

APOLLO

HYDRO SMART V4

Installation, Operation & Maintenance Manual

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1 INTRODUCTION & SAFETY

1.1 General Information

The APOLLO Hydro Smart is a factory-assembled hydronic distribution station designed to simplify the installation, operation, and maintenance of hydronic heating systems.

This manual provides essential instructions for the safe installation, commissioning, operation, and maintenance of the equipment.

Read and understand this manual before installing or operating the Hydro Smart. Installation and service shall be performed by qualified personnel in accordance with applicable codes and regulations.

1.2 Model Identification

This manual applies to the APOLLO Hydro Smart, Model HS-V4.

Previous Hydro Smart models may have different hydraulic connections, electrical components, control configurations, and operating procedures. Instructions in this manual shall not be assumed to apply to earlier models.

Always verify the model and manufacturing batch information on the equipment identification label.

1.3 Safety Information

DANGER — Electrical Hazard
Contact with energized electrical components may result in serious injury or death. Disconnect all electrical power and verify the absence of voltage before servicing.

WARNING — Pressurized System
The hydronic system operates under pressure. Allow the system to cool and safely relieve pressure before disconnecting any hydraulic component.

WARNING — Hot Surfaces
Piping, valves, and internal components may reach elevated temperatures during operation. Allow components to cool before servicing.

CAUTION — Equipment Protection
Use only approved system fluids and operate the equipment within the specified pressure and temperature limits.

NOTICE
Only qualified personnel shall perform installation, electrical connections, commissioning, and internal maintenance.

2 PRODUCT OVERVIEW & SPECIFICATIONS

2.1 General Description

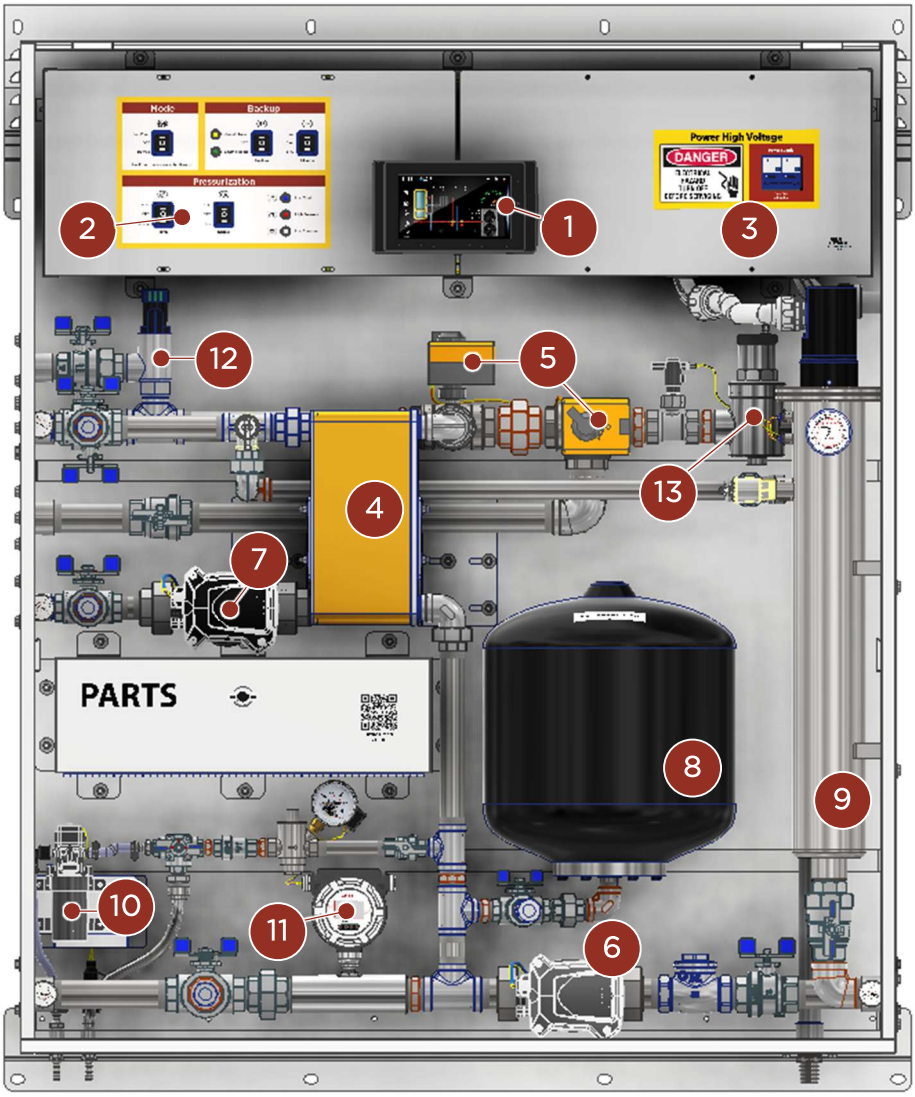
The Hydro Smart integrates hydraulic distribution, electrical controls, circulation pumps, an electric backup heater, a heat exchanger, an expansion tank, and an automatic pressurization system within a compact enclosure.

The unit is designed for use with compatible APOLLO heat pumps and may support hydronic heating, domestic hot water, fan coil units, radiant floor heating, and other applications according to the approved system design.

2.2 Main Components

The principal components include:

- Heat pump and DHW circulators
- Brazed plate heat exchanger
- 15 kW electric backup heater
- Expansion tank
- Automatic pressurization system
- Motorized valves and isolation valves
- Pressure and temperature instrumentation
- Electrical control cabinet
- Touchscreen controller



1 Touchscreen Controller
2 Operator Control Panel
3 Electrical Cabinet
4 Plate Heat Exchanger
5 Motorized 3-Way Valves
6 Main Circulator Pump
7 Domestic Hot Water (DHW) Circulator Pump
8 Expansion Tank
9 Electric Backup Heater
10 Pressurization Pump
11 Flow Meter
12 Bypass Valve
13 Automatic Air Vent

FIGURE 2-1 — Hydro Smart Internal Component Identification

2.3 Technical Specifications

Parameter	Specification
Model	HS-V4
Product Type	Hydronic Distribution Station
Power Supply	220 VAC, 1 Phase, 60 Hz
Maximum Input Power	17 kW
Rated / Maximum Current	73 A
Breaker Size	80 A
Electric Backup Heater	15 kW
Maximum Allowable Working Pressure	150 psi (10.3 bar)
Operating Temperature	20°F to 200°F (-6.7°C to 93.3°C)
System Fluid	Water / Inhibited Propylene Glycol
Standard Glycol Concentration	35%
Expansion Tank	9.5 US gal (36 L)
Heat Exchanger Area	18.7 ft² (1.74 m²)
Net Weight	293 lb (133 kg)
Installation	Indoor Only

2.4 Dimensions

Refer to the latest approved Hydro Smart dimensional drawing for installation planning.

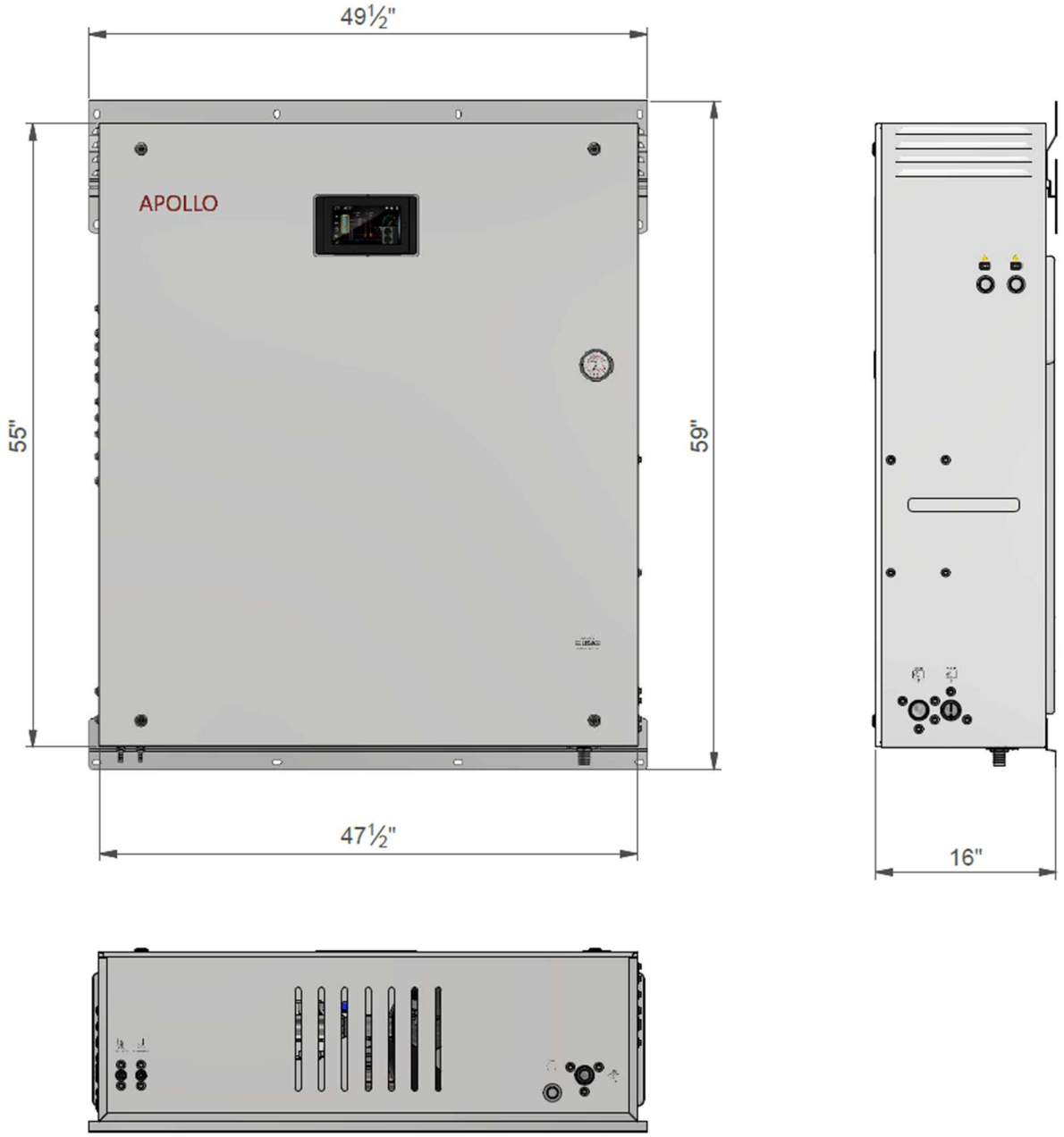


FIGURE 2-2 — Overall Dimensions

3 RECEIVING & INSTALLATION REQUIREMENTS

3.1 Receiving and Inspection

Upon delivery, inspect the equipment and packaging for visible damage.

Verify that the model identification matches the order and that all supplied accessories are present.

Report shipping damage or missing components to the distributor before installation.

3.2 Handling and Storage

Keep the equipment upright during transportation and handling. Use appropriate lifting equipment rated for the unit weight.

Do not lift or move the equipment using hydraulic piping, electrical components, or cabinet doors.

Store the unit indoors in a clean, dry location protected from moisture, dust, and freezing conditions.

3.3 Installation Location

Install the Hydro Smart in a clean, dry, indoor mechanical room.

The installation location shall provide:

- A structurally adequate mounting surface
- Access to hydraulic and electrical connections
- Sufficient clearance for servicing
- Protection from freezing and water exposure
- Suitable drainage for service operations and relief discharge

3.4 Wall Mounting Requirements

The Hydro Smart is designed for wall-mounted installation on suitable concrete or wood-framed walls.

The unit has a net weight of 293 lb (133 kg), excluding the weight of the internal fluid.

APOLLO supplies mounting hardware and drill bits for the supported installation configurations. Always select the appropriate hardware for the wall construction.

Installation Procedure

1. Verify that the wall structure can safely support the total operating weight of the equipment, including the internal fluid.
2. Locate and mark the mounting points according to the approved dimensional drawing.

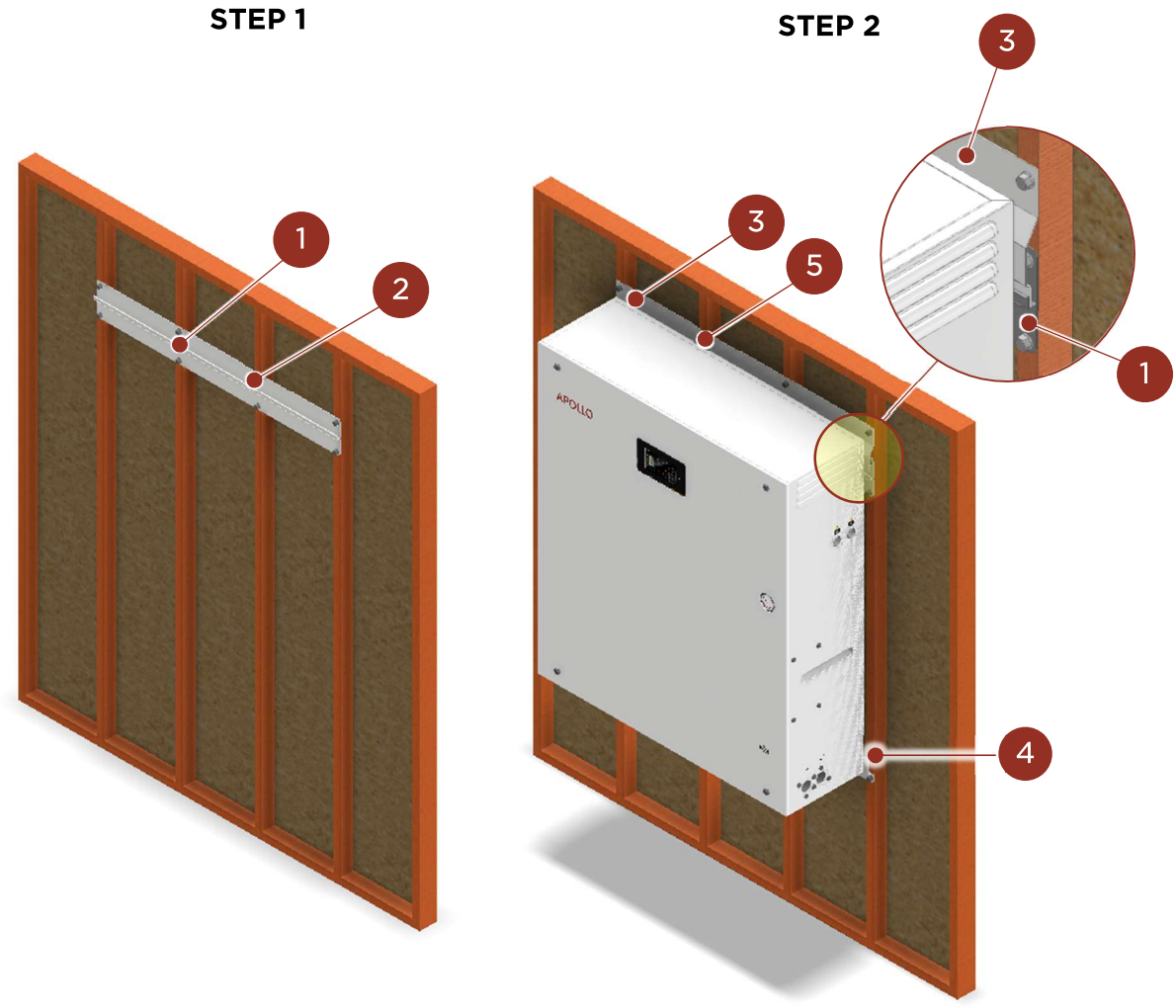
3. Drill the mounting holes using the appropriate supplied drill bit for the wall material.
4. Secure Support Bracket A to the wall using the specified mounting screws.
5. Using suitable lifting equipment, carefully lift the Hydro Smart and position it onto Support Bracket A. Ensure the unit is properly seated and supported.
6. Secure the unit to the wall using Support Brackets B and C and the specified wall mounting screws.
7. Verify that the equipment is level, properly seated, and securely fastened at all mounting points before removing the lifting support.
8. Confirm that the unit is stable before connecting the hydraulic piping.

WARNING — Heavy Equipment

Improper mounting may cause the equipment to fall, resulting in serious injury or property damage.

Do not attach the unit directly to drywall or other nonstructural materials. For wood-framed walls, fasteners must engage suitable structural framing or an engineered mounting support.

Mounting hardware suitability and required embedment shall be verified for the actual wall construction and operating load. Supplied hardware must not be assumed suitable for every concrete or wood-framed wall.



1 Lower Support Bracket (A)
2 Bracket A Mounting Screws
3 Upper Support Bracket (B)
4 Lower Retaining Bracket (C)
5 Wall Mounting Screws

Figure 3-1 — Hydro Smart Wall Mounting Assembly

Wall Type	Mounting Hardware	Drill Bit
Concrete	Supplied concrete anchors — size TBD	Supplied masonry drill bit
Wood studs	Supplied structural wood screws — size TBD	Supplied pilot drill bit

4 HYDRAULIC INSTALLATION

4.1 General Requirements

All hydraulic connections shall be completed by qualified personnel following the approved system design.

Before connecting piping, verify that all connections are clean and free from debris.

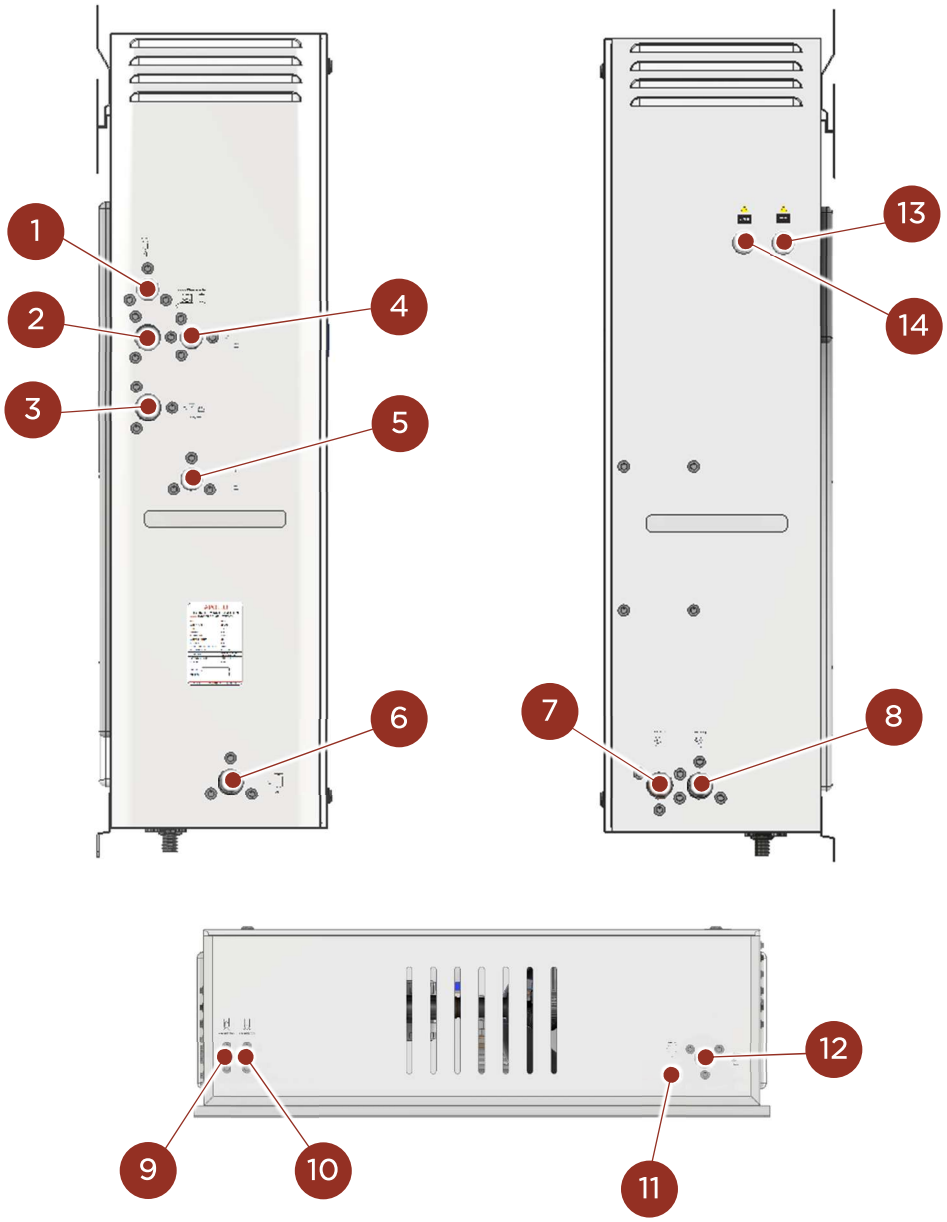
Use appropriate fittings and sealing materials compatible with the system fluid, operating temperature, and pressure.

4.2 Hydraulic Connection Identification

The Hydro Smart includes dedicated hydraulic ports for the heat pump, distribution system, domestic hot water, buffer connection, and auxiliary functions.

No.	Connection	Function
1	Pressure Bypass Outlet	Provides a bypass flow path for the hydronic system.
2	Main Supply	Supplies heated fluid to the main hydronic distribution system.
3	AHU / Pool Supply	Supplies heated fluid to an air handling unit or pool heat exchanger.
4	DHW Supply	Supplies heated fluid to the domestic hot water heating circuit.
5	DHW Return	Receives return fluid from the domestic hot water heating circuit.
6	Main Return	Receives return fluid from the main hydronic distribution system.
7	Heat Pump Supply	Receives heated fluid from the heat pump.
8	Heat Pump Return	Returns fluid to the heat pump.
9	Pressurization Inlet	Receives fluid from the automatic pressurization system.
10	Pressurization Outlet	Provides a fluid connection to the automatic pressurization circuit.
11	Hydro Geo Connection Opening	Reserved opening for the Hydro Geo configuration.
12	Pressure Relief Valve Discharge	Provides a discharge connection for the pressure relief valve.
13	Main Electrical Power Input	Entry point for the main electrical power supply.
14	Control Signal Output	Provides an output point for outgoing control signals.

*All connections shall be verified against the physical equipment labels and approved hydraulic schematic before installation.



1	Pressure bypass Outlet	8	Heat Pump Return
2	Main Supply	9	Pressurization Inlet
3	AHU/Pool Supply	10	Pressurization Outlet
4	DHW Supply	11	Hydro Geo Connection Opening
5	DHW Return	12	Pressure Relief Valve Discharge
6	Main Return	13	Main Electrical Power Input
7	Heat Pump Supply	14	Control Signal Input/Output

FIGURE 4-1 — Hydraulic Port Identification

4.3 Piping Connections

The main hydronic connections are designed for 1¼ in connections, with reductions to 1 in where supplied.

Use appropriately sized piping based on the approved hydraulic design.

When making threaded connections:

1. Verify the correct port.
2. Inspect and clean the connection.
3. Apply an approved thread sealant.
4. Install the fitting without overtightening.
5. Support the external piping independently.
6. Inspect for leakage during system filling.

4.4 Hydraulic Installation Verification

Before filling, verify:

☐ All connections match the hydraulic diagram.

☐ External piping is properly supported.

☐ Isolation valves are accessible.

☐ Drain and relief discharge provisions are complete.

☐ All fittings are secure.

☐ The system is ready for flushing and filling.

5 ELECTRICAL INSTALLATION

5.1 General

Electrical installation shall be performed by a qualified electrician in accordance with applicable electrical codes and the equipment nameplate.

Disconnect and lock out all electrical power before accessing the electrical cabinet.

5.2 Power Supply

The standard Hydro Smart electrical ratings are:

Parameter	Value
Voltage	220 VAC
Phase	Single Phase
Frequency	60 Hz
Maximum Input Power	17 kW
Rated / Maximum Current	73 A
Nameplate Breaker Size	80 A

The final conductor size, circuit protection, and disconnect requirements shall be determined by a qualified electrician in accordance with applicable codes and the approved electrical design.

5.3 Electrical Connections

Connect incoming power to the designated terminals shown on the approved electrical wiring diagram.

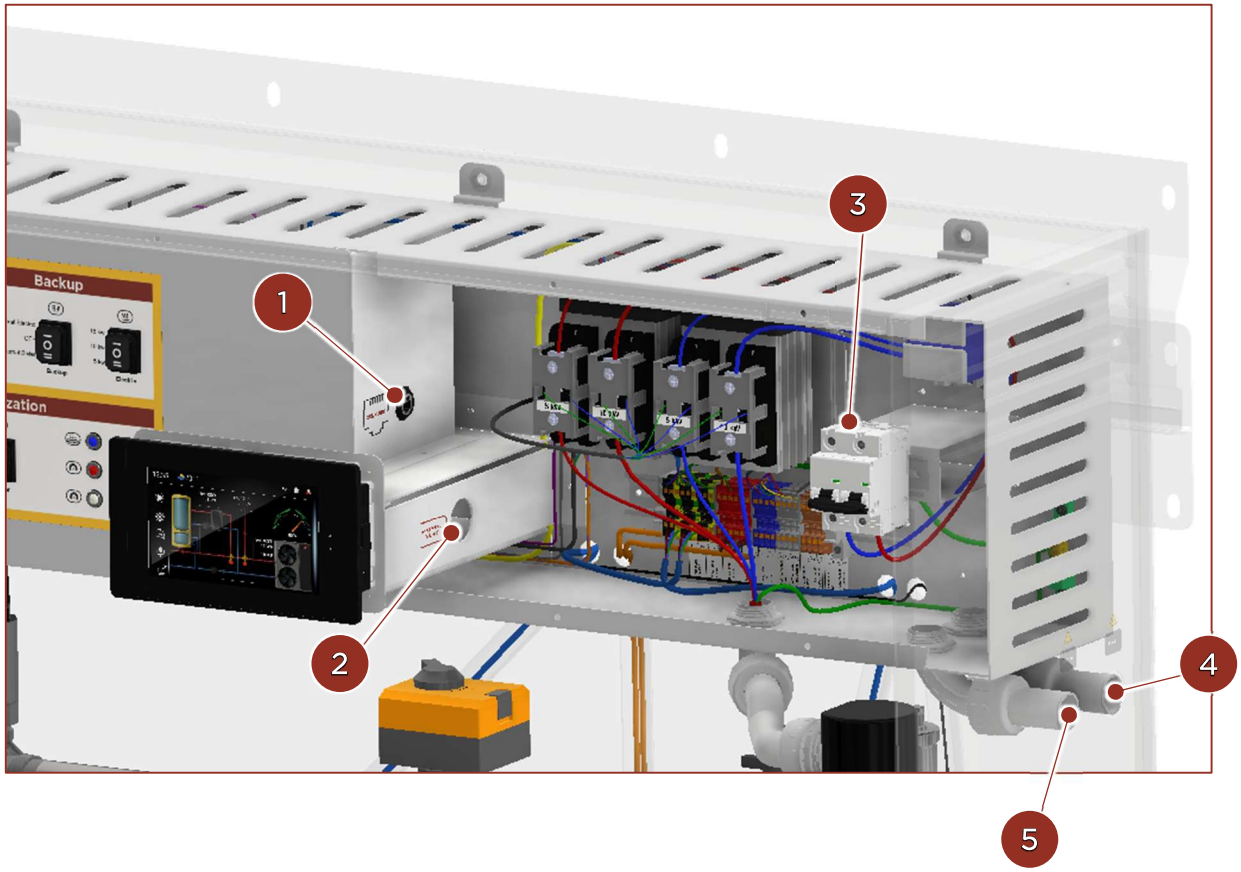
Verify that:

- Supply voltage matches the nameplate.
- Grounding is properly connected.
- Terminal connections are secure.
- Communication and control wiring are correctly installed.
- Electrical cabinet covers are closed before operation.

5.4 Communication Connections

Connect the Hydro Smart controller and compatible heat pump communication interface according to the approved wiring diagram.

Route communication wiring separately from power conductors as required by the installation instructions and applicable electrical codes.



1. Transmitter Communication Port
2. CAREL Controller Communication Cable Entry
3. Incoming Power Terminals
4. Main Power Cable Entry
5. Control Signal Cable Entry (Input/Output)

FIGURE 5-1 — Electrical Cabinet: Power and Communication Connections.

No.	Connection	Function
1	Transmitter Communication Port	Connection point for communication with the transmitter PCB.
2	CAREL Controller Communication Cable Entry	Cable entry for the Ethernet connection between the heat pump and the CAREL controller.
3	Incoming Power Terminals	Terminals for connecting the main electrical power supply.
4	Main Power Cable Entry	Entry point for the incoming electrical power cable.
5	Control Signal Cable Entry (Input/Output)	Cable entry for incoming and outgoing control signals.

6 WATER QUALITY & GLYCOL

6.1 Approved System Fluid

Use clean water or an approved inhibited propylene glycol solution suitable for closed-loop hydronic heating systems.

APOLLO specifies a standard glycol concentration of **35%.**

Do not use automotive antifreeze, untreated contaminated water, or unapproved chemicals.

6.2 Water Quality

Poor water quality may cause corrosion, scaling, reduced heat transfer, and premature component failure.

Before filling:

- Flush all field-installed piping.
- Remove debris and contaminants.
- Verify compatibility with system materials.
- Follow the approved glycol manufacturer's water-quality requirements.

6.3 Glycol Concentration

Prepare the glycol solution according to the manufacturer's instructions.

Verify the concentration using the supplied refractometer.

The required freeze protection shall be evaluated against the lowest expected system temperature.

For detailed instructions, refer to the Glycol Filling Procedure and the Refractometer User Manual.

7 SYSTEM FILLING & PRESSURIZATION

7.1 General

The Hydro Smart includes an automatic pressurization system designed to assist in maintaining the required hydronic system pressure.

Before starting the equipment, the system shall be properly filled, purged of air, and inspected for leaks.

7.2 Filling Procedure Overview

1. Verify that the hydraulic installation is complete.
2. Prepare the approved water-glycol solution.
3. Verify the glycol concentration.
4. Connect the filling equipment according to the approved filling procedure.
5. Set the required valves to their specified filling positions.
6. Fill and circulate the solution through the required hydraulic circuits.
7. Purge trapped air.
8. Verify the required system pressure.
9. Inspect all connections for leaks.
10. Restore the valves to their normal operating positions.

Do not energize circulation pumps or the electric heater until the applicable hydraulic circuits are completely filled and properly vented.

7.3 Automatic Pressurization System

Verify that the pressurization connections, fluid supply, float switch, and control components are correctly installed.

The pressurization system shall be configured according to the approved installation procedure.

Repeated pressurization cycles or frequent fluid addition may indicate leakage and shall be investigated.

7.4 Final Verification

☐ System filled.

☐ Glycol concentration verified.

☐ Air purged.

☐ System pressure verified.

☐ No leaks observed.

☐ Valves returned to normal operating positions.

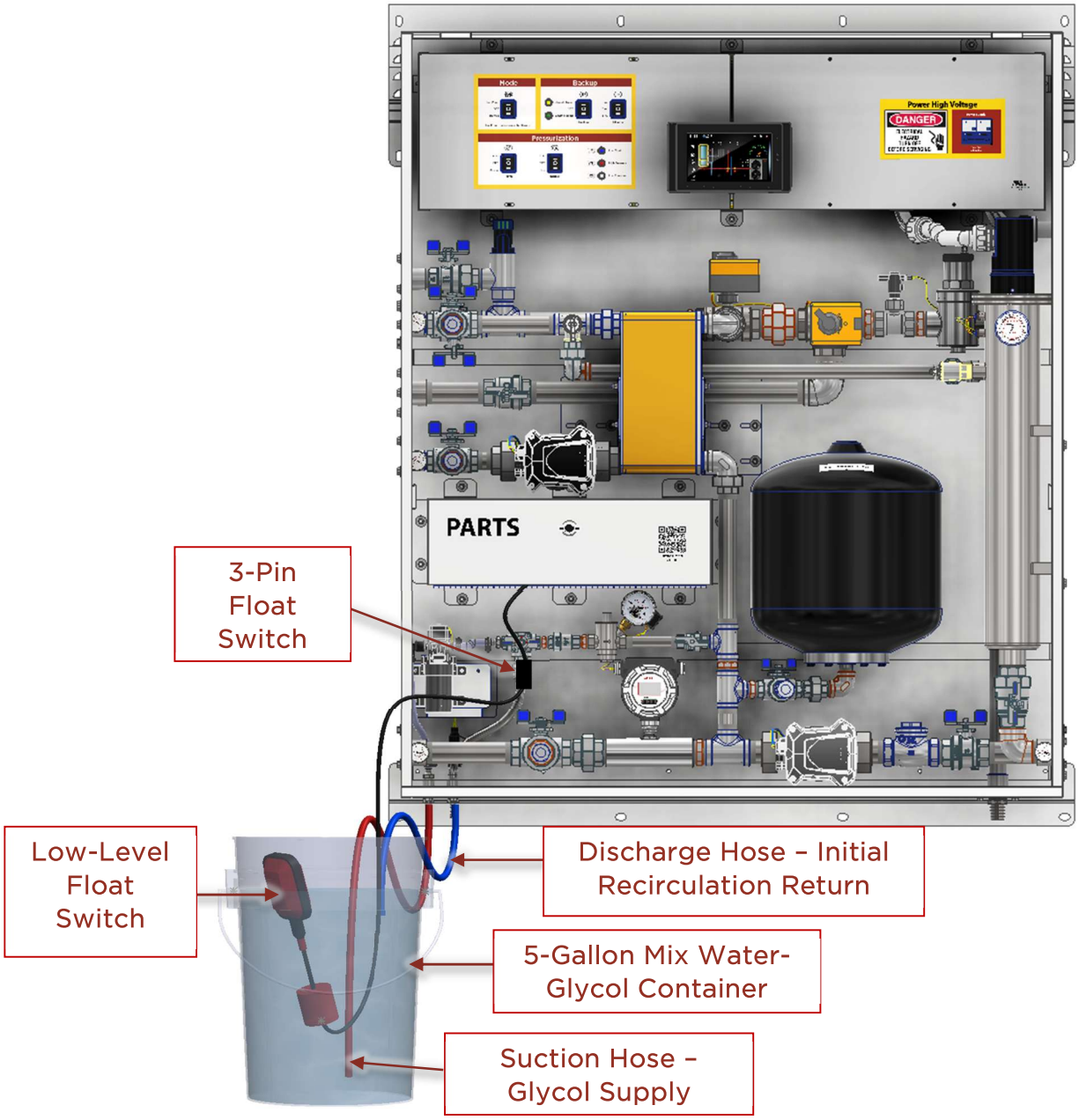


FIGURE 7-1 — Filling & Pressurization

8 COMMISSIONING & OPERATION

8.1 Initial Commissioning

Commissioning shall be performed by qualified personnel after completing the hydraulic and electrical installation.

Before starting the system, verify:

☐ Correct power supply.

☐ System filled and pressurized.

☐ No hydraulic leaks.

☐ Air removed from the system.

☐ Isolation valves correctly positioned.

☐ Heat pump connections completed.

☐ Electrical and communication wiring verified.

8.2 Initial Startup

1. Apply electrical power.
2. Verify controller startup.
3. Check for active alarms.
4. Confirm communication with the connected heat pump.
5. Verify circulator operation.
6. Confirm proper water circulation.
7. Test heating operation.
8. Verify system pressure and temperature stability.

If abnormal conditions occur, stop operation and correct the issue before continuing.

8.3 Normal Operation

During normal operation, the Hydro Smart coordinates water circulation, hydronic distribution, and auxiliary heating according to the installed control configuration.

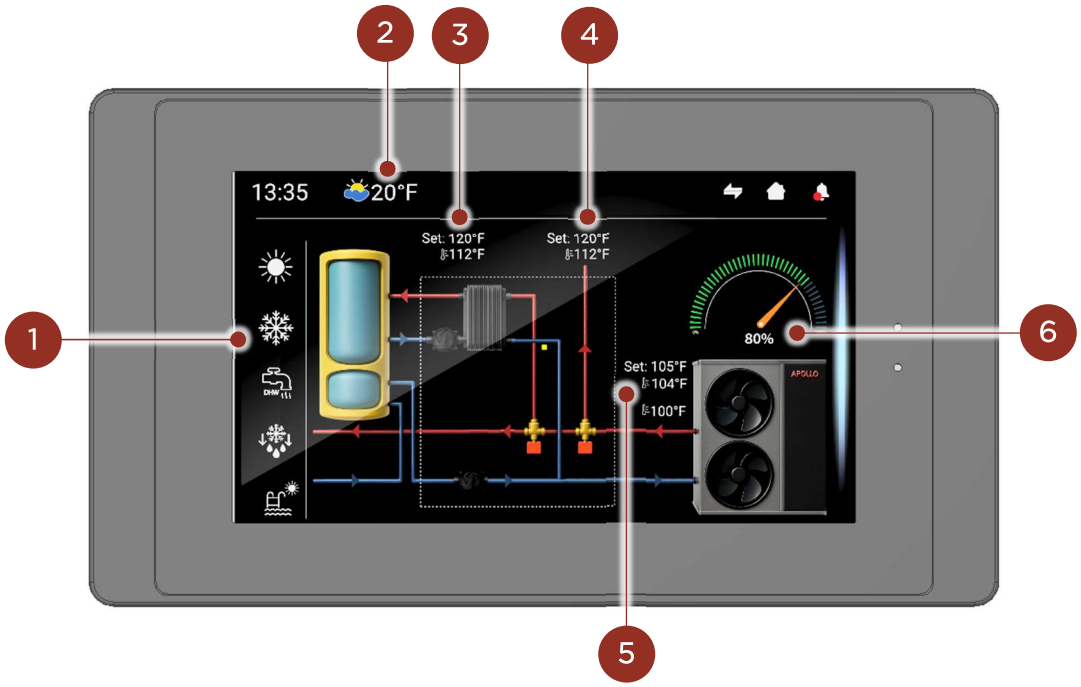
The touchscreen controller provides access to operating information, settings, and alarm notifications.

The electric backup heater supplements system heating when enabled and commanded by the control system.

8.4 Controller

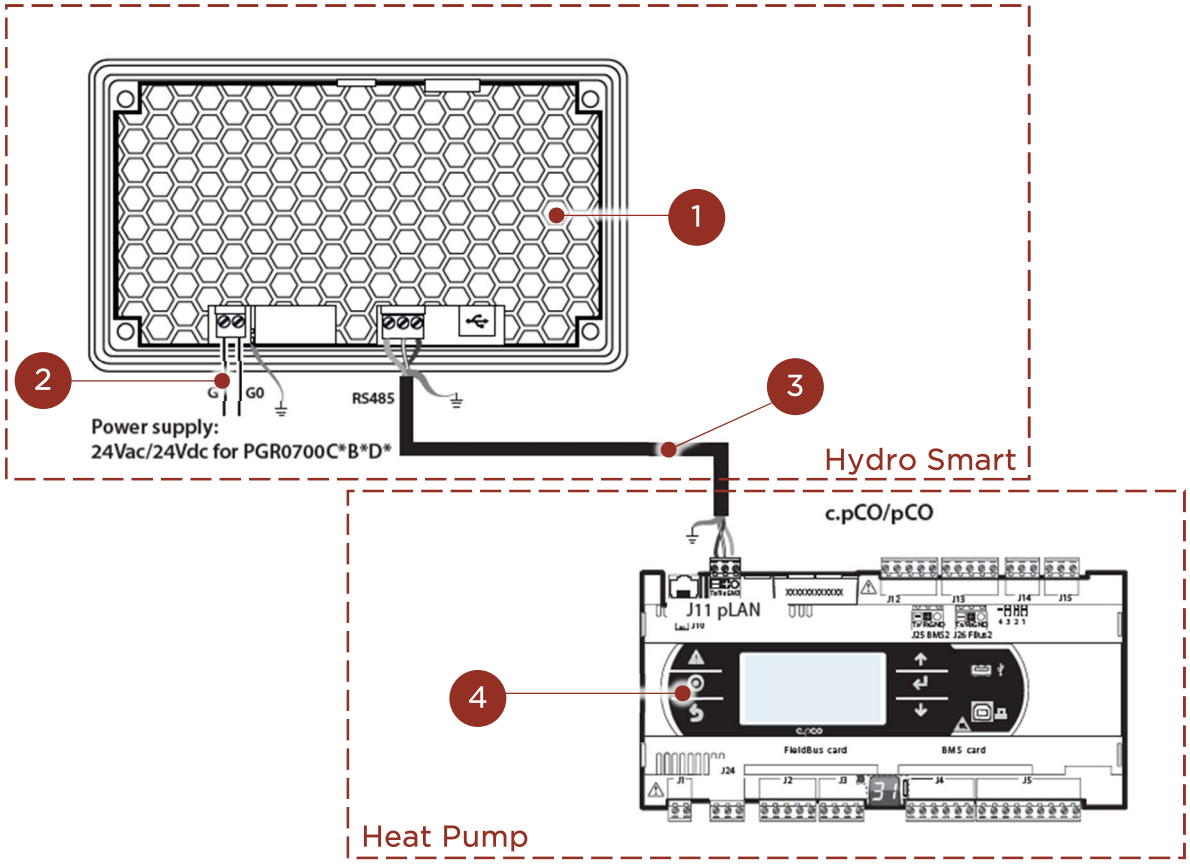
The controller may provide operating status, temperature information, alarms, and system settings according to the installed software version.

Only qualified personnel shall modify installer-level settings.



1. Operating Mode Menu
2. Outdoor Air Temperature
3. Domestic Hot Water (DHW) Temperature
4. Pool / AHU Supply Temperature
5. Heat Pump Outlet Water Temperature
6. Heat Pump Operating Capacity (%)

FIGURE 8-1 — Hydro Smart Touchscreen Controller: Home Screen and Main Operating Indicators.



1. CAREL Touchscreen Controller
2. Controller Power Supply Terminals
3. RS485 Communication Cable
4. Heat Pump Controller (CAREL c.pCO/pCO)

FIGURE 8-2 — Communication Connection Between the Hydro Smart and Heat Pump Controllers

NOTICE: Connect the communication cable according to the terminal assignments and polarity indicated in the approved electrical wiring diagram. Verify controller compatibility and communication settings before commissioning.

9 MAINTENANCE

9.1 General

Regular maintenance is required to maintain safe operation and reliable system performance.

Only qualified personnel shall service internal electrical and hydraulic components.

9.2 Recommended Maintenance Schedule

Interval	Activity
Monthly	Inspect for leaks and abnormal noise
Monthly	Check system pressure and controller alarms
Every 6 months	Verify glycol concentration and condition
Every 6 months	Inspect automatic pressurization operation
Annually	Inspect expansion tank and circulators
Annually	Inspect electrical connections
Annually	Inspect valves and safety devices
As required	Clean the plate heat exchanger

Maintenance intervals may need adjustment based on operating conditions.

9.3 Heat Exchanger Cleaning

If heat exchanger fouling or reduced heat transfer performance is detected, cleaning may be required.

The plate heat exchanger may be cleaned using the approved APOLLO acid cleaning procedure.

Only trained personnel shall perform chemical cleaning using approved products, concentrations, and protective equipment.

Do not circulate acid through the complete hydronic system. Isolate the heat exchanger and follow the dedicated cleaning procedure.

Refer to the **APOLLO Plate Heat Exchanger Acid Cleaning Procedure** for detailed instructions.

9.4 Maintenance Records

Record the maintenance date, work performed, observations, and technician information.

10 TROUBLESHOOTING

10.1 General

The following table provides basic guidance for identifying common operating problems.

If the issue cannot be corrected safely, contact APOLLO Technical Support.

10.2 Troubleshooting Table

Symptom	Possible Cause	Recommended Action
Controller not operating	Power supply interruption	Verify disconnect and circuit protection
Low system pressure	Leak or pressurization fault	Inspect for leaks and check pressurization system
High system pressure	Expansion tank or control issue	Stop operation and inspect system
No water circulation	Circulator or valve issue	Verify pump operation and valve positions
Poor heating performance	Insufficient flow, air, or fouling	Inspect circulation, air removal, and heat exchanger
Unusual pump noise	Air or improper hydraulic conditions	Verify filling and purging
Heat pump communication fault	Wiring or communication issue	Verify connections and configuration
Electric heater not operating	No demand or safety interlock	Verify controller status and operating conditions
Repeated alarms	Unresolved system fault	Record alarm and contact technical support

Do not repeatedly reset alarms without identifying the cause.

11 REPLACEMENT PARTS & TECHNICAL SUPPORT

11.1 Replacement Parts

Use approved replacement components compatible with the installed Hydro Smart model and manufacturing batch.

Major serviceable components include circulators, expansion tank, heat exchanger, valves, gauges, electric heater, controller, and pressurization components.

Contact an authorized APOLLO distributor for replacement part identification.

11.2 Product Identification

When requesting technical support or replacement parts, provide:

- Model number
- Batch number
- Manufacturing date
- Description of the issue
- Alarm information, if applicable
- Photographs when requested

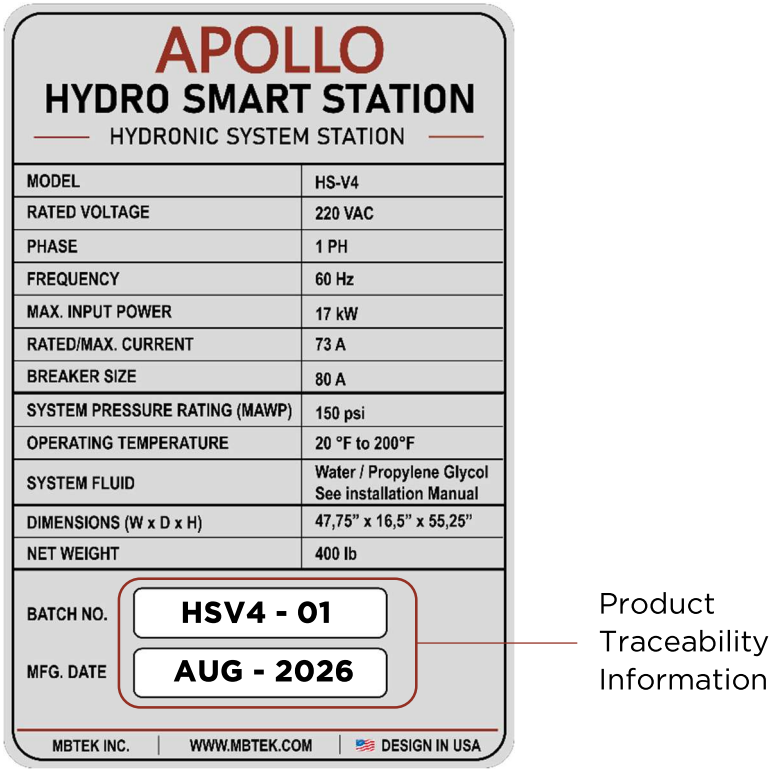


FIGURE 11-1 — Hydro Smart Product Identification Label

11.3 Technical Support

For installation assistance, maintenance questions, or replacement parts, contact your authorized APOLLO distributor or MBTEK.

Website: www.mbtek.com

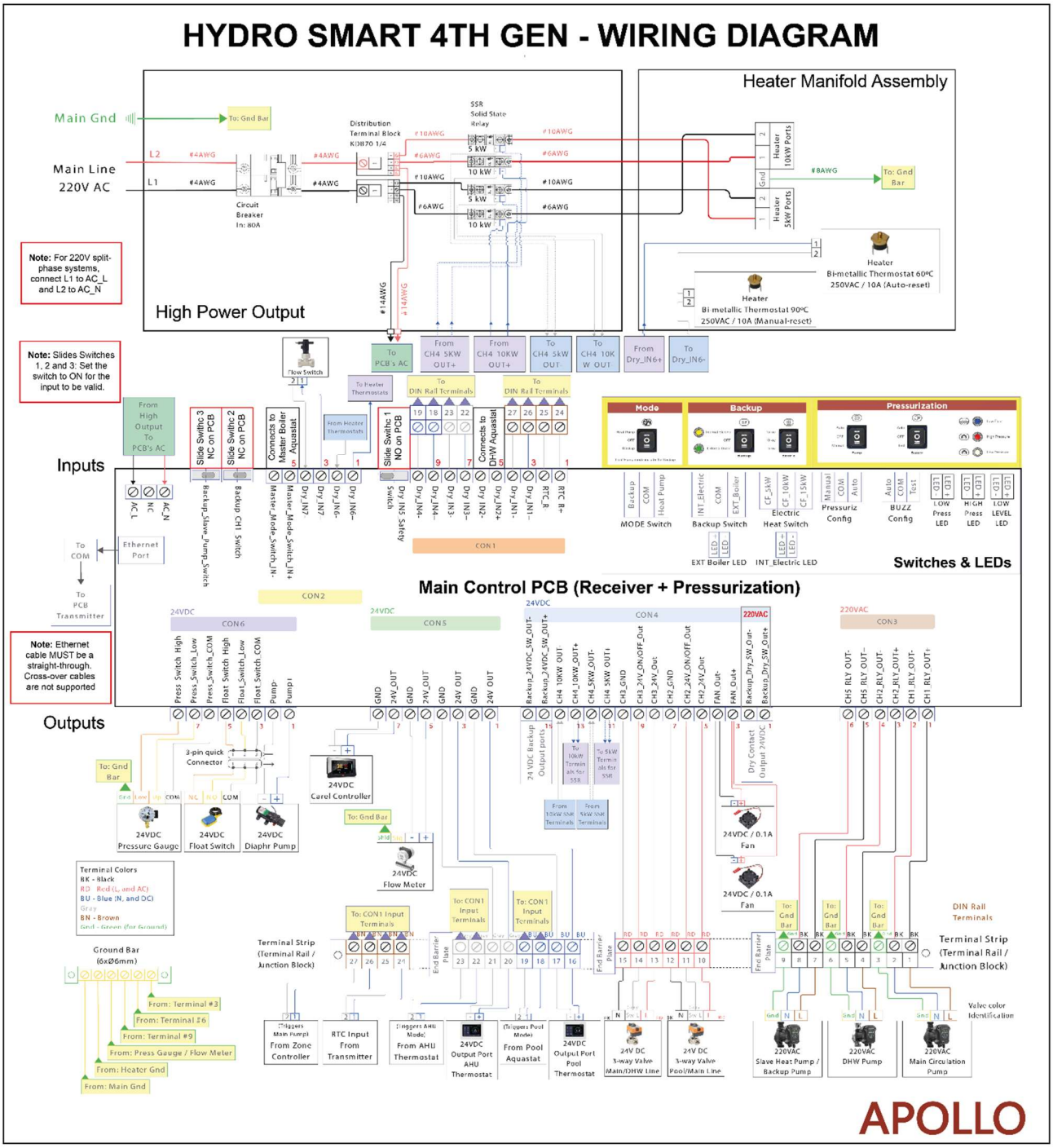
APPENDIX A — COMMISSIONING RECORD

Parameter	Recorded Value
Installation Date	
Installer / Company	
Model	
Batch Number	
Heat Pump Model	
Supply Voltage	
System Cold Pressure	
Glycol Concentration	
Controller Software Version	
Final Inspection Result	

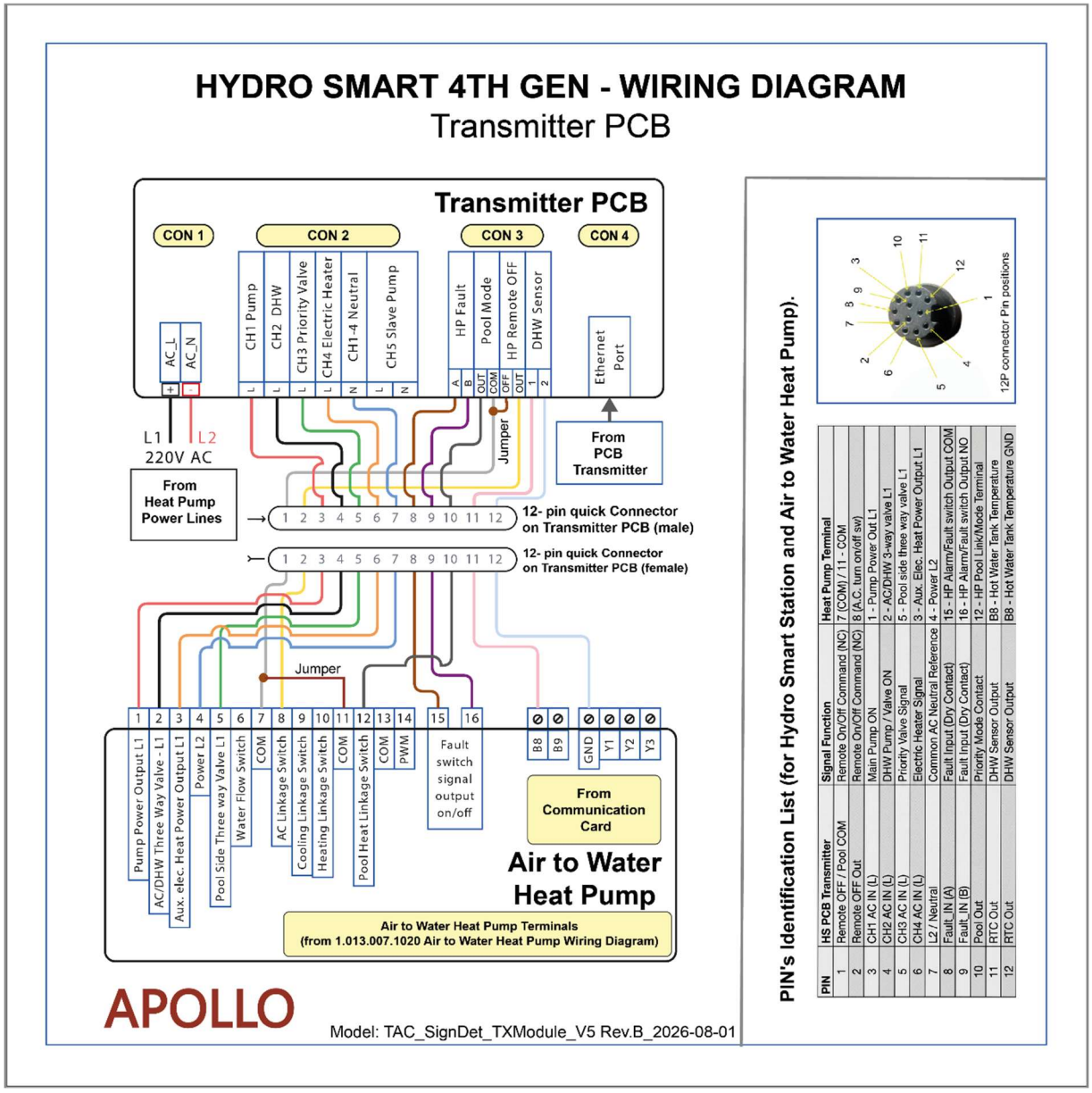
Installer Signature: _____

Date: _____

APPENDIX B — MAIN ELECTRICAL DRAWING



APPENDIX C — TRANSMITTER ELECTRICAL DRAWING



PIN	HS PCB Transmitter	Signal Function	Heat Pump Terminal
1	Remote OFF / Pool COM	Remote On/Off Command (NC)	7 (COM) / 11 - COM
2	Remote OFF Out	Remote On/Off Command (NO)	8 (A.C. turn on/off sw)
3	CH1 AC IN (L)	Main Pump ON	1 - Pump Power Out L1
4	CH2 AC IN (L)	DHW Pump / Valve ON	2 - AC/DHW 3-way valve L1
5	CH3 AC IN (L)	Priority Valve Signal	5 - Pool side three way valve L1
6	CH4 AC IN (L)	Electric Heater Signal	3 - Aux. Elec. Heat Power Output L1
7	L2 / Neutral	Common AC Neutral Reference	4 - Power L2
8	Fault_IN (A)	Fault Input (Dry Contact)	15 - HP Alarm/Fault switch Output COM
9	Fault_IN (B)	Fault Input (Dry Contact)	16 - HP Alarm/Fault switch Output NO
10	Pool Out	Priority Mode Contact	12 - HP Pool Link/Mode Terminal
11	RTC Out	DHW Sensor Output	B8 - Hot Water Tank Temperature
12	RTC Out	DHW Sensor Output	B8 - Hot Water Tank Temperature GND

APPENDIX D — HEAT PUMP COMMUNICATION

