured or sold.

Control Console Basics

This chapter will explain the operation of the control console.

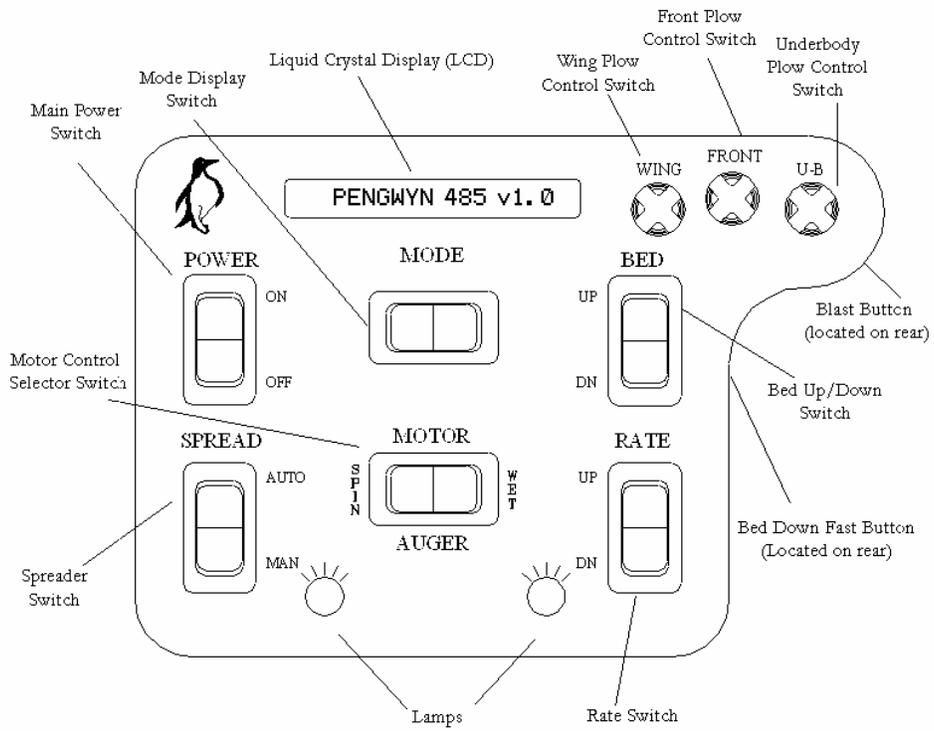
Front Panel Layout

200 Series



The 200 Control Console is also used to control 100 series manifolds without a V-Plow.

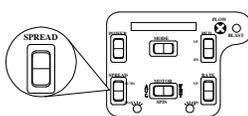
300 Series



The 300 Control Console is also used to control 100 series manifolds with a V-Plow.

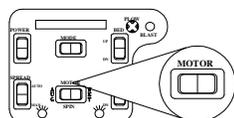
Spreader Controls

Spreader Switch



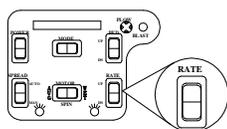
The spreader switch has three positions: AUTOMATIC, OFF, and MANUAL. The manual position is only active if the manual setting is enabled in Calibrate Mode. When in automatic mode, hydraulic flow to the auger motor is ground oriented. If the spreader is switched off no motors receive hydraulic flow. For information on these settings, refer to the Operation section of this manual.

Motor Select Switch



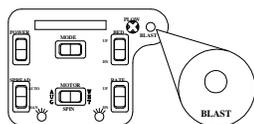
This three-position toggle switch is used to select the motor (Auger, Spinner, Wetting) you wish to control using the Rate Switch described below. For information on these settings, refer to the Operation section of this manual.

Rate Switch



When pressed this toggle switch changes the rate of a hydraulic motor selected by the Motor Select Switch by a value of one (1).

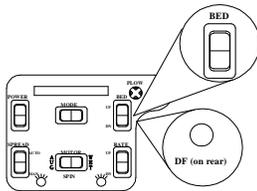
Blast Switch



The blast switch is a normally open push button switch mounted either on the front right (200 Series, shown) or on the rear right of the Console (300 Series). This button is used to override the setting of the auger in any mode of operation. When activated, the blast switch energizes all the auger and/or wetting valves, sending maximum hydraulic flow to the auger drive motor and/or wetting pump. The auger and/or wetting unit will put out maximum material when the blast switch is activated. When released, the switch returns to its **OFF** position and the spreader returns to the previous output setting. This is only intended to be used sparingly when going through intersections, over bridges, or wherever a higher application rate may be needed.

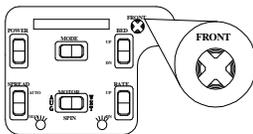
Bed/Plow Controls

Bed Switches



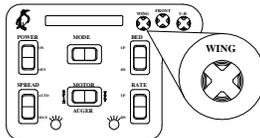
There is a bed rocker switch and a bed down fast button. The rocker switch controls raising the bed and lowering it slowly. To lower the bed at a faster rate depresses the bed down switch and the Down Fast button at the same time.

Front Plow Switch



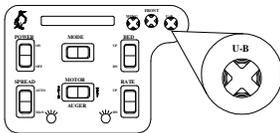
The front plow switch is located in the upper right hand of the control console. The five-position thumb switch controls plow movement up and down as well as the plow angle left and right

Wing Plow Switch (300 series and 100 series with V-plow option)



The wing plow switch is the also a five-position thumb switch easily accessible on the top-right corner of the console. This controls the wing plow up/down and left/right articulation. On V-plow models, this controls the left plow articulation.

Underbody Scraper Plow Switch (300 series and 100 series with V-plow option)



The five-position underbody scraper plow switch is the right most of the three plow switches. Underbody functions of up/down and angle left/right are controlled by this switch. On V-plow models, this controls the right plow articulation.

V-Plow Operation

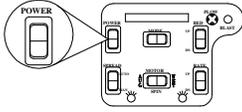
The V-Plow is an option for 100 series manifolds. The V-Plow system uses a 100 series V-Plow manifold and a 300 Series control console. The system uses two single acting spring return cylinders for left/right movement, and one double acting cylinder for up/down. The system's primary function is to create "scoop" and "V" configurations with the front plow, offering more plowing configurations. V-plow is set up from factory but in the case that a control console is swapped, jumper JP102 will need to be shorted. The following chart shows the controls and corresponding plow positions for V-Plow operation.

PLOW POSITION	SWITCH POSITION	PLOW POSITION	SWITCH POSITION	PLOW POSITION	SWITCH POSITION
	WING 		FRONT 		U-B 
					
		PLOW UP 			
		PLOW DOWN 			

User Interface

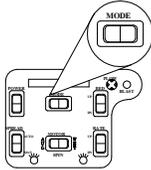
Controls

Main Power Switch



When the power switch is first flipped to the ON position, the panel will light up and the display will come on. The system will initialize and run several communication checks with the Valve Driver board. The display will briefly show the system number and then switch to Miles/Hr readout. If your control console does not complete this sequence, have the system checked by maintenance.

Mode Selection Switch



The Mode selection switch is centered about the control underneath the 16-character display. The switch is a 3 position momentary type that allows the user to “scroll” through from left to right the available display modes. As you scroll through the available modes, the display will briefly read “LCD MODE XX”, whereby “XX” is the corresponding mode number.



LCD MODE 1

Displays the current speed of the truck in miles per hour.



LCD MODE 2

Displays the current spreading rate of the truck in lbs of material per mile.



LCD MODE 3

Displays the day of the week and the time of day.



LCD MODE 4

Displays the calendar information.



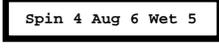
LCD MODE 5

This position differs based on the Spreader setting. In manual, this is TOOL MODE, allowing hydraulic tools to be run off the Pengwyn manifold without nuisance temperature and pressure alarms. This is described in detail below. With the Spreader in Automatic, there is no applicable function. If the spreader is switched off, this mode may be used for distance measuring feature in FEET. Use the blast button to Start/Stop measuring.



LCD MODE 6

This position differs based on the Spreader setting. In manual, this is TOOL MODE, allowing hydraulic tools to be run off the Pengwyn manifold without nuisance temperature and pressure alarms. This is described in detail below. With the Spreader in Automatic, there is no applicable function. If the spreader is switched off, this mode may be used for distance measuring feature in MILES. Use the blast button to Start/Stop measuring.



LCD MODE 7

Displays the current setting for the Spinner, Auger, Wetting motors.

1200/898 PSI

LCD MODE 8

Displays the hydraulic pressure in pounds per square inch (PSI). High-pressure sensor readings are on the left while a differential pressure reading is on the right.

TEMPERATURE 94°F

LCD MODE 9

Displays the hydraulic fluid temperature in degrees Fahrenheit.

Calibrate Mode?

LCD MODE 10

Used for gaining access to the calibration mode. Access by pressing the blast button while the spreader switch is in the off position, enter the 4 digit pass code using the plow switch, then press the blast button again.

Hydraulic Tool Mode

TOOL MODE

In order to run tools off the Pengwyn system, you must connect the **pressure hose** of the tool to the **pressure side of the auger** circuit and the **return hose** of the tool to the **return side of the spinner** circuit. Manual Mode must be enabled and **TOOL MODE** must be displayed. Bring the truck engine speed up to approximately 1000 RPM. The dial labeled auger will allow you to select the gallons per minute needed for the tool. Each setting is equal to the gallons per minute. Therefore, position **1** gives one gallon per minute of flow and so on. Recall that alarms are deactivated in Tool Mode.

Alarms

There are five warning alarms that include:

- Low fluid
- High temperature
- Spreader alert
- Spreader jam
- Internal fault

Low Fluid

This warning indicates that the hydraulic fluid in the reservoir tank is low. The display will flash "**LOW FLUID**" and create an audible beep. Also, all spreader functions will be disabled. The bed and plow functions will remain in operation as long as there is some fluid in the tank. If the fluid level is low the truck should return to the shop for maintenance immediately.

Fluid Hot

This warning indicates that the temperature has exceeded the maximum recommended operating temperature. The control box will produce an audible beep and the display will flash "**FLUID HOT**". The current hydraulic fluid temperature can be displayed by scrolling to **LCD MODE 9** on the main menu. The truck should be returned to the shop for maintenance immediately.

Spreader Alert (auger unload fault)

If there is an audible beep and the control box display flashes "SPREADER ALERT", material load on the auger has reached a preset minimum.

Spreader Alert indicates that there has been a reduction of the load on the hydraulic drive motor. Generally, this is caused when the spreader is running out of material. Other causes include:

- Tunneling/bridging of the material
- A broken mechanical connection between the drive motor and the auger/conveyor
- Blown hose on the auger/conveyor drive motor

Spreader Jam

Spreader Jam will cause an audible beep and the control box display will flash "**SPREADER JAM**". This indicates that no material is being ejected by the spreader system. It may be caused by a material jam at the auger/conveyor or the quick disconnect to the auger/conveyor drive motor may not be connected.

Very Cold Temperature Operation

During extremely cold weather with the spreader off the hydraulic fluid viscosity may become so thick the cylinder functions become very sluggish. To remedy this, two procedures will help.

1. Set the **AUGER** to **0**, the **SPINNER** to **2**, and the **spreader switch** to **AUTO**. This will allow continuous circulation of the pump with the spreader off.
2. If more rapid hydraulic fluid warming is desired, hold the plow switch **UP** for a minute or two; dead heading the plow cylinder and forcing the oil over the plow relief valve. This will warm the oil approximately five to ten degrees per minute.

Spreader Operation

Auger

The auger has 15 settings. If the spreader switch is on **MANUAL** and manual mode is enabled, each numerical position sets the flow to the auger circuit. Position **1** will indicate that one GPM of hydraulic oil is moving to the auger circuit and so on up to 15 GPM at position **15**. Flow to the auger circuit in **MANUAL** is constant and not ground oriented.

If the spreader switch is on **AUTOMATIC** the positions will output preprogrammed values in pounds per mile (lbs/mi). This will be ground oriented, flowing more with higher truck speed. Position **1** will output the amount that is programmed into it, such as 100 lbs of material per mile. Position **2** may be set for 200 lbs of material and so on up to position **15**. The Pengwyn increases/decreases hydraulic flow to the auger so the operator will have an even spread rate throughout the whole speed range of the truck and maintain the output of lbs/mi that the operator has selected. When the truck is stopped, the auger will also stop. Management will determine these constants and maintenance will program them in.

Spinner/*NaClone*[™]

The spinner has 15 settings. If the spreader switch is on **MANUAL** and manual mode is enabled, each numerical position sets the flow to the spinner circuit. Position **1** will indicate that .5 GPM of hydraulic oil is moving to the spinner circuit and so on up to 7.5 GPM at position **15**. The flow rate is always half of the setting number. Flow to the spinner circuit in **MANUAL** is constant and not ground oriented.

In **AUTOMATIC**, spinner settings **2** through **14** operate just as in **MANUAL** mode. The flow is not ground oriented and the spinner will continue to turn even when the truck stops. In position **15** with the spreader switch in **AUTOMATIC**, the spinner is ground oriented and flow is determined by the speed of the truck. When the truck is stopped and the spinner is in position **15** the circuit has a minimum flow of .5 GPM. Position **15** is used for zero velocity *NaClone*[™] operation only. The blast switch does not affect the spinner unless Z-Blast is turned ON. Z-Blast is intended for use with zero-velocity only.

Wetting

Liquid wetting (such as calcium chloride or salt brine) is pumped from an on-board storage tank onto the granular material at the spinner. When operating the spreader in manual, the setting numbers correspond to the amount of hydraulic flow in gallons per minute (GPM) being sent to the wetting system. Position **1** would be .5 GPM and so on up to position **15** which would send the maximum value, 7.5 GPM of flow. This differs from the other two motor circuits, which flow 1-15 GPM.

Gallons per Ton Wetting

The wetting system is based on the percentage of the maximum gallons per ton ratio number programmed into the console. To control the wetting system put the spreader switch in automatic mode, set the auger and spinner as desired and the wetting at the desired 1-10 setting. If the wetting maximum is set to 100 gallons per ton then position **10** equals 100 gallons of wetting solution per ton of salt. Position **1** would be 10 percent of the maximum ratio, or 10 gallons per ton. Position **2** would be 20 gallons per ton, and so on.

Gallons per Mile Wetting

The second wetting feature is a spray bar application that is used in a gallons/mile ratio. To do this put the spreader switch in automatic mode, set auger and spinner to 0 and the wetting as desired. Each of the 1-15 wetting settings can be set between 1 - 100 gallons per mile. If setting **1** is 20 gallons, setting **2** is 40 gallons, etc.

Control Console Calibration

This chapter will explain control console calibrations

Notes

Calibration Mode is used to monitor and change constants vital to the operation of each individual unit. Different models of trucks and spreader combinations will require different values.

Caution: Always exit Calibrate mode before turning the console power switch or the truck key off. Turning the power off before Calibrate mode will cause the loss of some of the newly programmed numbers. Exiting Calibrate mode will save all programmed constants to the Pengwyn memory.

Enter Calibration Mode by pressing the Blast Switch at the prompt (“LCD MODE 10”) and entering the passcode (see page 15 for default passcode). Menus are navigated with the front plow switch. Left/right toggle through the main categories (Adjust Speed, Adjust Auger, etc) while up/down toggle the subcategories of each. Exit Calibrate Mode to save constants into the control console memory.

Calibration Map

The following is a representation of the Calibration Menu of the Pengwyn 485 Series control console. Navigate through the submenus using the controls shown on the following page.

FORMAT:

Calibration Heading	
CALIBRATION VALUE	

FRONT  PRESS FRONT FLOW SWITCH LEFT OR RIGHT TO SCROLL CALIBRATION HEADINGS

FRONT  PRESS FRONT FLOW SWITCH DOWN TO SCROLL AVAILABLE CALIBRATION VALUES

BED  PRESS BED UP/DN SWITCH TO ADJUST VALUES

BED DOWN FAST  HOLD DOWN FAST AND BED TO CHANGE VALUES AT A FASTER RATE

Adjust Speed	Adjust Auger	Adjust Wetting	Adjust Clock
CAL MPH: XXX	CAL AUGER: XXX	WETTING MAX: XX	SET HOURS: XXXXX
SPEEDOMETER: XXX	AUGER JAM: XXXX	PUMP SLIP: X	SET MIN: XX:XX
PULSE/1 MI: XXXX	AUGER MIN: X	GPT CONST: XXX	SET AM/PM: XX
	AUGER DRAG: XX	GAL/MI CONST: X.X	SET DAY: XXX
	BLAST HOLD: XX	G/MI RATE: X.XX	SET DATE: XXX XX
	BLAST TIMEOUT: XX		SET MONTH: XXX XX
	SPREADER ALERT VALUES		SET YEAR: XXXX

Adjust Spinner	Adjust Misc.	Adjust Bed/Plow	Reset Constants?	Blast To Exit	Maintenance Mode
SPINNER_ON: XXX	UNIT: XXXXXX	FLOW CYL: XXXXXX			BLAST TO ENTER
Z-BLAST: XXX	LOW TEMP = XX F	BED CYL: XXXXXX			
NACLONE MIN: X	HIGH TEMP = XXX F	SCRAP PERIOD: XX			
CAL SPIN: XX.X	ALARM TEMP = XXX F	SCRAP PULSE: XX			
	BEEP OPTION: XXXX	FLOW CB PULSE: XX			
	MANUAL MODE: XXX	FLOW INVERT?: XX			
	SET PASS #: XXXX				

Calibration Settings

Adjust Speed

Speed Constant

The speed constant must be correct in order to achieve maximum effectiveness of the Pengwyn system. The control console must read the same speed as the truck speedometer. To ensure the operation is correct:

1. Jack rear axle of truck up and block the front wheels.

OR

Be prepared to drive the truck.

2. Refer to the Calibration Map at the beginning of this chapter and locate **CAL MPH** under the **Adjust Speed** heading.
4. Operate the truck at a constant speed (30 MPH or more).
5. Compare truck speedometer to speed shown on control console display.
6. Use **Bed Up/Down switch** to synchronize control console to truck speedometer.
7. Scroll to **PULSE/.1MI** under the **Adjust Speed** Menu.
8. Record the pulse count shown for your records.
9. Exit Calibrate Mode to save values.

Speedometer Type

The type of speedometer is selected in the calibration procedure. The two choices include SINE which is for all manual transmissions and SQR for trucks with an Allison World Transmission. To select the appropriate setting:

1. Refer to the Calibration Map at the beginning of this chapter and locate **SPEEDOMETER** under the **Adjust Speed** heading.
2. Use the **BED** switch to toggle between the two settings.
3. Exit Calibrate Mode to save values.

Distance Measuring Constant (using a surveyed mile)

To set the distance measuring constant using a surveyed mile:

1. Enter **RUN** mode with the spreader **OFF**.
2. Toggle the Display Mode Switch until you see "**START XX FT**". This is mode 5.
3. Drive the truck toward the starting point of the measured mile.
4. Press the **blast switch** when at the starting point. The display will instantaneously show "**RUN XX FT**" and then will begin increasing as the truck continues toward the mile marker.
5. Bring the truck to a stop at the end of the measured distance and press the **blast switch** when the end of the measured mile is reached. The display will now show "**STOP XX FT**". **XX** will be the feet the console counted over the measured distance.
 6. Record the number shown for your records (this number will be needed for a later calculation).

Calculation for Setting the Distance Measured Constant

Use this formula to determine the new pulse constant to be programmed into the Control console.

This calculation can be used for any measured distance over 400 ft.

$$\frac{\text{Measured Distance (from control box) X (Pulses from Control Box)}}{\text{Actual Distance Traveled (ft)}}$$

Once the MPH calibration is completed for a truck the pulse constant will always remain the same for the life of that truck.

Pulse Constant

If the pulse constant is known, it may be programmed into the console. To program a known pulse constant:

1. Refer to the Calibration Map at the beginning of this chapter and locate **PULSES/.1MI XXXX** under the **Adjust Speed** heading. The display will read "**PULSES/.1MI XXXX**". The **XXXX** indicates some number that could be anything from 0 to 5000. If the correct pulse count is known, this number can be directly inserted without having to drive the truck. If the correct pulse is not known record the pulse for the calculation that must be computed, otherwise:
 2. Use the **Bed Switch** to change this value. If a large number change must be made, pressing and holding the **DOWN FAST** button while simultaneously pressing the bed switch **UP** or **DN SLOW** will change the displayed number in increments of 100. When the correct number is achieved, the speedometer setting is complete.
 3. Exit Calibrate Mode to save the settings.

Adjust Auger

Finding the Spreader Constant

To find the spreader constant, material must be in the bed of the truck and the spreader system must be attached and operating.

To set up to find the spreader constant:

1. Weigh an empty bucket capable of holding 30 to 90 lbs of your granular deicing material.
2. Position bucket under output of the auger/conveyor to catch the material.
3. Ensure that material is distributed evenly over entire spreader box or conveyor belt.

With a V-box hopper, the gate opening must be adjusted to the position in which the truck will be operated. If the gate opening is changed, the

new constant number must be found or the spreader system will no longer be accurate.

To find the spreader constant:

4. Ensure Manual Mode is enabled (Section 2-3 of this manual).
5. In **RUN** Mode, start the engine and bring the engine speed to 1500 RPM. Warm the hydraulic fluid to operating temperature (80°F).
6. Turn **Spreader Switch** to OFF.
7. Set the Spinner to 0.
8. Set the Auger to 1.
You will need a stop watch to time the procedure.
9. Push the **Spreader Switch** to MANUAL and start timing.
10. Allow the system to run for 1 minute.
11. Turn the spreader switch OFF.
12. Weigh the bucket of material.
13. Empty the bucket of material.
14. Repeat steps 4-12 with the Auger switch in position 2.
15. Subtract value measured at Auger 1 from Auger 2.
16. Record this number for your records.
The resulting number is the spreader constant. You may want to run through this procedure twice, in order to double check the values.

Setting the Spreader Constant (Auger)

To insert the auger constant into the control console:

1. Refer to the Calibration Map at the beginning of this chapter and locate **Cal Auger XX** under the **Adjust Auger** heading.
2. Push the **Bed Switch** to the **UP** position to increase the setting or switch to the **DN** position to decrease the setting (using the **down fast** button in addition to the direction will change the number in increments of 10).
3. Record the auger constant number for your records.
4. Exit Calibrate to save constants.

Spreader Alert Calibration

Unless loading previous constants from a laptop, this procedure must be done if a control box is changed. The procedure should be repeated occasionally as a standard maintenance check to adjust for auger/conveyor or motor wear. The procedure should also be done any time the auger/conveyor motor is changed or the design of the spreader is changed. This is to prevent nuisance spreader alert alarms. To set the spreader alarm:

1. Have the engine running.
2. Have the spreader box or conveyor belt empty.
3. Toggle the Display Mode Switch to Temperature Mode.
4. If temperature is below 80° then warm up the hydraulic oil to at least 80°.

To warm up the hydraulic oil:

1. **Bring truck engine speed to 1500 rpm.**

2. Run and hold the plow in any direction until the oil is above 80°.

Once the proper temperature is achieved continue to set the spreader alarm:

5. Release the **Plow Switch**.
6. Maintain 1500 rpm engine speed.
8. Refer to the Calibration Map at the beginning of this chapter and locate **Maintenance Mode**.
9. Press **Blast** to enter Maintenance Mode.
8. Set both the Auger and Spinner to 0.
9. Push the spreader switch to AUTO.
As the automatic spreader alert settings advance.
10. Write down the settings so they can be checked in the next programming step.

The display will read "SPREADER CALIBRATE" and "PRESSURE CALIBRATE", as it tests the pump pressure. The display then will read "START UNLOAD CAL" and then "SETTING 1 = XXX", "SETTING 2 = XXX" and so on. The displayed pressure readings should slightly increase for each progressive setting. This will continue automatically up to **SETTING 15 = XXX**. The display will then read "FINISHED" and then "TURN SPREAD OFF".

If any pressure errors are encountered, the system will not run the test. These errors include:

- ZERO PRES. ERROR** - Check pump coil operation.
- HIGH PRES. ERROR** - Check hydraulic connections for blockage.
- LOW PRES. ERROR** - Check hydraulic circuit for open connection.

11. Turn the spreader **OFF**.
12. Lower the engine speed.
13. Exit Maintenance mode to save constants.

The spreader alert is now set.

Auger Jam

Auger jam is the pressure setting at which the control box will alert the operator that the auger/conveyor has jammed or locked up. Spreader jam is factory set at 2500 psi. It should be set at 200 psi below the main relief valve setting. To set this number:

1. Refer to the Calibration Map at the beginning of this chapter and locate **AUGER JAM XXX** under the **Adjust Auger** heading.
2. Push the **Bed Switch** to the UP position to increase the setting or switch to the DN position to decrease the setting (using the down fast button in addition to the direction will change the number in increments of 10).
3. Record the spreader jam number for your records.
4. Exit Calibrate to save constants.

Auger Minimum Value

When operating in the automatic mode, the PENGWYN system is setup to send a minimum flow rate to the auger/conveyor drive motor, regardless of the amount of material output requested. This is to compensate for the hydraulic motors inefficiency which would otherwise result in low material output when starting the truck from a dead stop. To set the minimum number:

1. Refer to the Calibration Map at the beginning of this chapter and locate **Auger Min X** under the **Adjust Auger** heading.

The minimum value number is adjustable from 0 to 5 in 1 gallon increments. A setting of one is recommended for single axle trucks and a setting of two for tandem axle trucks.

2. Push the **Bed Switch** to the UP position to increase this number or DN to decrease.
3. Exit Calibrate Mode to save constants.

Auger Drag

The auger drag setting determines the amount of material remaining on the auger or conveyor when the spreader alert alarm goes off. The number shown is the pressure above the empty auger fault where the Pengwyn sounds the alarm. To set the spreader drag:

1. Refer to the Calibration Map at the beginning of this chapter and locate **AUGER DRAG XXX** under the **Adjust Auger** heading.
2. The display will read "AUGER DRAG XXX". This number will usually be set between 50 and 120. This number varies with the type and make of the spreader used on the truck.
4. Push the **Bed Switch** to the UP position to increase the setting or switch to the DN position to decrease the setting (using the down fast button in addition to the direction will change the number in increments of 10).
5. Record the spreader drag number for your records.
6. Exit Calibrate to save constants.

Blast Hold Adjustment

When the BLAST switch is engaged, it can be released and the PENGWYN will hold the Blast function for a predetermined amount of time (between 1-30 seconds).

1. Refer to the Calibration Map at the beginning of this chapter and locate **BLAST HOLD XX** under the **Adjust Auger** heading.
2. Push the **Bed Switch** to the UP position to increase this number or DN to decrease.
3. Exit Calibrate Mode to save constants.

Blast Timeout

The Blast Timeout is the number of seconds that an operator may hold down the blast button before it will timeout and de-energize the blast circuit. The default value is 5 seconds. To change this value:

1. Refer to the Calibration Map at the beginning of this chapter and locate **BLAST TIMEOUT XX** under the **Adjust Auger** heading.
2. Press the **Bed Switch** UP to increase the number or DN to decrease the number.
3. Exit Calibrate Mode to save constants.

Checking the Spreader Alerts

1. Refer to the Calibration Map at the beginning of this chapter and locate **LO TEMP: XX** under the **Adjust Auger** heading.

The display will show low and high temperatures, alarm settings and then all the spreader alert programming numbers will flash across the display.

Adjust Wetting

Wetting Maximum

The wetting maximum is set to a number between 1 and 200 gallons per ton. This number will determine the maximum output for the wetting system. Example: if setting 10 (maximum) is equal to 100 gallons, setting 1 is 10 gallon per ton, setting 5 is 50 gallons per ton. Determine the maximum desired gallons per ton and program the number into the control console. To program the number:

1. Refer to the Calibration Map at the beginning of this chapter and locate **Wetting MAX** under the **Adjust Wetting** heading.
2. Push the **Bed Switch** UP to increase the number or DN to decrease the number. Holding **DNFST** along with these will change the number at a faster rate.
3. Exit Calibrate Mode to save constants.

Wetting Pump Slip

The pump slip constant ensures that hydraulic flow is always sent to the wetting pump. This number can be increased to compensate for any wear on the pump. The constant is adjustable from 0 to 3 GPM of hydraulic fluid. The factory default is 1. To set this value:

1. Refer to the Calibration Map at the beginning of this chapter and locate **Pump Slip X** under the **Adjust Wetting** heading.
2. Press the **Bed Switch** UP to increase the number or DOWN to decrease the number.
3. Exit Calibrate Mode to save constants.

Gallons/Ton Constant

This value indicates the gallons of wetting solution pumped for each gallon of hydraulic fluid by accounting for slippage of the wetting pump. The factory default constant of the Oberdorfer 3000 is 0.32 and the Oberdorfer 7000 is 0.88. The number can range from 0.02 to 2.40 in .02 increments. To set the wetting constant:

1. Refer to the Calibration Map at the beginning of this chapter and locate **GPT Constant** under the **Adjust Wetting** heading.
2. Push the **Bed Switch** UP to increase the number or DN to decrease the number. Holding **DNFST** along with these will change the number at a faster rate.
3. Exit Calibrate Mode to save constants.

Gallons/Mile Constant This function allows for 1 to 100 gallons of wetting solution pumped for each mile traveled. This constant is used when the PENGWYN control box is controlling a wetting spray bar only (no granular material being spread). This is a constant value and is the ratio of the hydraulic motor displacement to the liquid pump displacement and it ranges from 0.02 to 5.00 in .02 increments. When operating in this mode, the auger and spinner should be set to "0".
Oberdorfer 3000 - 0.32 Oberdorfer 7000 - 0.88.

1. Refer to the Calibration Map at the beginning of this chapter and locate **GPM Constant** under the **Adjust Wetting** heading.
2. Push the **Bed Switch UP** to increase the number or DN to decrease the number.
3. Exit Calibrate Mode to save constants.

Adjust Clock

Setting the Day and Time (and other clock settings)

1. Refer to the Calibration Map at the beginning of this chapter and locate **Set Hours** under the **Adjust Clock**. The time will be displayed.
2. Push the **Bed Switch** to the UP or DN position until the correct hour is shown.
3. Follow this procedure to set the minutes, AM/PM, day of the week, date, month and year. All are under the **Adjust Clock Menu**.
4. Exit Calibrate Mode to save settings.

Adjust Spinner

Zero Velocity Blast This is used only with zero-velocity. The spinner and auger both receive maximum hydraulic flow when the blast switch is activated. The factory default is OFF.

1. Refer to the Calibration Map at the beginning of this chapter and locate **Z-BLAST** under the **Adjust Spinner** heading.
2. Use the **Bed Switch** to toggle ON/OFF.
3. Exit Calibrate Mode to save constants.

Spinner Minimum Value This determines the minimum hydraulic flow to the spinner in automatic. It should be set at 3 for zero velocity or at 0 for a conventional spreader. To change the setting:

1. Refer to the Calibration Map at the beginning of this chapter and locate **NaClone Min** under the **Adjust Spinner** heading.
2. Press the **Bed Switch UP** to increase the number or DOWN to decrease the number.
3. Exit Calibrate Mode to save constants.

NaClone™ Zero-Velocity Spinner Constant

This is an option that may not be used on all trucks. If your truck uses a conventional broadcast type spinner, ignore this programming procedure.

The **CAL SPIN** setting is the truck speed at which the zero-velocity ejector achieves maximum hydraulic flow when the spinner setting is at 15. This speed must be programmed into the console. To check for the correct setting the first time the truck is programmed:

1. Decide what the desired maximum spreading speed will be.
2. Refer to the Calibration Map at the beginning of this chapter and locate **CAL SPIN** under the **Adjust Spinner** heading.
3. Press the **Bed Switch UP** to increase the number or DN to decrease the number.
4. Exit Calibrate Mode to save constants.
5. Do a trial run to see if maximum effectiveness is achieved.
6. Record the number for your records.

Adjust Misc.

Low Temperature This is factory set at 60° and should not be changed unless necessary. To change setting:

1. Refer to the Calibration Map at the beginning of this chapter and locate **LOW TEMP** under the **Adjust Misc.** heading.
2. Push the **Bed Switch UP** to increase the number or DN to decrease the number.
3. Exit Calibrate Mode to save constants.

High Temperature This is factory set at 120° and should not be changed unless necessary. To change setting:

1. Refer to the Calibration Map at the beginning of this chapter and locate **HIGH TEMP** under the **Adjust Misc.** heading.
2. Push the **Bed Switch UP** to increase the number or DN to decrease the number.
3. Exit Calibrate Mode to save constants.

Alarm Temperature This is factory set at 160° and should not be changed unless necessary. To change setting:

1. Refer to the Calibration Map at the beginning of this chapter and locate **ALARM TEMP** under the **Adjust Misc.** heading.
2. Push the **Bed Switch UP** to increase the number or DN to decrease the number.
3. Exit Calibrate Mode to save constants.

Beep Option It is possible to specify how the alarm system should go off. If **ONCE** is selected then the alarm beeps the first time the alarm message is shown, but not again. If **CONT** is selected the alarm sounds every time the alarm flashes on the screen. **OFF** disables the beeper completely, but the alarm message will flash on the screen.

To set Beeper option:

1. Refer to the Calibration Map at the beginning of this chapter and locate **BEEP** under the **Adjust Misc.** heading.
2. Use **Bed Switch** to toggle between the options.
3. Exit Calibrate Mode to save the settings.

Manual Mode Manual operation mode is enabled through Calibrate Mode. To change this setting:

1. Refer to the Calibration Map at the beginning of this chapter and locate **Manual Mode** under the **Adjust Misc.** heading.
2. Use **Bed Switch** to toggle between the options.
3. Exit Calibrate Mode to save the settings.

Passcode A passcode is required to enter Calibration mode. The default passcode is "4321". Follow the steps below to

change the passcode to enter calibrate mode:

1. Refer to the Calibration Map at the beginning of this chapter and locate **SET PASS XXXX** under the **Adjust Misc.** heading.
2. Push the **Bed Switch** to the UP position to increase the setting, and the DN position to decrease the setting. When pushing the **Bed Down Fast** button along with the **Bed Switch** the numbers will change in increments of 100.
3. Exit Calibrate Mode to save constants.

Record the passcode for your records. If your passcode is lost, Contact Pengwyn Technical Support.

Adjust Bed/Plow

Cylinder Selection for Plow and Bed In this setting specify whether the plow, bed, or both are single/double acting. To change the setting:

1. Refer to the Calibration Map at the beginning of this chapter and locate **Plow CYL; or Bed CYL** under the **Adjust Bed/Plow** heading.
- Enter Calibrate Mode.
2. Use **Bed Switch** to toggle between Single/Double. *Process is the same for both Plow and Bed adjustment.*
 3. Exit Calibrate Mode to save the settings.

Scraper Period (300 Series only) This is the amount of seconds between scraper recharges and can be set between 0 and 90 with a default of 15.

With the value set at 0 the system will not recharge the scraper plow.

If no scraper plow is used on the truck, be sure the value is set at 0.

To change the setting:

1. Refer to the Calibration Map at the beginning of this chapter and locate **Scraper Period** under the **Adjust Spinner** heading.
2. Press the **Bed Switch** UP to increase the number or DOWN to decrease the number.
3. Exit Calibrate Mode to save constants.

SET TO ZERO IF THERE IS NO UNDERBODY SCRAPER AVAILABLE ON TRUCK.

Scraper Pulse (300 Series only) This can be set from 0 to 4 seconds with a default of 1 second. This will determine the length of time the scraper down

function is refreshed. To change this value:

1. Refer to the Calibration Map at the beginning of this chapter and locate **Scraper Pulse** under the **Adjust Spinner** heading.
2. Press the BED switch UP to increase the number or DOWN to decrease the number.
3. Exit Calibrate Mode to save constants.

SET TO ZERO IF THERE IS NO UNDERBODY SCRAPER ON TRUCK.

Plow CB Pulse The Plow CB Pulse determines the amount of time in seconds the Counter Balance circuit will operate after the plow down is activated. The CB relief valve in the manifold will limit the plow lift force. Default value is '0'. To change this value:

1. Refer to the Calibration Map at the beginning of this chapter and locate **PLOW CB PULSE XX** under the **Adjust Bed/Plow** heading.
2. Press the **Bed Switch** UP to increase the number or DN to decrease the number.
3. Exit Calibrate Mode to save constants.

Plow Invert It is possible to invert the front, scraper, and wing plow vertical controls. Default value is 'NO'. To change this value:

1. Refer to the Calibration Map at the beginning of this chapter and locate **PLOW INVERT?: XX** under the **Adjust Bed/Plow** heading.
2. Press the **Bed Switch** UP to alternate the setting.
3. Exit Calibrate Mode to save constants.

Resetting Factory Constants In the rare event that the constants that are saved in the memory of the control box become scrambled, it is recommended that you:

1. Enter Calibrate Mode
2. Backup any constants necessary.
3. Scroll to **RESET CONSTANTS?**
4. Press and hold the **Blast Switch**.
5. Press **Bed Switch** UP.
3. Exit Calibrate Mode to save constant.

Programming Constants Table

SETTING	DEFAULT VALUE	CALIBRATED VALUE
CAL AUGER	61	_____
AUGER MIN	1	_____
CAL DRAG	50	_____
CAL JAM	2500	_____
BLAST TIMEOUT	5	_____
BLAST HOLD	0	_____
CYLINDER PLOW/BED	DBL/DBL	_____
PLOW INVERT	NO	_____
SCRAP PERIOD	15	_____
SCRAP PULSE	1	_____
PLOW CB PULSE	0	_____
PASSCODE	4321	_____
BEEP OPTION	ONCE	_____
SPEEDOMETER	SQR	_____
NACLONE MIN	5	_____
Z-BLAST	OFF	_____

CAL SPIN	45	_____
HIGH TEMP	120	_____
LOW TEMP	60	_____
ALARM	160	_____
PULSES/.1MI	3000	_____
MANUAL MODE	YES	_____

SETTING	DEFAULT VALUE	CALIBRATED VALUE
AUGER SETTINGS		
1	50	_____
2	100	_____
3	150	_____
4	200	_____
5	250	_____
6	300	_____
7	350	_____
8	400	_____
9	450	_____
10	500	_____
11	550	_____
12	600	_____
13	650	_____
14	700	_____
15	750	_____
GAL./MILE CONSTANT	2.00	_____
WETTING MAX	5	_____
GAL/TON CONSTANT	0.32	_____
PUMP SLIP	1	_____
GAL./MILE SETTINGS		
1	10	_____
2	20	_____
3	30	_____
4	40	_____
5	50	_____
6	60	_____
7	70	_____
8	80	_____
9	90	_____
10	100	_____
11	100	_____
12	100	_____
13	100	_____
14	100	_____
15	100	_____

PENGWYN CENTRAL HYDRAULIC SYSTEMS

SERIES 485 CONTROL CONSOLES

Pengwyn
2550 West Fifth Ave.
Columbus, OH 43204
Phone 800.233.7568 • Fax 614.488.0019