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Section #6 computer

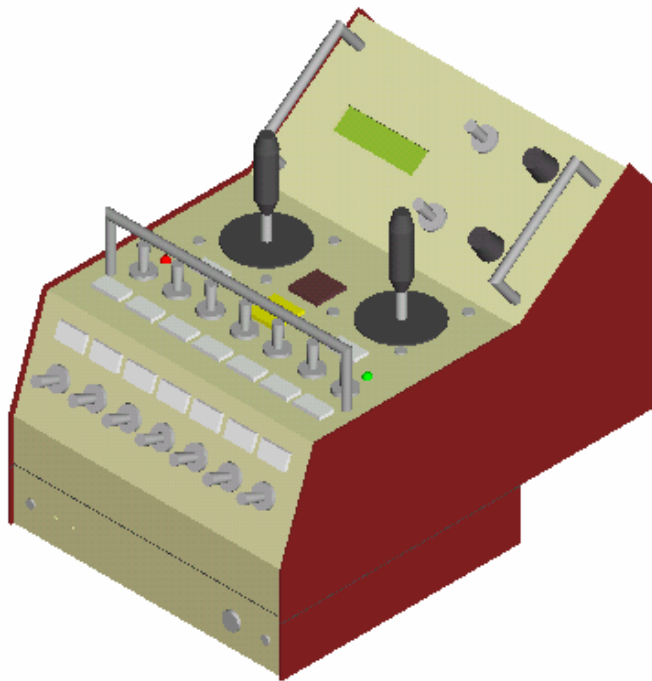


2000V Operation Manual

How It Works

The **ACCU-CAST** 2000V Sanding control unit consists of:

- A display board - with a two line by 16-character liquid crystal display, two 10 position rotary switches, a 3 position momentary toggle switch to increase and decrease values in the programming mode and a three-position maintain toggle switch to select between off – on – and program mode.
- A control unit - which monitors the vehicle speed, and the conveyor speed, and controls the spinner speed, and the conveyor speed.



The **ACCU-CAST** 2000 can be run in three modes

- **Computer** - The operator selects a material and a desired application rate. The computer then monitors the vehicle speed, and runs the conveyor at the speed needed to achieve the desired application rate. **Calibration of the ACCU-CAST 2000 is necessary before the computer can accurately control the application rate.**
- **Ground Speed Sense** - The operator selects a relative rate of application. The computer increases or decreases the conveyor speed to maintain this rate relative to the speed of the truck. The maximum vehicle sanding speed and the conveyor maximum and minimum must be set before this can work properly.

- **Manual** - The operator selects a conveyor speed. The conveyor runs at this speed.

The four control switches on the front panel and key switch on the drawer of the **ACCU-CAST** 2000V are used as follows:

- **^** - This toggle position is used to increase values when in the programming modes.
- **v** - This toggle position is used to decrease values in the programming mode.
- **CONVEYOR** - This 10 position rotary switch is used to select the material application rate when running, or to select various functions when in the programming mode. When running, full anti clockwise rotation will result in no material or 0 application rate. Turning the knob clockwise will increase material application.
- **SPINNER** - This 10 position rotary switch is used to select the spinner rate when running, or to select various functions when in the programming mode. When running, full anti clockwise rotation (position 0) will result in no spinner rotation. Turning the knob clockwise will increase the spinner rate.
- **DOWNLOAD** - Moving the toggle switch to the DOWNLOAD position will suspend material application and spinner motion when running, and enters the "Download" mode. "System Suspend" will be displayed.
- **RUN** - Moving the toggle switch from the DOWNLOAD position to the RUN position initiates material application as selected by the programming mode and the Spinner and Conveyor switch positions. The operation mode will be displayed.
- **PGM** - Moving the toggle switch to the PGM position while powering the unit up and then releasing it to the RUN position when Route Setup is displayed, enters the "operator programming mode." This mode permits selection of operator parameters.
- **Key Switch** - With the key in place, and the key switch rotated one quarter turn clockwise while powering the unit up you will enter the Calibration Programming mode. This mode permits detailed calibration. After programming, turning the key back one quarter turn and switching the unit off and back on again exits the programming mode.

To calibrate the temperature, you must slide out the computer tray in order to have access to the temp. adjustment pot (THIS IS THE ONLY ADJUSTABLE POT ON THE COMPUTER BOARD) Power up the unit and adjust the pot (ccw to increase) until the display reads the proper temperature. (you need to know the actual temperature and give the unit sufficient time to normalize).

Calibration Values

With power, speedometer, conveyor sensor, temperature sensor, conveyor valve, and spinner valve connected to the **PHE** 2000V proceed with the calibration as follows.

- In all cases you must start with the unit powered off
- Rotate the CONVEYOR and SPINNER knobs to the 0, or fully anti clockwise positions
- Insert the program key into the program switch and rotate it clockwise to the program position and then power the unit on.....
- Leaving the CONVEYOR knob at the fully anti clockwise (0) position, rotate the SPINNER knob to the following positions. The CONVEYOR knob position is indicated at the upper left of the display, the SPINNER at the upper right. Use the ^ and v switch to increase or decrease the values as required.

Set System Parameters; (Program key on) Power unit up

Conveyor switch - 0 Clock setup

Spinner switch	- 0	Minutes
	- 1	Hours
	- 2	Day of Week
	- 3	Date of Month
	- 4	Month
	- 5	Year

Conveyor switch - 1 Sand setup

Spinner switch	- 0	Enter calibration number for sand (see Hydraulic parameters conveyor switch –8)
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- 1..9 Enter application rates 1..9

- Conveyor switch - 2 Salt setup**
- Spinner switch - 0 Enter calibration number for salt
(see Hydraulic parameters conveyor switch –8)
- 1..9 Enter application rates 1..9

- Conveyor switch - 3 Material 1 setup**
- Spinner switch - 0 Enter calibration number for material 1
(see Hydraulic parameters conveyor switch –8)
- 1..9 Enter application rates 1..9

- Conveyor switch - 4 Material 2 setup**
- Spinner switch - 0 Enter calibration number for material 2
(see Hydraulic parameters conveyor switch –8)
- 1..9 Enter application rates 1..9

- Conveyor switch - 5 Minimum sanding speed**
Enter the minimum truck speed at which you want the conveyor to run. The conveyor will stop and start at this speed, i.e. 3 kph.

- Conveyor switch - 6 Blast rate as a percentage of full conveyor speed**
Enter the percentage of full conveyor speed you wish to use for blast.

- Conveyor switch - 7 Spinner auto off selection (yes / no)**
Choose Yes and the spinner will stop when the truck stops, choose No and the spinner will continue to run when the truck stops.

- Conveyor switch - 8 Operation mode (Manual / Ground speed / Computer)**
Manual mode or ground speed mode may be selected should the conveyor signal or speedometer signal be faulty.

Conveyor switch - 9 **Save system parameters** (press blast to save)
All above parameters will be saved.

NOTE: NONE OF THE ABOVE VALUES WILL BE SAVED UNLESS THE ABOVE STEP IS PERFORMED

Set Truck Parameters; (program key on + U/D switch Down) Power unit up, hold U/D switch down until proper Mode is indicated on display

Conveyor switch - 0 **Valve PWM frequency** (120 for VOAC valve)

Conveyor switch - 1 **Maximum gate opening** (8" for Viking LW box)
6" for Viking HW box.

Conveyor switch - 2 **Maximum ground speed reference** (normally 80)
This will be the speed at which the conveyor max's out in manual mode.

Conveyor switch - 3 **Save truck parameters** (press blast to save)

Conveyor switch - 4 **Calibrate speedometer;** (program key on + U/D
switch Down) Power unit up, hold U/D switch down until
proper Mode is indicated on display

Set pause switch to off, Power unit off, be sure
program key is on, hold U/D switch down, power unit on, hold U/D
switch until display indicates mode.

Press blast switch to enter speed setup mode, Drive
truck at exactly 50 KPH then switch to pause mode to calibrate, unit
will automatically save and exit.

Conveyor switch - 5..9 **Not used**

Set Hydraulic PWM Parameters; (Program switch on + U/D switch Up) Power
unit on, hold U/D switch up until proper mode is indicated on
display

Conveyor switch - 0 **Set Conveyor** (auto calibrate)

Bring engine speed to 1500 RPM.(on some trucks you can set the cruise control). Press Blast. Display will read “maximum”. Conveyor will go to full speed and the computer will begin to slowly decrease PWM output until conveyor speed causes the pulses to begin to decrease. Be patient, the numbers may not appear to be doing anything for a few minutes, but eventually it will lock on. This is conveyor maximum and the computer will mark it. The display will change to “minimum” and the speed will continue to decrease at a little faster pace until minimum pulses are reached at which time the computer will mark it as minimum and calibration is complete. This whole procedure is automatic and may take some time (Five or 6 minutes is common). Power off when complete.

Conveyor switch - 1 **Unused**

Conveyor switch - 2 **Set spinner Minimum; (Program switch on + U/D switch Up) Power unit on, hold U/D switch up until proper mode is indicated on display**

Use increase decrease toggle to adjust. (On versions 2.11 and older you must depress the blast switch in order to run the spinner and see the results of your adjustments).

Conveyor switch - 3 **Set spinner Maximum**
Use increase decrease toggle to adjust. To see the results of your adjustments press blast. The spinner will not run unless blast is pressed, but the PWM signal is being adjusted with the toggle.

Conveyor switch - 4 **Set conveyor Minimum**
Use increase decrease toggle to fine tune conveyor min. if required.

Conveyor switch - 5 **Set conveyor Maximum**
Use increase decrease toggle to fine tune conveyor max. if required.

Conveyor switch - 6 **Save Hydraulic parameters (Press Blast to Save)**

Conveyor switch - 7 **Not Used**

Conveyor switch - 8 **Dump 20,000 Pulses; (Program switch on + U/D switch Up) Power unit on, hold U/D switch up until proper mode is indicated on display (Press blast to start)**

This is your material calibration, for accuracy it should be done for each type of material that you expect to use. Load the hopper with an adequate amount of the material that you wish to calibrate for. Weigh the truck and return to the pile. Be sure to set the gate to 50% open or 4" on the Viking U-Body, then when you hit the blast button the conveyor will begin to run at full speed and the computer will count 20,000 pulses and stop the conveyor at that point. Now weigh the truck again, the difference between the weight before and after this procedure is the material moved by the conveyor for 20,000 pulses and becomes your calibration ratio number. Enter this number into the appropriate material setup beginning on page 4. Repeat this procedure for each of the materials. Turn off when complete. Note: it is not necessary to save but you must write down these numbers so that they can be entered in the appropriate material setup section.

Conveyor switch - 9 **Truck Number: Use the increase / decrease toggle to enter a unique 4 digit fleet number to identify this unit when downloading information to a central memory bank. Press Blast after number is set to save information.**

Operator Setup; No program key, Must be in computer mode, hold off/run/program switch in program while unit is powered up, continue to hold switch until mode is displayed

Conveyor switch -0 **Material to be used on current route**
Select from salt, sand, material 1 or material2



- | | | |
|------------------------|-----------|--|
| Conveyor switch | -1 | Gate opening
Select in 1 inch increments from 1 to maximum |
| Conveyor switch | -2 | Route number
Select route number with up/dn. Switch |
| Conveyor switch | -3 | Driver number
Select driver number with up/dn. Switch |
| Conveyor switch | -4 | Press blast to save route information |

Unload Feature:

Start with system powered off, pause switch in pause position, hold down blast switch while powering system on, continue to hold blast switch, turn pause off, once conveyor starts then release blast.

TROUBLESHOOTING AND ADJUSTMENT

Typical spinner problems are:

- Too slow
- Too fast
- Poor speed range control

Good spinner control depends on reasonably accurate setting of the spinner minimum and maximum calibration values. The PHE 2000V takes the minimum and maximum settings and divides the range into 10 equal increments. If the minimum and/or maximum setting is too high or too low the spinner will have only a few useful speed settings. In the spinner calibration mode set the minimum so that the spinner is just turning. The maximum is harder to do, as it is difficult to determine when the spinner speed has topped out, sometimes listening to it rather than watching it will give you a better idea. Verify this point by decreasing the maximum until the spinner noticeably decreases in speed, or is at a maximum desirable speed. The maximum may have to be adjusted several times to achieve the optimal setting.

The **ACCU-CAST** 2000V will always try to provide accurate spinner control, however deterioration of the hydraulic system from wear or contamination may make this difficult or impossible. Indications of hydraulic problems are:

- Pulsing in the spinner
- Maximum speed of the spinner not being as fast as it should be
- A narrow range between calibration minimum and maximum settings (10% or less)

On many occasions a worn or improperly sized motor has been mistaken for a calibration problem. The best way to diagnose this is to put a flow meter into the spinner circuit and observe the flows at different settings. If the flows ramp up and down consistently between 0 and about 6 GPM the system is doing its job and the problem is most likely in the motor.

Conveyor Control

Typical conveyor problems are:

- Increased frequency of “overspeed” messages
- “No pulse” message
- Decreased or no material output

Successful “computer” mode operation depends upon accurate calibration and correct setting of operator values. The *ACCU-CAST* 2000V uses the material calibration value to calculate the rate at which granular material is ejected from the gate to achieve the desired application rate for the vehicle speed. Granular application in “computer” mode is “closed loop”. The *ACCU-CAST* 2000V monitors the truck speed, conveyor speed and the gate opening (as set and recorded by the operator). It then adjusts the conveyor speed to achieve the selected application rate. The conveyor maximum and minimum settings are important to the computer so that it can do the best possible job of applying material accurately. These maximum and minimum settings are sensed automatically by the computer during calibration and saved at the end of the sequence. The above calibration sequence will take about 6 minutes.

- An actual gate opening that is not the same as the operator programmed gate opening will result in inaccurate material application.
- An incorrect conveyor maximum pulse count will cause error messages to be displayed. (Normal wear in the system may require occasional re-calibration to maintain accuracy).

Increased frequency of “OVERSPEED” messages

- Check the calibration number, it may have been improperly set
- Re calibrate the conveyor to compensate for system wear
- Check the gate opening as set in the operator parameters
- Check what application rate is being used (the system may not be capable of the desired rate at the speed the truck is being driven)

“No Pulse” Message

The *ACCU-CAST* 2000V thinks that the conveyor should be running but there is no signal to confirm that it is running. The computer will increase flow to the conveyor in an attempt to make it start, if this is not successful after 30 seconds the computer will revert to manual operation. The display will indicate manual operation and the positions of the spinner and conveyor switches. Each time the system is powered down and back up again the *ACCU-CAST* 2000V will attempt to start in “computer” mode and in the absence of a conveyor signal will revert to **“manual”** after 30 seconds.

- Put the computer into conveyor calibration mode. The conveyor should run at full speed and the display should indicate the maximum number of pulses.
- If the conveyor is running at full speed and the max. pulses are displayed let the calibration process continue, this may be all that is required.
- If the conveyor is turning at full speed but there is no indication of Max. pulses you will have to check the sensor and related wiring.
- If the conveyor is not running you will need to check the conveyor PWM output light on the computer board..
- If the PWM output light is on but the conveyor is not running you either have a wiring problem between the computer and the valve or you have a hydraulic problem.

Increased or Decreased Material Output

- Re-run the conveyor calibration sequence to compensate for normal system wear or component replacement.
- Check the material calibration numbers
- Do a material calibration for the material that you are currently spreading (material weights and flow rates may change significantly from pile to pile and with weather conditions)