ANHEL®

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TECHNICAL DOCUMENTATION · ANHEL® · 2026

Operating Manual

ANHEL® pumping units · SPD type

Version 1.0 Edition 2026 Saint Petersburg

OGRN 1137847188357 · Tax ID (INN) 7802825464 · KPP 780201001

anhelspb.com

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01 · NAVIGATION

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02 · UNIT COMPOSITION

Technical description

The ANHEL® SPD-type pumping unit consists of:

- 1 to 6 vertical multistage pumps, end-suction / horizontal pumps, or in-line pumps;
- isolating valves;
- suction and discharge manifolds;
- an instrumentation set;
- expansion vessel(s) protecting the instrumentation from water hammer;
- a steel base with a protective coating;
- differential-pressure switch, pressure-switch contacts or pressure transmitter (quantity and type vary with system and ordered options);
- dry-running protection (relay, electrical-contact gauges, pressure transmitter or another method per the order);
- an ANHEL® electrical control cabinet (see the cabinet manual or the catalogue summary).

03 · DELIVERY AND STORAGE

Transportation

To keep the pumping unit stable, transport in accordance with the symbols on the packaging: arrows up, keep the packaging dry, handle as fragile. If this is not feasible, take measures to prevent the pumping unit from tipping over.

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Safety precautions

This installation and operating manual contains essential, mandatory instructions for the installation, operation and maintenance of the unit. The installer or operator must read every section of the manual before installing or operating the pumping unit.

A copy of this manual must always be kept on site where the unit is located. In addition to the safety notes referred to in this section, all standard personnel-health precautions must be observed.

Safety markings used in this manual

Safety notes that may cause harm to people are marked with the general-hazard symbol and the electrical-power symbol. Other instructions related to damage to the unit are labelled with the word CAUTION.

Personnel qualification and training

Personnel responsible for the operation, maintenance, inspection and installation of the pumping unit must be qualified for these activities. The owner of the unit must distribute responsibility, competence and supervision among the personnel. Where necessary, the manufacturer or distributor can arrange training.

Damage caused by non-compliance

Failure to follow safety instructions may be hazardous to people, the environment and the pumping unit. Damage caused by ignoring instructions is not covered by the manufacturer's or distributor's warranty.

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Safety precautions (continued)

Failure to follow the operating manual may result in:

- failure of essential unit functions;
- personal hazard from electrical, mechanical or chemical exposure;
- environmental hazard from leakage of hazardous fluids.

> **CAUTION**
>
> The pumping unit control panel must always be locked during operation. The pumps must always be operated with the coupling guards in place. If hot or cold components present a hazard, direct contact must be prevented. Damage caused by mains-supply quality is excluded from the manufacturer's responsibility.

Service, inspection and installation

Inspection and installation must be carried out by authorised personnel who have fully studied this operating manual. Service must be performed by qualified personnel who have studied the separate repair manual. When pumping units handle hazardous liquids, make sure that any component that came into contact with the medium is immediately decontaminated after work.

Design changes and spare parts

Original spare parts and accessories approved by the manufacturer comply with safety standards. Design changes, modifications and the use of non-original spare parts void the warranty.

UNAUTHORISED OPERATION

The product's technical characteristics are only guaranteed when used in accordance with the "Application area" section. The operating limits given in that section must not be exceeded.

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05 · PURPOSE AND LIMITS

Application area

The ANHEL® SPD-type pumping unit is intended for use in cold- and hot-water supply systems (including drinking water), heating, air conditioning, firefighting and water treatment, as well as in various process applications in industry and agriculture.

Operating ranges

Maximum ambient temperature	50 °C
Maximum operating-fluid temperature	70 °C (180 °C on request)
Maximum working pressure	up to 25 bar (or as specified in the order)
Minimum suction pressure	see pump curves
Maximum suction pressure	current inlet + discharge pressure (closed discharge valve) must be below maximum allowable

CAUTION

The operating limits above must not be exceeded.

Frost protection

A pumping unit that is not used for an extended period and may be exposed to sub-zero temperatures must be drained. To drain the unit, close the isolating valves of the building piping system, remove the air-bleed plugs on the upper pump brackets and the drain plugs at the lowest points of the pumps and check valves.

All isolating valves and drain cocks of the unit must be open. Before restarting, refit the air-bleed and drain plugs only after the pump-chamber priming is complete. If the unit has been stored below 0 °C, hold it at above-freezing temperature for at least 24 hours before the first start-up.

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06 · CONTROL LOGIC

Operating principle — water-supply systems

The ANHEL® SPD-type pumping unit has Manual and Automatic control modes. The mode is selected by the user on the controller panel. In Manual mode the pumps are started and stopped from the controller panel by pressing the corresponding Start / Stop buttons; status is displayed without automation involvement.

CAUTION

Manual mode is used only for commissioning or in critical situations when this is required.

In Automatic mode the pumps are controlled from external sensor signals (pressure, differential pressure, temperature, flow, level, etc.). The cabinet operates on cascade-staging based on the feedback sensor.

The pressure transmitter signal (4…20 mA) is compared with a fixed setpoint in the controller defined by the user. The error between the two sets the impeller speed. Before starting, the lead pump is selected by minimum-running-time or start-count balancing.

The master pump is the one currently driven by the variable-frequency drive (VFD). Additional pumps are connected directly to the mains, via a soft starter, or via VFDs — depending on the cabinet configuration. To reduce water hammer, the master pump speed drops when an additional pump starts and rises when it stops. The cabinet allows the user to set the number of duty and standby pumps (1 to 6) on the controller panel.

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06 · CONNECTIONS AND PROTECTION

Operating principle (continued)

External connections

Dry-running protection	Relay / transmitter per ordered options
Analogue input	4–20 mA transmitter
Motor protection	Motor thermal contact or PTC sensor per configuration
Output signals (SCADA)	Per the wiring diagram appendix
Indication	"Mains", "VFD fault", pump "Run", pump "Fault". Other indicators per the wiring diagram.

Protections

Short-circuit	Standard
Over-current	Standard
Phase loss / asymmetry	Reverse phase-sequence or other protections per the wiring diagram
Ingress protection	IP54 or as ordered
Cabinet enclosure	Steel

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Operating principle (continued)

The ANHEL® SPD-type pumping unit for firefighting systems has Manual and Automatic control modes. The mode is selected on the cabinet front panel and shown by the status indicators. In Manual mode the pumps are operated from the front panel via the Start / Stop buttons, primarily for trial runs and short tests.

In Automatic mode the unit operates on external signals from instrumentation. The pumps run on a duty / standby schedule — if the duty pump fails, the cabinet automatically starts the standby pump, the "Fault" lamp lights up on the affected pump and the SCADA contacts flip.

Automatic fire-suppression system (APT)

The duty pump is started by a signal from the pressure switches. When a sprinkler bulb breaks at a given temperature, the system pressure drops sharply, the "Fire" indicator lights up on the cabinet front panel and the duty pump starts. If the pressure does not reach the design level during operation, the duty pump stops and the standby pump starts. The firefighting mode is stopped by switching the selector to Stop on the front panel.

Indoor fire-water riser (VPV)

The cabinet enters firefighting mode on an external "Fire" signal from the fire-alarm control panel, the fire-alarm cabinet, or when the "Fire" button on the front panel is pressed. The duty pump starts with the configured time delay and the pipework is filled with water. If the system already holds the required suppression pressure, the start is deferred until the pressure drops. If the design pressure is not reached, the duty pump stops and the standby pump starts. The firefighting mode is stopped via the front-panel selector.

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07 · ATS, INDICATION, PROTECTION

ANHEL® control cabinet

Automatic transfer switch (ATS)

The ANHEL® SPD-type firefighting pumping unit control cabinet is equipped with an Automatic Transfer Switch (ATS) fed from two independent power sources to meet the first-category supply reliability requirement. If one of the phases is lost, distorted, mis-sequenced, over- or under-voltage, the cabinet switches over to the standby feed automatically; it returns to the primary feed once it recovers.

The cabinet implements the technical-regulation requirements: tamper-protected controls (a protective window on the cabinet door), automatic short-circuit and open-circuit checks on the instrumentation circuits and on the duty / standby / make-up pump power circuits and other actuators. If a short or open circuit is detected on any of these, the "General fault" indication lights up and the "Attention" audible signal is generated.

Signals, indication, protections

Input signals (external)	"Start device" (duty / standby / make-up), discrete SCADA input for water-source presence with open/short detection, duty fire-pump start monitoring, "Fire" signal.
Output signals (SCADA)	Pump "Run" / "Fault", power presence on each feed, "Fire", "General fault", "Auto" / "Manual" mode, blocking of domestic and jockey pumps and ventilation. ANHEL® indicator-device protocol.
Indication	"Primary feed", "Standby feed", "Primary run", "Standby run", pump "Run" / "Fault", "Fire", valve state (open / closed / fault), "Auto" / "Manual" mode. "General fault" — audible "Attention" signal.
Protections	Short-circuit. Thermal over-current. Control-circuit open / short. Phase loss, distortion, mis-sequence, over- / under-voltage. Tamper-protected controls.
Ambient temperature	0 °C – 40 °C (average ≤ 35 °C)
Relative humidity	20 % – 90 % (non-condensing)
Optional modules	Soft starter, valve-control cabinet link (optional)
Ingress protection	IP54 or as ordered
Cabinet enclosure	Steel

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08 · ON-SITE INSTALLATION

Installation

The ANHEL® SPD-type pumping unit must be installed in a clean, dry, dust-free, well-lit, frost-free room on a smooth concrete surface.

To prevent possible noise complaints, observe the following requirements:

- The concrete pad surface must be level. A rubber gasket of about 20 mm is recommended between the concrete and the unit to compensate for any unevenness;
- Soundproofing materials may be used in the installation room if required;
- The suction and discharge pipework must be firmly fixed to avoid vibration and noise, and must not be anchored in loose concrete;
- Compensators should be fitted on suction and discharge pipework to avoid resonance;
- Flexible inserts between the manifold flanges and the connecting pipework are mandatory. Loads must not be transferred onto the manifolds;
- Connecting pipework must have sufficient diameter to avoid flow-induced noise;
- If contaminated water is possible, install a strainer on the suction line immediately before the unit;
- The unit must not be exposed to direct sunlight. The room must be well ventilated to ensure sufficient cooling of the pumps and the control cabinet.

When connecting the pipework, fit isolating valves on the suction and discharge lines to prevent draining the building piping during maintenance.

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09 · CONNECTION AND START-UP

Electrical connections

CAUTION

Connection and repair of the unit must only be carried out after it has been disconnected from the mains via an external circuit breaker or disconnector. If an ATS is fitted, both feeds must be disconnected.

The pumping units undergo full functional testing at the factory. When connecting the equipment, do not short the leads of electrical circuits or force the contactors closed. Electrical connections must be made by authorised personnel in accordance with the rules for operating electrical equipment. Make sure that the supply parameters match the cabinet data. The unit must be connected through a circuit breaker rated to the cabinet's nominal current.

The ANHEL® SPD-type pumping unit is equipped with a main switch through which the primary power is fed. After installation, the control-panel door must be locked. The key must only be accessible to authorised operating personnel.

10 · COMMISSIONING

Start / stop

CAUTION

All isolating valves of the unit must be fully open during operation. While the unit is idle or being transported, set the butterfly-valve disc to 45° and all other valves to the open position.

After installation, but before commissioning, the unit must be thoroughly flushed. Ingress of foreign objects (slag, scale, etc.) may damage the equipment. Each ANHEL® SPD-type unit is supplied to the customer pre-tested. Refer to the ANHEL® AShU control-cabinet operating manual for output-parameter (e.g. pressure) setup.

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Filling the unit with water

CAUTION

Never allow the pump to run dry. If for any reason the unit must be stopped during operation, switch off the main switch. If the ANHEL® SPD-type unit has been stored below 0 °C, hold it at above-freezing temperature for at least 24 hours before the first start-up.

Filling procedure for a unit with pumps

1. Close the isolating valve on the discharge line; open the isolating valve on the suction line.
2. Unscrew the air-bleed plug and slowly pour fluid through the filling port.
3. Refit the air-bleed plug and tighten it firmly.
4. Determine the correct direction of rotation indicated by the arrow on the pump head and on the fan cover.
5. Energise the unit by closing the main feed switch of the control cabinet. Set the pump circuit breakers to ON.
6. Start the pump in Manual mode from the operator panel (see the data sheet) and verify the direction of rotation. If the unit has several pumps, check each one by stopping the previous pump and starting the next.
7. Vent the pump through the air-bleed valve on the pump head. At the same time, open the isolating valve on the discharge line slightly.
8. Continue venting. Open the discharge valve a little further while the pump is running.
9. When the fluid starts to flow through the air-bleed valve, close it. Open the discharge valve fully.
10. Repeat the procedure for the remaining pumps (if any).

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10 · LIQUID ABOVE THE PUMP AXIS

Priming the pump

For closed or open hydraulic systems in which the level of the pumped fluid is above the horizontal axis of the pump suction pipe:

1. Close the isolating valve on the discharge pipe and slowly open the isolating valve on the suction pipe. Both the pump and the suction pipe must be completely filled with the pumped fluid.
2. Loosen the priming plug to bleed air. Close it as soon as fluid emerges through the valve.

11 · SERVICE AND SUPPORT

Service

Regular service is required for reliable and economical operation of the pumping unit. We recommend that inspections and service be carried out by trained specialists only. In the event of faults, please contact your supplier.

The Profit LLC service department, staffed by highly qualified service engineers, provides warranty and post-warranty service and repair under contract. Service and repair may be performed at the customer's site or at the Profit LLC service centre.

Profit LLC supplies spare parts for equipment repair to customers and service partners for the full range of supplied equipment for at least five years after delivery. A sufficient spare-parts and consumables stock for the core equipment guarantees short service and repair lead times.

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12 · TERMS AND CONDITIONS

Warranty

The warranty period for all ANHEL® SPD-type units is two years (24 months). The warranty period begins on the date of the first start-up specified in the corresponding Act but in any case may not exceed 30 (thirty) months from the date of delivery to the buyer specified in the bill of lading or hand-over act.

The warranty does not cover faults caused by:

- ingress of foreign objects, substances or liquids; household factors (humidity, low or high temperature, dust, animals, insects); natural disasters or force majeure (fire, accident, etc.);
- any repairs, upgrades, troubleshooting or service carried out on the units by the buyers themselves or by third parties not specifically authorised by the manufacturer;
- absence of scheduled preventive maintenance by manufacturer specialists or by a manufacturer-accredited service centre, performed in accordance with the manufacturer-approved PPO schedule;
- scheduled preventive maintenance or commissioning carried out without a written agreement from the manufacturer by persons or organisations not authorised by the manufacturer;
- inadequate training of operating-organisation staff or end users (including installation and assembly);
- mechanical damage or defects in the equipment or its parts caused by failure to observe transportation, storage, installation or operation rules;
- damage to the equipment or its parts caused by ingress of corrosive chemicals;
- use of the unit other than as intended, or contrary to the operating manual, TU, GOST and other technical documentation;
- violations of acceptance, storage, transportation, packaging, loading-unloading or operation rules established by the operating manual, TU, GOST and other technical documentation;
- damage to the equipment caused by established unlawful actions of any persons.

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13 · DELIVERY SCOPE

Documentation included

Each ANHEL® SPD-type pumping unit is delivered with the following documentation:

- ANHEL® SPD-type pumping-unit operating manual;
- ANHEL® AShU-type control-cabinet operating manual;
- pump installation and operating instructions;
- data sheet.

14 · END OF LIFE

Disposal

The main criterion for end-of-life condition is:

1. failure of one or more components for which repair or replacement is not provided; or an increase in repair and maintenance costs that makes continued operation economically unjustified;
2. the product and its assemblies and parts must be collected and disposed of in accordance with local environmental legislation.

ANHEL® service and support

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