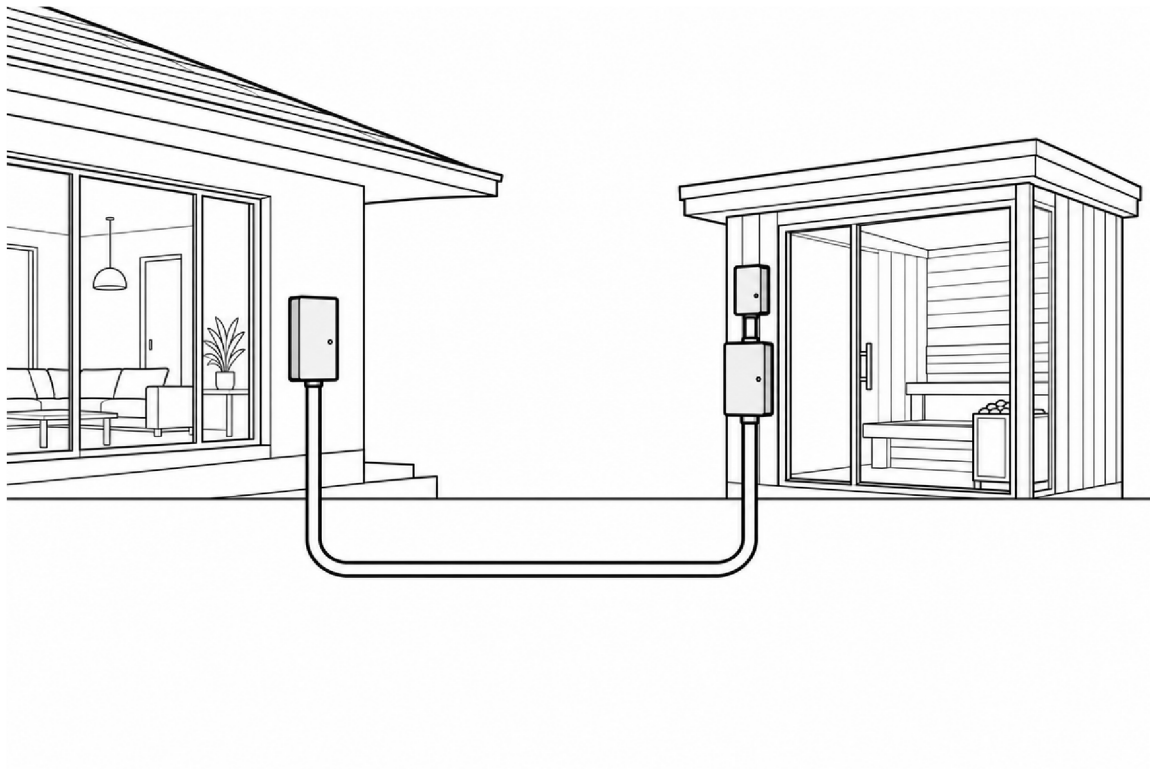


Power your sauna. Prepare with confidence.

A complete planning, connection and handover guide
for homeowners and qualified electricians.



HOUSE → SUPPLY → SAUNA

Cables. Protection. Earthing. A safe handover.

THAILAND / ENGLISH / 31 OCTOBER 2026

SEH-01 R4 / Print edition • site approval required

START HERE

A clear route to connection.

Use this handbook with the signed order and the exact heater manual.

01 One house. One sauna. One clear plan.	3	02 First, make sure the house is ready.	4
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Who does what?

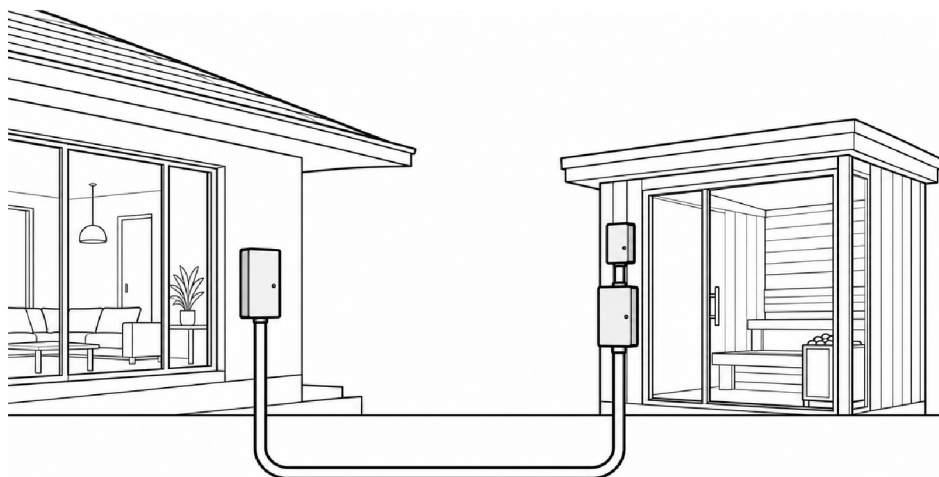
The client's qualified electrician installs and tests the supply, including final termination inside Sisu's box. Three-phase: L1, L2, L3, N and PE. Sisu retains its own RCBO and breaker, checks the incoming supply and tests the sauna.

Illustrations explain a conceptual installation, not a real client site. Use the exact equipment diagrams for terminal wiring. This monochrome edition is designed for printing.

01 / THE PICTURE GUIDE

One house. One sauna. One clear plan.

Follow a 9 kW single-phase example from the house to the sauna.



Buried house feeder; protected above-ground link from the local box to the Sisu box. Conceptual route only.

9 kW

heater example

220 V

single-phase supply

25 m

one-way cable route

① **House board**



② **Protected cable**



③ **Local isolator**



④ **Sisu box**

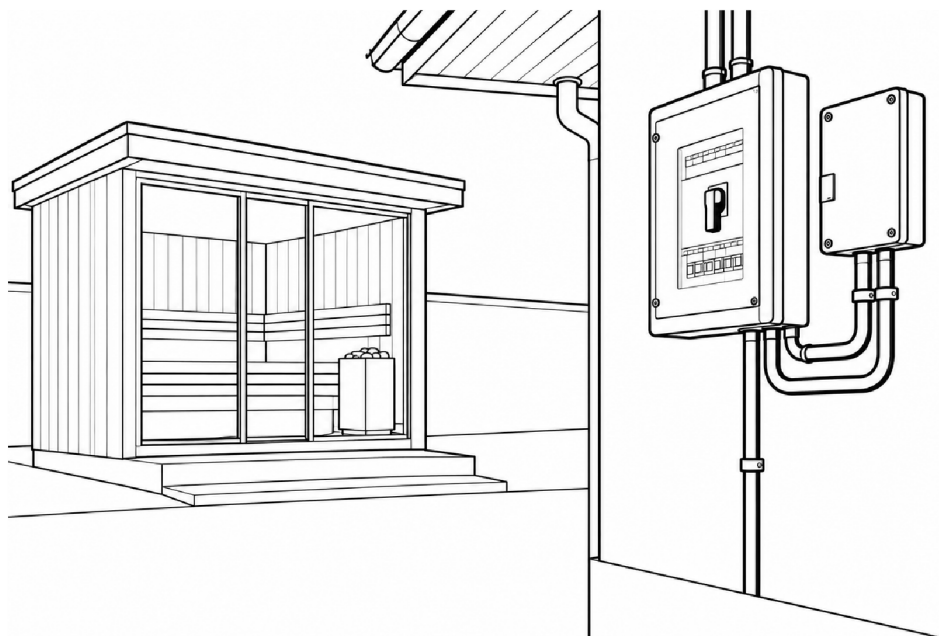
Our example in one sentence

The client's electrician checks the house supply, installs a protected dedicated circuit, then connects and tests L, N and PE at Sisu's box. Sisu checks the incoming supply and tests the sauna.

02 / START AT THE HOUSE

First, make sure the house is ready.

A heater adds a large load. Check capacity and voltage before buying cable.



Confirm the property supply and circuit protection before installation.

01 Check the available power

At 220 V, 9 kW draws about 40.9 A. Check the meter, main breaker, service cable and normal household demand together.

02 Check voltage with the planned load

A normal no-load reading is not enough. Far from the transformer or at the end of a village line? The client arranges loaded-voltage checks and any utility upgrade.

03 Provide a dedicated protected circuit

50 A is this example's preliminary breaker rating. Agree upstream RCBO protection, device poles, RCD type/settings and coordination with Sisu's retained RCBO and breaker.

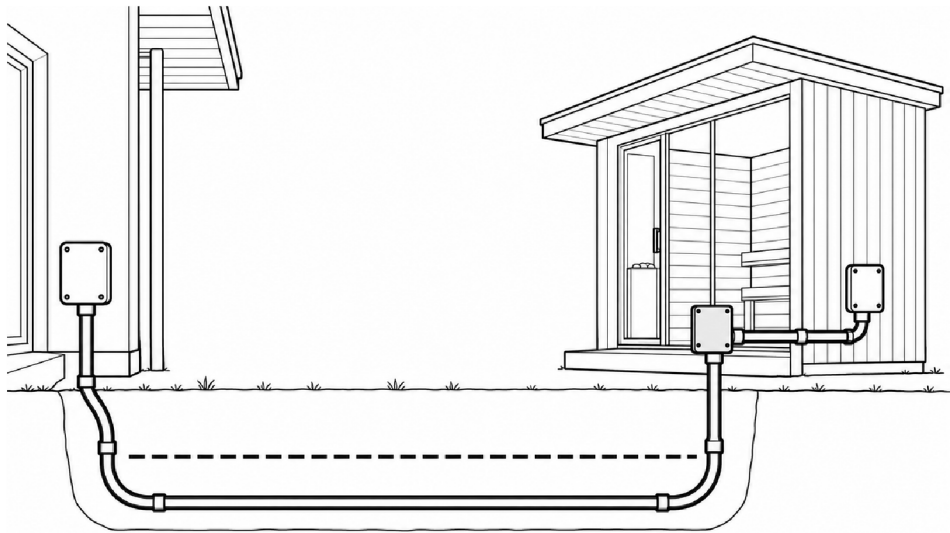
Approve the actual heater first

Use a model approved for 220 V single-phase. The nameplate, manufacturer's protective limits and heater/RCD compatibility govern the final design.

03 / FOLLOW THE CABLE

Three conductors. A protected route.

For this 25 m example: copper L, N and PE from the house to Sisu's box.



Buried feeder: specified NYY/NYY-G. Final local box-to-Sisu link: protected above ground. Depth follows the site design.

<div>————</div>	L	Line / brown	10 mm²
<div>-----</div>	N	Neutral / blue	10 mm²
<div>.....</div>	PE	Earth / green-yellow	10 mm²*

50 A

example breaker

10 mm²

minimum L and N here

2.20%

calculated route drop

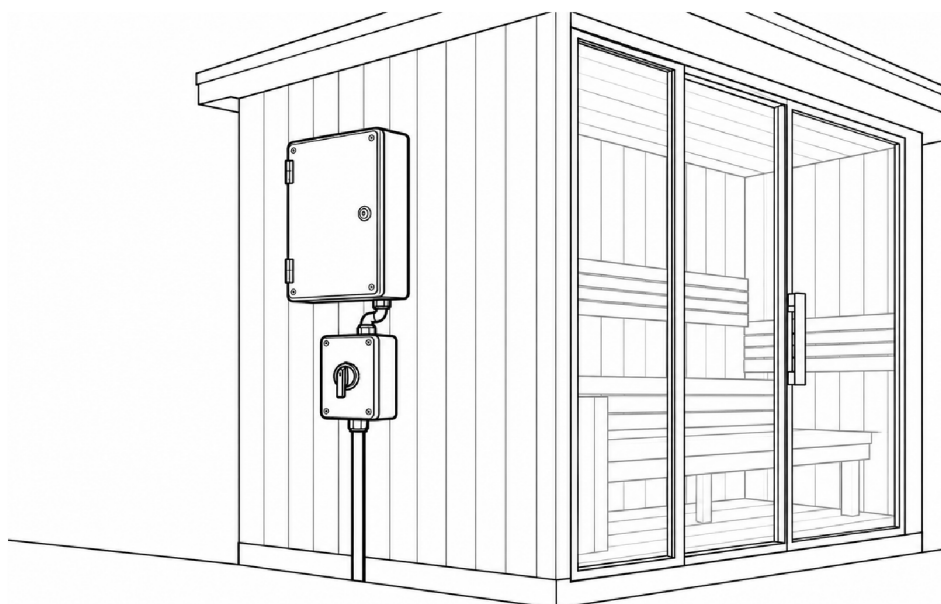
What makes 10 mm² the minimum here?

9 kW / 220 V, 25 m one-way, one circuit and the stated THW wall-conduit or NYY buried-conduit reference conditions; 3% route-drop target. Check the full tables and all site corrections. *Full-size PE is shown for this example; PE must be verified separately.

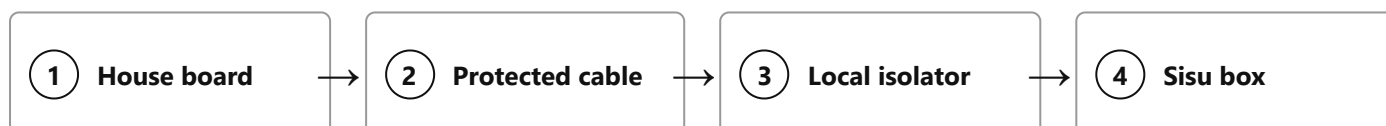
04 / CONNECT, CHECK, HAND OVER

Finish at the box. Then prove it works.

Agree the connection point and the electrician's visit before delivery.



Closed boxes; the short interconnecting conduit stays above ground. Internal wiring follows approved equipment diagrams.



Client's qualified electrician

Installs the feeder, PE and suitable local isolation. Completes final L, N and PE terminations in Sisu's box with the supply isolated, then tests the supply and records the results.

Sisu's checks and testing

Keeps its own RCBO and breaker. Checks the incoming supply at the box and tests heating, controls and the safety shutdown. Give the owner the signed records and isolation instructions.

Single-phase means three conductors here

L + N + PE. The five-conductor L1 + L2 + L3 + N + PE arrangement belongs to three-phase. No plug or extension lead. Keep the sauna isolated until the responsible installer completes the required tests.

Confirm the sauna first.

Room size alone does not determine the electrical connection.

- 01 Record the equipment**
Get the heater manufacturer, exact model, nameplate kW, voltage, phase arrangement and installation manual. Record the controller model and any second heater. A catalogue kW is not permission to use every supply arrangement.
- 02 Survey the main supply**
Confirm available phases, meter/service capacity, main breaker, spare board ways, earthing arrangement and existing demand: air-conditioning, water heaters, EV charging and pumps. A service upgrade requires utility approval.
- 03 Measure the actual cable route**
Measure one-way from the supplying board to the sauna connection, including rises, bends and the final link. Record buried, exposed, roof-space and insulated sections. Do not use a straight-line garden distance.
- 04 Agree the handover point**
Agree the Sisu box position and connection timing. The client's electrician supplies and connects the complete incoming cable into its designated terminals, then tests the supply. Preparing cable within 3 m is not the final connection. Keep unfinished wiring isolated.

Send Sisu before cable purchase

Nameplate + model manual + board photo + measured route + proposed breaker/cable + handover-point photo. Confirm the order's electrical schedule in writing.

06 / IMPORTANT: PROPERTY SUPPLY

Can the house supply the heater?

The client must arrange this assessment before confirming the electrical design.

Client responsibility: capacity and voltage quality

Arrange a qualified electrician to verify that the property supply can support the ordered heater together with normal household demand. Disclose known low-voltage problems and arrange any necessary electrical or utility upgrades before commissioning.



Check voltage before load AND under planned load

Both the utility-side route and the client feeder can contribute to voltage drop.

Far from the transformer?

A house at the end of a long village line, a heavily loaded transformer or an inadequate service cable may have low voltage under demand. Adding a large heater can worsen the voltage drop. A normal unloaded reading is not proof of capacity. [11]

Measure under realistic load

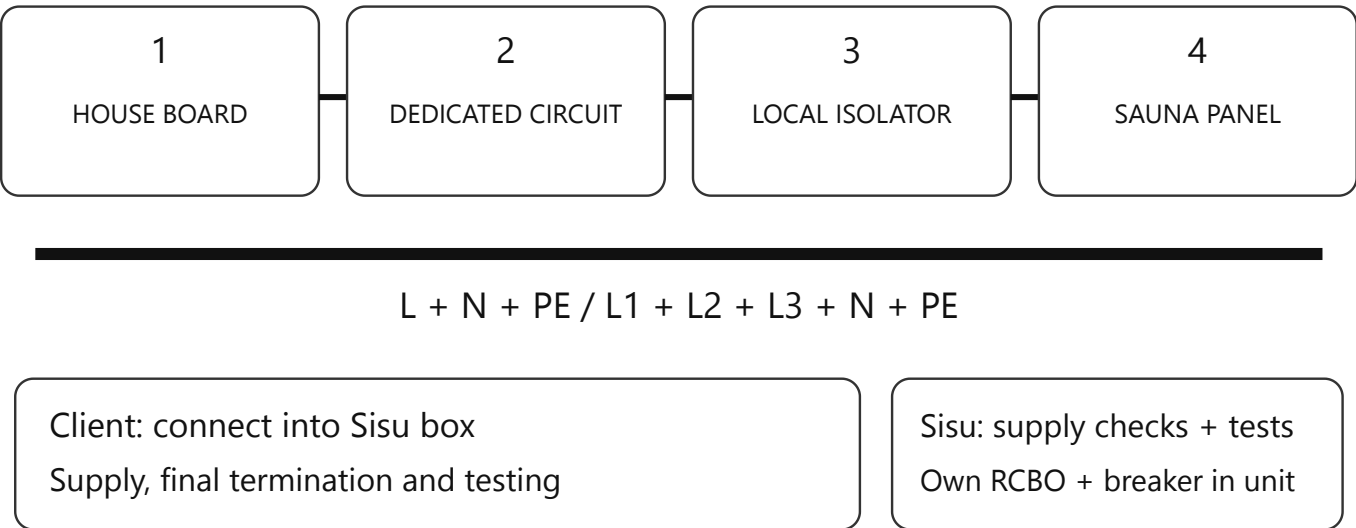
The electrician records voltage at the house board and Sisu box, unloaded and under planned heater plus household demand. Assess every phase and neutral, and peak-period variation where relevant. Use equipment voltage limits; these tables are not a supply-quality certificate.

Resolve inadequate supply before use

Larger cable from the house to the sauna cannot by itself cure low voltage already arriving at the house. The client arranges assessment and remedies with the electrician and utility. Sisu checks at its box; it does not certify or upgrade the village network. If supply is inadequate, defer commissioning.

From the house to the sauna.

A permanent dedicated circuit, with a continuous protective earth.



Functional overview only. Protective-device locations and poles follow the approved design.

Protect at the circuit origin

The client's board must protect the feeder. Sisu's own RCBO and breaker protect downstream equipment; they do not replace upstream feeder protection. Verify the client's protection and test record, not a verbal assurance. [10]

Accessible local isolation

Provide an appropriately rated lockable isolator outside the hot room, accessible for maintenance and emergencies. Keep it away from heater heat, spray and flood levels.

Separate other loads

Lighting, fans, controls and outdoor sockets may need separate circuits and protection. Include their current in any shared feeder design. Ice baths and chillers are separate appliances.

All sources count

Identify solar, batteries, generators, UPS and any separate control supply. Isolation must make all relevant circuits safe and prevent automatic restart.

08 / VOLTAGE & PHASES

One phase or three?

Use only the arrangement explicitly supported by the heater and controller.

Supply	Conductors to plan	Meaning
Single-phase	L + N + PE	3 conductors including earth. Typically 220–240 V L–N.
Three-phase with neutral	L1 + L2 + L3 + N + PE	5 conductors including earth. Typically 380–415 V L–L; 220–240 V L–N.

The tables use 220 V single-phase and 380 V balanced three-phase as conservative planning references at the stated power. Use the nameplate current whenever available. A fixed resistance heater’s actual power changes with voltage; these tables do not model that variation.

Never put 380 V across a 230 V element

A three-phase heater may still have 230 V elements. Star/delta links and neutral connections are model-specific. Copy no generic terminal-bridge diagram.

Neutral is not optional by assumption

Some heater-only circuits omit N, but controls or lighting may require it. This guide plans a full-size N. Omit it only with an approved model-specific design.

Do not infer the phase from sauna size

A small sauna can be supplied by three-phase. A large heater cannot be made single-phase by joining phases together. Confirm available utility supply and the ordered configuration.

09 / CONDUCTOR IDENTIFICATION

L, N and PE explained.

Label both ends. Prove conductor identity by testing, never by colour alone.

L / L1		Line 1 - brown
L2		Line 2 - black
L3		Line 3 - grey
N		Neutral - blue
PE / E		Protective earth - green/yellow

Labels state the actual conductor colours; this edition prints in monochrome. Existing Thai installations may use older colours. [6]

Term	Function
L / L1 / L2 / L3	Live/line/phase conductors carrying supply current.
N	Neutral: a live conductor in safety terms. It can carry current and must not be treated as safe to touch.
PE / E / $\perp$	Protective earth / ground. Bonds exposed conductive equipment to the earthing system; never a normal load return.

Cable notation matters

“5 × 10 mm² including PE” means five conductors, each 10 mm². “4-core + earth” may mean a different product. Confirm the actual core count and green/yellow PE with the cable supplier. mm² is conductor area, not diameter.

10 / BREAKERS & EARTH LEAKAGE

Choose the whole protection scheme.

Current rating in amperes and residual sensitivity in milliamperes are different.

Device	What it does	What to verify
MCB	Overload + short-circuit protection.	Ampere rating, curve, poles and fault breaking capacity.
RCCB / RCD	Residual-current protection; does not by itself provide overload protection.	Upstream overcurrent protection, rated current, type and sensitivity.
RCBO	Combines overcurrent and residual-current protection.	All MCB and RCD characteristics, plus manufacturer compatibility.
Isolator	Provides safe isolation when appropriately selected.	Load duty, pole arrangement and lock-off; not a replacement for protection.

Sisu keeps its own RCBO and breaker

Sisu's supply unit retains its own RCBO and specified breaker even when the client reports upstream protection. Do not omit or bypass them on that assurance. Confirm ratings against the approved unit design. Type A detects AC and pulsating DC leakage. [9]

Mandatory design hold: IEC sauna provisions distinguish the heater circuit from other circuits, and Harvia explicitly gives heater-RCD restrictions. Resolve the exact heater instructions, Thai requirements and Sisu's schedule in writing before installation. Do not remove an RCD to stop tripping; do not commission an unresolved conflict. [1, 4]

11 / PROTECTION DETAILS

A suitable rating is more than “32 A”.

The electrician specifies and records these details for the actual site.

- 01 Poles and neutral**

Single-phase normally needs a linked L+N disconnection arrangement; three-phase with N needs an appropriate linked four-pole arrangement where required. Match the device's dedicated N terminal and connection direction. PE never passes through a switching pole.
- 02 Residual-current routing**

All live conductors belonging to that RCD circuit pass through its sensing arrangement. PE stays outside it. No shared downstream neutrals between RCBO circuits, and no downstream N–PE link.
- 03 Breaking capacity and trip curve**

Check prospective short-circuit current at the board and device I_{cn}/I_{cu} suitability. Choose B/C or another curve from the fault-loop and load design. A higher curve is not a cure for nuisance trips.
- 04 Coordination and isolation**

The client should also provide dedicated upstream RCBO protection where compatible with the approved design. Coordinate it with Sisu's retained RCBO. Two instantaneous 30 mA devices can trip either or both; do not assume selectivity. Verify the actual devices and supply isolation. [10]

Never oversize a breaker to stop a trip

Investigate overload, damaged elements, moisture, leakage, wiring errors or loose terminals. The corrected cable capacity must remain at least the protective-device rating. [2]

Earth is essential. Neutral is different.

The protective conductor must remain continuous from the supply to the equipment.

Run PE with the circuit

Provide a dedicated green/yellow PE with the supply route. Connect heater frame, metal electrical enclosures and other exposed conductive parts that require earthing. Never rely on soil, timber screws or a water pipe as the protective conductor.

No improvised N-PE bond

Neutral and PE stay separate downstream as required by the supply arrangement. Do not make a link in the sauna board or isolator. Any supply-side bonding is part of the approved earthing design.

Electrodes are a design item

The electrician identifies TT/TN or the actual local arrangement and verifies automatic disconnection. An extra earth rod does not replace PE or correct a broken neutral. Do not create a separate uncoordinated earthing island.

Bonding is site-specific

Assess metal services and extraneous conductive parts. Poolside or shower-adjacent saunas need an additional location assessment. Do not automatically bond every decorative metal item without design review.

PE sizing used in this handbook

Tables show minimum phase/neutral areas; PE is a separate design check. Full-size PE is an acceptable option, while some NYY-G products provide a smaller PE. Record phase and PE sizes separately and verify the PE against applicable sizing, fault-energy and disconnection requirements. Never omit or reduce PE by guesswork. [3, 5]

13 / CABLE SELECTION

The right cable for each environment.

Cable type, insulation temperature and installation method matter as much as mm².

Route	Planning choice	Important limit
Protected indoor route	THW / IEC 01 singles in a complete suitable conduit system, or approved sheathed cable.	No loose unsheathed singles exposed to damage. Apply grouping and ambient corrections.
Underground garden feeder	Genuine NYY / NYY-G with the required cores and PE, explicitly rated for the proposed burial or duct arrangement.	A black sheath alone proves nothing. Confirm the exact datasheet and cable markings.
Outdoor exposed section	Cable / conduit system approved for UV, rain, impact and the local environment.	Seal entries and provide strain relief. Conduit is not assumed dry.
Final hot-zone connection	Heater-manufacturer approved heat-resistant cable, often a specified silicone/rubber product.	Ordinary NYY, THW and VCT are not automatically hot-zone cable.

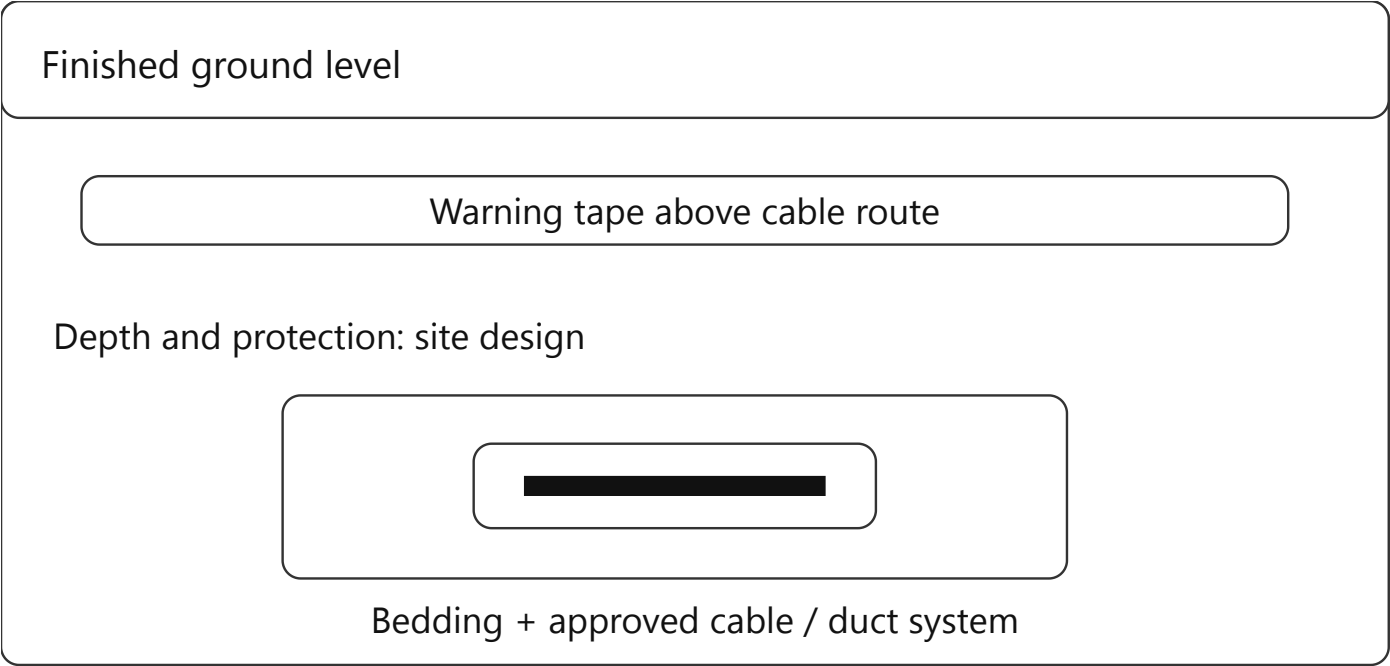
Do not substitute by name alone

NYY, NYY-G, IEC 10, VCT-G and CV have different product constructions. Do not assume IEC 10 is a direct-burial NYY equivalent. Obtain the actual manufacturer approval for burial, moisture exposure, operating temperature and voltage. [5]

14 / UNDERGROUND ROUTES

A reliable garden connection.

Use NYY / NYY-G or another specifically approved underground cable system.

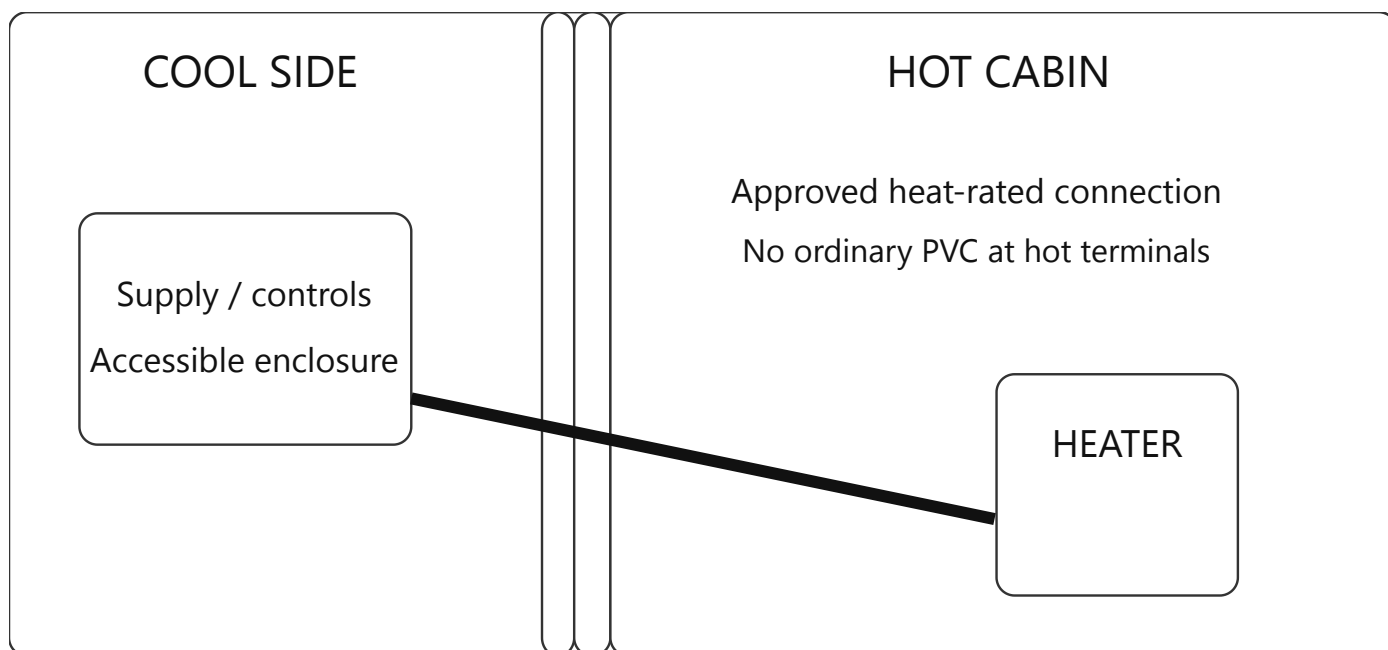


Conceptual section, not to scale. No universal burial depth is implied.

- ☐ Locate water, drainage, telecoms and existing electrical services before excavation. Obtain permission and protect tree roots and building foundations.
- ☐ The electrician specifies burial depth, bedding, duct class, impact protection and service separation to suit Thai requirements and garden/driveway use.
- ☐ Prefer a continuous run; avoid buried joints. Where unavoidable, use a specifically approved waterproof jointing system and record its location.
- ☐ Provide warning tape, protected risers, suitable bend radii, pulling access and sealed entries. Check duct fill and cable pulling limits.
- ☐ Photograph and dimension the route before backfilling. Inspect the cable and perform the agreed tests before covering it.

Keep ordinary wiring on the cool side.

The incoming feeder and the heater's hot connection are different cable sections.



Conceptual wall section. The heater manual determines routing and temperature ratings.

Cable insulation

Route general wiring outside thermal insulation where practical. In hot areas, use the exact heat-rated cable and accessories the equipment and location require; protect penetrations and keep heater clearances.

Equipment placement

Place normal switchgear, power supplies and service terminals outside the hot cabin. Use sauna-rated lights and sensors in their prescribed locations. Do not put ordinary sockets inside the sauna.

A sauna beside a pool needs two assessments

Rain, cleaning jets and pool/shower zones change enclosure and placement requirements. As a planning preference, specify suitable weather-resistant outdoor enclosures, often IP65 or better, but have the installer confirm the actual location rating. [1]

Two checks. Then the site checks.

Minimum sizes for the stated reference methods and voltage-drop target; site verification remains required.

- 01 Calculate the load**

Resistive planning load: $I = P / V$ for single-phase; $I = P / (\sqrt{3} \times VLL)$ for balanced three-phase. P is watts. Use the actual nameplate current and include auxiliary loads where supplied together.
- 02 Select a preliminary protective rating**

These examples use the next listed breaker rating at or above the calculated load. Confirm the actual nameplate current, manufacturer protective limit and applicable local load rules before selection. [12]
- 03 Choose cable for current AND distance**

Use the published THW-in-air or NYY-in-buried-conduit rating for the actual route, then check distance. THW reference: 40°C ambient; NYY reference: 30°C soil. One circuit, without grouping or other derating. Verify $I_b \leq I_n \leq \text{corrected } I_z$. [12]
- 04 Approve the completed design**

Confirm insulation rating, hot sections, grouping, ambient temperature, soil conditions, earthing, fault-loop/disconnection performance, terminals and the remaining voltage-drop budget. If any check fails, redesign before purchase. [2, 7]

$I_b / I_n / I_z$

I_b = load current. I_n = breaker rating. I_z = corrected cable capacity. Tables show the smallest listed conductor passing the stated current/drop checks, with a 2.5 mm² branch-circuit floor. Actual installation, fault checks and equipment limits may require larger sizes. [12]

17 / SINGLE-PHASE PLANNING

Single-phase: 3 to 9 kW.

220 V reference • L + N + PE • copper • dedicated heater circuit

Heater	Load A	Candidate breaker	THW / air	NYY / buried duct
3 kW	13.6	16 A	2.5	2.5
4.5 kW	20.5	25 A	4	2.5
6 kW	27.3	32 A	6	4
8 kW	36.4	40 A	10	6
9 kW	40.9	50 A	10	10

Minimum phase/N areas are in mm². Provide L, N and PE; size PE separately under the approved earthing design. THW: single-core conductors in wall-mounted conduit, 40°C air. NYN: cable in buried conduit, 30°C soil. One circuit, 70°C PVC, two loaded conductors; no grouping/other derating. Check distance and actual conditions. [12]

9 kW: short-run minimum

At this 220 V single-phase reference, 9 kW is 40.9 A: the example uses a 50 A breaker and 10 mm² phase/N for a short run under either stated method; provide PE separately. Published THW capacity is 50 A; NYN buried-conduit capacity is 62 A before corrections. Longer runs can require a larger cable. [12]

Prefer three-phase when practical

A high single-phase load can exceed the existing service or create poor phase balance. An approved three-phase version may reduce current per phase.

No plug or extension lead

Plan a fixed connection and suitable isolation. Do not reuse a cooker, shower or EV circuit without a complete design assessment.

18 / THREE-PHASE PLANNING

Three-phase: current per phase.

380 V line-to-line • balanced load • L1 + L2 + L3 + N + PE

Total heater kW	A / phase	Breaker A / phase	THW / air	NYN / buried duct
3 kW	4.6	10 A	2.5	2.5
4.5 kW	6.8	10 A	2.5	2.5
6 kW	9.1	10 A	2.5	2.5
8 kW	12.2	16 A	2.5	2.5
9 kW	13.7	16 A	2.5	2.5
10.5 kW	16.0	16 A	2.5	2.5
12 kW	18.2	20 A	4	2.5
15 kW	22.8	25 A	6	2.5
18 kW	27.3	32 A	10	4
21 kW	31.9	32 A	10	4
24 kW	36.5	40 A	10	6
30 kW	45.6	50 A	16	10
36 kW	54.7	63 A	25	16

The same ampere rating applies to every phase

"40 A three-phase" means 40 A per phase, not 120 A available on one conductor. 30 and 36 kW rows are total-load examples for engineered commercial or multi-heater systems; they do not imply a listed single heater or a permitted single circuit.

THW: wall-conduit singles at 40°C air. NYN: buried conduit at 30°C soil. One circuit, 70°C PVC, three loaded conductors; balanced neutral. Apply corrections and distance checks. A 9 kW short-run example is 16 A per phase, 2.5 mm² phase/N, plus PE under the approved design. Include any auxiliary loads. [12]

19 / DISTANCE TABLE: ONE PHASE

Longer route. Larger conductor.

Minimum phase/N mm² • each cell: THW / NYY • 220 V single-phase

Heater	10 m	25 m	50 m	75 m	100 m
3 kW	2.5 / 2.5	2.5 / 2.5	6 / 6	10 / 10	10 / 10
4.5 kW	4 / 2.5	4 / 4	10 / 10	16 / 16	16 / 16
6 kW	6 / 4	6 / 6	10 / 10	16 / 16	25 / 25
8 kW	10 / 6	10 / 10	16 / 16	25 / 25	35 / 35
9 kW	10 / 10	10 / 10	16 / 16	25 / 25	35 / 35

Column distance is the complete ONE-WAY cable route from the supplying board to the sauna load, including the final link. Choose the next longer column; do not interpolate down. Each cell gives THW / NYY minimums separately: current capacity must cover the listed breaker and calculated drop must not exceed 3% on this route.

These are not ampacity or permission tables

Provide L, N and PE. The listed minima apply to phase/N; PE is sized separately. Reference routes: wall-conduit THW at 40°C and buried-conduit NYY at 30°C soil. Actual cable, grouping, heat, soil and terminal checks can require a larger size. An upstream feeder's voltage drop uses part of the total allowable budget.

Calculation basis

Copper resistivity 0.0237 Ω·mm²/m, resistive load, full calculated heater current. $\Delta V = 2 \times l \times \rho \times \text{length} / \text{area}$. Use the calculated load current. Reference thermal data: THW table 5-20 and NYY table 5-23. [7, 12]

Beyond 100 metres

Ask for a project calculation. The available drop budget, fault performance and terminal capacity can dominate the design before thermal capacity does.

20 / DISTANCE TABLE: THREE PHASES

Three-phase over longer runs.

Minimum phase/N mm² • each cell: THW / NYY • balanced 380 V three-phase

Total kW	10 m	25 m	50 m	75 m	100 m
3 kW	2.5 / 2.5	2.5 / 2.5	2.5 / 2.5	2.5 / 2.5	2.5 / 2.5
4.5 kW	2.5 / 2.5	2.5 / 2.5	2.5 / 2.5	2.5 / 2.5	2.5 / 2.5
6 kW	2.5 / 2.5	2.5 / 2.5	2.5 / 2.5	2.5 / 2.5	4 / 4
8 kW	2.5 / 2.5	2.5 / 2.5	2.5 / 2.5	4 / 4	6 / 6
9 kW	2.5 / 2.5	2.5 / 2.5	2.5 / 2.5	4 / 4	6 / 6
10.5 kW	2.5 / 2.5	2.5 / 2.5	4 / 4	6 / 6	6 / 6
12 kW	4 / 2.5	4 / 2.5	4 / 4	6 / 6	10 / 10
15 kW	6 / 2.5	6 / 2.5	6 / 6	10 / 10	10 / 10
18 kW	10 / 4	10 / 4	10 / 6	10 / 10	10 / 10
21 kW	10 / 4	10 / 4	10 / 6	10 / 10	16 / 16
24 kW	10 / 6	10 / 6	10 / 10	10 / 10	16 / 16
30 kW	16 / 10	16 / 10	16 / 10	16 / 16	25 / 25
36 kW	25 / 16	25 / 16	25 / 16	25 / 16	25 / 25

Provide L1, L2, L3, N and PE. Listed minima apply to phase/N; size PE separately. Calculation: $\Delta V = \sqrt{3} \times I \times \rho \times \text{length} / \text{area}$; $\rho = 0.0237 \Omega \cdot \text{mm}^2/\text{m}$; drop as a percentage of 380 V. The 3% value is this handbook's planning target for this route, not a universal statutory limit. [7]

A balanced assumption must be true

Read each cell as THW / NYY, in mm². THW: wall conduit, 40°C air. NYY: buried conduit, 30°C soil. Values are separate minima for balanced resistive load and a 3% route-drop target. A controller, lighting transformer or several single-phase heaters can unbalance it. Use the actual phase currents and assess neutral drop separately where relevant.

21 / WORKED EXAMPLES

Turn the tables into a proposal.

Examples use the THW wall-conduit reference at 40°C; site approval is still required.

6 kW / single-phase / 25 m

220 V gives 27.3 A. Preliminary breaker: 32 A. Base cable: 3 × 6 mm². The 25 m distance candidate remains 3 × 6 mm²; calculated drop 2.45%. Verify corrected $I_z \geq 32$ A and the heater's permitted protection.

18 kW / three-phase / 50 m

380 V gives 27.3 A per phase. Preliminary breaker: 32 A. Candidate cable 5 × 10 mm². Calculated drop 1.48%. A buried route needs approved NYY/NYY-G or an equivalent specified system.

9 kW / single-phase / 100 m

220 V gives 40.9 A. Preliminary breaker: 50 A. The short-run base 10 mm² rises to 35 mm² at 100 m because of distance. Calculated drop 2.52%. Check service capacity and whether an approved three-phase heater is more practical.

The upstream drop is already 2%

If the project target is 3% in total, only 1% remains for this route. A table calculated at 3% cannot be used unchanged. Recalculate using the remaining budget and actual cable data.

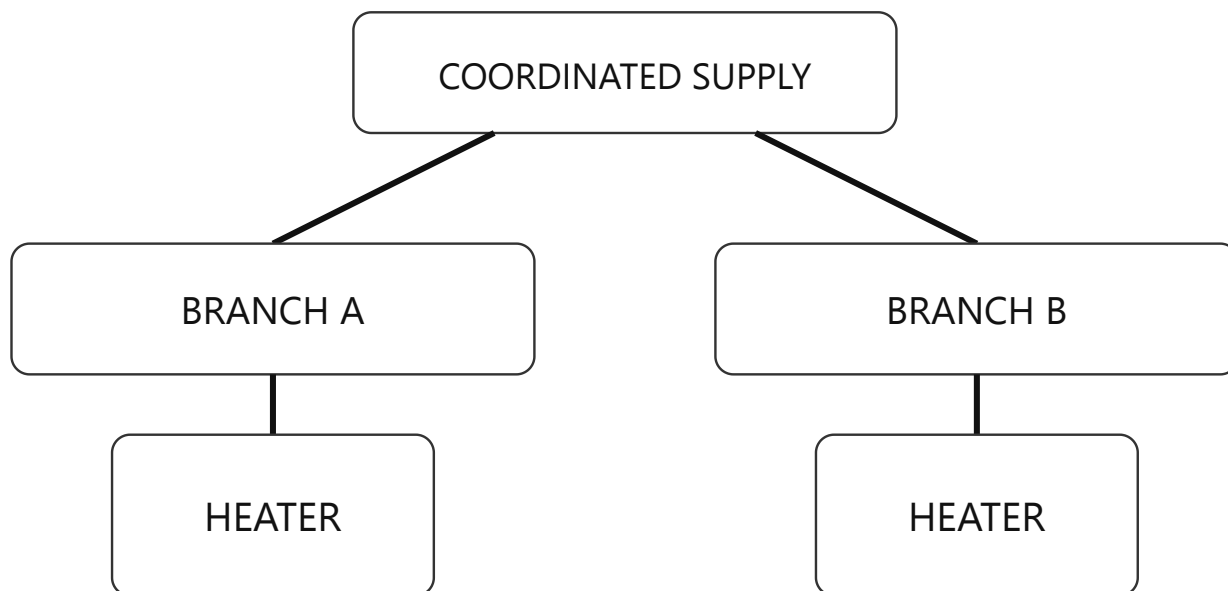
Bigger cable is not always a direct fit

Check gland, isolator and terminal capacities before purchase. Use an approved transition arrangement if needed; never cut strands off to fit a small terminal.

22 / TWO HEATERS & AUXILIARIES

Two heaters need a coordinated design.

A combined kW figure does not define the branch circuits.



Two separate heater branches. Exact protective and control arrangements follow the approved design.

- ☐ Identify each heater, controller and contactor rating separately. Confirm whether the approved system requires one protected branch per heater.

- ☐ Size the shared feeder for simultaneous demand unless a certified design explicitly permits load management. Do not assume the heaters take turns.

- ☐ Two 9 kW three-phase heaters total 18 kW, about 27.3 A per phase at the planning reference. Each branch still needs its own manufacturer-specific protection and cable assessment.

- ☐ Two single-phase heaters connected to different phases are not a balanced three-phase load. Calculate the actual current in each line and N.

- ☐ Provide coordinated emergency isolation and independent over-temperature protection as required for each heater. Include lights, fans and control supplies in the circuit schedule.

23 / MATERIALS & EQUIPMENT

Prepare a complete materials list.

Quantities and ratings come from the approved site design and the order scope.

Item	Specify / include
Dedicated protective device	Client protection coordinated with Sisu RCBO/breaker: poles, A, mA, type, curve and breaking capacity.
Board and local isolator	Spare ways, compatible busbar, enclosure/IP rating, linked poles, load rating and lock-off.
Copper feeder + PE	Approved type; actual core count × mm ² ; measured route plus termination allowance; drum markings.
Cable containment	Conduit/duct/tray, bends, couplers, clips, saddles, pull boxes, draw rope and supports.
Underground works	Approved bedding and protection, warning tape, protected risers, route markers and photographs.
Terminations	Correct glands, strain relief, bushes, terminals/lugs/ferrules approved for conductor class, shrouds and torque values.
Final heat-rated link	Heater-approved hot-zone cable. Client electrician supplies and connects incoming cable into Sisu's box.
Earthing and labels	PE terminals/bar, bonding materials if designed, circuit labels, conductor markers and all-source isolation labels.
Control and safety equipment	Controller, contactor, independent high limit, sensors, approved remote-start safeguards and separate auxiliary protection as ordered.
Testing and handover	Qualified labour, calibrated instruments, test schedule, final drawings and owner briefing.

Do not buy only "a breaker and some cable"

Agree which items are included with the sauna and which the client electrician supplies. Add reinstatement, permits and any service upgrade to the project allowance.

Good terminations prevent heat.

The exact model diagram takes precedence over any generic terminal layout.

01 Isolate, lock and prove dead

Only a qualified electrician opens mains enclosures. Identify all sources, prevent reconnection and prove dead with appropriate instruments and a verified safe-isolation procedure before work.

02 Confirm every conductor

Check L1/L2/L3/N/PE labels at both ends, conductor continuity and the manufacturer terminal schedule. Check whether neutral or bridge links are required; never infer links from a photograph of another model.

03 Use the right terminal hardware

Use approved lugs or ferrules for the conductor class and terminal. Keep copper fully inside the terminal, preserve strand count and provide gland strain relief. Do not place two conductors in a terminal unless rated for them.

04 Torque, inspect and record

Tighten to the equipment's specified torque with suitable tools. Inspect for exposed copper, insulation damage, water paths and cable tension. Complete dead tests before any controlled energisation.

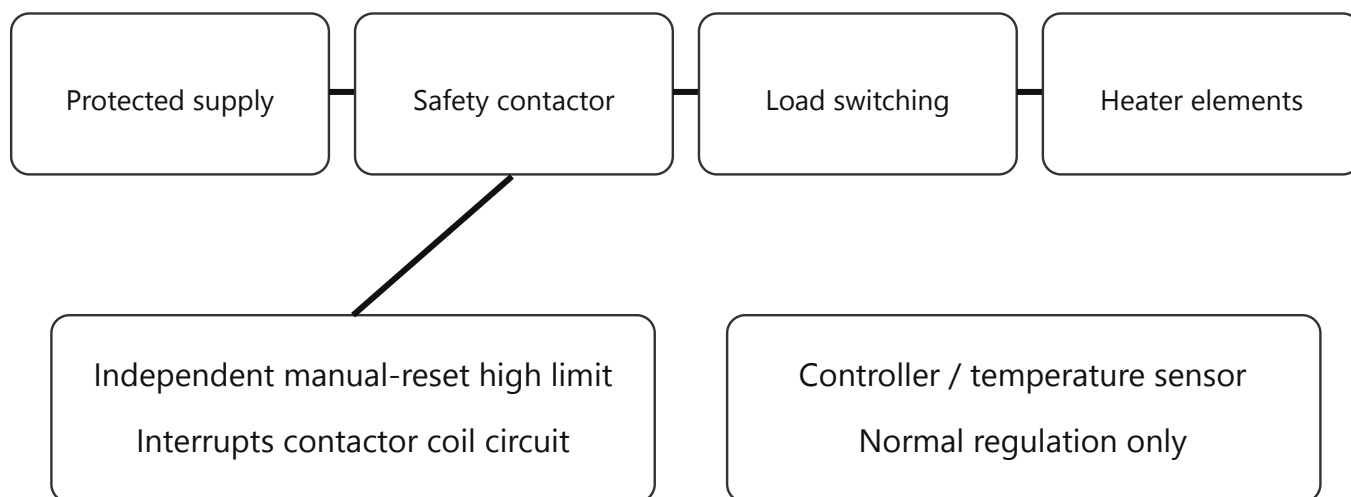
Never copy a universal terminal-bridge drawing

This handbook deliberately does not prescribe heater terminal numbers or star/delta bridges. The wrong link can put line-to-line voltage across a line-to-neutral element and destroy equipment or create a fire risk.

25 / CONTROL & INDEPENDENT SAFETY

The app is not the safety circuit.

Electronic control and independent over-temperature shutdown do different jobs.



Functional concept for systems using contactors and electronic load switching. Actual hardware varies.

- ☐ An independent manual-reset high-limit must remove heater power through the approved safety path, independent of the app and normal temperature regulation. Built-in heaters may integrate these functions differently.

- ☐ A semiconductor relay can fail conducting. It is not a service isolator. Verify contactor duty, enclosure cooling and the specified safety cut-out arrangement.

- ☐ Keep sensor/data wiring segregated from mains as required; use the specified sensor location and cable. Do not move a sensor to make the cabin heat harder.

- ☐ Remote or scheduled start is enabled only with the heater manufacturer's approved safeguards and a clear-heater inspection procedure. A Wi-Fi connection or working screen is not commissioning proof. [8]

Plan. Install. Test. Handover.

Agree this sequence with the client electrician before the delivery date.

- 01

Approve the site schedule

Confirm heater model, supply arrangement, measured route, protective scheme, cable, isolation and scope boundary. Resolve any RCD/manual conflict before buying equipment.
- 02

Prepare the upstream supply

The client electrician installs upstream protection, the complete route and PE, and arranges the property supply-capacity assessment. Test buried work before covering it. Keep unfinished conductors isolated and enclosed.
- 03

Confirm readiness before delivery

Prepare the agreed connection position before delivery. Arrange the client electrician's final termination when Sisu's box is in place. Provide the supply design and test records; a cable ending near the sauna is not a completed supply.
- 04

Complete final connection after assembly

The client's qualified electrician connects L1, L2, L3, N and PE to the designated three-phase incoming terminals in Sisu's box, using its diagram. Complete the supply tests before declaring it ready for controlled energisation. Sisu does not terminate the client's supply cable.
- 05

Commission and hand over

Sisu checks incoming supply at its box and tests the sauna, safety shutdown and monitored heating. The client electrician remains responsible for the upstream installation and its report. Missing, unsafe or inadequate supply means no commissioning; record the reason and return date.

27 / ELECTRICIAN'S TEST CHECKLIST

Inspect before energising.

Use the applicable Thai verification procedure and equipment manufacturer instructions.

- ☐ Approved model diagram, nameplate, supply phases and order schedule agree; all protective ratings and cable types are recorded.

- ☐ Main supply capacity and board suitability are confirmed. Circuit is dedicated and identified; isolation covers all relevant sources.

- ☐ Cable route, support, glands, mechanical protection, bending radius and burial record are acceptable. Hot-zone cable and penetrations are correct.

- ☐ PE continuity and required bonding continuity are measured and recorded. Neutral is correctly separated; no shared RCBO neutrals.

- ☐ Insulation resistance is tested using the correct procedure. Disconnect or protect electronic controllers, surge devices and other sensitive equipment as the manufacturer requires; do not apply a test voltage blindly.

- ☐ Polarity, conductor identification, neutral integrity and terminal links match the approved diagram. All terminations are torqued and covers fitted.

- ☐ Safety contactor/high-limit path, sensor positions, guarding and heater clearances are inspected. No safety device is bypassed.

Do not confuse a visual check with a measured test

The electrician records instruments, test conditions, measured values and the acceptance basis. A tick alone is not a substitute for the installation test report.

28 / CONTROLLED COMMISSIONING

Verify the real installation.

The client electrician verifies the supply; SisU checks at its box and tests the sauna.

- ☐ Record L–N and L–L voltage at the house board and SisU box, before loading and under the planned heater plus normal household demand. Check all phases, neutral and phase balance against the equipment limits. The client arranges upstream/utility remedies if inadequate.

- ☐ Verify earthing/fault-loop conditions and automatic disconnection. Measure prospective fault current and confirm breaker breaking capacity. Apply the test method appropriate to the site's TT/TN arrangement.

- ☐ Instrument-test each installed RCD/RCBO for its type and required trip performance. Record results and compare with the applicable standard and device data. Also operate the test button.

- ☐ Run a monitored heat cycle. Confirm correct heating, regulation, phase loading and absence of abnormal smell, noise or terminal/enclosure overheating. Follow the heater's first-use ventilation instructions.

- ☐ Demonstrate normal stop, local isolation and independent over-temperature shutdown using the manufacturer-approved test method. Do not improvise a test by dangerously overheating the cabin.

- ☐ Verify safe behaviour after power loss, sensor fault and any configured remote-start interlock. Confirm no unapproved automatic restart or bypassed safety path.

Release only after the electrical tests pass

A working app, a 200 response from a website or a warm heater does not establish electrical safety. Keep the sauna out of service until the responsible installer signs the actual test record.

29 / PROJECT ELECTRICAL SCHEDULE

Keep this with the sauna.

Complete after design approval. Attach the signed test report and final drawing.

Record	Project value / reference
Client / site / order number	
Heater model / serial / kW	
Second heater / controller model	
Manual revision / diagram reference	
Supply voltage / phases / earthing system	
Main service capacity / demand check	
Route one-way length / buried sections	
Cable type / core count × mm ² / PE	
Corrected I _z / correction factors	
Breaker make / poles / A / curve / kA	
Client RCD / Sisu RCBO + breaker / coordination	
Isolator rating / location / sources	
Voltage drop / loaded supply assessment	
Sisu box / client final-termination record	
Designer / electrician / date	

Electrician qualification in Thailand: หนังสือรับรองความรู้ความสามารถ สาขาช่างไฟฟ้าภายในอาคาร, with any additional engineering authority required for the project.

30 / COMMISSIONING & HANDOVER RECORD

Measured. Demonstrated. Signed.

Enter measured values and attach instrument reports. Do not pre-fill “pass”.

Test / demonstration	Result / reference
PE / bonding continuity	
Insulation resistance / test conditions	
Polarity / neutral / phase sequence	
Loaded/unloaded L–N, L–L / phase currents	
Earthing / loop / disconnection verification	
Prospective fault current / breaking capacity	
RCD/RCBO instrument trip tests	
High-limit safety shutdown / reset	
Normal stop / isolator / remote safeguards	
Monitored heat cycle / abnormal heat check	
Instrument IDs / calibration reference	
Outstanding work / agreed return date	

Release status: ☐ Ready for use ☐ Not ready - isolated

Responsible electrician / qualification / signature / date:

Sisu installer / owner briefing acknowledged / date:

Know how to stop safely.

Keep the electrical schedule and test records with your sauna documents.

Before every session

Keep towels, clothes and objects away from the heater. Check the room, visible cables and enclosures. Use the sauna only after commissioning is complete. Follow the separate user manual for app controls.

If a breaker or RCBO trips

Stop use and report the device label, time, weather and heater state. Do not repeatedly reset it, increase its rating or bypass it. A qualified electrician investigates the fault.

Periodic checks

Operate the RCD test button at the interval on its instructions, with the sauna safely stopped. Ask the electrician to specify periodic inspection intervals for outdoor wiring, earthing and protective devices.

Know the isolator

Ask the installer to show you the labelled sauna isolator and any separate supplies. The app's OFF button is not electrical isolation for repairs. Never remove electrical covers.

Burning smell, tingling or water ingress

Stop use. Isolate at the designated safe point if it is safe to approach. Keep people clear and obtain professional assistance. Do not touch a wet enclosure or suspect metalwork.

After alterations or flooding

Do not resume use until inspected and retested. A new heater, longer cable route, solar backup change or second heater can require a new electrical design.

Support

Use the order contact or sauna.in.th/contact. Send the model, order number, fault description and exterior photos only. Keep enclosures closed; do not send anyone to expose live parts for a photograph.

32 / SHARE WITH YOUR ELECTRICIAN

The one-page supply brief.

Use with the completed project schedule on page 31, not as a stand-alone design.

- ☐ **Confirm:** exact model and supply arrangement; the client arranges a property supply-quality/capacity assessment, including loaded voltage and utility limitations.

- ☐ **Supply:** permanent dedicated circuit from a verified suitable board; confirm meter, main breaker and spare demand.

- ☐ **Conductors:** L+N+PE for single-phase; L1+L2+L3+N+PE for the usual three-phase arrangement. Label both ends; keep N and PE distinct.

- ☐ **Protection:** Sisu retains its own RCBO and breaker regardless of client assurances. Provide suitable upstream feeder protection and coordinate any client RCBO. Verify actual devices and test records.

- ☐ **Cable:** verify corrected Iz, voltage drop and fault withstand. Use NYY/NYY-G or another approved cable system underground; use specified heat-resistant cable near the heater.

- ☐ **Connection:** the client electrician completes final termination inside Sisu's supply box. For three-phase, connect all five: L1, L2, L3, N and PE. Sisu checks the incoming supply and tests the sauna; it does not connect the client's cable.

- ☐ **Commission:** complete dead/live electrical tests and independent high-limit shutdown checks, then monitored heating. Sign the test report and brief the owner.

Not ready means no operation

Record the reason and agreed return/testing date. Where the client supply is incomplete or non-compliant, commissioning is deferred and a return visit may be chargeable under the order. This does not waive defect, warranty or lawful payment-withholding rights.

33 / TECHNICAL REFERENCES

The basis behind the guidance.

Primary technical sources checked on 31 October 2026. Keep the exact equipment manuals too.

1. **IEC 60364-7-703:2004** - sauna installation framework; use the adopted Thai requirements and current applicable edition.
[SEK Svensk Elstandard / IEC preview](#)
2. **Schneider Electric / Electrical Installation Guide** - cable sizing, installation methods and correction factors.
[General method for cable sizing](#)
3. **Schneider Electric / Electrical Installation Guide** - protective conductor sizing and fault considerations.
[Sizing of protective earthing conductor](#)
4. **Harvia Support** - manufacturer guidance restricting RCD use in heater circuits; do not generalise to every make or override local rules.
[Harvia heater-circuit RCD guidance](#)
5. **Thai Yazaki / Technical Data Catalog** - NYY/NYY-G construction, cable markings and underground use; confirm the exact product datasheet.
[Cable types and installation data \(manufacturer\)](#)
6. **Industrial Estate Authority of Thailand** - official project electrical specification showing phase/neutral/earth identification. It is not a universal wiring-code adoption notice.
[IEAT / electrical specification](#)
7. **Schneider Electric / Electrical Installation Guide** - voltage-drop formulae and hot-copper resistance basis.
[Calculation of voltage drop in steady load conditions](#)
8. **Harvia Support** - manufacturer-specific remote-start safeguards.
[Safety devices for electric heaters](#)
9. **Schneider Electric** - Type A residual-current detection characteristics.
[Acti 9 Type A RCBO characteristics](#)
10. **Schneider Electric** - upstream protection and RCD coordination.
[Location of protective devices / RCD coordination](#)
11. **PEA / EGAT / MEA** - distribution-network loading, line length and voltage-drop effects.
[Utility study: network capacity and voltage quality](#)
12. **S.Super Cable / Technical Data 2023** - EIT 022001-22 tables 5-20 and 5-23; manufacturer PDF pages 37 (A26) and 40 (A29). Breaker examples follow $I_b \leq I_n \leq I_z$.
[Published cable-rating tables / Protective-device selection / Thai Yazaki: branch-conductor minimum](#)

Finish with an approved site design.

This handbook supports planning and a careful handover; it does not certify an installation.

What the tables assume

Copper only; 220 V single-phase or balanced 380 V three-phase; resistive load; the stated nominal kW; full-size N and a separately verified PE. The examples use the next listed breaker at or above load. Published thermal ratings use the two stated installation methods; actual corrections and fault checks remain required.

Equipment and regulation checks

The responsible electrician confirms applicable Thai installation requirements, utility conditions, exact heater/controller instructions and project authority. Resolve conflicts before energisation; no general guide overrides statutory requirements.

What the tables do not assume

No allowance for extra auxiliary loads, upstream drop, harmonics, unusual ambient/soil, grouped cables or thermal insulation. No automatic approval of a particular branch rating, a particular board or a manufacturer's maximum protective rating.

Document identity

SISU Sauna Electrical Handbook • SEH-01 R4 • planning edition • 31 October 2026. English and Thai are separate companion editions with the same tables and checklist structure.

Keep these together

This handbook + approved electrical schedule + exact heater and controller manuals + final circuit drawing + signed installation test report + buried-route photographs + owner/user manual.