



# Model 306 Slope Control System

## Operating Manual



**MEI**

*Martronic Engineering, Inc.*



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<i>OVERVIEW</i> .....	2
<i>OPERATING MODES</i> .....	3
<i>MENU ITEMS</i> .....	4
<i>CALIBRATION</i> .....	5
<i>OTHER FEATURES</i> .....	5
<i>OUTPUT CABLE CONNECTIONS</i> .....	6
<i>SPECIFICATIONS</i> .....	7

## OVERVIEW

The 306 Machine Control System is a versatile slope control system, very useful on scrapers, dozers, pavers, and other equipment. Can be used as a stand alone control system, or used with GPS to control slopes to job site specifications. Some of the many features are as follows:

- Adjustable slope settings of +/- 95%.
- Blade control offers a proportional output speed control for both standard and proportional valves
- Blade correction speed increases as the error signal increases.
- Slope displayed in tenths of a percent of grade
- One button - precise automatic slope changes. Excellent tool for building pads or ditch bank work.
- Compact size for easy mounting.
- Can be controlled by external device, like gps
- Override switch that moves one side of the blade at full speed either up or down. Activation of this switch disables the "auto" function.

# OPERATING MODES

Pressing the SELECT button wakes the Model 306 from the SLEEP mode. The SLOPE METER display shows the "ACTUAL BLADE SLOPE". Zero would indicate the blade is level. Pressing the "SELECT" button cycles through the operating modes listed below. LED's located between the + and - buttons will light indicating the current mode.

## **PRESET:**

The + and - buttons allow you to change the "SET SLOPE" number. In auto mode, the blade will be controlled to the slope entered in this mode.

## **REVERSE:**

Pressing the "SELECT" puts you into the "REVERSE" mode. During auto blade operation, pushing either the + or - buttons will reverse the set slope number. This will drive the blade with a plus slope to a negative slope; or a negative slope to a plus slope. This is a toggle operation.

## **SET AUTOSLOPE:**

The + will set a reference slope which is used in the "ACTIVATE AUTOSLOPE" routine to precisely change the slope this amount.

## **ACTIVATE AUTOSLOPE:**

The + and - will change the slope by the reference slope set in the "SET AUTOSLOPE" routine. The + button will INCREASE the slope the preset amount. The - button will DECREASE the slope.

## **SLEEP:**

Pressing the "SELECT" button will, after a short delay, put the Model 306 into the "SLEEP" mode. Though the display goes dark, all the changes made will be stored as default until reprogrammed

# MENU ITEMS

The menu allows you to change the factory default settings. You may customize the system to suit equipment requirements, or to your personal preference.

- To open the “MENU” press the “AUTO BLADE” and “SELECT” buttons at the same time. The display will show the flashing menu “number” on the left and the menu “value” on the right.
- The “+” button will allow scrolling through the “NUMBER” list. The “SELECT” button allows cycling between the “Number” and the “Value”.
- The “+” and “-” buttons will change the setting of the “NUMBER” function selected.
- When all changes are made, the “AUTO BLADE” button stores these changes, resets all registers, and reactivates the system. Below is a list of the menu numbers and the factory values.

NOTE: The new settings are automatically recorded on permanent memory. These new settings may be changed by reentering the menu mode and resetting the values. It is also possible to return to the factory default settings by powering up the system while depressing the “-” button.

#	DEFAULT	DESCRIPTION
0	02 Center Width	Center channel width 0 to 20, 0 = no center, 20 = .2%.
1	10 Valve Speed, Down	Down starting speed near center. 0 to 25, 25 is fastest.
2	10 Valve Speed, Up	Starting speed, 25 is fastest.
3	05 Blade Error Speed	The speed at which the blade speed increases with error around center. 0 to 40, 40 is fastest.
4	20 Hydraulic Delay	Delays Fast movement
5	01Valve Type	00 - Standard Valve 10-Toggle Auto 01 - Proportional 11-Toggle Auto
6	00 GPS control	0-C; 1-D; 2-none
7	50 Calibration for Level	0 to 100 set with blade level for zero reading
8	00 Reverse Input	00 - Standard; 01 -Reverse Input
9	00 Reverse Output	0-normal; 1&3 reverse arrows; 1&2 reverse blade output
10	20 Inside Channel	Width of solid inside channel; 10 would be +/- .1%
11	05 Pulse On Time	Pulse on time for hydraulics around center
12	00 Auto Timer	Time to disable automatic if no GPS input ; 0 never
13	30 Max Hyd Speed	Maximum speed blade can move in auto
14	Not Used	
15	05 Pulse Timer	Time between pulses with inside channel; ON time is item 11

# CALIBRATION

## **CALIBRATION FOR LEVEL:**

Level the blade with a quality bubble level. Adjust the level sensor on the blade to as close to 0.0 % grade as possible. Finish calibration by selecting menu item 7 and adjusting it up if the display read - or to a lower number if it read +. Adjust the same number as the error.

Example: After mechanical adjusting the sensor the display reads - 0.2% grade; adjust menu item 7 from 50 to 52. Get out of the menu and verify the readout goes to 0.0 %. Readjust if necessary.

## **BLADE SPEED:**

Go into the menu and select item 1. Hit the Blade down switch while still in the menu. The blade should move very slowly down. If it is not moving at all, increase item 1 value. If it is moving more than 1/4 inch per second, reduce the value. Do the same for Blade up in menu item 2.

Finally: Get out of the menu mode. Manually adjust the blade off of level by 1%. Hit the automatic switch. If the blade oscillates more than one overshoot, then decrease the value of Item 3. If it does not overshoot at all, increase the value until it does. This may be adjusted to operators desire and / or work conditions.

# OTHER FEATURES

## **BLADE DRIVE:**

The blade drive circuit offers a proportional output speed with either a standard valve or a proportional valve. The standard valve will have a pulsing effect on the hydraulic system, so the proportional valve is a superior choice. The menu allows the operator to set a starting speed on the smallest error signal and the ramp speed to increase the speed of the blade as the error increases. This allows for high blade speed on override, or large error signals, without the overshoot problems other types of sensors generally experience.

## **COMPENSATED PUMP OUTPUT:**

Many tractor hydraulic systems employ a low pressure stand-by and require a signal to activate the pump. The 306 offers a separate output that maintains full pump pressure where high oil volume is required.

## **SOLENOID DRIVE OUTPUTS:**

All power outputs have automatically resetting fuse links. If a short circuit should occur in one of the functions, only that function would be disabled. When the problem is corrected, the 306 Panel will automatically restore power.

# OUTPUT CABLE CONNECTIONS

## ***POWER INPUT CABLE ( 2 PIN CONNECTOR)***

- A BLACK Chassis Ground
- B RED 12 OR 24 VDC Input

## ***CONTROL CABLE ( 5 PIN CONNECTOR )***

- A N/U
- B BLACK GROUND
- C WHITE SIGNAL
- D GREEN OPTIONAL SIGNAL
- E RED POWER

## ***HYDRAULIC OUTPUT CABLE ( 4 PIN CONNECTOR )***

- A RED Load Sense Output
- B BLACK Ground, Valve Common
- C WHITE Blade Down
- D GREEN Blade Up

## ***OPTIONAL OUTPUTS***

- JOHN DEERE TRACTOR INTERFACE
- CASE - FORD – STEIGER - INTERFACE
- DANFOSS VALVE INTERFACE

# SPECIFICATIONS

## **INPUT POWER**

- 12 OR 24 VDC OPERATION.NEGATIVE GROUND.
- NOMINAL 10 AMP MINIMUM

## **CURRENT REQUIREMENT:**

- 5 AMP MAXIMUM OUTPUTS.

## **OUTPUT POWER:**

- 5 AMP MAXIMUM PER VALVE
- SOLENOID 2.5 AMP MAXIMUM IF SIGNAL DURATION EXCEEDS TWO MINUTES.
- .1 AMP MAXIMUM OUTPUT DURING SHORT CIRCUIT CONDITION.

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