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Hill Engineering Limited External Coupler Sounder



Installation and User Manual

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ECS INFORMATION

PREFACE	INTRODUCTION	4
SECTION 1	INSTALLATION OF THE ECS UNIT	6
SECTION 1.1	INSTALLATION OF THE CONTROL SWITCH	8
SECTION 1.2	INSTALLATION OF THE SOUNDER	9
SECTION 1.3	INSTALLATION OF THE WIRING	10
SECTION 2	TESTING THE ECS UNIT	12
SECTION 3	TROUBLESHOOTING	13
SECTION 4	MAINTENANCE	14
SECTION 5	WARRANTY	15
SECTION 6	CONTENTS OF FITTING KIT	16
SECTION 7	EC DECLARATION	17

General information

May we take this opportunity to thank you for purchasing a Hill ECS unit. The ECS unit is a quality engineered, well-designed product capable of providing years of good service, thereby increasing the safety of your quick coupler. Please read this manual and any other enclosed documentation fully before commencing installation. This manual should be made available to all persons who may use or maintain the ECS unit. If any additional information is required then please contact the service department at Hill Engineering or the nearest authorised distributor.

Safety

All personnel working with the equipment must be well conversed with all of the applicable safety directives/regulations, procedures and precautions. Particular attention should be paid to personal safety while installing or maintaining the ECS unit. Please ensure that all the correct procedures are followed at all times. The user of the Hill Coupler is responsible for all precautionary measures concerning personnel working within the excavator risk area.

Think Safety, Work Safely, Be Safe

In this manual there are parts tagged with one of the following safety warnings. Particular care must be exercised with regard to these statements when performing the work described within that section.



This warning is used where there is a high probability of death or serious injury if the instructions are not followed correctly.



This warning is used where there is a possibility of injury to yourself or others if the instructions are not followed correctly.



This warning is used where there is a possibility of damage to the machine if the instructions are not followed correctly.

Revisions

The contents of the manual may be subject to revision where necessary.

The memo accompanying the revision information should be kept with this manual at all times.

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Installation should only be attempted by skilled and competent personnel who have read fully and understood the information contained within this manual.

The ECS installation within the manual is broken down into basic steps, which must be followed. The ECS kit contains a switch unit and adaptor which is mounted in the A line between the existing coupler hydraulic valve and the A line hydraulic hose to the coupler hydraulic cylinder.

The basic installation steps are as follows: -

- Unpack the kit and check all parts are present with reference to kit contents.
- The switch unit must be installed within the engine compartment affording protection from the elements.
- The switch unit must be connected into the existing hydraulic coupler extend (A) line.
- The sounder must be fitted to the lower end of the excavator's boom.
- The control wiring routed down to the ECS switch unit within the engine compartment and up to the sounder on the boom.
- Finally, the function of the ECS must be tested.

BEFORE BEGINNING THE INSTALLATION

Read all the relevant sections within this manual before beginning the installation.

Determine where you will connect to an ignition fed live supply.

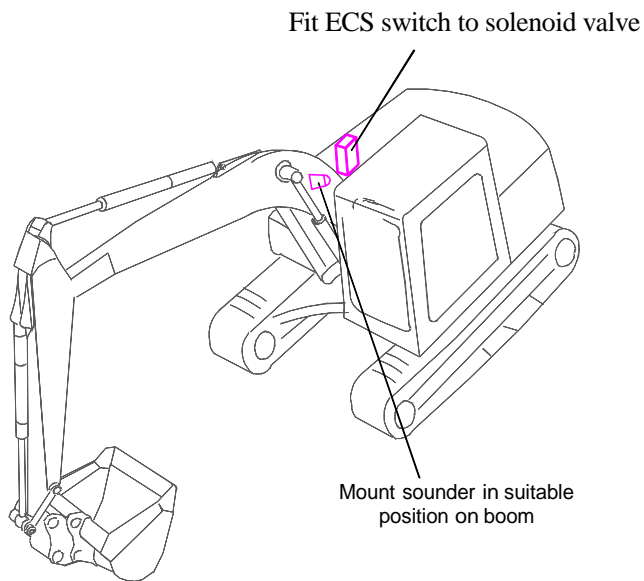
Determine the best place to attach the sounder so that it will not be damaged but will be directed at the excavator danger area – the coupler.

Make sure you have the proper fittings needed to connect to the existing hydraulic coupler Extend line (suitable fittings may NOT be present within the contents of the ECS Installation Kit).

Determine the best route for running the cable from the ECS switch to the sounder. Pay particular attention to the risk of mechanical damage or chafing

Determine the best route for running the cable from the supply point to the ECS switch. Pay particular attention to the risk of mechanical damage or chafing.

Recommended Installation Positions



**Lock off excavator using plant procedure before commencing work.
Before connecting any hoses always flush with clean hydraulic oil to
prevent contamination of the hydraulic system.
Do not allow hydraulic oil to come into contact with the eyes or skin.
Wear safety glasses and gloves at all time.**



Suggested position for sounder mounted on boom facing towards the dipper arm.

It is advisable to fit the ECS switch first then route the cable before finally positioning the sounder to ensure the cable will reach to the intended mounting position of the sounder.

Place the excavator and coupler along with any tools and supplies required on flat secure ground.

Place the safety lever in the locked position before leaving the cab.



The hydraulic system MUST be depressurised before commencing installation. Safety equipment must be worn while carrying out this operation

Locate the existing coupler control valve.

Identify the coupler extend line (normally the 'A' line from the valve).

The switch adaptor is 1/4" BSP male to 1/4" BSP female. Check whether adaptors are needed (will fit directly to the Hill valve arrangement)

Remove the hose from the fitting within the A port of the valve.

Screw and tighten the female end of the fitting onto the adaptor.

Reconnect the A line hydraulic pipe to the male end of the fitting.



Do not use excessive force when tightening the fittings.

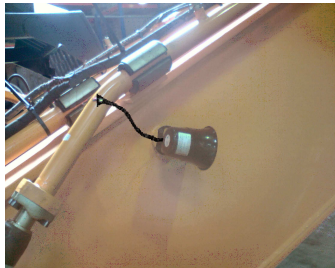
It is advisable to fit the ECS valve first then route the cable before finally positioning the sounder to ensure the cable will reach to the intended mounting position of the sounder.

The sounder is supplied with a mounting bracket. The bracket may be bolted or welded in position by a qualified person using the correct materials and procedures. Remove the bracket complete from the sounder by removing the pivot bolt.

Attachment of sounder (welded)

Before welding the bracket must be unbolted from the sounder. The bracket should be allowed to cool following welding before refitting the sounder assembly.

Once you have found a suitable position for your sounder remove any paint, oil, grease or rust. Then taking all necessary precautions the bracket may be welded in position.



NOTE

Pay attention to the holes in the plate and check the sounder points in the correct direction BEFORE welding or bolting.



Before proceeding with any welding, battery leads must be removed from the battery. Always check with the excavator dealer to take appropriate measures when welding on the machine.

Welding may cause fires.

Always remove combustible materials from the vicinity.

Protect all hoses and wiring from weld spatter.

Keep a fire extinguisher available in case of fire.

Always use the correct personal protective equipment.

Attachment of sounder (bolted)

Mark through the three fixing holes and drill and tap 3 M6 holes at the positions previously marked, in the boom. Fit the base using three screws and refit the sounder to the bracket.



Wear eye protection when drilling and tapping.

Beware of sharp edges and flying swarf.

Ensure loose clothing or hair cannot become entangled.

If mains powered equipment is used use suitable precautions to avoid the danger of electrocution.



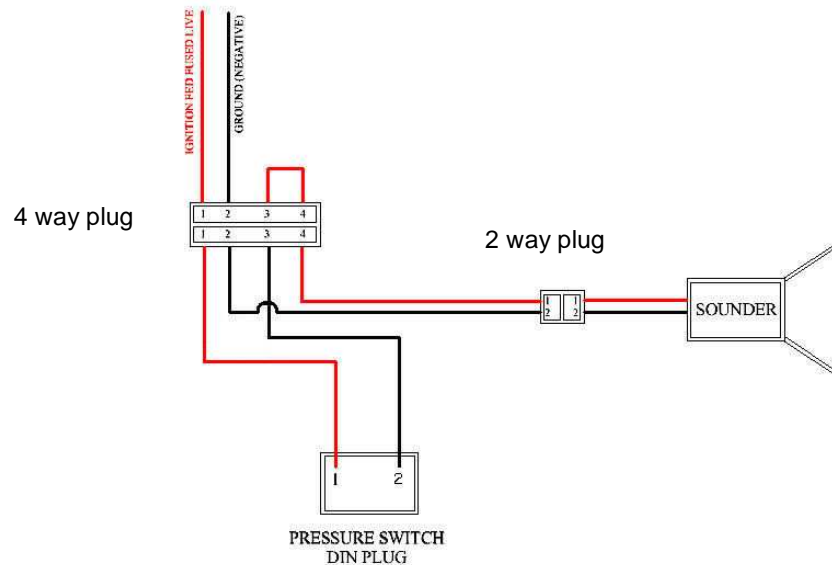
Before proceeding with the installation, the battery leads must be removed from the battery. Always disconnect the ground lead first and reconnect the ground lead last.

Find a safe place in the cab to connect into an ignition fed fused terminal. Run the supply cable leg of the loom from the ECS kit within the hydraulic/engine compartment to the terminals within the cab via a suitable route. Affix the wire using the cable ties provided to suitable anchors.

Run the sounder leg of the wiring loom from the hydraulic/engine compartment up the boom to the sounder via a suitable route. Affix the wire using the cable ties provided to suitable anchors. It is often easier to follow one of the coupler hoses out and up the boom.

Always fuse the live supply with 10 Amp (maximum) fuses and follow wiring diagrams supplied.

ECS wiring diagram



Connecting the ECS Switch unit

- Plug the DIN plug on the loom onto the ECS sensor after aligning the plug and blades on the switch. Tighten the central screw on the DIN plug clockwise to secure.



Connecting the sounder

- The sounder plugs directly into the loom via the two pin waterproof plug. Push the two halves of the plug together and ensure the retaining catch engages.



Connecting the supply cable to the valve loom

- The supply plugs directly into the loom via the four pin waterproof plug. Push the two halves of the plug together and ensure the retaining catch engages.



Connecting the supply.

Working inside the cab connect the **red** wire to an ignition fed live.
Connect the **black** wire to a ground terminal or point.
Reconnect the battery.



**Live supply must be fused using maximum a 10-amp fuse.
Route cables carefully to prevent damage and chafing.
Fit grommets if required.**

Turn on the ignition of the excavator

1. The warning sounder should sound.
2. Start the excavator.
3. Pressurise the hydraulics by using a service, the sounder should stop.
4. Operate the **Bucket Release**. The external sounder should also sound.
5. Return the **Bucket Release** switch to the off position.
6. Accelerate the excavator to no more than 50% of the maximum rpm.
7. Crowd the coupler fully i.e. fully extend the crowd cylinder.
The external sounder should silence.
8. Operate **Bucket Release** to withdraw hook. Keep the hydraulic system under pressure by continuing to extend the crowd cylinder.
The external sounder should sound.
9. Open and close the coupler several times to assist with bleeding air from the system by operating the **Bucket Release** switch.
10. Allow time for the hook to open and close fully before reversing switch position.
11. Turn off the machine and check and rectify any hydraulic oil leaks.



**Hydraulic fluid under pressure can penetrate the skin.
Do not test for leaks with bare hands.
Wear overalls, gloves and a full-face shield.
Use containers and absorbent materials to contain any leakage.**

Sounder does not sound on attachment release.

Check supply voltage to ECS.

No Voltage – Check fuse

Check voltage is present at sounder when coupler is released.

No voltage – Check wiring

Sounder sounds continuously.

Remove din plug from the ECS pressure sensor.

The sounder should stop. If the sounder continues check the wiring for damage and short circuits.

Reconnect the switch and ensure full hydraulic pressure (150 Bar min) is present in the A line.

If pressure is below 150 Bar check the supply hydraulic pressure from the machine to the coupler.

If the supply pressure is correct then check the coupler cylinder for piston seal or P.O. check valve seal failure resulting in circulating oil.

Plug connected to ECS pressure sensor and sounder remains off when releasing the coupler.

Operate the **Bucket Release** switch. The sounder should activate immediately. If not then pressurise the hydraulics – if the coupler fails to open then the solenoid valve/switch box/wiring is faulty.

If the coupler opens correctly then check the fuse and supply to the ECS sensor unit.

If the supply is OK replace the ECS switch unit.

**IN THE EVENT OF A FAULT THE MACHINE CAN BE USED
WITH LIMITED PROTECTION BY LEAVING THE FAULTY
SWITCH DISCONNECTED.**



**Do not attempt to service the sounder or ECS.
In case of a fault the item must be replaced as a complete unit**

NORMAL MAINTENANCE

The ECS unit requires no maintenance apart from a visual inspection for damage to any parts or the wiring.

Check hose connections for leaks.

WARRANTY

The Hill ECS is covered with a warranty of 12 months or 2000 hours, whichever occurs first, from first being fitted on the machine.

The warranty is limited to replacement of parts that are defective in material or workmanship.

The warranty does not cover:

- a) The cost of any repairs, alterations or replacement of any parts to the ECS, without first being authorised by Hill Engineering Limited.
- b) Any malfunction or problems arising from non-compliance with the installation specified within this brochure.
- c) Any, failures or problems which arise from work carried out by any fitter or engineer who has not been appointed by Hill Engineering Service Department.
- d) Misuse or operating of the quick hitch coupler beyond the capacity for which the quick coupler was designed.
- e) Consequential Loss Under no circumstances will the company be liable for any incidental or consequential damage or expense of any kind, including but not limited to, personal injuries and loss of profits arising in connection with any contract or with the use, abuse, unsafe use or inability to use the company's goods.

THE 12-MONTH WARRANTY COVERS:

- 1) Valve and fittings as supplied as original equipment by Hill Engineering Limited.
- 2) The Sounder Box

EXCLUSIONS AND LIMITATIONS ON WARRANTY

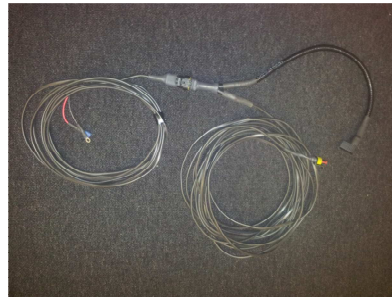
- 1) Hill Engineering's maximum liability shall not exceed, and the customer's remedy is limited to, either
 - I. Repair or replacement of the defective part or product or
 - II. At Hill Engineering's option return of the product and refund of the purchase price, and such remedy shall be the customer's entire and exclusive remedy.
 - III. When any defective goods are replaced upon an exchange basis or defective goods are repaired the provisions of this warranty clause shall apply to the replacement or repaired goods for the unexpired balance of the warranty period.

Item	Quantity	Description	Part Number
1	One	ECS Switch unit comprising:-	
	One	Switch	SWI08
	One	Adaptor	BSP041
2	One	Sounder	ALARM01
3	One	Loom assembly	SWL04
4	One	Sounder mounting plate comprising:-	
	One	Mounting Plate	
	Three	M6 screws 10 mm Long	SCR-M6X10
5	One	Packet Of Cable Ties	



SWI08

BSP041



SWL04



ALARM01

EC DECLARATION of CONFORMITY

Manufacturer HILL ENGINEERING LIMITED
UNIT 6 CARNBANE BUSINESS PARK
NEWRY
CO. DOWN
BT35 6QH

Description: External Warning System for Coupler
pressure drop on a hydraulic excavator

Model: External Coupler
Sonder

Serial No: As on unit

We declare that the above specified product complies with the Essential
Health & Safety Regulations identified in Directive 2006/42/EC

Standards Used

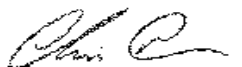
BS EN 982:1996 Safety requirements for fluid power
systems and their components-Hydraulics

BS 14121-1:2007 Safety of Machinery

Name of Authorised Person: Chris McCann

Position of Authorised Person: Quality Manager

**Signature of Authorised
Person:**



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