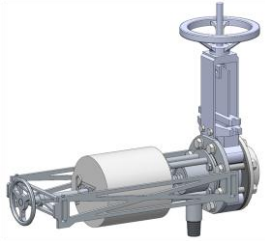




eDART Installation and Maintenance Manual - Thief Sampler

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Document eDART Installation and Maintenance Manual
- Thief Sampler (TS125) & Extraction Mechanism

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WARNING

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TABLE OF CONTENTS

1. Introduction..... 2
 2. Significant Product Details..... 2
 3. Product Outline..... 3
 4. Installation..... 5
 5. Routine Maintenance..... 5
 6. Sampler Extraction..... 6
 7. Disassembly of the Sampler 7
 8. Reassembly of the Sampler 8
 9. Control Philosophy..... 9
 10. Trouble Shooting 13
 11. Problems 13

1. INTRODUCTION

This document is the maintenance manual for the **eDART Thief Sampler (TS125) & extraction mechanism**. It provides the guidelines for the disassembly, maintenance and re-assembly of the sampler product.

2. SIGNIFICANT PRODUCT DETAILS

The eDART Thief Sampler is a robust sampler which reduces human error in line sampling – when set on a timer it can sample from the process known quantities repeatability. The sampler extracts a volume of approximately 125 ml per stroke.

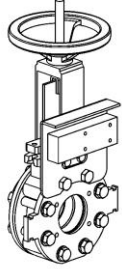
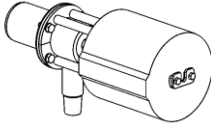
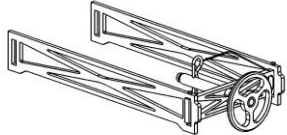
The standard sampler is manufactured from the materials shown in Table I

Table I: Product Details

| Item | Description | Material |
|------|----------------------|-----------------|
| 1 | Sampler Sleeve | Stainless steel |
| 2 | Sampler End Cap | Stainless steel |
| 3 | Sampler Seals | Polyurethane |
| 4 | Chute | Stainless steel |
| 5 | Extraction Mechanism | Stainless steel |

3. PRODUCT OUTLINE

3.1. Product Breakup

| Mount Assembly | Sampler Assembly | Extraction Mechanism |
|---|---|---|
|  |  |  |
| Figure 1 – Mount Assembly | Figure 2 – Sampler Assembly | Figure 3 – Extraction Mechanism |

3.1.1. Mount Assembly

The mount assembly consists of an isolation valve. In the images above, a Knife Gate Valve is shown, however a knock-and-block valve is often supplied, below.

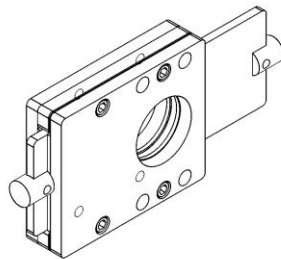


Figure 4 – Knock-And-Block Valve

The mount assembly bolts to the valve or pipe work at the installation position. The solenoid and timer are affixed to this assembly.

3.1.2. Sampler

This assembly consists of the sampler chute and actuator. It can be removed from the line while the process is live for general maintenance or position change.

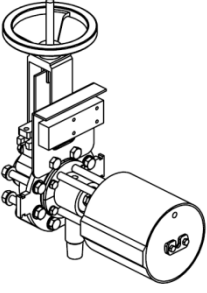
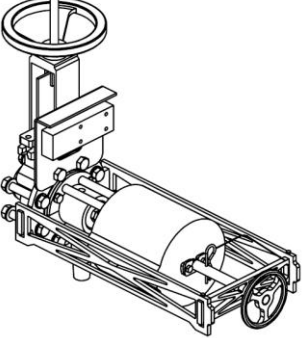
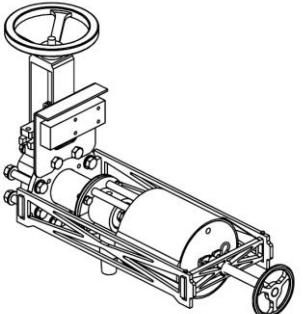
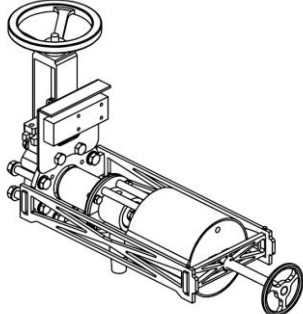
3.1.3. Extraction Mechanism

This assembly is used to remove the sampler while the process is live. It ensures that the sampler is extracted to the correct distance so that there is no line spillage and that the isolation valve can be closed. One of these mechanisms can be used on a number of thief samplers throughout the plant.

3.2. Product Explanation

The eDART Thief Sampler has three main sub-assemblies discussed in §3.1 – these are the Mount Assembly, the Sampler Assembly and the Extraction Mechanism.

An operating eDART Thief Sampler may either have the extraction mechanism removed (Figure 5) or attached (Figure 6).

| No Extraction | Extraction In | Close Valve | Extraction Out |
|---|--|--|---|
|  |  |  |  |
| Figure 5 – No Extraction Mechanism | Figure 6 – Extraction, In Position | Figure 7 – Close Valve Position | Figure 8 – Extraction Out Position |

To remove the Sampler from the live process the extraction mechanism is used to withdraw the sampler to a position where it is engaged enough so there is no spillage and the isolation valve can be closed without interference (Figure 7). The extraction mechanism then allows for the sampler to be extracted fully so it can easily be removed (Figure 8).

3.3. General Arrangement Drawing

The labels shown here are referred to throughout the document.

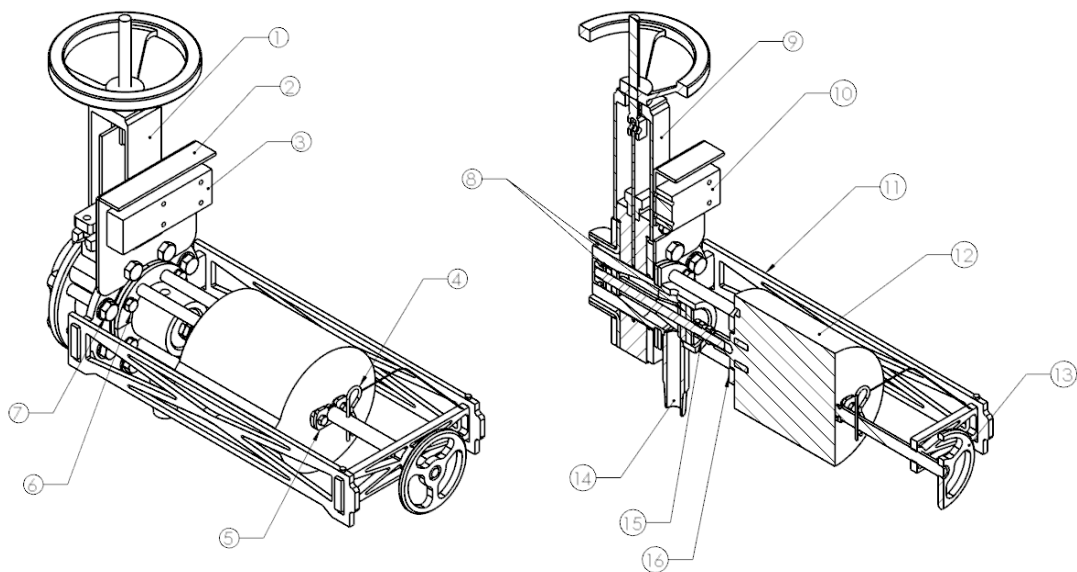
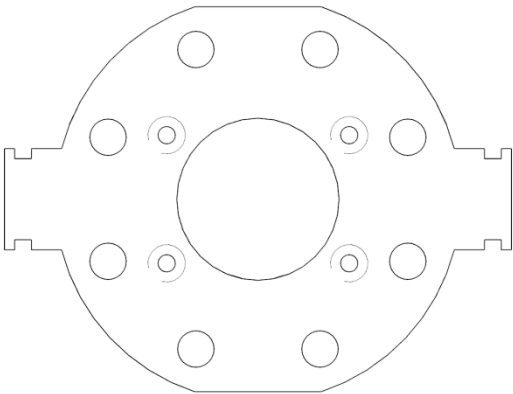
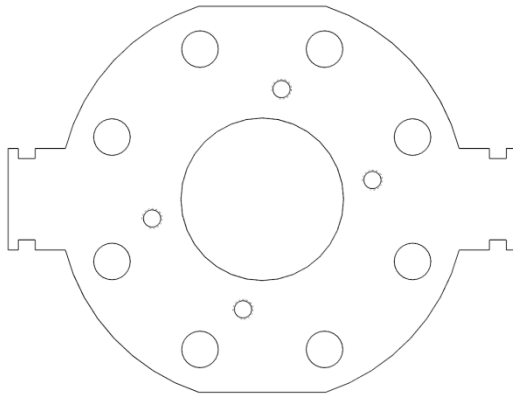


Figure 9 – Thief Sampler General Arrangement

4. INSTALLATION

1. The Mount Assembly (Figure 1) is bolted to the pipeline or eDART Valve by means of a rubber lined 100NB stub and 80NB SABS 1123 Flange. The length of the stub is designed so that the sampler does not protrude into the process and be subjected to undue wear.
2. The sampler should be installed in a turbulent flow, preferably in the eDART Slurry Valve at the given optional port. In a pipeline the Sampler should be installed after an elbow or in a vertical line.
3. The sampler chute (1 1/2" NPT threaded pipe) should face downwards to ensure the sample drains out of this area under gravity.
4. The “winglets” on the mounting plate **SHALL** be installed horizontally. Should it be required that the sampler chute be orientated at any other angle then another Mounting Plate **MUST** be supplied.

| Normal Horizontal Mounting Plate | 45° Left Mounting Plate |
|---|--|
|  |  |
| Figure 10 – Normal Mounting Plate | Figure 11 – 45° Left Mounting Plate |

5. ROUTINE MAINTENANCE

It is important to operate the unit on a regular basis. ***If the normal duties do not require the eDART Thief Sampler to operate regularly we recommend that a procedure be introduced to stroke the actuator and sampler on a weekly basis.*** The advantage of this is that cylinder lubrication is achieved and any possible problems that may occur are identified before consequential damage can result.

6. SAMPLER EXTRACTION

6.1. General



WARNING

- Ensure that the Extraction Mechanism is used to remove the eDART Sampler from the line and that the operator understands the importance of using it.
- All people using the Extraction Mechanism must ensure that the supplied R-Pin is located through the shaft. This prevents the sampler from being withdrawn too far before the isolation valve is closed.
- Failure to do so can result in serious injury and a hell-of-a-mess

Should the sampler require stripping for any reason, the following procedures should be followed:

- **Power down the solenoid and timer.**
- **Remove all the air connections to the actuator and cable tie the loose ends to the mount assembly (which will be left in situ).**
- **Remove the assembled actuator and sampler from the line using the extraction mechanism.**

6.2. Use of the Extraction Mechanism



WARNING – Please note procedure

Part One

- Ensure that the winglets of the Extraction Mechanism are in the horizontal position.
- Locate the loose ends of the extraction mechanism over the winglets of the mounting plate. It will slide down and lock in position.
- Ensure that the opening of the C-Shape Washer attached to the top plate of the actuator is pointing downwards.
- Adjust the screw so that the machined end locates in the C-Shape washer.
- Ensure that there is a R-Pin in the hole through the shaft to prevent over extraction.

Part Two

- Remove the bolts (Item 7 on the General Arrangement, Figure 9, Page 4)
- Wind back the sampler using the Extraction Mechanism's Handwheel until the pin prevents further extraction
- Close the isolation valve.
- Remove the pin and continue to wind the Sampler back.
- The Sampler can now be removed.

7. DISASSEMBLY OF THE SAMPLER



WARNING

- The actuator may be removed completely from the sampler for servicing only once the sampler has been removed from the line.

Once the sampler has been removed from the line, then:

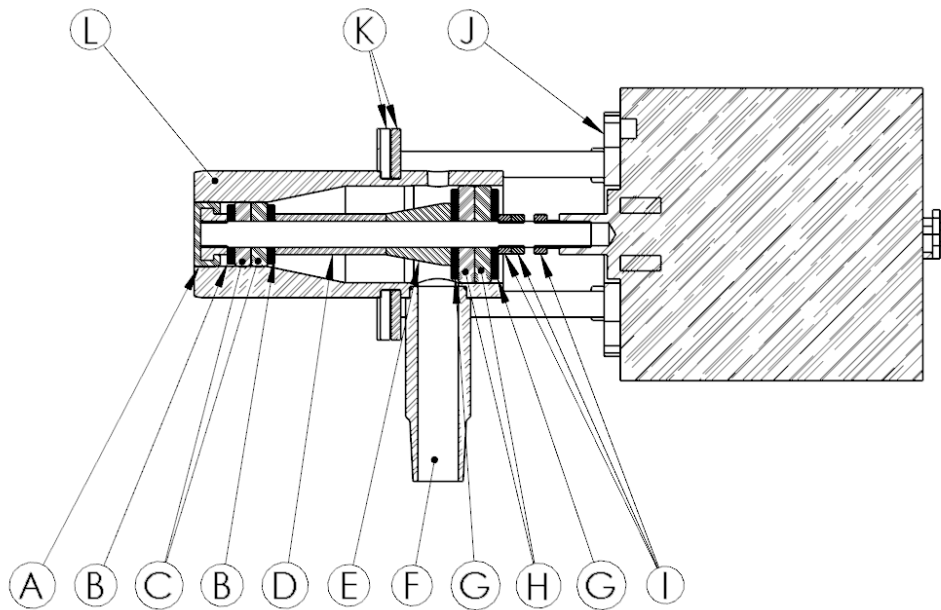


Figure 12 - Sampler Cross-Section

1. Disassemble the actuator from the sampler body by removing the M12 Hex Bolts (Item “J”, Figure 12 above).
2. Carefully slide the actuator together with the piston shaft subassembly off the sampler body.
3. Loosen the lock nuts on the actuator / piston shaft (Item “I”, above).
4. Unscrew the sampler end piston and shaft from the actuator stem.
5. Remove the two lock nuts then slide the sampler piston seals (Item “C” & “H”) support washers (“G” & “B”) and the sampler spacers (“D” & “E”) from the end cap shaft. **NB: Note the arrangement of the seals and spacers.**

8. REASSEMBLY OF THE SAMPLER

1. Change the worn components. The components that should be inspected are the piston seals and the end cap.
2. Rebuild the piston shaft sub assembly as per the following order (refer Figure 12):
 - Piston End Cap and shaft (“A”)
 - Smaller diameter Support Washer (“B”)
 - Smaller diameter Seal (2 off “C”)
 - Smaller diameter Support Washer (“B”)
 - Long Spacer (“D”)
 - Conical Spacer (“E”)
 - Larger diameter Support Washer (“G”)
 - Larger diameter Seal (two [2] off “H”)
 - Larger diameter Support Washer (“G”)
 - Lock nut (three [3] off “I”)
3. Ensure the unit fits comfortably together. There should not be any gaps.
4. Do not tighten the lock nuts as this will compress the seals
5. Slide the piston shaft sub assembly into the piston body (“L”)
6. Tighten the bottom lock nut so that the seals compress on to the piston body. Do not over tighten. It must still be able to slide but not pass sample.
7. Tighten the lock nut.
8. Ensure the actuator shaft is fully extended.
9. Screw the sampler shaft into the actuator shaft. The end cap (“A”) should just touch the sampler body. Tighten the lock nut.
10. Bolt the actuator to the sampler body with M12 Hex Head Bolts (“J”)
11. Should the flange (“K”) become dislodged then please call the number below for a call out.

9. CONTROL PHILOSOPHY



NOTE

- Please note the Solenoid Voltage type (110 VAC or 24 VDC) and apply the applicable source.

9.1. Standalone (Local) control

- The Thief Sampler can be ordered with an integral timer module for standalone control.
- In this configuration refer to the timer module manual for configuration.



WARNING

- The sampler will stroke automatically, ensure the solenoid is disconnected before working on the sampler or the process line. !.

9.2. Remote control

When controlling the sampler from a plant PLC or control system , the timer function needs to be programmed into the control system .

9.3. Control Set up

The thief sampler is typically set up to sample 10 litres per shift of 8 hours.

The Sampler has a volume of approximately 125ml but needs to be calibrated in-situ and on-site as this depends on the exact process conditions.

In this section the timer and solenoid are explained.



WARNING

- The sampler should never be left on or in the extended for any length of time as the sampler internals will suffer accelerated wear.

The eDART thief sampler is piped in the following way (Figure 13, below).

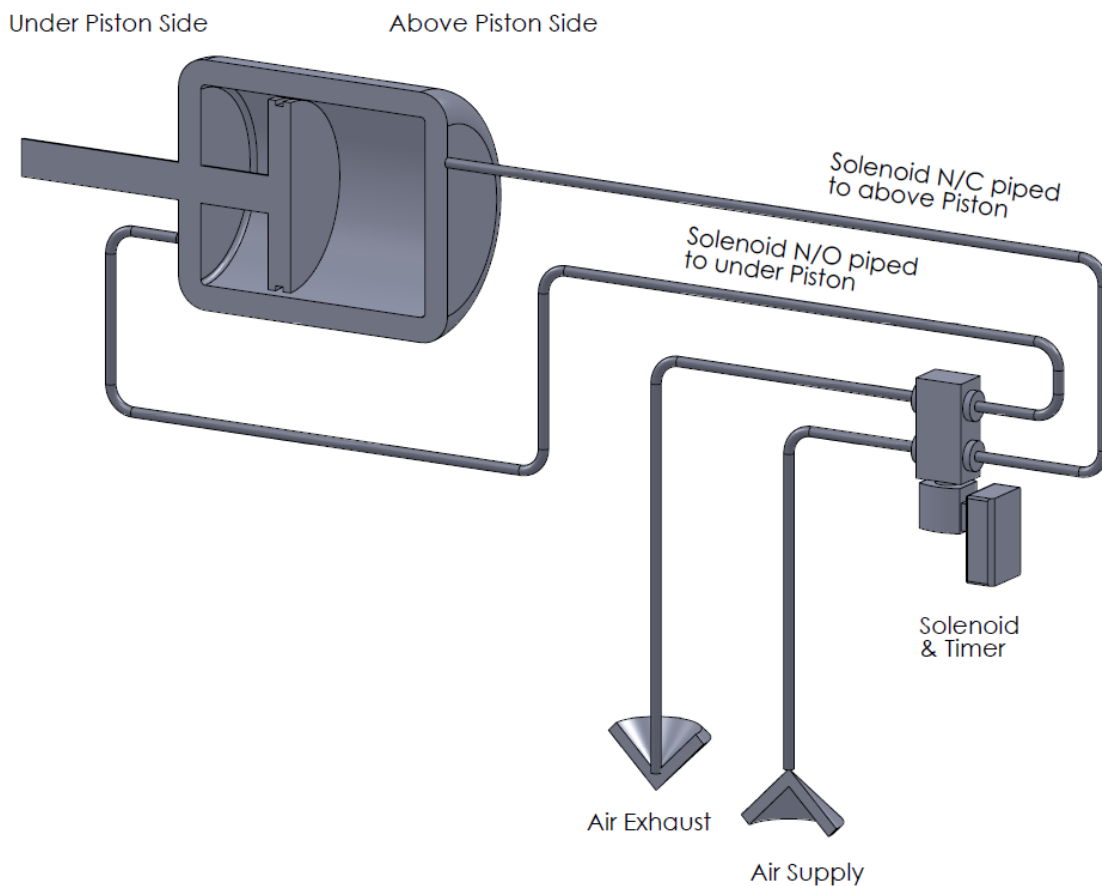


Figure 13: Solenoid Piping Schematic

9.3.1. Burkert Timer Settings



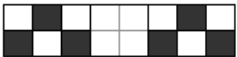
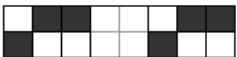
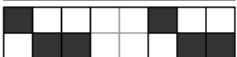
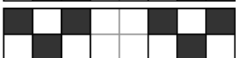
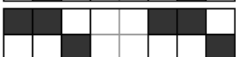
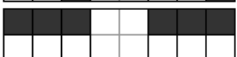








The on-time and off-time of the timer need to be set to achieve the desired sampling rate. The following figure shows the dip switch settings.

| Burkert Timer Settings | | <table border="1" style="display: inline-table;"> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td></tr> </table> | | | | | | | | | | | | | | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|-------------------------------|----------|--|---|---|---|---|---|-------|--|--|--|--|--|--|--|--|--|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | | | | | | | | | | | | | | | |
| Sample Size | 125.0 ml | | | | | | | | | | | | | | | | | | | | | | | | |
| Over Time Period | 480 min | | | | | | | 8 hrs | | | | | | | | | | | | | | | | | |
| Total Volume Required | 10.0 l | | | | | | | | | | | | | | | | | | | | | | | | |
| Strokes / Time Period | 80 | | | | | | | | | | | | | | | | | | | | | | | | |
| Suggested Time On | 4 Sec | | | | | | | | | | | | | | | | | | | | | | | | |
| Suggested Time Off | 356 Sec | | | | | | | | | | | | | | | | | | | | | | | | |

Function Selection

| | |
|--------------------|--|
| time on + time off |  |
| time off + time on |  |
| time on only |  |
| time off only |  |

Time Range Selection

| Version NA1 t min - t max | Standard Version t min - t max | t on | t off |
|------------------------------|-----------------------------------|--|--|
| 0,05 - 1 s | 0,5 - 10 s |  |  |
| 0,5 - 10 s | 1,5 - 30 s |  |  |
| 5,0 - 100 s | 5,0 - 100 s |  |  |
| 0,5 - 10 min | 0,5 - 10 min |  |  |
| 3,0 - 60 mn | 1,5 - 30 min |  |  |
| 0,3 - 6 h | 5,0 - 100 min |  |  |
| 1,2 - 24 h | 12,0 - 240 min |  |  |
| 5,0 - 100 h | 0,5 - 10 h |  |  |

Time Setting



Figure I4: Burkert Timer Settings

9.3.2. Burkert Solenoid Diagram

Figure 15 shows the pneumatic connections to the 4/2 way solenoid. Refer to Figure 13 for the piping schematic. Please note that some solenoids supplied are 5/2 way which only means that there are two exhausts (R). Please also note that there is a means to reverse the N/O and N/C ports; this should be set in the "Normal" position.

Burkert Solenoid Diagram

- A Actuator Port (Normally Open)
- B Actuator Port (Normally Closed)
- P Supply Port
- R Common Exhaust

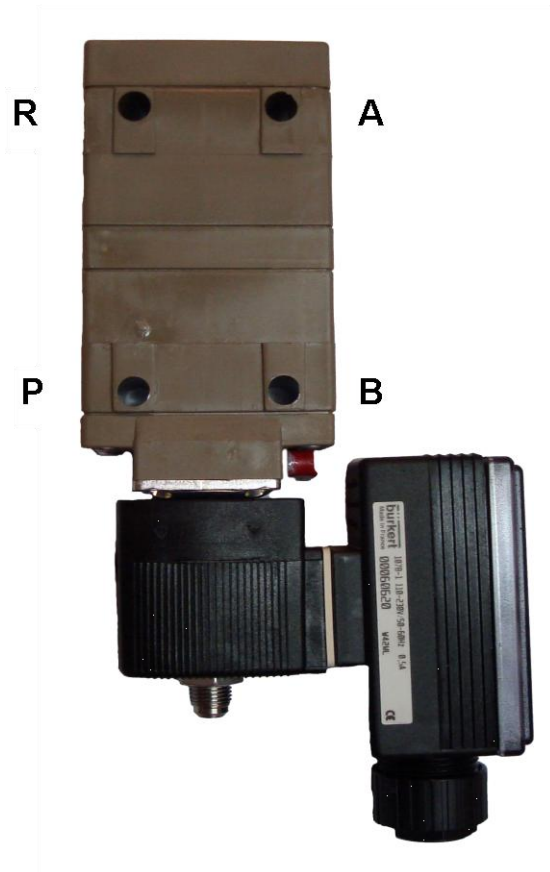


Figure 15: Burkert Solenoid



10. TROUBLE SHOOTING

| Problem | Possibility | Solution |
|---|--------------------|---|
| Thief Sampler passing sample in the steady state | Seals are worn | Replace |
| Thief Sampler is stroking but no sample is being discharged | Slurry Block | Clean discharge pipe Clean Sampler chute and sampler chamber |
| Thief Sampler receives signal but does not stroke | Jammed seals | Service sampler and clean seals |
| | Faulty Actuator | Replace actuator seals |

11. PROBLEMS

For any problems please contact eDART Slurry Valves directly on –

**Tel. +27. (0) 11. 823. 6620, or
 email: maintenance@edart.co.za**

- Document eDART Installation and Maintenance Manual - Actuator

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