



A Premier Northwest Company providing custom
Electro-hydraulic Control Systems

Doc. No. EH211M1B

AUTOMATIC LEVELING CONTROLLER Model number EH211

The EH211 utilizes a state of the art digital automatic leveling control system. There are two electrical components to the Leveling System, the operators control panel located in the cab to the right of the operators seat and the main control module located on the front of the walking beam.

Integral to main control module is a solid state dual axis accelerometer. This sensor is used to determine the cab tilt angle. It is positioned with an offset of 45 degrees to create a differential signal that will sense both left and right angle changes while incorporating front and rear angle (pitch) changes.

In conjunction with your vehicle's *SAFETY SYSTEM* the main electrical power supply for the automatic leveling controller must feed through a safety switch located beneath the operators seat. The leveling control's power is automatically kept off unless an operator is positioned in the seat. Do NOT defeat this safety switch.

Important note: The main control module is a solid state design and has no serviceable parts within the unit. If any problems occur please contact you dealer for assistance. If ever the module needs to be returned for service, **Do NOT** disassemble or remove the internal circuit board. Please dismount and return the entire control module enclosure as one piece to your dealer for prompt service. To eliminate down time this system is designed with true override. The control module can be completely removed and with only the operator control panel required for you to continue operating. You can manually tilt the cab by holding the override switch while using the left/right tilt switch.

ADJUSTMENT PROCEDURE

The Automatic Leveling System is fully calibrated at the factory. The functional adjustments have been preset at the assembly plant for each vehicle. There are several field adjustments that can be made by the operator to improve the performance based on your specific conditions. You should first operate the vehicle with the settings as shipped to asses its performance. If changes are needed use the following procedure.

Note: For safety have an assistant sit in the operators seat so that electrical power will be supplied to the Automatic Leveling System. All adjustments are made with the operator panel set for manual mode. When making adjustments to the leveling system's main control module a second person is positioned at the front beam directly in front of the control module. The entire time the second person is beneath the combine the engine **MUST NOT** be running.

Remove the four front cover screws and set the cover aside. Use care to keep unwanted dust and dirt from entering the open box. The Leveling Control main module features a LCD display and (5) pushbuttons. All adjustments are made from this panel. The Inc/Dec Menu buttons allow you to scroll through (10) menus. The Inc/Dec Value buttons allow you to change any given parameter. All other settings are saved automatically and the SAVE button is instead used for special purposes stated below.

The following sections correspond to the menus that are available by using the menu keys. Each menu is numbered 1 thru 12.

1. This display shows **tilt angle** in degrees. This is the main run display. Positive angles indicate the vehicle is tilting to the operator's right side and negative angles are to the operator's left side. In the far right corner of the display are two characters separated by a colon. The character on the left side of the colon shows the mode of operation defined at the operator's switch pane; M = manual mode and A = automatic mode. The character on the right side of the colon shows the current output of the module; r = low flow right side and R = high flow right side, l = low flow left side and L = high flow left side.

To **zero** the current cab position make sure the combine positioned on level ground. Use a bubble level on the feeder house to confirm a level setting. At the operators panel put control in manual mode and use the Left/Right tilt switch to manually position the cab for a level setting as read by the bubble level. Turn off the engine and direct the second person to go beneath the combine and open the control module. The operator control panel **must** be in the manual mode and the LCD **must** be displaying the **tilt angle** (menu one). Press and hold the SAVE button (for approx. 5 seconds) until the unit confirms with a "beep". Release the SAVE button. The control module has now automatically stored the current cab position to be zero.

2. The **low flow angle** is the first trip point that defines when the machine will begin to correct its tilt angle by actuating the low flow valve. Vehicle tilt angles less than this setting will be ignored and have no correction. The low flow angle is pre-set at the factory to **1.5** degrees. The range for this adjustment is from 0.1 deg to 5.0 deg.
3. The **high flow angle** is the second trip point that defines when the machine will add in the high flow valve to quicken the tilt response. The high flow angle is factory set to **5.0** degrees. The range for this adjustment is from 0.1 deg to 20.0 deg. Do not make this adjustment less than the low flow angle.
4. The **hysteresis** is used to control the angle at which the hydraulic valve is turned on versus the angle that turns the valve off. Example; the high flow angle is set for 5.0 deg and the hysteresis is set to 0.5 deg, the high flow valve will come on at 5.5 degrees and turn off at 4.5 degrees. For combines, this setting is usually minimized. The factory setting is **0.0** degrees (off). If unwanted jerking is experienced on compound slopes, this setting may need to be increased. The adjustment range is 0.0 deg to 1.0 deg.
5. The **filter** setting is used to dampen the response time of the sensor. The filter is used to reduce the effects from abrupt changes in terrain, typical when crossing small ditches or tractor ruts. The factory setting is **1**. A setting of 1 is a low filter setting giving the system a fast response and a setting of 5 is a high filter setting for slower response.
6. The **coil** selection defines the type of hydraulic circuit being used to level the combine. The M Squared Conversion requires this be set to a **3-coil** configuration.
7. This menu is used to verify the digital switch **inputs**. 0=off 1=on
 - L = left tilt switch from the operator panel L-L = left limit switch, not used on this system
 - R = right tilt switch from the operator panel R-L = right limit switch, not used on this system
 - A = automatic mode switch from the operator panel
8. The **accel.** menu is used to observe the tilt sensor output. X = the x axis output, Y = the y axis output and G = the net force on both axis outputs used to observe the effects of forward and rear vehicle pitch.
9. The **software** revision name is EH211F0x (x denotes revision level, A, B, C, etc.) and CS is the signature checksum (4 digit hexadecimal number). This information is required for prompt accurate service.
10. The **Angular rate** is a special filter that limits the output of the angle sensor. Because of the hydraulic solenoid valves and the cab mounting geometry there can be a significant jerk to the cab every time the auto leveler makes a correction. This jerk causes the angle sensor to read an increase in cab angle when in fact the angle is decreasing. The range for this limit filter is 0.4 deg/sec to 6.0 deg/sec. Factory setting is **3.6** deg/sec.
- 11 The **Angular delay** is a feature that allows the controller to completely ignore the output of the angle sensor. The jerk can create a very large instantaneous angle for the first fraction of a second. The range for adjusting this delay timer is 0.0 sec to 0.9 sec. Factory setting is **0.5** sec. The jerk is noticeable at the very start and at the very end of a corrective move. This menu has a letter to the left of the timer setting. [S] applies the timer only to the start of a corrective move, [E] applies the timer only to the end of a corrective action and [B] applies the timer to both the start and the end of a corrective move. Factory setting is [S]. If you want to turn this feature off enter a timer setting of 0.0 sec. Use the Save key to change the timer assignment [S], [E], [B]
12. The **password** is used by the factory for calibrating the angle sensor. This code is not available for field use.

Finished ? When you have completed your program changes you must scroll back to menu one. Clean off any dirt or dust from inside the control panel and the cover gasket. Replace the cover and securely tighten the four screws. Ensure the person is out from under the combine before starting the engine. The controller will automatically reset the display to menu one when the power is cycled. Use the Run/Stop switch on the operator panel to cycle the power or simply get up off the seat and the safety switch will cycle the power.