



ESSIG



OPERATING INSTRUCTIONS FOR Essig Moles 45mm to 145mm

- 1. Machine to be operated by trained personnel.**
- 2. Instructions to be read before use.**

Hy-Ram Mansfield
Pelham Street
Mansfield
Nottinghamshire
NG18 2EY

Hy-Ram Bury
9 Portland
Industrial Estate
Portland Street
Bury
Lancashire
BL9 6EY

Hy-Ram Enfield
Unit 2, Riverwalk
Business Park
Riverwalk Road
Enfield
EN3 7QN

Hy-Ram Livingston
18 Napier Square
Houstoun Road
Trading Estate
Livingston
West Lothian
EH54 5DG

Tel: 01623 422982
Fax: 01623 661022

Tel: 0161 7641721
Fax: 0161 7620577

Tel: 0208 805 8010
Fax: 0208 805 6010

TEL: 01506 440233
Fax: 01506 440266

Moles



Essig Moles

Soil Displacement moles for installing underground services. The ESSIG-IP-Mole is powered by compressed air, which is supplied by a generator. It is driven through the soil by a piston inside the body casing. The displacement creates a bore, in which product pipes or conduits can either be introduced directly with the mole or installed later.

All machines are fully reversible - no cables or turning needed, simply turn off the supply of compressed air, pull the hose while reintroducing compressed air.

Advantages of the ESSIG-Mole:

- Can be used by 1 or 2 operators
- Small tool dimensions
- Minimal profile overlap
- Short preparation time
- No thrust bearing
- Accurate

Type	IPM type= ø in mm	Length / mm	Weight / Kg	Air cons. m ³ /min 6-7 bar	Impacts per min	Up to pipe ø-mm	Expanders
	45	800	8	1,0	380	DN40	
IP Standard	45	1000	9	1,0	330	DN40	
IP Standard	55	1200	16	1,0	330	DN40, 45	
IP Standard	65	1300	25	1,0 - 1,5	330	DN50, 1,5" PE	
IPZK Short Build	70	1050	22	1,0 - 1,5	450	DN50, 2" PE	
IP Standard	70	1500	27	2,0	330	DN50, 2" PE	
IP Standard	75	1500	29	2,0	330	DN50, 2" PE	
IP Standard	80	1500	36	1,5	330	DN75	
IPZK Short Build	95	1200	42	2,0	420	DN70, 80	120, 130, 140
IP Standard	95	1500	50	2,0	360	DN70, 80	120, 130, 140, 160, 175
IP Standard	110	1500	72	2,5	360	DN90	140, 160, 175
IPZK Short Build	130	1050	58	3,5	420	DN110	
IP Standard	130	1600	90	2,5 - 3,5	360	DN110	150, 160, 180, 200
IP Standard	145	1850	140	4,5 - 5,0	300	DN125 PE/PVC	180/200

Mole Oil



Lubricant Oil for use with Moles:

Product code	Description
605-000010	5l Mole Oil
605-000015	5l Antifreeze Mole Oil

Moling Boots & Gloves



Dielectric Wellington

Moling Glove

A range of PPE is available for increased protection in the event of an accidental strike. Fully insulating electrical gloves and boots have a shelf life of 6 months, at which time they need to be replaced.

Product code	Description
904-000003	Pair Size 6 Dielectric Wellington
904-000004	Pair Size 7 Dielectric Wellington
904-000005	Pair Size 8 Dielectric Wellington
904-000006	Pair Size 9 Dielectric Wellington
904-000007	Pair Size 10 Dielectric Wellington
904-000008	Pair Size 11 Dielectric Wellington
904-000009	Pair Size 12 Dielectric Wellington
904-000016	Pair Size 13 Dielectric Wellington
904-000012	Moling Gloves Small c/w leather outer glove
904-000013	Moling Gloves Medium c/w leather outer glove
904-000014	Moling Gloves Large c/w leather outer glove
904-000015	Moling Gloves X-Large c/w leather outer glove
904-000011	Flame Retardant Balaclava
904-000017	Moling Helmet (c/w Visor/Ear-Defenders/Chin Strap)

Important Safety Instructions

This symbol calls attention to important safety instructions which, if not followed, could result in serious personal injury or death.



Read, understand and observe all safety information and instructions in this manual, and on safety decals on the ESSIG MOLE piercing tool before using it. For safety reasons, read the operators manual carefully and exercise caution while using the ESSIG MOLE piercing tool. Please note specific safety requirements as explained by procedures called out in this manual. Failure to follow these instructions could result in serious personal injury or death. All tools, materials and equipment manufactured and supplied by Essig Industrielle Anlagen GmbH & Co. KG, Inc. Essig Moles are designed to be used by qualified and trained personnel only. Essig Industrielle Anlagen GmbH & Co. KG, Inc. will not be held liable for any injury or damage to either people or property resulting from the misuse of Essig Industrielle Anlagen GmbH & Co. KG equipment. **Please save this user's guide for future reference and have it available to all operating personnel.**



DANGER:

DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. This signal Word should be used in the most extreme situations.



WARNING:

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



CAUTION:

CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

SAVE THESE INSTRUCTIONS

ESSIG MOLE is manufactured to the current technical safety-relevant regulations. Nevertheless, the use of the machine may represent a danger to the health and life of users or third parties. Always ensure that you pay particular attention to warnings, safety labels and instructions.

Call Before You Dig!

Check the existence and exact position of buried pipe and cables by contacting the respective utilities or owners of networks. The exact and definite existence and position of buried cables and pipes should be defined by trial pits or using cable and pipe detection equipment or other means.

Cable Strike!

Should you accidentally hit an electrical cable, immediately leave the site, ensure no one enters and contact the electrical company to turn off the supply. In case of a cable strike, the danger resulting from that damaged electric cable can only be evaluated following detailed information by the respective electrical company. Never rely on your own knowledge as to types of cables, safety measures and protective measure which may not be correct for the type of cable encountered. Always consider cables to be “live” and a potential danger to life. Do not re-enter the site until authorized by the electrical company.

Danger of Entrapment!

Do not place hand in moving machine components or devices. Always ensure that all safety guards, covers or other safety devices are correctly in place “before starting.” Do not remove safety covers or safety devices during operation of the machine.

No loose clothes!

Do not wear loose clothes or long hair. Danger of body injury by loose clothes or hair being caught in the moving parts of the machine.

Suspended loads!

Do not stand under suspended (floating) loads. Danger of body injury by falling loads. Use suitable means of avoiding danger.

Disconnecting Air Hoses!

Only disconnect pressure free hoses. Always turn off the compressor and bleed all air before disconnecting hoses. Before starting any maintenance or inspection work, ensure that the ESSIG MOLE is not connected to any air supply. During repair and maintenance operations always follow the respective safety recommendations. Repair and maintenance operations are restricted to trained and certified staff only.



Do Not Over-Pressurize!

Do not over pressurize, otherwise explosion or serious damage may occur. Do not exceed the operating pressure of 7 bar (100 psi).

Read Operators Manual!

Before starting the machine, fulfill all safety related requirements. All personnel should thoroughly read this operating manual. Follow all safety instructions concerning safety and possible danger. Do not modify or remove the safety devices or warning labels of this machine. Keep all labels regarding safety and possible danger on the machine in good, readable condition. Special care is required before and during the safety check. Every crew member should fully understand the safety measures required for the operation and should be capable of following these regulations individually.

Safety Equipment!

The operating crew should always wear the appropriate safety equipment, i.e., ear protection, safety shoes/boots, hard hat, safety glasses, gloves etc.

Operation by Qualified Personnel Only!

Operation of the ESSIG MOLE should be carried out by suitably trained, qualified, and certified personnel only. New operators or operators in training should be working under the constant supervision of a qualified person. Personnel operating the ESSIG MOLE should have sufficiently studied the operating manual.

Skin Burning Warning!

This item can be hot or cold. Do not touch as burns may result.

Air Hose and ESSIG MOLE Tool Maintenance!

Never use self-swaged hoses. Swaging, re-fitting or replacement of air hoses should always be done in a specialist workshop only. Make sure that the hose couplings are properly tightened before starting the compressor. Check all hoses, pipe lines, fittings, joints and securing bolts daily for correct position and function before starting the bore. Use the machine only if it is in perfect working order and after studying the operating manual, particularly the safety related sections. Always check the machine and its accessories for unwanted movements. To guarantee long life, regular maintenance is essential. Inadequate or infrequent repair and maintenance operations may lead to accidents, downtime and costly repairs of the machine.

Transporting the ESSIG MOLE Tool!

Danger of accidents. The downward movement of the piston may lead to the ESSIG MOLE slipping through the textile sling or (in case of smaller machines) through the operator's hand. Never lift or carry the machine using the air hose (whip hose)—damage to the hose may result. Handling and transporting the machine should be done on a flat, level surface only. Do not overload the transportation vehicle.



Using a Starting Cradle & Entrance & Exit Pit Excavation!

It is recommended that the ESSIG MOLE be used with the starting cradle for correct alignment. Do not touch the steel cable. Do not re-tension during operation. In case of boring above or below known utilities (electrical, gas, water, telecom or others) make sure that a starting cradle is used to align the machine onto the target point. Secure the starting cradle so that the front is the length of the ESSIG MOLE head assembly away from the front wall. The walls of the starting pit should be made vertical where the machine enters. If the soil in the starting pit is very soft and loose, then the cradle should be supported on wooden boards, fixed timber or other means. Always ensure that no buried services are beneath the starting cradle in the launch pit otherwise you may drive an earth anchor into them & cause serious damage. Make sure there is a sufficient amount of ground cover. Make sure that start and exit pits are excavated and shored as necessary to comply with OSHA regulations and guard against collapse.

Operation of the ESSIG MOLE Tool!

Start operation of the ESSIG MOLE on reduced air (pressure) only. Always run the ESSIG MOLE slowly into the ground, continually checking the line and level with the SIGHT SCOPE. Only when satisfied that all is correct should the ESSIG MOLE have full power from the compressor by fully opening the ball valve. Check the SIGHT SCOPE for accuracy before each bore. The control unit/lubricator, should always be within reach of the operator. In case of danger to people or machine, turn off the air supply from the compressor immediately. Always watch the behavior and reaction of your colleagues. In case of danger, take the necessary steps immediately. Use recommended oils and lubricants only. Firmly hold or block the hose end when cleaning the hose with compressed air. Point the hose away from body. Do not point hoses at others. Respect a minimum safety distance from any over head live lines. When operating beneath railroad tracks, all standards and requirements should be observed. Machine and equipment should be removed from a job site on the track-free side. Never cross the tracks unless supervised.

Introduction to ESSIG MOLE

The ESSIG MOLE boring tool is a cylindrical air-hammer which is driven through the ground by compressed air. Its bores are used for the laying of pipes and cables under roadways and other surface installations. The ESSIG MOLE can be used in all replaceable soils (sand, loam, gravel)—even those soils containing fracturable rocks. The ESSIG MOLE, however, cannot be used in solid rock, and is not designed for use against unfracturable rocks. Also, soft soils (as in a swamp) may present problems in accuracy as the tool's own weight may cause it to deviate. In normal operation, however, the patented reciprocating stepped cone chisel head and long cylindrical shape ensure maximum boring accuracy. Normally, when a boring tool encounters a rock, the tool is pushed off course. The reciprocating action of the ESSIG MOLE, however, will break a rock up and allow the tool to pass. In addition, if the tool should encounter an unfracturable rock, the ESSIG MOLE can easily be reversed and retrieved to re-start the bore.

Operation of the ESSIG MOLE

Connection to a Compressor

Like any pneumatic tool, ESSIG MOLE requires a compressor with adequate capacity for optimal operation. Please see the technical data to determine the quantity of air required for each individual ESSIG MOLE model. Note that the operating pressure must not exceed 100 psi.* **Operating the ESSIG MOLE at pressures higher than 100 psi will invalidate the warranty.** Before connecting the ESSIG MOLE blow air through the air hoses to remove any dirt or other contamination.

TYPICAL ESSIG MOLE CONNECTION SEQUENCE

MODELS 45-110

Make sure that the couplings are securely interlocked and safety rings are tightened before the machine is started. Wrap the couplings with adhesive or electrical tape to keep dirt from getting into the air line. ESSIG MOLE requires continuous lubrication during operation. This is provided by the in-line lubricator, which is connected between the regulator and the tool. The lubricator should be checked daily at least to ensure that it contains an adequate supply of oil.

Lubricator Operation and Adjustment High quality pneumatic lubricant is essential for optimum performance of the ESSIG MOLE soil placement hammer. Hiram mole oil is the recommended lubricant. The lubricator ensures that the necessary lubricant is vaporized and supplied to the ESSIG MOLE. If using the silver ASL lubricator the quantity of oil delivered to the ESSIG MOLE can be adjusted by turning the metering screw that is located in the oil reservoir under the fill cap. Normal setting for these lubricators is 3 to 4. During operation of the ESSIG MOLE a small mist of OIL should be seen in the exhaust air coming out of the hammer. When using the blue pot style lubricator the quantity of oil can be varied by turning the adjustment knob.

Aligning and Starting The ESSIG MOLE

Once the ESSIG MOLE is in the ground, it runs straight; its direction cannot be changed or corrected (similar to a bullet when fired from a rifle). For this reason it is extremely important to align the ESSIG MOLE exactly on target. This can be accomplished using several methods: bottom trench launching with a lever using SIGHT SCOPE and surveyor's stake or using a starting cradle and anchor stakes with the larger ESSIG MOLES.

DANGER: Before starting the bore, the utility one call number must be contacted so that any utility lines can be located and marked in the area. Always bore from the congested utility area to the non-congested area.

NOTE: The minimum depth specification for operation of the ESSIG MOLE is ten times the tool diameter. If the minimum depth is not observed, there is a risk of surface damage from soil displacement. The starting and exit pits should be excavated, with the pits being back sloped or shored to conform with local safety work codes. For small diameter bores, the ESSIG MOLE is laid in the bottom of the pit and pointed at the exit pit. When a precise bore is needed then a SIGHT SCOPE is placed on the ESSIG MOLE. With the height setting of the SIGHT SCOPE noted on the surveyor's staff, a line of sight is taken and the ESSIG MOLE is positioned to align it to the point of exit. Once the ESSIG MOLE is aligned, it should be run into the ground at reduced power (by opening the ball valve half way or less) until the ESSIG MOLE is one third of its way into the ground. Stop and check the alignment making corrections at this time. Until the ESSIG MOLE is fully into the bore, its line and grade should be constantly checked and where necessary, corrected. It may be necessary to stop the ESSIG MOLE several times. The accuracy to the bore is entirely dependent on correct starting alignment. After the ESSIG MOLE is half way into the ground and the alignment and grade are correct then the air flow can be increased slowly to full power.

Larger diameter bores may require a starting cradle to assist alignment of critical bores. A starting cradle is a guide device that provides for exact aligning of grade and direction. It can be used with the SIGHT SCOPE for a complete alignment system.

To use the starting cradle, position it with the roller toward the starting pit wall. Lower the ESSIG MOLE onto the starting cradle so that the front one third of the tool is centered on the cradle. The anchor stakes are next driven into place to fix the cradle to the pit floor. While using the SIGHT SCOPE the starting cradle can be adjusted both vertically and horizontally with the adjusting screws until the crosshairs in the scope line up with the designated mark on the surveyors staff. Operate and check for alignment as described earlier.

General Instructions to be followed during Operation

Always keep a close eye on the ESSIG MOLE while it is working. If the ESSIG MOLE is boring faster than 60-ft. per hour decrease the air supply. The ESSIG MOLE may go off course at that rate of speed. If the ESSIG MOLE does not begin to cycle when the machine is started it may require an alternate starting procedure. One of the following may be used:

- Turn off the air supply and wait for pressure to bleed out of the tool. Then open valve completely to start the tool.
- “Kick-start” with a surge of air pressure. This can be accomplished by kinking the air hose (as close to the tool as possible), turning on the air and then releasing the hose.
- A quantity Hiram lubricating oil or biodegradable lubricant (about 4 oz.) can be introduced into the tool by pouring it into the air hose. Then reconnect the hose and try again. If the hose is shaking or rapidly cycling back and forth in the starting pit the ESSIG MOLE may be swimming in the bore. Reduce the air supply to the ESSIG MOLE to allow the soil to grip the sides of the casing and allow forward progress to continue. When boring in unstable ground (sand, loose gravel) it is recommended to pull pipe behind the tool. It is recommended that the air hose be marked at regular intervals as an aid to determine the distance that the ESSIG MOLE has covered. Remember to add the lengths of the tool and connection hose itself to these calculations. As the ESSIG MOLE emerges into the exit pit, reduce the air supply.

The Reversing Mechanism

The ESSIG MOLE can be reversed if it encounters an unfracturable obstacle or if it is used for making dead-end holes.

1) Turn Air Off.

2) Count Slowly To 5! (letting all the air exhaust out)

3) Pull Air Hose, Hold & Turn Air On.

When reversing, the operator should firmly hold the hose and make sure that the tool does not back over it.

Factors Affecting Accuracy

Although the ESSIG MOLE is extremely accurate under most conditions, there are several factors which can affect the accuracy of a bore.

Soft soil

If the soil is too soft or watery, the machine will tend to slip slightly due to its weight and/or vibration. Some a counter measures is to reduce compressed air supply by 50%.

To reverse the mole:

1) Turn Air Off.

2) Count Slowly To 5! (letting all the air exhaust out)

3) Pull Air Hose, Hold & Turn Air On.

For Service and repair please contact:

**Hy-Ram Mansfield
Pelham Street
Mansfield
Nottinghamshire
NG18 2EY
Tel: 01623 422982
Fax: 01623 661022**