

Installation Instructions

General Handling Instructions Micro Cables and Microduct Assemblies



Content

1 Introduction

1.1 Scope 3

1.2 Target Group..... 3

1.3 Prerequisites..... 3

2 Safety Instructions 4

3 Handling Drums 6

4 Handling Cables and Ducts

4.1 Protecting Cable Against Rodents..... 8

4.2 Sealing Ducts..... 8

4.3 Sealing Between Duct and Cable..... 9

4.4 Cutting Ducts 9

4.5 Handling Microducts..... 10

5 Manholes

5.1 Rectangular Manholes 11

5.2 Cylindrical Manholes..... 13

6 Reference List 15

1 Introduction

This document describes the general handling instructions for micro cables and microduct assemblies.

1.1 Scope

This document covers the safety instructions and handling instructions of drums, micro cables, and microduct assemblies. It also covers handling of those products in manholes.

1.2 Target Group

This document is primarily targeted at installation technicians. Hexatronic recommends that personnel have an adequate professional background and have attended product training arranged by Hexatronic.

1.3 Prerequisites

In this document, it is assumed that the reader is familiar with concepts, terminology, and abbreviations, concerning the Fiber Optic deployment.

2 Safety Instructions

This section describes the safety regulations that always are followed when handling the micro cables and microduct assemblies.

Local regulations must be taken into consideration. The safety information in this section is in addition to local regulations.

Note: Reduce the risk of accidents by studying all the instructions carefully before starting work. If questions arise regarding the safety instructions, contact the supervisor or the local Hexatronic company for clarification.

For further information on personal health and safety for Hexatronic system products, see also:

- Personal Health and Safety Information, Reference [1]
- System Safety Information, Reference [2]

When handling micro cables and microduct assemblies, the following safety conditions must be fulfilled:

Local Safety Regulations

- It is of vital importance that all local safety regulations are carefully and thoroughly followed.

Training

- Prior to using any kind of cable blowing equipment, all personnel must be fully trained in the preparation and the operation procedures of the cable blowing technique.

Clothing

- Always wear eye and ear protection, hard hat, and protective clothing.



- When working along the roadside, always use high visibility clothing, and follow the local regulations on the procedure.

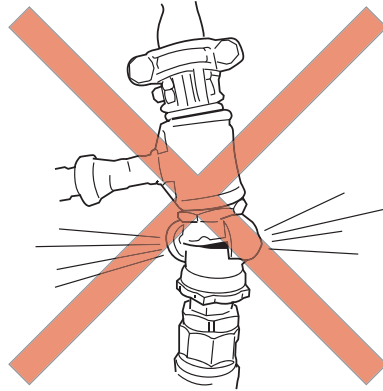
Communication

- Make sure that radio communication is established between the working stations, and that all people involved in sending the start and stop commands, use the same language.

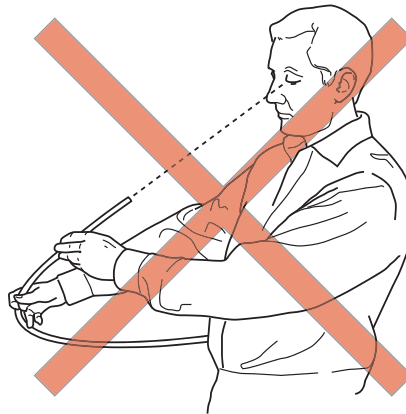
Compressed Air

- Always progressively open the valves for compressed air. Compressed air is stored power, and therefore check its safety concerns.
- Working with high air pressure can be very dangerous. Make sure that all connectors are securely fitted, and that all valves on the cable blowing equipment are closed. Connectors can be lethal if not properly secured.

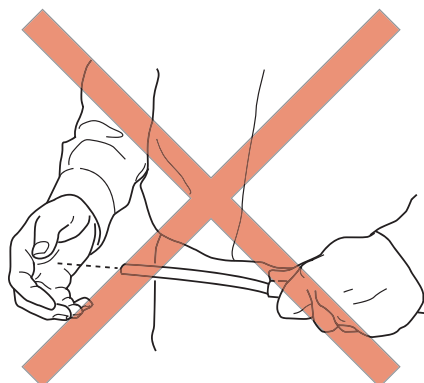
Note: The connector in the figure below is NOT securely fitted, and may come loose when the air pressure enters the hose. A loose connector on a high pressure device is very dangerous.



- Use only low air pressure when testing.
- Never look into a duct. Even if it seems that something has got stuck, something can still be coming out of the duct that is a danger to eyes or body. Also, be aware that material can move in high speed through the duct, and even if the duct is pointing in another direction, the material may bounce, and can still be dangerous.



- Never point the duct to any part of the body. If the front cap on the cable loosens, it will become a dangerous projectile. Always point the duct in a safe direction. Also, aim away from bystanders or people passing by.

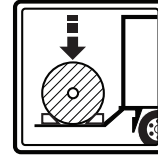


3 Handling Drums

Cable and duct drums must be handled with care. Improper drum handling may cause damage to the cable or the duct.

The rules for handling drums are described in the following list:

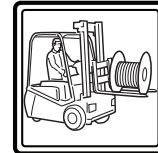
- When loading or unloading drums, either use a fork lifter, or lift the drum through the center hole.



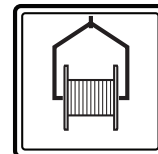
- Never try to roll the drum off a truck, a ramp, or similar.



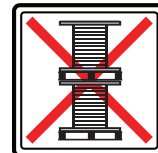
- When using a fork lifter, the fork is only allowed to lift the drum from the flange side. Make sure that the fork grips both flanges of the drum, and that the fork never touches the duct or cable. Otherwise, the fork may damage the duct or cable.



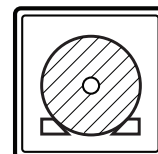
- When lifting with a crane through the center hole, make sure the lifting wires are kept with a distance using a rod or an axle spreader to avoid lateral pressure on the flanges.



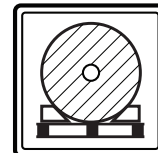
- Never place the drum on the side. Always keep it standing upright.



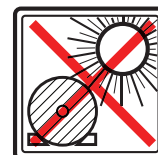
- Make sure that the drum is secured both when stored and during transportation. Especially on site, this is extremely important, due to liability issues, if the drum rolls away.



- When storing the drum outside, make sure that the ground is firm and well drained.



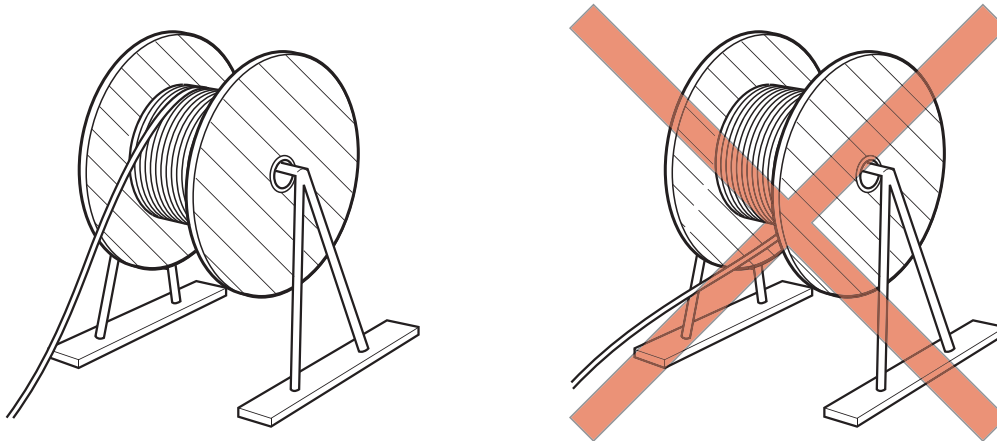
- Do not store the drum in direct sunlight, and do not expose it for extreme temperatures.



- Always roll the drum in the direction of the arrow indicated on the drum. This will make sure that the duct or cable do not uncoil during the transportation.



- When rolling the duct or the cable off a drum, always roll it from the top side of the drum.



Example of Improper Drum Handling

If a drum stand is not available, people sometimes lift the drum on one side and coil off the duct, turn after turn, see Figure 1.

Do not use this method since the duct will be twisted, and it will have undulation in the trench. A twisted duct will give problems when blowing a cable through.

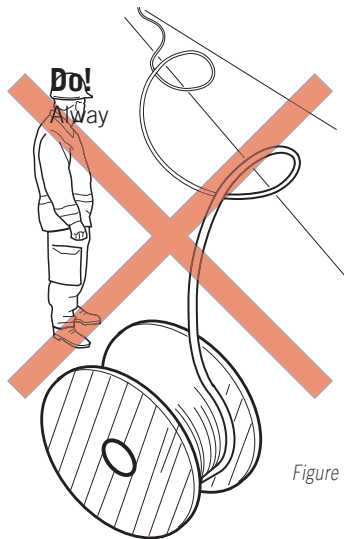


Figure 1 – Example of Improper Drum Handling

Caution!

Always use a drum stand.

4 Handling Cables and Ducts

This section provides information about the extra cable protection, and duct protection, and gives information about how to seal, cut, and handle ducts.

4.1 Protecting Cable Against Rodents

The extra cable protection prevents also the coiled cable against rodents, using a flexible hose. The hose is slit open on one side, and wrapped around the cable coil. There are flexible hoses in different materials and different sizes. For rodent protection, a metal flexible hose can be used, or a plastic flexible hose covered with aramid tape, see Figure 2.

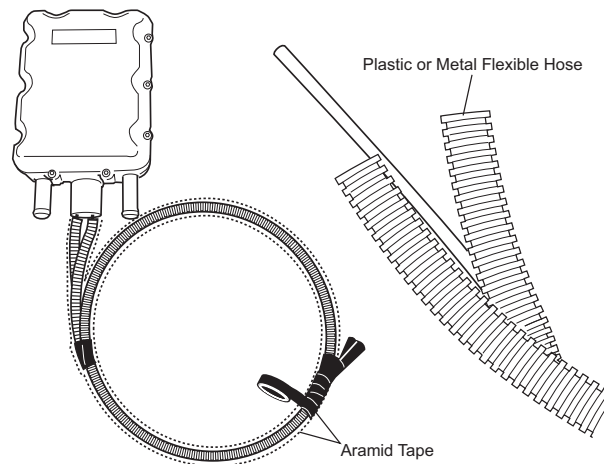


Figure 2 – Fiber Joint Closure With an Extra Cable Protection

4.2 Sealing Ducts

It is of the greatest importance to seal the ducts to keep them dry and clean. This can be done by using a cold type duct seal, or by using a heat method and a shrink end cap, see Figure 3.

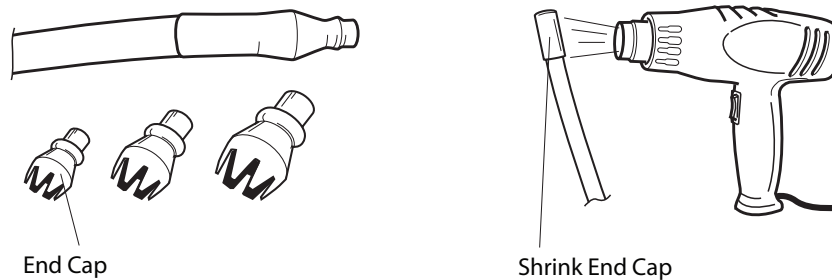


Figure 3 – Sealing Duct by Using End Cap or by Heating Shrink End Cap

4.3 Sealing Between Duct and Cable

The Hexatronic Micro Cable system is upgradeable, and as such, the cable is easy to replace. In order to be able to replace the cable, the duct must be kept clean also after the cable has been installed. This is done by using gas seal connectors wherever the cable leaves the duct.

A gas seal connector has a rubber gasket inside. The rubber gasket is compressed by twisting the yellow and black knobs on the connector.

Note: This compression should only be done once the cable has been installed. Otherwise, it is impossible to install the cable.

The gas seal connectors are used where the duct enters buildings, where maintenance loops are stored, and where splice enclosures are kept, see Figure 4. In short, wherever the cable is entering, or exiting the duct.

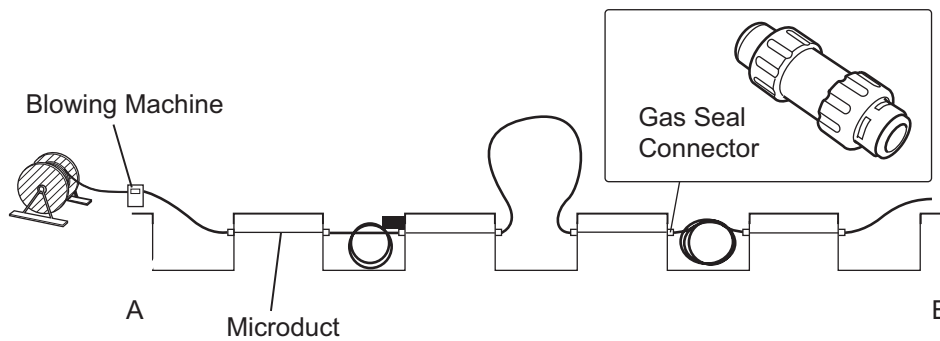


Figure 4 – Sealing Between Duct and Cable with Gas Seal Connectors

4.4 Cutting Ducts

Always use the appropriate tools for cutting ducts, see Figure 5.

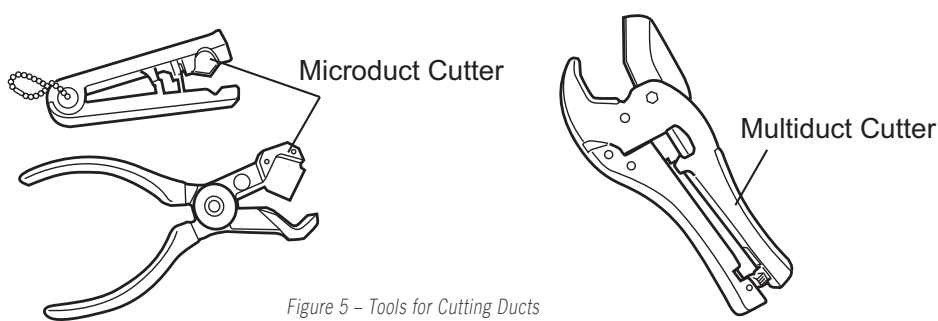


Figure 5 – Tools for Cutting Ducts

Caution!

Never use a hacksaw or a side cutter to cut the duct.

The hacksaw, see Figure 6, will produce plastic residue, and the side cutter, see Figure 7, will flatten the duct, and increase the risk for a cable to get stuck.

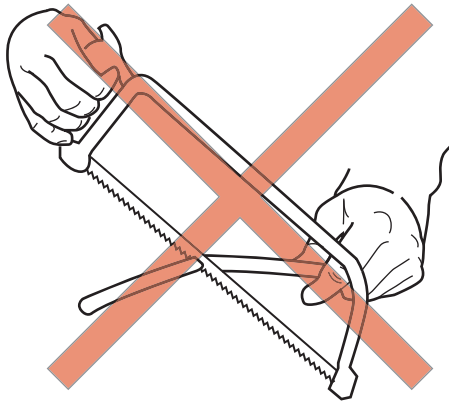


Figure 6 – Cutting Duct with Hacksaw

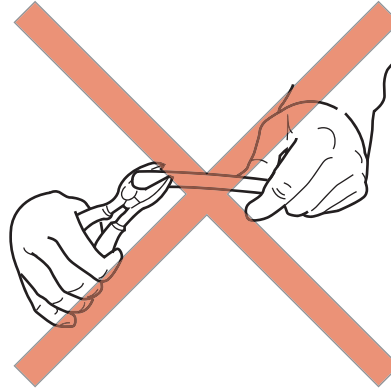


Figure 7 – Cutting Duct with Side Cutter

4.5 Handling Microducts

The point where the microduct gets in contact with the sheath is also the place where the microduct can easily be bent too much, see Figure 8. Extra care and precautions must be taken at this point, to avoid damage.

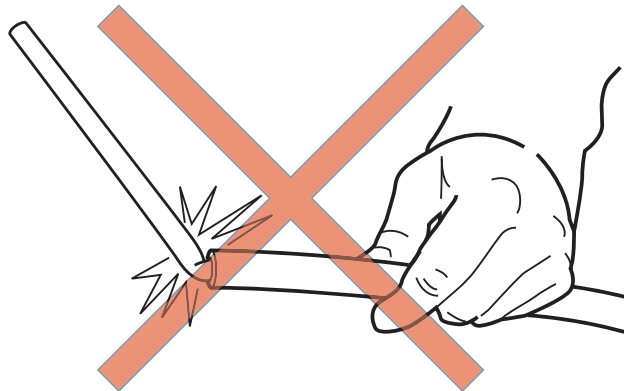


Figure 8 – Overbending Microduct

5 Manholes

Manholes come in different sizes and shapes. This section describes the two major types, which are rectangular and cylindrical, and also gives information about jointing ducts, and placing joint closures in such manholes.

Note: When handling duct assemblies in manholes always respect the minimum bending radiuses.

5.1 Rectangular Manholes

The recommended size of the rectangular manholes is minimum 1500 x 800 x 500 millimeters, where 500 millimeters is referring to the depth. For the entry and exit positions in rectangular manholes, see Figure 9.

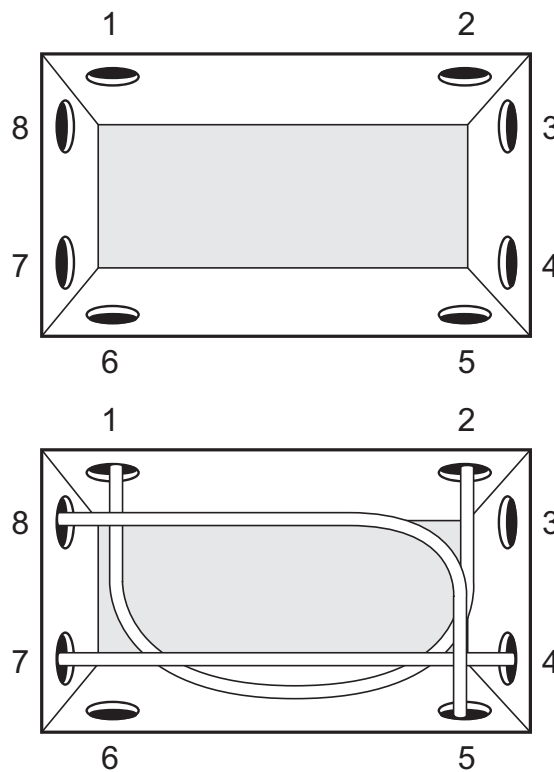
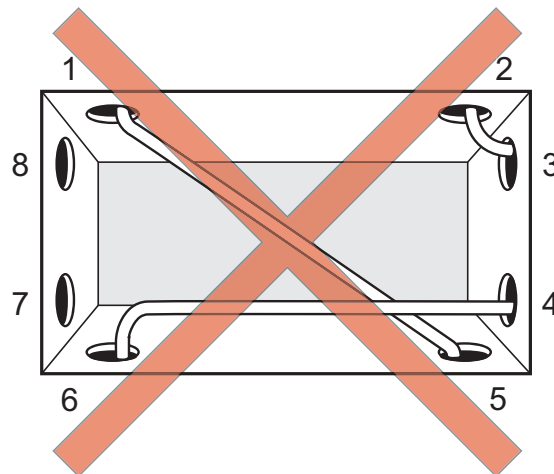


Figure 9 – Entry and Exit Positions in Rectangular Manholes



5.1.1 Jointing Ducts in Rectangular Manholes

When ducts are jointed in a rectangular manhole, there has to be some excess duct to work with. The duct overlap must be at least 600 millimeters, see Figure 10. As a rule of thumb, let the duct reach the opposite wall of the manhole, and make sure that the duct enters through the shorter sides of the manhole.

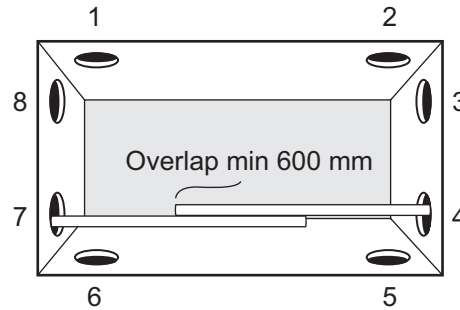


Figure 10 – Minimum Overlap of Jointing Ducts

If the joint has to be done where the duct angles off in another direction, the joint must not be placed in the curve of the duct, but on the longest side, see Figure 11.

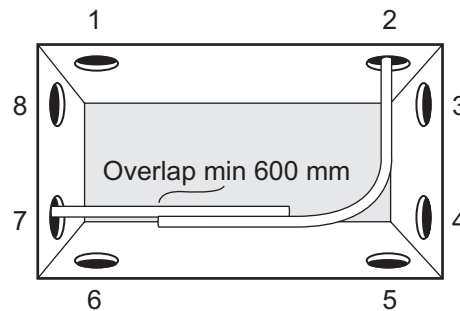


Figure 11 – Jointing Ducts Where the Duct Angles off

5.1.2 Placing Joint Closure in Rectangular Manholes

When placing the joint closure in rectangular manholes, make sure that the duct assembly is not bent below its specified minimum bending radius. Also, protect the duct assembly and joint closure to minimize the risk of someone standing on it when entering and exiting the manhole, see Figure 12.

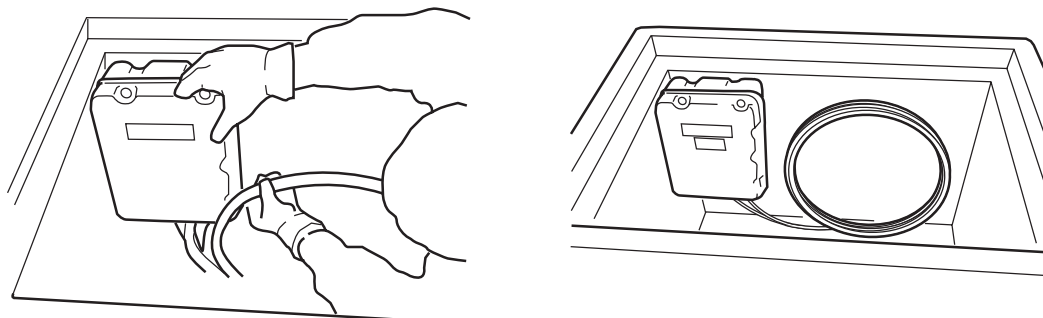


Figure 12 – Placing Joint Closure in Rectangular Manholes

5.2 Cylindrical Manholes

When using cylindrical manholes, the entry and exit of ducts in the center of the manhole is avoided, since the risk of someone stepping on the duct increases. Always use the entry and exit positions where the duct has a wide bending radius, see Figure 13.

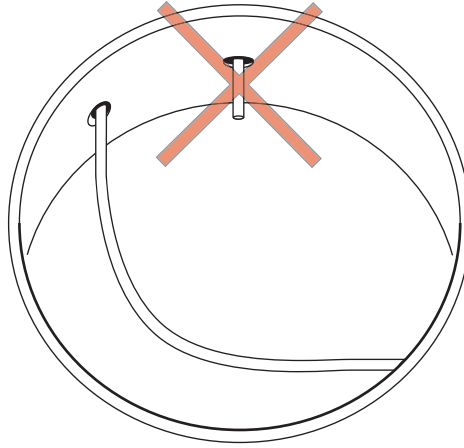


Figure 13 – Entry and Exit Positions in Cylindrical Manhole

5.2.1 Jointing Ducts in Cylindrical Manholes

When jointing ducts in a cylindrical manhole, it is of great importance to use the side of the manhole as entry and exit positions, see Figure 14. In that case, working in the manhole is easier, and there is no risk of someone stepping on the duct joint.

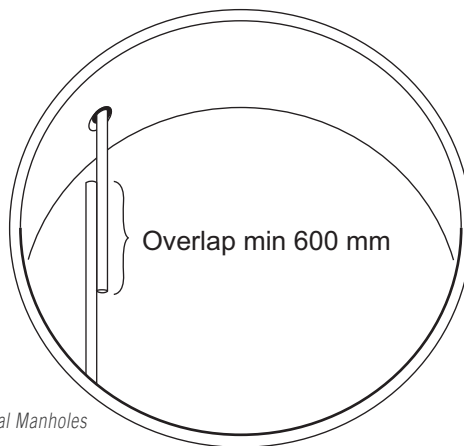


Figure 14 – Jointing Ducts in Cylindrical Manholes

Note: The diameter of the manhole in the bottom, and where the ducts enter the manhole, is minimum 1000 millimeters.

5.2.2 Placing Joint Closures in Cylindrical Manholes

When placing a joint closure in a cylindrical manhole, consider the risk of the next person entering the manhole, and stepping on the cable. Protect the cable loop, and preferably mount the splice enclosure on the side of the manhole, see Figure 15.

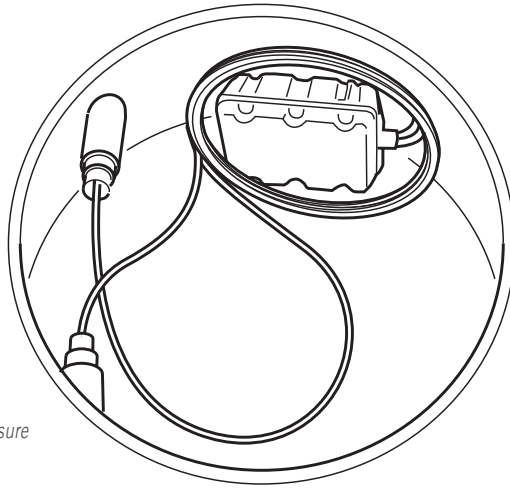


Figure 15 – Placing a Joint Closure
in Cylindrical Manholes

6 Reference List

Hexatronic Documents

- [1] Personal Health and Safety Information
PERSONAL HEALTH AND SAFETY INFORMATION, 124 46-2885
- [2] System Safety Information
SYSTEM SAFETY INFORMATION, 124 46-2886
- [3] Micronet System Description
OPTICAL FIBER MICRO CABLE SYSTEM, 28701-1/FGB 101 254