

# Thermo Ramsey



# GRAD-LINE®



Grad-Line has been manufacturing grade, slope and feed controls for over 30 years. In that time, thousands of customers worldwide have been utilizing our controls on a wide variety of machines and applications with great results.

Our goal from the beginning was to design and build high-quality paver controls at a reasonable

price. We started with mechanical grade and slope controls for OEM customers in the 1970's, and because of their reliability and low cost, they are still in high demand today from OEM customers, as well as end users.

We introduced the first sonic auger controls in the late 1970's and paving contractors quickly realized the importance of true feed control when extendable screeds were becoming common. We recently introduced our fourth generation sonic sensor with the Grad-Line Universal Sonic Sensor (or GUSS), for both feed control (with the SonaMat E-Series) and grade control (with the HS300).

Thermo Ramsey's current line-up of paver controls includes the G176 Mechanical Grade Control, S276 Slope Control, HS300 Sonic Level Control, SonaMat IV Auger Control and SonaMat E-Series Auger Control. The G176 and S276 have been

around for a long time for good reason. They have proven to be reliable and easy to use. The HS300 Sonic Level Control was designed to offer contractors using small machines, as well as highway class machines, a system that is low cost, accurate and reliable. The small physical size of the HS300 makes it convenient for even the smallest pavers. Both the SonaMat IV and E-Series Sonic Auger Control use the same electronics, however the E-Series utilizes a small control box with the head-of-material level adjustment pot for remote mounting at the back of the screed.

All of our products feature a one year parts and labor warranty, and technical assistance is just a phone call away.

## Grad-Line Universal Sonic Sensor

### Grad-Line Universal Sonic Sensor

The Grad-Line Universal Sonic Sensor (GUSS) is the result of years of research and development and was designed to be used in a variety of applications. When used with the HS300 Level Control System, the GUSS is used as a grade control. When used with the SonaMat E-Series System, the GUSS is used as an auger control. This flexibility allows the paving crew to keep a spare sensor for the entire paver, or they can rob a sensor that is not being used to replace a damaged sensor. Either way, the flexibility of the GUSS means less downtime. State of the art features include "step gain" technology that automatically adjusts the gain of the sensor depending on the distance from the target. This results in superior performance at all operating distances from 8" to 36". The sealed ceramic sensor will not get damaged from water or diesel fuel. In fact, we recommend using diesel fuel or solvent to clean the sensor periodically. There is even an LED to alert you to fault conditions. So if reliability, efficiency and ease of use are what you are after, you'll want to look into the Universal Sonic Sensor from Grad-Line.

### Features and Benefits:

- The Grad-Line Universal Sonic Sensor can be used for auger or grade control
- All new mounting brackets
- Simple to operate and maintain
- Designed to survive the harsh environment of everyday paver use
- Sensor will not get damaged by water
- Fully sealed ceramic sensor
- Fault identification and diagnostics
- Compact, robust sensor design
- 1/4 turn connectors
- Reliable control at an affordable price
- Sensor can be cleaned with diesel fuel or kerosene



### Specifications:

**Power Supply:** 8-30 VDC

**Power Requirements:**

Input Current: 0.2a Output Current: 2a (PWM Output)

**Temperature:**

Operating Temperature: -20° C to +80° C  
(-4° F to 176° F)

**Communication:** Digital

**Operation Range:** 203 to 813 mm (8-32 inches)

**Connector:** 1/4 turn MS, 6 pin

**Sensor Accuracy:** 1 mm

**Sensor LED Indication:**

LED on Steady = Sensor is within operating range and no errors exist

LED Slow Flash = Sensor is out of operating range

LED Quick Flash = Short circuit condition exists in cable or control

# Auger Feed Control

## SonaMat E-Series

### Sonic Feed Control Combined with the Ease and Convenience of Remote Operation

Over 80% of mat imperfections are caused by improper control of the head of material in front of the screed on an asphalt paver. Accurate material control is crucial to achieving today's smoothness specs.

The SonaMat E-Series is the 4th generation sonic feed control system from Grad-Line. It combines the latest sonic technology with the ease and convenience of remote operation. "High technology" doesn't always mean "complicated." With the SonaMat E-Series, you get rugged, hi-tech performance AND simple, reliable operation.



The E-Series system consists of two control boxes, two GUSS sonic sensors, two universal cables and mounting brackets. Set-up has never been easier. Just set it and forget it.

#### THE E-SERIES CONTROL

The E-Series control box is designed to be mounted and left on the paver in any convenient location. It's no longer necessary to walk around the screed or into traffic to make adjustments. With the E-Series, safety, simplicity and reliability are the keys to success. To adjust the head of material, simply turn the knob to the desired setting: 1 = min., 10 = max.

#### Features and Benefits:

- The Grad-Line Universal Sonic Sensor can be used for auger OR grade control, with the HS300 Level Control System
- One cable fits all
- Control mounts in any convenient location
- Rugged, reliable and simple operation
- Fully sealed ceramic sensor
- Diagnostics LED
- Compact, robust design
- 1/4 turn connectors
- 8 to 32 inch operating range
- Quick release mounting brackets
- Reliable control at an affordable price
- SAFETY! No more reaching into the dangerous auger area or walking out into traffic to adjust material thickness.

#### Specifications:

**Power Supply:** 10-30 VDC

**Power Requirements:**

Input Current: 0.4a Output Current: 1.2 Amps (PWM Output)

**Control Output:** On/Off and Proportional PNP

**Communication:** Digital

**Cable:** Universal Grad-Line 10 ft retractable coil cord

**Temperature:**

Operating Temperature: -20° C to +80° C (-4° F to 176° F)

**Control Pin Designations:**

P1 = + Battery

P2 = - Battery

P3 = Output

# Grade & Slope Controls

## G176 Grade & S276 Slope Controls

### Accurate, Reliable and Affordable Control for Asphalt Pavers, Milling Machines and Concrete Slip Form Machines

The G176 and S276 Grade and Slope Controls from Thermo Ramsey's Grad-Line products have been around for a long time. The reason is simple: superior performance at a reasonable price. If you're looking for an entry-level grade control, look no further! The G176 Grade and S276 Slope Controls ensure a smooth mat and a consistent slope every time.

Whether you're matching a joint, following a stringline or using a towable averaging ski, the G176 and S276 will ensure precise control in all conditions.

#### Features and Benefits:

- Simple to operate
- Solid State Electronics
- Operates on any voltage from 10-50 VDC
- Sensitivity adjustment compensates for high vibration screeds
- Can be easily installed on asphalt pavers, milling machines or concrete slip form curb and gutter machines
- Meets state and federal requirements for automatic controls for grading and paving equipment
- Grade and Slope modules are interchangeable

#### Specifications:

**Input Voltage:** 10-50 VDC

**Current:** Available to drive hydraulic valve coils.  
On/Off: 2.5 Amps Minimum  
Proportional: .5 Amps Maximum

**Resolution:** .020 inches at wand

**Accuracy:** .040 inches at wand. Surface accuracy dependent on machine and conditions.

**Temperature:** -7° C to +80°C  
(+20° F to +176° F)



# Grade & Slope Controls

## HS300 Sonic Level Control

### All the Control You Need Right in the Palm of Your Hand

The HS300 system consists of two handset controllers, two GUSS sonic sensors, two universal sensor cables and all brackets needed to easily mount the system. Add the optional slope or mechanical sensors for even more control. At the end of the day, everything packs away in a durable carrying and storage case.

#### READY:

Set-up of your machine is quick. In fact, no tools are needed. Simply select either the sonic or mechanical grade sensor, place it in its bracket and plug it in. If the sensor LED is ON STEADY—YOU'RE READY.

#### SET:

To calibrate the system, simply press the CAL button on the handset.

#### PAVE:

Press AUTO on the HS300 and pave. That's all there is to it. Use the " " and " " buttons to make mat adjustments as they are needed.

#### MONITOR SLOPE WHILE CONTROLLING GRADE:

With reliability specs and competition for jobs at fierce levels, you need to get the most out of your material usage AND still meet specs. The HS300 lets you operate with dual grades for maximum material control and monitor slope at the same time. With its unique dual display, you can operate the grade in the top display and monitor slope with the bottom one. This feature gives you continuous live readout of slope.

Missing a section of curb or lose your grade reference? Not a problem with the HS300. Simply press the MAN key to switch from grade to slope control. Now use the slope sensor to control that side of the paver until you are back over the good curb, then switch back. There's no more need to pull a temporary stringline or run the paver manually.



Hand Held Controller



Grad-Line Universal  
Sonic Sensor (GUSS)



### Specifications:

**Power Supply:** 10-30 VDC (reverse power and short circuit protected)

**Power Requirements:** Input Current: 0.4a Input Current: 3.0a

**Control Output:** On/Off NPN

**Communication:** Digital

**Cable:** Universal Grad-Line 10 ft retractable coil cord

**Temperature:**

Operating Temperature: -20° C to +80° C (-4° F to 176° F)

**Control Pin Designations:**

A = + Battery

B = - Battery

C = Raise Value Output

D = Lower Value Output

E = Digital Communications Buss

F = Digital Communications Buss

**Error Codes:**

ER1 = Sensor outside operating range

ER2 = Loss of Reference Target (Sonic Only)

ER3 = Sensor too close to surface (Sonic Only)

ER4 = No sensor plugged in or sensor bad

ER5 = Controller failure

ER6 = Over voltage condition exists

ER7 = Over current condition exists

### Features and Benefits:

- Compact design allows for easy storage
- Control grade while monitoring slope and visa-versa
- High intensity LED's allow easy viewing in direct sunlight
- Utilizes the same sonic sensor and sensor cable as the SonaMat E-Series auger control
- Easy to setup and calibrate

# Auger Feed Control

## SonaMat IV

### Maintaining A Consistent Material Level Has Never Been Easier

To achieve the smoothness bonus, you need every advantage you can get. Perhaps nothing goes as far to achieve this as a consistent head of material. If your head of material is fluctuating even a little bit, you could lose out on a lot of money. Paddle controls always seem to cause headaches because they contact the asphalt and are not easily adjusted.

The SonaMat IV from Thermo Ramsey's Grad-Line uses sound waves to detect the material level in front of the screed. The control knob on the sensor allows you adjust the head of material to the desired level. Because the sensor is typically mounted on the end gate, proper level is maintained automatically when the screed is extended or retracted.

The SonaMat IV can be mounted on almost any paver within minutes and is completely protected from the environment. The sealed ceramic transducer allows you to wash down the machine without worrying about damaging the sensor.

### Features and Benefits:

- Improved electronics allow better performance in smoke, haze and humidity.
- Sealed Ceramic Transducer will not get damaged by moisture and can be cleaned with solvent or diesel fuel.
- Control can be programmed for either On/Off (PNP) or Proportional valves.
- Dead band and frequency response are also programmable at the factory or with the optional software package.
- Sensing range can be easily adjusted from 8" to 36" using the adjustment knob.
- LED indicates proper range and operation.
- Direct replacement for the SonaMat II.



### Specifications:

**Power Supply:** 10-30 VDC  
**Output:** PWM open Collector Transistor  
**Sensing Range:** 8 to 36 inches  
**Operating Temperature:** -20° C to +80° C  
(-4° F to +176 ° F)

### Default Settings:

**Valve Driver:** Proportional PNP  
**Dead Band:** 6 inches  
**Start-up Delay:** 1 second  
**PWM Frequency:** 10 Hz

### Programmable to:

**Valve Driver:** On/Off PNP  
**Dead Band:** 1-12 inches  
**Start-up Delay:** 1-30 seconds  
**PWM Frequency:** 1-1000 Hz

\*Settings can be programmed at the factory or by the customer with the optional software and hardware package.

# Thermo Ramsey

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