Center pivot field wiring

Main cabinet / Eleven numbered bottom openings and three roof feeders. Select an outlet to open its wiring sheet.

MAIN CABINET · REFERENCE FRONT VIEW

11 bottom cable openings / 3 top antenna feed-throughs

M-AR1 4G LTE
Cellular coax

M-AR2 GPS A
Fixed center positioning coax

M-AR3 RADIO 2.4GHZ
Cabinet-to-tower radio coax

MAIN RETROFIT CABINET

Front view with door open. Find the numbered cable gland before pulling the cable.

AC Supply and PE
Incoming AC and 24 V distribution.

I/O Controller
Commands and digital feedback.

TB Terminal strips
Command, isolated return and bus groups.

RF Gateway and radio
Cellular, fixed GPS A and the radio link.

BOTTOM GLAND ROW · MATCH THE NUMBER ON THE ACTUAL ENCLOSURE

M01 M02 M03 M04 M05 M06 M07 M08 M09 M10 M11

AC supply and PE →
M01 AC POWER IN 110VAC
3 × 1.5 mm² · confirm supply

Start, stop and status →
M02 RUN / STOP
4 × 0.75 mm² · control

Forward and status →
M03 FORWARD
4 × 0.75 mm² · control

Reverse and status →
M04 REVERSE
4 × 0.75 mm² · control

Panel fault status →
M05 PANEL FAULT
2 × 0.75 mm² · control

Local-mode status →
M06 LOCAL MODE
2 × 0.75 mm² · control

Main water supply →
M07 SPAN SPRAY
4 × 0.75 mm² · control

Single end gun →
M08 END GUN
4 × 0.75 mm² · control

Optional cable monitor →
M09 CABLE MONITOR
2 × 0.75 mm² · 120 Ω STP

Reserved speed control →
M10 SPEED CONTROL
4 × 1.0 mm² · control

Optional sensor bus →
M11 SENSORS
2 × 0.75 mm² · 120 Ω STP

Match the enclosure number and measure the actual route before cutting the cable.
M09 and two-wire M11 use separately sourced 120 Ω shielded twisted pair. Check the sensor power route separately.
Reference layout shows functions and identifiers. Confirm actual openings, gland fit and cable rating. Use the approved drilling drawing for dimensions.

End-tower cabinet openings

End-tower cabinet / Two numbered bottom openings and two roof feeders. Select a route to trace its conductors.

END-TOWER CABINET · REFERENCE FRONT VIEW

2 bottom cable openings / 2 top antenna feed-throughs

E-BR1 RADIO 2.4GHZ
Tower-to-main radio coax

E-BR2 GPS B
Moving end-tower positioning coax

END-TOWER RETROFIT CABINET

Identify supply and fault wiring independently.

AC **Supply and PE**
Incoming AC and 12 V distribution.

RF **GPS B and radio**
End position and local radio traffic.

I/O **Tower fault inputs**
X1–X4 with local input returns.

E01

E01 AC POWER IN 110VAC · 3 × 1.5 mm²

E02

E02 TOWER FAULTS · 8 × 0.75 mm²

E02 · SINGLE-CABLE INSTALLATION

Mark the jacket E02 TOWER FAULTS at both ends.

Tower signals
Four pairs · signal and return

→ 8 × 0.75 mm²

End-tower cabinet
Local relay or approved dry input

Powered sources use the approved isolation relay coil pair.

Approved dry contacts use the documented X input and local return route.

Open the E02 single-cable wiring sheet →

E02 · SEPARATE ISOLATION BOX

Use a separate 8 × 0.75 mm² cable on each side where fitted.

Tower signals
Up to four powered pairs

→

Isolation box
K1–K4 relays

→

End-tower cabinet
X1–X4 and returns

MACHINE SIDE jacket suffix
4 × A1/A2 coil pairs

Open machine-side wiring →

CONTROLLER SIDE jacket suffix
4 × 11/14 dry pairs through opening 02

Open isolated return wiring →

The tower cabinet schedule has two bottom openings. **See main-cabinet M09 for the optional cable monitor →**

Drawn by function. Confirm gasket and cable gland placement on the enclosure and use the approved drilling drawing for dimensions.

Field cables and roof feeders

Main cabinet 01–11, end tower 01–02 and the five roof feeders.

M01	Main cabinet supply and protective earth	09
M02	Start, stop and returned run status	10
M03	Forward command and feedback	11
M04	Reverse command and feedback	12
M05	Original cabinet fault feedback	13
M06	Local mode and takeover feedback	14
M07	Main sprinkler supply and feedback	15
M08	Single end gun and feedback	16
M09	Cable monitor data pair	17
M10	Reserved standard travel-speed cable	18
M11	Optional agricultural sensor cable	19
E01	End-tower supply and protective earth	20
E02	Four end-tower fault inputs	21
E02-S	Tower faults · single external cable	22
E02-M	Tower faults · machine-side cable	23
E02-C	Tower faults · controller-side cable	24
AR1	Cellular gateway antenna feeder	25
AR2	Pivot-center GPS A feeder	26
AR3	Main local-radio antenna feeder	27
BR1	Tower local-radio antenna feeder	28
BR2	End-tower GPS B antenna feeder	29

Field cables | Separate-box variants | Main cabinet interior | Tower interior & records

Separate-box cable variants

Choose these sheets only where a main feedback relay is in a separate enclosure. Each physical segment has its own page.

M02-C	Run / stop · controller side cable	30
M02-M	Run / stop · machine side cable	31
M03-C	Forward · controller side cable	32
M03-M	Forward · machine side cable	33
M04-C	Reverse · controller side cable	34
M04-M	Reverse · machine side cable	35
M05-C	Panel fault · controller side cable	36
M05-M	Panel fault · machine side cable	37
M06-C	Local mode · controller side cable	38
M06-M	Local mode · machine side cable	39
M07-C	Span spray · controller side cable	40
M07-M	Span spray · machine side cable	41
M08-C	End gun · controller side cable	42
M08-M	End gun · machine side cable	43

Inside the main cabinet

Follow an internal device lead or terminal group. The optional monitoring enclosure is shown on its own sheets.

MI01	Main cabinet AC feed-through and earth	44
MI02	24 V DC supply distribution	45
MI03	Main controller 24 V branch	46
MI04A	Cellular gateway 24 V branch	47
MI04B	Main local radio 24 V branch	48
MI05	Controller to gateway Ethernet	49
MI06	Controller to main radio RS-485	50
MI07A	Run and direction command pigtails	51
MI07B	End-gun and span-spray command pigtails	52
MI08	Feedback strip to controller inputs	53
MI09A	Feedback returns to block 1	54
MI09B	Feedback returns to block 2	55
MI10A	DGND to return block 1	56
MI10B	Return block 1 to return block 2	57
MI11	Isolated run and direction feedback	58
MI12	Isolated end-gun and panel fault feedback	59
MI13	Isolated local mode and span-spray feedback	60
MI14A	Option cabinet · isolated measurement pair	61
MI14B	Option cabinet · acquisition module power	62

Field cables | Separate-box variants | Main cabinet interior | Tower interior & records

Inside the end tower and field records

Follow the tower low-voltage and communication circuits, then record commissioning and as-built terminals.

EI01	End tower AC feed-through and earth	63
EI02	12 V DC supply distribution	64
EI03A	Tower local radio 12 V branch	65
EI03B	GPS B receiver 12 V branch	66
EI03C	Tower input collector 12 V branch	67
EI04A	Collector input COM positive lead	68
EI04B	0 V feed to the tower return block	69
EI05A	RS-485 · Tower local radio	70
EI05B	RS-485 · GPS B receiver	71
EI05C	RS-485 · Tower input collector	72
EI06A	Fault feed-through signal pigtails	73
EI06B	Fault feed-through return pigtails	74
EI07	Optional tower isolation contact pigtails	75
COM-1	Commission travel, stop and local control	76
COM-2	Commission water, data and fitted options	77
RECORD	As-built cable and core record	78
HANDOVER	Acceptance and handover	79
EVIDENCE	What the project records establish	80

Field cables | Separate-box variants | Main cabinet interior | Tower interior & records

Prepare, identify and prove the cable

Start with the approved circuit, the jacket ID and the two physical ends.

1 Isolate both ends

A qualified electrician identifies all energy sources, including separate tower supplies and backfeeds. Follow the site isolation procedure and verify absence of voltage before touching conductors.

2 Choose the actual cable

Read the core count and conductor area on the jacket. Measure the installed route. Verify protection, voltage rating, gland fit, bend allowance and outdoor suitability for the actual duty.

3 Label the jacket and each core

Apply matching jacket and core marks at both ends. A four-core cable needs two jacket labels and eight core labels. Internal leads marked “(function)” use descriptive names when the project gives no printed core ID.

4 Read the two sides of the rail

On these drawings, the upper connection of a feed-through goes inside the box and the lower one goes to the field. Both belong to one terminal. Adjacent terminals are separate.

5 Terminate and ring out

With both ends isolated, disconnect sensitive equipment for the planned check. Prove each core by tag. Follow the fitted terminal’s strip length and torque, then gently tug each conductor.

6 Resolve every open end

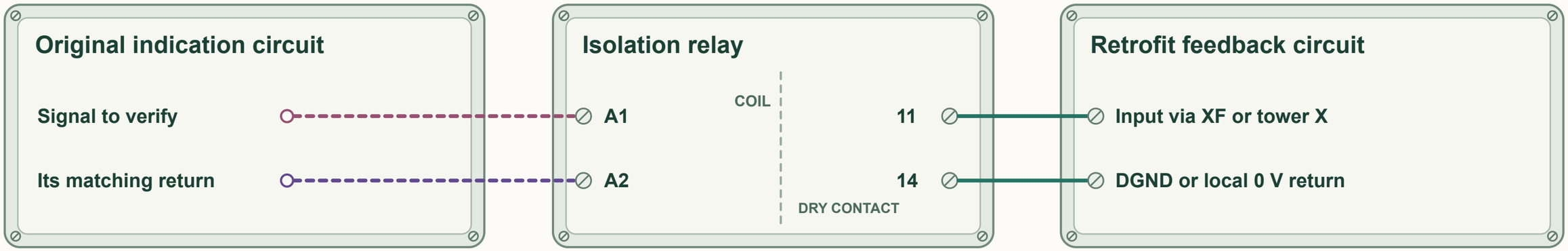
A dashed trace ending in a ring marks a site decision. Identify and record the actual terminal, matching return and normal state. Cap each reserved or spare core separately until assigned.

Assembly drawings, pp. 1–3, 8, 11–12 / Cable and label schedule R03, pp. 1–5

Identify the feedback interface

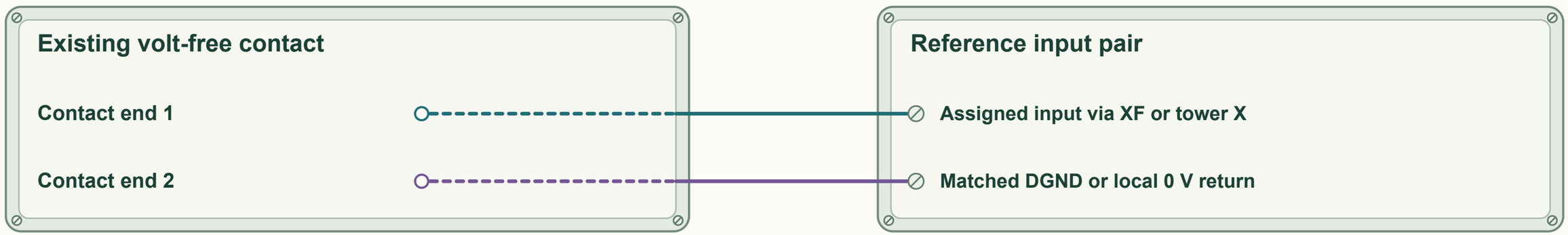
The main cabinet uses DI and DGND. The end tower uses X inputs and its own local 0 V return.

Powered indication through an isolation relay



The coil and its dry contact are electrically separate. Terminal 12 is unused in the reference normally-open arrangement.

A compatible dry contact already exists



Check the interface before connection

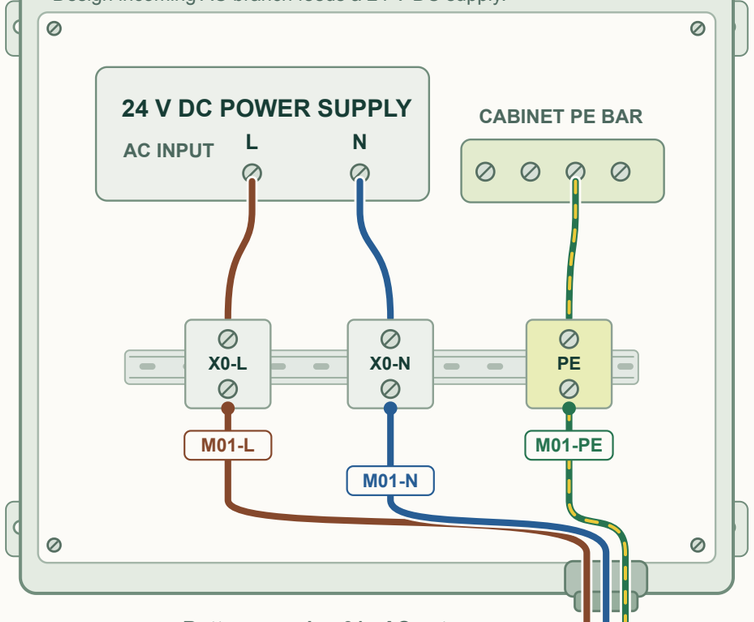
Document whether the original signal is powered or volt-free, its normal state and the matching return. Choose the approved circuit and use its conductor labels. Machine voltage stays on the coil side.

Main cabinet supply and protective earth

Reference 110 V AC branch to the 24 V DC power supply

MAIN RETROFIT CABINET

Design incoming AC branch feeds a 24 V DC supply.



Bottom opening 01 · AC entry

VERIFY THE SOURCE BEFORE TERMINATING

Design input is 110 V AC. Verify actual control-supply voltage.

L Approved protected line branch

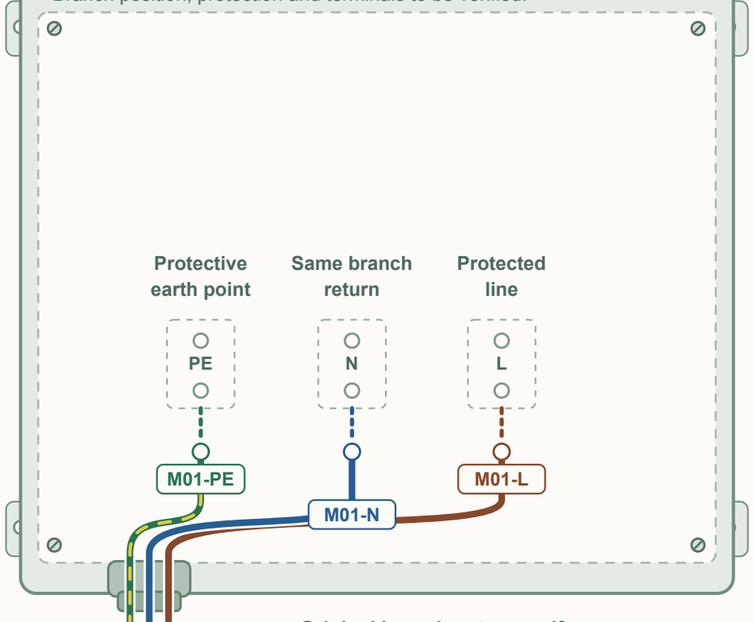
N Verified return of that same branch

PE Dedicated protective-earth conductor

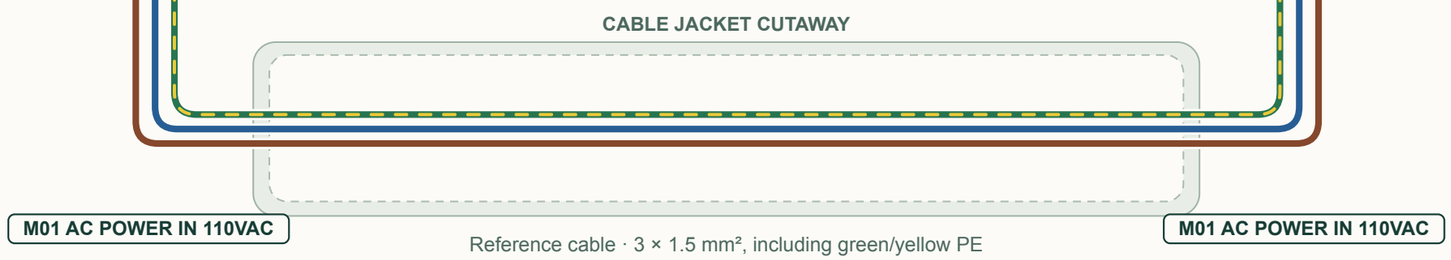
Record the approved locations before landing any lead.

ORIGINAL CONTROL CABINET

Branch position, protection and terminals to be verified.



Original branch entry · verify



Reference cable · 3 × 1.5 mm², including green/yellow PE

Solid line · documented wiring route

Dashed line + open end · confirm on site

Colors distinguish routes. Use the printed core IDs.

1 Approve the branch

Isolate both ends and verify absence of voltage.
Check the source and its dedicated protection.
Verify L, its paired return and the earth point.

2 Label and route

Use the shown jacket label for an approved 110 V feed.
Mark L, N and PE at each end before landing.
Use bottom opening 01 and the matching terminals.

3 Check before use

Verify protective bonding and conductor identity.
Record AC input and the 24 V DC output.
Reconnect loads only under the approved procedure.

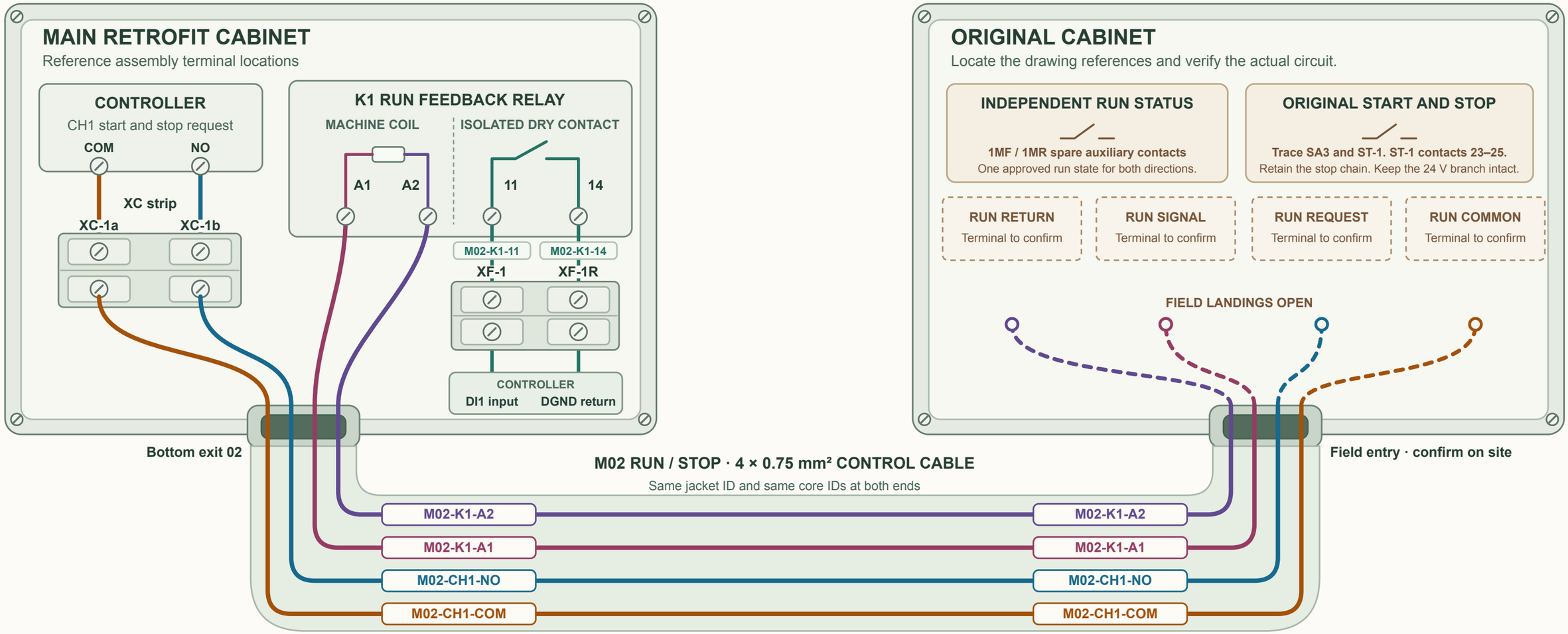
BENCH TEST No cable-specific continuity, protective-earth or voltage measurement is recorded for this main supply lead.

FIELD CHECK Approved source, protection, terminal position and protective continuity must be recorded on the actual machine.

Main conductor schedule R02 • rows 7–9 | Cable schedule R03 | Assembly pp. 2–4

Start, stop and returned run status

Four cores carry the remote start and stop request and a separate run feedback circuit.



Solid line · documented wiring route — **Dashed line + open end · confirm on site** — Colors distinguish routes. Use the printed core IDs.

1 Find opening 02

Isolate and prove both cabinets de-energized.
Mark the jacket and each core at both ends.
Ring out all four cores with the ends isolated.

2 Trace the original controls

Trace SA3 and ST-1. Retain the original stop chain.
Confirm a separate run signal in both directions.
Confirm its matching return and relay coil rating.

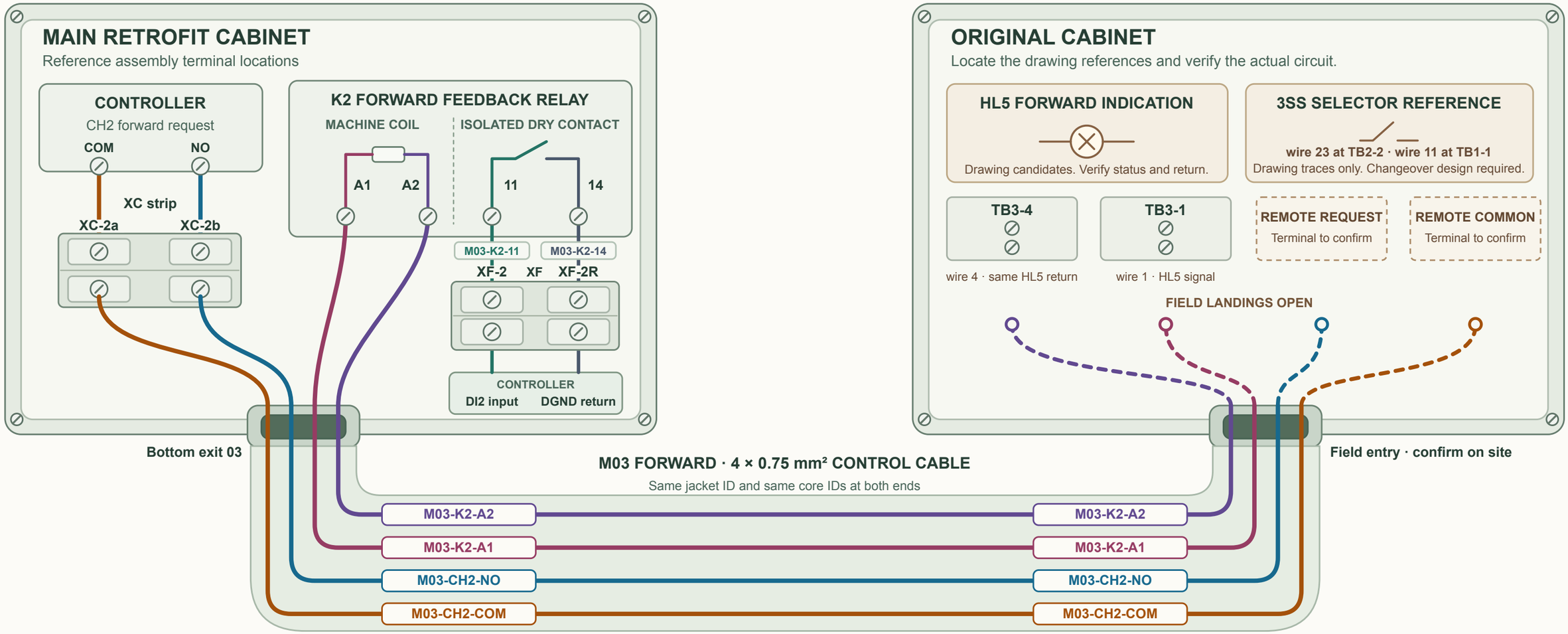
3 Prove run and stop

Use the signed design and approved test load first.
Prove local stop, remote stop and no sudden start.
Witness travel and match DI1 to actual standstill.

BENCH TEST	13 Nov 2026: DI1 closed on forward and reverse starts and opened after a stop on the existing contact-harness fixture.
FIELD CHECK	Confirm the original hold/release design, independent run source and original stop authority. Never bridge ST-1 contacts 23 and 25.

Forward command and feedback

One four-core cable carries the forward request and the separate forward-status circuit. • 4 × 0.75 mm²



Solid line · documented wiring route

Dashed line + open end · confirm on site

Colors distinguish routes. Use the printed core IDs.

1 Identify both pairs

Isolate both cabinets. Mark the jacket M03 FORWARD. Fit the same core ID at each end. Check continuity end to end with both ends disconnected.

2 Trace before landing

Trace the selector in all positions. Verify the HL5 signal, its matching return and the feedback relay coil rating. Land the four field ends against the signed drawing.

3 Prove forward travel

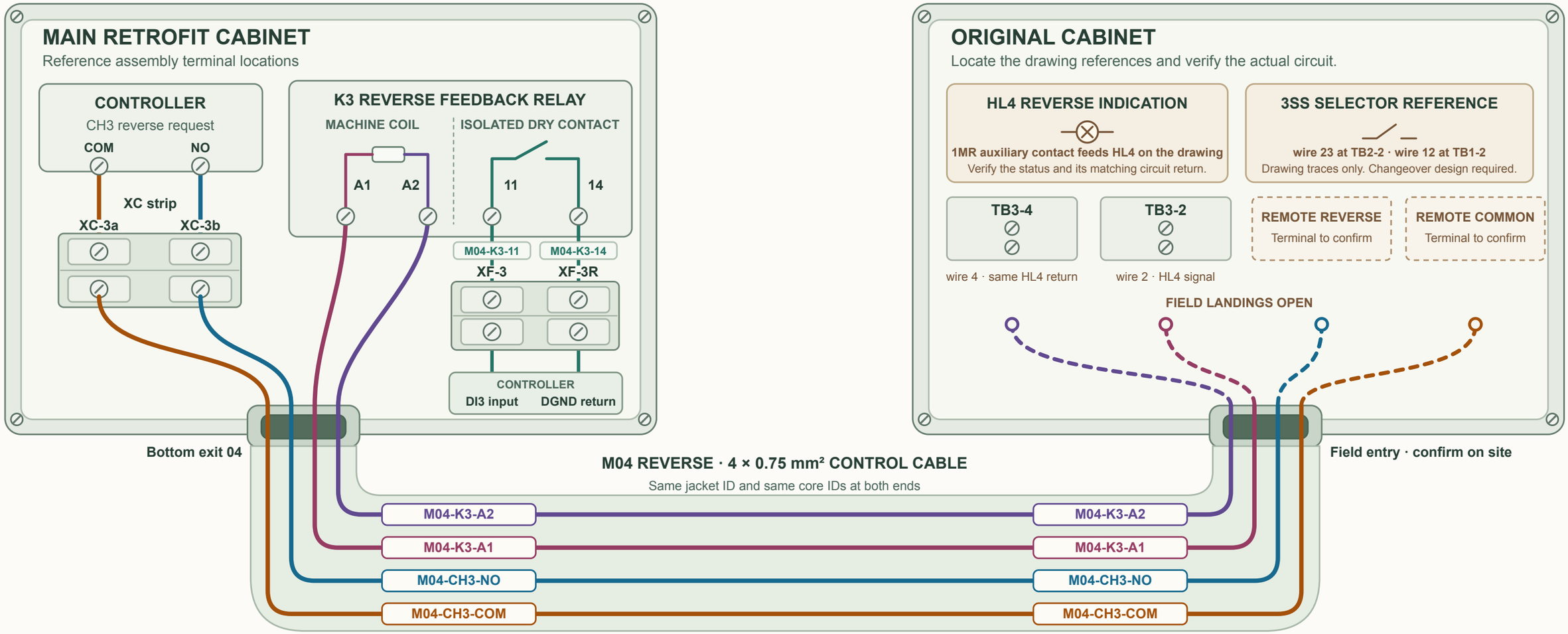
After field approval, test the request and DI2 separately. Witness forward travel. Check reverse feedback stays off. Stop the pivot and confirm that DI2 clears.

BENCH TEST	13 Nov 2026 · With the bench jumper harness, DI2 closed on forward start and opened after stop.
FIELD CHECK	Confirm the selector circuit, interlocks and feedback pair before landing the field ends.

Main cable schedule R02, rows 14–17 / Forward wiring example R03, pp. 2–3, 5 / Original main cabinet schematic

Reverse command and feedback

The reverse request and the independently returned reverse status use separate pairs in the same cable.



Solid line · documented wiring route — **Dashed line + open end · confirm on site** — Colors distinguish routes. Use the printed core IDs.

1 Find opening 04

Isolate and prove both cabinets de-energized.
Match the jacket and core labels at both ends.
Use an isolated test to verify each core.

2 Trace the two circuits

Record the actual 3SS switch positions and paths.
Verify both HL4 wires and the relay coil rating.
Use the signed reverse and interlock drawing.

3 Prove reverse and stop

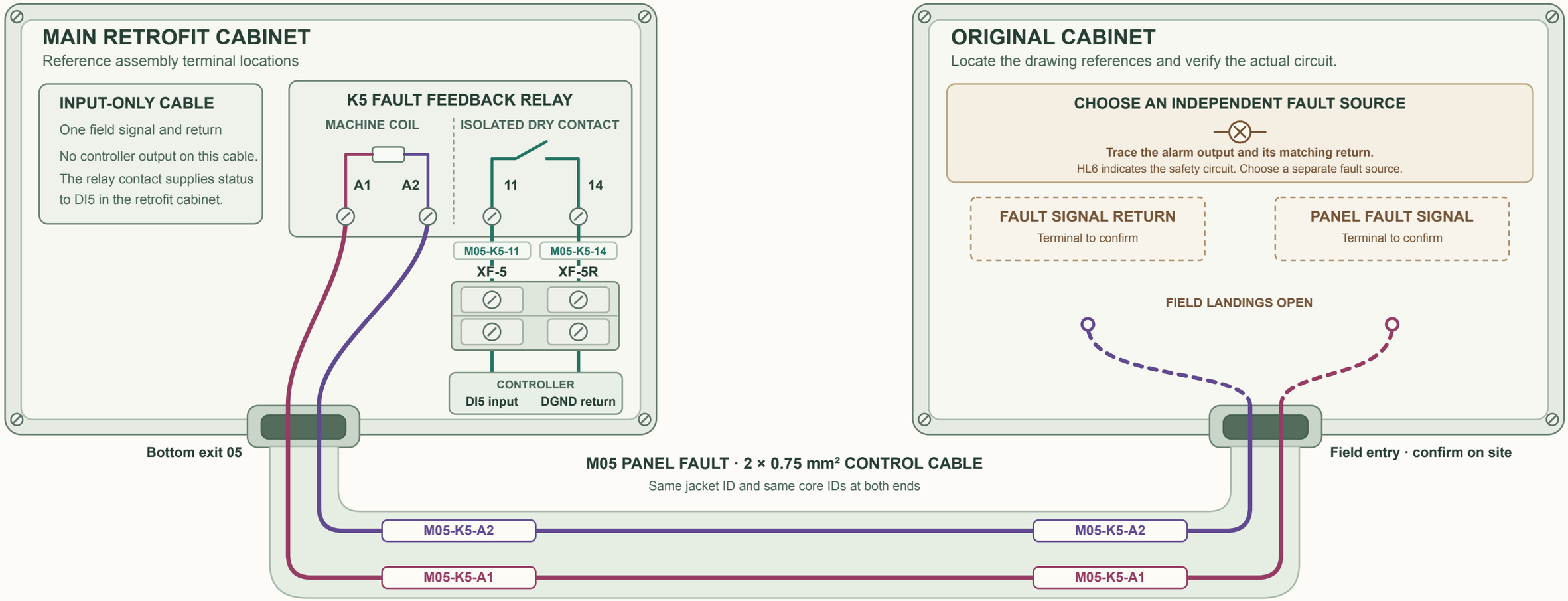
At standstill, test the request and DI3 separately.
Witness reverse travel and check DI2 stays off.
Stop and verify DI3 drops and travel ceases.

BENCH TEST	13 Nov 2026: DI3 closed on reverse start and opened at stop in the existing contact-harness test.
FIELD CHECK	Verify the original selector circuit, interlock, HL4 source and return before landing. Observe actual machine movement and stop.

R02 main cable schedule, rows 18–21 and tests 08–10 / R03 opening 04 and dry-contact labels / 13 Nov board bench

Original cabinet fault feedback

Two cores bring an approved original-panel fault indication to the isolated controller input.



Solid line · documented wiring route — **Dashed line + open end · confirm on site** — Colors distinguish routes. Use the printed core IDs.

1 Find opening 05

Isolate both cabinets. Identify the two cores.
Fit the same core labels at both cable ends.
Check the cable with both ends disconnected.

2 Identify the indication

Confirm how healthy, fault and power loss read.
Verify the matching return and coil rating.
Land only on the approved isolation circuit.

3 Prove the fault and reset

Use the approved test point to simulate a fault.
Check the DI5 change and the returned App state.
Reset, check recovery and record what DI5 covers.

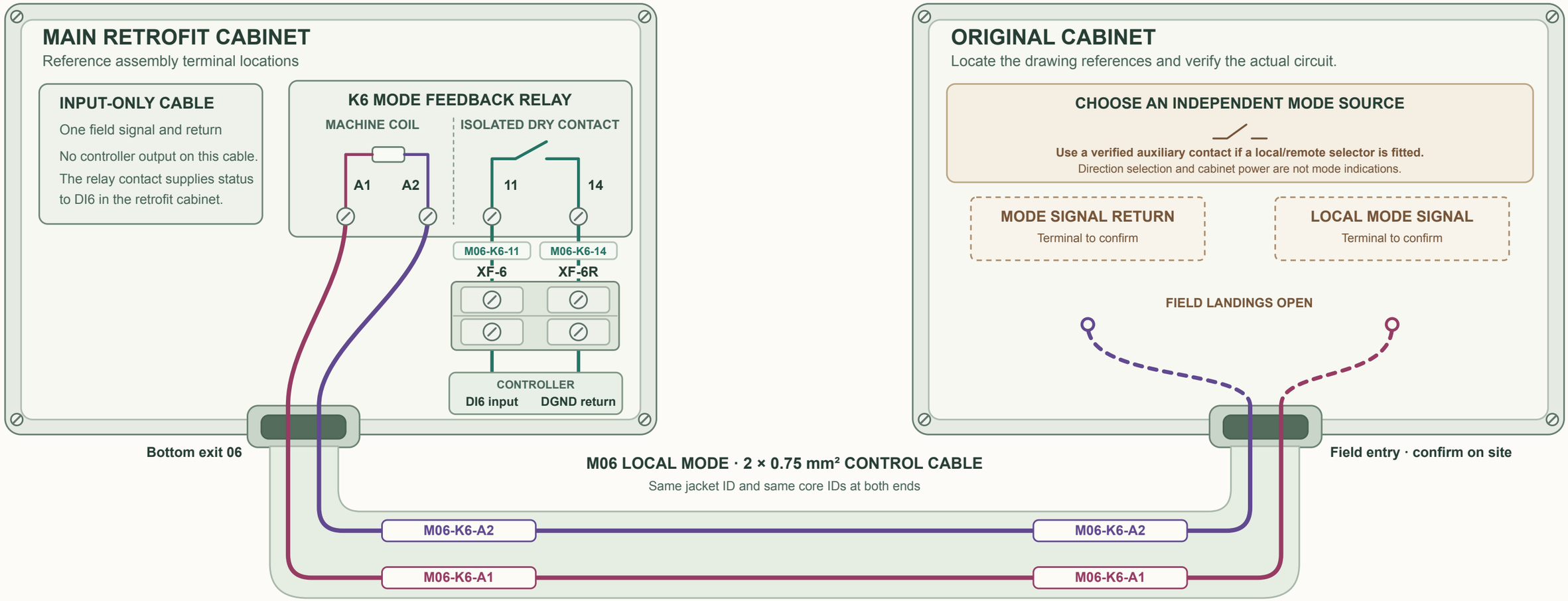
BENCH TEST R02 specifies an isolated relay test. No DI5 fault-loop result is recorded in the 13 Nov board test.

FIELD CHECK Keep the original safety chain in service. Keep DI5 unassigned until an independent fault source is approved and verified.

R02 main cable schedule, rows 22–23 and tests 03 and 16 / R03 opening 05 and dry-contact labels

Local mode and takeover feedback

Two cores bring the independent local-mode indication to DI6 where a suitable source is fitted.



Solid line · documented wiring route — **Dashed line + open end · confirm on site** — Colors distinguish routes. Use the printed core IDs.

1 Find opening 06

Isolate and prove both cabinets de-energized.
Label the jacket and two cores at both ends.
Ring out the isolated cores and mark any reserve.

2 Confirm the selector route

Record the actual behavior in every mode.
Find the separate indication and its own return.
Land the mode pair only after approval.

3 Prove local authority

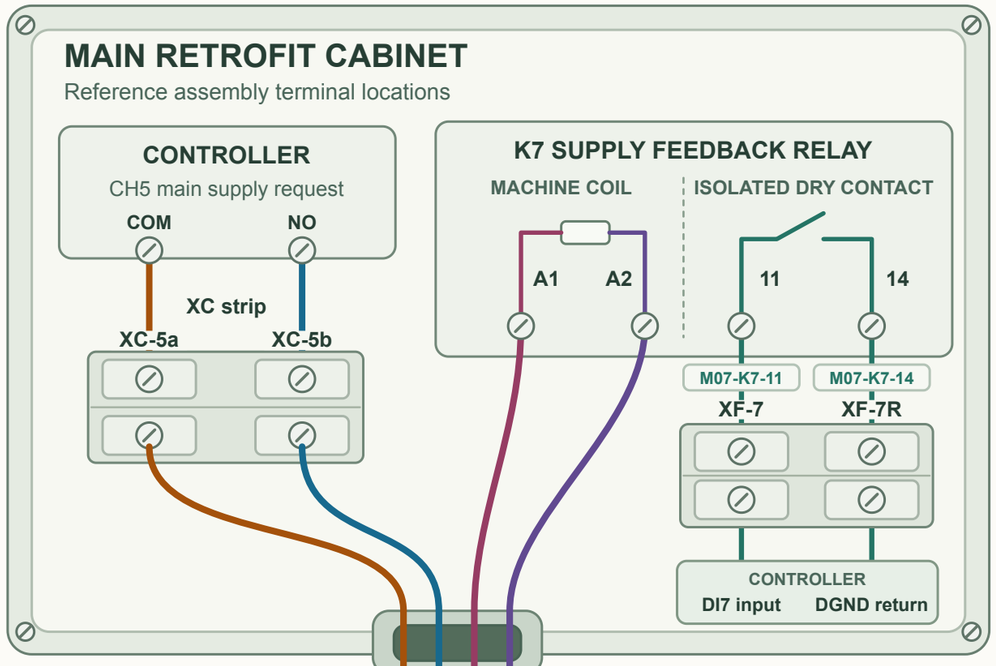
Prove the original local stop and takeover.
Where fitted, match DI6 to the actual selector.
Check mode changes do not start travel.

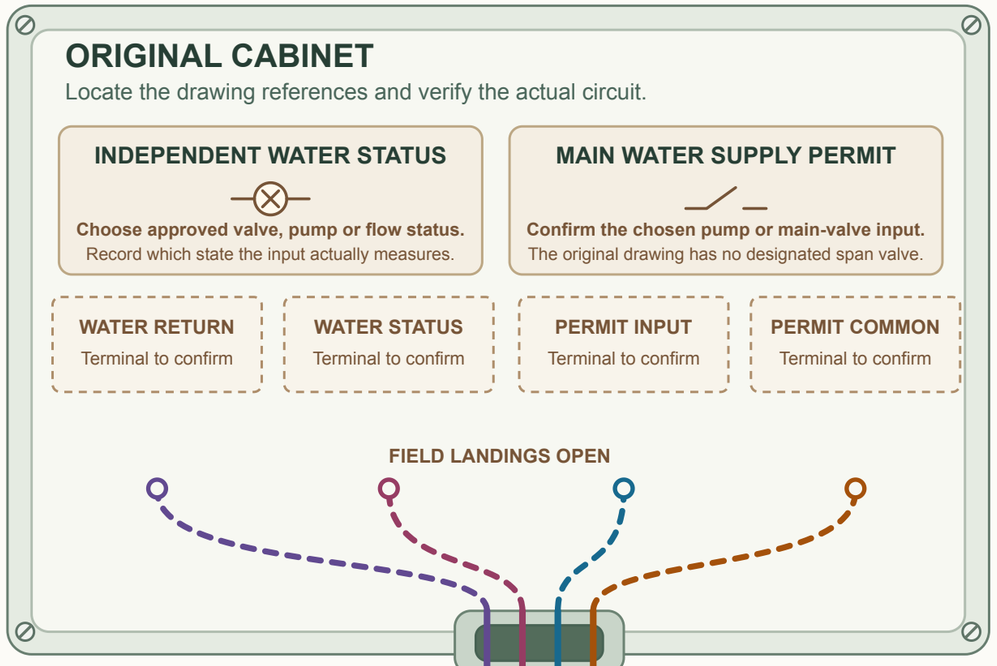
BENCH TEST	R02 specifies a mode indication test. No DI6 installed-selector result is recorded in the 13 Nov board test.
FIELD CHECK	Verify original local stop and takeover before remote movement. Keep DI6 unassigned unless fitted and approved.

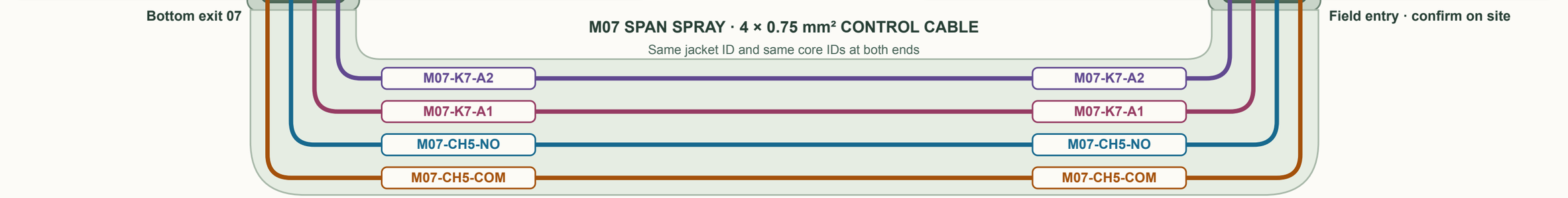
R02 main cable schedule, rows 24–25 and tests 10 and 16 / R03 opening 06 and dry-contact labels

Main sprinkler supply and feedback

The supply permit and an independent pump, valve or flow indication use separate pairs.







Solid line · documented wiring route

Dashed line + open end · confirm on site

Colors distinguish routes. Use the printed core IDs.

1 Find opening 07

Isolate all related circuits and label both ends.
Ring out the two command and two status cores.
Keep any unassigned cores insulated separately.

2 Identify permit and status

Approve the supply permit and separate status.
Record whether status means valve, pump or flow.
Use the signed drawing before landing the cores.

3 Prove flow separately

Test CH5 and DI7 separately with an approved load.
Witness actual flow when water is allowed to run.
Record the request, return and water result.

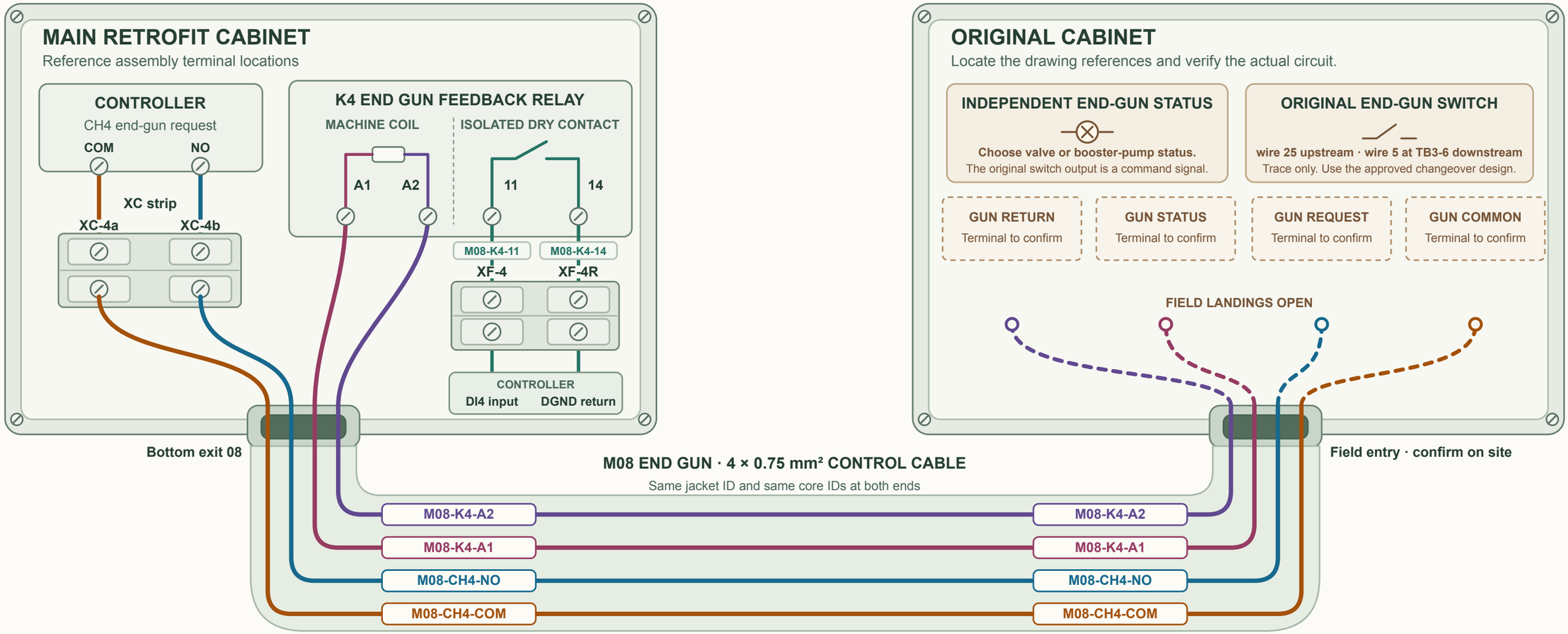
BENCH TEST The board output CH5 closed with DI7 open and timed out on the contact bench. No pump, valve or water was connected.

FIELD CHECK Keep these cores isolated until the supply permit and independent feedback are approved. Remove any temporary bench feedback jumper.

R02 main cable schedule, rows 26–29 / R03 opening 07 and dry-contact labels / Board supply-feedback timeout record

Single end gun and feedback

The original switch can be traced. Remote changeover and separate valve or booster-pump status require approval.



Solid line · documented wiring route — **Dashed line + open end · confirm on site** — Colors distinguish routes. Use the printed core IDs.

1 Find opening 08

Isolate both cabinets. Label the four cores.
Trace wires 25 and 5 at the original gun switch.
Check continuity on the isolated cable.

2 Approve the two routes

Use the signed break-before-make changeover.
Verify the independent status and its return.
Keep the original stop protection in service.

3 Prove remote shutoff

In remote mode, test off with the local switch on.
Check that DI4 follows the approved status source.
Record valve, pump and actual spray separately.

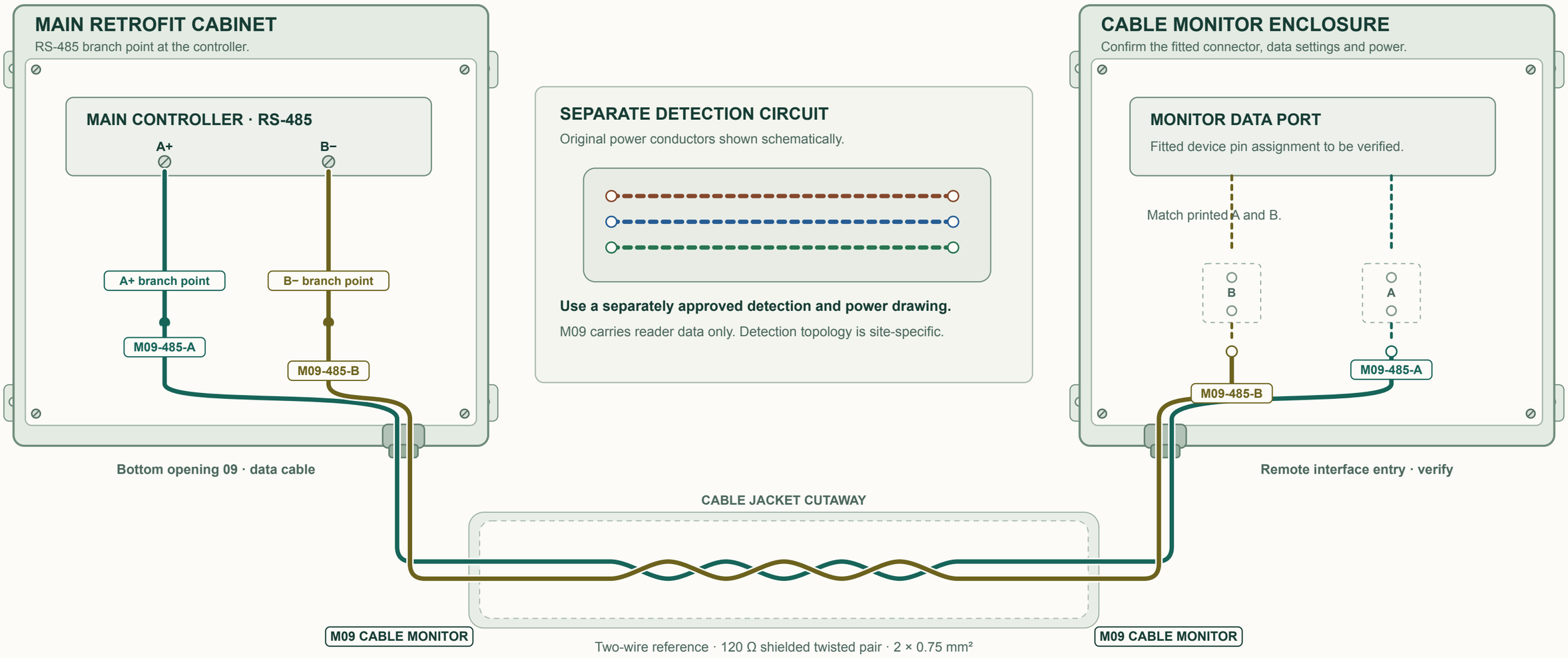
BENCH TEST 13 Nov 2026: DI4 followed CH4 on and off on the contact-harness fixture. No spray was tested.

FIELD CHECK Confirm original switch routing and independent status. In remote mode, prove the end gun shuts off while the local switch is on.

R02 main cable schedule, rows 30–33 and tests 12–13 / R03 opening 08 and dry-contact labels / 13 Nov board bench

Cable monitor data pair

Optional RS-485 interface through main cabinet opening 09



Solid line · documented wiring route

Dashed line + open end · confirm on site

Colors distinguish routes. Use the printed core IDs.

1 Identify data points

Find the controller’s 485 A+ and B− branch.
Confirm monitor A/B pinout and serial settings.
Approve monitor supply and shield arrangement.

2 Tag both ends

Print the M09 jacket label at both cable ends.
Label A and B individually before termination.
Keep the data pair clear of power wiring.

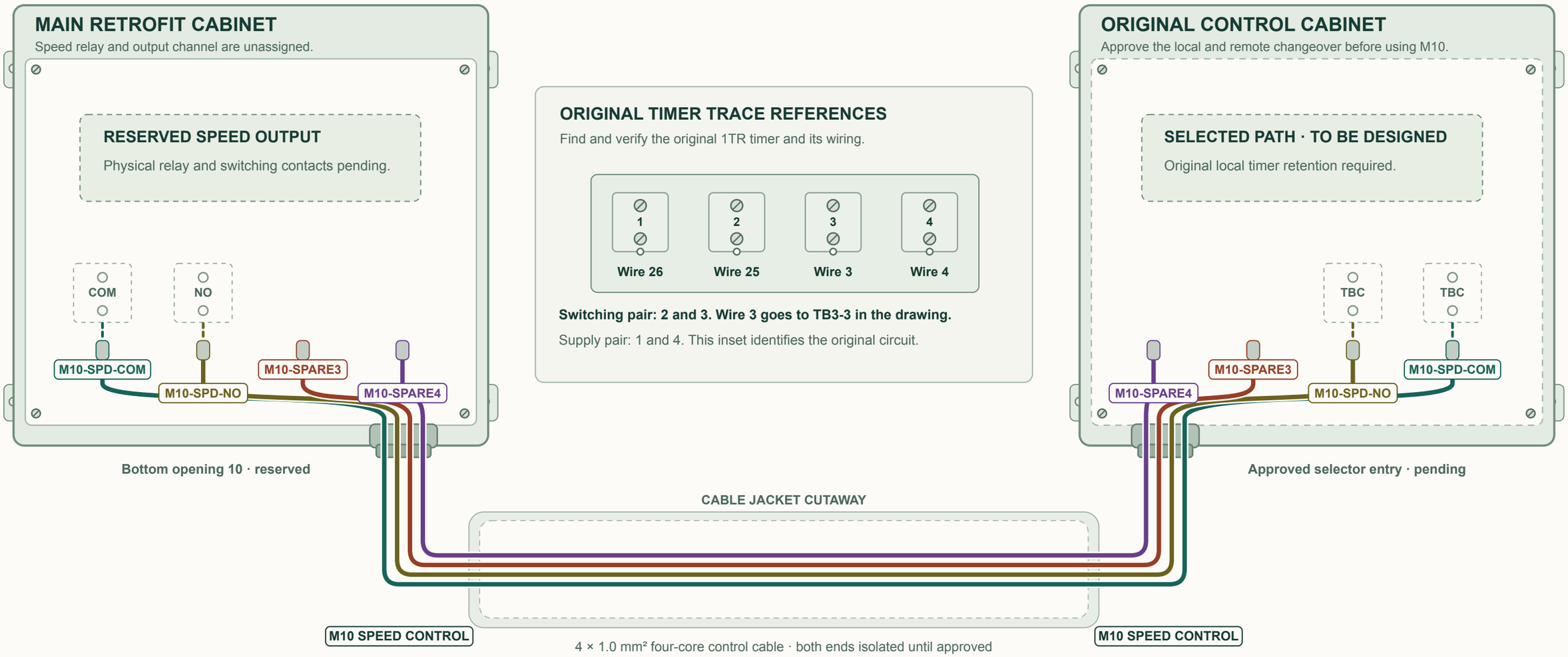
3 Verify separately

Check identity and continuity of the data pair.
Use the separate approved detection drawing.
Test alarm delivery, mains loss and reconnection.

BENCH TEST	Software simulation covered power loss, monitor faults and reconnection. The physical detection circuit still needs testing.
FIELD CHECK	Approve the separate monitored-cable detection circuit, power and backup. M09 is the data path only.

Reserved standard travel-speed cable

Four-core cable to hold until speed switching is approved



Solid line · documented wiring route

Dashed line + open end · confirm on site

Colors distinguish routes. Use the printed core IDs.

1 Trace original timer

Locate 1TR switching terminals 2 and 3.
Verify wires 25 and 3, including TB3-3.
Check supply pair 1/4 independently.

2 Prepare the cable

Mark M10 SPEED CONTROL at both cable ends.
Apply COM, NO and applicable spare labels.
Insulate each unassigned end individually.

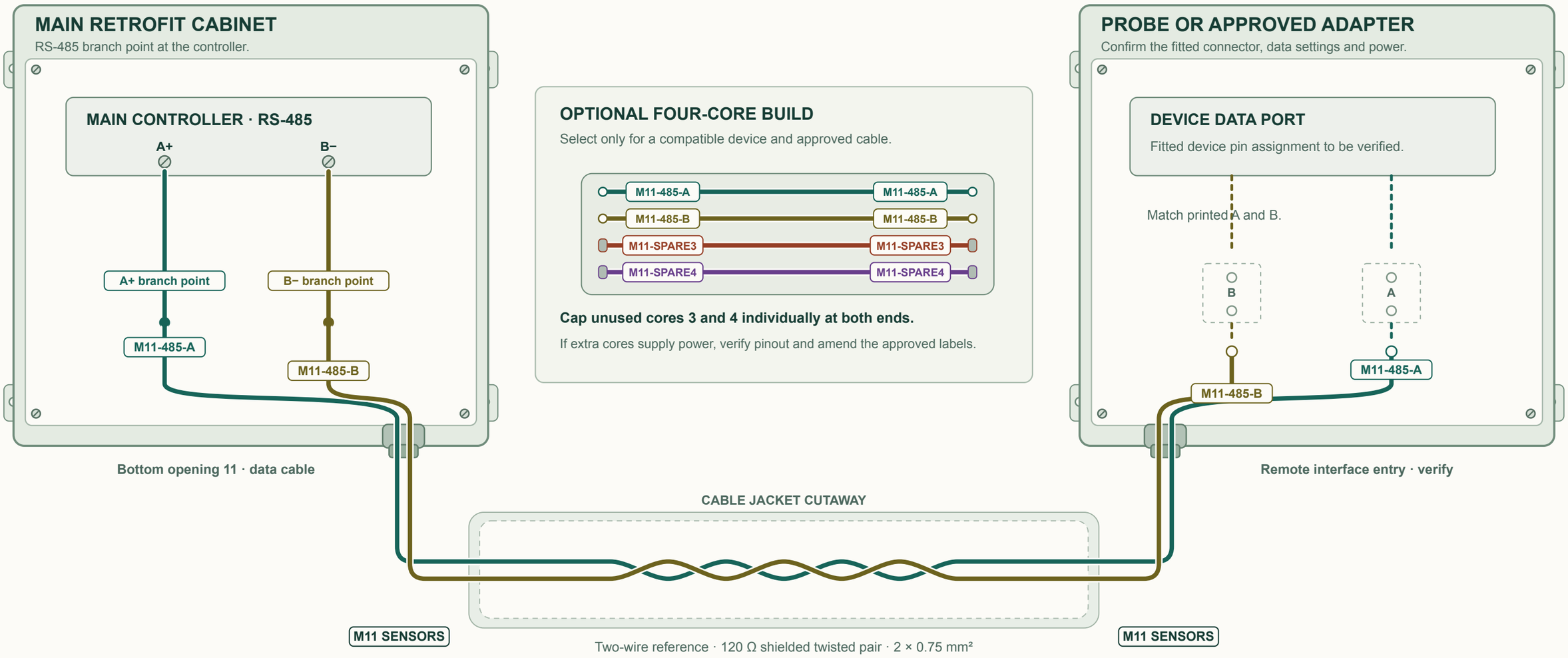
3 Release and test

Approve relay channel and local/remote circuit.
Prove switching on an approved test load.
Record run-window timing and physical travel.

BENCH TEST	Software timing at 25%, 50% and 100% plus stop was tested. The record covers no physical speed relay or machine travel.
FIELD CHECK	Keep all reserved cores isolated until a physical channel and the local/remote switching design are approved.

Optional agricultural sensor cable

Two-wire data pair or device-specific approved four-core cable



Solid line · documented wiring route — **Dashed line + open end · confirm on site** — Colors distinguish routes. Use the printed core IDs.

1 Identify the probe

Confirm A/B pinout, profile and sensor voltage.
Verify a suitable adapter for analog readings.
Approve the device supply separately.

2 Choose the cable

Use the approved two-wire pair if power is separate.
Use a compatible four-core cable when specified.
Cap and mark only genuinely unused spare cores.

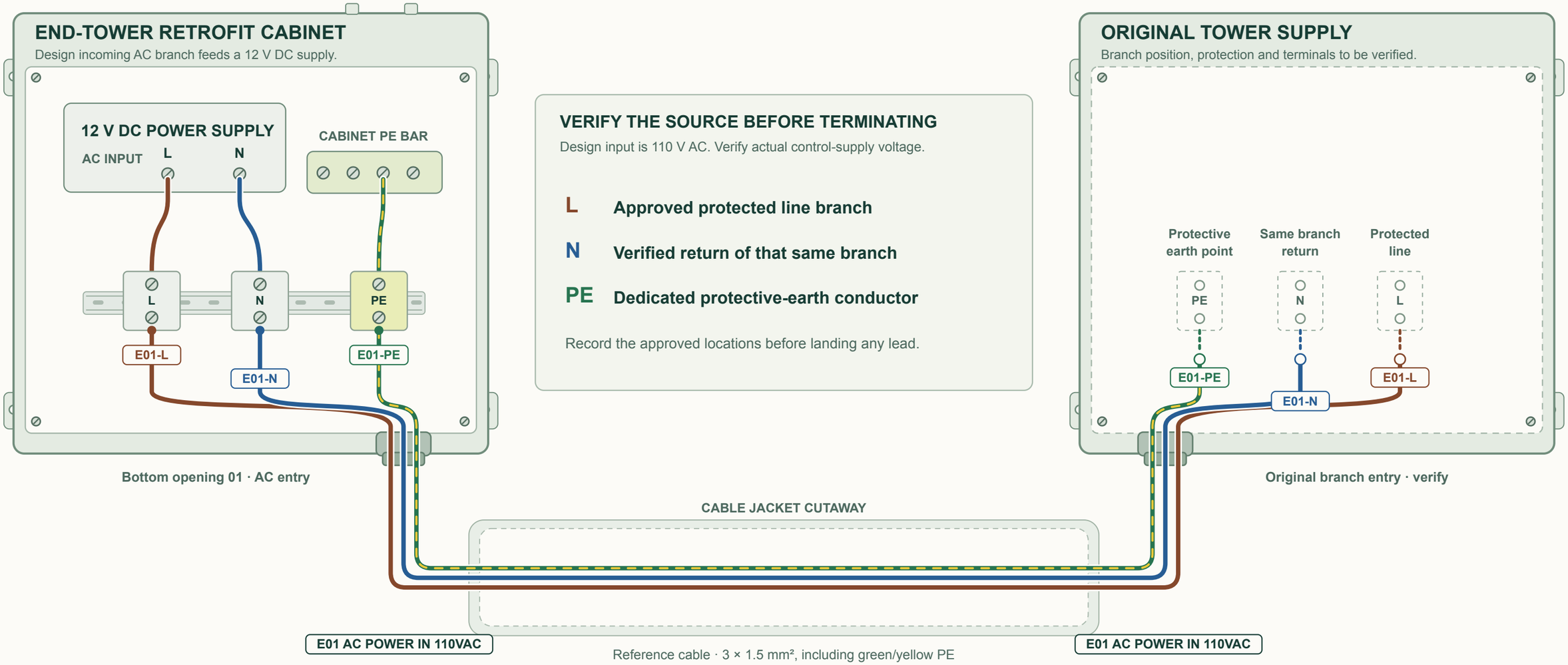
3 Validate the sample

Check continuity and branch communication.
Confirm address and reading profile with Admin.
Compare the fresh sample to a known reference.

BENCH TEST	Serial simulator only. Read profiles and software processing were exercised. The fitted sensor and wiring still need testing.
FIELD CHECK	Approve each probe or adapter pinout, power and profile, then verify a fresh reading and its units after reconnecting.

End-tower supply and protective earth

Reference 110 V AC branch to the tower 12 V DC power supply



Solid line · documented wiring route

Dashed line + open end · confirm on site

Colors distinguish routes. Use the printed core IDs.

1 Approve tower supply

Identify and isolate the approved source.
Confirm voltage, branch protection and return.
Verify the original tower protective earth point.

2 Tag, route and bond

Mark E01 jacket and each core on both ends.
Use tower bottom opening 01 for AC entry.
Separate the AC group from the fault input group.

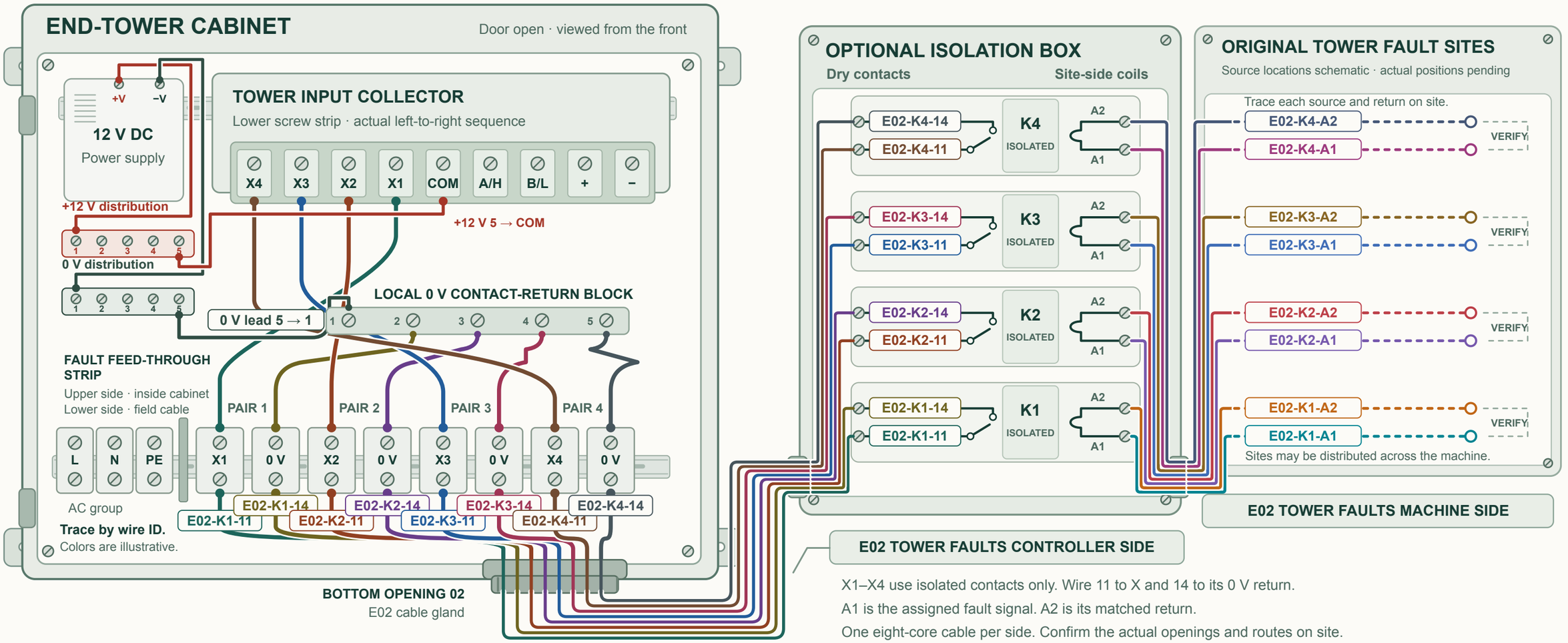
3 Check before use

Verify protective continuity and source pairing.
Record the 12 V DC supply before loading.
Check voltage again with approved loads fitted.

BENCH TEST	No cable-specific continuity, protective-earth or voltage measurement is recorded for this tower supply lead.
FIELD CHECK	Record the actual tower supply and branch protection, protective bond and measured DC output before connecting the loads.

Four end-tower fault inputs

The separate isolation box uses two eight-core cables. Trace one relay and its matching pair at a time. • 8 × 0.75 mm² per cable



Solid line · documented wiring route — **Dashed line + open end · confirm on site** — Colors distinguish routes. Use the printed core IDs.

1 Identify the fault source

Isolate the circuits. Assign each physical tower to X1–X4.
Trace its signal and matching return. Record both ends.
Continuity-check each tagged core before landing it.

2 Wire one relay at a time

Land the approved signal at A1 and its return at A2.
On the dry side, take 11 to X and 14 to its 0 V return.
Only the isolated contact feeds the input pair.

3 Prove alarm and reset

After approval, test each assigned tower separately.
Match its alarm and reset to the tower shown in the App.
Verify that the other three inputs keep their prior state.

BENCH TEST	12 Nov 2026 · X1 read active when connected to local 0 V and cleared when released on the bench.
FIELD CHECK	Confirm all four tower assignments, source terminals and end-to-end alarm returns.

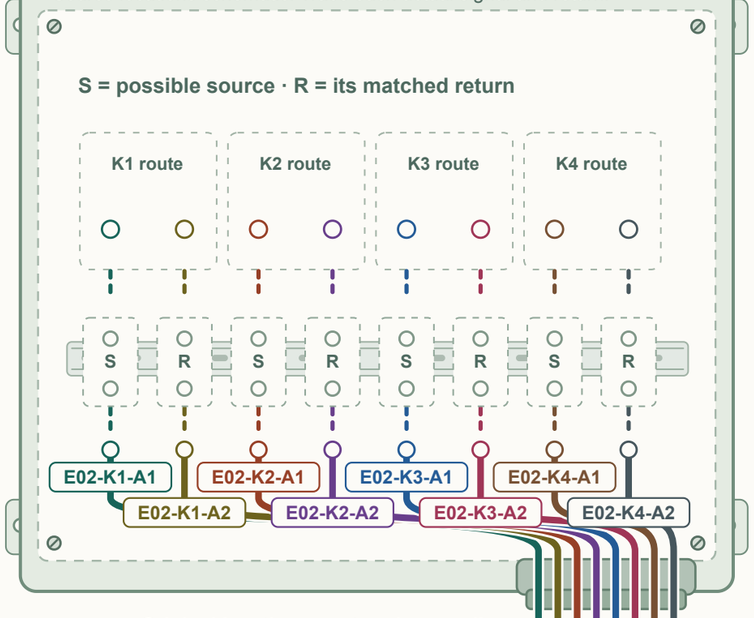
Cable label schedule R03, E02 / Cabinet assembly drawings, pp. 12, 14–16 / Isolated input test record, 12 Nov 2026

Tower faults · single external cable

Cabinet-mounted isolation relays · powered signals to A1/A2

ORIGINAL TOWER FAULT LOCATIONS

Source locations schematic. Trace each actual signal and return.



Original locations · entry plan pending

CONFIRM ORIGINAL FAULT SIGNALS

A single cable carries all four powered pairs to the tower cabinet.

A1 **Assigned tower fault signal**

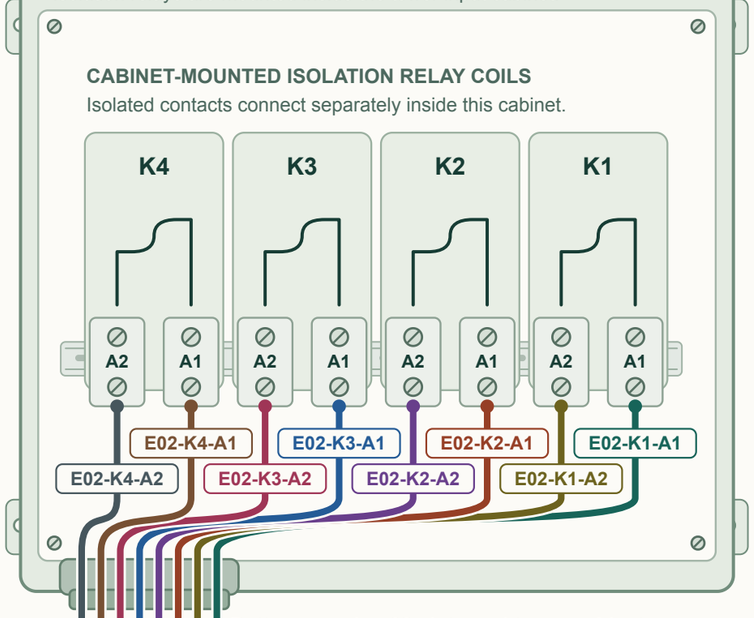
A2 **Matched return of that same circuit**

Fault sources may be distributed across the machine.

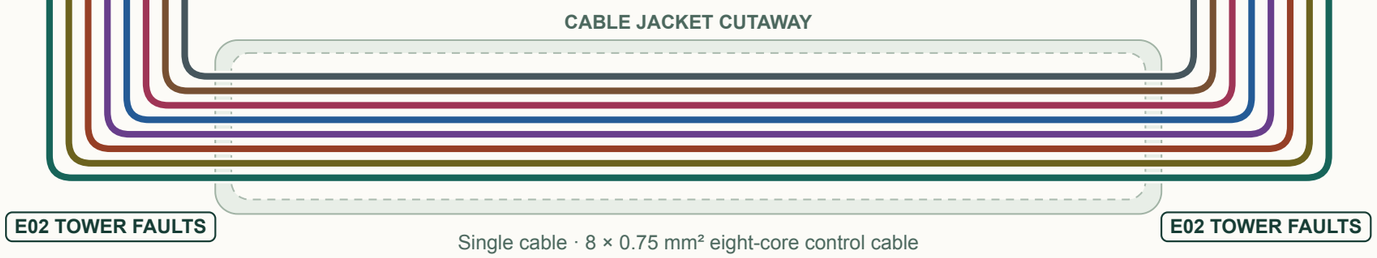
K1–K4 are relay IDs. Assign actual tower IDs on site.

END-TOWER RETROFIT CABINET

Isolation relays are mounted inside the tower input cabinet.



Bottom opening 02 · into end-tower cabinet



Single cable · 8 × 0.75 mm² eight-core control cable

Solid line · documented wiring route

Dashed line + open end · confirm on site

Colors distinguish routes. Use the printed core IDs.

1 Identify each tower

Mark actual tower IDs for the four relay routes.
Verify each powered signal and its matched return.
Approve the circuit voltage and relay coil ratings.

2 Label and route

Print E02 TOWER FAULTS at both cable ends.
Tag all eight A1/A2 cores at both ends.
Enter through bottom opening 02 and land at coils.

3 Verify both sides

Check each relay response and return separately.
Check the cabinet's isolated contacts to X1–X4.
Verify reset and the actual tower shown in the App.

BENCH TEST	The isolated input module was tested on X1. The eight-core field lead and four fitted relay coils await their own tests.
FIELD CHECK	Record the physical source and return for each tower and verify each X channel using the approved isolated contact path.

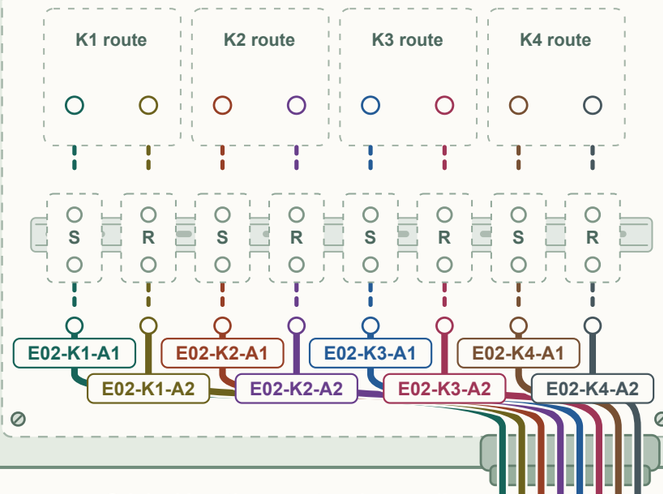
Tower faults · machine-side cable

Separate isolation enclosure option · powered source to relay coils

ORIGINAL TOWER FAULT LOCATIONS

Source locations schematic. Trace each actual signal and return.

S = possible source · R = its matched return



Original locations · entry plan pending

CONFIRM ORIGINAL FAULT SIGNALS

All eight cores belong to the powered machine-side cable.

A1 **Assigned tower fault signal**

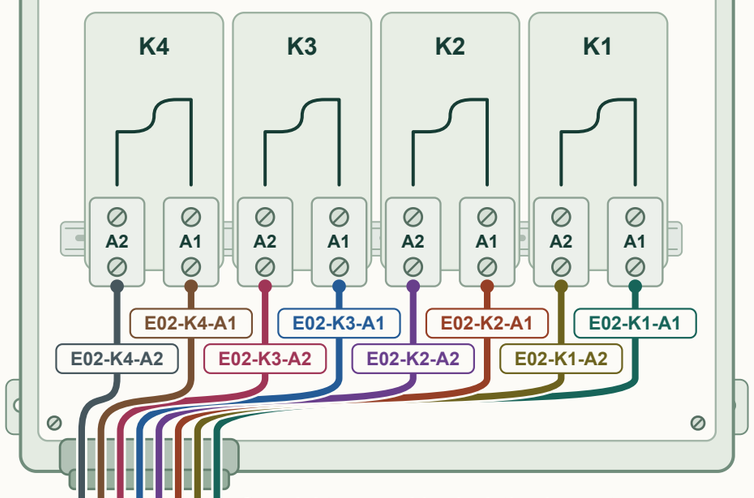
A2 **Matched return of that same circuit**

Fault sources may be distributed across the machine.

K1–K4 are relay IDs. Assign actual tower IDs on site.

SEPARATE ISOLATION ENCLOSURE

Coil-side A1/A2 terminals only.



One eight-core cable · isolation box entry

CABLE JACKET CUTAWAY

E02 TOWER FAULTS MACHINE SIDE

E02 TOWER FAULTS MACHINE SIDE

Reference segment · 8 × 0.75 mm² eight-core control cable

Solid line · documented wiring route

Dashed line + open end · confirm on site

Colors distinguish routes. Use the printed core IDs.

1 Identify each tower

Record actual tower IDs against the four routes.
Identify each powered signal and matched return.
Approve protection, voltage and coil ratings.

2 Label both ends

Use E02 TOWER FAULTS MACHINE SIDE on jackets.
Put each matching A1/A2 label at both ends.
Keep this cable separate from the dry-contact lead.

3 Test the assigned paths

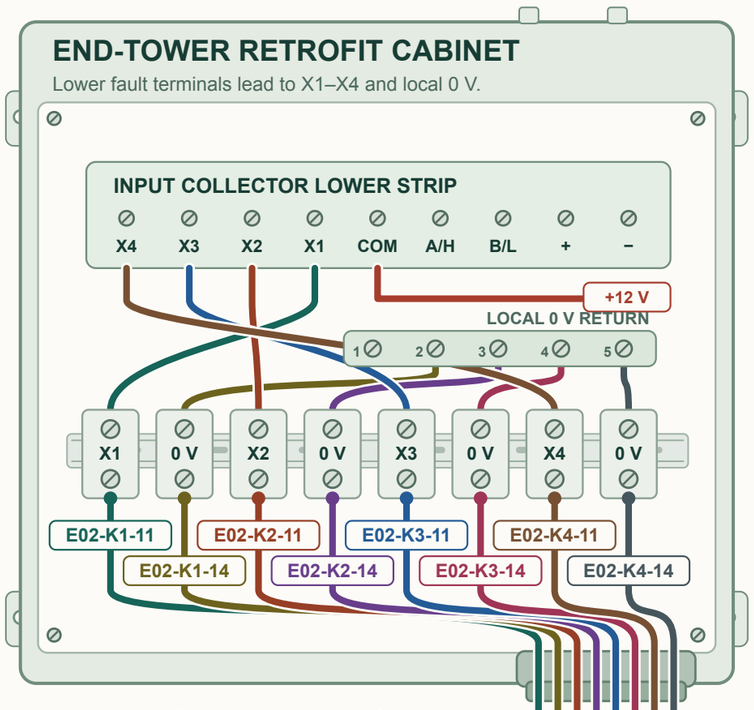
Verify source and return for each isolated route.
Prove the intended relay responds and resets.
Record the actual sources in the as-built drawing.

BENCH TEST No end-to-end test of this machine-side eight-core cable or its four original fault circuits is recorded.

FIELD CHECK S/R locations are shown schematically. Identify the actual tower, source and same-circuit return before connecting.

Tower faults · controller-side cable

Separate isolation enclosure option · dry contacts to fault terminals



DRY CONTACTS TO TOWER INPUTS

Keep the input/return pairs separate across the cable.

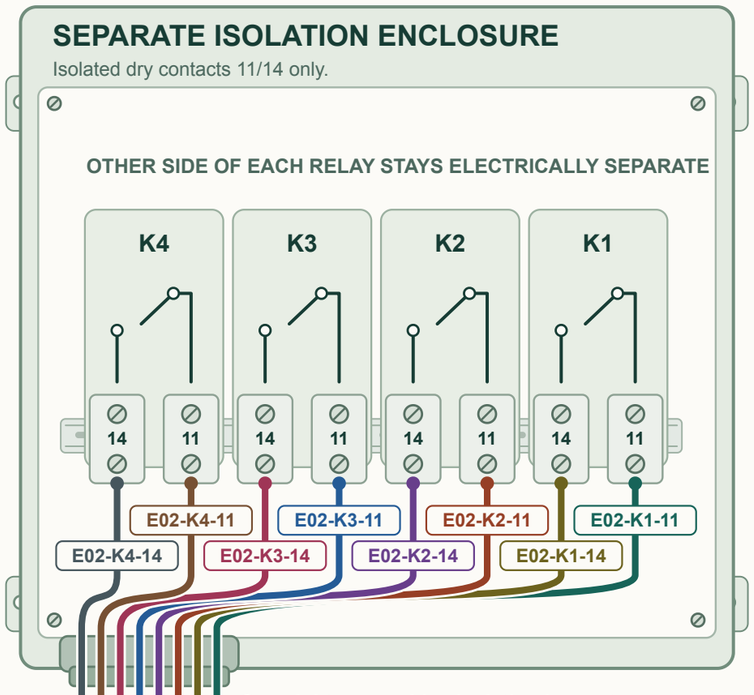
11 **Goes to the matching X input**

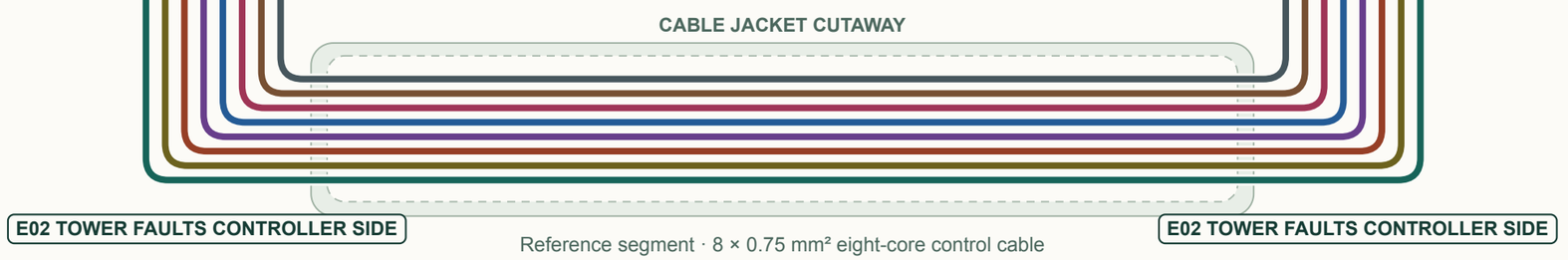
14 **Goes to that pair's local 0 V return**

Collector COM is connected to the cabinet's local +12 V.

0 V distribution 5 feeds return block 1. See sheet EI04B.

Prove each input against its assigned physical tower.





Solid line · documented wiring route

Dashed line + open end · confirm on site

Colors distinguish routes. Use the printed core IDs.

1 Identify the dry side

Find isolated relay terminals 11 and 14.
Trace matching X-input and local 0 V terminals.
Keep the relay coil circuit separate.

2 Tag and land

Mark the CONTROLLER SIDE jacket at both ends.
Match every E02 11/14 label at both ends.
Use end-tower bottom opening 02.

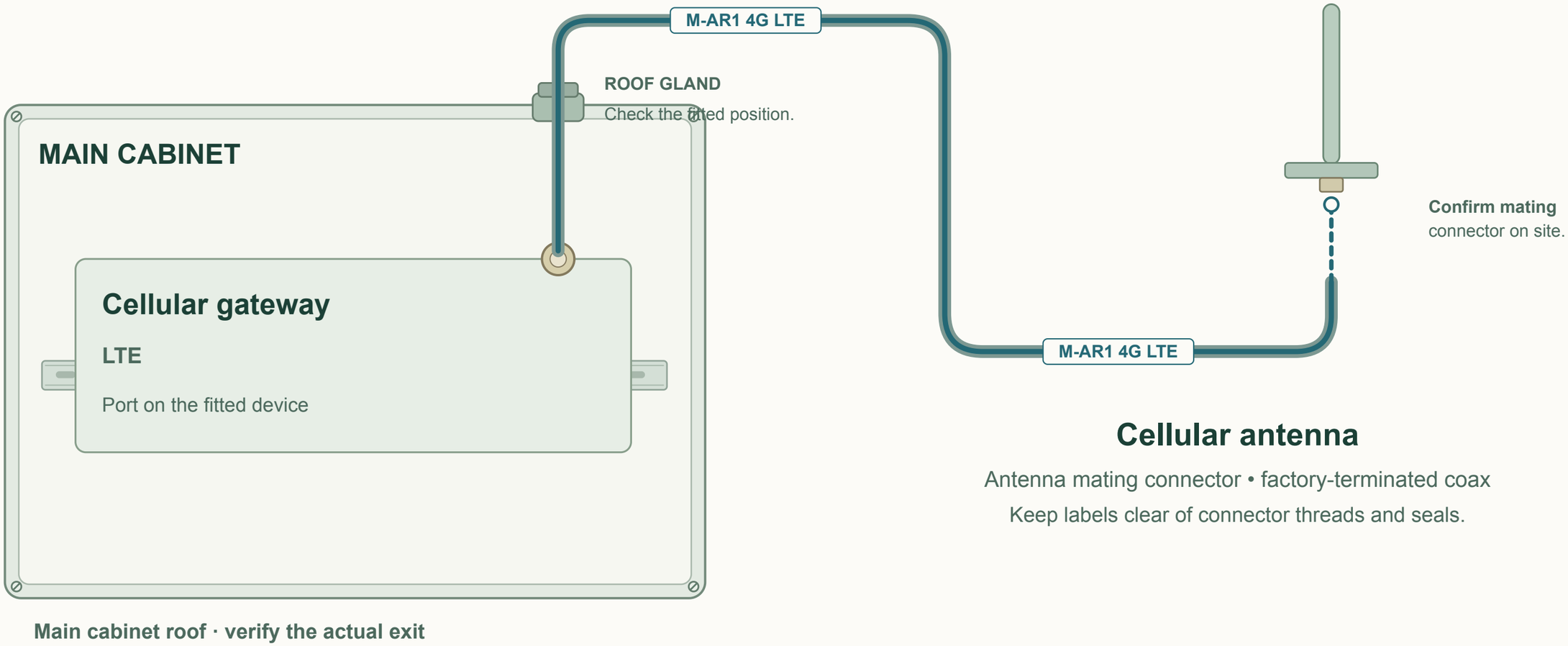
3 Check alarms

Prove one fault and reset at a time.
Verify the actual tower and displayed X channel.
Record positioning and alarm evidence separately.

BENCH TEST	Isolated USB testing verified X1 on/off. A separate power-cycle test retained module address 2 and 9600 baud.
FIELD CHECK	Verify the reported tower and live position. The shown input circuit uses local +12 V COM and isolated 11/14 contacts.

Cellular gateway antenna feeder

One complete coaxial feeder. Apply the full jacket label to both ends.



Solid line · documented wiring route

Dashed line + open end · confirm on site

Colors distinguish routes. Use the printed core IDs.

1 Find the correct port

Identify the device port marked LTE.
Use the lead specified for this antenna.

2 Route the whole feeder

Use the approved roof exit and weather seal.
Confirm clearance, bend radius and slack.

3 Label and prove

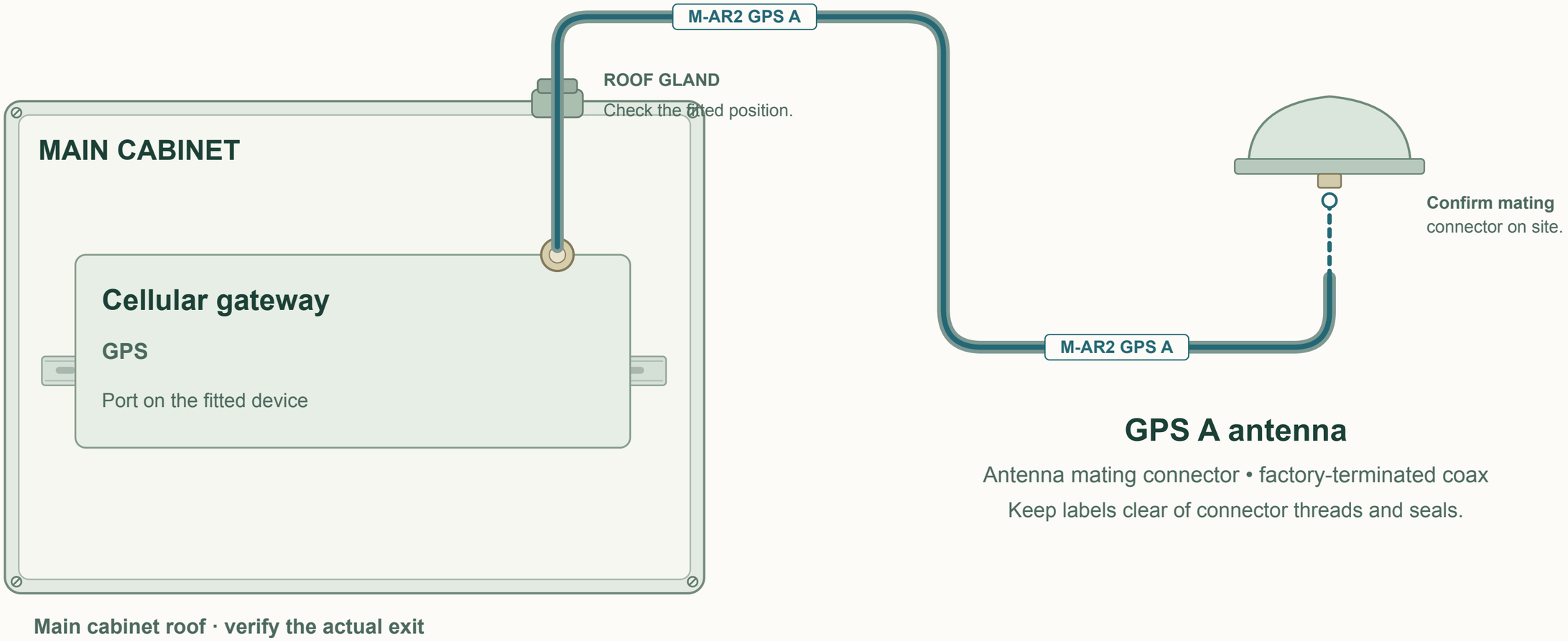
Apply the same jacket label at both ends.
Check the commissioned signal for this link.

BENCH TEST	The gateway used 4G on the board. Antenna connector and link margin were not separately recorded.
FIELD CHECK	Connector family and roof-hole position require hardware confirmation. Match both ends to the fitted feeder.

Assembly drawing, p. 5. R02, roof entry. R03, p. 4, complete feeder labels.

Pivot-center GPS A feeder

One complete coaxial feeder. Apply the full jacket label to both ends.



Main cabinet roof · verify the actual exit

GPS A antenna

Antenna mating connector • factory-terminated coax

Keep labels clear of connector threads and seals.

Solid line · documented wiring route

Dashed line + open end · confirm on site

Colors distinguish routes. Use the printed core IDs.

1 Find the correct port

Identify the device port marked GPS.
Use the lead specified for this antenna.

2 Route the whole feeder

Use the approved roof exit and weather seal.
Confirm clearance, bend radius and slack.

3 Label and prove

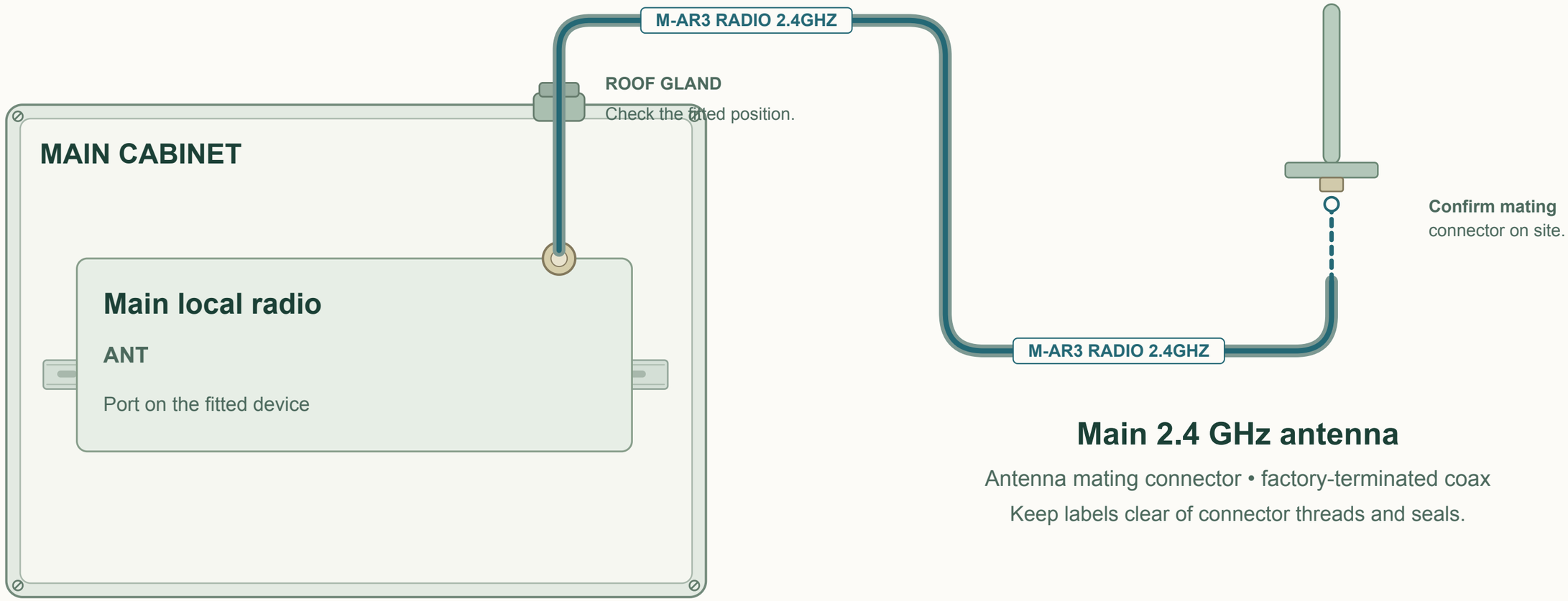
Apply the same jacket label at both ends.
Check the commissioned signal for this link.

BENCH TEST	The project recorded real position A. The feeder connector and signal margin were not separately recorded.
FIELD CHECK	Connector family and roof-hole position require hardware confirmation. Match both ends to the fitted feeder.

Assembly drawing, p. 5. R02, roof entry. R03, p. 4, complete feeder labels.

Main local-radio antenna feeder

One complete coaxial feeder. Apply the full jacket label to both ends.



Main cabinet roof · verify the actual exit

Main 2.4 GHz antenna

Antenna mating connector • factory-terminated coax

Keep labels clear of connector threads and seals.

Solid line · documented wiring route

Dashed line + open end · confirm on site

Colors distinguish routes. Use the printed core IDs.

1 Find the correct port

Identify the device port marked ANT.
Use the lead specified for this antenna.

2 Route the whole feeder

Use the approved roof exit and weather seal.
Confirm clearance, bend radius and slack.

3 Label and prove

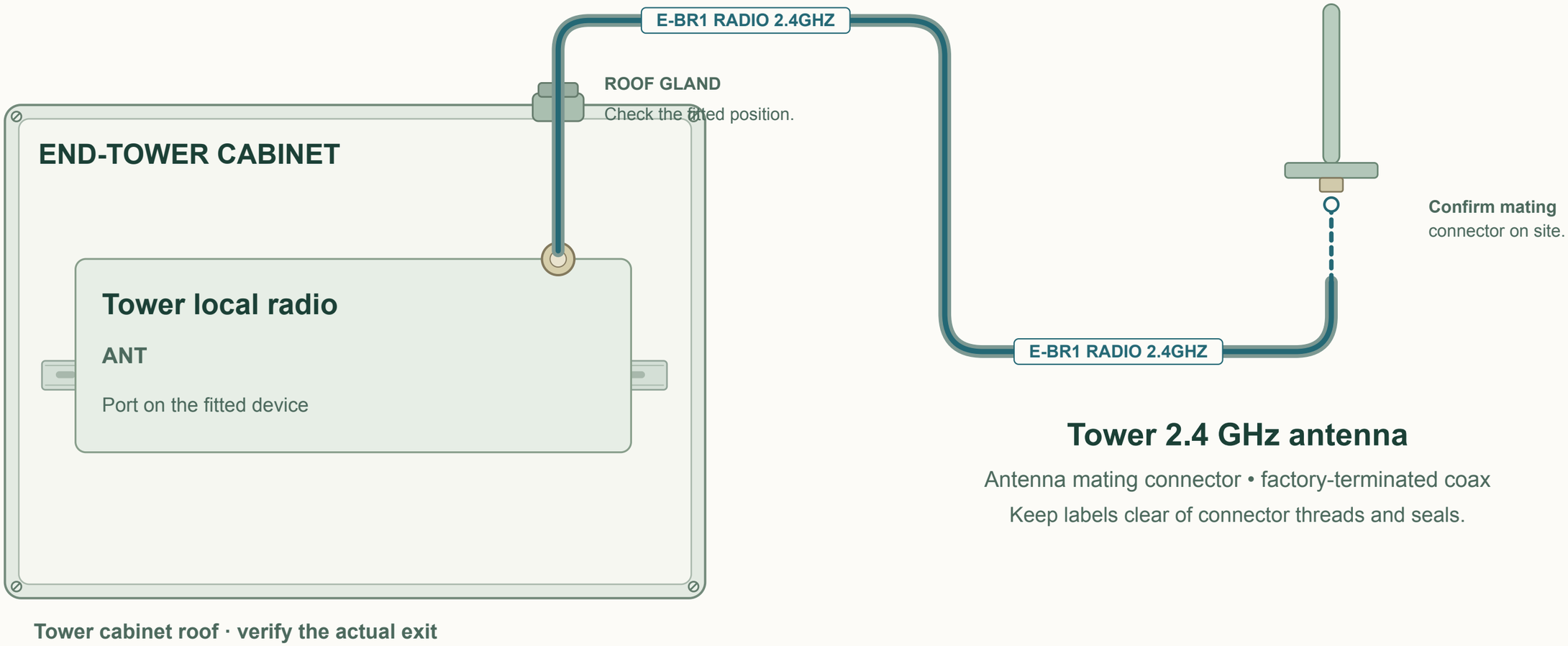
Apply the same jacket label at both ends.
Check the commissioned signal for this link.

BENCH TEST	Project board records show the radio pair carried position B. There is no feeder-specific RF test in the record.
FIELD CHECK	Connector family and roof-hole position require hardware confirmation. Match both ends to the fitted feeder.

Assembly drawing, p. 5. R02, roof entry. R03, p. 4, complete feeder labels.

Tower local-radio antenna feeder

One complete coaxial feeder. Apply the full jacket label to both ends.



Solid line · documented wiring route

Dashed line + open end · confirm on site

Colors distinguish routes. Use the printed core IDs.

1 Find the correct port

Identify the device port marked ANT.
Use the lead specified for this antenna.

2 Route the whole feeder

Use the approved roof exit and weather seal.
Confirm clearance, bend radius and slack.

3 Label and prove

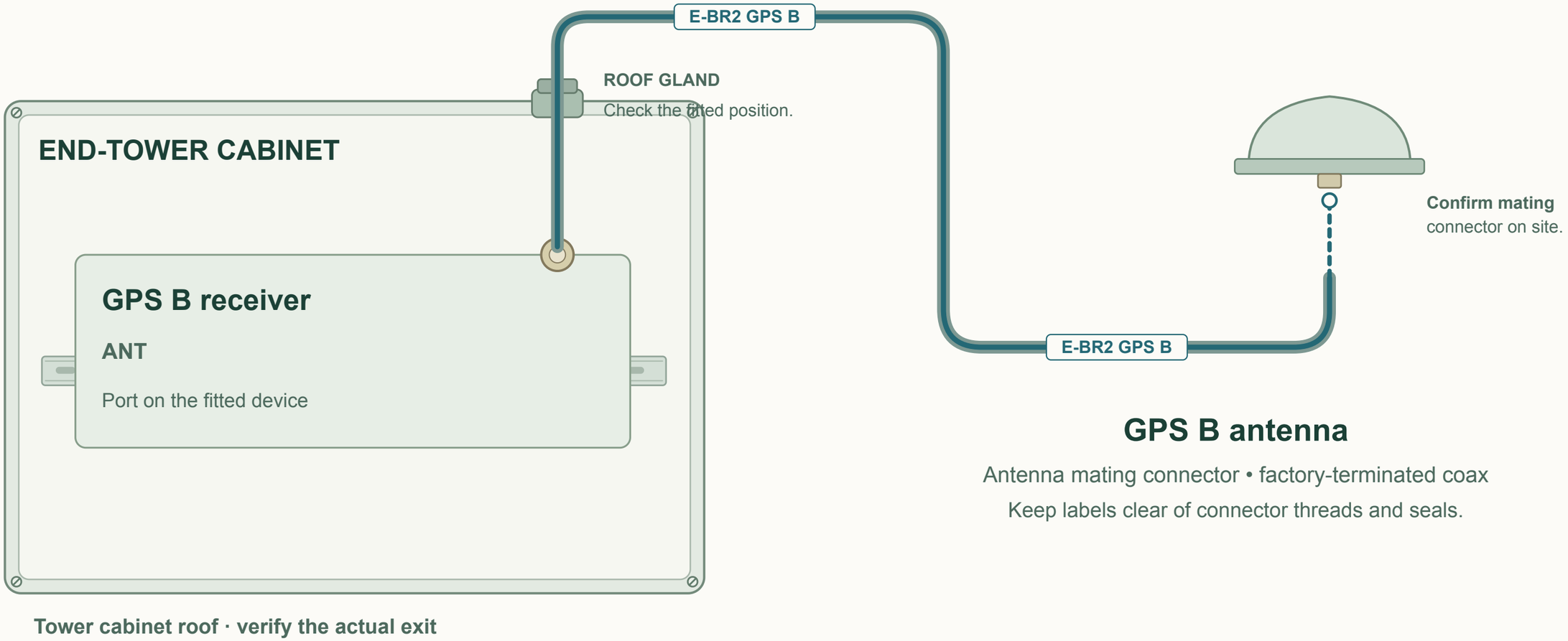
Apply the same jacket label at both ends.
Check the commissioned signal for this link.

BENCH TEST	Project board records show the radio pair carried position B. There is no feeder-specific RF test in the record.
FIELD CHECK	Connector family and roof-hole position require hardware confirmation. Match both ends to the fitted feeder.

Assembly drawing, p. 15. R03, p. 4, complete feeder labels.

End-tower GPS B antenna feeder

One complete coaxial feeder. Apply the full jacket label to both ends.



Solid line · documented wiring route

Dashed line + open end · confirm on site

Colors distinguish routes. Use the printed core IDs.

1 Find the correct port

Identify the device port marked ANT.
Use the lead specified for this antenna.

2 Route the whole feeder

Use the approved roof exit and weather seal.
Confirm clearance, bend radius and slack.

3 Label and prove

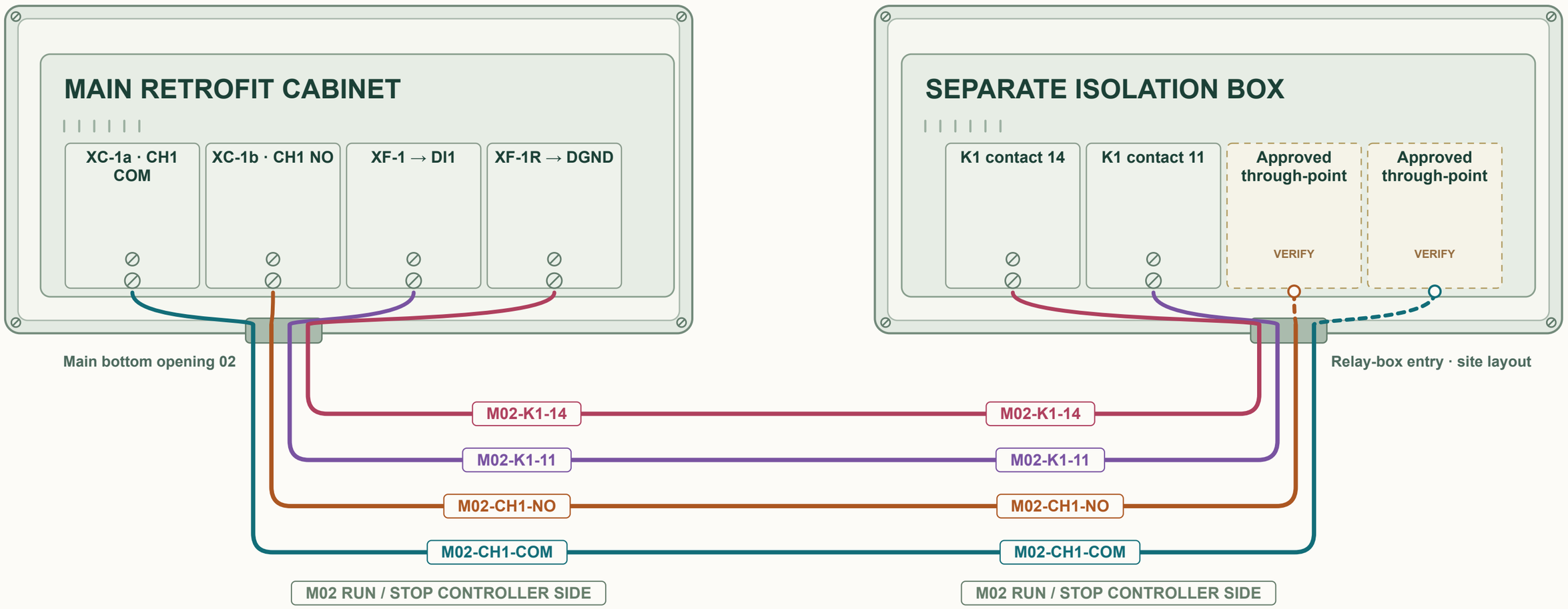
Apply the same jacket label at both ends.
Check the commissioned signal for this link.

BENCH TEST	The project recorded real position B. The feeder connector and signal margin were not separately recorded.
FIELD CHECK	Connector family and roof-hole position require hardware confirmation. Match both ends to the fitted feeder.

Assembly drawing, p. 15. R03, p. 4, complete feeder labels.

Run / stop · controller side cable

M02 RUN / STOP CONTROLLER SIDE • 4 × 0.75 mm² • Optional separate-box installation



Main bottom opening 02 to relay box • Confirm unnumbered entry locations on site.

Solid line · documented wiring route

Dashed line + open end · confirm on site

Colors distinguish routes. Use the printed core IDs.

1 Mark this segment

Identify main cabinet opening 02 and relay K1.
Apply the CONTROLLER SIDE jacket ID at both ends.
Mark every core before termination.

2 Land the dry pair

Land K1 contact 11 at XF-1 and 14 at XF-1R.
Follow XF-1 to DI1. Follow XF-1R to DGND.
Confirm any command through-points on site.

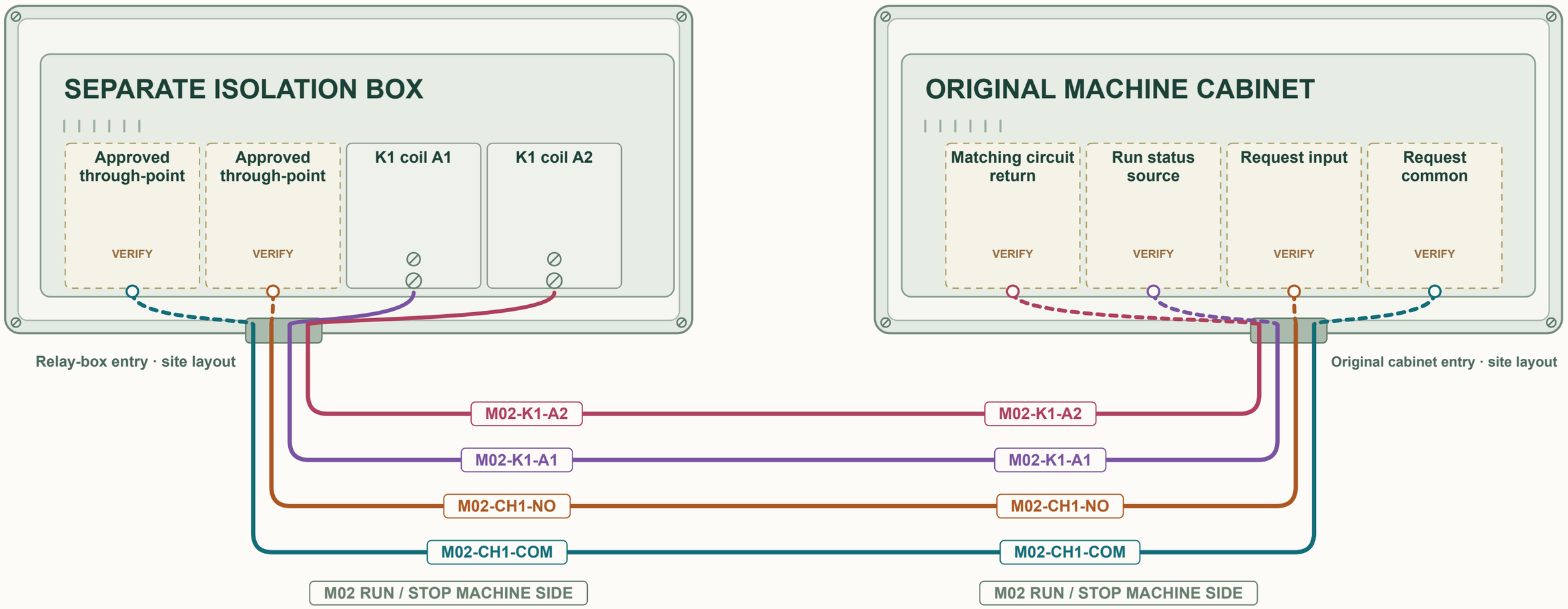
3 Test at the controller

Check core continuity with both ends disconnected.
Operate the approved test contact and observe DI1.
Release the test contact and verify the normal state.

BENCH TEST	This separate-box field cable has no recorded end-to-end bench test.
FIELD CHECK	Confirm the cable route, core continuity and the independent run return on the installed machine.

Run / stop · machine side cable

M02 RUN / STOP MACHINE SIDE • 4 × 0.75 mm² • Optional separate-box installation



Relay box to original machine cabinet • Confirm unnumbered entry locations on site.

Solid line · documented wiring route — **Dashed line + open end · confirm on site** — Colors distinguish routes. Use the printed core IDs.

1 Trace the original circuit

Trace the start, hold and stop chain.
Confirm its status source and same-circuit return.
Record the actual original-panel terminals.

2 Label and land

Apply the MACHINE SIDE jacket ID at both ends.
Use A1/A2 only for the verified relay coil circuit.
Confirm any command through-points on site.

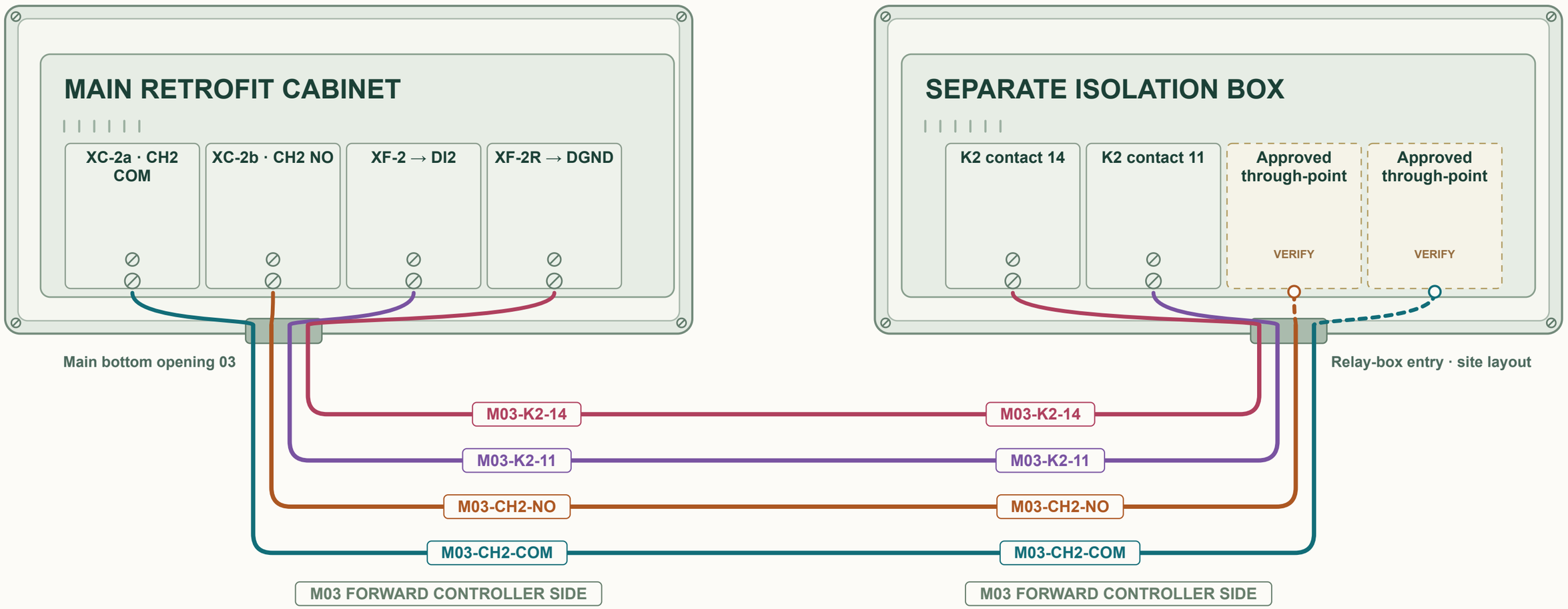
3 Verify this segment

With ends isolated, ring out each core by its tag.
Prove that the coil follows the actual field status.
Witness the independent run return.

BENCH TEST	This separate-box field cable has no recorded end-to-end bench test.
FIELD CHECK	Confirm the cable route, core continuity and the independent run return on the installed machine.

Forward · controller side cable

M03 FORWARD CONTROLLER SIDE • 4 × 0.75 mm² • Optional separate-box installation



Main bottom opening 03 to relay box • Confirm unnumbered entry locations on site.

Solid line · documented wiring route

Dashed line + open end · confirm on site

Colors distinguish routes. Use the printed core IDs.

1 Mark this segment

Identify main cabinet opening 03 and relay K2.
Apply the CONTROLLER SIDE jacket ID at both ends.
Mark every core before termination.

2 Land the dry pair

Land K2 contact 11 at XF-2 and 14 at XF-2R.
Follow XF-2 to DI2. Follow XF-2R to DGND.
Confirm any command through-points on site.

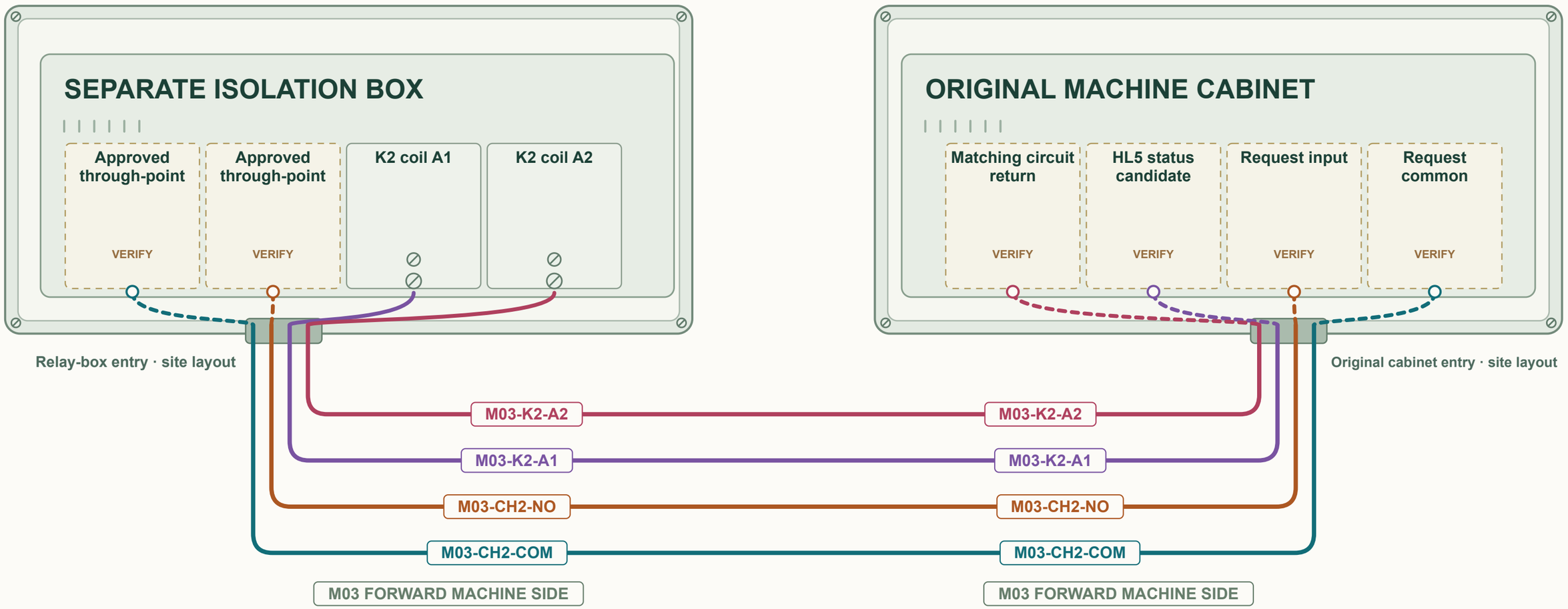
3 Test at the controller

Check core continuity with both ends disconnected.
Operate the approved test contact and observe DI2.
Release the test contact and verify the normal state.

BENCH TEST	This separate-box field cable has no recorded end-to-end bench test.
FIELD CHECK	Confirm the cable route, core continuity and forward status on DI2 on the installed machine.

Forward · machine side cable

M03 FORWARD MACHINE SIDE • 4 × 0.75 mm² • Optional separate-box installation



Relay box to original machine cabinet • Confirm unnumbered entry locations on site.

Solid line · documented wiring route

Dashed line + open end · confirm on site

Colors distinguish routes. Use the printed core IDs.

1 Trace the original circuit

Trace 3SS wire 23 and forward wire 11.
Confirm its status source and same-circuit return.
Record the actual original-panel terminals.

2 Label and land

Apply the MACHINE SIDE jacket ID at both ends.
Use A1/A2 only for the verified relay coil circuit.
Confirm any command through-points on site.

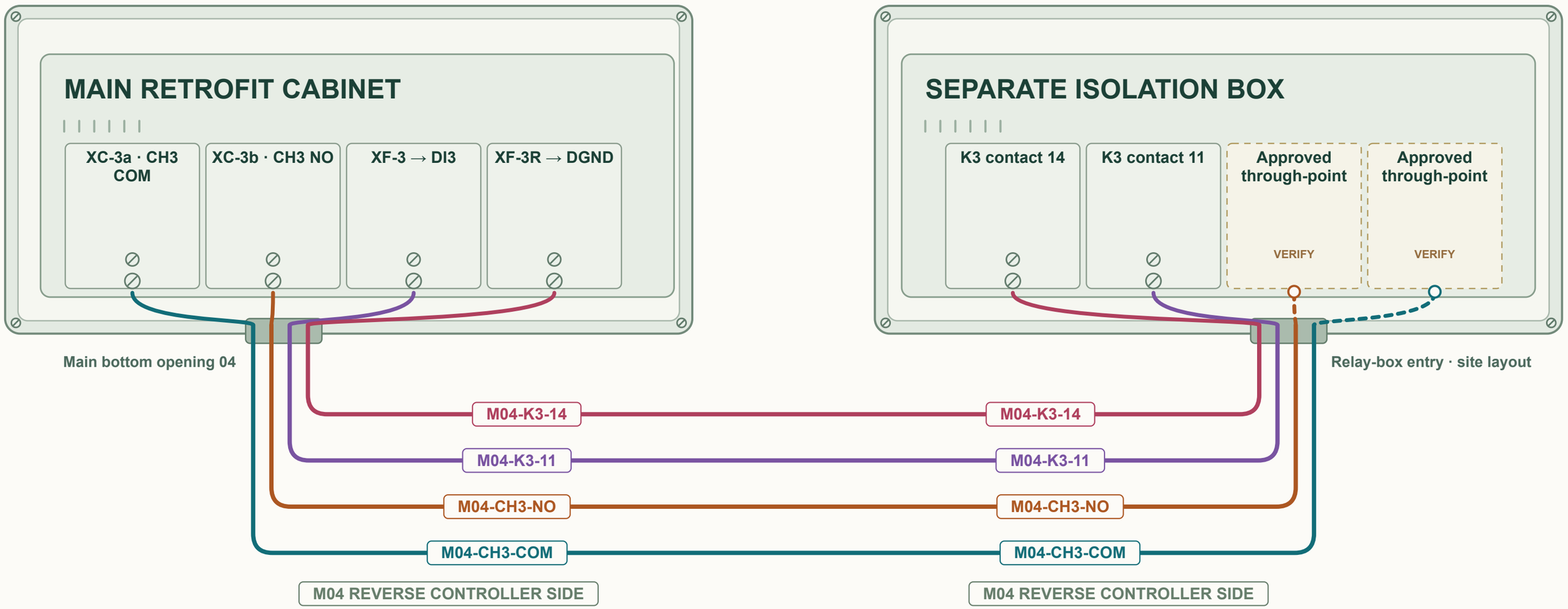
3 Verify this segment

With ends isolated, ring out each core by its tag.
Prove that the coil follows the actual field status.
Witness forward status on DI2.

BENCH TEST	This separate-box field cable has no recorded end-to-end bench test.
FIELD CHECK	Confirm the cable route, core continuity and forward status on DI2 on the installed machine.

Reverse · controller side cable

M04 REVERSE CONTROLLER SIDE • 4 × 0.75 mm² • Optional separate-box installation



Main bottom opening 04 to relay box • Confirm unnumbered entry locations on site.

Solid line · documented wiring route

Dashed line + open end · confirm on site

Colors distinguish routes. Use the printed core IDs.

1 Mark this segment

Identify main cabinet opening 04 and relay K3.
Apply the CONTROLLER SIDE jacket ID at both ends.
Mark every core before termination.

2 Land the dry pair

Land K3 contact 11 at XF-3 and 14 at XF-3R.
Follow XF-3 to DI3. Follow XF-3R to DGND.
Confirm any command through-points on site.

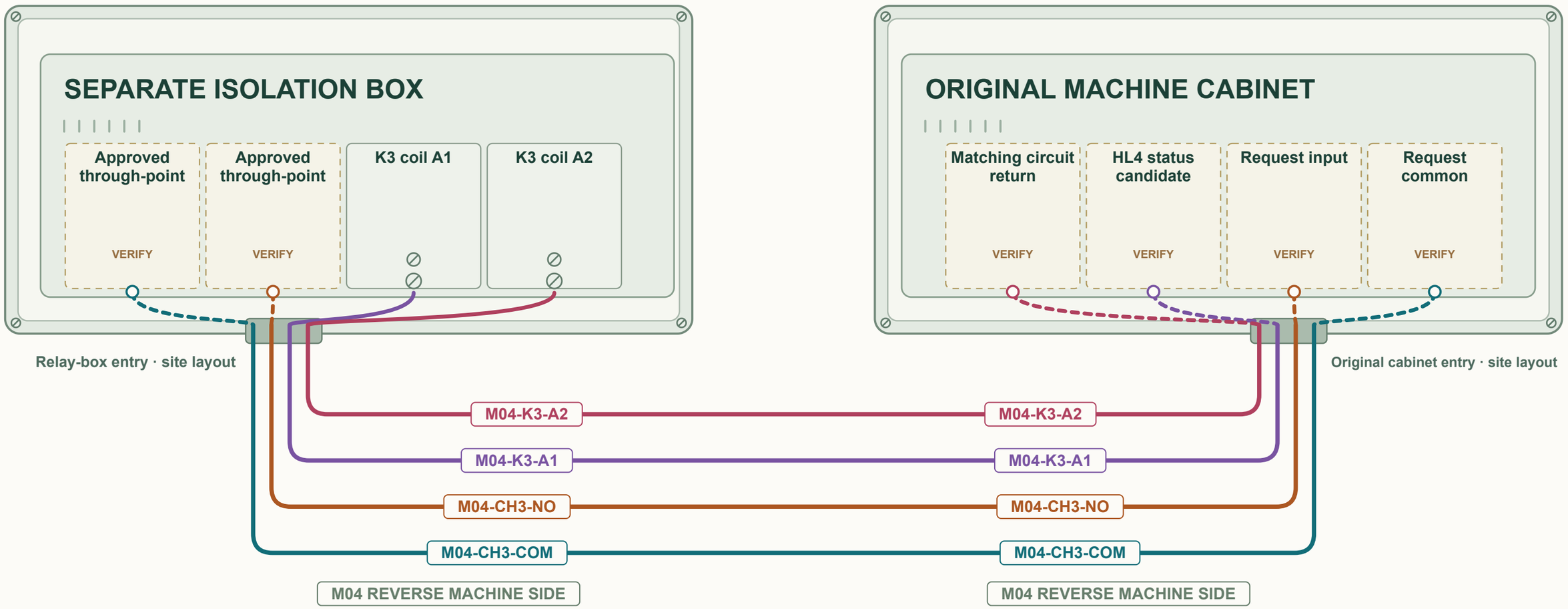
3 Test at the controller

Check core continuity with both ends disconnected.
Operate the approved test contact and observe DI3.
Release the test contact and verify the normal state.

BENCH TEST	This separate-box field cable has no recorded end-to-end bench test.
FIELD CHECK	Confirm the cable route, core continuity and reverse status on DI3 on the installed machine.

Reverse · machine side cable

M04 REVERSE MACHINE SIDE • 4 × 0.75 mm² • Optional separate-box installation



Relay box to original machine cabinet • Confirm unnumbered entry locations on site.

Solid line · documented wiring route

Dashed line + open end · confirm on site

Colors distinguish routes. Use the printed core IDs.

1 Trace the original circuit

Trace 3SS wire 23 and reverse wire 12.
Confirm its status source and same-circuit return.
Record the actual original-panel terminals.

2 Label and land

Apply the MACHINE SIDE jacket ID at both ends.
Use A1/A2 only for the verified relay coil circuit.
Confirm any command through-points on site.

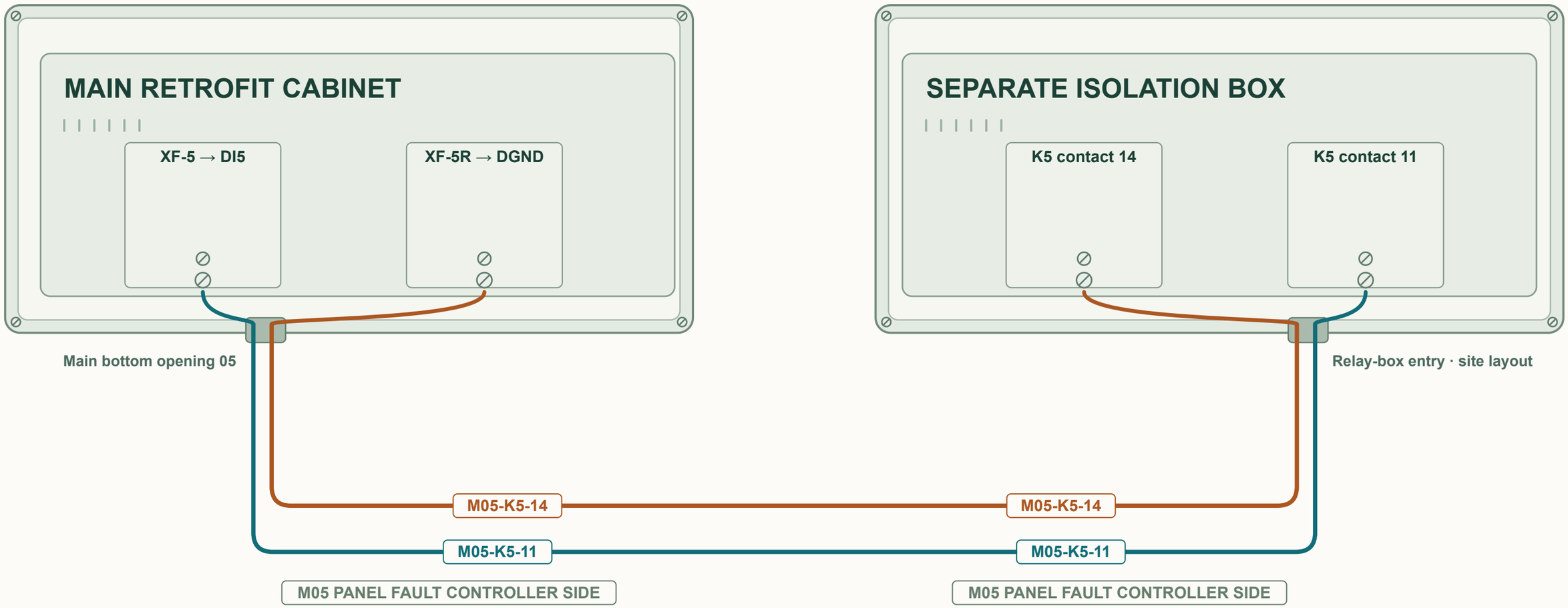
3 Verify this segment

With ends isolated, ring out each core by its tag.
Prove that the coil follows the actual field status.
Witness reverse status on DI3.

BENCH TEST	This separate-box field cable has no recorded end-to-end bench test.
FIELD CHECK	Confirm the cable route, core continuity and reverse status on DI3 on the installed machine.

Panel fault · controller side cable

M05 PANEL FAULT CONTROLLER SIDE • 2 × 0.75 mm² • Optional separate-box installation



Main bottom opening 05 to relay box • Confirm unnumbered entry locations on site.

Solid line · documented wiring route

Dashed line + open end · confirm on site

Colors distinguish routes. Use the printed core IDs.

1 Mark this segment

Identify main cabinet opening 05 and relay K5.
Apply the CONTROLLER SIDE jacket ID at both ends.
Mark every core before termination.

2 Land the dry pair

Land K5 contact 11 at XF-5 and 14 at XF-5R.
Follow XF-5 to DI5. Follow XF-5R to DGND.
Keep both cores in the isolated input circuit.

3 Test at the controller

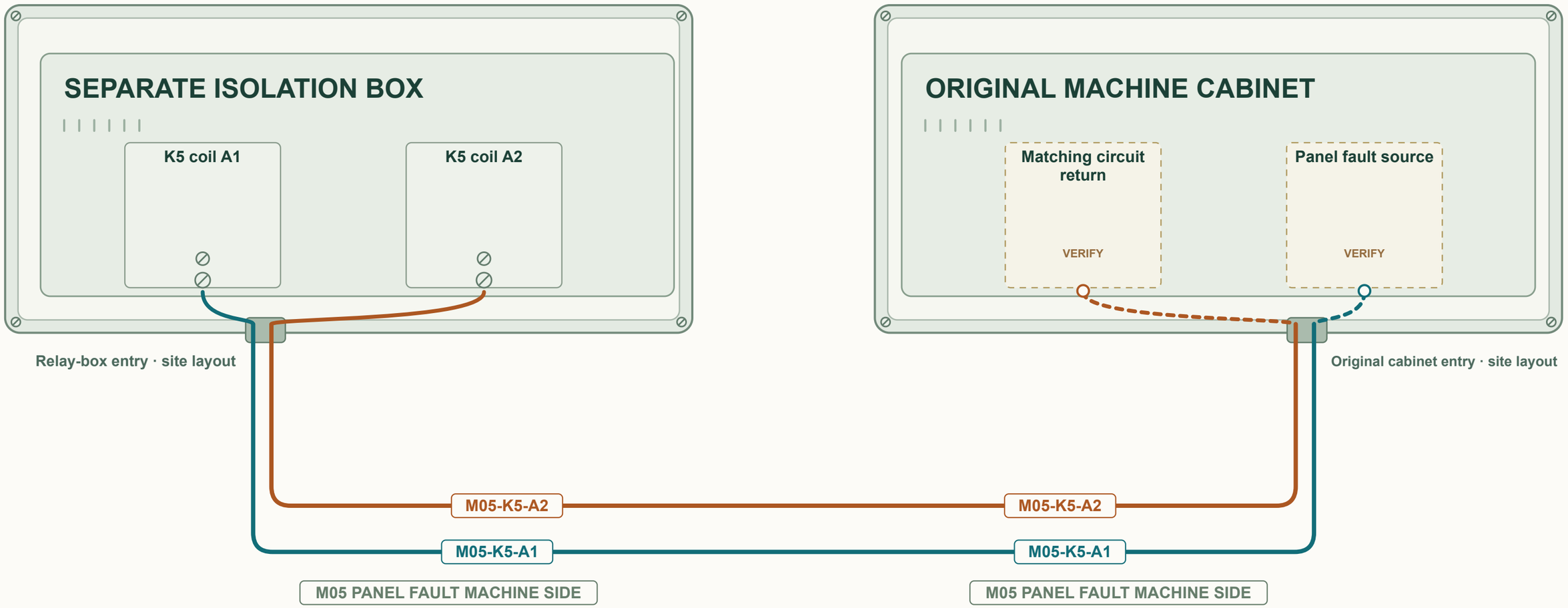
Check core continuity with both ends disconnected.
Operate the approved test contact and observe DI5.
Release the test contact and verify the normal state.

BENCH TEST	This separate-box field cable has no recorded end-to-end bench test.
FIELD CHECK	Confirm the cable route, core continuity and the independent panel fault return on the installed machine.

Cable labels R03, pp. 3 and 5 / Main terminal schedule R02, M05 / Cabinet assembly, pp. 6–8

Panel fault · machine side cable

M05 PANEL FAULT MACHINE SIDE • 2 × 0.75 mm² • Optional separate-box installation



Relay box to original machine cabinet • Confirm unnumbered entry locations on site.

Solid line · documented wiring route

Dashed line + open end · confirm on site

Colors distinguish routes. Use the printed core IDs.

1 Trace the original circuit

Verify which signal means a general panel fault.
Confirm its status source and same-circuit return.
Record the actual original-panel terminals.

2 Label and land

Apply the MACHINE SIDE jacket ID at both ends.
Use A1/A2 only for the verified relay coil circuit.
Match the circuit to the fitted coil rating.

3 Verify this segment

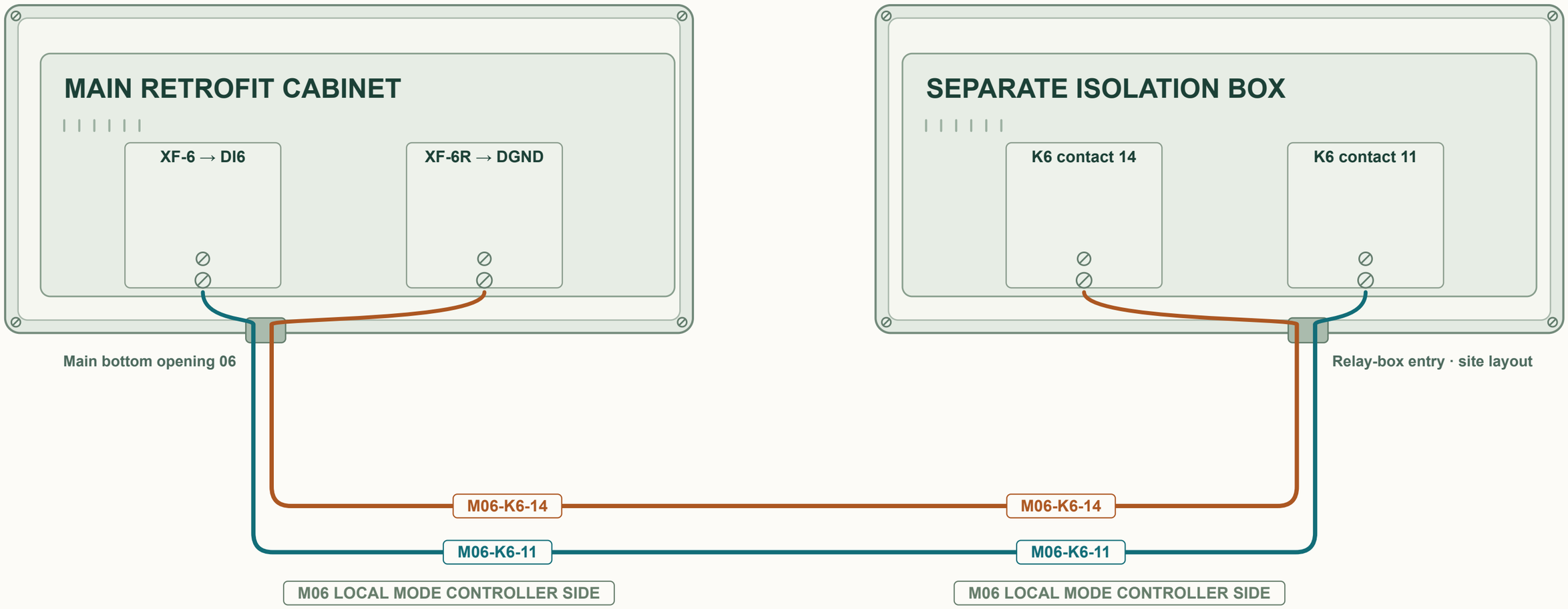
With ends isolated, ring out each core by its tag.
Prove that the coil follows the actual field status.
Witness the independent panel fault return.

BENCH TEST	This separate-box field cable has no recorded end-to-end bench test.
FIELD CHECK	Confirm the cable route, core continuity and the independent panel fault return on the installed machine.

Cable labels R03, pp. 3 and 5 / Main terminal schedule R02, M05 / Cabinet assembly, pp. 6–8

Local mode · controller side cable

M06 LOCAL MODE CONTROLLER SIDE • 2 × 0.75 mm² • Optional separate-box installation



Main bottom opening 06 to relay box • Confirm unnumbered entry locations on site.

Solid line · documented wiring route

Dashed line + open end · confirm on site

Colors distinguish routes. Use the printed core IDs.

1 Mark this segment

Identify main cabinet opening 06 and relay K6.
Apply the CONTROLLER SIDE jacket ID at both ends.
Mark every core before termination.

2 Land the dry pair

Land K6 contact 11 at XF-6 and 14 at XF-6R.
Follow XF-6 to DI6. Follow XF-6R to DGND.
Keep both cores in the isolated input circuit.

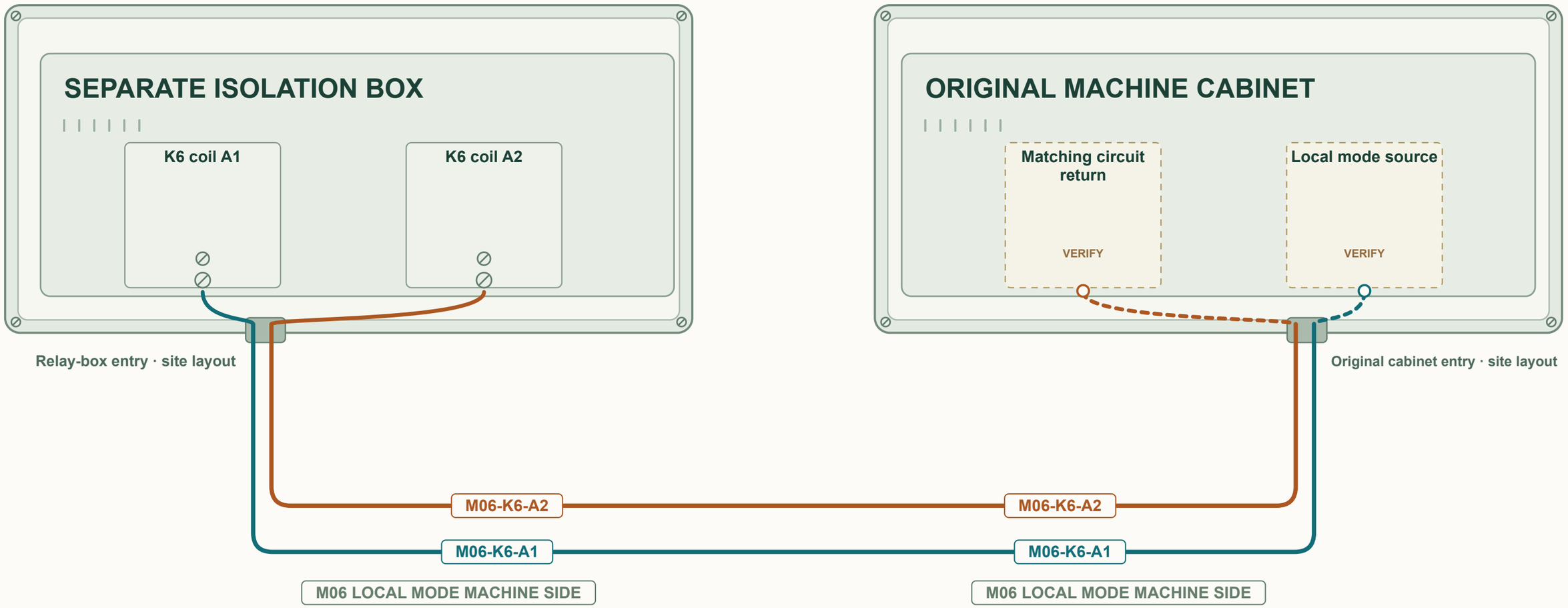
3 Test at the controller

Check core continuity with both ends disconnected.
Operate the approved test contact and observe DI6.
Release the test contact and verify the normal state.

BENCH TEST	This separate-box field cable has no recorded end-to-end bench test.
FIELD CHECK	Confirm the cable route, core continuity and the local mode return on the installed machine.

Local mode · machine side cable

M06 LOCAL MODE MACHINE SIDE • 2 × 0.75 mm² • Optional separate-box installation



Relay box to original machine cabinet • Confirm unnumbered entry locations on site.

Solid line · documented wiring route

Dashed line + open end · confirm on site

Colors distinguish routes. Use the printed core IDs.

1 Trace the original circuit

Identify a separate mode indication contact.
Confirm its status source and same-circuit return.
Record the actual original-panel terminals.

2 Label and land

Apply the MACHINE SIDE jacket ID at both ends.
Use A1/A2 only for the verified relay coil circuit.
Match the circuit to the fitted coil rating.

3 Verify this segment

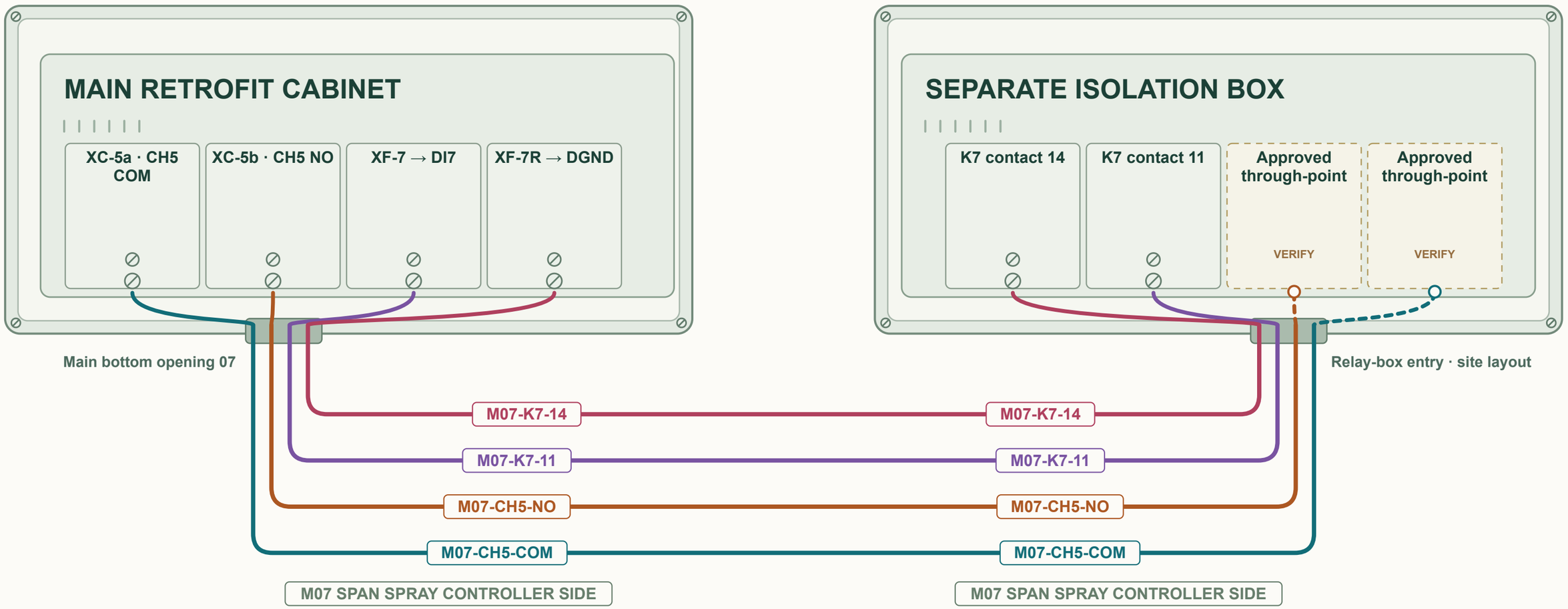
With ends isolated, ring out each core by its tag.
Prove that the coil follows the actual field status.
Witness the local mode return.

BENCH TEST	This separate-box field cable has no recorded end-to-end bench test.
FIELD CHECK	Confirm the cable route, core continuity and the local mode return on the installed machine.

Cable labels R03, pp. 3 and 5 / Main terminal schedule R02, M06 / Cabinet assembly, pp. 6–8

Span spray · controller side cable

M07 SPAN SPRAY CONTROLLER SIDE • 4 × 0.75 mm² • Optional separate-box installation



Main bottom opening 07 to relay box • Confirm unnumbered entry locations on site.

Solid line · documented wiring route

Dashed line + open end · confirm on site

Colors distinguish routes. Use the printed core IDs.

1 Mark this segment

Identify main cabinet opening 07 and relay K7.
Apply the CONTROLLER SIDE jacket ID at both ends.
Mark every core before termination.

2 Land the dry pair

Land K7 contact 11 at XF-7 and 14 at XF-7R.
Follow XF-7 to DI7. Follow XF-7R to DGND.
Confirm any command through-points on site.

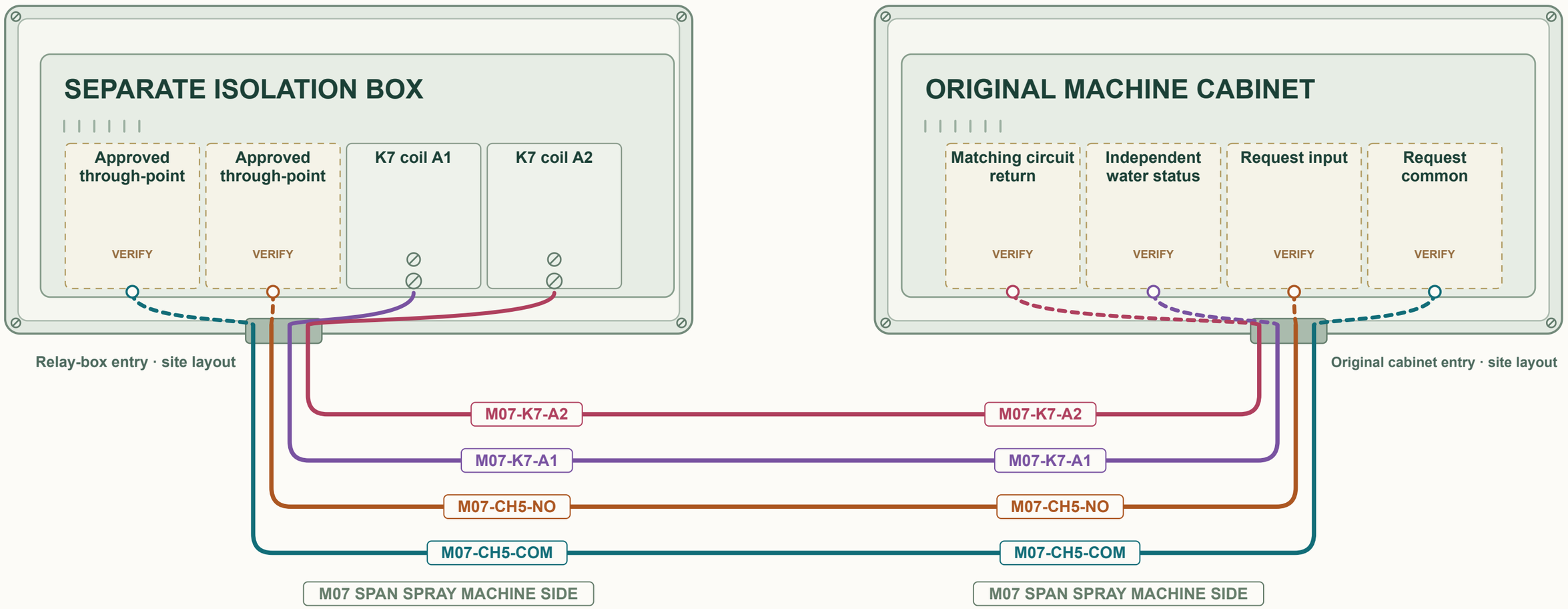
3 Test at the controller

Check core continuity with both ends disconnected.
Operate the approved test contact and observe DI7.
Release the test contact and verify the normal state.

BENCH TEST	This separate-box field cable has no recorded end-to-end bench test.
FIELD CHECK	Confirm the cable route, core continuity and water status under an approved wet test on the installed machine.

Span spray · machine side cable

M07 SPAN SPRAY MACHINE SIDE • 4 × 0.75 mm² • Optional separate-box installation



Relay box to original machine cabinet • Confirm unnumbered entry locations on site.

Solid line · documented wiring route

Dashed line + open end · confirm on site

Colors distinguish routes. Use the printed core IDs.

1 Trace the original circuit

Trace the pump or valve permit and its feedback.
Confirm its status source and same-circuit return.
Record the actual original-panel terminals.

2 Label and land

Apply the MACHINE SIDE jacket ID at both ends.
Use A1/A2 only for the verified relay coil circuit.
Confirm any command through-points on site.

3 Verify this segment

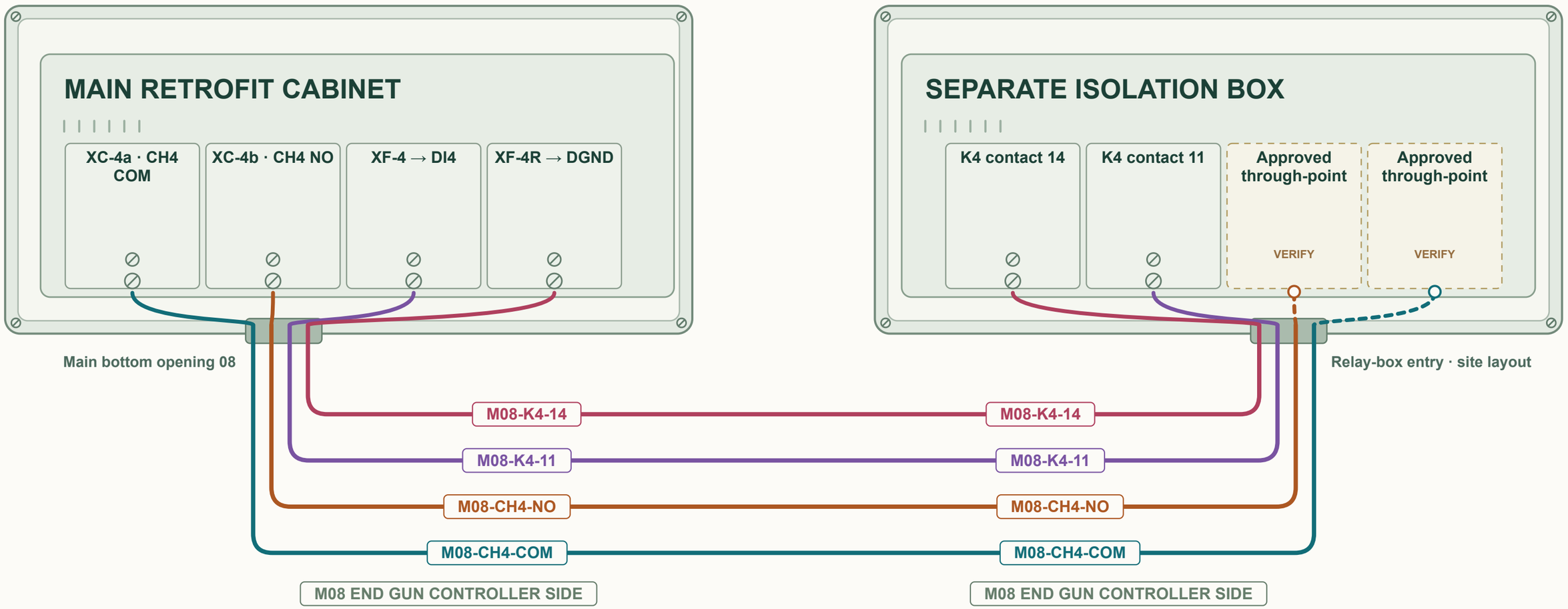
With ends isolated, ring out each core by its tag.
Prove that the coil follows the actual field status.
Witness water status under an approved wet test.

BENCH TEST This separate-box field cable has no recorded end-to-end bench test.

FIELD CHECK Confirm the cable route, core continuity and water status under an approved wet test on the installed machine.

End gun · controller side cable

M08 END GUN CONTROLLER SIDE • 4 × 0.75 mm² • Optional separate-box installation



Main bottom opening 08 to relay box • Confirm unnumbered entry locations on site.

Solid line · documented wiring route

Dashed line + open end · confirm on site

Colors distinguish routes. Use the printed core IDs.

1 Mark this segment

Identify main cabinet opening 08 and relay K4.
Apply the CONTROLLER SIDE jacket ID at both ends.
Mark every core before termination.

2 Land the dry pair

Land K4 contact 11 at XF-4 and 14 at XF-4R.
Follow XF-4 to DI4. Follow XF-4R to DGND.
Confirm any command through-points on site.

3 Test at the controller

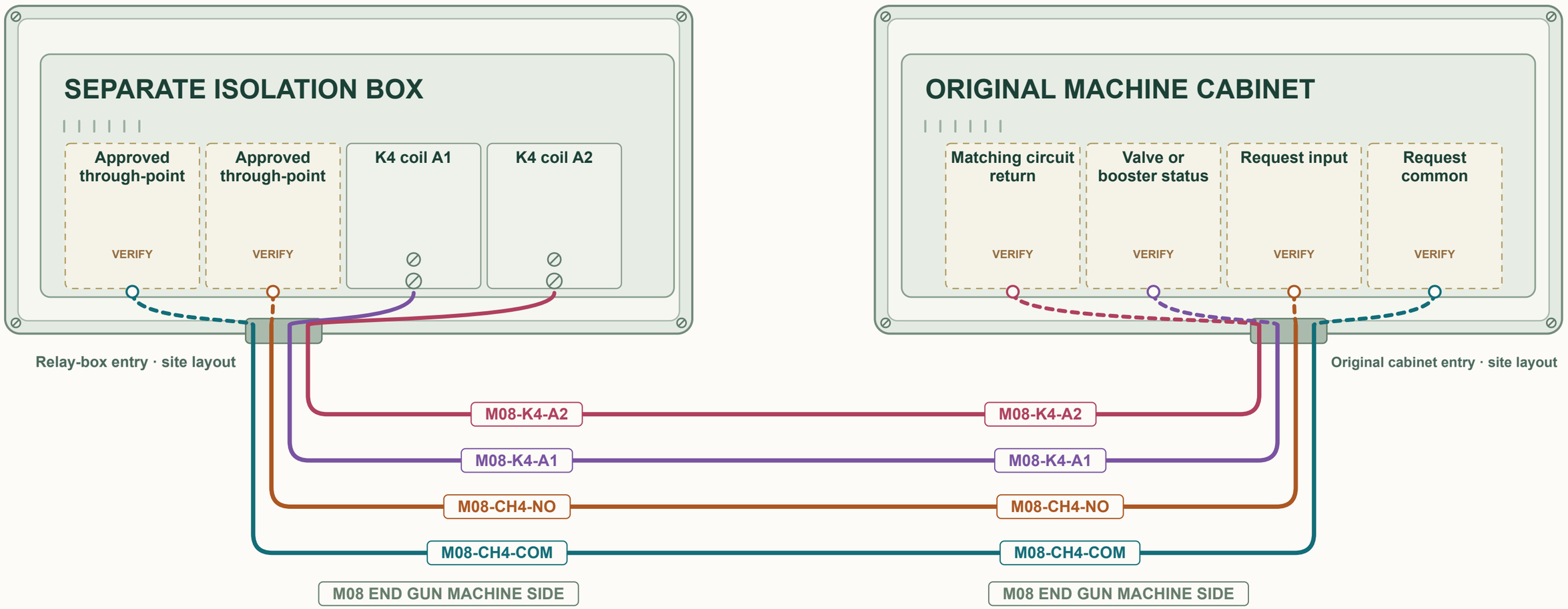
Check core continuity with both ends disconnected.
Operate the approved test contact and observe DI4.
Release the test contact and verify the normal state.

BENCH TEST	This separate-box field cable has no recorded end-to-end bench test.
FIELD CHECK	Confirm the cable route, core continuity and the end-gun feedback and actual spray on the installed machine.

Cable labels R03, pp. 3 and 5 / Main terminal schedule R02, M08 / Cabinet assembly, pp. 6–8

End gun · machine side cable

M08 END GUN MACHINE SIDE • 4 × 0.75 mm² • Optional separate-box installation



Relay box to original machine cabinet • Confirm unnumbered entry locations on site.

Solid line · documented wiring route

Dashed line + open end · confirm on site

Colors distinguish routes. Use the printed core IDs.

1 Trace the original circuit

Trace switch wire 25 and wire 5 at TB3-6.
Confirm its status source and same-circuit return.
Record the actual original-panel terminals.

2 Label and land

Apply the MACHINE SIDE jacket ID at both ends.
Use A1/A2 only for the verified relay coil circuit.
Confirm any command through-points on site.

3 Verify this segment

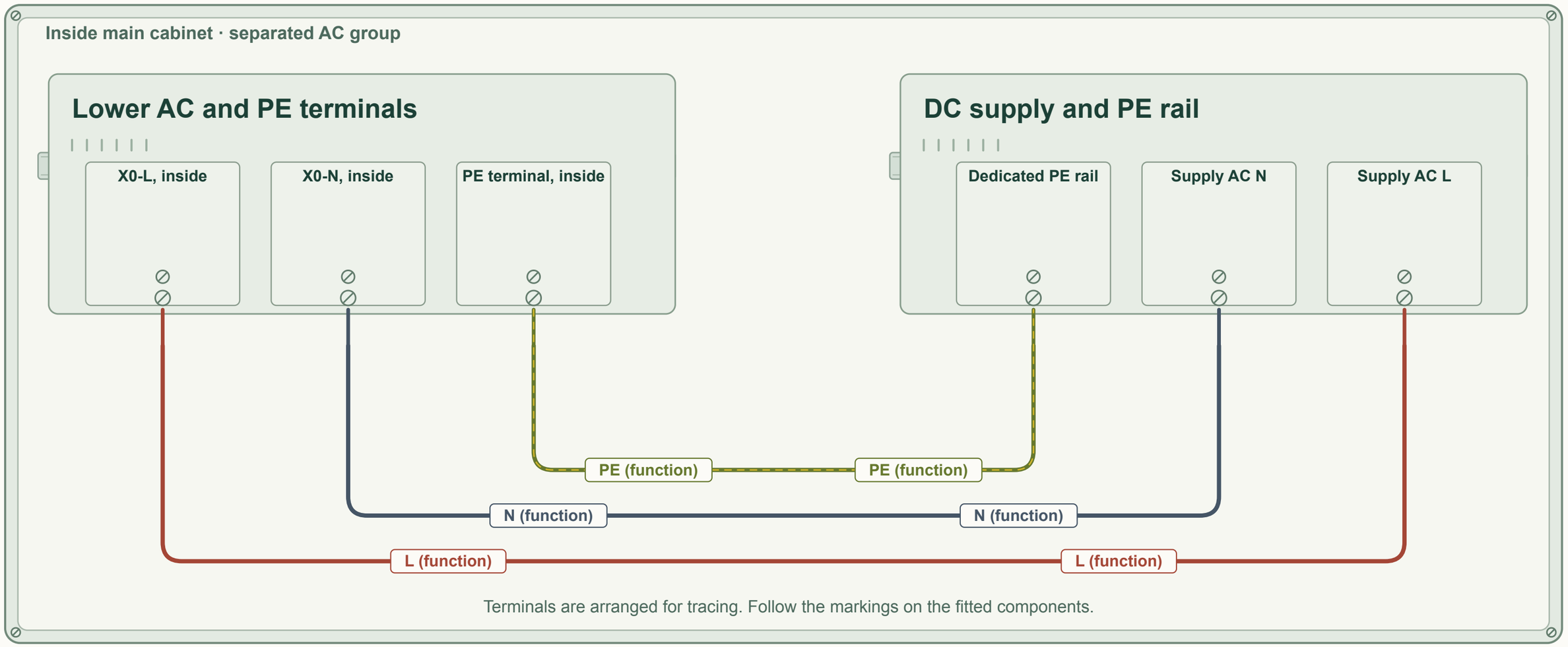
With ends isolated, ring out each core by its tag.
Prove that the coil follows the actual field status.
Witness the end-gun feedback and actual spray.

BENCH TEST This separate-box field cable has no recorded end-to-end bench test.

FIELD CHECK Confirm the cable route, core continuity and the end-gun feedback and actual spray on the installed machine.

Main cabinet AC feed-through and earth

Three separate pigtails feed the 24 V DC supply and the protective-earth rail.



Solid line · documented wiring route

Dashed line + open end · confirm on site

Colors distinguish routes. Use the printed core IDs.

1 Locate

Find L, N and PE on the lower rail.
Work with both sides isolated and verified.

2 Trace

Follow L and N to the supply input.
Follow PE to the dedicated bonding rail.

3 Prove

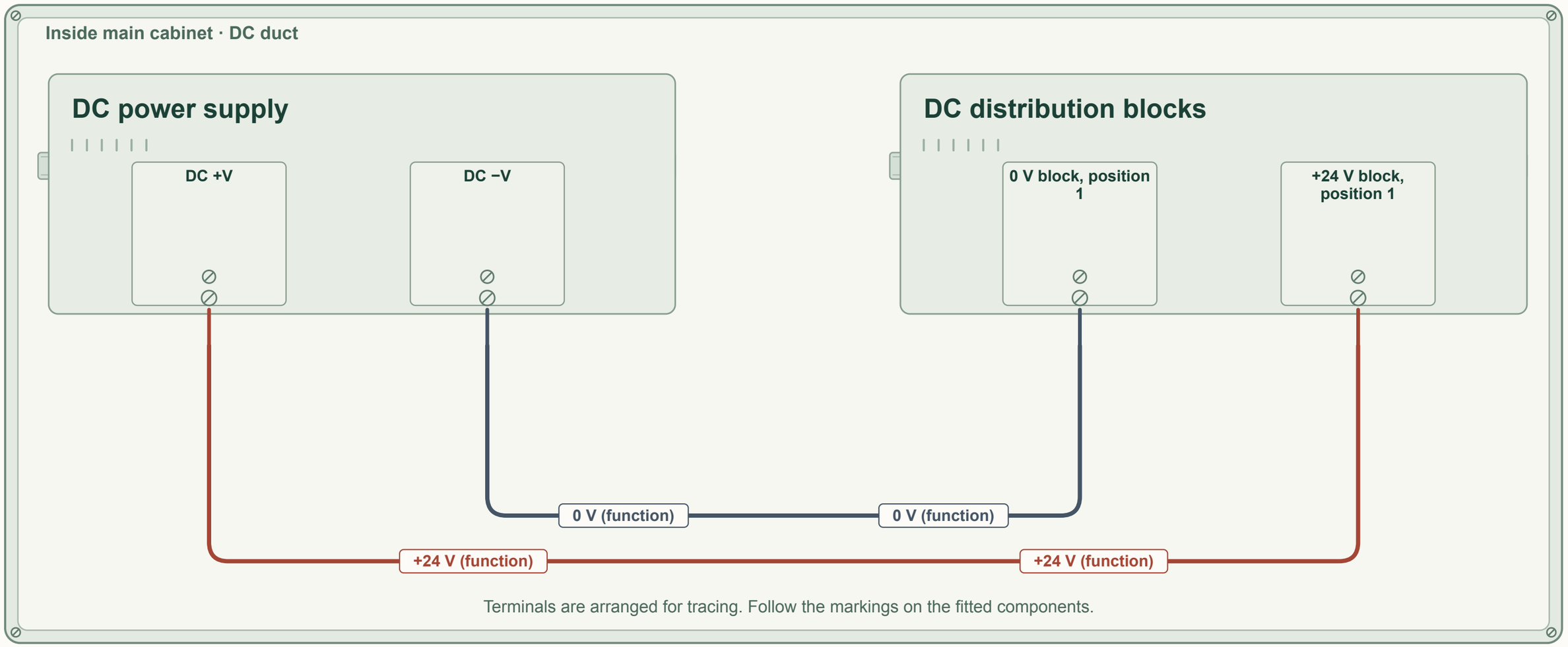
Check each path and the earth continuity.
Record the approved branch protection.

BENCH TEST	The assembly drawing identifies both ends. No electrical measurement of these specific leads is recorded.
FIELD CHECK	Verify the AC branch, protection and any enclosure bonding against the installed machine.

Assembly drawing, pp. 2–3. R02, opening 1.

24 V DC supply distribution

Place the positive and return leads into separate distribution blocks.



Terminals are arranged for tracing. Follow the markings on the fitted components.

Solid line · documented wiring route

Dashed line + open end · confirm on site

Colors distinguish routes. Use the printed core IDs.

1 Identify

Find +V and −V on the supply.
The block positions follow the assembly drawing.

2 Connect

Connect the positive lead to its own block.
Run the 0 V lead to the separate return block.

3 Prove

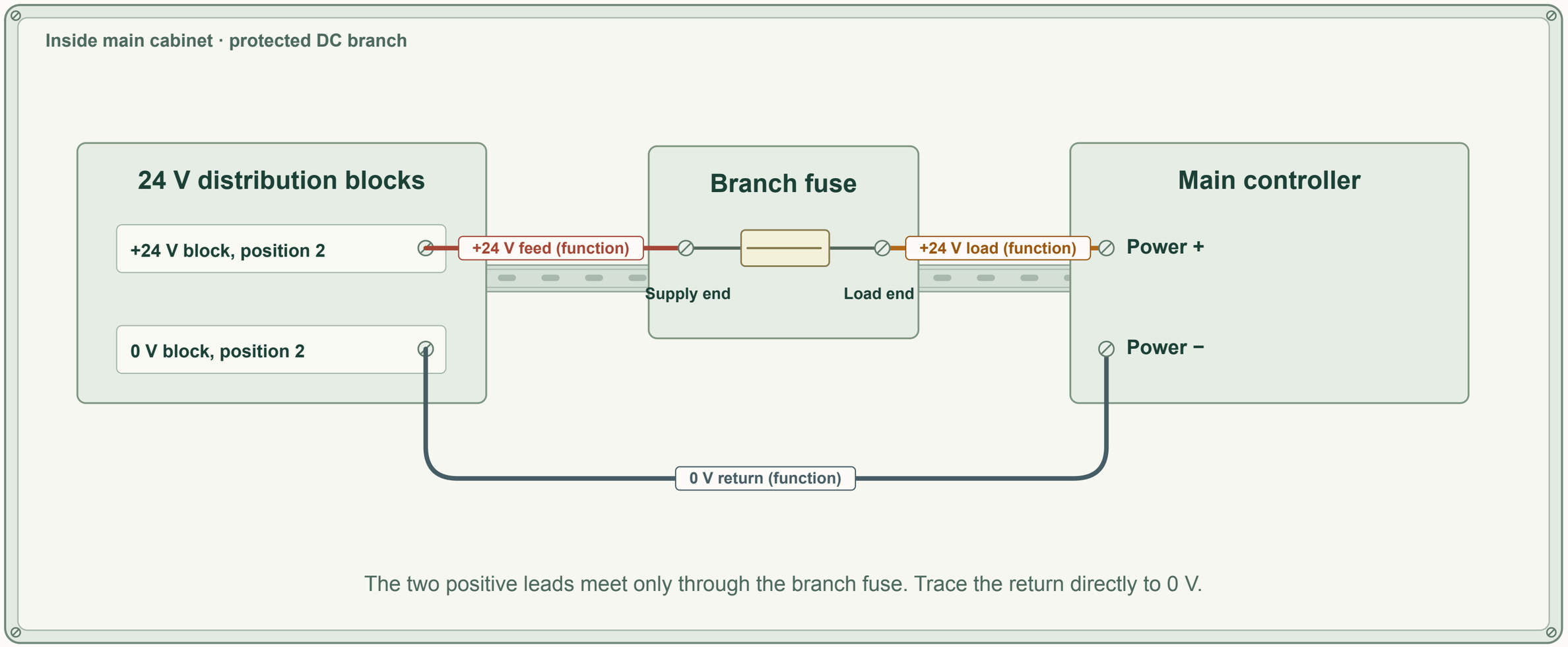
Verify polarity at the blocks before loading.
Record voltage with the fitted loads connected.

BENCH TEST	The assembly drawing identifies both ends. No electrical measurement of these specific leads is recorded.
FIELD CHECK	Verify actual wire gauge, polarity and voltage. Positive and return distribution blocks stay separate.

Assembly drawing, p. 4.

Main controller 24 V branch

Follow the positive feed through its own fuse and the return directly to the device.



The two positive leads meet only through the branch fuse. Trace the return directly to 0 V.

Solid line · documented wiring route

Dashed line + open end · confirm on site

Colors distinguish routes. Use the printed core IDs.

1 Identify

Locate position 2 on both DC blocks.
Confirm the fuse holder and protection rating.

2 Trace the branch

Trace the two positive pieces via the fuse.
Trace the 0 V lead directly to the device.

3 Prove polarity

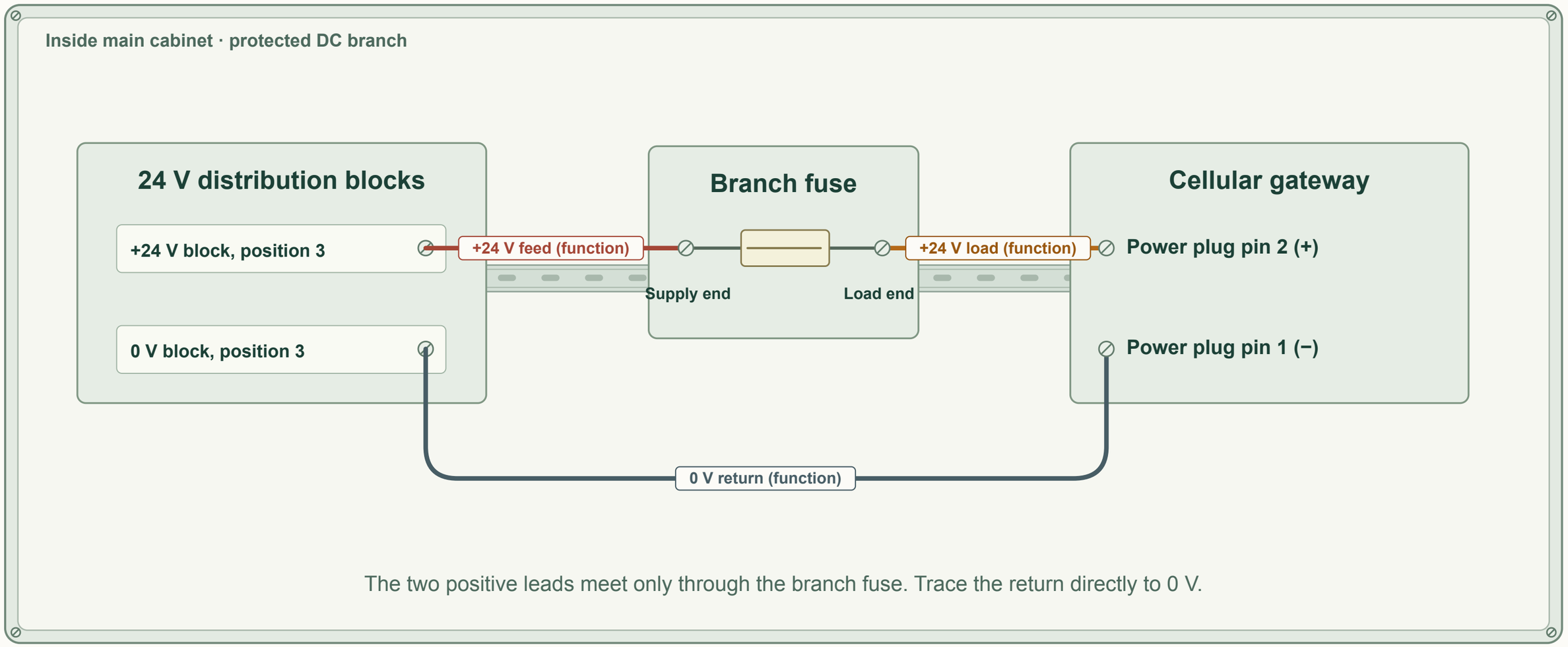
Check the marked device terminals before power.
Record voltage at the device under load.

BENCH TEST	No branch-specific bench voltage or continuity reading is recorded for this fused feed.
FIELD CHECK	Confirm actual device pin numbering and the approved fuse before connecting the branch.

Assembly drawing, p. 4, position 2

Cellular gateway 24 V branch

Follow the positive feed through its own fuse and the return directly to the device.



The two positive leads meet only through the branch fuse. Trace the return directly to 0 V.

Solid line · documented wiring route

Dashed line + open end · confirm on site

Colors distinguish routes. Use the printed core IDs.

1 Identify

Locate position 3 on both DC blocks.
Confirm the fuse holder and protection rating.

2 Trace the branch

Trace the two positive pieces via the fuse.
Trace the 0 V lead directly to the device.

3 Prove polarity

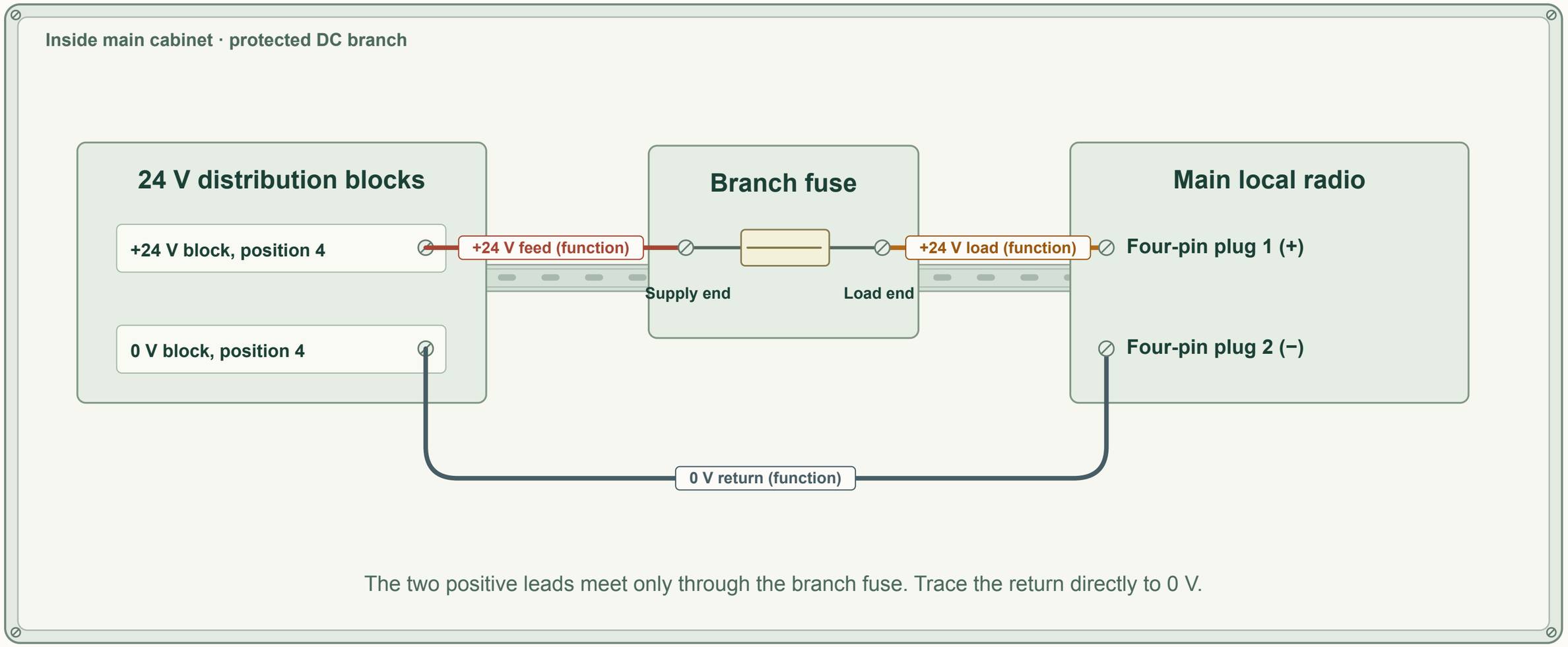
Check the marked device terminals before power.
Record voltage at the device under load.

BENCH TEST	No branch-specific bench voltage or continuity reading is recorded for this fused feed.
FIELD CHECK	Confirm actual device pin numbering and the approved fuse before connecting the branch.

Assembly drawing, p. 4, position 3

Main local radio 24 V branch

Follow the positive feed through its own fuse and the return directly to the device.



The two positive leads meet only through the branch fuse. Trace the return directly to 0 V.

Solid line · documented wiring route

Dashed line + open end · confirm on site

Colors distinguish routes. Use the printed core IDs.

1 Identify

Locate position 4 on both DC blocks.
Confirm the fuse holder and protection rating.

2 Trace the branch

Trace the two positive pieces via the fuse.
Trace the 0 V lead directly to the device.

3 Prove polarity

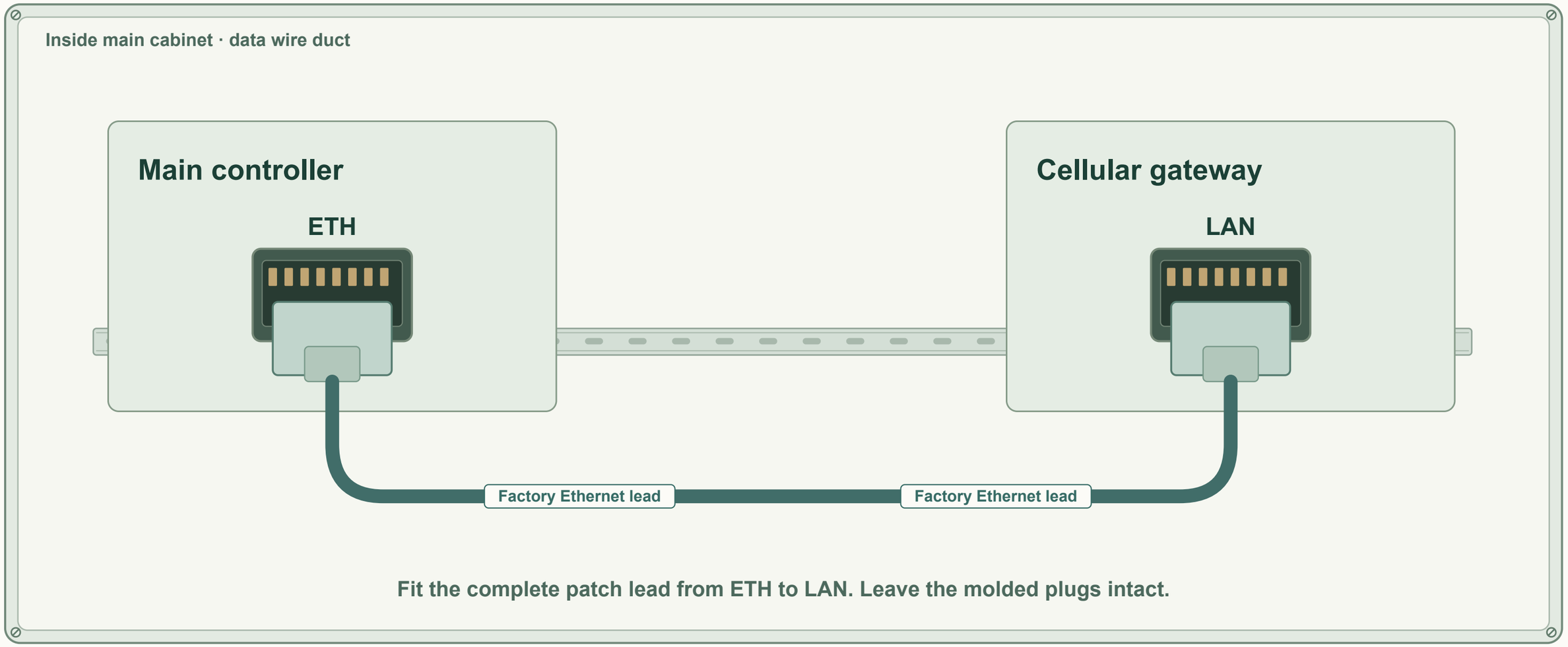
Check the marked device terminals before power.
Record voltage at the device under load.

BENCH TEST	No branch-specific bench voltage or continuity reading is recorded for this fused feed.
FIELD CHECK	Confirm actual device pin numbering and the approved fuse before connecting the branch.

Assembly drawing, p. 4, position 4

Controller to gateway Ethernet

This factory patch cable carries the cabinet’s wired data link.



Fit the complete patch lead from ETH to LAN. Leave the molded plugs intact.

Solid line · documented wiring route

Dashed line + open end · confirm on site

Colors distinguish routes. Use the printed core IDs.

1 Match the ports

Identify the controller ETH port.
Identify the gateway LAN port.

2 Seat the plugs

Route the factory lead clear of AC wiring.
Seat each plug and check the retaining clip.

3 Prove the link

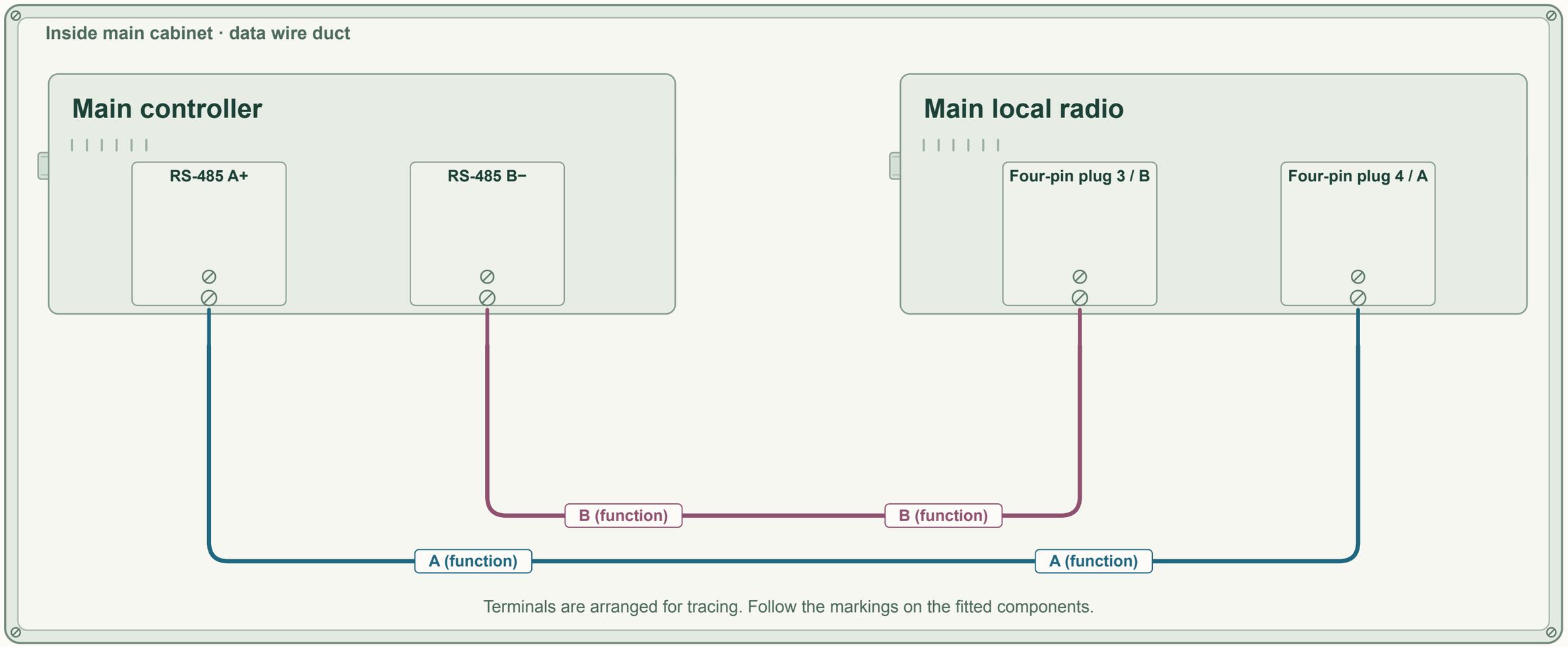
Check physical link indicators when fitted.
Verify the controller reaches its service.

BENCH TEST	The controller and gateway carried board telemetry. The record does not give a cable-specific link-speed test.
FIELD CHECK	Check the fitted lead and link. Keep this data lead separate from the cellular and radio antenna feeders.

Assembly drawing, p. 5. Project board communications record.

Controller to main radio RS-485

One twisted pair connects the controller to the main radio’s four-pin connector.



Solid line · documented wiring route

Dashed line + open end · confirm on site

Colors distinguish routes. Use the printed core IDs.

1 Identify

Find controller A+ and B−.
Match the radio plug view and pin numbers.

2 Trace two cores

Connect A+ to pin 4 / A.
Connect B− to pin 3 / B.

3 Prove data

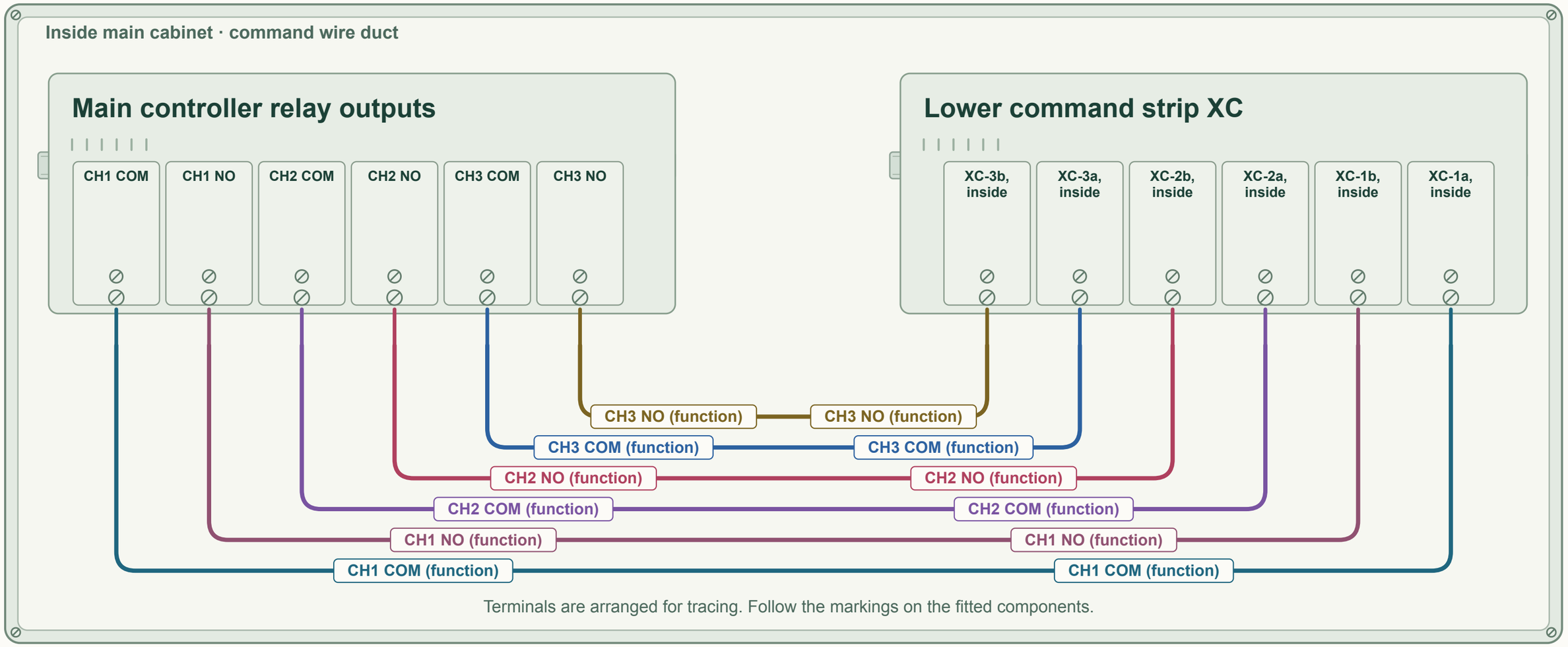
Check the disconnected pair for continuity.
Check fresh position B reports across the link.

BENCH TEST	The paired radios carried position B at 9600 baud during the recorded board test.
FIELD CHECK	Verify the fitted cable, shield and serial settings. The radio hop between cabinets is wireless.

Assembly drawing, p. 5. Two-radio position return record, 11 Nov 2026.

Run and direction command pigtails

One wire per contact terminal. Keep each command pair separate on the lower strip.



Terminals are arranged for tracing. Follow the markings on the fitted components.

Solid line · documented wiring route

Dashed line + open end · confirm on site

Colors distinguish routes. Use the printed core IDs.

1 Locate

Find the channel's COM and NO at the controller.
Identify the same channel pair on the XC strip.

2 Trace one core

Run COM to the a terminal and NO to b.
Keep separate command pairs electrically apart.

3 Prove at the strip

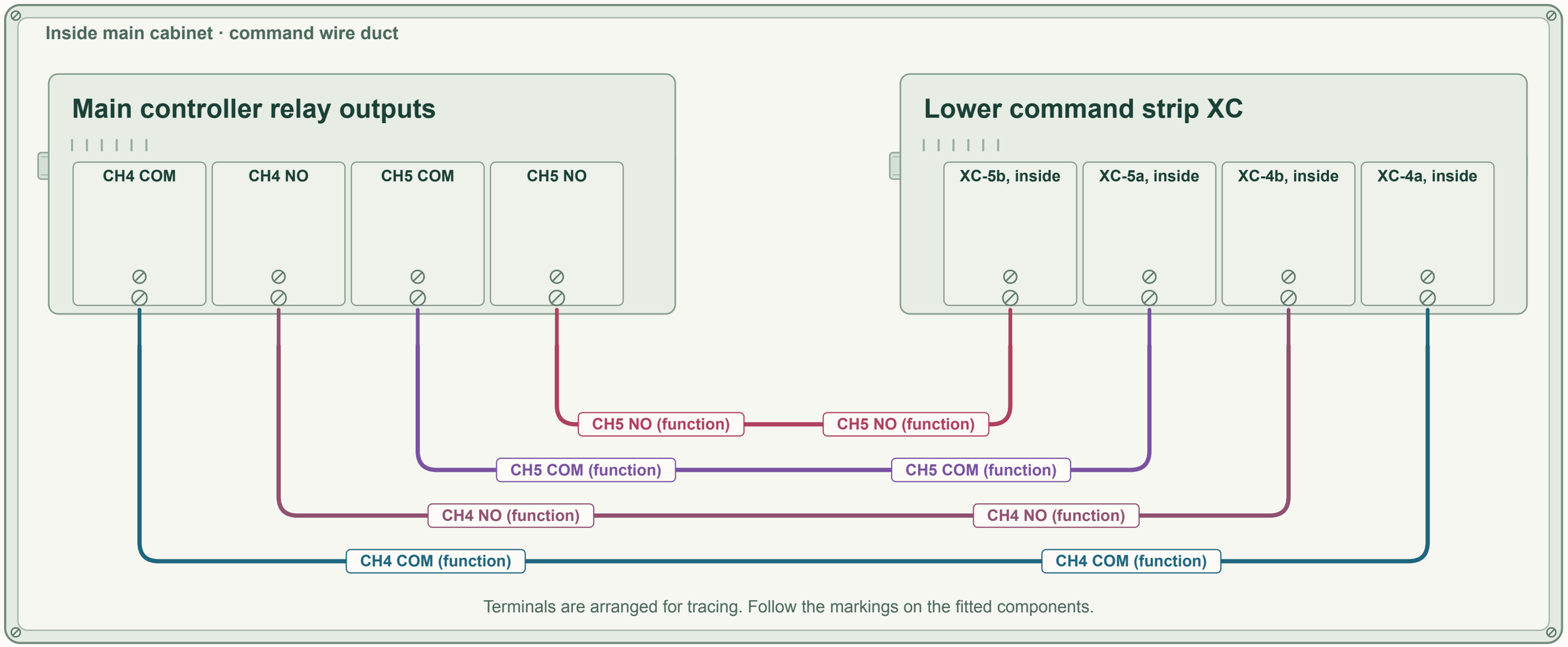
Check continuity on the isolated pigtails.
Use the external card for the original cabinet.

BENCH TEST	The existing bench harness returned the run, forward and reverse contacts on the 13 Nov board test.
FIELD CHECK	Remove bench jumpers before field connection. Keep original interlocks and confirm field-side terminals.

Assembly drawing, pp. 2, 6. R02, XC terminal designations. Contact bench, 13 Nov 2026.

End-gun and span-spray command pigtails

One wire per contact terminal. Keep each command pair separate on the lower strip.



Terminals are arranged for tracing. Follow the markings on the fitted components.

Solid line · documented wiring route

Dashed line + open end · confirm on site

Colors distinguish routes. Use the printed core IDs.

1 Locate

Find the channel's COM and NO at the controller.
Identify the same channel pair on the XC strip.

2 Trace one core

Run COM to the a terminal and NO to b.
Keep separate command pairs electrically apart.

3 Prove at the strip

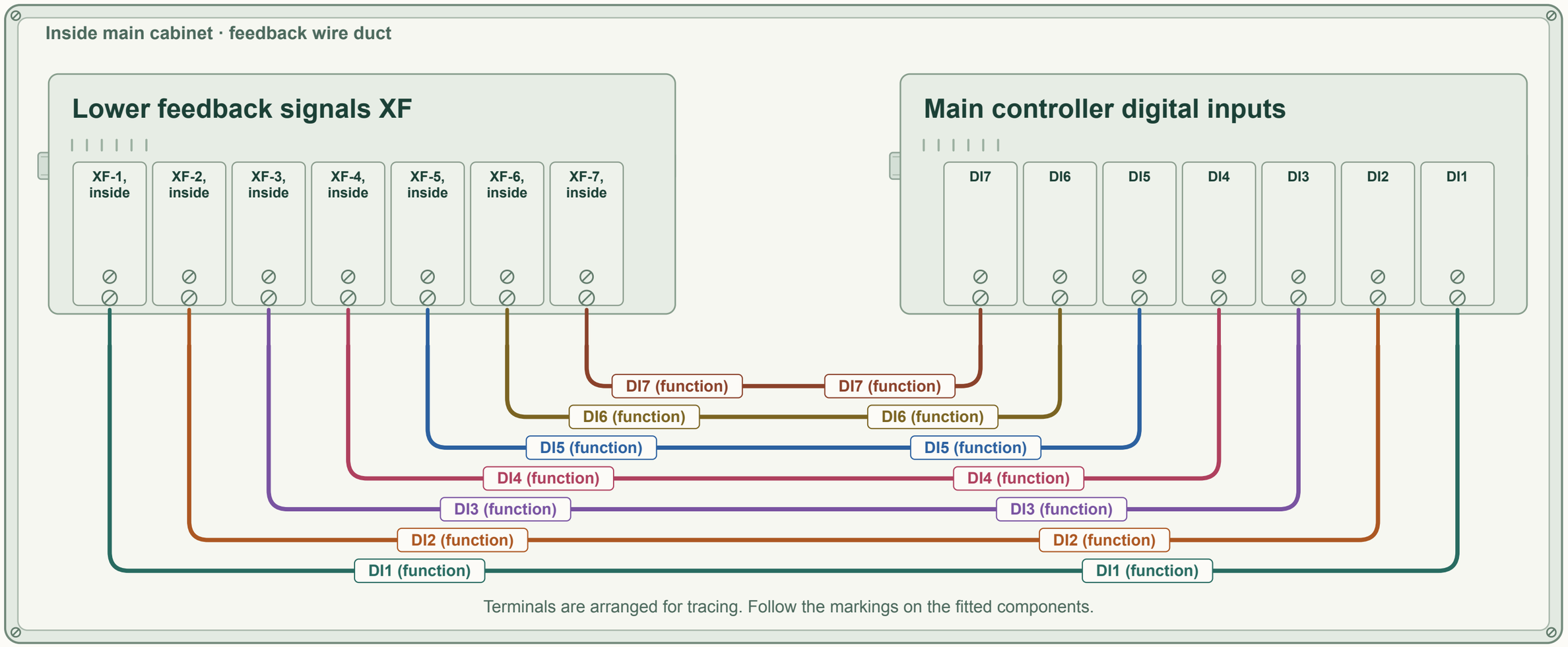
Check continuity on the isolated pigtails.
Use the external card for the original cabinet.

BENCH TEST	The existing harness returned the end-gun contact. The span-water circuit was left open on the 13 Nov setup.
FIELD CHECK	Remove bench jumpers before field connection. Keep original interlocks and confirm field-side terminals.

Assembly drawing, pp. 2, 6. R02, XC terminal designations. Contact bench, 13 Nov 2026.

Feedback strip to controller inputs

Seven signal pigtails follow terminal number from the feedback strip to the controller.



Terminals are arranged for tracing. Follow the markings on the fitted components.

Solid line · documented wiring route

Dashed line + open end · confirm on site

Colors distinguish routes. Use the printed core IDs.

1 Find the signal terminals

Identify the signal side of each XF pair.
Use its matching controller DI number.

2 Trace the cores

Connect XF-n to DI-n one channel at a time.
Leave the matching R core in the return bank.

3 Prove each dry input

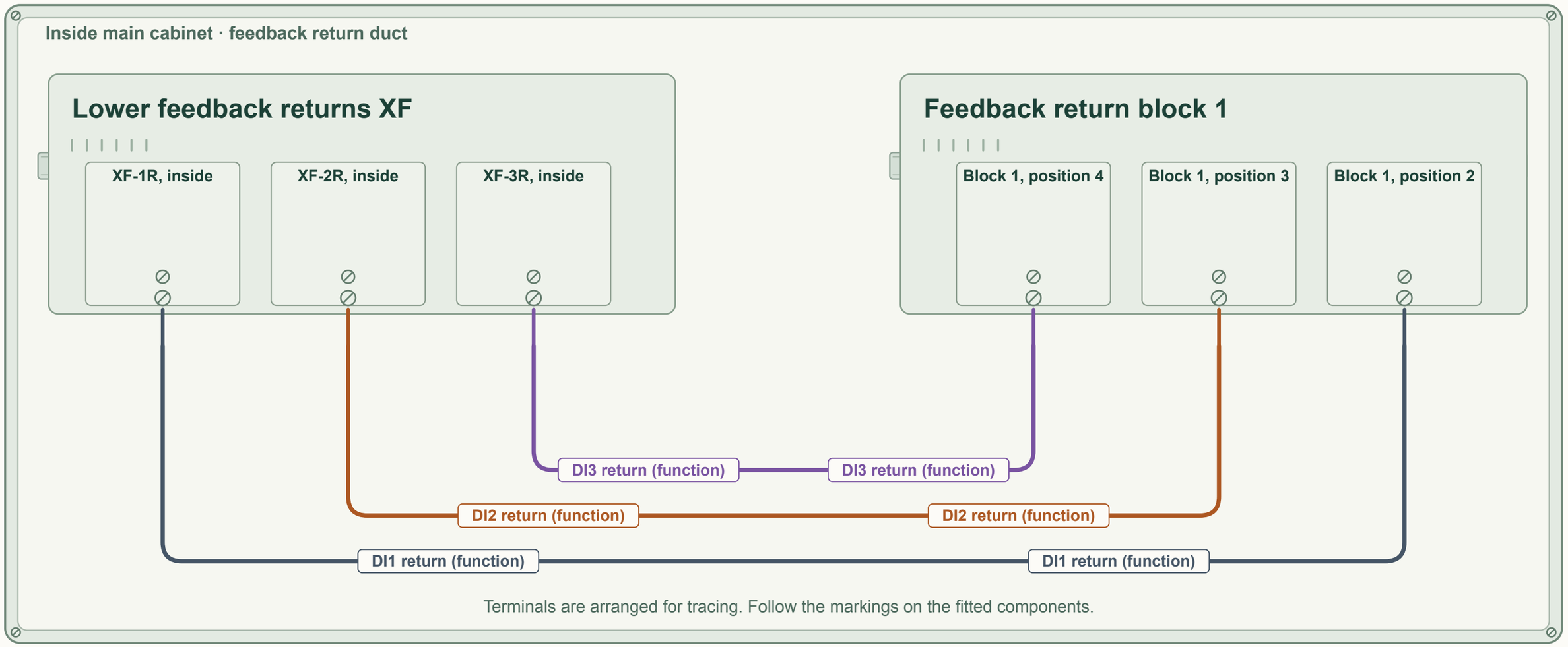
Test only using the approved dry input path.
Confirm the other inputs stay in their state.

BENCH TEST	The bench captured run, direction and end-gun contact inputs. DI7 was open.
FIELD CHECK	Verify installed channels and feedback meaning. Keep any original circuit voltage out of DI and DGND.

Assembly drawing, p. 7. R02, feedback terminals. Contact bench, 13 Nov 2026.

Feedback returns to block 1

Route each dry-contact return to its assigned position in the main feedback return system.



Solid line · documented wiring route

Dashed line + open end · confirm on site

Colors distinguish routes. Use the printed core IDs.

1 Find the matching returns

Identify the R terminal of each XF pair.
Use the correct five-position return block.

2 Route the cores

Land each return on its listed position.
Leave the signal cores on their own paths.

3 Trace to DGND

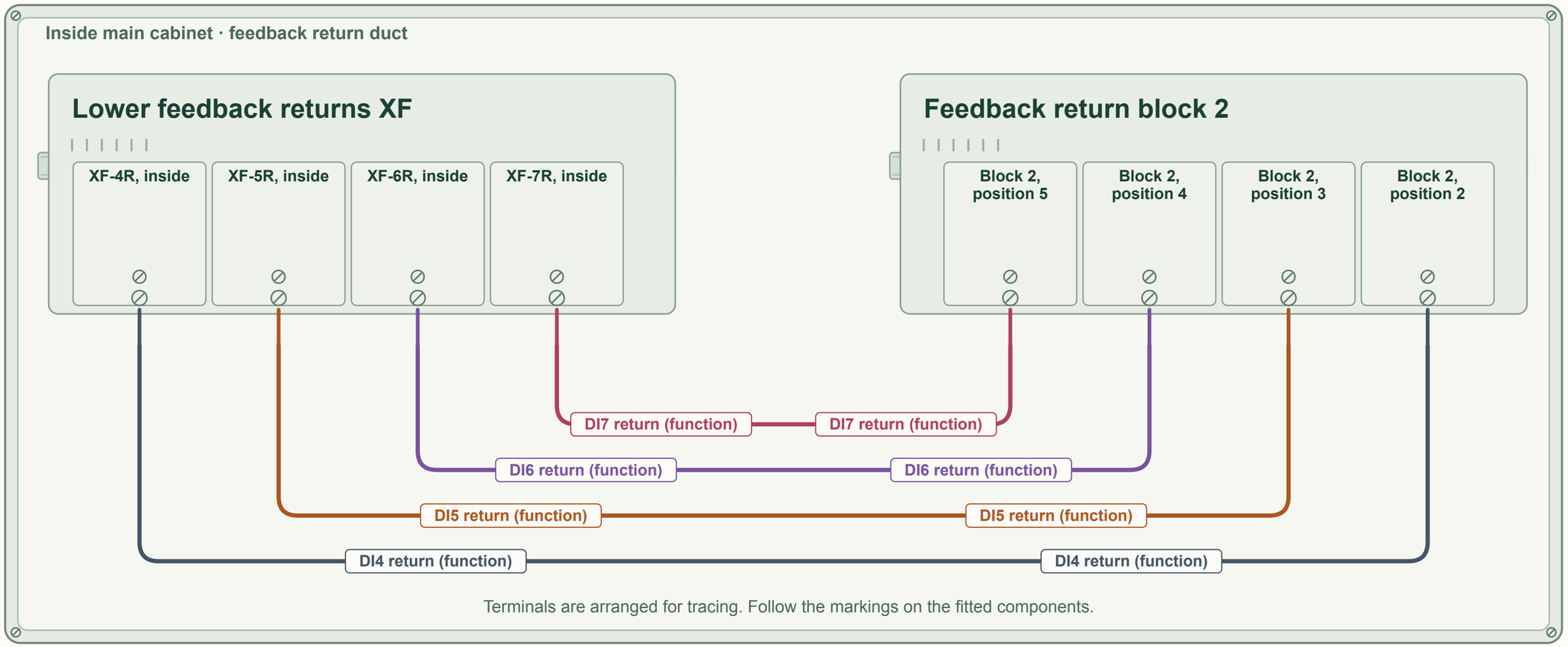
Follow the block links on MI10A and MI10B.
Check that powered feedback remains isolated.

BENCH TEST	The drawing specifies the return positions. The reference bench left DI7 open.
FIELD CHECK	Verify each return and check that no original cabinet voltage reaches the feedback input or DGND.

Assembly drawing, pp. 7–8. R02 and R03, feedback terminal names.

Feedback returns to block 2

Route each dry-contact return to its assigned position in the main feedback return system.



Solid line · documented wiring route

Dashed line + open end · confirm on site

Colors distinguish routes. Use the printed core IDs.

1 Find the matching returns

Identify the R terminal of each XF pair.
Use the correct five-position return block.

2 Route the cores

Land each return on its listed position.
Leave the signal cores on their own paths.

3 Trace to DGND

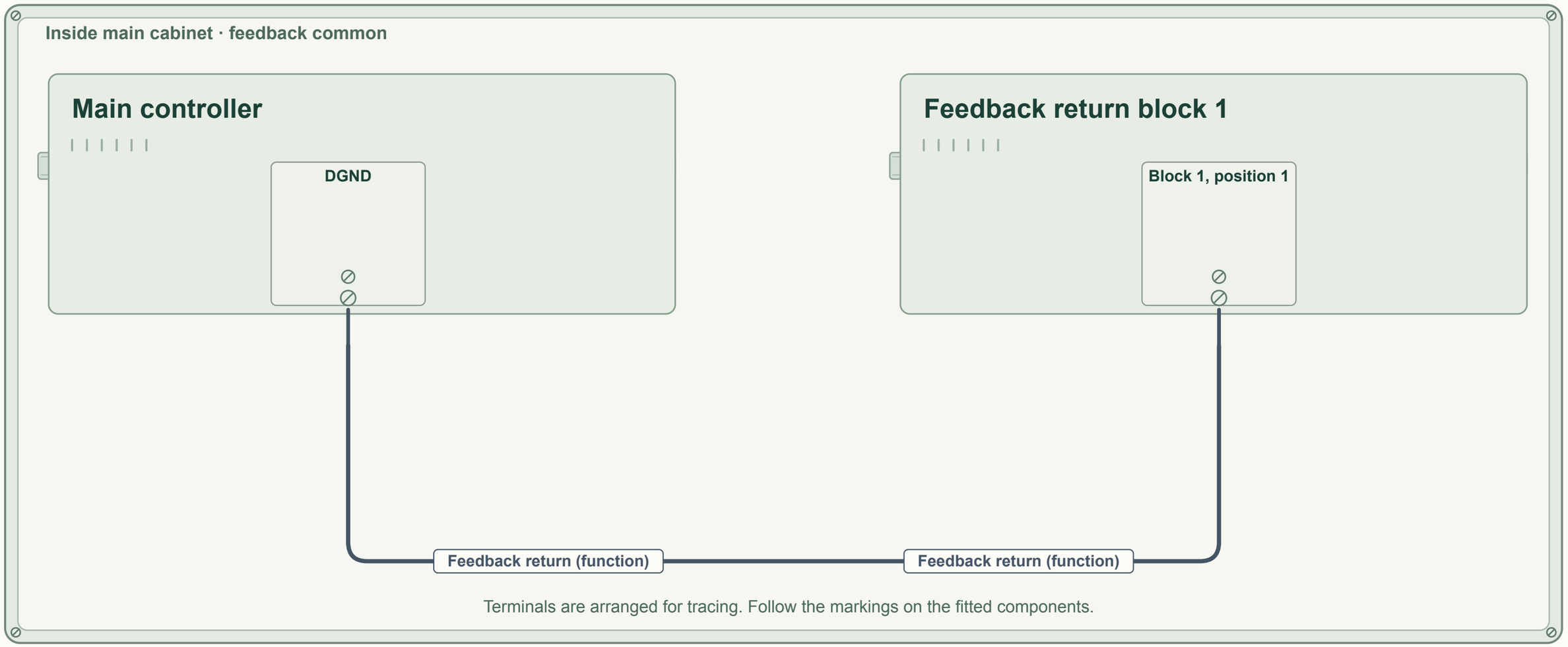
Follow the block links on MI10A and MI10B.
Check that powered feedback remains isolated.

BENCH TEST	The drawing specifies the return positions. The reference bench left DI7 open.
FIELD CHECK	Verify each return and check that no original cabinet voltage reaches the feedback input or DGND.

Assembly drawing, pp. 7–8. R02 and R03, feedback terminal names.

DGND to return block 1

This jumper connects the controller input common to the first feedback return block.



Terminals are arranged for tracing. Follow the markings on the fitted components.

Solid line · documented wiring route

Dashed line + open end · confirm on site

Colors distinguish routes. Use the printed core IDs.

1 Identify

Find DGND beside the controller inputs.
Find position 1 on feedback return block 1.

2 Route the jumper

Join DGND to that position.
Keep this path inside the dry feedback circuit.

3 Trace to the pair

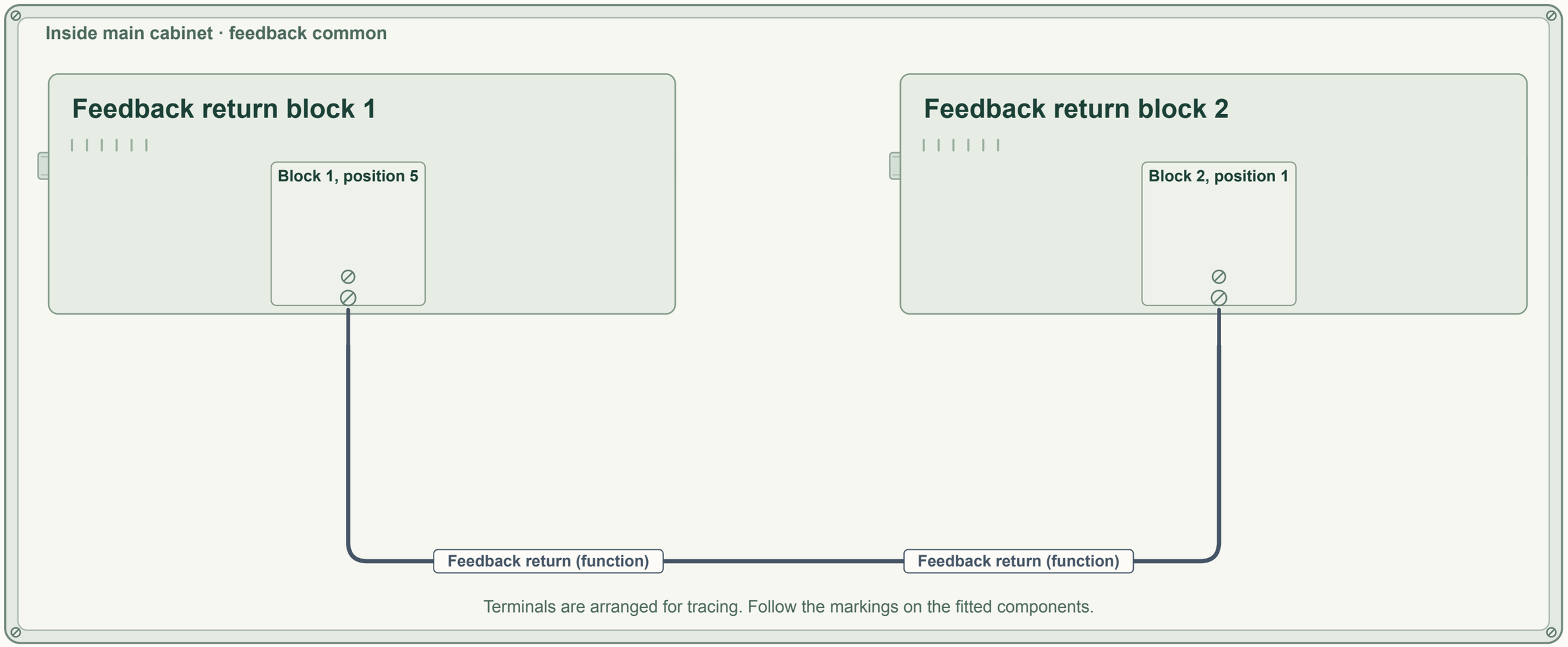
Check isolated continuity to the return bank.
Use MI10B for the link to the second block.

BENCH TEST	The assembly drawing identifies both ends. No electrical measurement of these specific leads is recorded.
FIELD CHECK	Verify the return block as assembled. Keep original cabinet return voltage isolated from DGND.

Assembly drawing, p. 8.

Return block 1 to return block 2

The two feedback return blocks are joined by one short jumper.



Terminals are arranged for tracing. Follow the markings on the fitted components.

Solid line · documented wiring route

Dashed line + open end · confirm on site

Colors distinguish routes. Use the printed core IDs.

1 Locate both blocks

Find position 5 on block 1.
Find position 1 on block 2.

2 Connect the link

Fit one jumper using those two positions.
Use the same feedback-return marking both ends.

3 Prove the common

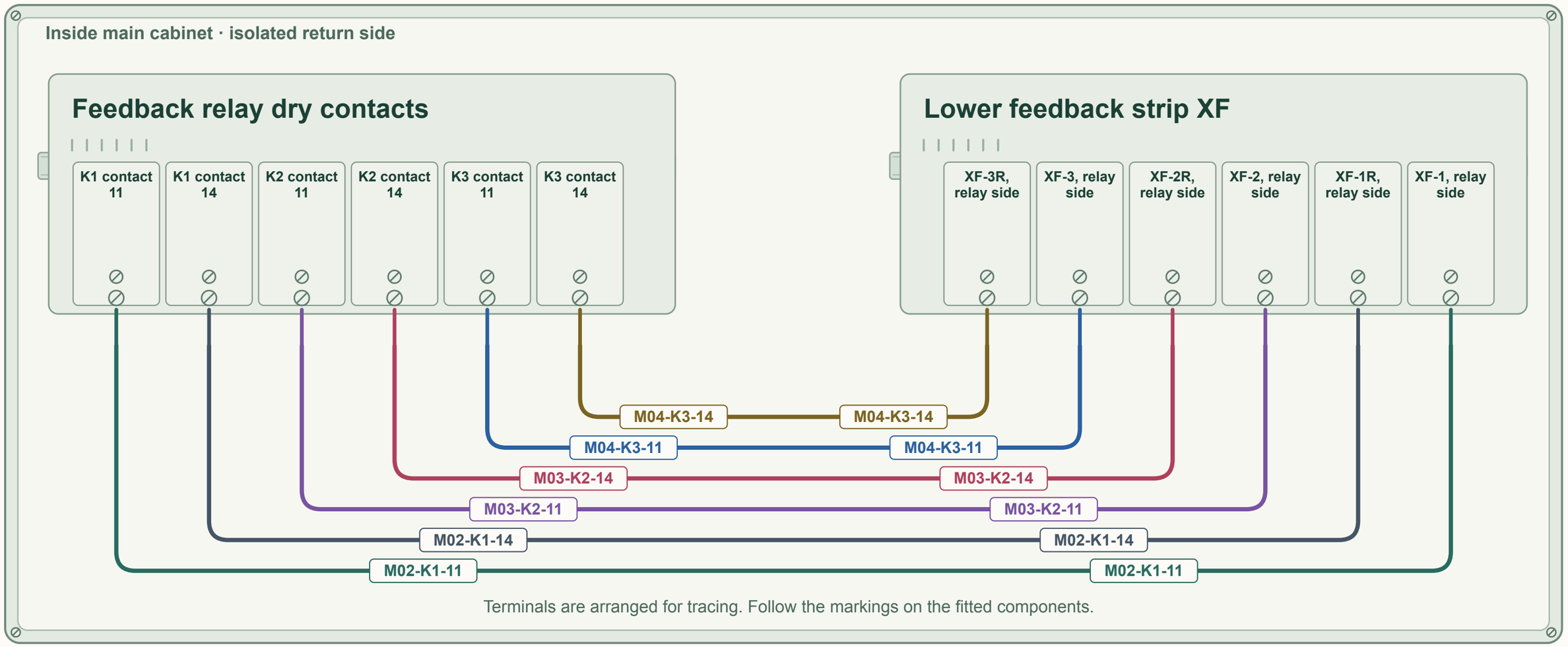
Confirm continuity back to controller DGND.
Keep individual input leads out of this link.

BENCH TEST	The assembly drawing identifies both ends. No electrical measurement of these specific leads is recorded.
FIELD CHECK	Check final continuity of the two return banks to DGND and record the installed jumper.

Assembly drawing, p. 8, feedback return jumper.

Isolated run and direction feedback

The relay coil remains on the original circuit side. These pigtails leave only the dry contacts.



Solid line · documented wiring route

Dashed line + open end · confirm on site

Colors distinguish routes. Use the printed core IDs.

1 Find the correct side

Identify the 11 and 14 dry-contact terminals.
Keep original-circuit voltage on the coil side.

2 Trace one relay

Trace 11 to the matching XF signal terminal.
Trace 14 to the matching XF return terminal.

3 Check the result

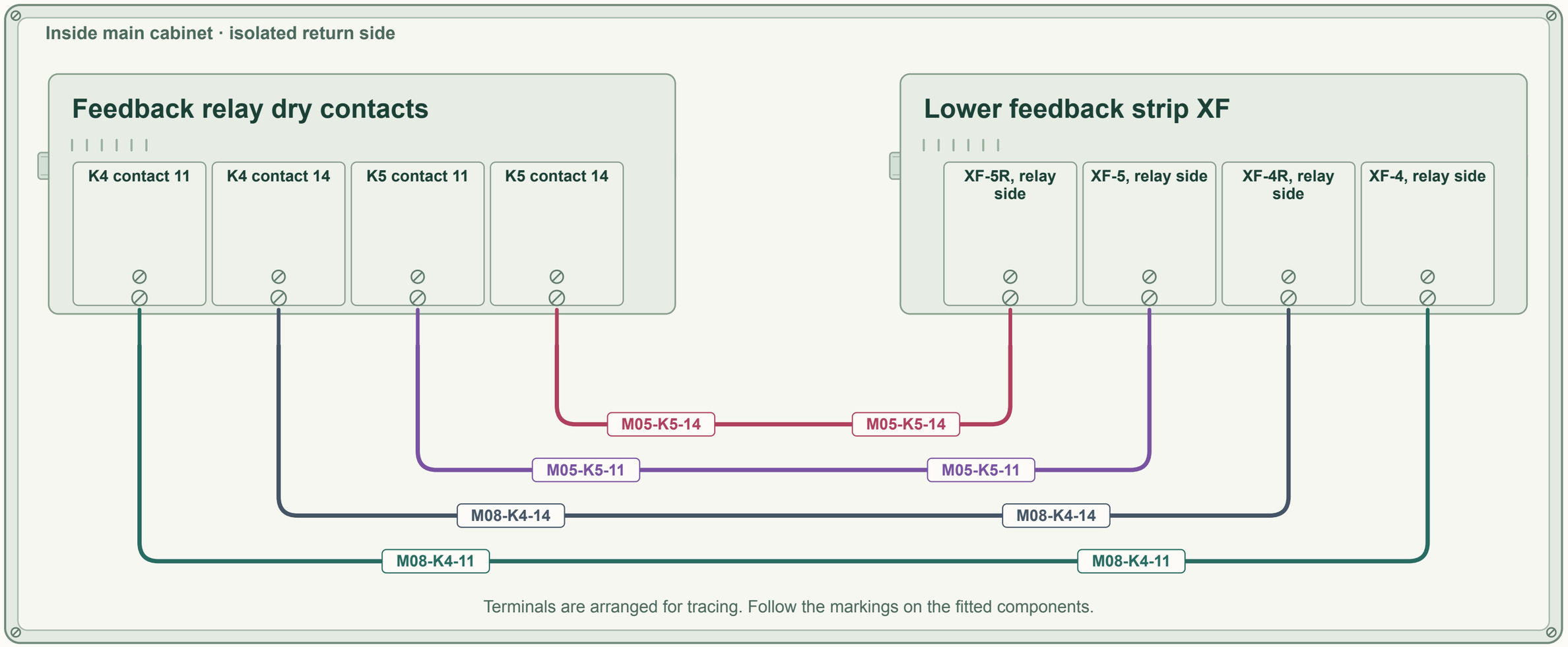
Check each dry input and its return separately.
Leave contact 12 unused on this arrangement.

BENCH TEST	The assembly and R03 show the dry-side paths. Actual fitment and separate coil-circuit tests remain site work.
FIELD CHECK	Use these labels only on the 11/14 conductors. Record the approved coil rating and field feedback source.

Assembly drawing, pp. 7–8. R03, p. 5. R02, dry-contact return map.

Isolated end-gun and panel fault feedback

The relay coil remains on the original circuit side. These pigtails leave only the dry contacts.



Solid line · documented wiring route

Dashed line + open end · confirm on site

Colors distinguish routes. Use the printed core IDs.

1 Find the correct side

Identify the 11 and 14 dry-contact terminals.
Keep original-circuit voltage on the coil side.

2 Trace one relay

Trace 11 to the matching XF signal terminal.
Trace 14 to the matching XF return terminal.

3 Check the result

Check each dry input and its return separately.
Leave contact 12 unused on this arrangement.

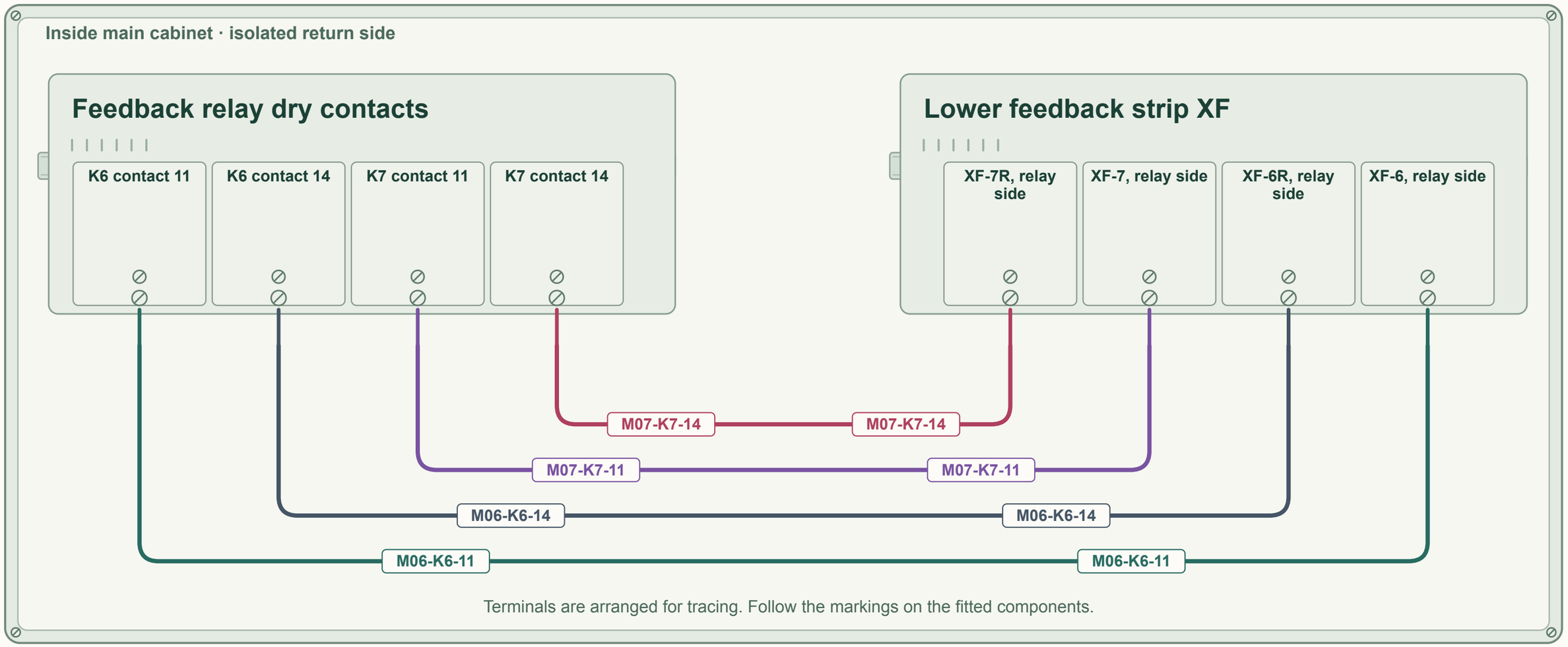
BENCH TEST The assembly and R03 show the dry-side paths. Actual fitment and separate coil-circuit tests remain site work.

FIELD CHECK Use these labels only on the 11/14 conductors. Record the approved coil rating and field feedback source.

Assembly drawing, pp. 7–8. R03, p. 5. R02, dry-contact return map.

Isolated local mode and span-spray feedback

The relay coil remains on the original circuit side. These pigtails leave only the dry contacts.



Solid line · documented wiring route

Dashed line + open end · confirm on site

Colors distinguish routes. Use the printed core IDs.

1 Find the correct side

Identify the 11 and 14 dry-contact terminals.
Keep original-circuit voltage on the coil side.

2 Trace one relay

Trace 11 to the matching XF signal terminal.
Trace 14 to the matching XF return terminal.

3 Check the result

Check each dry input and its return separately.
Leave contact 12 unused on this arrangement.

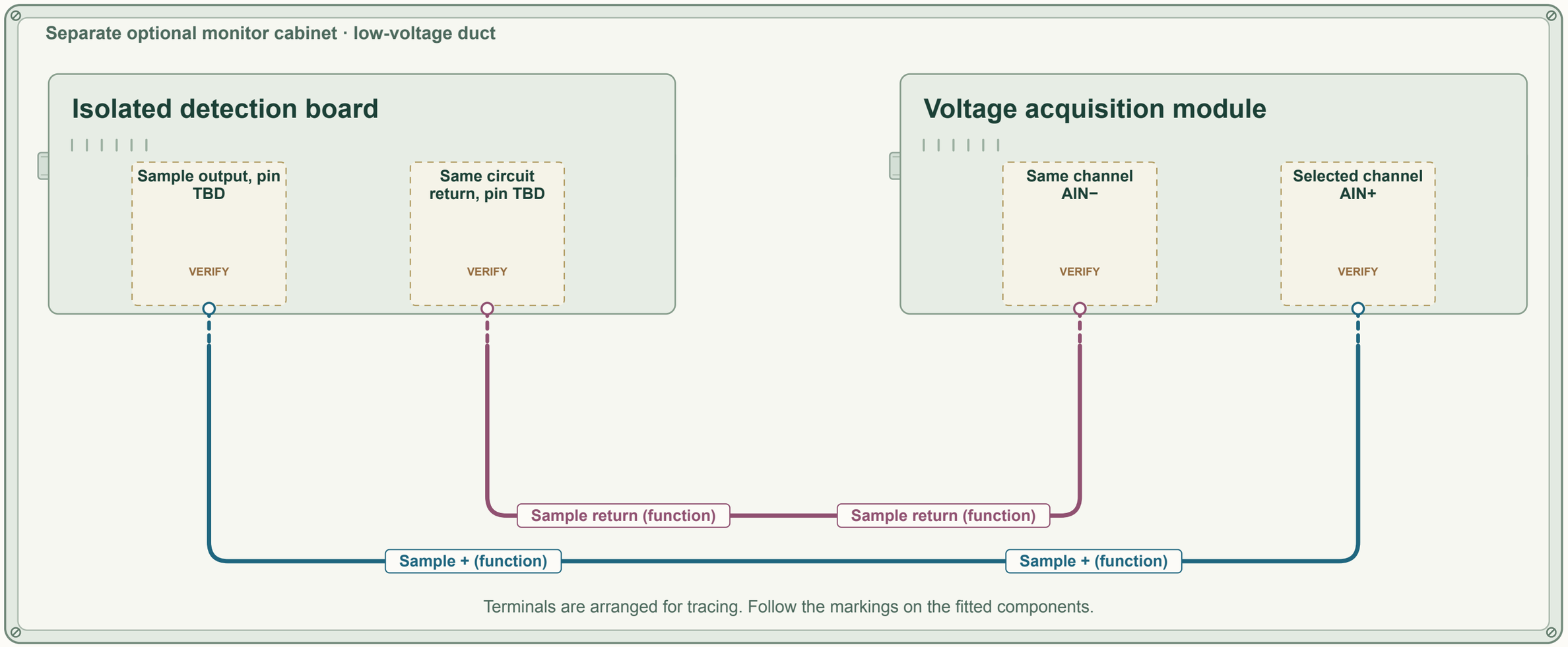
BENCH TEST The assembly and R03 show the dry-side paths. Actual fitment and separate coil-circuit tests remain site work.

FIELD CHECK Use these labels only on the 11/14 conductors. Record the approved coil rating and field feedback source.

Assembly drawing, pp. 7–8. R03, p. 5. R02, dry-contact return map.

Option cabinet · isolated measurement pair

Reference low-voltage sample cabinet for cable monitoring. This is a separate optional assembly.



Solid line · documented wiring route

Dashed line + open end · confirm on site

Colors distinguish routes. Use the printed core IDs.

1 Confirm scope

Identify the optional low-voltage monitor box.
Obtain the signed detection-board drawing.

2 Trace one pair

Use the same approved acquisition channel.
Check the isolated 0–10 V signal range.

3 Keep the scope clear

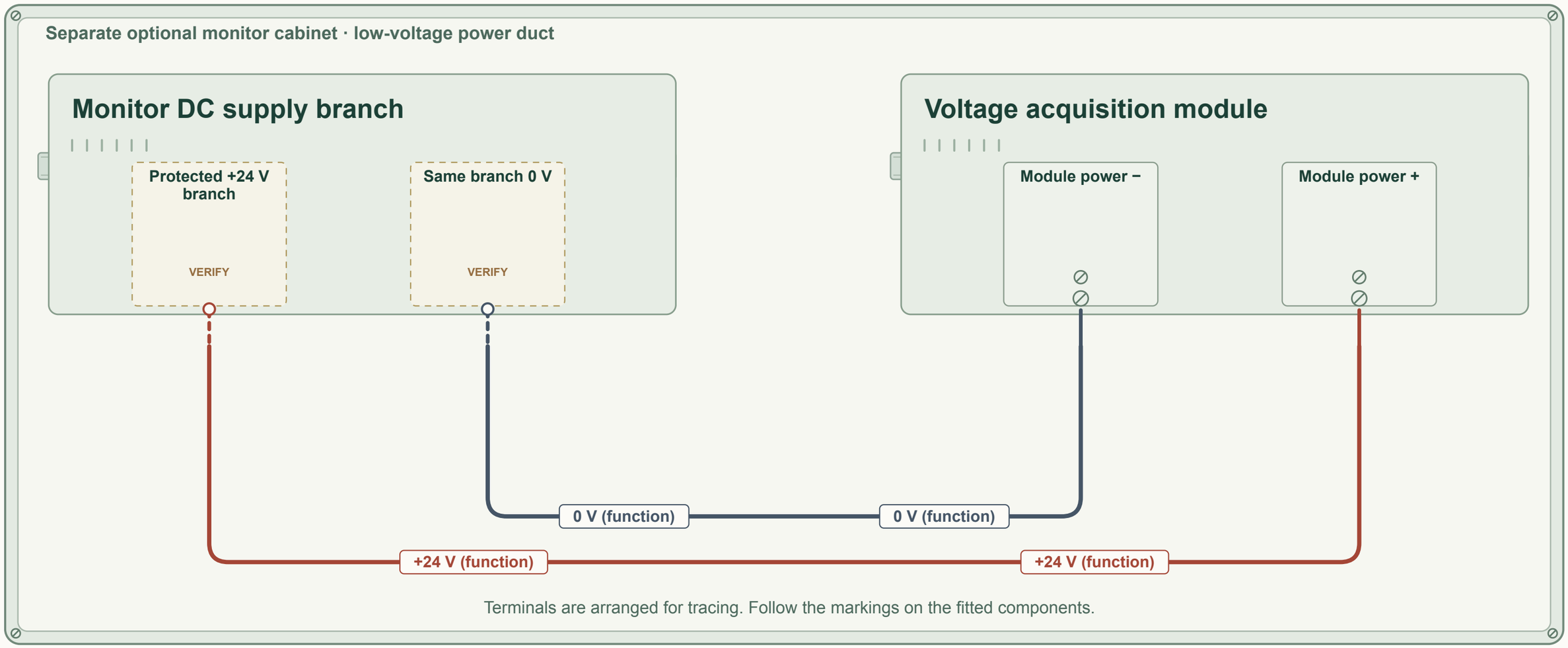
Keep this pair in the low-voltage wire duct.
Use the separate approved power-circuit plan.

BENCH TEST	Reference design only. Sample pins, channels and live field detection have not been established.
FIELD CHECK	Confirm the detection-board drawing and isolation. Leave the original power-circuit landings pending.

Assembly drawing, pp. 9–10 and 17, optional monitor and separate sample-cable enclosure.

Option cabinet · acquisition module power

The optional measurement module has a separate protected DC supply branch.



Solid line · documented wiring route

Dashed line + open end · confirm on site

Colors distinguish routes. Use the printed core IDs.

1 Find the branch

Use the approved monitor-cabinet DC plan.
Confirm the branch terminals and protection.

2 Trace the two leads

Follow the protected positive feed to +.
Return through the same 0 V supply branch.

3 Prove before connecting

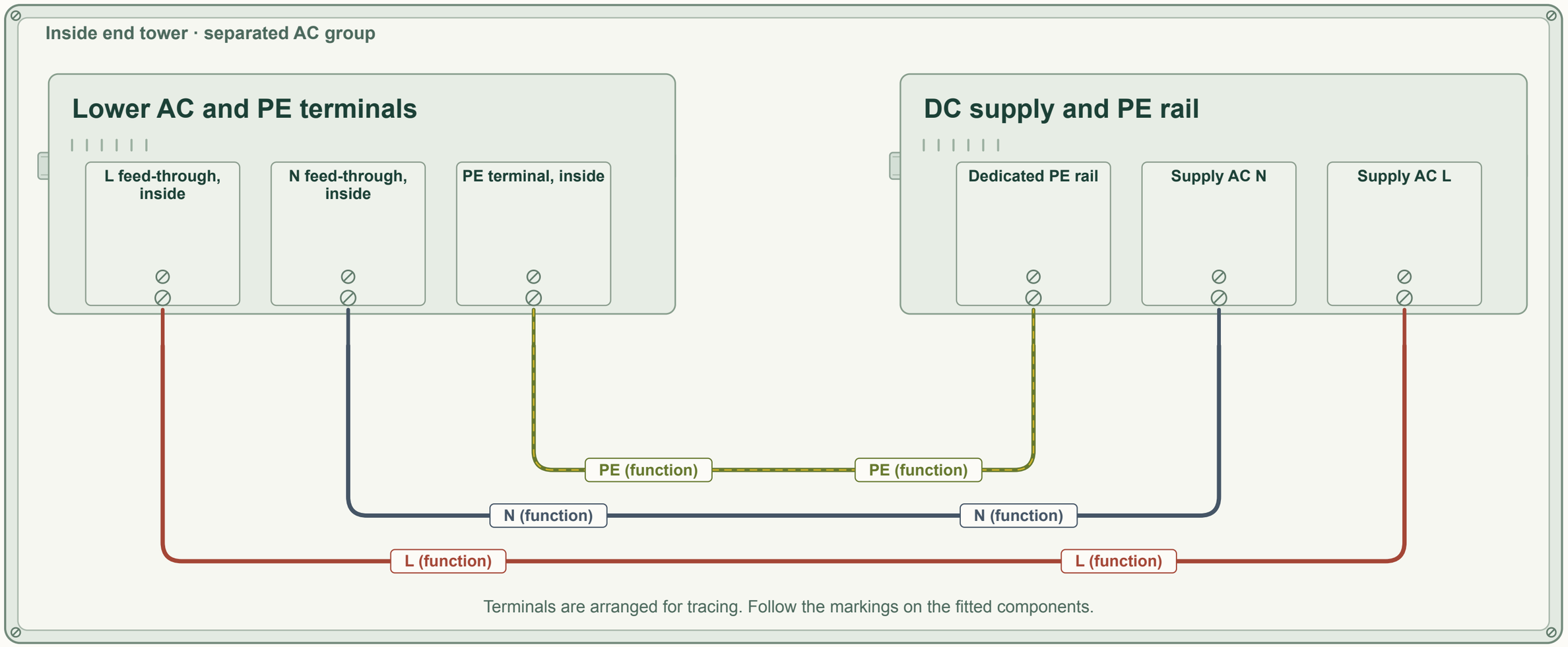
Confirm voltage and polarity at the module.
Test the backup supply if one is fitted.

BENCH TEST	Reference design only. The optional field module and backup runtime have not been established.
FIELD CHECK	Confirm protection, supply and backup duration on the selected monitor assembly.

Assembly drawing, pp. 9–10, optional monitor low-voltage supply.

End tower AC feed-through and earth

Three separate pigtails feed the 12 V DC supply and the protective-earth rail.



Solid line · documented wiring route

Dashed line + open end · confirm on site

Colors distinguish routes. Use the printed core IDs.

1 Locate

Find L, N and PE on the lower rail.
Work with both sides isolated and verified.

2 Trace

Follow L and N to the supply input.
Follow PE to the dedicated bonding rail.

3 Prove

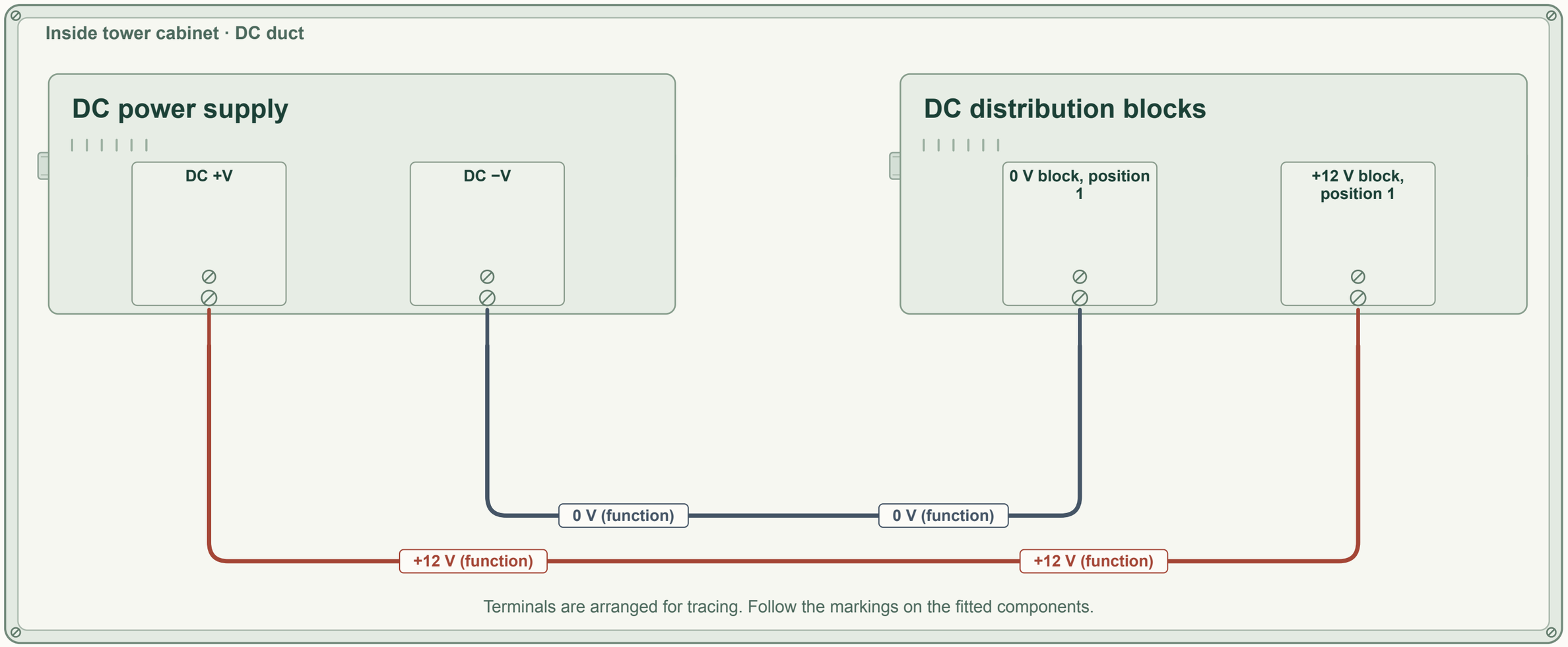
Check each path and the earth continuity.
Record the approved branch protection.

BENCH TEST	The assembly drawing identifies both ends. No electrical measurement of these specific leads is recorded.
FIELD CHECK	Verify the AC branch, protection and any enclosure bonding against the installed machine.

Assembly drawing, pp. 12–13.

12 V DC supply distribution

Place the positive and return leads into separate distribution blocks.



Terminals are arranged for tracing. Follow the markings on the fitted components.

Solid line · documented wiring route

Dashed line + open end · confirm on site

Colors distinguish routes. Use the printed core IDs.

1 Identify

Find +V and −V on the supply.
The block positions follow the assembly drawing.

2 Connect

Connect the positive lead to its own block.
Run the 0 V lead to the separate return block.

3 Prove

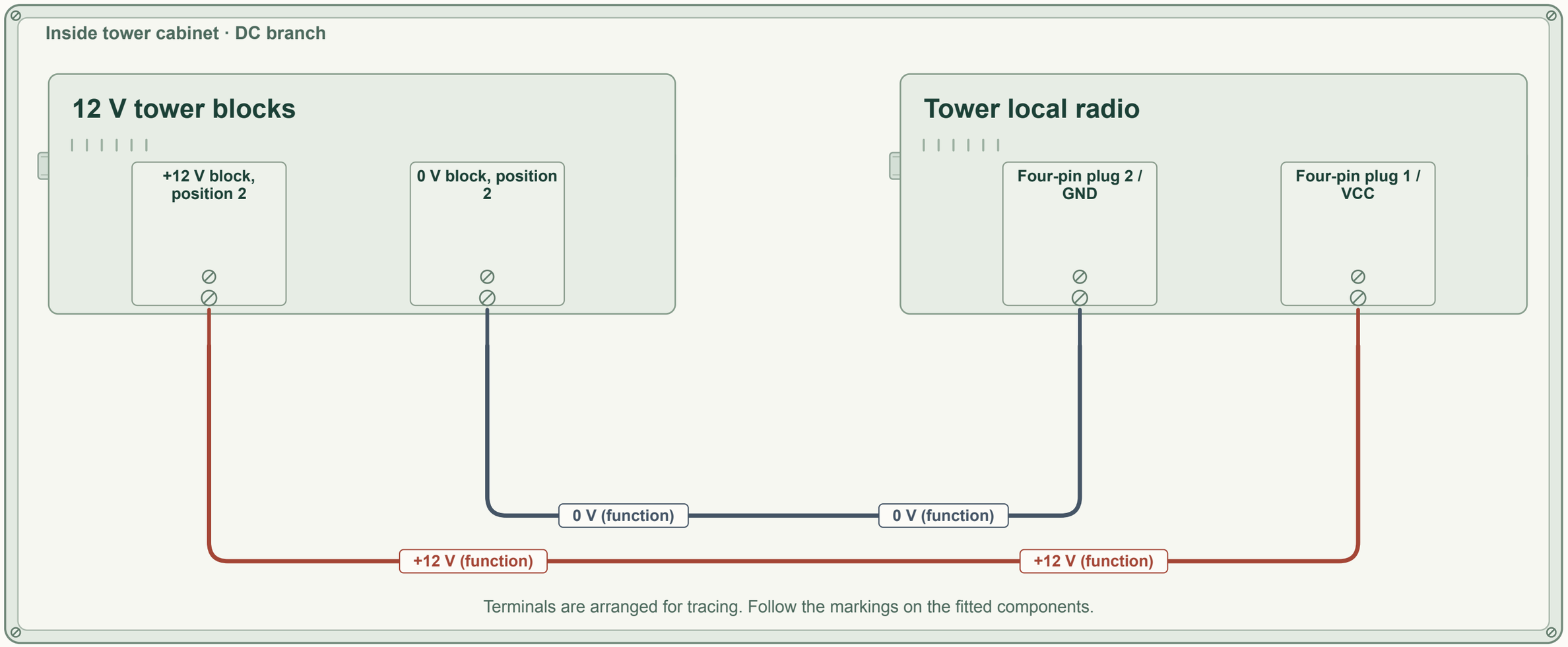
Verify polarity at the blocks before loading.
Record voltage with the fitted loads connected.

BENCH TEST	The assembly drawing identifies both ends. No electrical measurement of these specific leads is recorded.
FIELD CHECK	Verify actual wire gauge, polarity and voltage. Positive and return distribution blocks stay separate.

Assembly drawing, p. 14.

Tower local radio 12 V branch

Two separate power leads connect the device to the tower distribution blocks.



Terminals are arranged for tracing. Follow the markings on the fitted components.

Solid line · documented wiring route

Dashed line + open end · confirm on site

Colors distinguish routes. Use the printed core IDs.

1 Locate

Locate position 2 on both tower blocks.
Use the device connector labels and orientation.

2 Connect

Keep the positive and 0 V leads together.
Land each core on its matching terminal.

3 Prove polarity

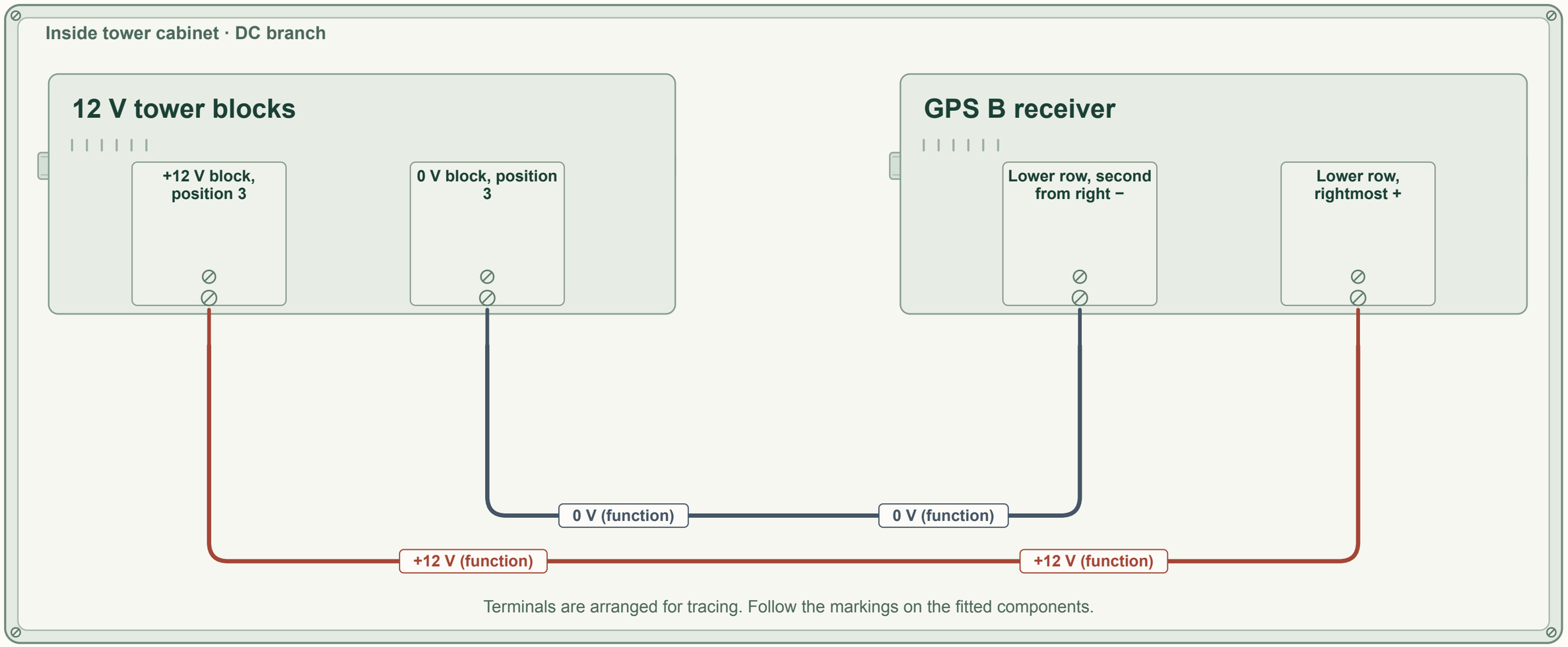
Measure at the device connector before loading.
Verify voltage again with the device powered.

BENCH TEST	The assembly drawing identifies both ends. No electrical measurement of these specific leads is recorded.
FIELD CHECK	Compare connector position with the fitted device and document the branch under load.

Assembly drawing, p. 14, position 2

GPS B receiver 12 V branch

Two separate power leads connect the device to the tower distribution blocks.



Terminals are arranged for tracing. Follow the markings on the fitted components.

Solid line · documented wiring route

Dashed line + open end · confirm on site

Colors distinguish routes. Use the printed core IDs.

1 Locate

Locate position 3 on both tower blocks.
Use the device connector labels and orientation.

2 Connect

Keep the positive and 0 V leads together.
Land each core on its matching terminal.

3 Prove polarity

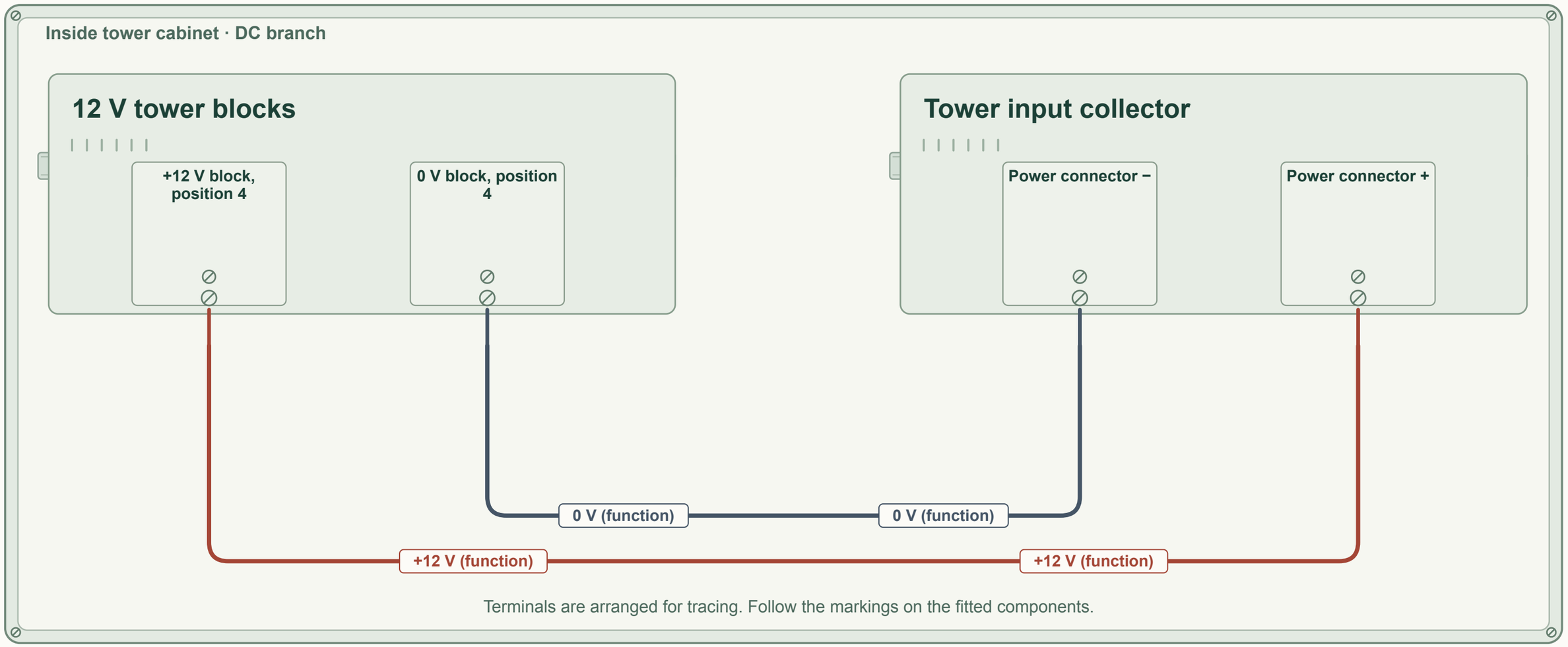
Measure at the device connector before loading.
Verify voltage again with the device powered.

BENCH TEST	The assembly drawing identifies both ends. No electrical measurement of these specific leads is recorded.
FIELD CHECK	Compare connector position with the fitted device and document the branch under load.

Assembly drawing, p. 14, position 3

Tower input collector 12 V branch

Two separate power leads connect the device to the tower distribution blocks.



Solid line · documented wiring route

Dashed line + open end · confirm on site

Colors distinguish routes. Use the printed core IDs.

1 Locate

Locate position 4 on both tower blocks.
Use the device connector labels and orientation.

2 Connect

Keep the positive and 0 V leads together.
Land each core on its matching terminal.

3 Prove polarity

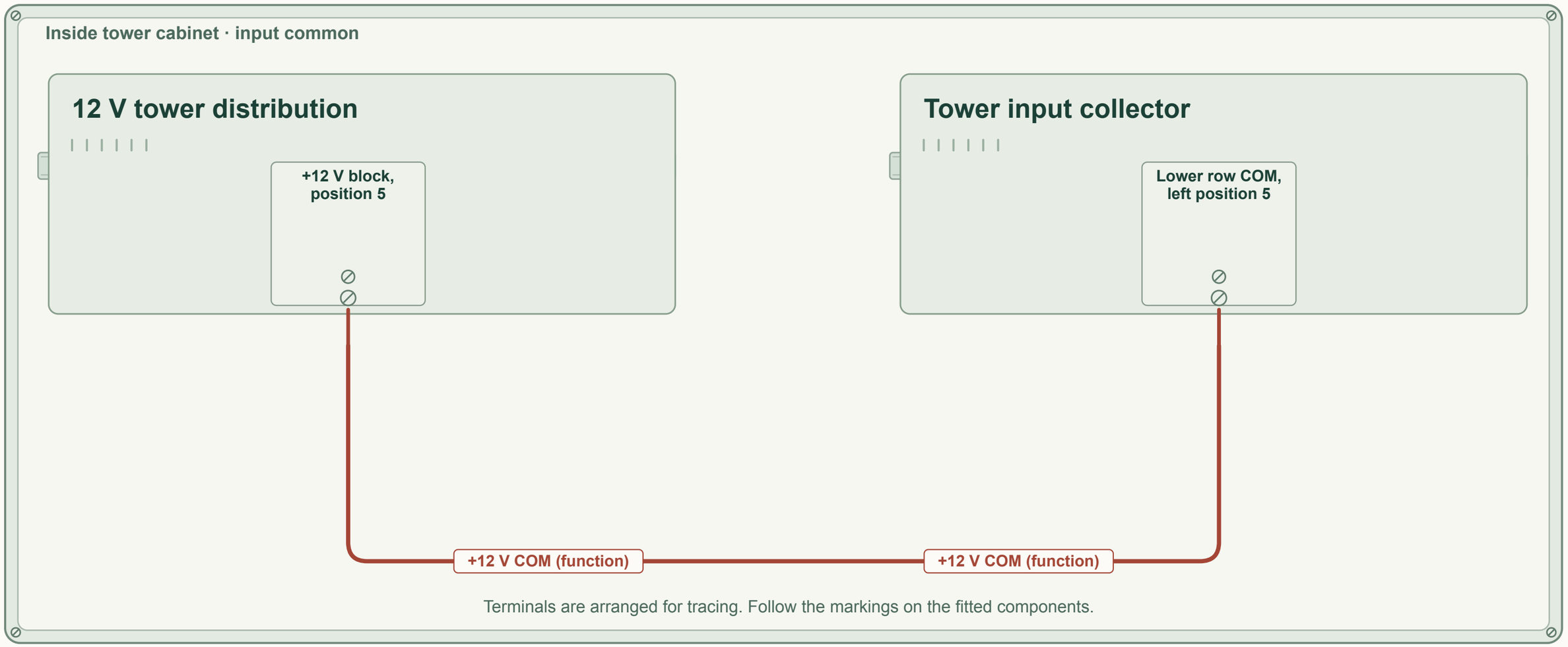
Measure at the device connector before loading.
Verify voltage again with the device powered.

BENCH TEST	The assembly drawing identifies both ends. No electrical measurement of these specific leads is recorded.
FIELD CHECK	Compare connector position with the fitted device and document the branch under load.

Assembly drawing, p. 14, position 4

Collector input COM positive lead

The shown input collector uses local +12 V at COM. This is separate from its power-terminal positive lead.



Solid line · documented wiring route

Dashed line + open end · confirm on site

Colors distinguish routes. Use the printed core IDs.

1 Find the poles

Locate position 5 of the positive DC block.
Find COM at position 5 from the left.

2 Fit one lead

Link the positive block to COM as shown.
Follow EI04B for the separate 0 V return.

3 Verify the circuit

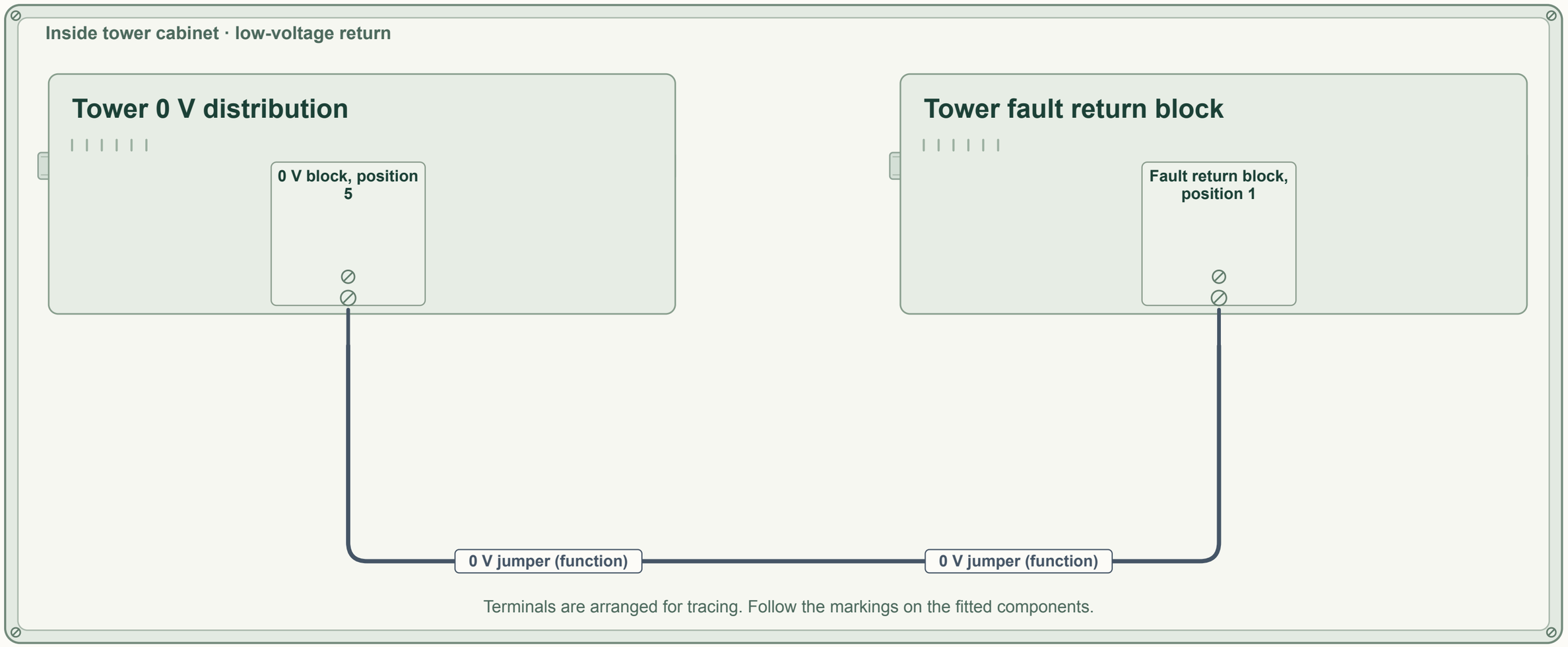
Confirm this input common on the fitted unit.
Prove one isolated dry contact at a time.

BENCH TEST	This COM arrangement appears in the assembly drawing. X1 was toggled on an isolated module.
FIELD CHECK	Verify that the fitted collector requires positive COM before using the drawing.

Assembly drawing, pp. 14, 16. Isolated X1 input test, 12 Nov 2026.

0 V feed to the tower return block

The return block carries the four fault-pair returns back to the same local 0 V source.



Solid line · documented wiring route

Dashed line + open end · confirm on site

Colors distinguish routes. Use the printed core IDs.

1 Find the block positions

Find position 5 on the 0 V power block.
Find position 1 on the fault return block.

2 Trace one jumper

Connect these two 0 V positions.
Use positions 2 to 5 for the fault pairs.

3 Prove the return

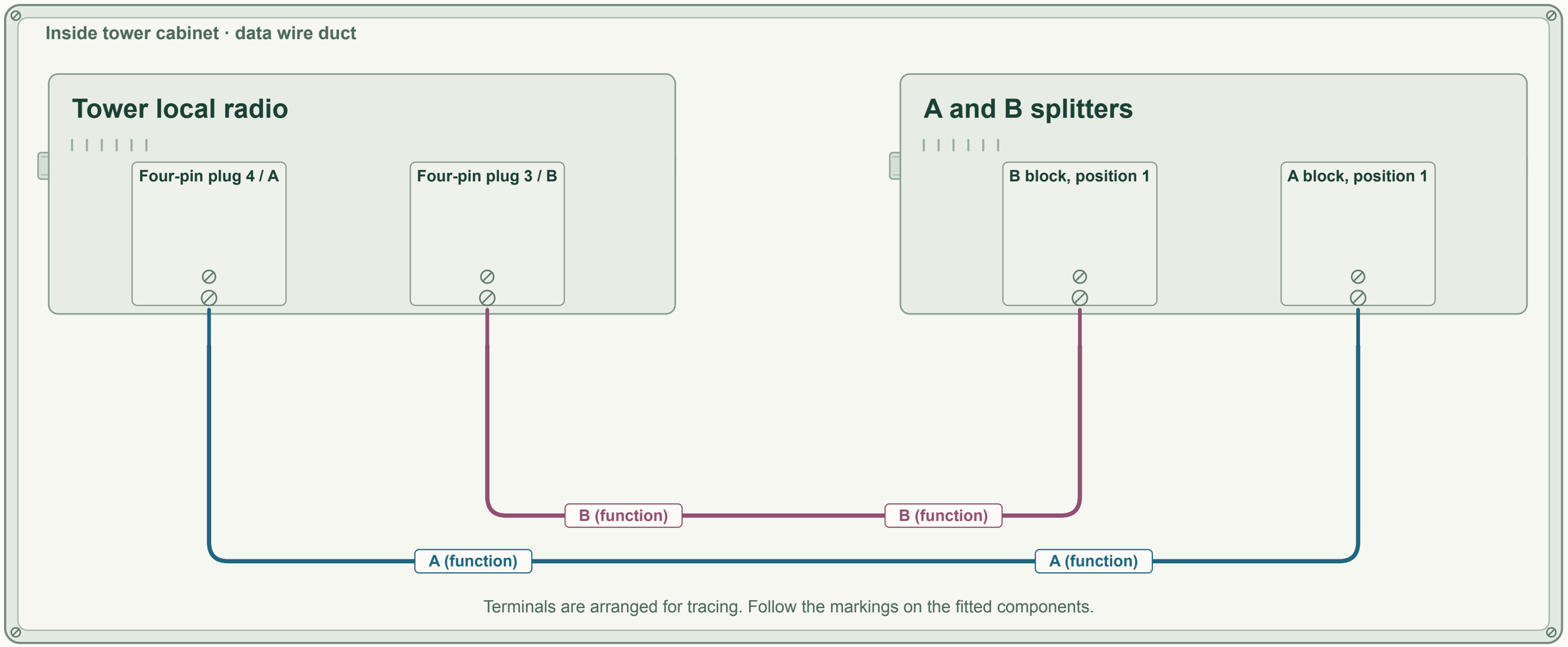
Measure continuity with the system isolated.
Keep the collector COM on its +12 V lead.

BENCH TEST	The assembly drawing identifies both ends. No electrical measurement of these specific leads is recorded.
FIELD CHECK	Verify continuity to local 0 V. Keep the original powered fault circuits isolated from this return.

Assembly drawing, p. 14, negative distribution position 5 to return position 1.

RS-485 · Tower local radio

Follow this one twisted pair between the device and its assigned A and B splitter positions.



Solid line · documented wiring route

Dashed line + open end · confirm on site

Colors distinguish routes. Use the printed core IDs.

1 Identify the pair

Find the device A and B connections.
Use position 1 on both splitters.

2 Trace and land

Trace A and B separately before connection.
Check the connector view and cable routing.

3 Prove on the bus

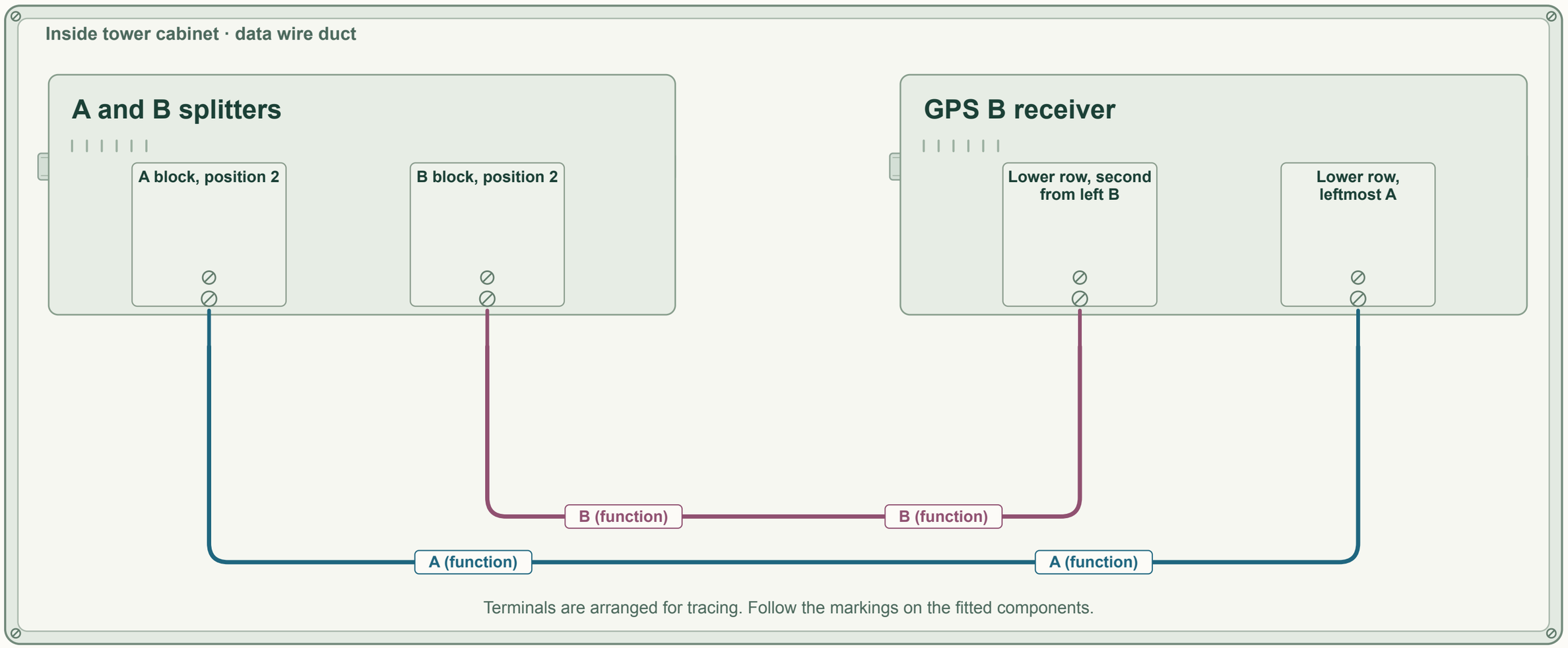
Check that data updates over the fitted radio.
Confirm the assigned serial settings in service.

BENCH TEST	Position B was reported over the radio. The collector kept address 2 and 9600 baud after an isolated USB power cycle.
FIELD CHECK	Verify the assembled shared radio bus with both devices reporting and each fitted tower fault cycling.

Assembly drawing, p. 15. Radio return and tower collector USB verification records.

RS-485 · GPS B receiver

Follow this one twisted pair between the device and its assigned A and B splitter positions.



Solid line · documented wiring route

Dashed line + open end · confirm on site

Colors distinguish routes. Use the printed core IDs.

1 Identify the pair

Find the device A and B connections.
Use position 2 on both splitters.

2 Trace and land

Trace A and B separately before connection.
Check the connector view and cable routing.

3 Prove on the bus

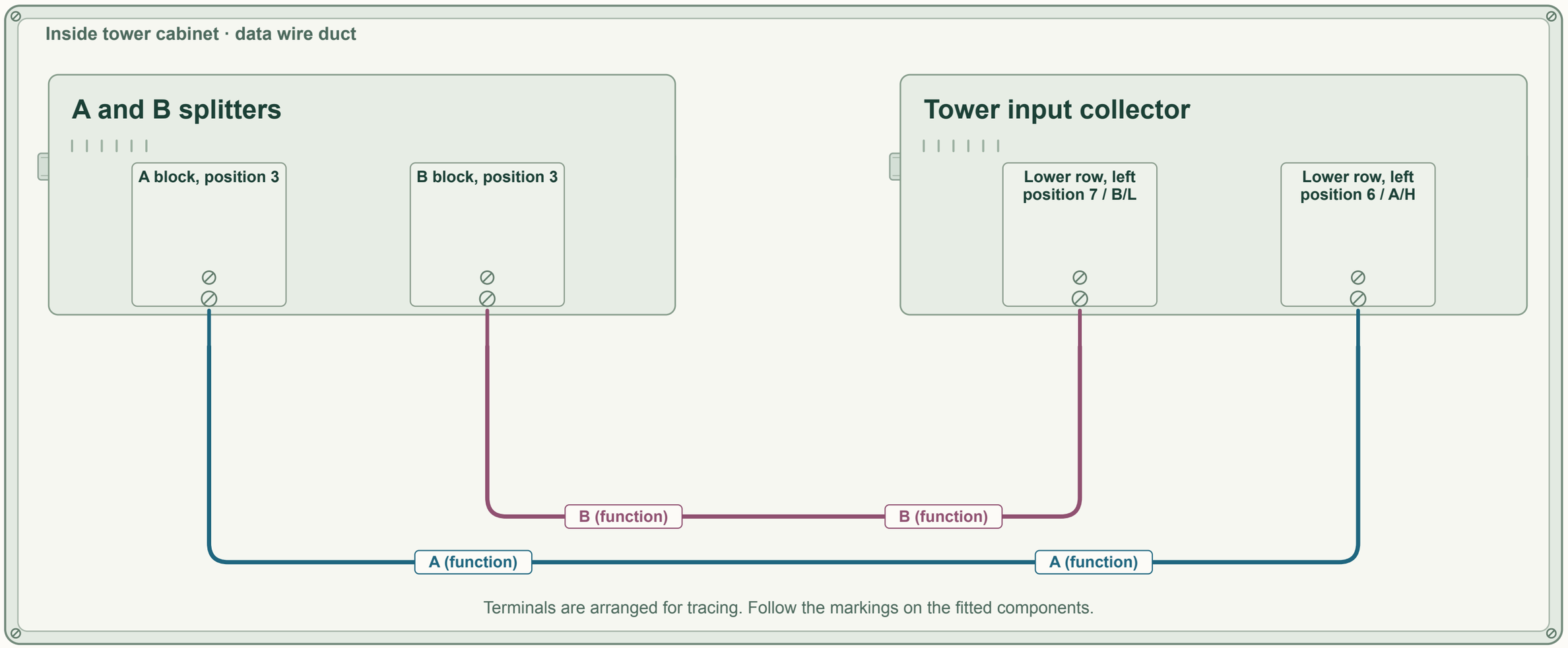
Check that data updates over the fitted radio.
Confirm the assigned serial settings in service.

BENCH TEST	Position B was reported over the radio. The collector kept address 2 and 9600 baud after an isolated USB power cycle.
FIELD CHECK	Verify the assembled shared radio bus with both devices reporting and each fitted tower fault cycling.

Assembly drawing, p. 15. Radio return and tower collector USB verification records.

RS-485 · Tower input collector

Follow this one twisted pair between the device and its assigned A and B splitter positions.



Solid line · documented wiring route

Dashed line + open end · confirm on site

Colors distinguish routes. Use the printed core IDs.

1 Identify the pair

Find the device A and B connections.
Use position 3 on both splitters.

2 Trace and land

Trace A and B separately before connection.
Check the connector view and cable routing.

3 Prove on the bus

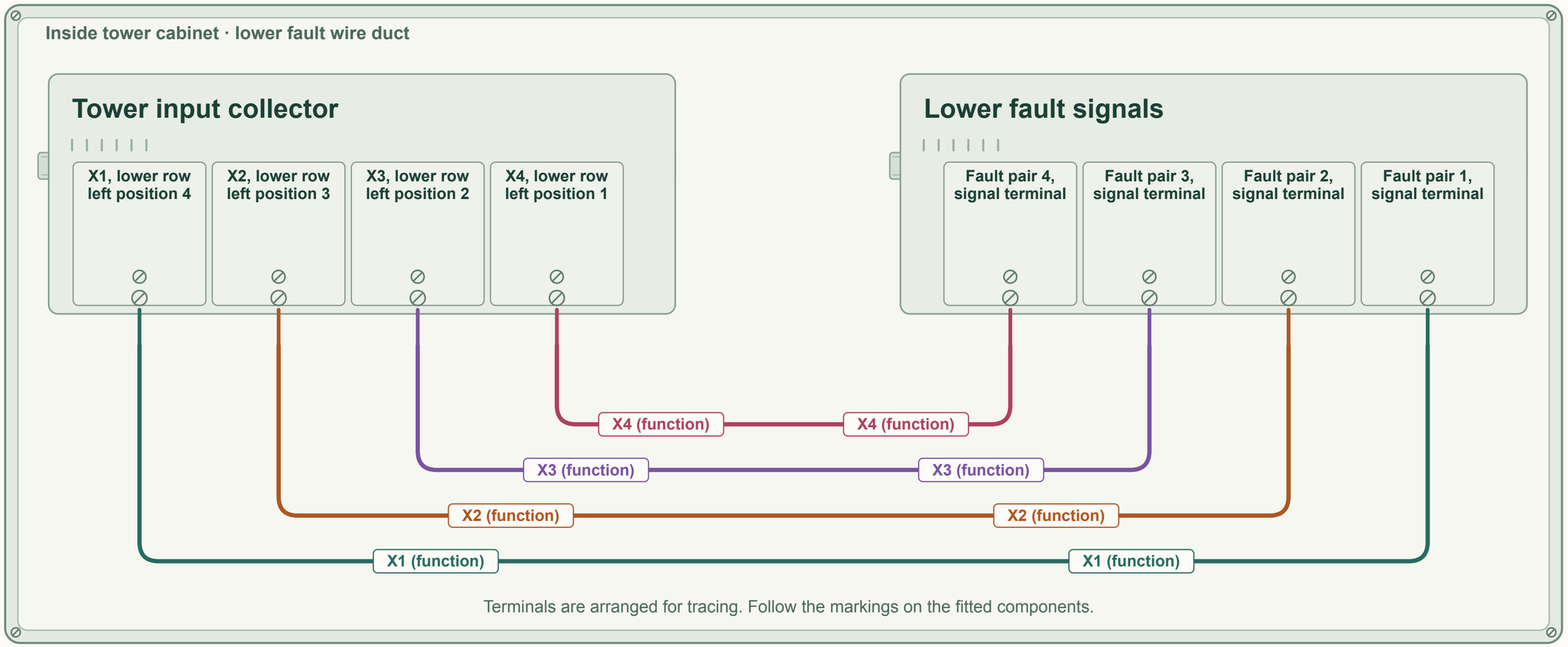
Check that data updates over the fitted radio.
Confirm the assigned serial settings in service.

BENCH TEST	Position B was reported over the radio. The collector kept address 2 and 9600 baud after an isolated USB power cycle.
FIELD CHECK	Verify the assembled shared radio bus with both devices reporting and each fitted tower fault cycling.

Assembly drawing, p. 15. Radio return and tower collector USB verification records.

Fault feed-through signal pigtails

Each fault signal crosses the lower rail through one dedicated feed-through terminal.



Solid line · documented wiring route

Dashed line + open end · confirm on site

Colors distinguish routes. Use the printed core IDs.

1 Read the strip

From the left, the inputs read X4 to X1.
The lower rail pairs read X1 to X4.

2 Trace one signal

Match each X to its own fault-pair signal.
Use EI06B for the four associated returns.

3 Prove each input

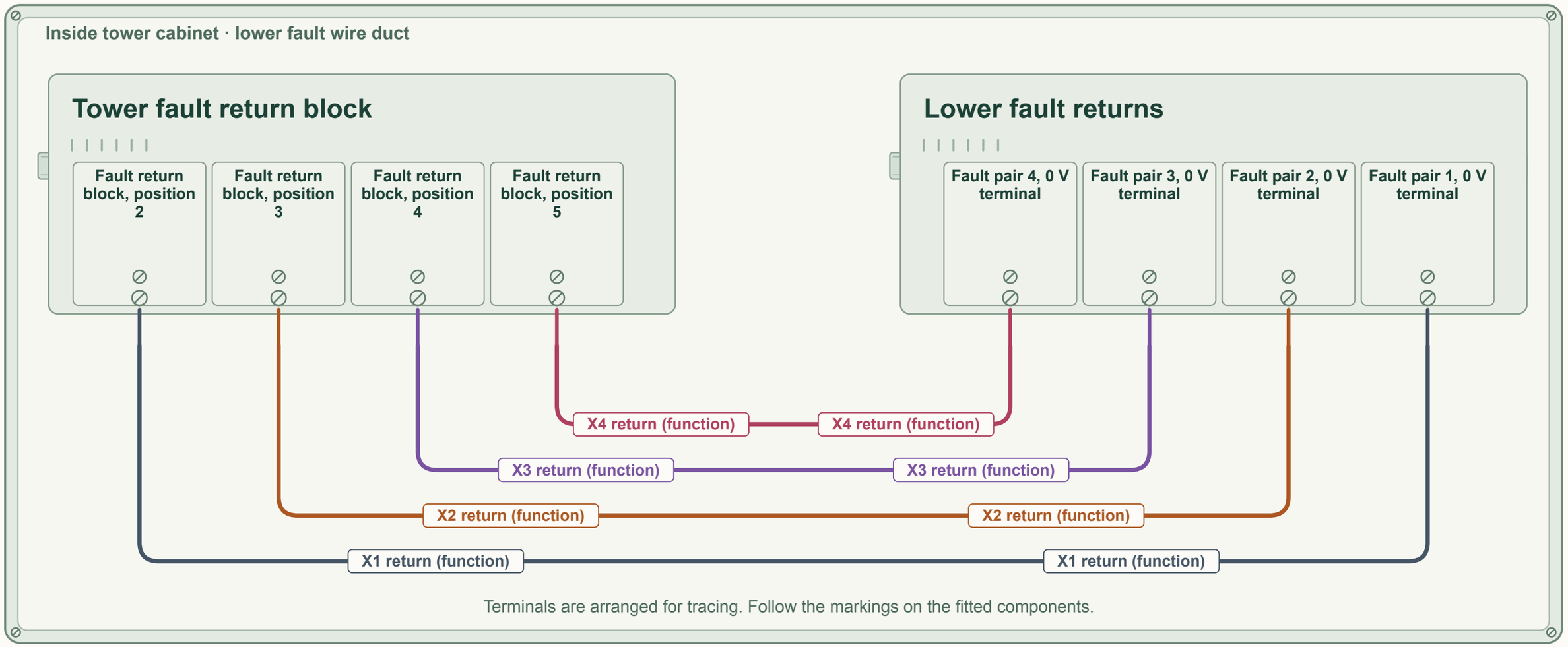
Test open and closed using the dry side.
Check the App shows the recorded tower.

BENCH TEST	X1 passed on isolated USB. Address 2 and 9600 baud were checked after a separate power cycle.
FIELD CHECK	Verify X1–X4 and actual tower names on the assembled radio path. Check fresh position B during the test.

Assembly drawing, pp. 12, 16. Isolated X1 test and USB setting-retention records, 12 Nov 2026.

Fault feed-through return pigtails

Each lower rail fault pair has its own return pigtail to the local 0 V block.



Solid line · documented wiring route

Dashed line + open end · confirm on site

Colors distinguish routes. Use the printed core IDs.

1 Find the matching pairs

Identify the 0 V terminal of each fault pair.
Trace its dedicated slot in the return block.

2 Trace only the return

Use positions 2 to 5 for fault pairs 1 to 4.
Position 1 receives the 0 V supply jumper.

3 Prove isolation

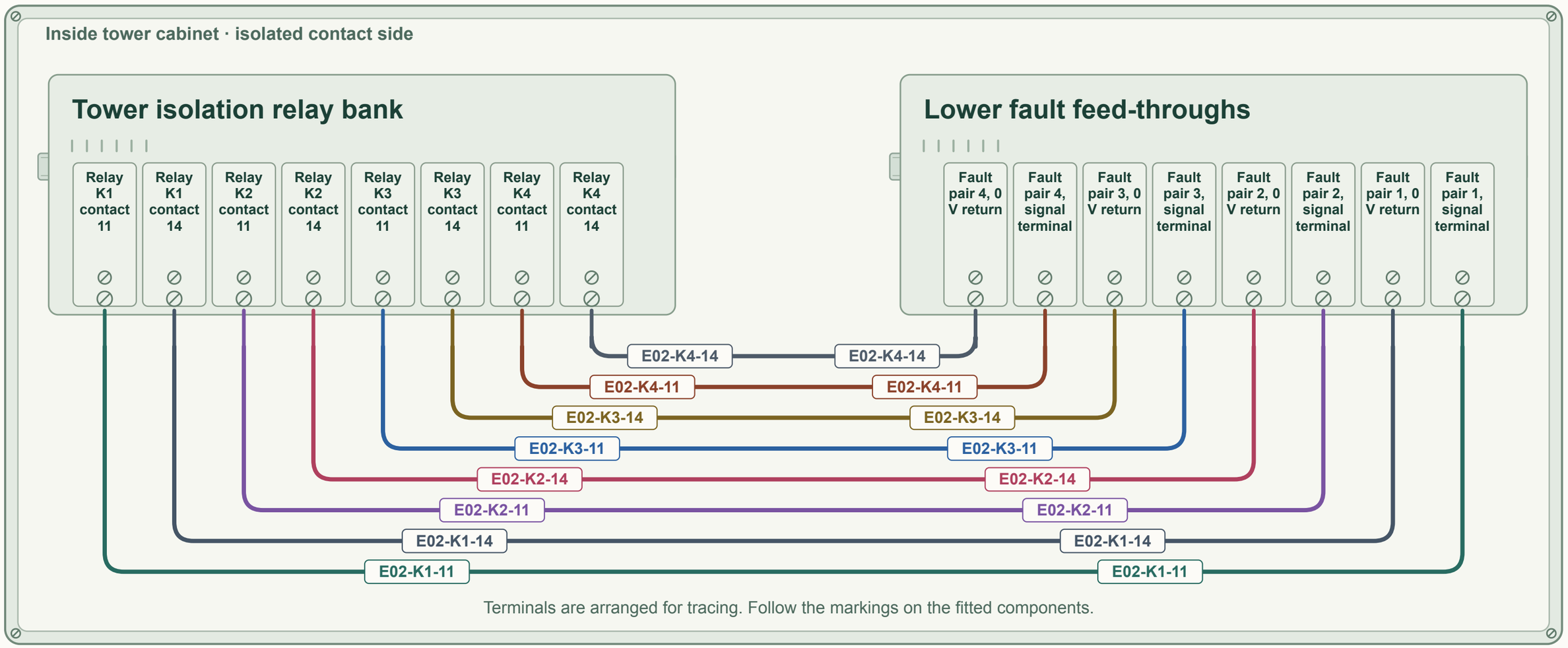
Check continuity to local 0 V with power off.
Verify the powered machine side is isolated.

BENCH TEST	The assembly drawing specifies all four return pigtails. The standalone X1 test did not prove the full harness.
FIELD CHECK	Verify each actual conductor and its source identification before operating the tower.

Assembly drawing, pp. 12, 14, 16. Isolated X1 input test record.

Optional tower isolation contact pigtails

Use this dry-contact routing if the isolation relays are within the end-tower assembly.



Solid line · documented wiring route

Dashed line + open end · confirm on site

Colors distinguish routes. Use the printed core IDs.

1 Locate the relay bank

Confirm where the relays are actually mounted.
Use E02 for an external isolation enclosure.

2 Trace the dry side

Route each 11 to its paired fault signal.
Route each 14 to that pair's local 0 V.

3 Verify the separation

Keep the powered circuit on A1/A2.
Check the four dry paths after assembly.

BENCH TEST	R03 defines the dry-side tags. The standalone X1 check did not verify the optional relay paths.
FIELD CHECK	Confirm approved relay placement, input mapping and the function of each original-machine circuit.

R03, p. 5, E02 dry contacts. Assembly drawing, pp. 14, 16.

Commission travel, stop and local control

Record the request, the independent feedback and what the installer actually observed.

1 Check original controls

With the approved test method, prove local start, local stop, emergency stop, limits and forward/reverse interlocks. Record the local selector position and independent mode indication.

2 Prove inputs before motion

Use an isolated fixture or approved test contact. Change one input at a time, check its expected return and show it releases. Remove temporary jumpers and restore the field routing.

3 Witness forward travel

Select the identified machine. Request forward and start. Observe actual movement, DI1 run and DI2 forward together. Check reverse indication remains inactive. Record time and direction.

4 Stop and confirm standstill

Issue stop. Record output release, returned run and direction inputs, physical standstill and stopping distance or angle. Confirm the site is clear before requesting the opposite direction.

5 Witness reverse travel

Request reverse then start under the approved trial. Verify physical direction, DI1 run and DI3 reverse. Stop and confirm both feedbacks release. Exercise local takeover per the signed plan.

6 Record loss and recovery

Use the approved plan for missing feedback, contradictory inputs or loss of communications. Record the fault, local authority and recovery. Verify the machine stays in the expected state after reconnection.

Commission water, data and fitted options

Perform each test against the installed device and its assigned channel.

1 Span water and end gun

Operate each fitted circuit separately. Read its independent return and observe the actual valve, pump or spray. Check the shutdown state. Record where the indication comes from.

2 Tower faults

Trigger each approved test point separately, then reset it. Match the physical tower to the correct X input and App record. Check that other inputs hold their state and position B remains fresh.

3 Cellular link and radio

Record the fitted gateway, local carrier, working network and antenna ports. Verify the center-to-tower radio separately. Interrupt and restore each link using the approved test plan.

4 Center and tower position

Check the fixed center and a fresh tower fix with timestamps. During a tower interruption, verify that the previous B position is shown as last known. Verify recovery on fresh data.

5 Speed and sensors

For an assigned speed output, verify timing and actual travel. For each fitted sensor verify supply, connector, bus address, scaling, timestamps and the observed reading. Protect unused cores.

6 Cable monitor

Compare the protected conductor, power state, telemetry and notification. Witness the approved loss-of-power and conductor-fault tests separately. Record backup runtime when fitted.

As-built cable and core record

Print a copy for each physical cable segment. Enter the terminal actually used at each end.

Site / machine

Cable / segment / length

Drawing / revision

Core ID	End A · location / terminal	End B · location / terminal	Test / result	Date / initials

Cable type / circuit voltage / bonding arrangement

Open conductors, individually insulated spares or additional witness notes

Acceptance and handover

Complete this page with the electrician, site witness and owner.

Electrical installation

Attach the signed drawings, cable lengths, landed terminals, protective bonding and enclosure checks. Record which conductors or options remain parked.

Observed operation

Attach the travel, stop, local takeover and fault records. Include water, tower or option evidence only for the installed configuration.

Operator handover

Identify the machine in the App. Show normal stop, local control, stale position and returned feedback. Record who witnessed each action.

Open items

Identify the specific circuit, unconfirmed endpoint, responsible person and test still due. Attach the updated as-built record before releasing that function.

Electrical installer

Signature / date

Site witness

Signature / date

Owner / operator

Signature / date

Use with the machine-specific terminal schedule and commissioning records.

What the project records establish

Use the circuit-specific bench and field notes at the foot of every wiring sheet.

1 Cabinet assembly drawings

The 17-page assembly guide identifies the two enclosures, internal supply distribution, command and input rails, data cables, roof feeders and the separate prototype cable-monitor components.

2 R02 terminal schedule

The main cabinet core schedule and its test sheet identify controller and rail designations. Original cabinet references lead the electrician to a circuit to trace. Final field landings require the site drawing.

3 R03 jacket and core labels

The five-page cable guide and print schedule cover the eleven main outlets, two tower outlets, five antenna feeders, optional spares and the machine-side and controller-side relay cable variants.

4 Control board and contact harness

On 13 Nov 2026 the existing harness returned run, forward, reverse and end-gun inputs. Final stop cleared the observed inputs and outputs. Verify the field motor, new wiring and water circuits separately.

5 Tower and positioning tests

The isolated tower module registered X1 changing state on 12 Nov. Address 2 at 9600 baud was separately read back after a power cycle. Confirm all four installed tower alarms over radio and fresh position B.

6 Optional timer and cable monitor

The standard timer sequence has a recorded software case. Its physical output and the original timer changeover await approval. Original conductors, residual-voltage checks and any monitor backup supply require site evidence.