Engineered solutions

Relay / contactor panels, circuit breaker panels, PCB relay modules, electrical distribution boards for railway applications

Optimising rolling stock LCC, RAMS, health and environment

Standard/customised engineered solutions

Scope of supply

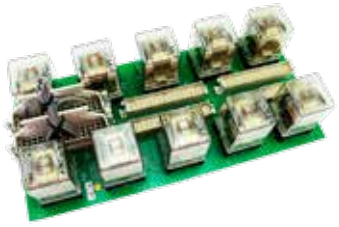
- Wired relay, contactor panels
- PCB relay modules
- Miniature circuit breaker panels

Services

- Engineering, project management, testing, on site commissioning, training and after sales service
- Inhouse design, testing and manufacturing (prototype, series production)
- Local series production in country of choice possible

Standard solutions

- Free configurable relay modules
- Delivery time < 6 weeks



Customised solutions

- Circuit diagram, space envelope and preferred electrical interfacing is required, quotation < 1 week
- Customised or built-to-print prototype panels/modules fully tested, delivery time < 14 weeks

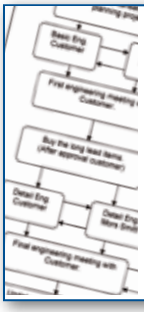
Standards

Mors Smitt solutions are compliant/tested to the following railway standards:

EN 50155	Electronic equipment used on rolling stock
EN 50264-1	Rolling stock power & control cables
IEC 60571	Electronic equipment used on railway vehicles
IEC 60077	Electrical equipment for rolling stock
IEC 60947	Low voltage switchgear and controlgear
IEC 61373	Rolling stock equipment - Shock & Vibration
EN 50121	Electromagnetic compatibility for railway applications
NF F16-101/102, EN 45545-2	Fire behaviour - railway rolling stock
IEC 60529	Protection class standard (IP class)
IEC 60068-2	Salt/mist, damp/heat

Standard/customised engineered solutions

Our capabilities



Enquiry

- Estimated component quantity
- Available space envelope
- Preferred interfacing
- Schematic & circuit diagrams
- Location in train
- Mechanical construction

Project design

- Pre engineering
- Preliminary planning
- 3D mechanical design drawing
- Interface proposal
- Product specification
- Quotation

Engineering

- Kick off meeting
- Electrical & electronic design
- Mechanical design
- CAD & 3D inventor design software platforms
- Design review / customer meeting
- Product specification

Quality assurance plan

- Scope of supply
- Detailed engineering and design
- Planning
- Schematics
- Components specifications
- Project team
- Supervision and testing
- Manufacturing and assembly plan

Manufacturing and assembly

- Components manufacturing
- Puchasing parts
- Final approval customer
- Start production
- Quality and testing control

Testing and inspection

- Quality control
- Type & functional testing
- FAI - first article inspection
- FAT - factory acceptance test
- Modifications

On site support

- Commissioning & engineering support
- Training
- Implementation support
- Modification on site

After sales support

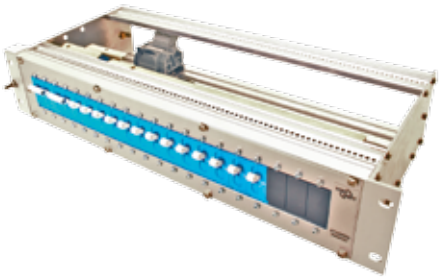
- Warranty service
- Spare parts
- Maintenance support
- Product repair
- Training

Standard engineered solutions

Standard relays / circuit breaker (mcb) panels and PCB modules

- Flexibility to assign trainfunctions to relay contacts
- Free configurable relay modules
- Easy changeable mcb panels with common points connection via busbar
- Last minute changes possible
- Marshalling (cross wiring) of train wiring directly on panel or PCB module terminals
- Strong reduction space and weight
- Low cost
- Very short delivery times
- Local manufacturing (and sourcing) in country of choice possible

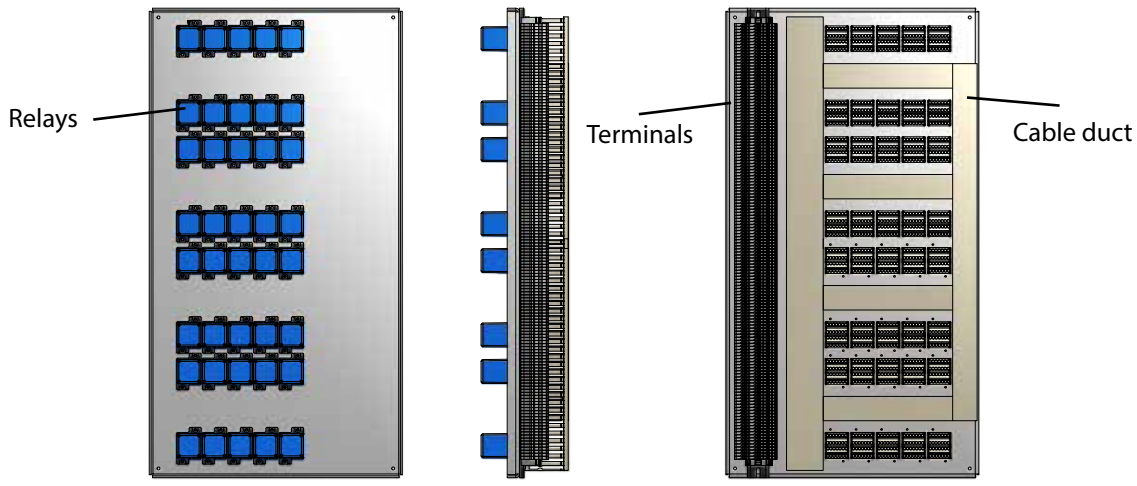
We can engineer and supply cable harnesses or organise local sourcing, manufacturing and supply, if required.



Example of standard circuit breaker 19" power distribution rack.

Standard wired solution (examples)

Relay panel with 40x D-U200 4 C/O contact relays offering 160 C/O contacts. 75 % of all contacts wired to terminals. All wiring coded and in cable ducts. Cross wiring to train functions can easily be made via jumpers on parallel terminals. Other relay types like timers, latching etc. can also be used instead of instantaneous. Easy to change as relays are plug-in types. A relay panel with e.g. 40 relays can be used in the train motor car, less relays are used in trailer cars.

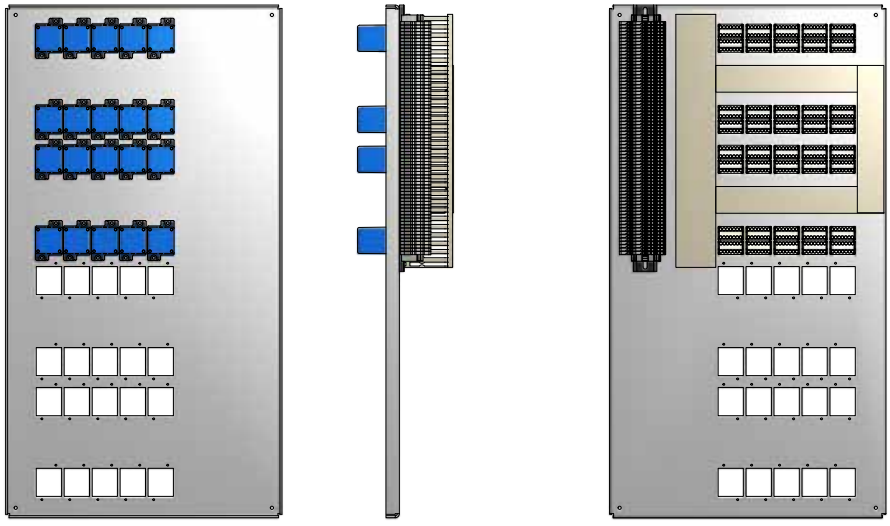


Panel: 770 x 415 mm

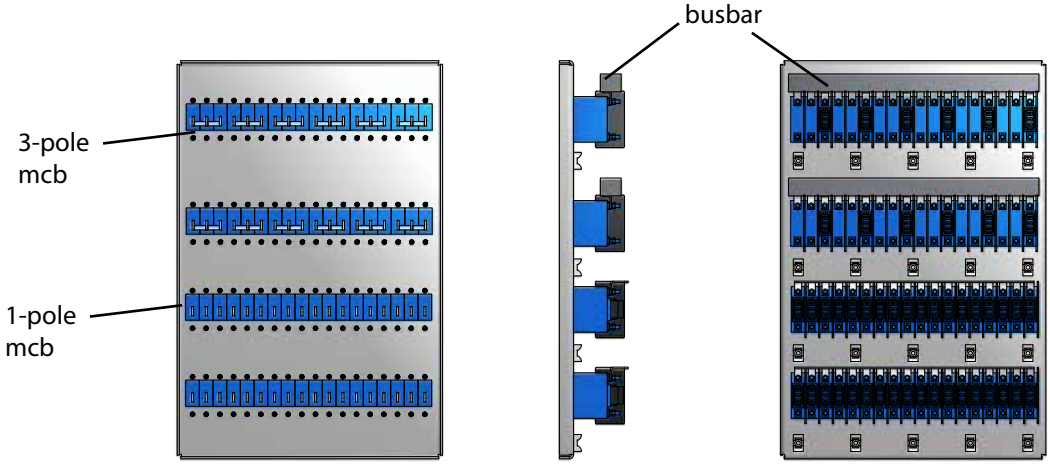
Height: 143 mm

Standard engineered solutions

Relay panel with 20 x D-U200 4 C/O relays offering 80 contacts, for e.g. trailer car. Expandable to 40 relays in total.



Panel: 770 x 415 mm *Height: 143 mm*



Panel: 555 x 370 mm *Height: 91 mm*

Example of circuit breaker panel (common points connected via busbar)

Example of easy connecting train wiring to relay panel

Standard engineered solutions

Free configurable PCB relay modules

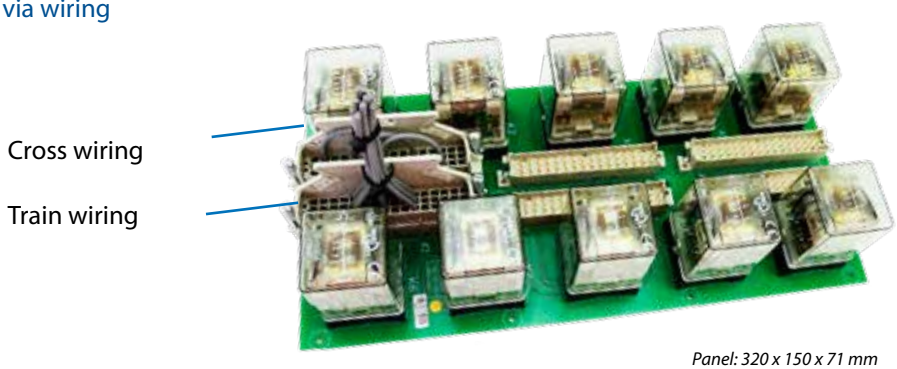
Cross wiring (marshalling) train functions to relay contacts and coils

During design, installation and commissioning on trains one can easily cross wire (and change) on the connector.

Example Harting connector for cross wiring

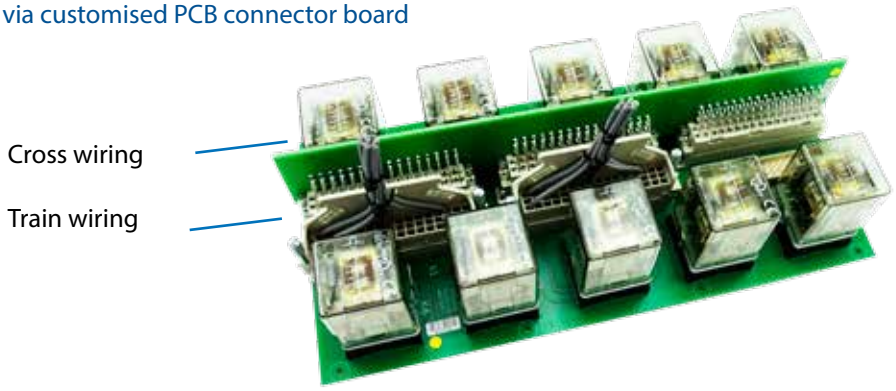
Once finalised and after design-freeze, the wiring can be transferred via a 'click-on' PCB connector board

Connections via wiring



Panel: 320 x 150 x 71 mm

Connections via customised PCB connector board



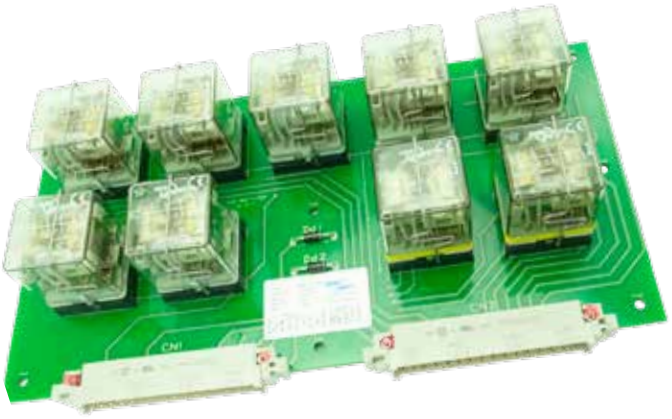
Flexibility in number of contacts: when coils of 2 relays with 4 poles each are connected in series via cross wiring, this results in an 8-pole relay, or even a 12-pole relay when 3 relays with 4 poles each are connected.

For example:

1 x D-U204	⟶	4-pole	⟶	110 VDC	
2 x D-U208	⟶	8-pole	⟶	55 + 55 VDC	= 110 VDC coil voltage
3 x D-U207	⟶	12-pole	⟶	36 + 36 + 36 VDC	= 108 VDC coil voltage

Standard engineered solutions

Example free configurable PCB relay modules (5A PCB tracks)



Panel: 310 x 170 x 71 mm

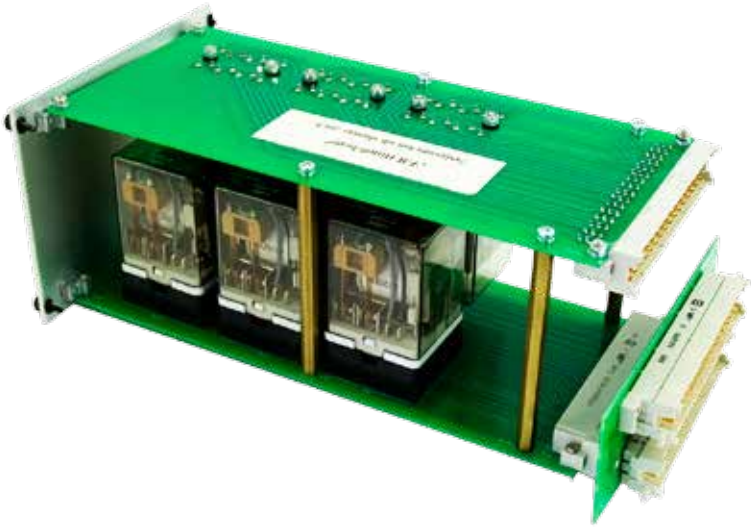
Example free configurable wired relay modules (10 A switching)

Panel: 310 x 170 x 120 mm

Inside wired relay module

Standard engineered solutions

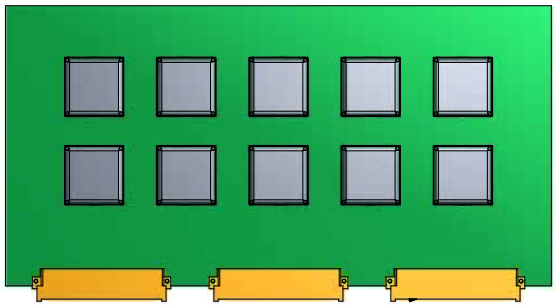
Examples free configurable PCB relay modules



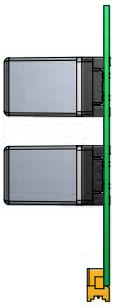
Panel: 3 HE, 19" rack, 180 x 129 x 106 mm

Standard engineered solutions

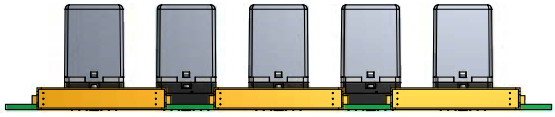
Examples free configurable PCB relay modules (5A PCB tracks)

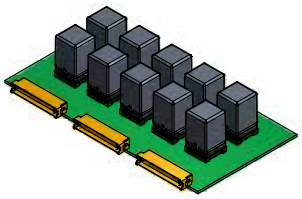


Panel: 370 x 190 mm

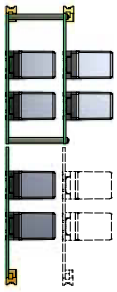


Height: 71 mm

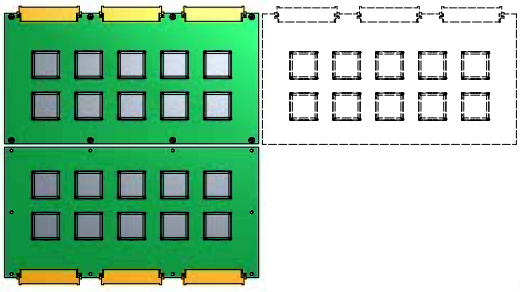




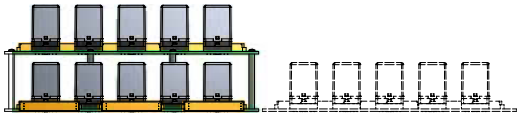
Budget PCB 10 relay module

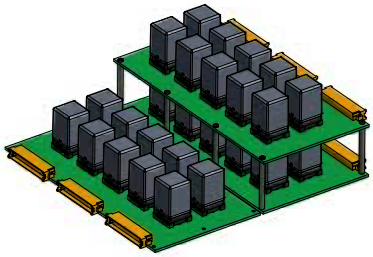


Height: 155 mm



Panel: 746 x 385 mm

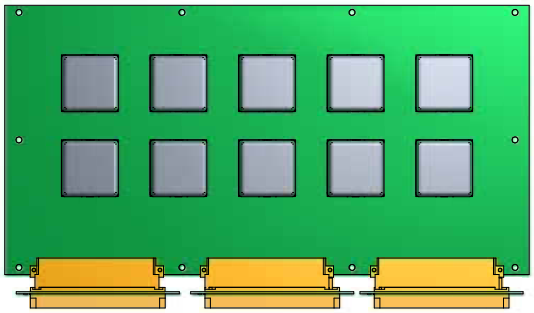




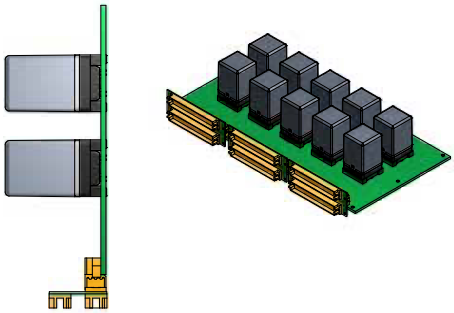
Budget PCB relay module

Standard engineered solutions

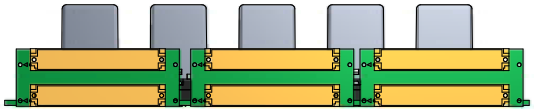
Examples free configurable PCB relay modules



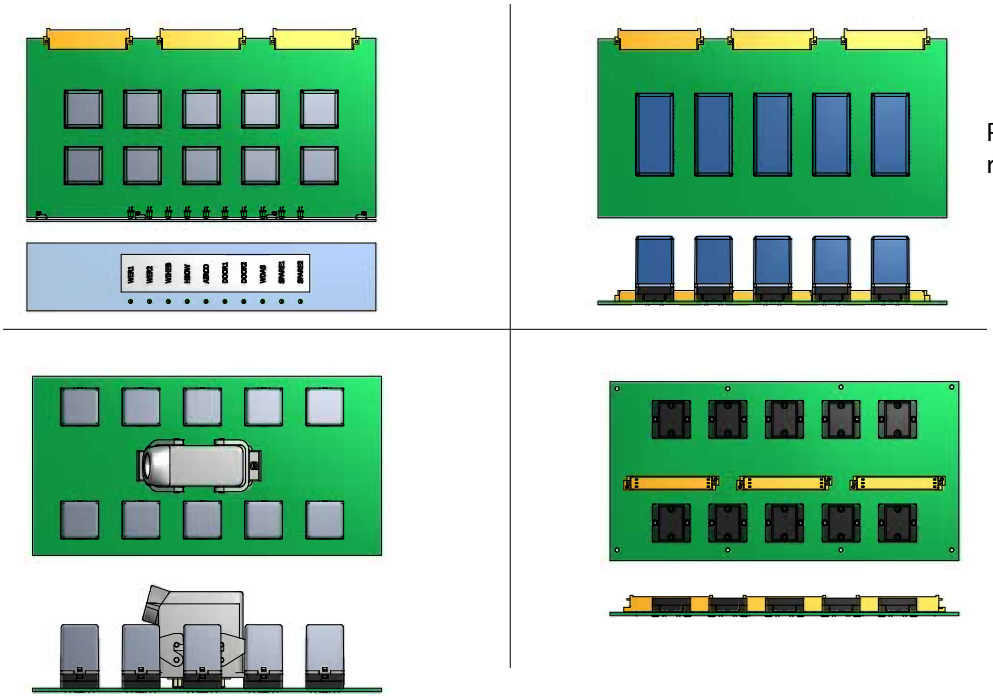
Panel: 370 x 220 mm



Height: 71 mm



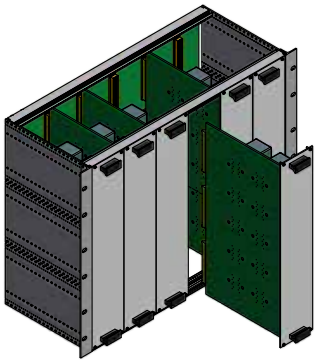
Optional splitter connector

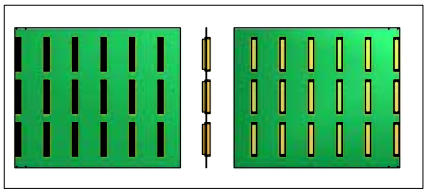


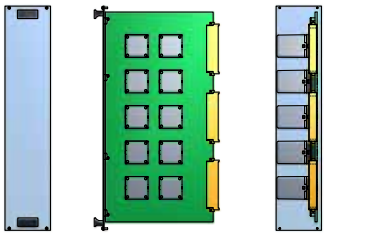
PCB with 5x D8-U200 8 C/O relays offering 40 contacts

Standard engineered solutions

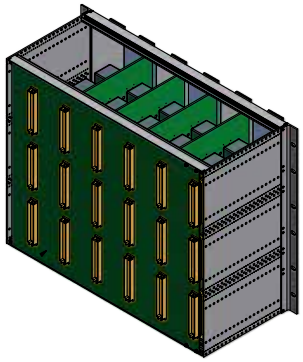
Examples free configurable 19" rack PCB relay modules



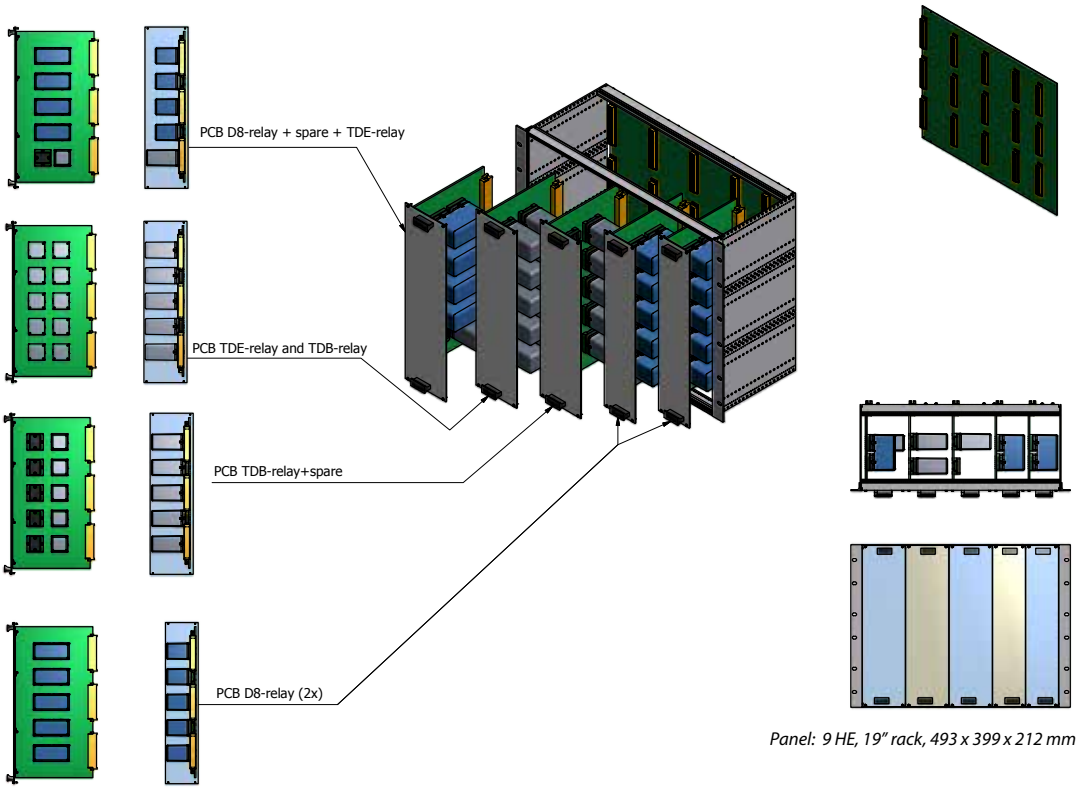




Panel: 370 x 190 mm *Height: 80 mm*



PCB relay 19 inch rack unit A

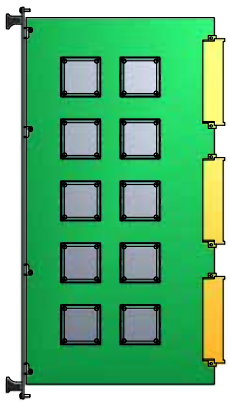


Panel: 9 HE, 19" rack, 493 x 399 x 212 mm

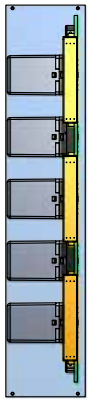
PCB relay 19 inch rack unit B

Standard engineered solutions

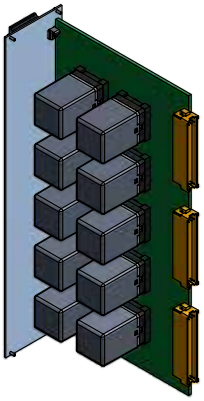
Examples free configurable 19" rack PCB relay modules



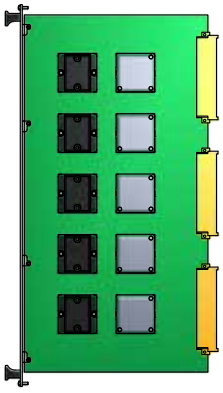
Panel: 370 x 190 mm



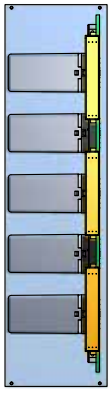
Height: 80 mm



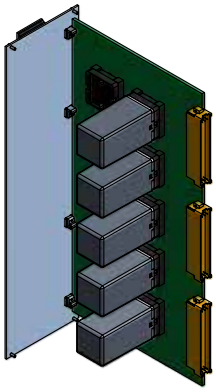
10x D-U-relay module



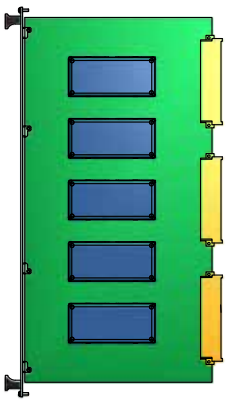
Panel: 370 x 190 mm



Height: 106 mm

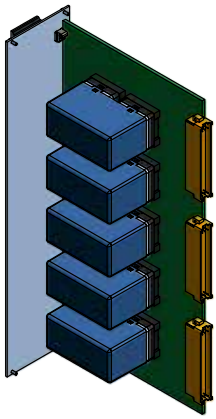


5x TDE/TDB+5 spare relay module



Panel: 370 x 190 mm

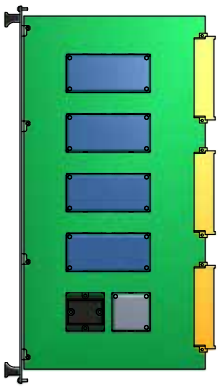
Height: 85 mm



5x D8-relay module

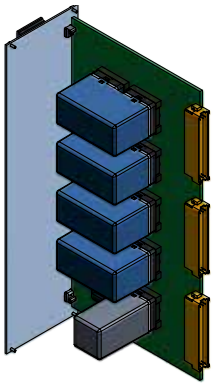
Standard engineered solutions

Examples free configurable 19" rack PCB relay modules

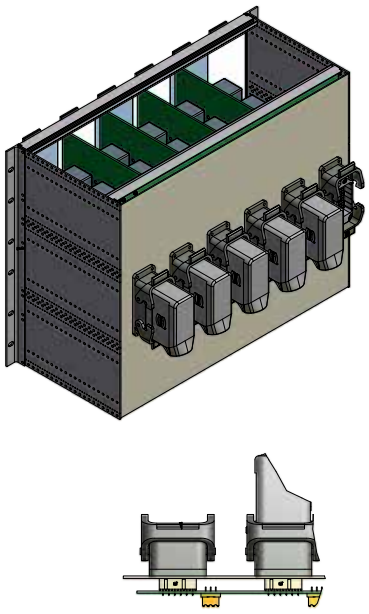


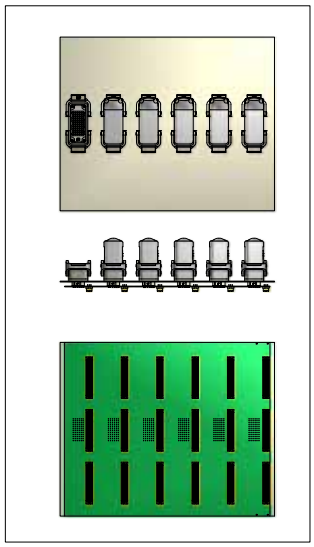
Panel: 370 x 190 mm

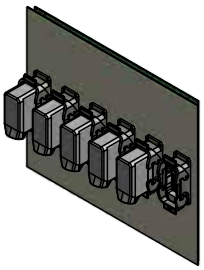
Height: 106 mm



4x D8, 1 TDE+1 spare relay module





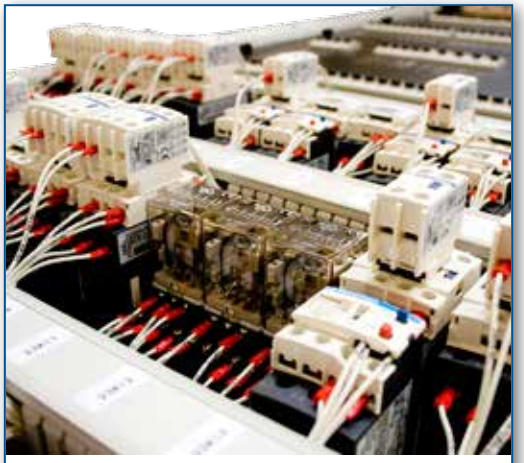


Optional backplane with industrial connector

Customised engineered solutions

Anything is possible. Send us your circuit diagrams, space envelope and preferred electrical interfacing (connectors). Within 1 week we can make a design and a quotation, within 14 weeks a prototype is ready for your FAI/FAT.

Examples of our customised solutions:



Electrical distribution panel for Alstom, BLS

Project RE Lotschberg, Switzerland
105 panels

Panel solution for Alstom

Project RATP Metroline 7, 8 and 13, France
435 panels

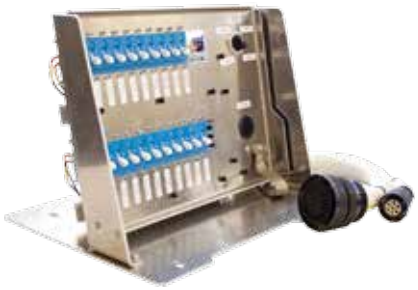
Electrical relay board for Hyundai-Rotem

Refurbishment project, SMRT C151, Singapore
660 panels

Electrical distribution board for Hyundai-Rotem

Project Denver P3 Eagle
56 units

Customised engineered solutions

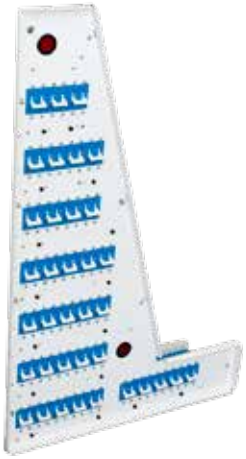


Electrical distribution panel for Bombardier

Project SSL, London Underground
2.792 panels

AC/DC distribution box under train (IP65) for Bombardier

Project ART 300, Canada
> 100 units



Circuit breaker in driver cab for Bombardier

Project ART 300, Canada
> 100 units

19" rack for Alstom

Project Metroline 1, RATP Paris
360 racks

Mors Smitt
A Wabtec Company

SERVING SAFETY

DS-Engineered solutions -V1.2 July 2013

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