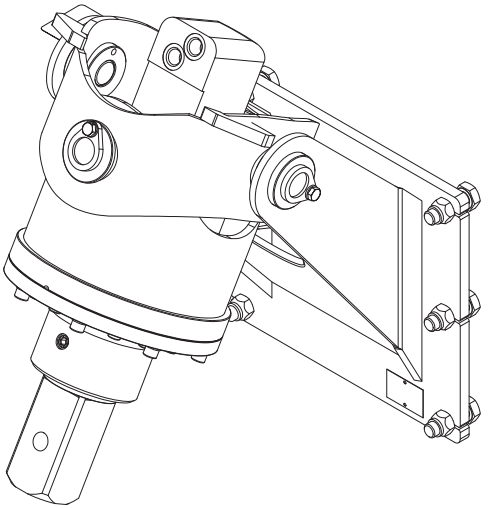
MINI MACHINE DRIVES
OPERATOR'S MANUAL



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SCAN THIS QR CODE

ACCESS OPERATOR MANUALS
RISK ASSESSMENTS AND MORE

PM-000264

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DECAL IS APPLIED TO THE ATTACHMENT

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DECAL TO BE APPLIED TO WINDOW OF MACHINE

ACCESS OPERATOR MANUALS RISK ASSESSMENTS AND MORE

Table of Contents

Table of Contents 3
Critical Information - Service Intervals 4
To the Purchaser 5
Product Identification 6
Preparation for use 8
Safety Precautions - General Information 9
Safety - Working with the Attachment 16
Safety - Decal Labels 19
Safety - Decal Locations 21
Before Use 22
Commissioning Procedure 24
Operating Instructions 28
In-line Pressure Relief Valve 36
Maintenance 39
Technical Specifications 46
Spare Parts 47
Troubleshooting 48
Notes 50
Halo Alignment System 51
Warranty Statement 59

Critical Information - Service Intervals

NOTE

Do not connect or operate your planetary drive unit without first having read and understood the following statement.

Your Digga Mini Machine Drive unit is a high performance attachment that is designed for drilling, screw anchoring (Pier) installation, core barreling and other extreme applications where it is seeing high levels of torque. To avoid premature wear and failure, and to fulfil your terms of warranty please read this statement.

All Digga Mini Machine Drive units must have a first oil change within the first 30 hours (extreme use) or 50 hours (moderate use) or 3 months of use, which ever comes first to ensure the bed in of the drive unit. For more detailed information please read the maintenance section of this manual.

If the first oil change is not performed within this period, excessive wear within the gearbox will occur that will cause premature failure and all Warranty will be voided.

Oil must then be changed thereafter every 300 hours (extreme use) or 500 hours (moderate use) and a full service every 12 months must be performed by an authorised service agent to ensure Warranty requirements are met.

In the event of a failure under the warranty period:

- Contact Digga immediately, do not disassemble your drive without first obtaining written permission and instructions from Digga.
- Proof of service must be provided in hard copy form of both operational and service history records (including serial number of gearbox and hydraulic motor). Service must be performed by an authorised Digga service agent.

To the Purchaser

Thank you and congratulations on the purchase of your new Digga Mini Machine Drive.
This product was carefully designed and manufactured to give you years of dependable service. It is mandatory to read these instructions to keep the equipment running in top working condition.

Before Operation
Inspect the attachment for shipping damage and if any damage does exist, do not operate until the damaged parts have been replaced or repaired. The primary responsibility for safety with this equipment falls to the operator. Make sure the equipment is operated only by trained individuals that have read and understood this manual. If there is any portion of this manual or function you do not understand, contact your local authorized Digga dealer or the manufacturer to obtain further assistance. Keep this manual available for reference. Provide the manual to any new owners and/or operators.

About This Manual
This manual has been designed to help you do a better and safer job. **Read this manual carefully and become familiar with its contents before connecting and operating this unit.**

Service
Use only manufacturer replacement parts. Substitute parts may not meet the required standards.

CAUTION

Never allow anyone to operate this attachment without reading the “Safety precautions” and “Operating instructions” sections of this manual. Always choose hard and level ground to park the vehicle on and set the brake, so the unit cannot roll.

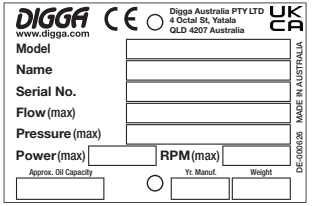
Product Identification

MODELS COVERED IN THIS MANUAL		
MINI MACHINE DRIVE		
MM-09K	**MM-10K**	**MM-14K**

Your Digga Mini Machine Drive model provides important information about the product. Compare the model engraved on the serial plate to the list above.

Product Identification

Your Digga Mini Machine Drive is a user non serviceable part. Unauthorised disassembly will void warranty. When servicing or assembling your product, use only genuine Digga replacement parts. Substitute parts may not meet the standards required for safe and dependable operation. Use of non genuine Digga parts will void warranty and Digga accept no liability what so ever for consequential or special damages. All service must be performed by qualified professionals. Contact your local Digga dealer for details. To facilitate warranty or service, record the model and serial number of your unit in the space provided on this page. This information may be obtained from the identification plate located on the product



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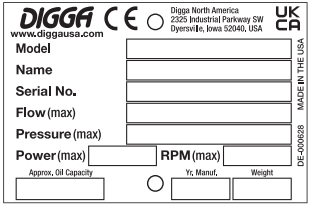


DE-000628 (only North America)

Model: _____

Serial Number: _____

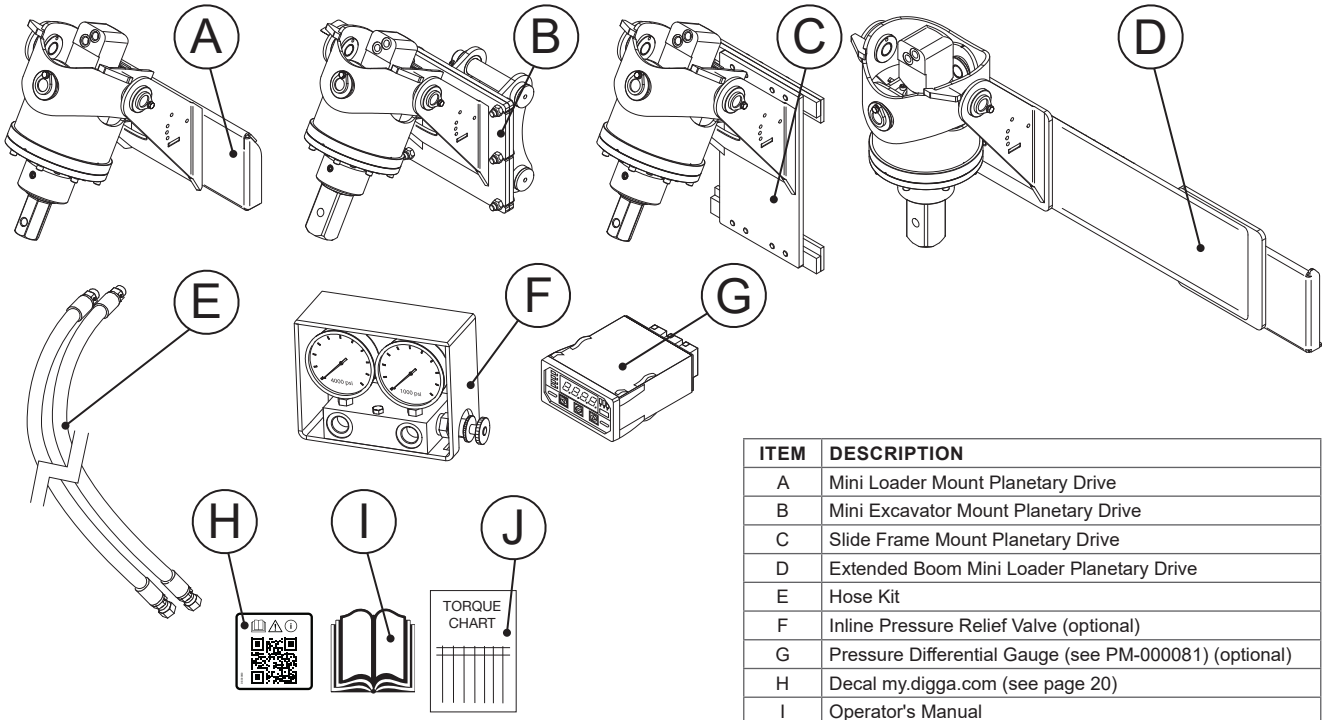
Purchase Date: _____

NOTE

The parts department needs this information to ensure accurate parts can be sent to the authorized service agent.

Preparation for use

To avoid any inconvenience before operation, please check that you have received the following items which you may have ordered. Items may differ depending on type of machine the Mini Machine Drive is to be fitted to.



ITEM	DESCRIPTION
A	Mini Loader Mount Planetary Drive
B	Mini Excavator Mount Planetary Drive
C	Slide Frame Mount Planetary Drive
D	Extended Boom Mini Loader Planetary Drive
E	Hose Kit
F	Inline Pressure Relief Valve (optional)
G	Pressure Differential Gauge (see PM-000081) (optional)
H	Decal my.digga.com (see page 20)
I	Operator's Manual
J	Torque Chart (see page 38)

You must understand all safety statements shown on your attachment and in this manual. Especially note the information called out by the designations shown below. Follow these safety precautions, when operating or maintaining the attachment.

DANGER

The DANGER designation indicates an imminently hazardous situation that, if not avoided, will result in death.

WARNING

The WARNING designation indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury.

CAUTION

The CAUTION designation indicates a potentially hazardous situation that, if not avoided, could result in minor or moderate injury or property damage.

NOTE

You will also see information called out with the NOTE designation. This additional safety or general information is important to the maintenance and operation of your loader.

During day-to-day operation of your attachment, you will encounter a variety of situations beyond those listed in this manual. We encourage you to assess the risk present at any job site and in every work task before beginning work. Apply appropriate risk mitigation strategies to make safety a first priority at all times, and if these are not sufficient, stop the job and immediately seek the help of a qualified safety consultant.

Safety Precautions - General Information

Know where utilities are

- Observe overhead electrical and other utility lines. Be sure the equipment will clear them.
- Before starting any digging project, lodge an enquiry with BYDA (Before you Dig Australia) or your local utilities location service for the identification of buried electrical, telephone, cable wires, gas, water and sewer lines are likely to be present. Unintentionally disrupting these hidden hazards while working with your machine can result in dangerous situations and property damage.
- Only commence works after having received and studied the underground plans and information thoroughly. Never begin work until the work area has been fully marked for underground utilities.
- For more information about digging best practices access www.byda.com.au. Many countries offer a similar service which advises the location of underground services in your area. If available use this service prior to digging, drilling, trenching or any form of excavating and earthmoving.

CAUTION

You must ensure that underground utilities have been officially marked before working in the area. Markings must be valid according to state law or practice.

Exposure to Respirable Crystalline Silica Dust Along with Other Hazardous Dusts

- It is recommended to use dust suppression, dust collection, and if necessary personal protective equipment during the operation of this or any other machine attachment that may cause high levels of dust.

Remove Paint Before Welding or Heating

- Hazardous fumes/dust can be generated when paint is heated by welding, soldering, or using a torch.
- Do all work outside or in a well ventilated area and dispose of paint and solvent properly.
- Remove paint before welding or heating. When sanding or grinding paint, avoid breathing the dust.
- Wear an approved respirator. If you use solvent or paint stripper, remove stripper with soap and water before welding. Remove solvent or paint stripper containers and other flammable material from area. Allow fumes to disperse at least 15 minutes before welding or heating.

End of Life Disposal

- At the completion of the useful life of the Mini Machine Drive, drain all fluids and dismantle by separating the different materials (rubber,steel, plastic, etc.). Follow all federal, state and local regulations for recycling and disposal of the fluid and components.

Operating the Mini Machine Drive

- The primary responsibility for safety with this equipment falls to the operator. Make sure that the equipment is operated only by trained individuals, who have read and understood this manual.
- An operator must not use drugs or alcohol, which can change his or her alertness or coordination. An operator taking prescription or over-the-counter drugs should seek medical advice on whether or not he or she can safely operate the equipment.
- Don’t hurry the learning process or take the unit for granted.
- It is the skill, care, common sense, and good judgment of the operator that will determine how efficiently and safely the job is performed.
- Visually inspect your equipment, ensure correct assembly and installation is done and never operate the equipment that is not in proper working order.
- Know the capabilities of your equipment and practice its operation to become familiar with the controls, emergency shut down procedures, and the way it handles on your machine.
- Follow all safety decals and keep them clean. Replace them, if they become worn, damaged or illegible.

Safety Precautions - General Information

- Do not paint over, remove or deface any safety signs or warning decals on your equipment.
- Operate only from the operator's station and operate only in daylight or with sufficient artificial light.
- Always carry loads close to the ground and do not exit the machine with the machine boom raised.
- Do not exceed rated operating capacity (ROC) of the host machine, as machine may become unstable resulting in loss of control. Overloading or exceeding the manufacturers specifications will also void all warranty.
- Always lower the loader arms or the machine boom to the ground, shut off the engine and remove the key before getting off the unit.
- Remove the Mini Machine Drive from the parent machine before transporting to and from the job site.
- Never use the attachment on a machine that is not equipped with a cab rollover protective structure (ROPS) and/or falling object protective structure (FOPS), and operator restraints (seat belts or equivalent devices). Although, this is not applicable when using this attachment on a stand-on mini loader.
- Establish and maintain a minimum 6 meters (20 feet) exclusion zone around the working area. No person other than the operator should enter the work zone, while the parent machine's engine is running.
- Do not allow site workers to climb on the attachment at any time, including while stationary, in operation or being moved.
- Avoid steep hillside operation which could cause the machine to overturn. Consult your machine operator's and safety manual for maximum allowable incline.
- Reduce speed when driving over rough terrain, on a slope, or turning to avoid overturning the machine.
- Travel only with the Mini Machine Drive in a safe transport position to prevent the uncontrolled movement.
- Drive slowly over rough ground and on slopes.
- Tether any auger, anchor or extensions connected to the Mini Machine Drive with a chain if necessary, to prevent uncontrolled swinging of the attachments.
- Drill stem rotation must be stopped before adding or removing sections, or marking adjustments to the drill stem or sampling equipment.

- Augers shall be cleaned only when the rotating mechanism is in neutral and auger is stopped. Long handled shovels shall be used to move cuttings from the auger. Materials heavier than 10 kg (22 lbs) must be moved mechanically or by two people.
- Do not drive close to ditches and excavations, etc., as cave in could result.
- Flow and pressure gauges, fittings, and hoses must have a continuous operating pressure rating of at least 25% higher than the highest pressure of the system.
- All operations must be stopped in the event of local thunderstorm or lightning activity. During operation, weather conditions shall be monitored, operations shall cease during electrical storms or when electrical storms are imminent. Ground personnel and bystanders.
- Be alert to others in the work area. Be sure others know when and where you will be working.
- Loose fitting clothing, long hair, jewellery and equipment which might become entangled in moving equipment are prohibited while working near the Mini Machine Drive .
- Operators, helpers, and other personnel working near the attachment must wear steel-toe safety shoes, safety glasses, and hard hats as a minimum. Hearing protection, respirators, and personal protective clothing will be specified in the site-specific Health and Safety Plan.
- The Mini Machine Drive shall be used only for their designed intent and shall not be loaded beyond their rated capacity. Overloading or exceeding the manufacturers specifications will void all warranty.

CAUTION

Wait for the mechanism completely stop before making any adjustments or cleaning.

Safety Precautions - General Information

DANGER

During Mini Machine Drive operation, maintain a minimum “no-work zone” buffer of 10 feet (3 meters) from any overhead electrical service and 6 feet (2 meters) from any underground service . All bystanders should be kept at a minimum of 20 feet (6 meters) away from the working area of the Mini Machine Drive.

Storing your Mini Machine Drive

- Seal hydraulic couplers from contaminants and secure all hydraulic hoses off the ground to help prevent damage.
- Clean the unit thoroughly by removing all mud, dirt, grease, etc..
- Inspect for visible signs of wear, breakage, or damage. If required, order any damaged parts and perform the necessary repairs to avoid delays upon removal from storage.
- Check that hydraulic motor and hoses are full of clean oil and apply grease to all grease nipple points.
- Coat liberally with grease the output shaft and collar, extension shaft and collar, and all connecting pins to prevent rust and reduce wear.
- Tighten loose nuts, cap screws, and hydraulic connections.
- Replace safety decals that are damaged or in an unreadable condition.
- Store unit in a dry and protected place, as leaving the unit outside will materially shorten its life.

Maintaining the Mini Machine Drive

- All maintenance should be performed with the engine turned off, parking brakes applied, machine arms lowered, and hydraulic pressure relieved.
- Lock out and tag out the equipment before repairs or maintenance is performed.
- Only properly trained and qualified individuals are permitted to perform repairs and maintenance.
- If lift arms must be left raised for any reason, use a positive lift arm lock to secure the arms in place. Serious damage or personal injury could result from lift arms accidentally lowering.
- Never adjust a relief valve for pressure higher than recommended by the machine's manufacturer.

Transporting the Mini Machine Drive

- When transporting your attachment, follow all local government regulations that may apply along with any equipment safety precautions provided in this manual.
- It is the responsibility of the operator that safe systems of work are employed while handling this attachment.
- No tie down points are provided on the attachment and its the responsibility of the operator to ensure that the attachment is firmly fastened without causing any damage to it.
- Do not attach tie down accessories in any way that may damage hoses or hydraulic components.
- Attachment should be well secured, when being moved or in transit and furthermore prior to moving, storing, loading/unloading,or parking.
- Verify that all tie down accessories (chains, slings, ropes, shackles, etc.) are capable of maintaining attachment stability during transporting and are attached in such a way to prevent unintended engagement or shifting of the unit.
- Use extra care when loading or unloading the attachment on to a trailer or truck and disconnect hydraulic couplers during the transportation. No responsibility for loss or damage to persons or property in any regard can be attributed to Digga.

Safety - Working with the Attachment

Complete a Risk Assessment

Your Digga Mini Machine Drive is a versatile earthmoving machinery attachment, capable of performing its tasks in a safe and effective manner. To ensure the safety of operators and others, it is important to document the work at hand for hazard and risk. Before beginning work, complete a risk assessment. The following steps provide a framework for this activity:

1	**DOCUMENT THE ACTIVITY** Assemble those involved in the activity. Write down the tasks required for the activity in step-by-step form.
2	**IDENTIFY THE HAZARDS** Next to each task, identify what part of the task may cause injury to those engaged in the task or others in the vicinity. Rate the consequences and likelihood of the hazard using the risk assessment matrix.
3	**DOCUMENT THE CONTROL MEASURES** Using the results from the risk assessment matrix, determine which hazards require attention. List all mitigation measures that are required to eliminate or minimize those hazards.
4	**IDENTIFY THE RESPONSIBLE PERSON** Document the name of the person responsible for implementation of the mitigation measure.
5	**MONITOR AND REVIEW** Ensure that the activity is supervised and that the documented process is being followed.

NOTE

Remember, Personal Protection Equipment (PPE) provides a level of protection during work, but PPE is the last level of hazard control and prevention. Always refer to the hierarchy of hazard control, when planning a safety process.

Take Extreme Care When Dealing with Hydraulics - Whilst Assembling, Operating, Maintaining or Performing any work on or near this product.

- Hydraulic fluid under pressure can penetrate the skin and may develop gangrene or other permanent disabilities. **Hydraulic leaks under pressure may not be visible!**
- If any fluid penetrates the skin, **get immediate medical attention!**
- Wear safety glasses, protective clothing, and use a sound piece of cardboard or wood when searching for hydraulic leaks. **Do not use your hands!**
- Before connecting or disconnecting hydraulic hoses, read your machine or power unit's operator manual for detailed instructions on connecting and disconnecting hydraulic attachments.
- Ensure that all parts meet the specifications for this product when installing or replacing hydraulic hoses or fittings.
- After connecting hydraulic lines:
  - □ Slowly and carefully raise the machine's arm/boom and cycle the rollback/dump cylinders to check hose clearances and to check for any interference.
  - □ Operate the hydraulics on this product to ascertain forward and reverse.
  - □ Ensure that the hoses cannot interfere with or actuate the quick-attach mechanism.
  - □ Ensure that hoses will not be pinched, or get tangled, in any equipment.
- Do not lock the auxiliary hydraulics in the "ON" position.
- Refer to host machine operator's manual and this manual for procedures and service intervals, then inspect and maintain the entire hydraulic system to ensure that the fluid remains clean, that all devices function properly, and that there are no fluid leaks.

NOTE

For any additional safety information please see "Risk Management Booklet". To obtain a copy of this document please contact Digga Head Office.

Safety - Working with the Attachment

When Mounting this Product to Your Machine

- Refer to the operator's manual of your host machine for any special or detailed mounting instructions regarding quick-attach mechanism.
- This product should fit onto the quick-attach frame or hitch (machine mount). If this product does not fit properly, contact your Digga dealer before operating.
- Where enabler 'Dead Man' controls are installed it is illegal to disengage, tamper with, or remove them.

WARNING

Never place any part of your body into the mounting plate, frame, hitch or loader holes. A slight movement of the power unit and this product could cause serious injury.

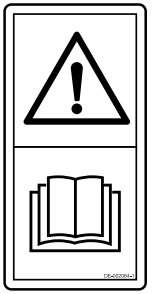
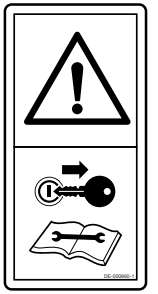
When Adjusting Servicing or Repairing this Product

- Do not make any modifications to your Digga Mini Machine Drive.
- When making repairs use only authorized Digga service agents and use only genuine Digga parts. For fasteners, hydraulic hoses, or hydraulic fittings, use only properly rated parts.
- Replacement parts must also have safety signs attached.

CAUTION

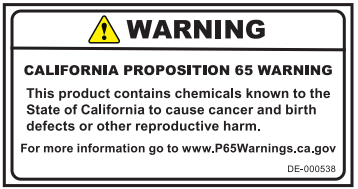
Wait for all moving parts to stop completely before making any adjustments or cleaning.

This section provides a glossary of safety labels found on your Digga Mini Machine Drive. These labels are important! Become familiar with both their meaning and location prior to operating the Mini Machine Drive. Ensure that each label is clean, visible, and legible at all times. To clean the decal, use a soft cloth, water, and soap. Avoid the use of solvents, gasoline, or other harsh chemicals, as these may damage the decal. If a label has been damaged or removed, it must be replaced.

READ OPERATOR'S MANUAL	REMOVE IGNITION KEY	ENTANGLEMENT / CRUSH HAZARD
		
DANGER **Completely read and understand this operator's manual before using your attachment. Keep the manual with the attachment at all times.**	**WARNING** **Before performing any maintenance on the planetary drive or attachment, switch engine off and remove the key. Never leave the key in an unattended machine.**	**WARNING** **Keep hands and body parts clear of the auger drive. Keep all bystanders at a safe distance (6 meters/20 feet) from operating auger drive and work zone.**

Safety - Decal Labels

PROPOSITION 65 WARNING



WARNING

This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. For more information access:

www.p65warnings.ca.gov

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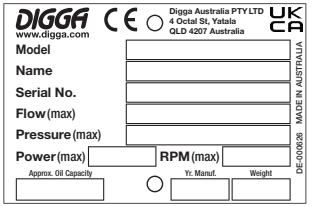
NOTE

Scan the QR-code to access:

my.digga.com

Find manuals, safety information, guides and more.

SERIAL TAG



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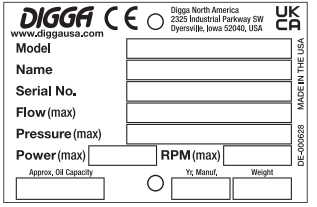
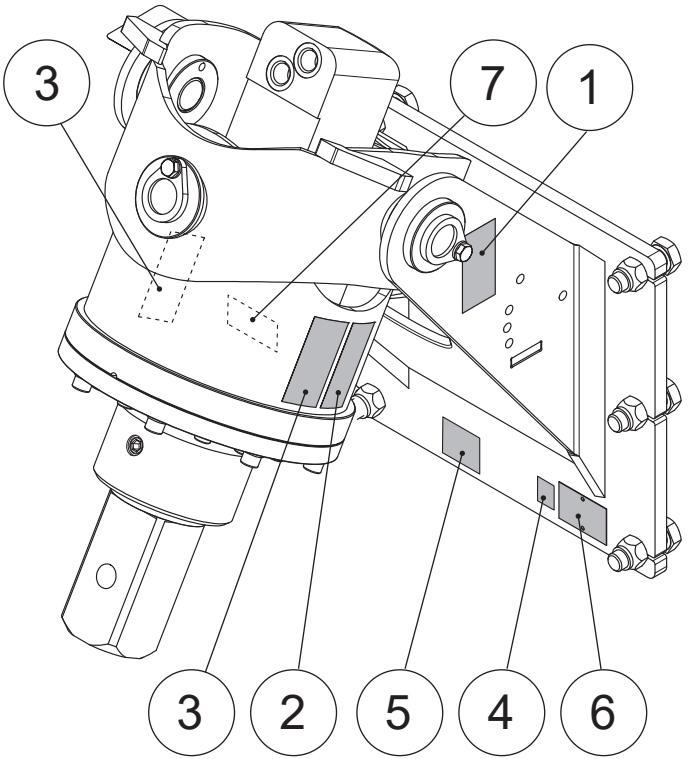


DE-000628 (North America)

NOTE

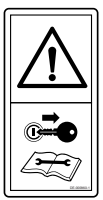
The serial tag plate depends on the region and contains model, serial number and technical specifications of the unit. See "Product Identification" on page 7.

ITEM	ORDER CODE	DESCRIPTION	QTY
1	DE-002064-1-SM	Read Operator's Manual	1
2	DE-000960-1	Remove Ignition Key	1
3	DE-000630-1	Entanglement / Crush Hazard	2
4	DE-000850	my.digga.com	1
5	DE-000538(1)	Proposition 65	1
6	DE-000626	Serial Tag	1
	DE-000628(1)		
7	DE-000046(2)	Before you Dig	1



Item 1

Item 2

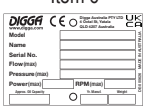


Item 3

Item 4

Item 5

Item 6



Item 7

(1) Only applicable to North America. See page 7.
(2) Only applicable to Australia. See page 10.

Before Use

The key feature of your Digga Mini Machine drive is low maintenance. Only regular oil changes are required. It contains no user serviceable parts, and unauthorised disassembly will void warranty. Written permission from Digga must be obtained before performing any disassembly.

DANGER

Safety first!! Read and understand the safety instructions before beginning any maintenance.

Before First Use

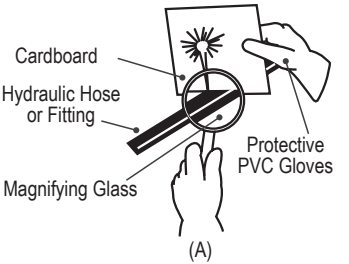
Inspect the Mini Machine Drive for shipping damage. If damage does exist, do not operate until the damaged parts have been replaced or repaired.

Before Each Use

- Make sure that all nuts and bolts are in place and properly tightened.
- Make sure that all other fasteners are in place and are performing their specified function.
- Make sure that all hydraulic fittings are tightened and that there are no leaks in any fittings or hoses.
- Make sure that all safety signs are in place, are clean, and are legible (see "Safety - Decal Locations" on page 21).
- Check for wear and tear on pins, linkages, cutting edges and replace any damaged parts and excessively worn parts.
- Use only manufacturer recommended replacement parts. Other parts may be substandard in fit and quality.
- Ensure any damaged or excessively worn parts are replaced.
- Always wear safety goggles or glasses when inspecting equipment.

WARNING

Escaping fluid under pressure as low as 100 PSI can have sufficient force to penetrate the skin up to 4" (100mm) away causing serious personal injury. Fluid escaping from a very small hole can be almost invisible. Use a piece of cardboard or wood, rather than hands to search for suspected leaks (A). Keep unprotected body parts, such as face, eyes, and arms as far away as possible from a suspected leak and use heavy duty PVC protective gloves. Flesh injected with hydraulic fluid may develop gangrene or other permanent disabilities.



WARNING

Always wear the correct PPE, when operating or performing maintenance on this attachment. If a hydraulic fluid injection injury occurs, seek emergency medical attention immediately. Explain to medical staff that the injury is the result of pressurized fluid injection. Remember that even if the point of entry appears as a minor pin hole, this potentially could be a major injury, especially if not treated in time.

Commissioning Procedure

The Digga Mini Machine Drive attaches to the tool bar/quick-attach/hitch mechanism of your machine. Due to this arrangement, thorough knowledge of the machinery controls is necessary for machine operation. Read and understand your machine operator's manual for information regarding machine operation before attempting to use the Mini Machine Drive.

When a Mini Machine Drive is purchased from DIGGA or a DIGGA Dealer/Distributor, the mount/attachment is matched for suitability and compatibility to the flow, pressures and load ratings of the original machine it was purchased for. For fitment of the Mini Machine Drive to other machines you must first contact your DIGGA dealer and receive written confirmation to ensure you do not incorrectly fit the attachment to a machine with higher pressure, or lower rated load capacities than what the product was designed for.

Warranty will be void if the Mini Machine Drive is fitted to an alternative machine without first receiving written confirmation from your DIGGA dealer. Exceeding the recommended maximum flow, pressure, or rated load capacity of the Mini Machine Drive as stated on the serial tag will void all warranty.

Check the work site and identify the extent of the work to be carried out and note any possible hazards or constraints. Overhead cables, underground utilities, services, etc. Check with relevant service providers on the location of these before commencement of any work (see "Know where utilities are" on page 10). Review the job at hand and determine the Mini Machine Drive is appropriate for the intended conditions. For example: Do not use it as a lifting device.

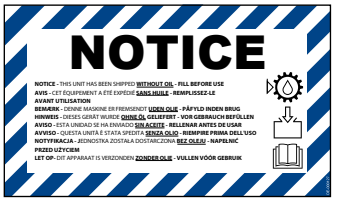
Operating Parameters - HP (KW) Power Ratings

The hydraulic motor of your planetary drive unit has a maximum power rating. Maximum pressure and flow cannot be achieved at the same time. Ensure you know and understand the maximum flow, pressure and power ratings of your drive unit and parent machine. Never exceed the maximum ratings listed on the following table. The following charts indicate the maximum capacities of the drive unit.

DESCRIPTION	MM-09K		MM-10K / MM-14K	
THEORETICAL TORQUE	8,235 ft lbf @ 3,500 psi	11,165 Nm @ 240 bar	10,478 ft·lbf @ 3,000 psi	14,206 Nm @ 205 bar
EXPECTED TORQUE (77% EFFICIENCY)	6,341 ft lbf @ 3,500 psi	8,597 Nm @ 240 bar	8,040 ft·lbf @ 3,000 psi	10,938 Nm @ 205 bar
MAXIMUM PRESSURE	3500 psi @ 15 gpm	240 bar @ 60 lpm	3,000psi @ 18.5gpm	205 bar @ 70 lpm
MAXIMUM FLOW	30 gpm @ 1,900 psi	115 lpm @ 130 bar	18.5gpm @ 3,000psi	70 lpm @ 205 bar
MAXIMUM POWER	33 HP	25 kW	33 HP	25 kW

All Digga planetary drive units are despatched from the factory full of fluids (hydraulic and gearbox oil) unless a warning decal is attached. The decal is only applied in special circumstances, for example if a drive unit needs to be air-freighted to the customer. Air transportation regulation prohibits certain fluids from being air-freighted. If there are no fluids in the drive unit at the time of despatching, then the decal DE-000127 will be applied to the drive unit.

Once you have determined if the drive unit has gearbox oil in or requires oil, ensure that the correct grade and quantity of oil is used. Do not run the drive unit without gearbox oil. Connect the hydraulic hoses to the drive unit and if required, to the Inline Relief Valve. See "In-line Pressure Relief Valve" on page 36. Some accessories available for the Mini Machine Drive such as the Pressure Differential Gauge (see PM-000081) and Halo (see "Halo Alignment System" on page 51) might require the connection of electrical harnesses.



Part Number: DE-000127

CAUTION

Before the drive unit is connected to the machine, ensure that it is full of hydraulic oil and the gearbox is full of gear oil. For details, see the Maintenance section of this manual.

Commissioning Procedure

All planetary drive units listed in this manual use ISO EP 320 (mineral oil) gearbox oil for operating in tropical ambient temperatures. See maintenance section of this manual for gearbox oil volume, gearbox oil volume checking as well as the gearbox oil recommended for cold climate conditions. The gearbox oil quantity is also engraved on the serial tag located on the pickup plate of the attachment. See page 21.
For commissioning in cold climate conditions, run the motor for approximate one hour at 30% of rated pressure before application to full load. Be sure that motor and gearbox are full of fluids prior to any load application. When procuring any hose assemblies for use on your Digga planetary drive unit ensure that the maximum operating pressure of the hoses is always 25% higher than what the excavator or machine can produce (which the planetary drive unit will be used on).

Installing your planetary drive

- Remove the shipping banding from around the attachment.
- Ensure you have read the serial tag on the drive unit to obtain the maximum flow and pressure ratings, and your machine flow and pressure settings are aligned with the requirements of the drive unit. Never exceed the maximum flow and pressure ratings as warranty will be voided.
- Follow all standard safety practices and the instructions for installing an attachment as shown in your machine operator's manual.
- Lower the unit to the ground and remove any attachments from the front of the host machine.
- Attach the quick attach mounting frame or hitch to the host machine as per the machine manufacturers specifications. Ensure the locking mechanisms on the machine are engaged and the attachment is secure.

- Relieve any pressure from the auxiliary hydraulic system and after making sure there is no foreign matter on the hydraulic couplers, connect the power and return couplers to the auxiliary hydraulic system of your machine. The list below shows the most common places to “tap” into the hydraulic system on various types of machines.
  - □ Mini Loaders - Auxiliary hydraulic outlets.
  - □ Mini Excavators - Auxiliary hydraulic outlets or bucket curl cylinder circuit.
- Filtration/Contamination - These units are fitted with a hydraulic motor, therefore require the oil to be of suitable cleanliness. Ensure hoses are clear of any contamination during connecting/disconnecting to prevent contaminants entering the hydraulic motor.
- Ensure all worn parts are replaced. Worn parts will become ineffective and severely diminish the overall performance of the planetary drive and auger.

NOTE

Ensure that the locking mechanism on your quick attach is engaged, therefore locking the attachment onto the machine. If there is any portion of this manual that you do not understand, contact your Digga dealer or Digga Head Office. Altering, tampering or dismantling any part of the Digga drive unit without written permission from Digga will void any warranty.

Operating Instructions

Cold Weather Startup Information

The information that is contained on this page is an aid to the operation and maintenance of your Digga planetary drive unit in cold weather. When you operate the host machine in temperatures from 9°C (48°F) to −40°C (−40°F) refer to the operation and maintenance manual of your machine. It is difficult to outline the operation and maintenance of a machine that is used in freezing temperatures for a general publication. The difficulty in outlining the requirements is caused by the following conditions:

- The unlimited differences in weather conditions
- Applications and ground conditions
- Supplies that are available in your area

In order to provide the best possible guidelines, use the information provided in this manual and other criteria such as: varying factors, recommendations from your machinery dealer, and past proven practices.

Hints for Cold Weather

Make sure that you read the information for selecting the correct oils for use in cold weather. For details refer to the Maintenance section of this manual. Prepare the machine for the weather conditions as instructed in your machines operator's manual.

Procedure for Startup in Cold Weather

- Your Digga planetary drive unit is designed to operate within ambient temperatures of 5°C (41°F) and 30°C (86°F).
- For temperatures below 5°C (41°F) it is recommended to slowly start the drive under no load, at minimum speed. This will allow warm hydraulic oil from your host machine to circulate through the hydraulic motor of your drive and slowly bring it to the minimum recommended operating temperature.
- Once the minimum temperature has been achieved it is recommended to slowly introduce load to the output of the drive unit, which in turn will increase the internal gear oil temperature.

NOTE

The host machines cooling system and the lubrication system for the engine do not lose heat immediately upon shutdown. The transmission and the hydraulic system lose heat more rapidly because of more exposed areas. The planetary gearbox and motor cases cool rapidly, since the cases do not operate as warm as other compartments. Therefore, after any period of down time on the machine, ensure you achieve full operating temperatures through following start up instructions. Thick oil can also cause high case pressures which in turn cause shaft seal problems.

Operating Instructions

Auger Installation

- Ensure the selected auger hub is compatible with your planetary drive shaft (Figure 1). Remove any pins from either the drive shaft or the auger.
- Position the auger in a way that allows your machine to align the drive shaft with the auger hub. Use mechanical assistance or teamwork if the load exceeds 55 lbs (25 kg). Consider using cradles to secure the auger vertically.See "Safety Precautions - General Information" on page 9.
- Insert the planetary drive into the auger hub, ensuring hole alignment (Figure 2).
- Insert the pin through the auger hub and drive shaft, then secure it in place with the lynch pin (Figure 3).
- Release the auger from its cradle (if applicable), lift it, and commence the work.

Fig.1

Fig.2

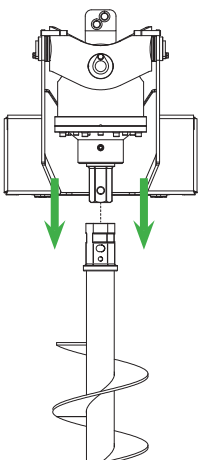
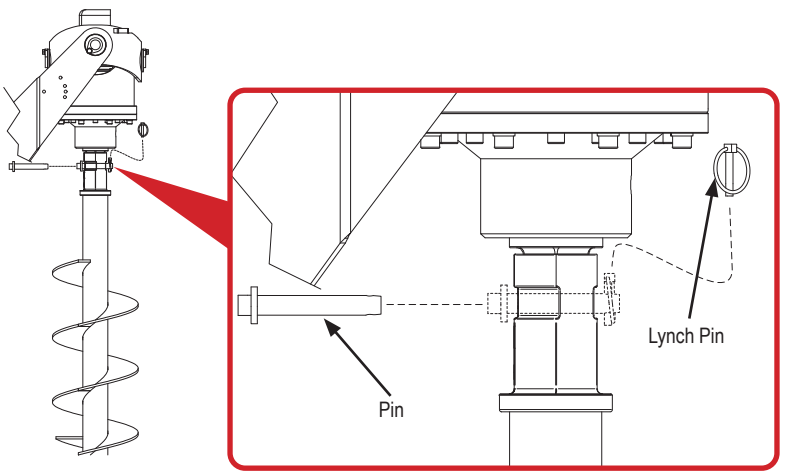


Fig.3



Operating Procedure - Augering

- This unit is designed for drilling vertical or horizontal holes or rotating piers into the ground. Use in any other way is considered contrary to the intended use. After all installation instructions have been completed, safety information read and understood, and the rest of this operator's manual has been reviewed, your Digga Mini Machine Drive is now ready for use.
- With the auger raised off the ground and the host machine's engine set at a low RPM, activate the host machine's drive control valve to determine which position the control valve lever must be in to turn auger in a forward (clockwise) rotation. This is the "digging" position.
- Before beginning to dig, experiment with auger speed to determine a suitable auger RPM. Generally in light and sandy soil a high RPM is desirable. In hard, rocky, or frozen soils a slower RPM is desirable. To increase auger RPM, increase host machine's engine RPM. To decrease auger RPM, decrease host machine's engine RPM.
- Raise the Mini Machine Drive so the auger hangs vertical. The 4-way swing (gimbal) should allow the auger to self-align vertically (plumb).
- Lower the auger into the starting position.

CAUTION

Your Digga planetary drive is specifically designed for drilling and rotational operation only, it is not a lifting device!

Operating Instructions

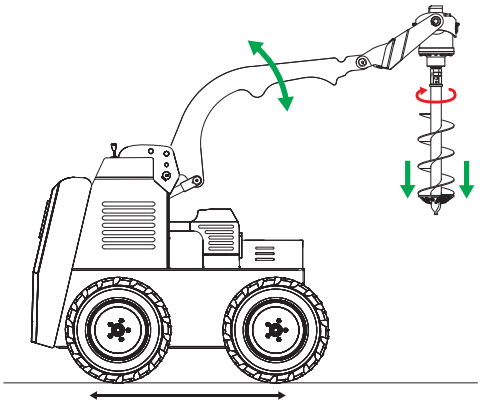
- Ensure the crowd on your machine is forward and not back. This will keep the drive unit clear of the machine mount and allow the auger to move freely from side to side and forward and back. The pendulum action must not be hindered otherwise damage / bending of the shaft or auger may occur.
- Lower the auger into the ground ensuring the auger drive does not stall and remains in a vertical position, start rotation of the auger.
- As the auger starts to load up with spoil, stop the rotation whilst still in the hole and raise the auger vertically. Move away from the hole, rotate the auger and stop, rotate the auger and stop in the forward direction to remove the spoil. **Do not rapidly engage forward/reverse action to remove spoil.**
- Do not remove the auger on an angle out of the hole, as you will run the increased risk of bending the auger or shaft.
- If trying to remove the auger full of material and you experience strong resistance, reverse the auger slowly whilst raising the auger vertically to assist with removal. Do not pull with the machine as you may run the risk of shaft damage to the drive.
- Do not flick the dirt (especially mud or clay) from the auger, as you may run the increased risk of bending the auger shaft.
- Keep clearing the auger hole regularly as you drill deeper. This will help prolong the life of the auger and the wear parts. In rocks it is recommended to add a slow stream of water to help the performance and life of the rock teeth.

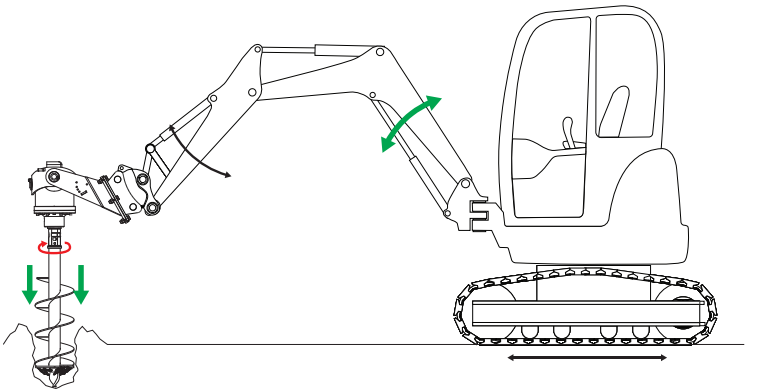
⚠ CAUTION

Do not rapidly engage forward reverse operation to remove soil from the auger, this creates excessive pressure spikes which will adversely effect performance and longevity of the motor.

For Mini Loaders - Apply the greatest amount of down force from the main boom. Be aware that the boom moves in an arc and to maintain a plumb drilling position. You will need to compensate for this movement by moving your machine backwards or forwards to ensure you are drilling straight. You must take extreme care when doing this to prevent the auger or screw pile from bending or pulling flights against the inside of the hole.

For Mini Excavators - Apply the greatest amount of down force from the main boom. Be aware that the boom moves in an arc and to maintain a plumb drilling position. You will need to compensate for this movement by adjusting the dipper arm or moving your machine backwards or forwards to ensure you are drilling straight. You must take extreme care when doing this to prevent the auger or screw pile from bending or pulling flights against the inside of the hole.





Operating Instructions

Operating Procedure - Extensions and telescopic auger extensions

Once you have obtained the maximum depth with the extension and auger you have, raise the auger out of the hole and clear the spoil from the auger. Place the auger back into the hole ensuring the auger is bottomed out in the hole and the hub of the extension is clear and easily accessible. Remove the auger pin to disengage the drive unit from the auger.

⚠ CAUTION

Ensure personal safety at all times. Determine if access to the auger hub, once the auger is in the hole, is safe. If not safe for persons assisting, place boards or covers across the hole before attempting to reach across to the hub.

- Install the additional extension onto the auger drive with pin and safety clip, lower the extension and attach to the auger with second pin and safety clip (lynch pin). Always ensure persons assisting are clear and visible to the operator at all times.
- Recommence drilling, once you have reached the maximum depth, raise the auger and extension out of the hole until the eyelets of the extension are visible and just above the hole. Slide the two support bars through the two heavy duty eyelets or U-brackets welded to the outer extension. Either then remove the pin and section of extension and place away from the hole. Then re-pin back to the bottom section, take the weight of the rest of the extension and auger on the machine and remove the support bars. Clear the auger and then keep repeating these steps.
- For telescopic extensions, use the same method as above, but slide the inner extension back into the auger and pin.

NOTE

Digga does not accept any liability for injury or damage resulting from the operator using the extension (s) outside the designed operating procedure.

Operating Procedure - Screw anchoring (pile/pier)

- Installation is to be performed by a trained and/or certified installer.
- Connect the manufacturer's approved adapters to the planetary drive head.
- Install the pile in one continuous motion until the desired depth and torque is achieved.
- The rate should match the pitch on the pile. Make sure to apply just enough downward pressure to help the advancement of the pile into the ground, but not to much that you are driving or drilling the pile into the ground. Always maintain a plumb line so that you do not bend the pile.

NOTE

It is the responsibility of the installer to correctly calculate, plan and execute the installation of the piers to the nominated required torques. Digga does not accept any liability or consequential loss that is incurred from incorrect installation, over torquing or under torquing of piles.

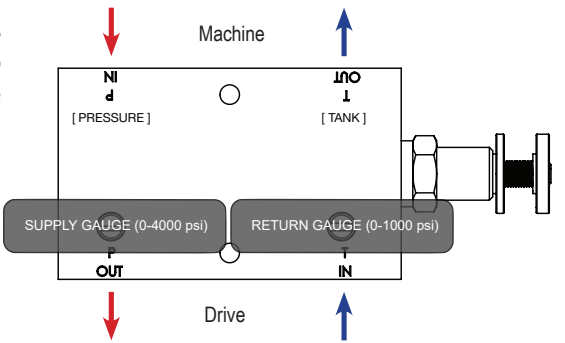
In-line Pressure Relief Valve

The Mini Machine Drive is compatible with the Inline Relief Valve (IRV), an essential accessory for screw-pile installation. This valve features two dial gauges for measuring supply and return hydraulic pressures, along with an integrated adjustable relief valve. The pressure difference can be correlated with torque using a torque chart. The relief valve can be adjusted to bypass hydraulic flow when the drive reaches the specified pressure/ torque, allowing for precise torque control while preventing potential damage to screw anchors. It can be used independently for estimating applied torque or with a calibrated torque measuring system. Always consult an engineer for the correct installation of screw pile foundations.

Installation

The IRV should be mounted in a location where the operator has a clear view of the gauge readings, and as close as possible to the drive unit. Consider the operational risks to select the valve placement . See "Complete a Risk Assessment" on page 16.

Fix the valve in place using bolts through the two holes provided on the body of the valve.



Connect the hydraulic lines to the valve ports as following:

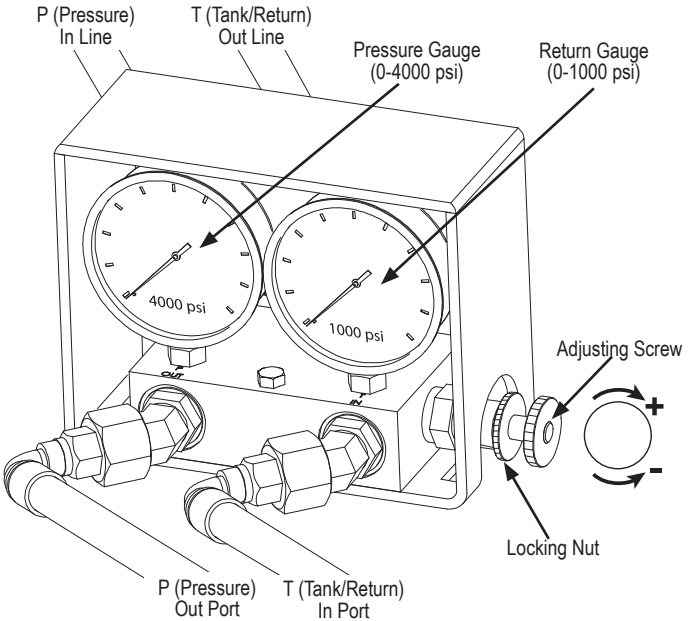
- Connect the 'P (Pressure) In' port of the IRV to the pressure source of your machine.
- Connect the 'T (Tank/Return) Out' port of the IRV to your machine's return line.
- Connect the 'P (Pressure) Out' port to the pressure side of the mini machine drive motor.
- Connect the 'T (Tank/Return) In' port to the return side of the mini machine drive motor.
- Connect the supply line gauge, that ranges from 0 to 4000 psi, to the ¼” NPT port on 'P' side.
- Connect the return line gauge, that ranges from 1000 to 4000 psi to the ¼” NPT port on 'T' side valve.

Ensure all connections are firm and the hoses are not chaffing. Hoses located within 1 meter (3 ft) from the operator must be sleeved with a burst protection, such as Eaton Guardian, or equivalent.

Setting the relief pressure

Once the Inline Relief Valve is correctly installed, you can independently adjust the pressure to your mini machine drive unit for precise torque control.

1. Observe the pressure reading on the supply (P) gauge.
2. Release the locking nut slightly turning it in a counter-clockwise direction.
3. To increase the pressure setting, turn the adjustment screw in a clockwise direction until the desired pressure setting is obtained.
4. To decrease the pressure setting, turn the adjustment screw in a counter-clockwise direction until the desired pressure is obtained.
5. Turn the locking nut in a clockwise direction to lock the adjustment screw.
6. Monitor the pressure using the attached gauges.

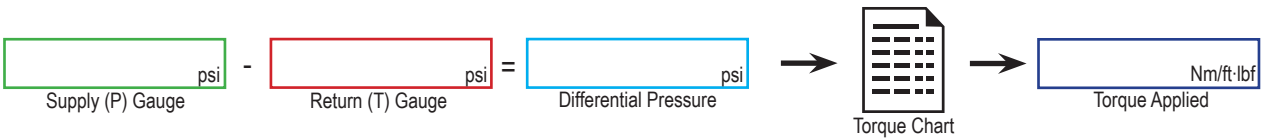


In-line Pressure Relief Valve

Reading

The difference between both gauge readings indicate the differential pressure, which correlates to the torque applied to the screw pile.

1. Read the pressure on the Supply (P) gauge.
2. Read the pressure on the Return (T) gauge.
3. Subtract the Return pressure from the Supply pressure. The result is the differential pressure. Refer to the torque chart supplied with you mini machine drive to determine the theoretical torque applied.



NOTE

The torque indicated is theoretical and it might be affected by several variables. Consider checking your readings with a calibrated monitoring system such as Digga Torque Logic, Digga Torque Hub or Digga Torque Spool. Consult a qualified engineer for the correct installation of screw pile foundations.

Oil Change

The gearbox oil capacity is engraved onto the serial tag located on the top of the hood.

Initial (Bed-in) Oil Change:

The first oil change must be carried out within the first 50 hours of use under moderate operating conditions. Thereafter, every 500 hours.

- Change the gear oil after the first 30 hours of severe operating conditions* (i.e. severe ambient temperature conditions of +40°C or below 0°C, when augering, screw piling or core barrelling in hard ground). Thereafter, every 300 hours.

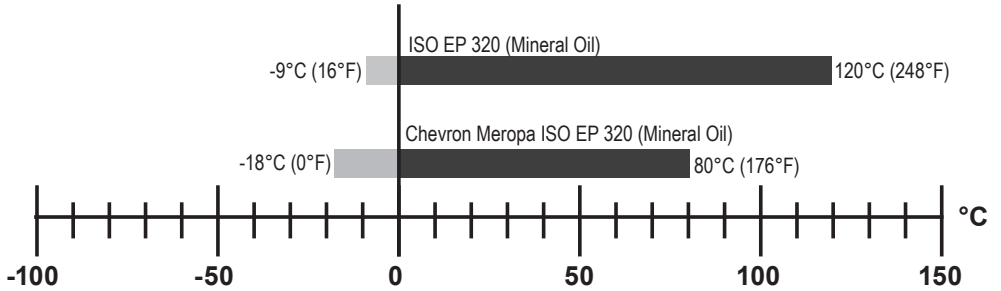
OIL CHANGE SCHEDULE	MODERATE OPERATING CONDITIONS	SEVERE OPERATING CONDITIONS*
FIRST OIL CHANGE	Within 3 months OR initial 50 hours of use	Within the first 30 hours of use
2ND OIL CHANGE PLUS SUBSEQUENT OIL CHANGES	After 500 hours or 12 months of use	After 300 hours of use thereafter (Drive requires a major stripdown, inspection and rebuild)
Gearbox Oil: ISO 320 EP (Extreme Pressure) Mineral Gear Oil. See chart on the next page.		

NOTE

***Severe/extreme operating conditions include but not limited to ambient temperature conditions of +40°C (104°F) or below 0°C (32°F), working in hard ground, anchor applications and/or extended and continuous hours of operation. The gearbox oil capacity is engraved onto the serial tag located on the planetary drive unit.**

Maintenance

Minimum and maximum gear oil operating temperature for gearboxes



Operating in Asia Pacific and Europe

The planetary drive unit in the Mini Machine Drive when operating in Asia Pacific and Europe uses extreme pressure (EP) gear oil ISO 320 viscosity (mineral oil) for lubrication of gears and bearings. Minimum and maximum gear oil operating temperatures for these regions is -9°C (16°F) to 120°C (248°F). Please contact your Digga specialist for the recommended gear oil if operating outside this range.

Operating in North America

The planetary drive unit on the Mini Machine Drive when operating in North America uses the gear oil Chevron Meropa ISO 320 (mineral oil) for lubrication of gears and bearings. Minimum and maximum gear oil operating temperatures for this region is -18°C (-0.4°F) to 80°C (176°F). Please contact your Digga specialist for the recommended gear oil if operating outside this range. Continuous operating temperature must not exceed 80°C. Instructions on how to warm up a drive if operating below 5°C (41°F) can be found in "Cold Weather Startup Information" on page 28. Please read and understand these instructions.

Procedure to Check the Gearbox Oil Level

Unfortunately, there is no provision to make a quick visual inspection of the gearbox oil level. There is no window or sightglass provision. The gearbox is filled to the correct level at the factory. Unless there are clear signs of gearbox oil leakage it should not require topping up between scheduled oil changes or services. To check the correct oil level see illustration in maintenance on page 42.

Procedure to Drain Gearbox Oil

It is advisable to replace the output shaft seal at the first oil change as this is the most important oil change to prolong the life of bearings and gears (see "Seal replacement" on page 45). The reasoning behind this is that whilst bedding in, gearboxes can generate fine metallic contamination. This will find its way to the lowest part of the gearbox and collect in the output seal thus allowing an abrasive paste to wear the output seal and the output shaft. It is advisable that oil changes are performed by a Digga Authorised Service Agent, however it is not always possible for many reasons to get this done by a Dealer however what is important is that the oil is changed at the required intervals.

1. Ensure that the gearbox is stable, secure and safe to work on prior and that the drive unit is vertical and that there is an appropriate sized drip tray to catch the drained oil.
2. Before commencing to drain any oil, check the serial tag of the unit to determine the quantity of oil which the gearbox holds. This will indicate the quantity of oil which has to be replaced into the gearbox and size of bucket needed to contain the oil. Remove the drain plug from the output housing. This will allow the bulk of the gearbox oil to drain out (this will not drain the gearbox entirely). The lower section of

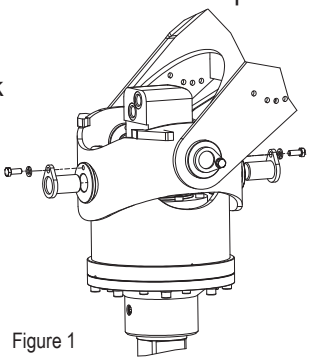


Figure 1

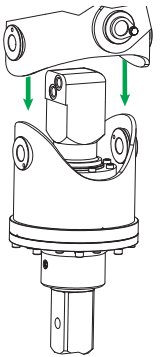


Figure 2

the output housing, below the plug will still contain some oil.

3. To drain the remaining oil it is recommended to remove the drive unit from the gimbal assembly.
4. Undo the bolts and remove the front and rear teardrop pivot pins (Figure 1).
5. Slide the drive unit out of the gimbal assembly and lie it on it's side with the bung hole facing down (Figure 2).
6. Once all oil has been drained follow the procedure on the following page to refill oil.

Procedure for Changing or Re-filling Gearbox Oil Level

- Lay the drive unit flat on the ground with the oil fill bung facing up. Using an 8mm (0.31") Allen key remove the bung. To drain oil, turn the drive until the hole is facing down. Allow to drain until all oil has been removed (Figure 3).
- Rotate the unit until the oil fill hole is sitting between 60º - 70º from horizontal (Figure 4).
- Once the filler hole is at approximately 60º the oil should be sitting at the base of the filler hole thread (Figure 5).

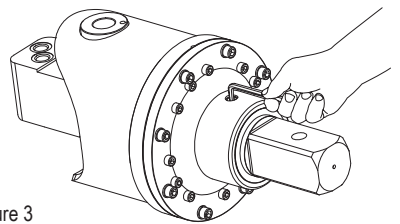


Figure 3

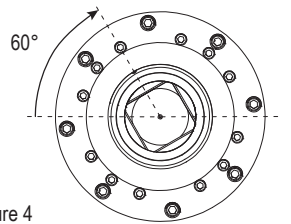


Figure 4

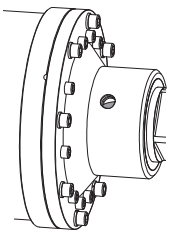


Figure 5

- If the oil level is too low to reach the thread it should be topped up. Rotate the unit so the filler hole is sitting at the top and add oil. Repeat steps 2 - 4 until you have achieved the correct level.
- Note that the oil takes time to work it's way through the gearbox. Allow time for it to settle once it has reached the bung hole. Then check the level again until all seepage has occurred.

NOTE

If your planetary drive unit is leaking oil after you have performed the daily checks, consult your local authorised service agent.

Gearbox Oil Capacity - Mini Machine Drives

DRIVE UNIT	OIL CAPACITY IN LITRES	OIL CAPACITY IN GALLONS (US)	OIL CAPACITY IN QUARTS (US)	RECOMMENDED OIL FOR GEARBOX
MM-09K	1.54	0.40	1.62	ISO EP320 Mineral
MM-10K	1.54	0.40	1.62	ISO EP320 Mineral
MM-14K	1.54	0.40	1.62	ISO EP320 Mineral

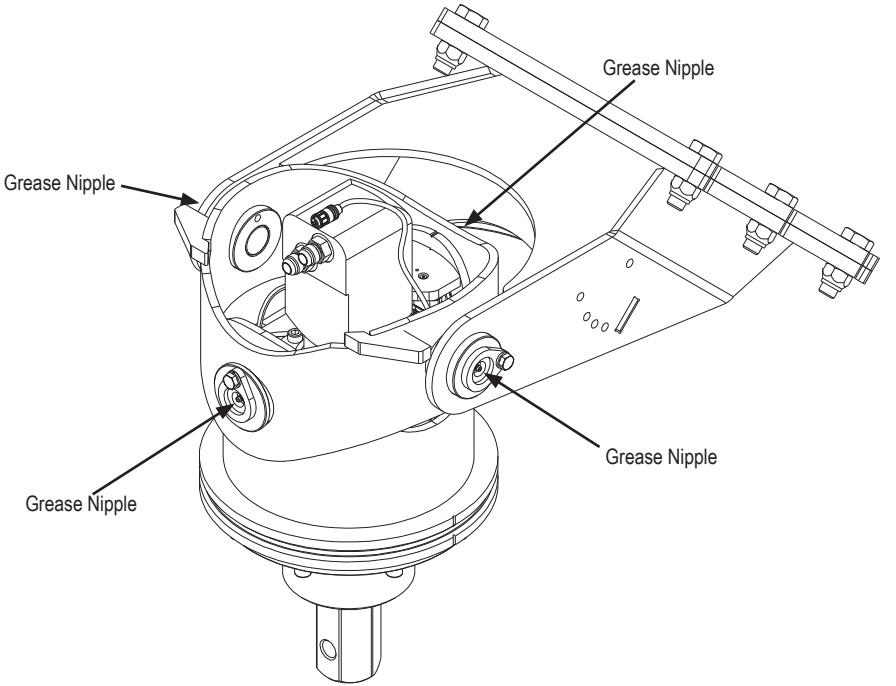
NOTE

Digga specified ISO EP320 mineral gear oil is specifically for “Extreme Pressure” industrial gearboxes. Oil capacity charts are estimated for a gearbox being filled the first time. When changing the oil, not all oil will drain out, there will always be some residual oil left in the gearbox. Follow the procedure to fill the gearbox, using the oil capacity charts as a guide only.

Maintenance

Greasing

The mini machine drive is mounted in a 4-way swing gimbal. Keep its 4 pivot pins well lubricated to allow the drive unit to swing freely by applying grease through the 4 grease nipples provided.



Seal replacement

1. Use a chisel to remove the shaft seal (Figure 1).
2. Clean the area where the shaft seal sits (Figure 2). It is recommended to clean the surface area with an alcohol-based cleaner.
3. Smear multipurpose grease to the inside of the new shaft seal (Figure 3).
4. Add threadlocker medium strength (e.g. Loctite 243) around the outside of the shaft seal.(Figure 4)
5. Insert new shaft seal and tap it into place with a hammer and level metal plate, until the seal is level with the housing (Figure 5).

Figure 1

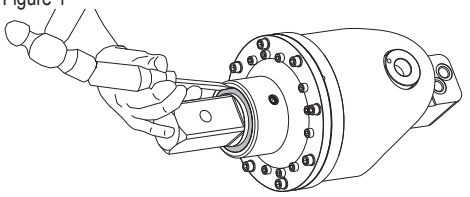


Figure 2

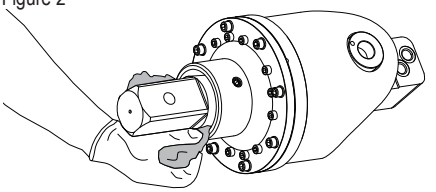


Figure 3

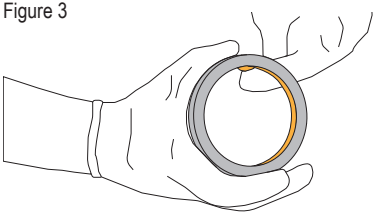


Figure 4

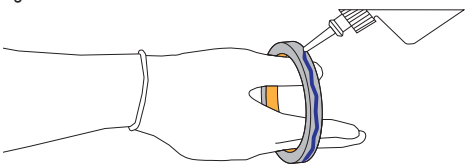
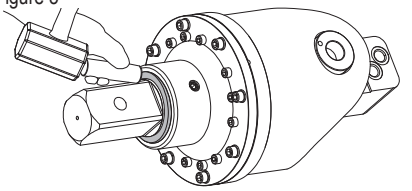


Figure 5



Technical Specifications

MODEL	MM-09K	MM-10K	MM-14K
STANDARD OUTPUT SHAFT	75mm square	2.5" Hex	75mm square
INLINE PRESSURE RELIEF VALVE	Optional		
HALO	Optional		
THEORETICAL TORQUE	11,165 Nm @ 240 bar / 8,235 ft lbf @ 3,500 psi	14,206 Nm @ 205 bar / 10,478 ft lbf@ 3,000 psi	
EXPECTED TORQUE (77% EFFICIENCY)	8,597 Nm @ 240 bar / 6,341 ft lbf @ 3,500 psi	10,938 Nm @ 205 bar / 8,040 ft lbf @ 3,000psi	
MAXIMUM POWER	25 kW / 33 HP		
MAXIMUM FLOW	115 lpm @ 130 bar / 30 gpm @ 1,900 psi	70 lpm @ 205 bar / 18.5 gpm @ 3,000 psi	
MAXIMUM PRESSURE	240 bar @ 60 lpm / 3500 psi @ 15 gpm	205 bar @ 70 lpm / 3,000 psi @ 18.5 gpm	

SPECIFICATION[1]	WEIGHT[3]		WIDTH		LENGTH		HEIGHT	
CONFIGURATION[2]	kg	lbs	mm	in	mm	in	mm	in
MINI LOADER	131	291	613	24.1	564	22.2	617	24.3
MINI EXCAVATOR (HITCH INCLUDED)	171	380	410	16.1	667	26.2	723	28.4
MINI LOADER EXTENDED BOOM	196	435	613	24.1	1530	60.2	1379	54.3
GEARBOX ONLY	63	140	290	11.4	290	11.4	612	24.1

[1]Does not include Halo, Inline Pressure Relief Valve or other accessories.
[2]This list does not cover all configurations available. Consult your Digga dealer for more information.
[3]Actual weights might vary between different mountings and configurations.

Spare Parts

For spare parts of your Mini Machine Drive, obtain the serial number from the aluminium serial tag located on the mount of the Mini Machine Drive. The serial number allows Digga to trace all production and service records. Ensure all service and maintenance is performed by an authorized Digga service agent and all service records are kept. For spare parts contact your nearest Digga dealer or Digga Head Office.

For further information on spare parts, please contact one of the Digga sales offices shown below, or contact your local authorised Digga dealer.

DIGGA INTERNATIONAL SALES OFFICES

ASIA PACIFIC

DIGGA HEAD OFFICE - BRISBANE
4 Octal St, Yatala QLD 4207
Phone: +61 7 3807 3330
Email: info@digga.com

DIGGA NEW SOUTH WALES
19 Mckay Close,
Wetherill Park, NSW 2164
Phone: 1300 2 DIGGA
Email: nsw@digga.com

DIGGA VICTORIA
17-21 Babbage Dr,
Dandenong, VIC 3175
Phone: 1300 2 DIGGA
Email: vic@digga.com

Web: www.digga.com

NORTH AMERICA

DIGGA NORTH AMERICA
2325 Industrial Parkway SW
Dyersville IA 52040
Phone: + 1 563 875 7915
Email: infous@digga.com

Web: www.diggausa.com

EUROPE

DIGGA EUROPE
Unit 1, Nexus Park
Plenty Close
Newbury, RG14 5RL
England, United Kingdom
Phone: +44 (0) 1488 688 550
Email: infouk@digga.com

Web: www.diggaeurope.com

Troubleshooting

Mini Machine Drive

TROUBLE	POSSIBLE CAUSE	REMEDY
No rotation.	Quick release coupler(s) not engaged.	Check quick release coupler(s).
	Quick release coupler(s) faulty.	Replace faulty coupler(s).
	Auxiliary valve on machine faulty.	Refer to machine manual.
	Hydraulic oil tank low.	Fill oil tank to maximum level.
	Hydraulic motor failure.	Contact your DIGGA Dealer*.
	Output shaft bearing failure.	
	Planetary gear failure.	
	Machine oil pump faulty.	Refer to machine manual.
Slow rotation.	Low oil flow.	Check machine specifications.
	Drive unit to large for machine.	Contact your DIGGA Dealer*.
	Hydraulic system too hot.	See hydraulic section.
Hood leaking oil.	Hose(s) or Fitting(s) Leaking.	Tighten or replace.
	Motor ‘O’ ring failure.	Contact your DIGGA Dealer*.
Output shaft leaking oil.	Oil seal failure.	
	Hydraulic motor failure.	
No torque.	Oil pressure too low.	Check machines specifications.
	Drive unit too small for machine.	Contact your DIGGA Dealer*.
	Hydraulic system too hot.	See hydraulic section.
Grinding or loud noise.	Gearbox failure.	Contact your DIGGA Dealer*.

*Do not disassemble drive to assess fault. Disassembly without written permission and instructions from Digga will void all warranty.

Hydraulic System

TROUBLE	POSSIBLE CAUSE	REMEDY
Oil over heating.	Oil pressure too low.	Set relief valve to machine specification.
	Restriction in line.	Inspect and repair.
	Auger continually stalling.	Limit down pressure.
	Drive unit too small.	Contact your Digga dealer.
	Machine too small.	Fit drive unit to larger machine.
	Hydraulic oil tank low.	Fill oil tank to maximum level.
	Insufficient oil capacity.	Fit oil cooler.

Augers

TROUBLE	POSSIBLE CAUSE	REMEDY
Slow digging speed.	Worn teeth or pilot.	Replace the wear parts.
	Ground too hard.	Contact your Digga dealer.
	Low oil flow.	Check the machine specifications.
	Auger too large for the drive unit.	Fit larger drive unit.
	Machine too small.	Fit drive unit to larger machine.

Notes


HALO

Halo Alignment System

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 approximately 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 to 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.

Halo Alignment System

How long does the battery last for?
Through normal use, approximately. 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.

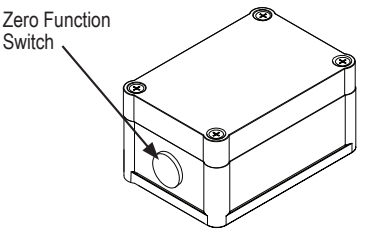
Alternative chargers:
Use of an alternative charger is strictly prohibited and could result in a dangerous hardware failure. Only use a certified Halo charger.

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°.

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.

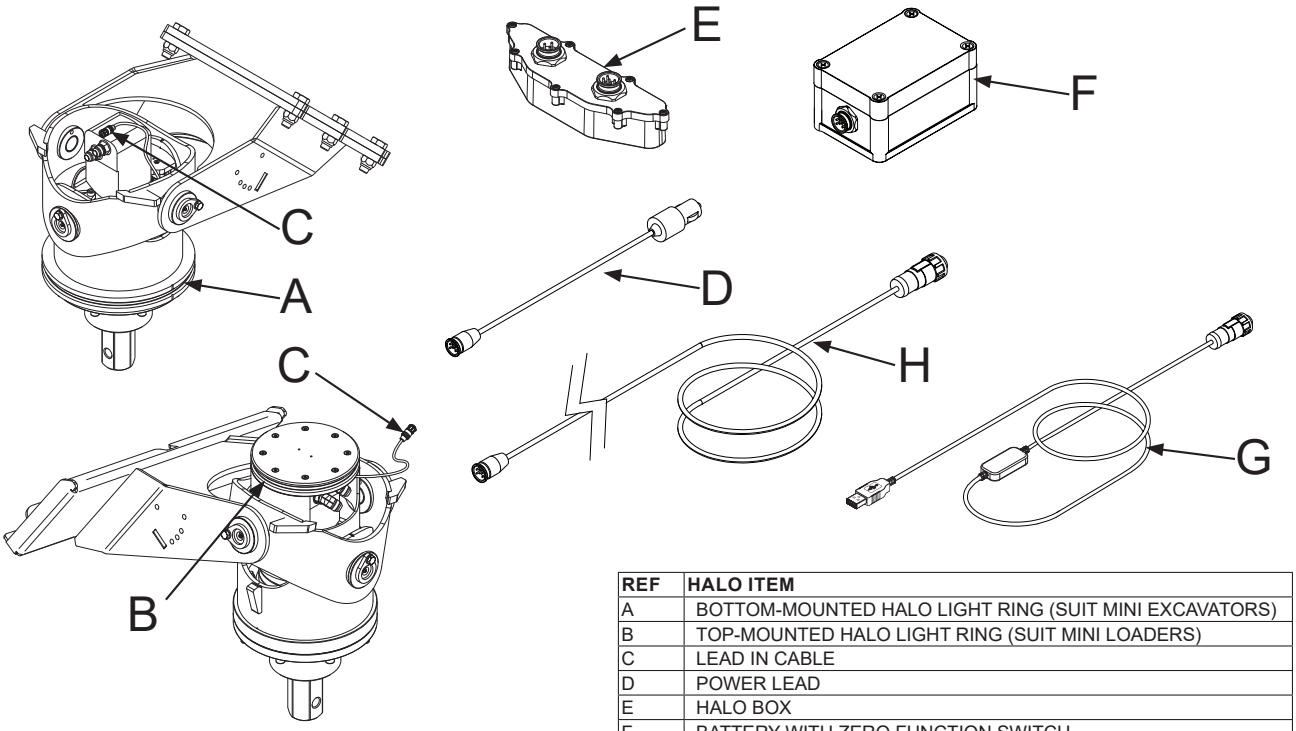
Best practices

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.

Halo Alignment System

Halo Components and Optionals



REF	HALO ITEM
A	BOTTOM-MOUNTED HALO LIGHT RING (SUIT MINI EXCAVATORS)
B	TOP-MOUNTED HALO LIGHT RING (SUIT MINI LOADERS)
C	LEAD IN CABLE
D	POWER LEAD
E	HALO BOX
F	BATTERY WITH ZERO FUNCTION SWITCH
G	USB CHARGER CABLE
H	CABLE EXTENSION (1m, 3m or 6m)

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.

Halo Alignment System

TROUBLE	POSSIBLE CAUSE	REMEDY
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.
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.
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.
	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.
Halo doesn't turn on.	Faulty 12V supply.	Check that the LED light is glowing on the cab cable (12V cigarette plug). If the LED light isn't displaying, the 12V socket may be faulty.
	Damaged cable extension.	Check for any damage to any exposed cables. Cable damage could indicate a discontinuity and require a replacement.
	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.
	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 Statement

Mini Machine Planetary Drives

Motor - Warranty up to 1 year subject to compliance with service Interval information and subject to manufacturers inspection.

Gearbox - Warranty up to 1 year subject to compliance with service Interval information and manufacturers inspection.

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 (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). 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 or to a location specified by Digga.

The warranty will be considered void if the product or any part of the product is modified or repaired in any way not expressly authorised 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 goods returned to Digga by the customer under warranty or repair must have all freight charges prepaid for on the customers account. 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.

Damage or failure through operator abuse or negligence voids warranty.

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. If the first oil change and subsequent oil changes are found to have not been performed at the correct specified time, and results in premature gearbox failure during the warranty period, the warranty will be voided.


DIGGA