SERIES 1|H

USER MANUAL



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GKD

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SERIES 1-H INTRODUCTION

The GKD 1-H Height Limiting Indicator is designed to be fitted to plant and machinery with an adjustable height boom to warn the operator that the equipment is approaching, or has reached a pre-determined maximum height limit. The 1-H also gives an electrical output signal when the limit is reached which can be used to control the operation of the machine.

Principles of Operation

The Series 1-H control unit is fitted in the cab of a machine, in clear view of the operator. An electronic Angle Sensor is fitted to the variable angle boom of the machine and wired into the Series 1-H control unit.

The machine is set initially with the boom set as near to Horizontal position as practical and the control unit taught that “Horizontal” position. The machine is then set to the “Maximum height”, the maximum boom angle, for example when it might be approaching an overhead power line. The control unit is then taught that maximum height value. When the machine is approaching, or has reached the maximum height a series of LEDs and a sounder on the Series 1-H control unit warn the operator they are approaching the limit. When the limit is reached a relay within the Series 1-H control unit switches off, sending a signal to the equipment if required.

The “Maximum Height” can easily be reset to different heights under key switch control to allow for different operating conditions.

SERIES 1-H INDICATORS AND CONTROLS

The indicators on the Series 1-H display consist of five coloured LED lamps, which operate as follows:



Fault Lights up red when there is a fault with the system or configuration

! Lights up red when the machine reaches 95% of it's permitted maximum load

- Lights up amber when the machine reaches 75% of it's maximum load
- Lights up green when the machine is under 75% of it's maximum load

On Lights up green at all times whilst the unit is powered

Indicators in Active Mode

See detailed notes in section below

Key Switch

System OFF in Inactive Mode

System On in Height Limit Active Mode

System in Set-up in Set Limits Mode

Set/Test Button

Set - in Set Limit mode

Test - in Active Mode

SETTING UP THE SERIES 1-H CONTROL UNIT

Initial switch on

Set the key switch to Active Mode and apply system power.

At power up all 5 LEDs come on and the Internal Sounder bleeps as a self test. The LEDs then go off in turn.

At switch on if the machine is well within the Height Limit the Green “ON” LED and Green level indicator LED will come on.

Horizontal Position Setting

The Horizontal Position is usually set once, when the 1-H system is first installed. See the 1-H Installation Manual for details of how the to set the Horizontal Position.

SETTING THE HEIGHT LIMIT

The Height Limit can be set at any time to suit the conditions under which the machinery is to be used on that occasion. The Height Limit is normally set under key switch control, by an authorized operator.

WARNING: THE HEIGHT LIMIT MUST BE SET TO THE LOWEST LEVEL OF THE OVERHEAD OBSTRUCTION OVER THE WHOLE WORKING AREA!

- Set the Key switch to Set Limit. The red Fault LED will light if no limit is set. (In Set Limit & Inactive modes, the control relay is On to give free boom movement).
- Set machine to new maximum height limit position. (Min. 15 degrees above Horizontal). The Height Limit must be set with the machine in the 'worst case'. i.e. equipment at full reach (for excavators) or extending boom fully extended (for teletruks and machines with extending booms).
- Press the Set button and the Yellow LED comes On. Release the Set button and the Green LED comes On to indicate a new limit has been set.
- Set the Key switch to Active. The Red ! LED & Bleep come On as boom is at height limit. (The control relay goes Off to disable UPWARD movement, if connected).
- Lower the machine boom from the maximum height.
- The Red ! LED & Bleep go off at about 90% of the height limit. (The control relay comes On again to re-enable UPWARD movement, if connected).
- The Yellow LED goes off at about 70% of the height limit.
- The Green LED comes on to indicate the boom is well within the Height Limit.

PRACTICAL OPERATION OF THE SERIES 1-H SYSTEM

Limits

1. The Height Limit must be set at least 15 degrees above Horizontal.
2. The Height Limit must be set with the machine in the ‘worst case’. i.e. equipment at full reach (for excavators) or extending boom fully extended (for teletruks and machines with extending booms).
3. The Height Limit must be set less than 90 degrees above Horizontal.
4. Height Limit indication comes On at about 95% of the height limit.
5. Height Limit indication goes Off at about 90% of the height limit.
6. The Yellow LED comes On at about 75% of the height limit.
7. The Yellow LED goes Off at about 70% of the height limit.
8. A Fault LED error condition is given if the boom angle goes outside the set ranges.
9. Height limits are subject to a 5% “Hysteresis”. For example, the Height Limit state comes On at 95% of the Height Limit, & goes Off at 90% of the height limit.)
10. The boom can be operated up to 90 degrees above, or below horizontal.
11. A height limit state will only be indicated if the boom is ABOVE horizontal.

Relay operation

The Relay goes OFF when the Height Limit is reached, or the Series 1-H DC power is lost.

The Relay is ON in Inactive and Set Limit modes to allow any boom movement.

Angle Sensor

When powered up the Green LED on the side of the Angle sensor will flash to show that it is working correctly.

Test

At power up, all 5 LEDs and the internal sounder come on as a self-test, then go off in turn.

In Active mode, press the Test button to turn on all the LEDs and the Internal Sounder.

Releasing the button causes them all to go off in turn.

FAULT CONDITION INDICATION

In Active Mode the Red **!** LED flashes fast if there is no Height Limit is set.

In Set Limit Mode the Red **!** LED stays on if there is no Height Limit is set.

Fault LED

If the “Fault” LED is lit, a connection error is present between the 1HLI display and the angle sensor. Check the CAN bus cable between the display and the angle sensor for damage or incorrect connection. NOTE: On first switch on, before the Horizontal boom position has been learned, it is normal for the fault light to flash.

Angle sensor, no LED

The angle sensor LED should be flashing GREEN whilst the system is powered.

No LED showing on the angle sensor may be caused by angle sensor failure, but is more likely to indicate that no power is being supplied to the sensor through the CAN bus cable.

Angle sensor, red LED

Should the angle sensor LED be RED, an angle sensor internal fault has occurred.

No motion cut or external alarm

Check to make sure that the display internal relay connection (BLUE wire) is connected to a +V ignition switched source, as the power to the green and yellow output wires is derived from the blue power input wire.

Motion cut not working

Ensure that the Horizontal boom position has been learned by the system (see page 14) and that a valid height limit ABOVE the horizontal position has been set, and that the key switch is in the ACTIVE position. If still not working, check the YELLOW wire output to the solenoid valve for power, and that the solenoid has a good chassis earth to the 0V connection.

SERIES 1|H

GKD Technologies reserve the right to change these instructions in line with the policy of continuous improvement.

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