



512 Tuttle St., Des Moines IA 50312

Ground Screw Installation Instruction Manual

1. Safety Precautions

1.1. General Safety Requirements

- 1.1.1. To ensure safe handling and uninterrupted operation of installation machine, it is essential to be familiar with standard safety guidelines and applicable health and safety regulations.
- 1.1.2. This manual provides all necessary instructions for the safe installation of ground screw products. However, it is important to also always refer to the documentation provided with the particular installation equipment used as well.
- 1.1.3. Equipment should be stored indoors in a dry environment.

1.2. Operational Safety

- 1.2.1. Risk of Tipping. Handle, store, and transport installation machine carefully to prevent it from tipping over.
- 1.2.2. PPE. Always wear appropriate personal protective equipment (PPE), including safety shoes.
- 1.2.3. Unauthorized Access. Keep unauthorized personnel away from the machine and work area.
- 1.2.4. Tripping Hazards
 - 1.2.4.1. Maintain a clean and organized work area.
 - 1.2.4.2. Remove tools and materials from the ground.
 - 1.2.4.3. Be aware of uneven or unstable terrain.

1.3. Environmental Conditions

- 1.3.1. Work only in well-lit areas.
- 1.3.2. Be mindful of weather conditions.
- 1.3.3. Do not operate the machine in rain, snow, or on slippery surfaces.

1.4. PPE Requirements. Always wear the necessary personal protective equipment when operating installation machinery.

- 1.4.1. Safety Shoes: Required for all machine handling
- 1.4.2. Durable Work Clothing: Required for all machine handling
- 1.4.3. Safety Gloves: When screwing in/out ground screws or during transport
- 1.4.4. Safety Glasses: When screwing in/out ground screws
- 1.4.5. Hearing Protection: When exposed to loud noise during operation

1.5. Minimum Age. Operators must be at least 18 years old. Apprentices under 18 may operate the machine only under supervision.

1.6. Emergency Procedures

- 1.6.1. In case of emergency, CALL 911 immediately.
- 1.6.2. Know the location of first-aid stations.
- 1.6.3. Ensure all personnel are familiar with emergency procedures.
- 1.6.4. Administer first aid as needed.
- 1.6.5. Contact a doctor or paramedic.



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2. Installation Procedure

2.1. Pre-Installation

- 2.1.1. Call your local "Call Before You Dig - 811" number before beginning installation.
- 2.1.2. Locate and mark desired screw positions.
- 2.1.3. Drill optional pilot holes no more than 1/3 the diameter of the ground screw as deep as possible ensuring it's plumb.
- 2.1.4. Install set bolts at the top of the Model 3 (open top with 3 welded nuts) ground screw to prevent warping of the nuts during ground screw install.

2.2. Installation

- 2.2.1. Hand start the ground screw, if possible, maintaining plumb.
- 2.2.2. Connecting the driver to the ground screw:

2.3. Using Hand-Held Electric Driver (E-driver)

- 2.3.1. Place the adapter on top of the ground screw.
- 2.3.2. Place the E-driver on top of the adapter.
- 2.3.3. Connect and extend the telescopic torque arm.
- 2.3.4. Securely brace the torque arm against something such as a stake, house, truck tire or previously installed ground screws. Do not try to hold manually.



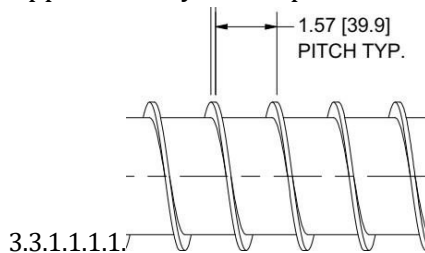
- 2.3.5. Use a post level or two magnetic bullet levels to ensure the ground screw is installed plumb, especially during the first 18-24".
 - 2.3.6. Start the E-driver in high gear. Once it begins to struggle, switch to low gear and only go another revolution or two as you've hit max torque.
 - 2.3.7. The ground screw should be installed so the top is approximately 3" above grade.
 - 2.3.8. Flange installation: Insert flange so base is flush with the top of the ground screw and secure with the 3 set bolts (M16x30mm 2.0 Pitch galvanized) as tight as possible or until the bolt is flush with the nut.
 - 2.3.9. Pipe installation for solar: Refer to the racking manufacturer for torque specifications.
- ### 2.4. Using Machine-Mounted Hydraulic Driver (Digga MM-10K or similar high torque anchor drive)
- 2.4.1. Refer to the operator's manual for the hydraulic drive unit.
 - 2.4.2. Pin the adapter to the drive shaft.
 - 2.4.3. Use a post level or two magnetic bullet levels to ensure the ground screw is installed plumb, especially during the first 18-24".
 - 2.4.4. The ground screw should be installed so the top is approximately 3" above grade.
 - 2.4.5. Flange and pipe installation is the same as above.



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3. Installation Tips

- 3.1. During installation the rotation of the ground screw must be accompanied with appropriate downward pressure (crowd) to advance the screw approximately one thread pitch per rotation.
- 3.3. For example, the thread pitch is 40mm (1 1/2" - 1 5/8"), so the screw should advance downward approximately 40mm per revolution.



- 3.4. If the screw is advancing at a significantly slower rate than the thread pitch, there is not enough downward pressure. This causes the screw to churn (spin without advancing downward). A small amount of churn is acceptable; however, additional down pressure may be necessary.
- 3.6. If the screw is advancing at a significantly faster rate than the thread pitch, there is too much downward pressure causing the screw to auger (advance downward like a drill bit vs. allowing the threads to engage the soil). In this case, reduce the down pressure/crowd and allow the threads to engage the soil and pull itself into the ground.

4. Insertable flanges

- 4.1. Be sure to seat the bottom of all insertable flanges flush with the top of the ground screw.
- 4.2. Install the set bolts flush with the nut plus 1/4 turn per the ESR instructions.

5. Obstructions & Refusal

- 5.1. An obstruction causing refusal is when something in the subsurface does not allow the screw to continue its downward motion.
- 5.2. Drill a pilot hole no more than 1/3 the diameter of the ground screw as described in 1.3 above.
- 5.3. Pre-drilling in rock requires additional work.
 - 5.3.1. Pre-drill at a diameter slightly larger than the maximum diameter of the threads.
 - 5.3.2. Drill the hole to the final embedment depth needed and lower the ground screw into the hole.
 - 5.3.3. Turn the screw counterclockwise while putting the cuttings back in the hole and/or adding gravel.
 - 5.3.4. The screw will auger the gravel into the bottom of the hole. As the hole fills, the screw will begin to raise out of the hole.
 - 5.3.5. Once the screw is approximately 10-14" out of the hole, drive the screw back down into the gravel to depth. This creates a concrete anchor/Tapcon-type effect.
 - 5.3.6. Actual depth the screw needs to rise and then be re-embedded may vary due to backfill material, hole size, and other site conditions.



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6. Ground Screw Length – Frost Depth

Ground Screw Length Based on Frost Depth			
Assumes Installation to 3" Above Grade			
Thread Length 880mm/35"		Thread Length 610mm/24"	
Frost Depth	Minimum Ground Screw Length	Frost Depth	Minimum Ground Screw Length
0-35"	1550mm/61"	0-32"	1300mm/51"
36-37"	1600mm/63"	33-44"	1600mm/63"
38-53"	2000mm/79"	45-60"	2000mm/79"
54-55"	2050mm/81"	>60"	Consult AGS
>53/55"	Consult AGS		

7. Onsite quality control

- 7.1. Verify ground screws and flanges match the approved dimensions per the drawings at the following link: <https://www.arcat.com/company/american-ground-screw-inc-52607/cad>
- 7.2. Critical dimensions to verify are outside diameter (OD), overall length, thread length and pipe thickness.