Instruction manual for ENA Levelling-System Grade and Slope controls

This operation manual will make you familiar whit the operation of your ENA Grade – controls as well as the ENA Slope – controls.
Both these units can be operated on pavers – finishers, graders, trench – diggers a.s.o.
To obtain the best utilisation from your units, read this instruction booklet completely and carefully.

GRADE CONTROLS

SECTION 1

General description

The four major components of H 90 and RPS 100 Grade – Controls system are:

1. Housing assembly
2. Control Module
3. Grade Sensor
4. Accessories

1.1 Housing Assembly

The housing assembly consist of the housing, the mounting boss and connector and contains the interface wiring, the Grade Sensor and the Control Module. The mounting boss fits into a standard ENA Grade control clamp for machine mounting.

1.2 Control Module

The Control Module directs the H 90 and RPS 100 Grade Control units. ENA offer two types.

1. CONTROL MODULE NPN. The NPN Control Module has been designed for machines with on/off solenoid controlled hydraulic valves and a positive (+) voltage to the valves is pulse width modulated.
2. CONTROL MODULE PROPORTIONAL. The Proportional CONTROL MODULE is designed to drive a single coil servo control valve.

Displays and Switches:
ON/OFF
The cylinder can be controlled either automatically or manually by a selector switch.
ON - AUTOMATIC
OFF – MANUAL

INDICATOR LIGHTS
Lights provide a visual indicator of the direction of valve drive.

SENSITIVITY ADJUSTMENT
An adjustment which varies the dead – band within which no electrical signal is given to the valves. This adjustment is on both Grade and Slope Control Modules. Clockwise rotation of this control increase the sensitive (narrows the dead – band) . Normally set at 5 – 7.

LEFT - RIGHT SWITCH
This switch connects the Grade and Slope Controls to their appropriate valves and consequently to the correct cylinders. The switch is always to the right when the module is used on a Grade Control. When It's used on a Slope Control, the switch is set to whatever side is controlled by Slope Control.

1.3 GRADE SENSOR
The Grade is preset with respect to either of two Grade sensing methods: wand or ski. Any variation from a preset Grade causes rotation of the Grade Control shaft, creating an electrical error signal. This signal is amplified in the Control Module, in yurn energizing an electro – hydraulic valve. The valve is held open until the correction is complete.

Grade Controls are available in two configurations: The H 90 with potentiometer sensor and RPS 100 with a RDTV sensor. Both controls perform similar functions. The selection of choice of unit best suited to his application.

SECTION 2

INSTALLATION AND ADJUSTMENT

Both the H 90 and the RPS 100 RDTV grade Control Units can be installed quickly and easily with standards tools.

2.1 ELECTRICAL CONNECTIONS
Both Grades Controls require an input source of positive (+) 11-30 VDC. Install the 10 pin receptacle on the machine and complete the electrical connections to the source of battery power and the hydraulic valve.

2.2 INSTALLATION
1.Set the ON/OFF switch to OFF. Install The round boss on top of the control into the jack assembly**. NOTE:** Grade Control Unit must be mounted at least 1,5 feet forward of the leading edge of the screed for proper operation.

2. Select the sensing arm most suitable for use the matching shoe or wand. For over-the-line sensing, rotate the sensor shaft of the control unit until the flat portion is facing the same direction as the switches and indicator lights. Install the sensing arm on the shaft so that it is pointing behind the control unit, and secure using the setscrew.

3. Connect the power/signal cable to the control unit and to the appropriate connecting receptacle on the machine. Set ON/OFF switch to OFF.

2.3 ADJUSTMENT

1. Adjust the jack holding the control unit until both indicator lights are off (null position).
2. Set Left/RIGHT switch to Slope Right or Grade.
3. Set ON/OFF switch to ON position.
4. Adjust the SENSITIVITY DIAL counter clockwise until the machine begins to oscillate. Turn the SENSITIVITY DIAL slowly clockwise until the machine becomes stable again. (Optimum sensitivity setting)

NOTE: A slight adjustment of SENSITIVITY might be required the first time the machine is put in operation due to vibration of the machinery. Once the dynamic adjustment (adjustment made while the machine is porating) has been made, further adjustment will not be necessary.

5. Check phasing by lifting the wand or ski, the appropriate cylinder should react with an up movement. Lower the wand or ski and the cylinder movement should be in a down direction.

SECTION 3

OPERATION

After the initial adjustment has been completed, operation consist mainly of closing the electrical circuit between the control unit and the equipment.
Set ON/OFF switch to ON.
The lights provide a visual indication of valve direction. When both indicator lights are off, no signal is applied to the hydraulic valves. (Control is in a null condition)

SECTION 4

MAINTENANCE

Both Grade Control Units are designed to provide maximum service reliability and requires a minimum of maintenance. The following precautions, however, will help to insure a proper working system.

- At regular intervals inspect cables for evidence of wear or deterioration.
- Inspect the receptacles and cable connectors for water, damage or dirt.

NOTE : If the receptables are not kept clean of dirt, grease, asphalt or concrete build up in the thread area, the connector will not be able to make an electrical connection.

SLOPE CONTROLS

SECTION 1

GENERAL DESCRIPTION
The four major components of the ENA Slope Control Units are:

1. Housing assembly
2. Control Module
3. Slope Sensor
4. Handset Assembly

1.1 Housing Assembly
The Housing Assembly contains the Slope Sensor, interfacing wiring, and the Control Module. A removable handset is attached to the right hand side. The Housing Assembly attaches to a quick release mounting plate, using an over – centre latch on each side or an optional fixed, bold down, base plate.

1.2 CONTROL MODULE
The Control Module directs the ENA Slope Control Unit. ENA offers one type: CONTROL MODULE NPN. The NPN Control Module has been designed for machines with on/off solenoid controlled hydraulic valves at the valve common. Drive to the pulse width modulated.

Displays and Switches:
ON/OFF
The cylinder can be controlled either automatically or manually by selector switches.
ON – Automatic
OFF – Manual

INDICATOR LIGHTS
Lights provide a visual indication of the direction of valve drive.

SENSITIVITY ADJUSTMENT
An adjustment which varies dead – band within which no electrical signals is given to the valves. This adjustment is on both the Grade and Slope Control Modules. Counter clockwise rotation of his control increases the sensitivity (narrow the dead – band) . Normally set at 4 – 6.

LEFT - RIGHT SWITCH
This switch connects the Grade and Slope controls to their appropriate valves and consequently to the correct cylinders. The switch is always to the right when the module is used on a Grade control. When it’s used on a Slope control, the switch is set to whatever side is controlled by Slope control.

1.3 SLOPE SENSOR

The Slope Sensor used gravity as it's reference. Any variation from the desired preset slope creates an electrical error signal. This signal is amplified in the Control Module, in turn energizing an electro – hydraulic valve. The valve is held open until the correction i complete. Slope Control Units are available in one configurations: The OPS 100 with a Inclinometer.

1.4 HANDSET ASSEMBLY

The Handset has a digital readout that can be set up to 12.7% in either direction, and reads directly in percent of slope. A fold – away bail (handle) allows the Handset Assembly to be hooked onto the machine at the operators convenience. Also provided is a simple reset button.

SECTION 2

INSTALLATION AND ADJUSTMENT

ENA Slope Control Units can be installed quickly and easily with standards shop tools.

2.1 ELECTRICAL CONNECTIONS

The Slope Control Unit requires input source of positive (+) 12 or 24 Volt DC. Install the 10 – pin receptacle on the machine and complete the electrical connections to the source of battery power and the hydraulic valve.

2.2 INSTALLATION

1. Attach the quick release plate to the beam. The optional control with the fixed base plate will bolt directly to most cross beams.
2. Set the ON/OFF switch to OFF. Attach the control unit to the mounting plate by latching looks on the side of the housing. Connect the cable between the housing and the machine receptacle.
3. Set the LEFT – RIGHT switch to the slope controlled end of the screed. Slope Left when connected to the left side connector. Slope Right switch when connected to the right side connector.
4. Adjust the Handset to 00,0% slope by turning the thumbwheel.
5. Position the finishing surface to level. (Green light on level – led)
   (On an asphalt finisher, place a level on the screed plates, on curb and gutter machines, use the mounting structure supporting mould)
   NOTE: If there is a light on after levelling on the machine, the handset needs to be Zeroed.

2.3 ZERO HANDSET

To zero the Handset, set sensitivity to 4 and turn the thumbwheel until both the ´lights on the Control Module are off.

NOTE: The control is now calibrated to the machine. Both lights should be off. If light on or blinking, repeat.

SECTION 3

OPERATION

After the initial adjustment has been completed, operation consists
Mainly of closing the electrical circuit between the control unit and the equipment. The following steps outline the procedures involved when operating the control unit.

1. Set ON/OFF switch to ON
2. Select percent of slope by turning the thumbwheel on the Handset. The lights provide a visual indication of valve drive direction. When both indicator lights are off no signal is applied to the hydraulic valves. (Control is in a null condition).

SECTION 4

MAINTENANCE

The Slope Control Units are designed to provide maximum service reliability and requires a minimum of maintenance. The following precautions, however, will help to insure a proper working system.

- At regular intervals inspect cables for evidence of wear or deterioration.
- Inspect the receptacles and cable connectors for water, damage or dirt.

NOTE: If the receptacles are not kept clean of dirt, grease, asphalt or concrete build up in the thread area, the connectors will not be able to make an electrical connection.
NOTE: Disconnect the cable at the control unit before removing any components.