1 Introduction

This publication details the installation, connection and maintenance of an ABB Pumped Reference Air Unit. This pump supplies reference air to any of the following ABB oxygen probes: AZ20, AZ25, AZ20/ZFG2 replacement, ZFG2 and ZGP2.

Note. The pump cannot be used with multiple probes simultaneously.

4 pump models are available – see Table 1:

<table>
<thead>
<tr>
<th>Description</th>
<th>Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/4 BSP (Metric) 230 V AC 50 / 60 Hz</td>
<td>AZ200 770</td>
</tr>
<tr>
<td>1/4 BSP (Metric) 115 V AC 50 / 60 Hz</td>
<td>AZ200 771</td>
</tr>
<tr>
<td>1/4 NPT (Imperial) 230 V AC 50 / 60 Hz</td>
<td>AZ200 772</td>
</tr>
<tr>
<td>1/4 NPT (Imperial) 115 V AC 50 / 60 Hz</td>
<td>AZ200 773</td>
</tr>
</tbody>
</table>

Table 1  ABB Pumped Reference Air Unit Part Numbers

The internal air filter is a replaceable item (ABB part number 0217463).

2 For more information

Further information is available from: www.abb.com/analytical

or by scanning these codes:

Sales  Service
3 Safety

Information in this document is intended only to assist our customers in the efficient operation of our equipment. Use of this manual for any other purpose is specifically prohibited and its contents are not to be reproduced in full or part without prior approval of the Technical Publications Department.

3.1 Safety precautions
Please read the entire document before unpacking, setting up, or operating this pump.
Pay particular attention to all warning and caution statements. Failure to do so could result in serious injury to the operator or damage to the equipment.
To ensure the protection provided by this equipment is not impaired, do not use or install this equipment in any manner other than that which is specified in this manual.

3.2 Health & Safety

To ensure that our products are safe and without risk to health, the following points must be noted:

- The relevant sections of these instructions must be read carefully before proceeding.
- Warning labels on containers and packages must be observed.
- Installation, operation, maintenance and servicing must only be carried out by suitably trained personnel and in accordance with the information given.
- Normal safety precautions must be taken to avoid the possibility of an accident occurring when operating in conditions of high pressure and / or temperature.

Safety advice concerning the use of the equipment described in this manual or any relevant Material Safety Data Sheets (where applicable) may be obtained from the Company address on the back cover, together with servicing and spares information.

3.3 Electrical Safety – CEI / IEC 61010-1:2001-2
This equipment complies with the requirements of CEI / IEC 61010-1:2001-2 ‘Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use’ and complies with US NEC 500, NIST and OSHA.
If the equipment is used in a manner NOT specified by the Company, the protection provided by the equipment may be impaired.

3.4 Symbols – CEI / IEC 61010-1:2001-2
One or more of the following symbols may appear on the equipment labelling:

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>✚</td>
<td>Protective earth (ground) terminal.</td>
</tr>
<tr>
<td>✦</td>
<td>Functional earth (ground) terminal.</td>
</tr>
<tr>
<td>✬</td>
<td>Direct current supply only.</td>
</tr>
<tr>
<td>✧</td>
<td>Alternating current supply only.</td>
</tr>
<tr>
<td>⚡</td>
<td>Both direct and alternating current supply.</td>
</tr>
<tr>
<td>☑</td>
<td>The equipment is protected through double insulation.</td>
</tr>
<tr>
<td>⚠</td>
<td>This symbol, when noted on a product, indicates a potential hazard which could cause serious personal injury and / or death. The user should reference this instruction manual for operation and / or safety information.</td>
</tr>
<tr>
<td>⚠</td>
<td>This symbol, when noted on a product enclosure or barrier, indicates that a risk of electrical shock and / or electrocution exists and indicates that only individuals qualified to work with hazardous voltages should open the enclosure or remove the barrier.</td>
</tr>
<tr>
<td>🔴</td>
<td>This symbol indicates that the marked item can be hot and should not be touched without care.</td>
</tr>
<tr>
<td>⚠</td>
<td>This symbol indicates the presence of devices sensitive to electrostatic discharge and indicates that care must be taken to prevent damage to them.</td>
</tr>
</tbody>
</table>
3.5 Restriction of Hazardous Substances (RoHS)

The European Union RoHS Directive and subsequent regulations introduced in member states and other countries limits the use of six hazardous substances used in the manufacturing of electrical and electronic equipment. Currently, monitoring and control instruments do not fall within the scope of the RoHS Directive, however ABB has taken the decision to adopt the recommendations in the Directive as the target for all future product design and component purchasing.

3.6 Product disposal

Note. The following only applies to European customers.

ABB is committed to ensuring that the risk of any environmental damage or pollution caused by any of its products is minimized as far as possible. The European Waste Electrical and Electronic Equipment (WEEE) Directive (2002 / 96 / EC) that came into force on August 13 2005 aims to reduce the waste arising from electrical and electronic equipment; and improve the environmental performance of all those involved in the life cycle of electrical and electronic equipment.

In conformity with European local and national regulations (EU Directive 2002 / 96 / EC stated above), electrical equipment marked with the above symbol may not be disposed of in European public disposal systems after 12 August 2005.

3.7 Safety recommendations

For safe operation, it is imperative that these service instructions be read before use and that the safety recommendations mentioned herein be scrupulously respected. If danger warnings are not heeded to, serious material or bodily injury could occur.

Warning. The installation of the pump should be performed exclusively by personnel specialized and authorized to work on electrical installations, in accordance with relevant local regulations.

Caution. This equipment has been tested and found to comply with the limits for Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with this instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user is required to correct the interference at his own expense.

3.8 Service and repairs

Other than the serviceable items listed in this document, none of the pump’s components can be serviced by the user. Only personnel from ABB or its approved representative(s) is (are) authorized to attempt repairs to the system and only components formally approved by the manufacturer should be used. Any attempt at repairing the pump in contravention of these principles could cause damage to the pump and corporal injury to the person carrying out the repair. It renders the warranty null and void and could compromise the correct working of the pump and the electrical integrity or the CE compliance of the pump.

If you have any problems with installation, starting, or using the pump please contact the company that sold it to you. If this is not possible, or if the results of this approach are not satisfactory, please contact the manufacturer’s Customer Service.

3.9 Potential safety hazards

The following potential safety hazards are associated with operating the system:

- Electrical (line voltage)
4 Installation

4.1 Siting
Site the pump adjacent to the probe – see Fig. 4.1 for environmental requirements.

![Fig. 4.1 Environmental Requirements](image)

4.2 Mounting
Overall dimensions are shown in Fig. 4.2. Mount the pump on a flat secure surface using the 3 mounting lugs (A).

![Fig. 4.2 Dimensions and Mounting Lug Locations](image)

4.3 Electrical safety

**Warning.**
- Isolate the incoming power supply before accessing the pump or making connections.
- The pump is not fitted with a switch therefore a disconnecting device such as a switch or circuit breaker conforming to local safety standards must be fitted to the final installation. It must be fitted in close proximity to the pump within easy reach of the operator and must be marked clearly as the disconnection device for the pump.
- Electrical installation and earthing (grounding) must be in accordance with relevant national and local standards.
- Use cable appropriate for the load currents: 3-core cable rated 5A and 90 °C (194 °F) minimum, that conform to either IEC 60227 or IEC 60245. The terminals accept cables from 0.8 to 2.5 mm² (18 to 14 AWG).
- The pump conforms to Installation Category II of IEC 61010.
- After installation, there must be no access to live parts, for example, terminals.
- If the pump is used in a manner not specified by the Company, the protection provided by the equipment may be impaired.
- All equipment connected to the pump’s terminals must comply with local safety standards (IEC 60950, EN601010-1).

**Caution.**
- Always route power cables and air lines separately.
- Make connections only as shown.
- Maintain Environmental Protection at all times.
- Ensure the seal and mating surfaces are clean to maintain environmental rating.
- Conduit connections must provide cable entry sealing.
- Ensure cable glands are tightened after wiring. Do not overtighten the plastic cable glands to avoid destroying their sealing properties. Initially, tighten finger-tight, then a further 1/2 to 3/4 turn using a suitable spanner or wrench.
- Fit a blanking plug where required.
- Inductive loads must be suppressed or clamped to limit voltage swings.
4.4 Accessing the terminal block
Referring to Fig. 4.3:
1. Loosen the 4 pump cover retaining screws A.
2. Remove the pump cover B.
3. Loosen cable gland C to prepare for the incoming power supply cable.

4.5 Electrical connections
4.5.1 Preparation
Referring to Fig. 4.4:
1. Prepare the incoming power supply cable as follows:
   a. cut the outer sheath back to leave 100 mm (4.0 in.) sleeved wires A
   b. cut the sleeved wires back to leave 5 mm (0.2 in.) tails B
2. Pass the cable through cable gland C.

4.5.2 Making connections
Referring to Fig. 4.4, make mains connections as detailed in steps 1 to 5. The mains power supply must be 115 or 230 V AC, 50 / 60 Hz depending on the pump model (refer to Fig. 4.3 and Table 1.1, page 1).
1. Prepare the incoming power supply cable as follows:
   a. cut the outer sheath back to leave 100 mm (4.0 in.) sleeved wires A
   b. cut the sleeved wires back to leave 5 mm (0.2 in.) tails B
2. Pass the cable through cable gland C.
3. Connect the neutral (blue wire D) to the terminal block to match the existing connection.
4. Connect the earth wire E to the pump’s internal earth connection.
5. Connect the live (brown) wire F to the terminal block to match the existing live connection.

**Warning.** Ensure the live (brown) wire is protected with a 1.6 A Type F fuse.
6. Refit the pump cover by reversing the procedure in Section 4.4.
4.6 Reference air connections

Referring to Fig. 4.5:

1. It is important that air to the pump inlet is clean and dry.

   Caution. Failure to observe this requirement causes damage to both the pump and the probe.

   If necessary, connect a pipe to the pump (suction) inlet A and ensure the other end of the pipe is located in a clean, dry area.

2. Connect the pumped reference air outlet B directly to the reference air inlet on the probe – refer to individual probe manuals for reference air connection details.

3. A flow restrictor C in the pump outlet line ensures the correct flow is delivered without further regulation from the pump. Ensure the flow restrictor is in place to protect pump components.

5 Maintenance

5.1 Replacing the air filter

<table>
<thead>
<tr>
<th>Note. Isolate the pump from power and air supplies before replacing the air filter.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Remove the pump cover – see section 4.4, page 5. Referring to Fig. 5.1:</td>
</tr>
<tr>
<td>2. Disconnect the top tube A from air filter B.</td>
</tr>
<tr>
<td>3. Disconnect the lower tube C from air filter B.</td>
</tr>
<tr>
<td>4. Release clip D and carefully remove air filter B by pulling it out of the clip.</td>
</tr>
<tr>
<td>5. Discard air filter B.</td>
</tr>
<tr>
<td>6. Fit a new filter by reversing steps 1 to 4.</td>
</tr>
</tbody>
</table>

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Fig. 4.5 Pumped Reference Air Unit Inlet and Outlet

Fig. 5.1 Replacing the Air Filter