DIGGA®

HALO

Field Test Unit - 2019

OPERATORS MANUAL

PM-000198

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 drill 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 battery. After connecting the battery, 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.

Battery placement

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.
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

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.

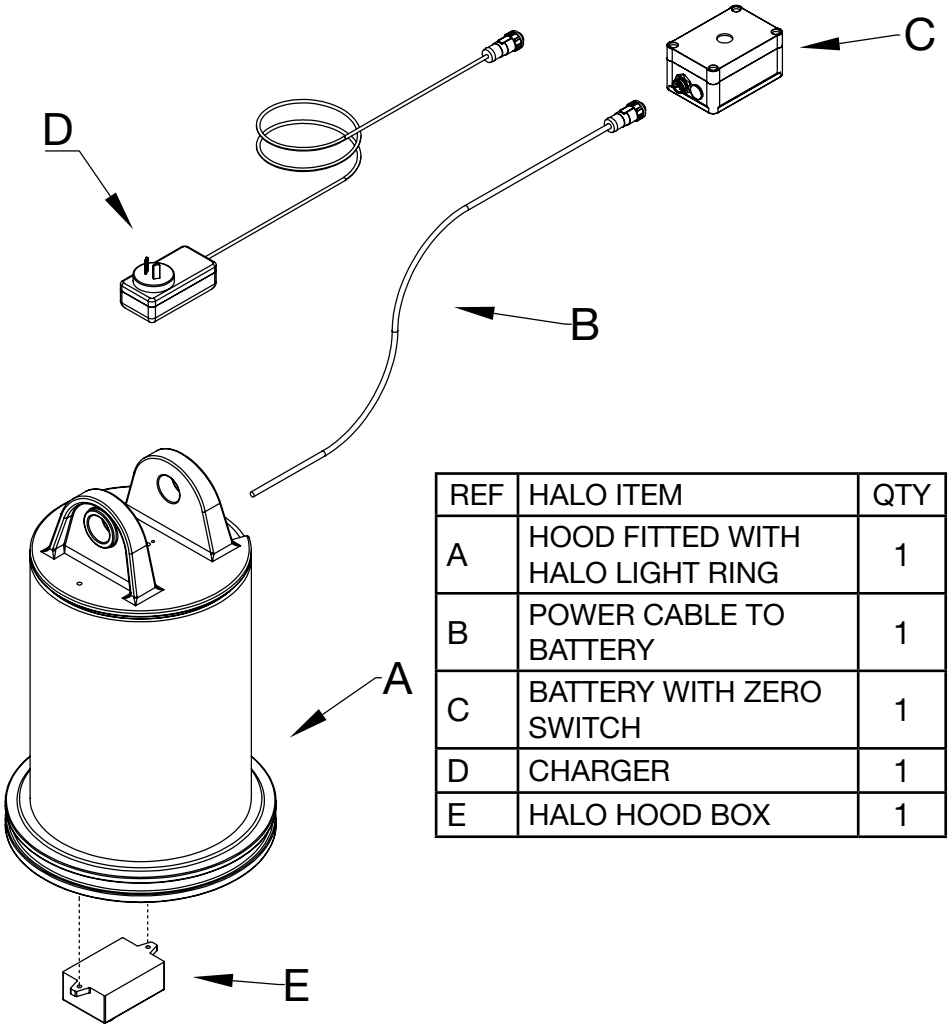
Charging the battery
The battery should be charged after every use and at least once every 3 months if not used regularly. This type of lithium battery will have a prolonged life if charged after or before each use. Make sure the battery is never left hanging by the charger cord as this could result 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 practice.

Best practices
The Halo Version 1 does not feature an on/off button for simplicity. The system will turn on when the battery is connected and will turn off when disconnected. When connecting the battery 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. It's not necessary to use the zero function however if accuracy is important for a specific drilling application it is recommended to manually align the drive to a completely plumb orientation and use the zero mode set absolute plumb. Whilst the Halo is calibrated to plumb prior to delivery to customers, using the zero function to set absolute plumb at the beginning of each day when accuracy is important will remove any error caused by possible drift over time.

Limitations
The Halo uses an inclinometer instrument to measure the angle 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 angle of the Halo is sensing the angle of the drive, not the auger.
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 their drilling, simply stop the rotation of the auger or pile for a brief moment and the calculation will display an accurate reading with which the operator can adjust their machine and recommence drilling. 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 battery 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 to remove the debris. If pressure washing and normal cleaning methods do not prevail, a screw driver will scratch the clear plastic but will remove any caked on mud. Do not under any circumstances use a hammer or any other device to chisel at the LED ring.

COMPONENTS LIST



REF	HALO ITEM	QTY
A	HOOD FITTED WITH HALO LIGHT RING	1
B	POWER CABLE TO BATTERY	1
C	BATTERY WITH ZERO SWITCH	1
D	CHARGER	1
E	HALO HOOD BOX	1

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.

12/24V alternative supply:
Connecting directly to another battery or charger to run the Halo will result in possible failure of the electronics.

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°

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 doesn't turn on	Charger supply	Check that the 240V outlet that's being used to charge the battery is working correctly by testing another appliance (cell phone charger for example).
2	Halo doesn't turn on	Charger fault, flat battery	If the 240V socket is active, check whether the dim green light is illuminating on the charger. If it is not glowing at all, the charger could be faulty. When plugging the charger into the Halo battery, the light should change to red when charging and back to green once charged. If the charger does not exhibit that behaviour, it could be faulty.
3	Halo doesn't turn on	Dirty or corroded terminals	Unplug all the connectors from all parts of the Halo including the hood box (part E). Check that all the connectors are clean and free from any corrosion. Plug all the parts back together to check if a dirty terminal has caused a discontinuity.

4	Halo doesn't turn on	Battery or power cable fault	Plug the halo charger directly into the hood box. Disconnect the power cable (part B in the list of Halo items) and plug the charger (part D) directly into the Halo hood box (part E). This will run the halo system directly from the charger which is plugged into the 240V socket. If bypassing the battery and power cable results in the Halo LEDs turning on, the battery or power cable are faulty or damaged. If this step doesn't produce any life from the Halo LED ring, check the connectors inside the hood on part E. Also check if there is any damage to the cable that runs from the LED ring inside the hood to part E. If there is no connection problem or damage to these parts, the LED ring or hood box could be faulty.
5	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.
6	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.
7	Halo shows incorrect readings	Zero mode is active	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.
8	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.

Australian Designed and Manufactured