Product Profile 2027
A P J Engineers Pvt. Ltd.

New for 2027

APJ Bolted. Built from the day your drawings are approved.

A modular LT switchboard with a galvanised steel frame bolted from stocked parts and powder-coated CRCA doors. Designed in 3D, checked for clashes, verified by calculation, and traced by QR code for life.

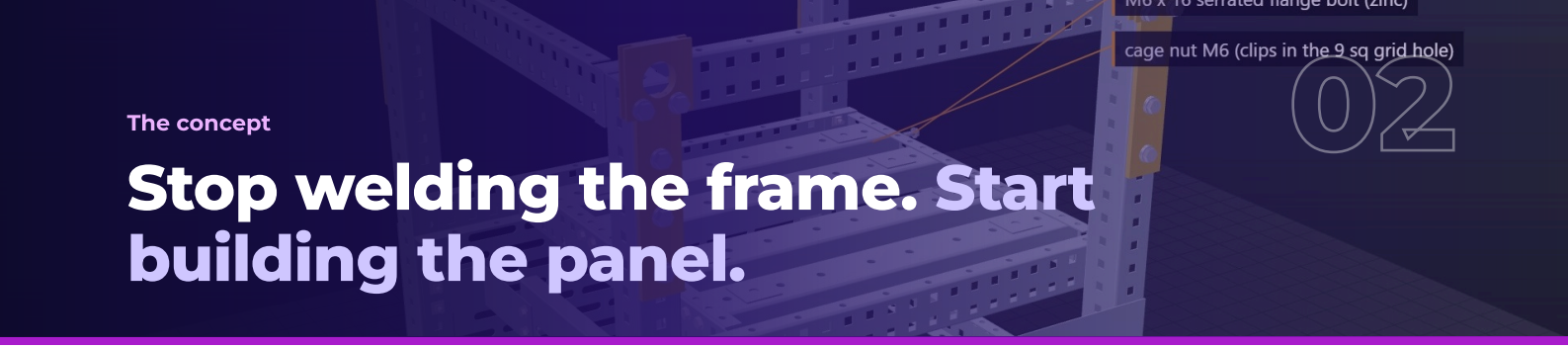


> 50%
less delivery time than a welded, painted panel

Day 1
build starts on drawing approval

GI + CRCA
galvanised frame, powder-coated doors

QR record
history and traceability on every panel

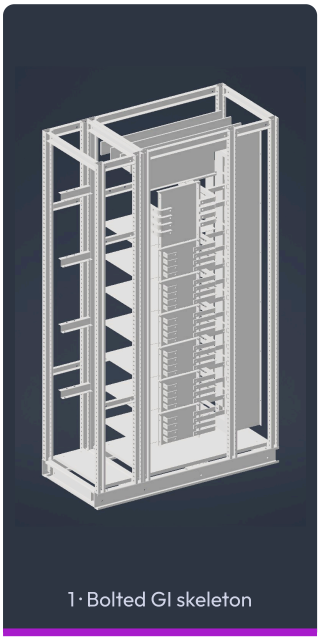


The concept

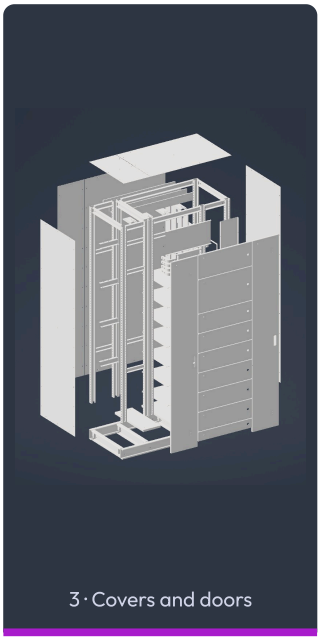
02

Stop welding the frame. Start building the panel.

In a conventional panel, most of the lead time goes into cutting, welding, grinding and painting the body before a single breaker is fitted. APJ Bolted removes that wait.


1 · Bolted GI skeleton


2 · Internals and partitions


3 · Covers and doors


4 · Finished board

Views from the 3D model of an APJ Bolted board. The same model produces the cutting files and the part list.

A frame from the shelf

The skeleton of every board is made from a small set of standard parts, 20 or fewer, kept in stock. They are never designed again for a job.

Galvanised, not painted

Frame, partitions and all internal parts are zinc-coated GI. They need no pre-treatment and no powder coating, and there is no bare weld to rust.

Only the skin is made to order

Doors and outer covers are CRCA, powder coated. Covers, partitions and gland plates are laser-cut to size the day the drawing is approved.

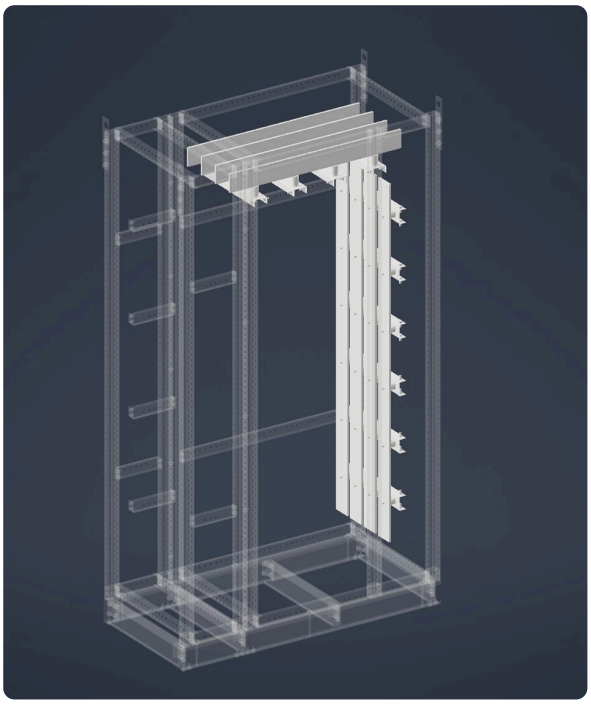
What it means for your project

Delivery time cut by more than half against a welded, fully painted panel. Late changes are a matter of unbolting and swapping a part. Sections split for transport and bolt together at site, and a section can be added years later on the same grid.

One grid, one catalogue, every board.

APJ Bolted is a frozen catalogue of parts on a fixed module grid. A project selects and assembles catalogue items by rule; it does not create new parts.

Feature	APJ Bolted
Section widths	200, 300, 400, 600, 800 and 1000 mm; ACB columns 700 mm up to 2000 A and 800 mm for 2500 to 4000 A
Depths	600, 800, 1000 and 1200 mm
Height	Body up to 2400 mm on a base frame, in 50 mm modules
Frame and internals	Galvanised steel (GI Z120): 2.0 mm in ACB sections, 1.5 mm in light sections; partitions 1.2 mm
Doors and outer covers	CRCA 1.5 mm, 2.0 mm option, powder coated
Gland plates	3 mm on large boards, 2 mm otherwise, cut to the cable schedule
Doors	One door per feeder; 120° hinges; quarter-turn locks; 3-point lock on doors 1800 mm and taller
Form of separation	As your drawing calls for, up to Form 4b
Degree of protection	IP52 as standard; IP42, IP54 and IP65 as engineered options
Busbars	Aluminium or copper; main bars at the front, earth bar through every section
Breaker makes	Schneider, ABB, Siemens, L&T, Eaton and Legrand
Variants	Classic and Lean, chosen per board



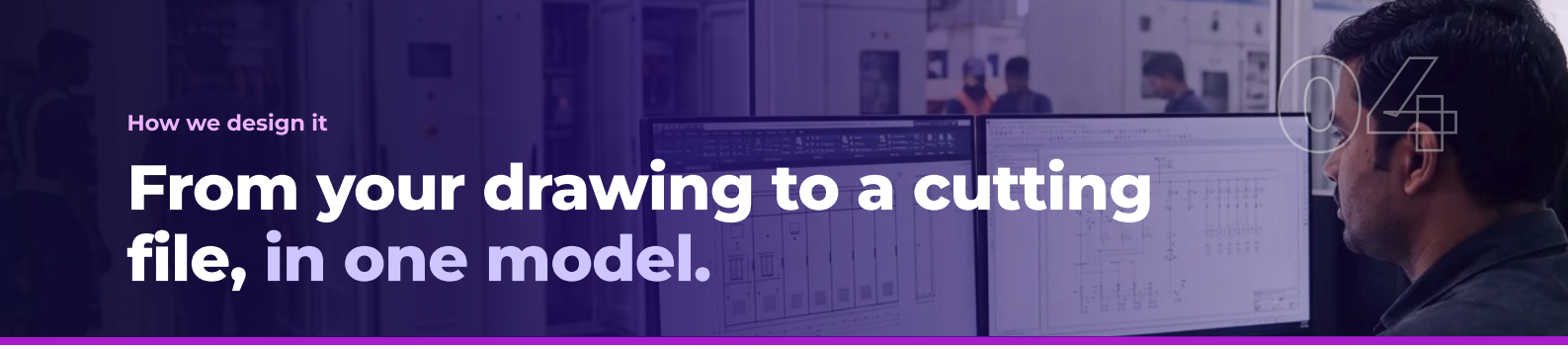
Busbar chamber and feeder columns in the 3D model.

Why a frozen catalogue

- Every part already has its drawing, cutting file and 3D model
- Two or three part types per function, not a hundred
- Stock can be held, so the frame is never the delay
- The same parts make the spare and the extension

Busbar links for each make

Link geometry is taken from each breaker maker's terminal data, so the bars meet the terminals without site bending. Links are cut to length per board from fixed bar sections.



How we design it

From your drawing to a cutting file, in one model.

The board is built in software before it is built in steel. One model drives the drawings, the cutting files, the calculations and the assembly guide, so they cannot disagree.

01 **Read the real drawing**
We work from your approved GA, SLD and BOM, not from an offer-stage sketch. Device make and reference number come from the BOM.

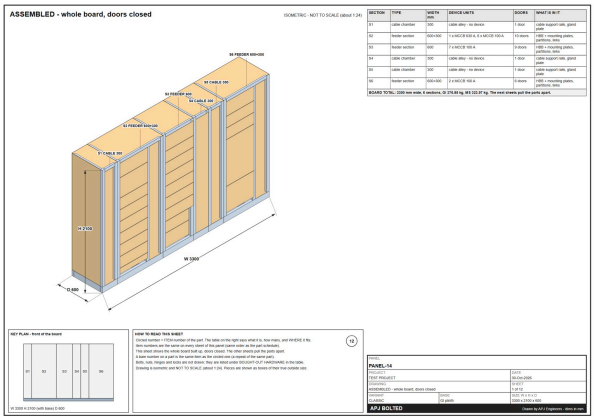
02 **Place the devices**
Each breaker is taken from a device library built on the maker's own dimensions and terminal positions.

03 **Select the catalogue parts**
Sections, depth, door heights, partitions and form of separation are chosen by rule from the frozen catalogue.

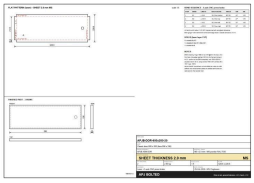
04 **Route the busbars and links**
Main bars, droppers and breaker links are sized and routed in 3D, phase by phase.

05 **Check**
Clash, clearance, device fit, heat and structure are checked on the model. Anything that fails is listed with the change it needs.

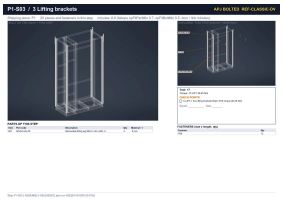
06 **Release the pack**
Cutting files go to the laser. The shop floor gets part drawings, a hardware schedule and a step-by-step assembly guide.



Assembly sheet: whole board with part balloons and where-used table.



Part drawing with flat pattern.



Assembly step sheet with fasteners and torque.

What the model produces for every board

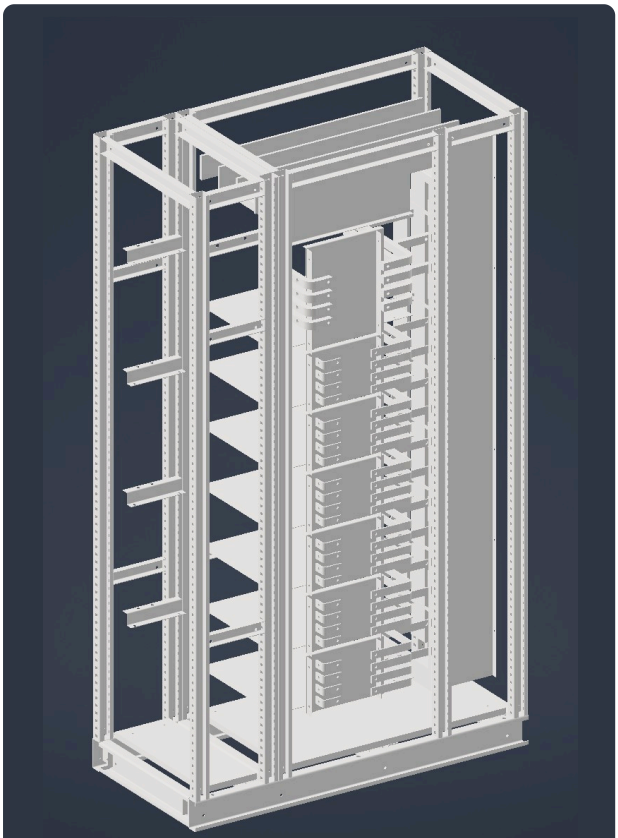
- GA in PDF and DWG
- Part list with serial numbers
- Part drawings and laser files
- Hardware schedule with torque
- Structural calculation sheet
- Design verification summary
- Installation guide
- Assembly video
- 3D viewer that opens offline

The clash test

05

Every part meets every other part on screen first.

A door that fouls a breaker handle or a busbar that sits too close to a partition is cheap to fix in the model and expensive to fix on the floor. So the model is tested before any sheet is cut.



Full 3D assembly used for the interference and clearance run.

Check	What it catches
Interference	Two solid parts occupying the same space: plate against rail, cover against hinge, bracket against device
Clearance	Any live part closer than 14 mm to earthed steel or to another phase
Device fit	A breaker deeper or wider than its compartment, before the mounting plate is cut
Link routing	A busbar link that cannot reach its terminal within the lane left for it
Cable space	Cable chamber width against the feeder rating, and room to bend and terminate
Door and handle	Door swing, handle projection and lock positions on every feeder

14 mm
minimum clearance checked between live bars and steel

3D
solid model of every part, fastener and device

What happens to a finding

Each finding is listed against its part with the change it needs: move, resize or swap for the next catalogue item. The board is re-run after the change. Busbar links and their fixing hardware are finally checked by trial fit on the first section.

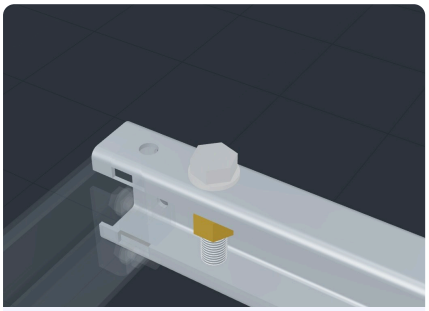
Why it matters to you

Fewer surprises at FAT, no cutting and re-drilling at your site, and drawings that match the panel that arrives.

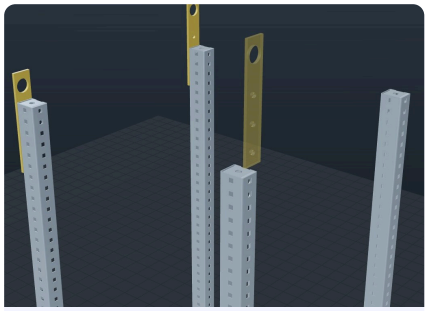
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Assembled like a kit, not fabricated like a tank.

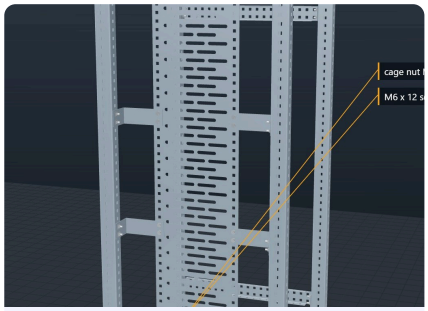
Because the frame comes from stock and the model has already fixed every hole, the shop floor assembles to a guide instead of marking, welding and correcting.



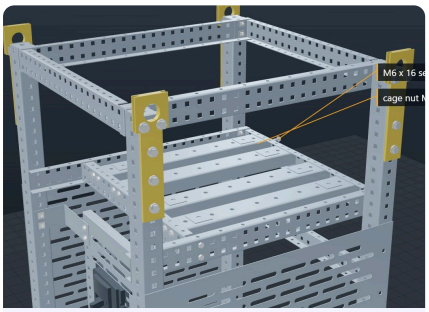
1 · Base frame
Base channels bolted and levelled.



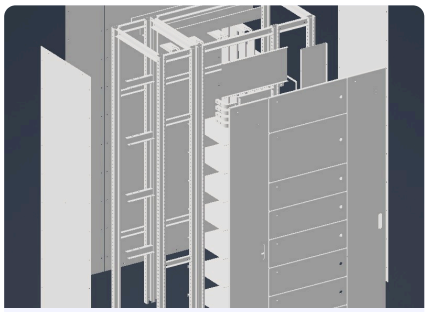
2 · Uprights and lifting lugs
Corner uprights on the base; removable lugs on top.



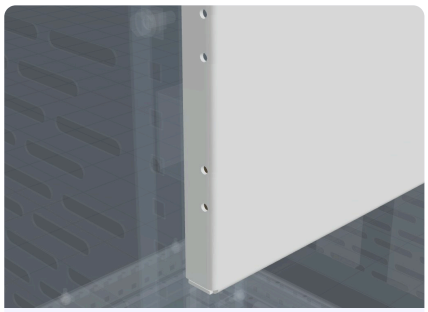
3 · Rails and mounting plates
Depth and width rails, plates and DIN rails.



4 · Busbar supports and bars
Supports at fixed pitch, main and earth bars.



5 · Partitions and covers
Form separation, then side, top and rear covers.



6 · Doors
Powder-coated doors, hinges, locks and earth straps.

The schedule we build to

Day 0
Drawings approved. Pack released, covers, partitions and gland plates laser-cut, doors to coating.

Day 1
Skeleton assembled from stock parts. Mounting plates, rails and busbar supports fitted.

Day 2
Frame ready for busbar, devices and wiring. Doors arrive from the coating line.

This is the target schedule for the frame of a standard board; busbar work, wiring and testing follow and depend on the size of the board and delivery of switchgear.

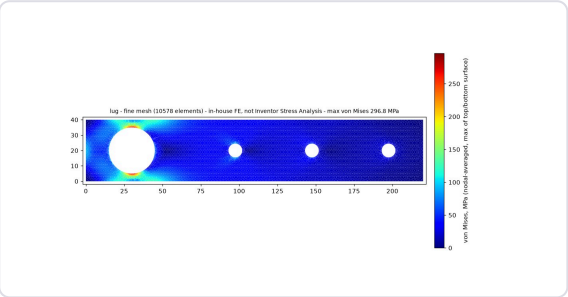
Mechanical verification

07

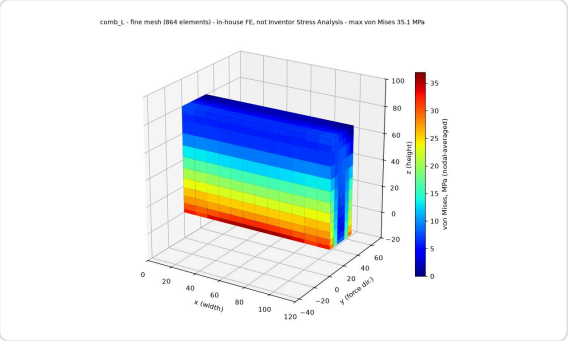
A bolted frame has to be proven, so we calculate every joint.

Each board gets a structural calculation sheet. On a reference DG synchronising board it runs to nearly 200 checks, each rated pass, tight or fail. A failed check changes the design before release.

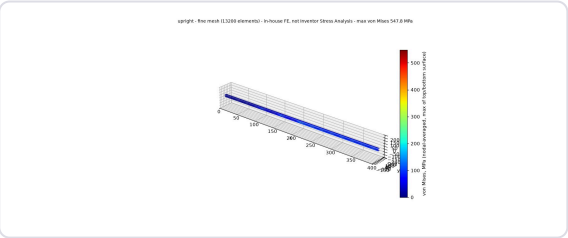
Check	Load case and method
Lifting	Lugs, lug bolts and spreader beam calculated at 1.25 times the heaviest shipping piece; vertical slings; lift trial at the works
Uprights	Buckling of the column at full height under the section load
Rails	Bending stress and deflection of the rails carrying ACBs and mounting plates
Frame sway	Lateral movement at the top of the frame, with walls and covers fitted
Base frame	Section weight on a solid floor and across a cable trench; base section chosen to suit
Anchoring	Floor fixings under a seismic load of 0.24 g (IS 1893, zone III)
Transport	0.5 g sideways and 2 g vertical on each shipping piece, with lashing points and lashing force
Doors	Hinge and lock loads; door sag limited to 2 mm
Busbar supports	Short-circuit force on bars and supports; support pitch 100 mm, 125 mm for 65 kA boards
Bolted joints	Bolt shear, bearing and tightening torque for every joint type



Stress plot of a lifting lug under the lift load.



Busbar support under short-circuit force.



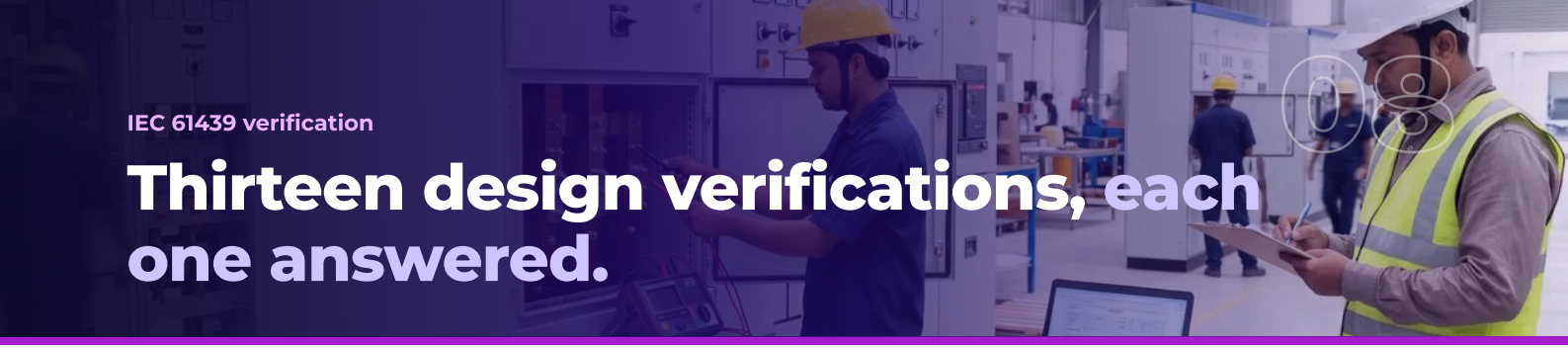
Upright section under load.

Hand calculation, then finite element

Critical parts are checked twice: by hand calculation and by a finite-element model. Where the two disagree, the more demanding result governs the design.

Torque on record

Every joint type has a stated tightening torque. The hardware schedule in the pack lists bolt size, grade, finish, quantity and torque for each position.



IEC 61439 verification

Thirteen design verifications, each one answered.

IEC 61439-1 lists the characteristics a switchboard design must be verified for. This is how APJ Bolted addresses each of them.

Clause	Verification	Method	How APJ Bolted is verified
10.2	Strength of materials, corrosion	Design rule	Zinc-coated GI frame and internals, powder-coated CRCA doors and covers, zinc-plated fasteners
10.2.5	Lifting	Calculation and trial	Lifting set calculated at 1.25 times the heaviest piece; lift trial at the works
10.3	Degree of protection	Design rule	IP52 construction with gasketed doors; higher IP as an engineered option
10.4	Clearances and creepage	Design rule and 3D check	14 mm minimum clearance checked in the model and measured at routine test
10.5	Protective circuit	Calculation and routine test	Earth bar sized by calculation; door earth straps; continuity measured on every board
10.6	Incorporation of devices	Design rule	Devices placed from maker's data and fit-checked in 3D
10.7	Internal circuits and connections	Calculation	Busbars sized at 0.8 A/mm² in aluminium and 1.6 A/mm² in copper
10.8	Terminals for external conductors	Design rule	Cable chamber width set by feeder rating, from 200 mm to 1000 mm
10.9	Dielectric properties	Routine test	Power-frequency withstand and insulation resistance on every board at FAT
10.10	Temperature rise	Calculation	Heat calculation by the IEC TR 60890 method; filter fans fitted where the calculation needs them
10.11	Short-circuit withstand	Calculation	Busbar stress and support force to IEC 61439-1; support pitch 100 mm, 125 mm at 65 kA
10.12	EMC	Design rule	Devices to their own product standards, installed to the maker's instructions
10.13	Mechanical operation	Routine test	Doors, locks, interlocks and draw-out movements operated at FAT

What this is

APJ's design verification by calculation, design rule and routine test, issued as a summary sheet with each board. Our welded design is separately type-tested at ASTA, CPRI and ERDA up to 6300 A and 85 kA. Where a project needs laboratory type-test evidence on the bolted construction, tell us at enquiry stage.

Routine tests on every board

Visual and dimensional check, wiring continuity, insulation resistance, power-frequency withstand, earth continuity, functional and interlock operation. Witnessed FAT is welcome.

The final product

It looks like a premium switchboard, because it is one.



Illustration of a finished APJ Bolted board: flush powder-coated doors, one per feeder, with the galvanised frame visible in the open end section.

Outside

Flush doors and covers within the frame size, nothing standing proud. Any RAL shade. Blue name channel across the top.

Inside

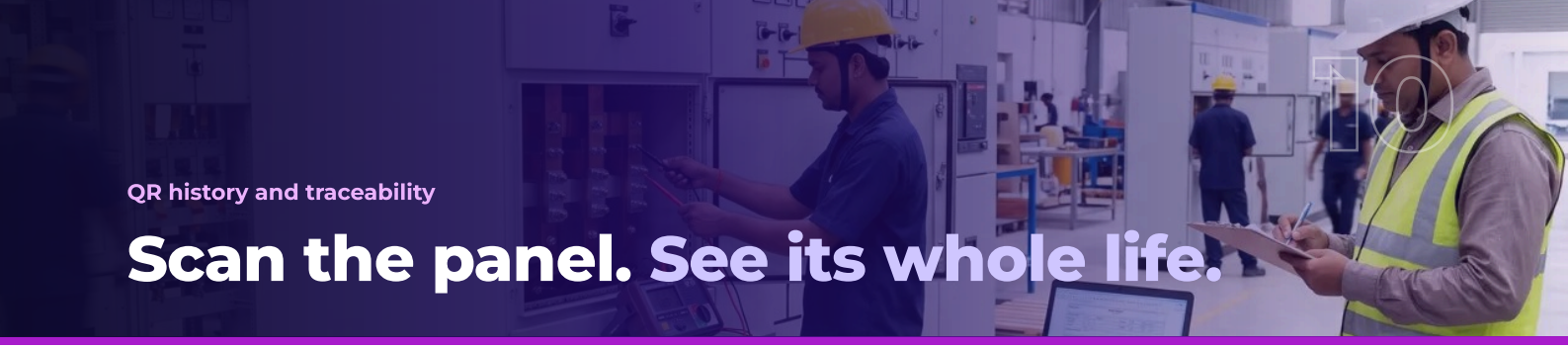
Bright zinc-coated frame and partitions, busbars on moulded supports, shrouded terminals and a clean cable chamber.

At site

Shipping sections bolt together with fish plates for the main and earth bars. No welding, no touch-up paint.

Welded panel and APJ Bolted, side by side

	Welded panel	APJ Bolted
Frame	Cut, bent and welded for each job	Standard GI parts from stock, bolted
Finish	Whole body through pre-treatment and powder coat	Zinc-coated internals; only doors and covers coated
Start of build	After fabrication and painting	The day drawings are approved
Late change	Cut, re-weld, repaint	Unbolt and swap the part
Extension	Site welding and touch-up	Add a section on the same grid
Documents	GA and wiring drawings	GA, part list, hardware schedule, calculations, assembly guide, 3D viewer



QR history and traceability

Scan the panel. See its whole life.

Every APJ panel carries a QR code. It links the steel in front of you to the record of how it was designed, built, tested and looked after.

PANEL RECORD

Factory acceptance test	report
Test readings	IR · HV · earth
Photos and test video	view
Drawings	GA · wiring
Part list	as built
Site report	commissioning
Service history	visits

The code sits on the panel door.

01 At design
The board gets its identity. Drawings, part list and calculation sheets are filed against it.

02 In production
Material issue, assembly stages and hold points are recorded against the same identity.

03 At test
The IEC 61439 factory acceptance test is recorded with readings, photographs and a video, and signed by your witness if present.

04 At dispatch
The QR label goes on the door. From here anyone with a phone can open the record.

05 At site
Installation and commissioning reports are added by our engineers on their phones.

06 In service
Every maintenance visit, fault and repair is added, so the next engineer sees the full history.

Why it matters with a bolted panel

Every part in an APJ Bolted board has a catalogue code. Years later, the record tells you exactly which partition, cover or link to order, and the replacement fits because the catalogue has not changed.





Why APJ Bolted

Six reasons to specify it on your next project.

Half the wait

Delivery time cut by more than half, because the frame is stocked and nothing waits for paint.

Verified, not assumed

Structure, heat and short-circuit forces calculated for each board; routine tests on every one.

Clash-checked in 3D

Interference, clearance and device fit tested on the model before cutting.

Change-friendly

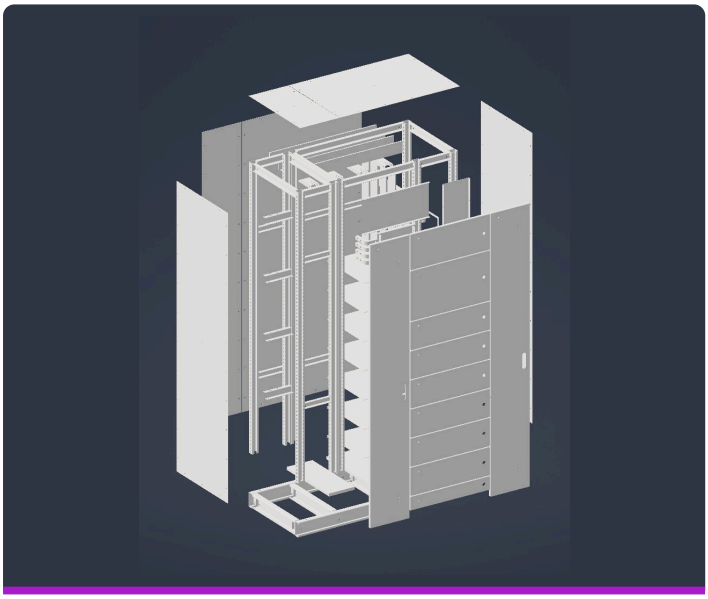
Unbolt, swap, extend. The same grid and parts years later.

Traceable for life

A QR record from design to the last service visit.

Made by one works

Laser, benders, coating, busbar work, assembly and testing under one roof.



Send us one drawing

Give us the GA and BOM of a board you are about to order. We will return it as an APJ Bolted design, with the 3D model, the part list and a delivery date, so you can compare for yourself.

Talk to us

Works

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