

Cables, transformers, switchgear

Why that size, not just what size

Cable sizing that names the requirement that decided it, copper held as a position, transformers priced on what they cost to own, and test certificates printed from readings.

Three-way cable sizing

Current, volt drop, short circuit

Copper as a position

Orders netted against metal

Cost of ownership

Transformer losses priced in

From the catalogue to the drum – every size explained

Constructions with the works' own ratings, designs sized against them, orders with their copper exposure, drums, transformers and panels – and each step posts its own accounting entry.



Sized, and told why

Every design is checked on current, volt drop and short circuit; the screen names the one that decided it and shows each rejected size.



Copper you can see

Firm-price orders marked to today's copper and netted against the metal already bought – the whole round trip, not half of it.



Transformers on lifetime cost

No-load and load losses priced over the years the buyer will run the machine, at the buyer's own energy price and loading.



Certificates from readings

Each reading is judged against its own limit; a conductor above its maximum resistance fails and holds the drum.

3

checks on every cable

88%

of a 240 mm² cable: metal

20

years of losses priced in

9

screens in the module

Three tests on every cable – and the one that decides

A cable is sized by whichever requirement binds. The engine tries every candidate against all three and says which one decided the size – because the question is always why.



Sizing engine

- Current after derating – soil temperature, grouping, resistivity and depth multiplied together, not added.
- Volts lost down the run, reactance included, against your volt-drop limit.
- Surviving the short circuit, from $k^2 S^2 \geq I^2 t$, against the fault level at the source.
- When nothing fits, the engine says so and offers parallel runs, checking each option against all three.



The works' own catalogue

- Ratings are the works' own type-test figures held as catalogue data – never a table copied out of a standard.
- No rating for an installation method means the sizing screen refuses rather than guesses.
- Derating curves are the works' own too; values between entries are interpolated, not rounded.
- Constructions hold conductor, insulation, cores, armour and grade, with ratings in air and on tray for each size.



Same load, three different answers

In a worked example, **250 A** over **180 m**, buried at 35 °C with 3 circuits, derates to 0.7031 and needs **240 mm² on ampacity**. At **350 m** it needs **400 mm² on volt drop**. A **60 A** load off a 31.5 kA substation needs **240 mm² on fault withstand**.

At 900 m

Nothing fits in one run: two parallel runs give 17.83 V against a 16 V limit; three give 300 mm².

Short drum lengths

Cut ends are tracked; in testing, 42,015 SAR sat in lengths nobody will buy.

Routine test

In testing, a drum read 0.08023 against 0.0754 – about 6% light on copper – and was held.

Priced on what it costs – to hold and to own

Copper exposure on every firm-price order, transformers evaluated on lifetime losses, and switchgear panels checked for heat before despatch.



Copper position

- Conductor mass from size, length, density, lay and cores: a kilometre of 4-core 240 mm² carries **8,705 kg** of copper.
- Every firm-price order marked to today's copper, with the move shown order by order.
- Netted against the metal bought and held in the yard, so the book shows the whole round trip.



Transformers and panels

- Loss capitalisation: $A = \text{energy} \times 8760 \times \text{PVF} / 1000$ and $B = A \times (\text{average loading})^2$, on the buyer's own figures.
- Panel temperature rise = $W / (k \times A)$, counting only the faces that see the room; a panel that runs too hot is held.
- Routine test certificates are printed from the readings – nobody types a pass.

Worked examples from testing

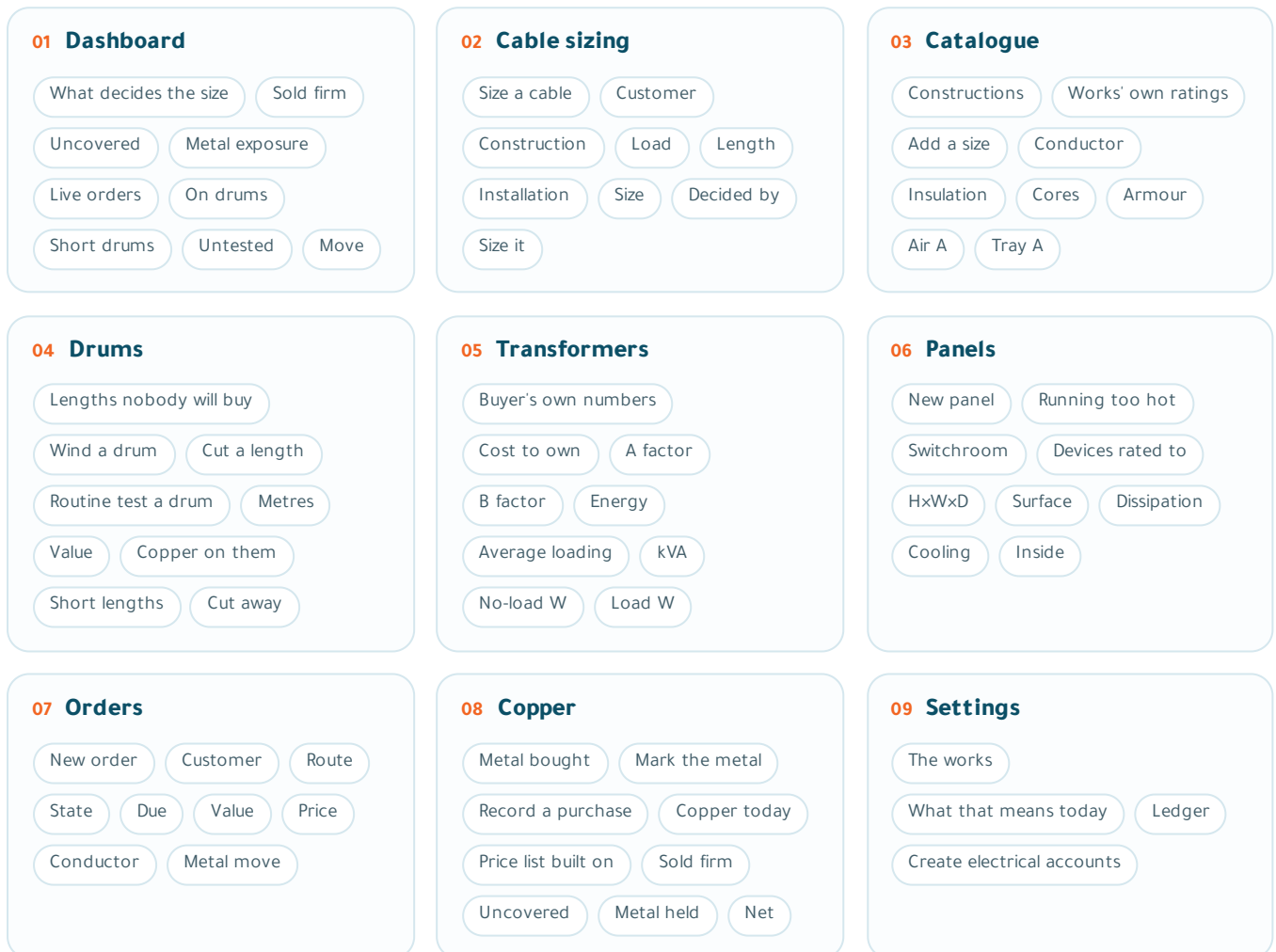
Case	What happened	Result
Firm-price orders	Marked to today's copper	142,101.86 down
Metal held	39 tonnes bought and in the yard	124,500 up
Round trip	Orders netted against the metal held	17,601.86 behind
Transformer at 0.18/kWh	Standard 269,801 against low-loss 275,158 to own	Standard wins
Transformer at 0.32/kWh	Standard 335,839 against low-loss 327,462 to own	Low-loss wins
MCC panel	1,094 W into 4.88 m ² in a 40 °C switchroom	80.76 °C – held

PVF at 8% over 20 years is 9.8181, giving $A = 27.52$ and $B = 9.91$ – all checked by hand. Reporting only the orders, without the metal, is how a works talks itself into a panic.

Every screen in the module – and what is on it

Read off the running application – the panels, columns and figures that are actually there.

9 **76**
screens functions



Not a separate program – a complete business system

The trade module sits on top of a complete ERP: everything it does lands directly in the accounts, the stores and the reports – no double entry.



Accounting

Editable chart of accounts, automatic entries from every transaction, VAT and financial statements.



Financial dimensions

Cost centres, departments, business lines and sites – with statements per factory.



Inventory

Warehouses and bins, batches and serials, moving average, FIFO or standard cost.



Purchasing & sales

RFQs, purchase orders and receipts, quotations, invoices and ageing.



Maintenance & assets

Equipment register, preventive maintenance, work orders and depreciation.



Access & language

Roles and rights per module, audit trail, full Arabic and English interface.

Rules built into the engine

$$k^2 S^2 \geq I^2 t$$

Short-circuit
withstand

Volt drop

Down the run,
reactance included

Derating

Factors multiplied,
curves interpolated

A · B factors

Transformer loss
capitalisation

$$W / (k \cdot A)$$

Panel temperature
rise

Ratings and derating curves come from your works' own type tests, held as catalogue data; the engine does not copy tables out of a standard.

See why that size **is the one**

Book a session and we'll load a construction from your own catalogue, size a real enquiry with you, and walk through the copper in your order book.

Request a demo

Website

www.vluerp.com

Demo request

www.vluerp.com/#demo

Email

hello@vluerp.com

1 Cable sizing: one load at three lengths, and the requirement that decides each size.

2 Copper: firm-price orders marked to today's metal and netted against stock.

3 Transformers: two designs costed on your buyer's own energy price and loading.

4 Drums: a routine test that fails on resistance and holds the drum.

Switched on from Add-ons with a free seven-day trial, and it runs on the same general ledger.