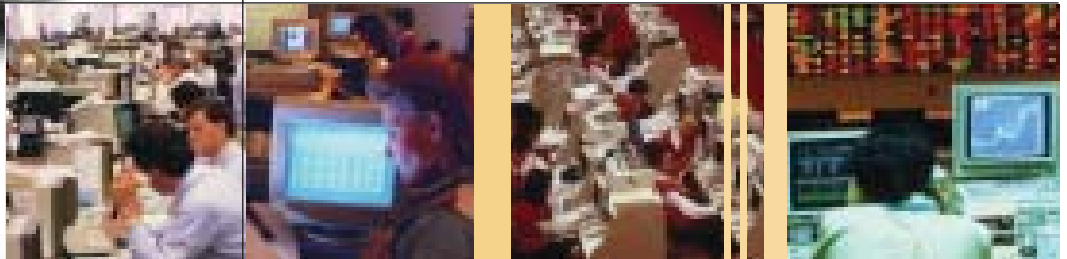


What is a PDU?

The acronym stands for **Power Distribution Unit** and has become a generic description for a wide variety of power distribution systems. In ABB's case it refers to final distribution boards in computer rooms or data floor environments, but to fully understand the widely differing approaches to the application it helps to trace the development of the product from its original distribution board format.

Standard pattern switchgear represents the tradition for power distribution systems in commercial installations, but while its level of reliability has consistently improved, it has become less suitable for larger data processing systems because of the additional demands placed on the supply network. For example, the ergonomics of high value computer installations often require all data processing operations of national and multi-national corporations to be concentrated in central locations. These data centres operate on a 24 hour/365 day basis. Data corruption or loss following an unscheduled power interruption of just a few minutes, can take weeks to retrieve. The effect on operations and revenue generation can obviously be serious so the need for ultimate reliability in the power distribution system cannot be over-emphasised.



System downtime or “green periods” are extremely rare in the data centre environment; consequently traditional routine maintenance becomes unrealistic. Because of this, products are required wherein traditional maintenance activities have been “designed out”. Typically this equates to having products where maintenance periods are in excess of five years and greater emphasis placed on non-intrusive surveillance.

Another example is the need to manage asset migration during the life of the facility. Even in large, continuously running data centres, processing machinery has to be changed periodically, whether to expand or update the networks, or to allow maintenance to be carried out. System managers have to oversee the regular demands to add or remove hardware without disrupting the operation of the centre. A distribution system that allows large parts of the system to be worked upon, whilst adjacent circuits remain live, removes a major obstacle to planning and executing changes to the network.

A common feature of data centres is the need for capital injection in the facility and subsequent infrastructure, prior to securing a revenue stream from the investment. Occasionally the period of time between completion of the facility and full occupancy can be a matter of months or even years. A requirement of the SPDU “system” is that it must have the ability to match capital investment with the client’s income stream.

To summarise, the key features required in a data centre or computer room SPDU are:

- A highly reliable and proven design
- The need for minimal or zero routine maintenance
- Safe methods of live exchange and/or addition of hardware
- A flexible system that allows growth to match your client base

Systems not addressing these requirements add risk to the reliability of the network and care should be taken when describing them as computer room or data floor SPDUs.

The ABB Secured Power Distribution Unit (SPDU) Resilience of design

The product at the heart of the SPDU is the globally renowned MNS system, a product manufactured for the last decade to exact standards in 26 countries across the world. MNS is a true, fully type-tested (TTA) modular frame based cubicle system with the widest international certification in its class, including:

- Certification under the supervision of German Lloyds and Lloyd’s Register of Shipping for use in applications demanding vibration-proofing between a frequency range of 5 and 100 Hz.
- Compliance with the requirements laid down in VDE0660 Part 508, as well as IEC 1641, covering the effectiveness of the design to prevent quench and therefore minimise the effects of accidental electric arcs.
- A busbar system designed to be maintenance free and approved for installation where periodic maintenance inspections are greater than five years.
- A unique plug-in system that allows the safe removal and replacement of functional devices from live distribution bars.
- A framework configuration that gives infinite possibility for customisation, yet has been approved for use in high shock environments such as earthquake zones and warships.

Component and build quality

ABB is the world’s largest electrical engineering group. Components used in the SPDUs are standard, type-tested units developed and manufactured by ABB and used extensively in high specification applications in power generation, power distribution and industrial controls sectors. ABB operates quality assurance procedures to ISO 9001, maintaining the quality in the finished product.



The Client Cabinet

The client cabinet is an integral part of the infrastructure side of the SPDU and is where final distribution products are connected to the SPDU. The heart of the client cabinet is the patented “Multi-Functional Wall”. This precision moulded composite barrier acts as both the carrier for the distribution busbars and the segregation between them and the main busbars. Its unique labyrinth design enables devices to be safely plugged onto the live distribution bars without fear of arcing or shorting, protecting both plant assets and operator.

The modular design enables integral client cabinets to be added with minimal downtime if required, or satellite client cabinets to be added without interruption to the supply.



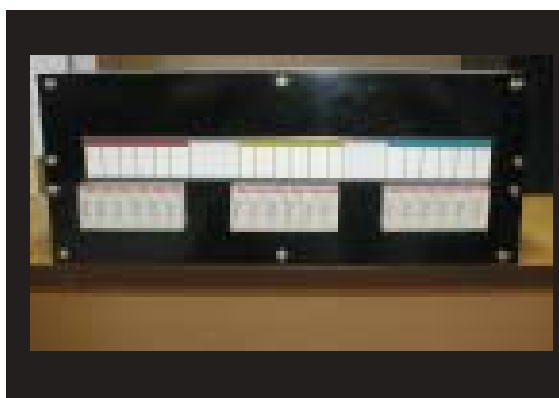


The MCB Client Tray

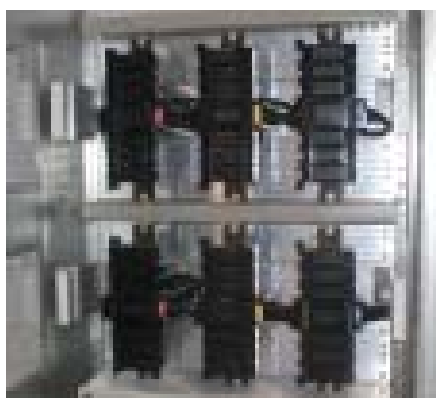
The Client Tray

The client tray carries the final distribution devices that supply power to the client's assets. Plugged directly into the Multi-Functional Wall the tray is available in a range of designs: MCCB, MCB and Fuse, both single pole and neutral and three pole depending on the application and philosophy of the distribution scheme.

The labyrinth apertures in the function wall prevent inadvertent contact with the risers whilst simultaneously inhibiting arcing during module insertion and withdrawal. Modules are fully shrouded for operator safety. Plant cables are connected directly to the outgoing terminals of each breaker and can be terminated safely whilst adjacent circuits are live. Wiring out to remote terminals has been avoided because of:

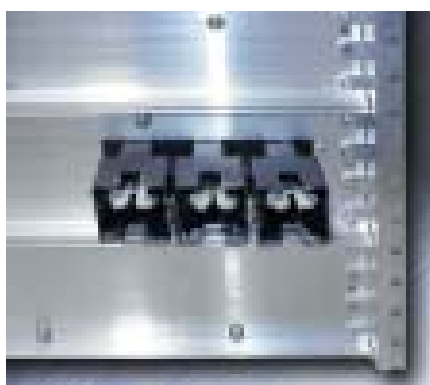


The 1038 Client Tray, showing DIN rail mounted devices



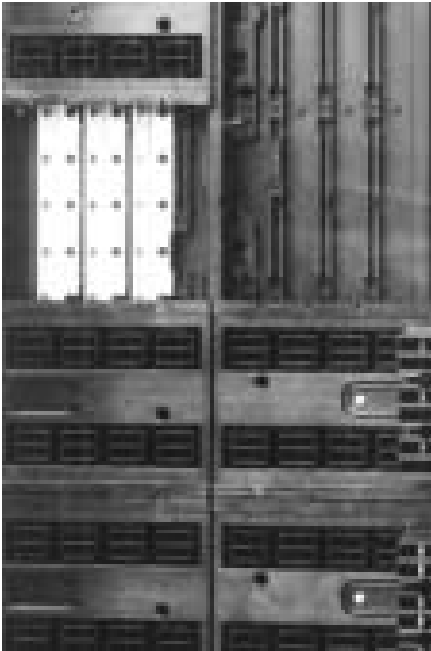
The HRC fuse Client Tray

- The incidence of inadvertent errors in connection or disconnection and the consequent risk to assets and operators alike
- Additional points of connection increase the potential points of failure in the system
- Handles on captive screws are fitted to allow rapid replacement or addition of new circuit ways



The Client Tray connects to the distribution bars by means of shrouded push-on connectors





Multi-function wall

Maximum creepage distance when using the Multi-function wall

- High short circuit withstand ratings
- Bolted design, embedded distribution bars
- Creepage distance 40mm exceeds marine requirements
- Conductor for small module connections
- Fault-free zone from the main busbars to the protective device in the module

All phases are isolated before making contact through the Multi-function wall

- Personnel safety and asset protection through superior design
- Touch proof (IP 2x) without moving parts
- Arc-resistant firewall to the busbar compartment
- Superb isolation properties
- Fault-free zone from the busbar to the apparatus

Primary contacts

Contacts for up to 250A/Contacts for up to 63A

- Silver plated contact and distribution bars
- Exceeds accordance to IEC 60439-1
- Contact ratings 63A, 250A, 400A, 630A

Distribution bars

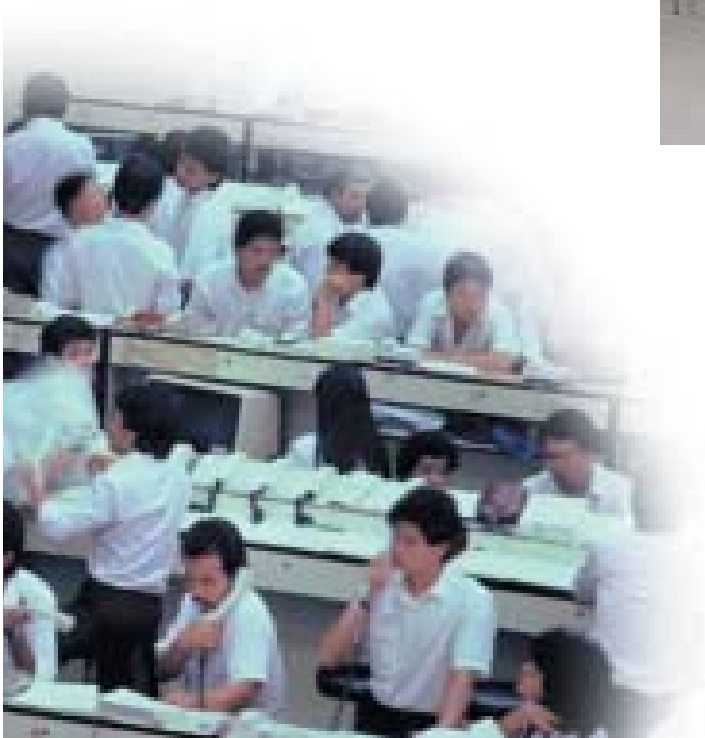
Distribution bars embedded in Multi-function wall.

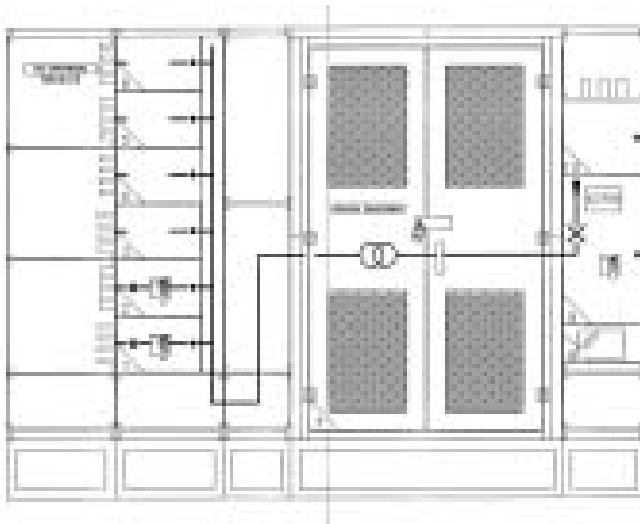
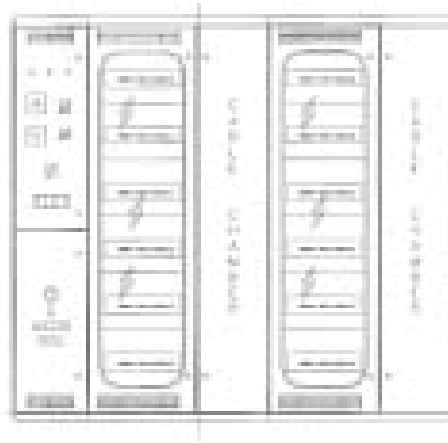
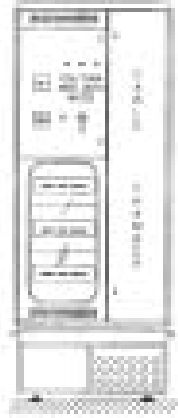
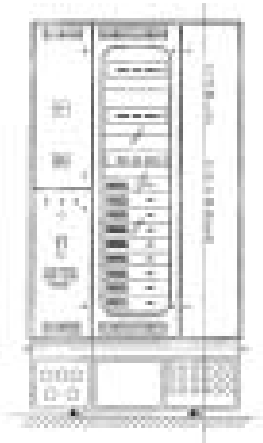
Dual bar option shown

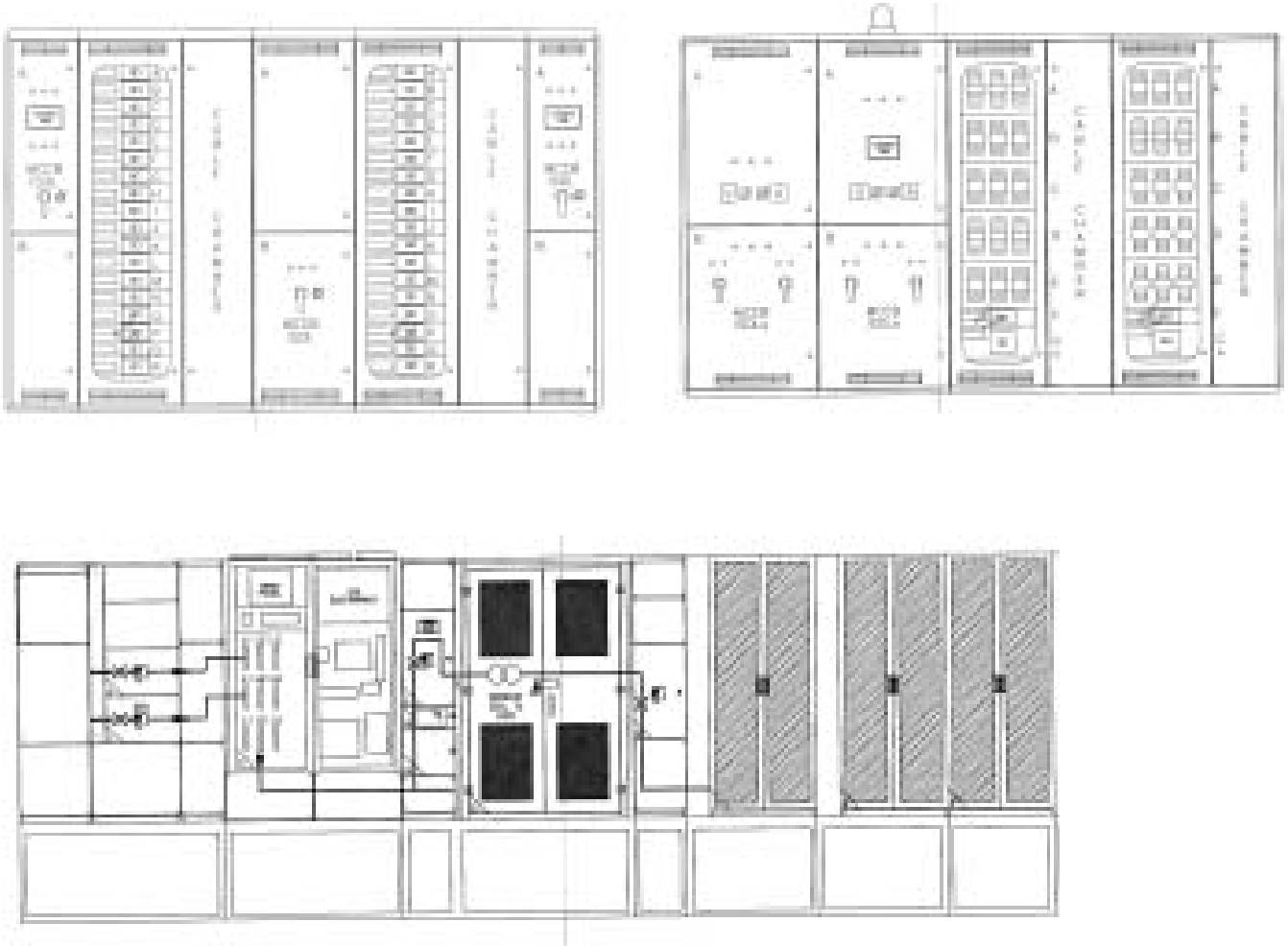
- Embedded in Multi-function wall
- Exceeds IEC 1641 all clauses
- 750A and 1500A
- L-shaped profile for greater rigidity

The infrastructure side

The infrastructure consists of the incomer and associated protection, metering, maintenance free busbars, static switches, isolation transformers and the client cabinet. SPDUs obtain power typically from a main or sub-main switchboard, either direct, via static or rotary uninterruptible power supply units, diesel generators or a combination. The fully type-tested MNS busbar system permits up to four electrical independent busbar groups to be installed in the standard product, permitting numerous combinations of back-up supply options. However, whilst changeover systems of greater or lesser sophistication theoretically improve system availability, in practice the added complication tends to increase the likelihood of failure. The SPDU design has therefore deliberately minimised the variety and quantity of components used and the number of contacts and connections between incoming and outgoing terminals.

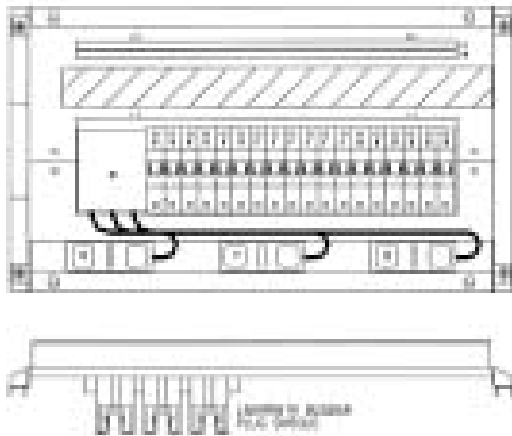




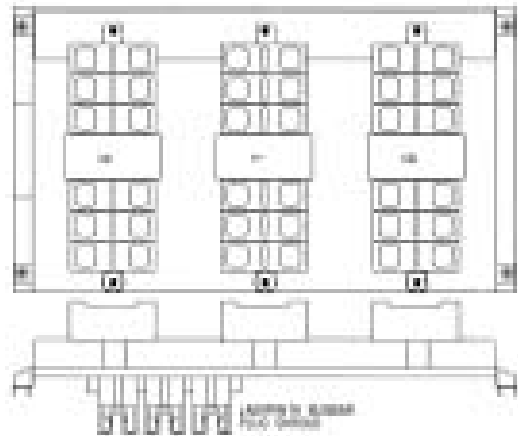


Standard SPDUs – Modules 1

6w TP&N (18 SP Ways) MCB 6-32A
63A Fuses (6 Modules Max/Pillar)

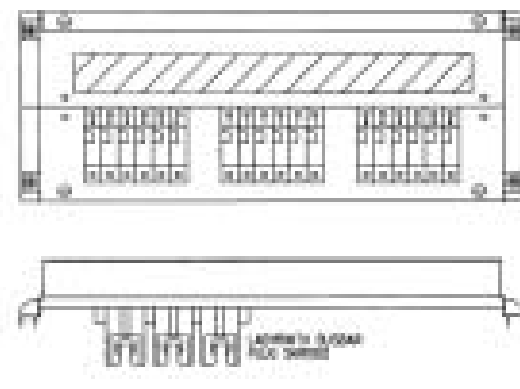


6w TP&N (18 SP Ways) Fuses 6-32A
6 Modules Max/Pillar



Standard SPDUs – Modules 2

18 SP/SP & N Ways Fuses 6-32A
10.3 x 38 Gg Fuses (9 Modules Max/Pillar)



6w TP&N (18 Ways) MCB 6-32A
125A MCCB (6 Modules Max/Pillar)

