APPLICATION NOTE

Intelligent Distribution for Main & Sub Distribution boards in Data Centers

0.5MW IT loads, Essential Level offering | IEC

To ensure high energy efficiency and service continuity, Data Centers need 24/7 metering and monitoring of electrical parameters.
Discover our pre-configured solution package to design a Data Center with a 0.5 MW IT Load and monitor incomings, IT load points, and PUE in the electrical distribution.

What is Intelligent Distribution at the Essential Level?
It is everything in terms of products and functionalities since it enables electrical parameters to be measured for incomings and IT load points, 24/7 data and PUE monitoring and analysis of the results. It could be the perfect solution for small installations with basic needs.

Why you need Intelligent Distribution
Green and efficient data centers are vital to reduce CO_2 emissions and fulfill sustainability targets. Electric infrastructures are leveraging on new digital technologies to answer this most demanding market needs. All the necessary information about electricity distribution can be collected and analyzed with ease, regardless of operator time and performance.

Main benefits

Maximized efficiency
Creates awareness about the energy efficiency status of the data center and how it can be increased

Easy to install
Simple to install offering with up to 66% less cables and up to 10% less connectivity components.

Faster commissioning
State-of-the-art embedded sensors for 10% reduced footprint and 25% faster commissioning.

Intelligent Distribution solution for Main & Sub Distribution boards in load Data Center

0.5 MW IT loads | Essential Level offering

WHITE PAPER

Discover more about others Level offerings.

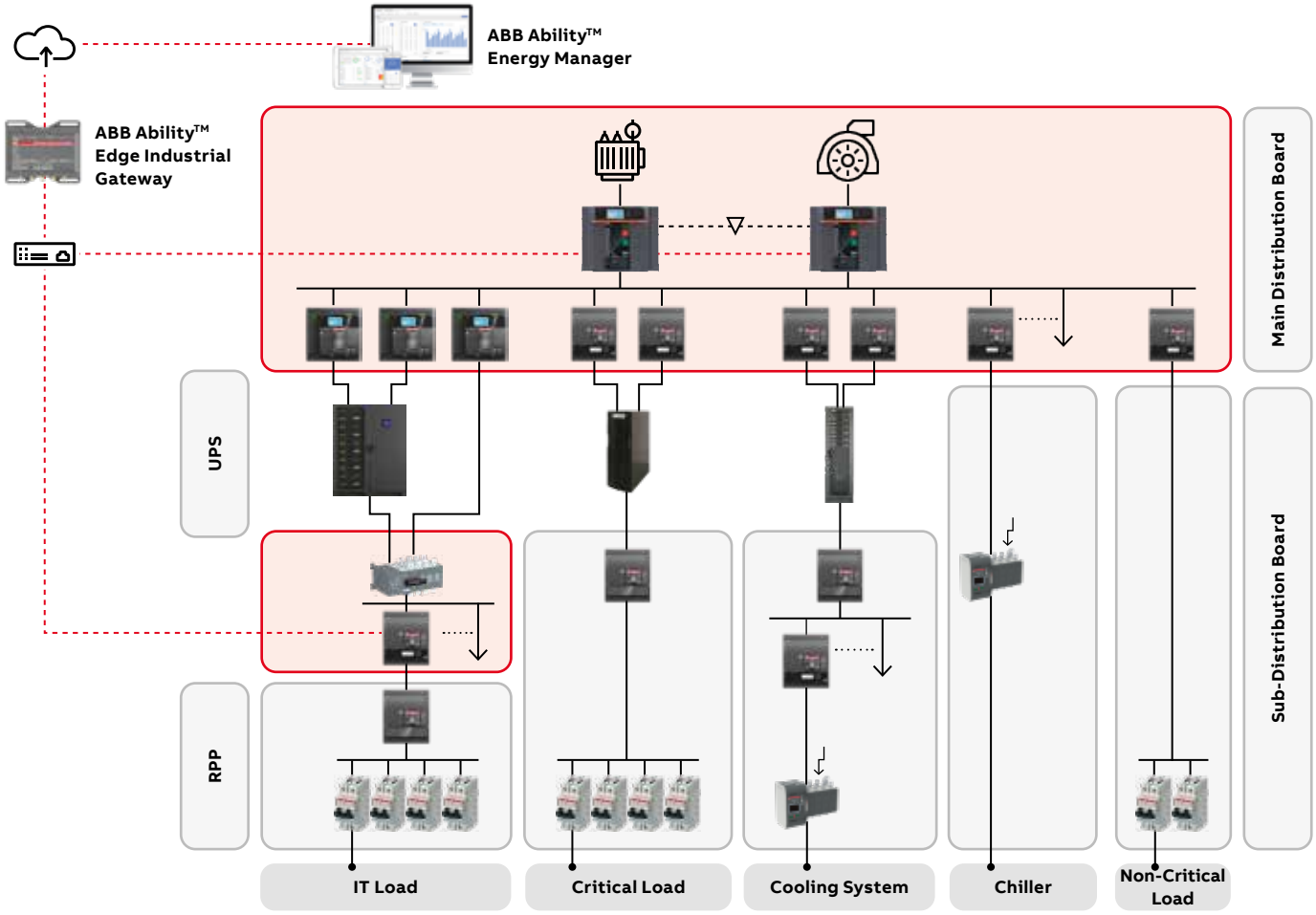
WHITE PAPER

Deep dive Main & Sub Distribution end uses.

In this application note, you will find the selection criteria and product bundle to enable intelligent power distribution in a Data Center with a 0.5 MW IT load design.

Specifications:

- Circuit breakers for incoming power and those downstream of IT loads are selected to acquire measurement and communication competencies.
- Unconnected devices are chosen so that they can be easily upgraded when measurement or communication are required in the future.
- The parameters measured include current, voltage, frequency, power, energy, power factor and peak factor. Precision is 1% for current (rms) and 0.5% for voltage.



Layout: Figurative single-line diagram of side A of the system plus system data center

Input Data	
Data Center Design	System plus system
IT Load Power [MW]	0.5
Rated AC Voltage [V]	400
Rated Power Transformer [kVA]	1250
Rated Power Generator [kVA]	1250
UPS Rated Power for IT Loads [kW]	500
UPS Rated Power for Critical Loads [kVA]	30
UPS Rated Power for Cooling System [kW]	4 x 20
Communication Protocol	Modbus TCP
Power Supply for Communication [V]	24 VDC
Supervision System	ABB Ability™ Energy Manager

Guide to system design of your project

Product needs for different projects can be specified by using the table below. Choose the relative row in the table according to your connectivity situation and product frame to find the required trip unit, accessories, gateway and subscription types for intelligence at the Essential level.

Connectivity	ABB product	Trip Unit	Measuring	Communication	Accessories	System
×	ACB - Emax 2 - E1.2...E6.2	Ekip Touch	Measuring Package	Ekip Com Modbus TCP	Ekip Supply	• ABB Ability™ Edge Industrial Gateway • ABB Ability™ Energy Manager Subscription +Datacenter Energy package
×	ACB - Emax 2 - E1.2...E6.2	Ekip G Touch (1)	Available	Ekip Com Modbus TCP	Ekip Supply	
	ACB - Emax 2 - E1.2...E6.2	Ekip Touch	-	-	-	
×	MCCB - Tmax XT - XT7/XT7M	Ekip Touch Measuring (2)	Available	Ekip Com Modbus TCP	Ekip Supply	
×	MCCB - Tmax XT - XT2, XT4, XT5	Ekip Touch Measuring	Available	Ekip Com Modbus TCP INT (3)	-	
	MCCB - Tmax XT - XT2, XT4, XT5, XT7/XT7M	Ekip Touch	-	-	-	

(1) Ekip G-Touch is a special trip unit for generator protection and already includes the Measuring Package.
(2) Ekip Touch Measuring already includes the Measuring Package.
(3) Since there is no need for any other modules at this offering level, Ekip Com Modbus TCP for XT2, XT4, XT5 frames have been chosen for the internal version. This internal module is mounted inside the breaker and needs a 24 VDC external supply.
ACB: Air Circuit Breaker
MCCB: Moulded Case Circuit Breaker

After this, the number of gateways and how many devices should be subscribed can be determined according to the total number of connected devices and points, as shown below.

Connected Device	Quantity	Point per device (TCP)	Total point
Emax 2 circuit breaker	4	1	4
Tmax XT circuit breaker	6	1	6
Gateway	1		10
Total Devices for subscription	11		

- The devices connected to each ABB Ability™ Edge Industrial Gateway with Modbus TCP/IP communication protocol cannot exceed 45 points.
- An external Ethernet switch with at least 12 ports must be used.
- The total power supply required for communication and supervision system is 79W @24V DC.
  - Emax 2 maximum rated power is 10W @24 VDC.
  - Tmax XT maximum rated power is 4W @24 VDC.
  - Gateway 15W maximum is 15W @24 VDC.
  - The Ethernet switch needs 110 - 240V AC power supply while maximum power consumption is 1.4W.

Bill of Materials

Code	Description	Side A Qty	Side B Qty	Total Qty
Main Distribution Board				
1SDA073005R1	E2.2B 2000 Ekip Touch LSI 4p WMP	1	1	2
1SDA107525R1	SW Measuring package for Emax 2	1	1	2
1SDA074173R1	EKIP SUPPLY 24-48V DC E1.2..E6.2-XT	1	1	2
1SDA074151R1	EKIP COM MODBUS TCP E1.2..E6.2	1	1	2
1SDA073007R1	E2.2B 2000 Ekip G Touch LSIG 4p WMP	1	1	2
1SDA074173R1	EKIP SUPPLY 24-48V DC E1.2..E6.2-XT	1	1	2
1SDA074151R1	EKIP COM MODBUS TCP E1.2..E6.2	1	1	2
1SDA101127R1	XT7S 1000 Ekip Touch LSI In=1000A 4p F F	1	1	2
1SDA101127R1	XT7S 1000 Ekip Touch LSI In=1000A 4p F F	1	1	2
1SDA101126R1	XT7S 800 Ekip Touch LSI In=800A 4p F F	1	1	2
1SDA068168R1	XT2N 160 BREAKING PART 4p F F	1	1	2
1SDA100143R1	Ekip Touch LSI In=63A XT2 4p	1	1	2
1SDA068168R1	XT2N 160 BREAKING PART 4p F F	1	1	2
1SDA100144R1	Ekip Touch LSI In=100A XT2 4p	1	1	2
1SDA068178R1	XT4N 250 BREAKING PART 4p F F	1	1	2
1SDA100320R1	Ekip Touch LSI In=250A XT4 4p	1	1	2
1SDA068178R1	XT4N 250 BREAKING PART 4p F F	1	1	2
1SDA100320R1	Ekip Touch LSI In=250A XT4 4p	1	1	2
1SDA068178R1	XT4N 250 BREAKING PART 4p F F	3	3	6
1SDA100320R1	Ekip Touch LSI In=250A XT4 4p	3	3	6
1SDA068168R1	XT2N 160 BREAKING PART 4p F F	1	0	1
1SDA100143R1	Ekip Touch LSI In=63A XT2 4p	1	0	1
1SVR427045R0400	CP-D 24/4.2	1	1	2
Sub Distribution Board for IT Load				
1SCA022872R8420	OTM800E4CM24D	1	1	2
1SDA068178R1	XT4N 250 BREAKING PART 4p F F	3	3	6
1SDA100326R1	Ekip Touch Measuring LSI In=250A XT4 4p	3	3	6
1SDA105177R1	EKIP COM MODBUS TCP XT2-XT4 INT	3	3	6
Supervision System				
1SDA116751R1	ABB Ability™ Edge Industrial Gateway	-	-	1
2CDG120082R0011	IS/S 8.1.1 Fast Ethernet Switch 8 ports	-	-	2
ABB Ability™ Marketplace (1)	ABB Ability™ Energy Manager Watching 1 YR	-	-	1
	1 extra device for ABB Ability™	-	-	6
	Datacenter Energy Package	-	-	1

(1) These subscription codes can be purchased through ABB Ability™ Marketplace.

APPLICATION FINDER

We've made it simpler for you to set up your project!
Click here to find the reference architecture that best fits your needs and download the Bill of Materials.

Product offering

Emax 2:

WEB PAGE

CATALOG

EKIP G BROCHURE

Tmax XT:

WEB PAGE

CATALOG

OTM Motorized Transfer Switch:

WEB PAGE

CATALOG

ABB Ability™ Energy Manager – Watching:

WEB PAGE

ABB Ability™ Edge Industrial Gateway:

WEB PAGE

To discover more

APPLICATION FINDER

Find the reference architecture tailored to your needs and speed up your project thanks to our new Application Finder Tool!

CONTACT US

Do you have a similar project and are you searching for the right Application configuration? Contact us and talk to our experts!

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