DIGGA®

HALO

OPERATORS MANUAL

EARTHMOVING WAREHOUSE

PM-000198-A

OPERATORS MANUAL

Main function

The Halo alignment system measures the angle of the drive with respect to plumb. With this measurement, the Halo displays a sequence of colours on a circular LED array that is visible to the machine operator. The LED array changes colour with the angle of the drive, showing 'all green' when very close to plumb (within 1.5°). When the drive is slightly off plumb (by more than 1.5°) the LEDs will change from all green to partially green and red, showing the operator which way to manoeuvre the drive to return to plumb. The operator should move their machine in the direction of the green portion of the LED array.

When the drive is hanging free when the machine is not operational, the LED sequence may appear to be incorrect or 'backwards' when tilting the drive about the hitch. It's not until the drive pivots about the end of the auger/pile that the Halo system will make sense to the operator.

Start-up

Make sure the auger drive is hitched and hanging approx. plumb before connecting the power supply. After connecting the power supply, the auger drive with Halo must be still (not moving) for 30 seconds. During this time you may notice the lights moving even though the drive is still. After 30 seconds, the Halo will have finished the start-up calibration will be showing the correct LED sequences.

Powering the Halo

The Halo system is offered with a variety of power options. The basic version of the Halo is powered by the 12V/24V auxiliary power from the cab (otherwise known as a cigarette socket). The basic version does not include any 'zero' capability or data capability. The Halo can also be powered by a custom built magnetic battery which also features a 'zero' switch for drilling at angles and to increase accuracy for piling applications. The Halo battery can be connected to the system at the boom or in the cab via any combination of Halo extension cables.

Limitations

The Halo uses 6-way sensor fusion to measure the orientation of the drive. Because there is a certain amount of mechanical play between the auger/pile and the drive itself, the operator should be aware of this limitation and that the Halo LED array is displaying the orientation of the drive, not the auger/pile.

The inner workings of the inclinometer are susceptible to heavy vibration and jolting. Whilst a lot of effort and testing has gone into minimising these effects for regular use, drilling into rocky or tough ground will produce 'shocks' to the drive (also felt through the operator) which will temporarily show an incorrect reading of the angle data on the LED array (similar to 'knocking' a spirit level with a hammer whilst taking a reading). If the operator wishes to take an accurate reading to gauge the orientation of the drive, simply stop the rotation of the auger or pile for a brief moment and the system will display a stable reading. If the LED display exhibits erratic behaviour as a result of an impact or vibration, either disconnect the power during this type of use, or disconnect and reconnect the power supply to reset the system.

Clearing debris from the LED groove

Where mud or debris becomes heavily caked into the LED ring groove, do not use force or sharp objects to remove the debris. If pressure washing and normal cleaning methods do not prevail, carefully use a blunt implement encourage any caked on mud to dislodge. Do not under any circumstances use a hammer or any other device to chisel at the LED ring.

FAQ

What do the various colour arrays signify?

Solid green: within 1.5° from plumb
Partially green, partially red: more than 1.5° from plumb, move your controls to chase the green portion to return to plumb.

How long does the battery last for?

Through normal use, approx. 8-9 hours. Spare batteries and charges are available for purchase. Leaving the Halo turned on whilst display 'all green' will use the battery at a slightly faster rate. Once the power has been depleted, the LEDs will turn off and the battery will need to be recharged.

Travelling with the battery:

Customers may treat the Halo battery in the same way you would a cordless drill battery. The battery meets IEC 62133:2012 (Second edition) specifications for safety as a portable sealed battery. This battery standard enables the batteries to fly however each airline has their own specific rules so it is wise to check prior to planning travel.

Spare batteries:

Spare batteries are readily available from Digga for 'hot swapping' on long days or as a backup.

Alternative chargers:

Use of an alternative charger is strictly prohibited and could result in a dangerous hardware failure. Only use a certified Halo charger.

Can the drive be used in wet conditions?

The Halo electronics are designed to run reliably in any drilling conditions, including down an auger hole that's filled with water. When recharging the battery it is recommended to allow the connectors to completely dry before connecting the charger or reconnecting the Halo to prevent any galvanic corrosion if a small amount of moisture has leaked passed the seals. Do not manually dry the electrical terminals with an implement.

How accurate is the Halo?

When utilising the zero switch and 'zeroing' the Halo against an accurate level, the repeatability of the Halo is ± 0.25°.

Battery placement (for customers with the Halo magnetic battery)

The battery features strong magnets within the case that will help to attach the battery to the hitch or boom where it is out of the way. Through vibration and regular use, the battery may move about so it's recommended to place it somewhere where it can butt up against an edge to reduce the amount of movement. Alternatively the operator can also cable tie the battery in place however this will make recharging less convenient.

It's best to place the battery somewhere on the machine so that the power cable cannot be crushed through normal use. The battery and Halo system is protected from short circuit however the power cables are not repairable and will need to be replaced in the event of damage. The cables are rugged by design however it's not a good idea to let the battery hang from the power cable at any point. If the battery is dislodged from the boom or hitch during use, stop immediately and change the location of the battery or cable tie the battery in place to avoid this happening repeatedly.

Zero switch (for customers with the Halo magnetic battery)

The battery is equipped with a zero function which zero's out the inclination. This can be useful if drilling on an incline that is not plumb, such as inclined piers. It's also useful if a greater accuracy is required. A colour sequence displays on the Halo LED ring to give the operator an indication of zero mode. Press the switch to activate zero mode and the Halo LEDs will all flash blue for a moment. When in zero mode, the middle section of the LED array will illuminate blue. To exit zero mode, press the switch again and the LEDs will all flash white for a moment. Now the middle section of the LED array will display white. It's not recommended to zero the Halo beyond 30° from plumb. The zero switch is of a type which has no mechanical movement. This improves the longevity and reliability of the switch. The lack of noticeable movement does not indicate a fault. To activate the switch, tap and press heavily on the top of the switch and observe the LED changes.

Charging the battery

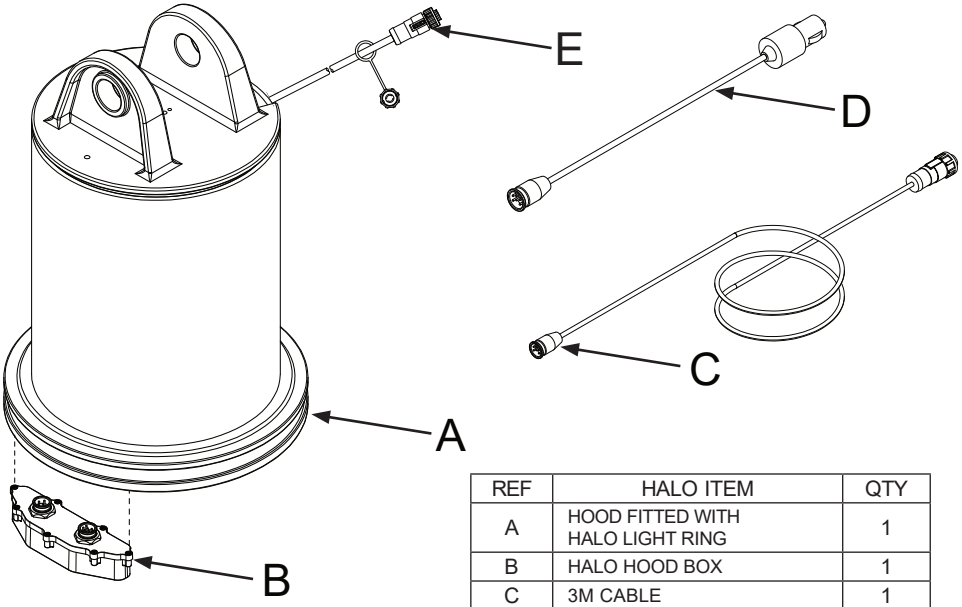
The battery should be charged after every use and at least once every 3 months if not used regularly. This type of lithium battery will have a prolonged life if charged after or before each use. Make sure the battery is never left hanging by the charger cord as this could result in failure over time. The charger should only be used indoors and out of direct sunlight in a cool, dry place (similar to where and how you would charge a mobile phone). The battery should be charged fully before first use. Batteries are shipped at 30% charge as per recommended practise.

Best practices

When connecting power to the Halo, allow the drive to hang stationary (no movement) for 30 seconds for the system to perform a start-up calibration. If this isn't permitted, the calibration may not complete.

While HALO is not in use, while being transported or stored, place the yellow lead-in cable into the hood to protect it from potential crushing damage. Ensure cable is connected to the hood or hoses before placing into the hood to avoid cable from falling out of reach.

COMPONENTS LIST



REF	HALO ITEM	QTY
A	HOOD FITTED WITH HALO LIGHT RING	1
B	HALO HOOD BOX	1
C	3M CABLE	1
D	CIGARETTE LIGHTER PLUG	1
E	LEAD IN CABLE	1

SERVICING AND DISASSEMBLY NOTES

When disassembling any part of the Halo, please ensure all parts are reassembled in the same order and orientation to avoid any problems. When lowering the hood onto the drive, make sure no cables are crushed in the process. Once reinstalled, make sure no cables exiting the hood can be crushed. The Power cable needs to have 400-500mm slack inside the hood to ensure it does not strain on the hood box connector. Make sure a cable tie is used to secure this length of slack in the Power cable inside the hood by tying the power cable firmly to one of the hydraulic hoses (with the slack inside the hood). The power cable should then be re-wrapped in the black spiral wrap to protect from damage in use.

When reinstalling the LED ring and cable, the LED ring groove should face down (away from the top of the hood). The cable exits a groove in the hood ring which correctly orientates the LED ring. It's important that the plastic groove of the LED ring faces downwards otherwise the LED lights won't show correctly.

Hood boxes are factory calibrated when assembled. If the hood box is removed from the mount or the hood has been removed for servicing, it's likely this will change the position of the sensor slightly, resulting in a slight offset. This can be dealt with by zeroing the Halo prior to each use where precision is required, or the Halo can be recalibrated by Digga (details of this procedure including cost are to be advised at a later date).

TROUBLE SHOOTING

Reference	Problem observed	Possible reason	Troubleshooting steps
1	Halo shows flickering readings	Drilling environment	When drilling in hard or rocky ground, the inclination readings can be prone to misreading or abnormal behaviour. The inclination sensor is sensitive and much like hitting a spirit level with a hammer, drilling in hard or rocking ground can cause issues with the Halo system. If the readings are not useful in such applications, either the operator can bring the drive to a halt to take a valid reading from the Halo at rest, or disconnect the Halo whilst that ground is making it difficult to produce a useful reading.
2	Halo freezes	Drilling environment	If the Halo sensor becomes overwhelmed with erratic sensor data from rough ground, it's possible for the instruments that senses the inclination to enter an error state. Restarting the Halo will remove this error state.
3	Halo shows incorrect readings	Zero mode is active (using the Halo battery)	In normal drilling mode, the Halo will display white in the centre of the LED array when the green and red array show. If the centre shows blue, the zero mode is activated. To return to normal drilling mode, either press the zero mode button again and the LEDs will flash all white for a moment, or turn the Halo off and on by unplugging the battery.
4	Halo shows incorrect Readings	Start-up calibration incomplete	Make sure the auger drive is hitched and hanging approx. plumb before connecting the battery. After connecting the battery, the drive with the Halo must be still for 30 seconds. During this time you may notice the lights moving even though the drive is still. After 30 seconds, the Halo will have finished the start-up calibration will be showing the correct LED sequences.
5	Halo doesn't turn on	Faulty 12V supply	Check that the red light is glowing on the cab cable (12V cigarette plug). If the red light isn't displaying, the 12V socket may be faulty.
6	Halo doesn't turn on	Damaged cable extension	Check for any damage to any exposed cables. Cable damage could indicate a discontinuity and require a replacement.
7	Halo doesn't turn on	Damaged lead in cable (yellow tail)	The lead in cable with the yellow tail connects the Halo hood box to the cable system outside of the hood. If this cable is damaged it will require a replacement to be installed by removing the hood which needs to be performed by a qualified Digga service technician.
8	Halo doesn't turn on	Damaged or failed Halo component	If the Halo hood box or LED ring is damaged or has experienced a failure and requires a replacement, please contact Digga service for assistance.

WARRANTY

All new Digga products are warranted to be free from defects in materials or workmanship, for a period of twelve (12) months from date of original purchase which may cause failure under normal usage and service when used for the purpose intended.

In the event of failure within twelve (12)months from initial retail sale, lease or rental date (excluding cable, ground engaging parts such as sprockets, digging chain, bearings, teeth, tamping and demolition heads, blade cutting edges, pilot bits, auger teeth, auger heads & broom bristles), furthermore the warranty does not cover against damage caused by the incorrect use, storage or neglect. If after examination, Digga determines failure was due to defective material and/or workmanship, parts only will be repaired or replaced. Digga may request defective product or products be returned prepaid to them for inspection at their place of business at 4 Octal Street Yatala, Queensland, or to a location specified by Digga. Any goods returned to Digga by the customer under warranty or repair must have all freight charges prepaid for on the customers account.

The warranty will be considered void if the product or any part of the product us modified or repaired in any way not expressly authorized by Digga, or if closed components are disassembled prior to return. Closed components include, but are not limited to: gearboxes, hydraulic pumps, motors, cylinders and actuators.

Any claims under this warranty must be made within fifteen (15) days after the Buyer learns of the facts upon which such claim is based. All claims not made in writing and received by Digga outside the time period specified above shall be deemed waived.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED AND THERE ARE NO WARRANTIES OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL DIGGA BE LIABLE FOR CONSEQUENTIAL OR SPECIAL DAMAGE.
DIGGA'S LIABILITY FOR ANY AND ALL LOSSES AND DAMAGES TO BUYER, RESULTING FROM ANY CAUSE WHATSOEVER, INCLUDING DIGGA'S NEGLIGENCE, IRRESPECTIVE OF WHETHER SUCH DEFECTS ARE DISCOVERABLE OR LATENT, SHALL IN NO EVENT EXCEED THE PURCHASE PRICE OF THE PARTICULAR PRODUCTS WITH RESPECT TO WHICH LOSSES OR DAMAGES ARE CLAIMED, OR, AT THE ELECTION OF DIGGA, THE REPAIR OR REPLACEMENT OF DEFECTIVE OR DAMAGED PRODUCTS.

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