

Technical specifications

Containerized data centre

NTR CDC 40f+





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1 THE PURPOSE OF CDC

NTR CDC 40f+ je is a standalone, self-sufficient data centre unit with highest level of energy efficiency. CDC is shaped as a container and thus it is entirely mobile. This mobile unit includes a server room with all necessary additional support and surveillance infrastructure. It is easy to install, does not require massive preparations for building on the location and is easily moved to a new location. Relocation is possible with the equipment installed in the CDC. It provides a perfect installation for small to medium sized companies that need up to 420 U rack space for operation of their own system.

Its design slightly exceeds the standard 40 foot container dimensions, thus the whole length of the container is standardized at 40' or 12.2 metres. Consequently, the data centre can be transported to a new location by road or by rail. It works best for companies whose business needs, surveillance or remoteness requires them to have their own information infrastructure together with basic installation requirements.

The containerised data centre unit provides all the necessary support infrastructure including:

- A reliable power supply system with diesel genset and redundant UPS units;
- A reliable technical cooling system;
- An active and passive fire prevention system;
- A security and video surveillance system;
- A communication wiring inside container;
- All necessary 19" infrastructure for server installation;
- A remote control system for monitoring of all in-built systems.



2 BASIC PROPERTIES

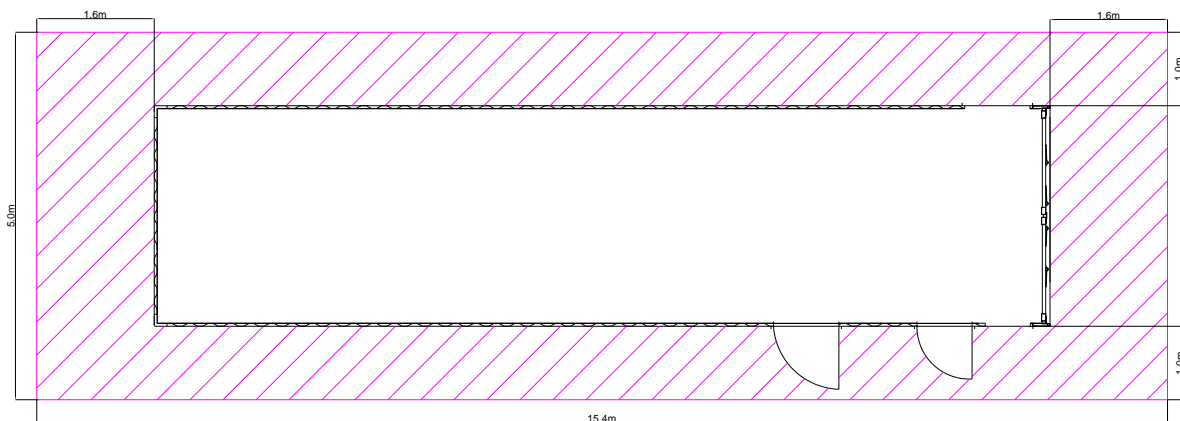
2.1 EXTERNAL DIMENSIONS

External dimension of CDC 40f+ are 12.2 x 3.0 x 3.1 m (L x W x H). An empty unit weight approximately 10,000 kg, maximum load of installed equipment is 12,000 kg.

Specification	Estimated weight
Empty CDC	Up to 10,000 kg, depending on the installed systems
Number of system racks	Up to 10
Maximum load of single rack	Up to 1,200 kg
Available installation space in system racks	Up to 420 U
Maximum load of installed equipment	Up to 12,000 kg
Maximum total load of full CDC	Up to 22,000 kg

2.2 INSTALLATION REQUIREMENTS

Before installing the CDC, the loading force of the foundation needs to be adequately prepared. Each project requires a different foundation preparation depending on the location. For proper functioning, a space of approx. 15.4 m x 5 m (W x L) is needed, as seen on the scheme below:



To install NTR CDC 40f+ at least 5 m in height is required. Additional external units of technical cooling are installed on the base unit. They are assembled on location on pre-prepared installation points. Minimal spaces require location inspection.

2.3 ELECTRICAL CONNECTION REQUIREMENTS

NTR CDC 40f+ is equipped with a diesel genset and at least two independent UPS systems. Therefore, only mains connection on the installation site is required. For cable inlet there is a separate cable duct near the main entry door to the CDC. Usually mains connection is in a 3 phase version with a TN-S protection system. Recommended mains voltages are 400V/50HZ, but on request, other versions are available. Recommended mains connection power is between 100 and 160 A per phase.



2.4 COMMUNICATION CONNECTION REQUIREMENTS

All necessary communication wiring inside NTR CDC 40f+ is already installed. Details are available upon request. In the production phase, wiring can be adapted according to the customer's needs. Communication wiring and equipment for remote control and monitoring systems are independent from other communication systems in the CDC.

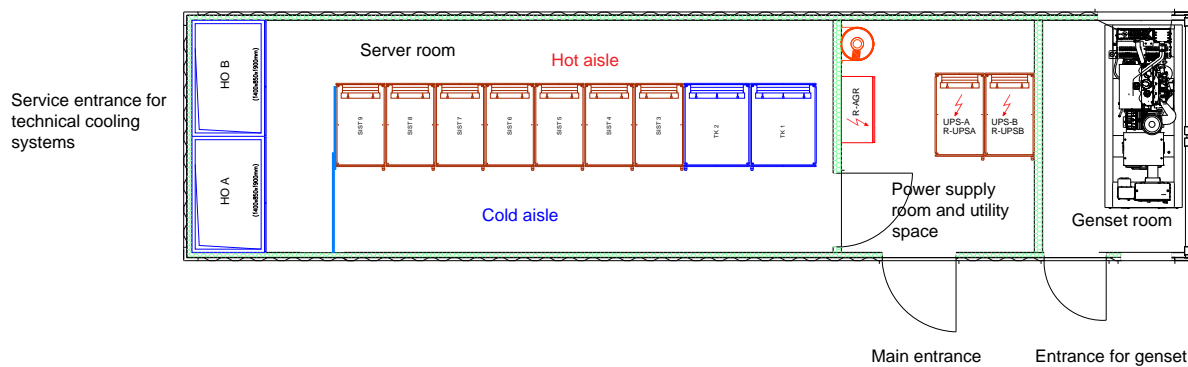
A separate cable duct is available for connection to the customer's external location network. Connection can be made with Ethernet Cat6A or Fiber optic cables.



3 TECHNICAL SPECIFICATIONS OF NTR CDC 40F+

3.1 BASIC LAYOUT OF NTR CDC 40f+

The NTR CDC 40f+ is designed as a standalone, self-sufficient data centre unit with all necessary support infrastructure provided. Technically it is designed as a standard length container unit with some extra width and height. This enables easy and comfortable transport to different locations. Due to high degree of integration and space optimization, NTR CDC 40 f+ functions in the same way as much larger data centres. Layout is described on the picture below.



The unit is divided into three physically separated rooms, which provides fire safety and security.

These three rooms are:

- System room for installation of customer’s IT equipment. It is built as a separate security and fire prevention unit. An automatic fire suppression system is installed. The system room contains system racks together with cooling devices. For efficient cooling, Cold and Hot aisle separation is installed;
- Power supply and utility room, also built as a separate fire prevention and security unit. All power supply systems, extinguishing supply and other common equipment are placed inside;
- Diesel generator set room with diesel generator inside.

3.2 KEY CAPACITIES OF NTR CDC 40F+

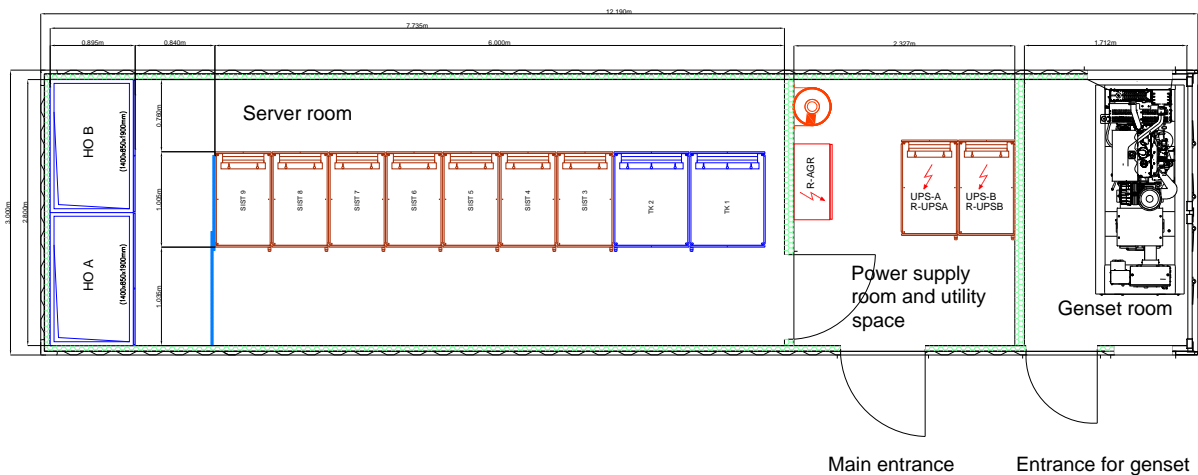
The NTR CDC 40f+ containerised data centre has the following basic capacities:

Specifications	Key capacities
Capacities of system racks	Up to 10 system racks with dimensions 600 x 1000 x 2000 (W x D x H), or any other combinations of system and communication racks with dimension 800 x 1000 x 2000 (W x D x H), total width of all racks is 6000 mm
Available equipment installation space	Up to 420 U
Technical cooling system principles	Direct free cooling with additional mechanical cooling
Capacity of technical cooling with full redundancy	31 kW or 45 kW of cooling power
Capacity of technical cooling without redundancy	60 kW or 85 kW of cooling power
Capacity of uninterruptable power supply with full redundancy	40 kVA/32 kW or 60 kVA/48kW at CosFi 0,8
Capacity of uninterruptable power supply without redundancy	80 kVA/60 kW or 110 kVA/88kW at CosFi 0,8



Autonomy of uninterruptable power supply system	min 15 min at full load
Type of backup power supply	diesel generator set with instant automatic start up at power outage
Capacity of backup power supply	aprox. 100 kVA
Autonomy of backup power supply	min 48 hour, extendable with fuel supply
Typical energy efficiency - PUE	as low as 1,2, dependable on installation location climate conditions
Fire protection in CDC	early fire and smoke detection with fire suppression system
Security surveillance	security surveillance with alarm transfer in whole CDC
Video surveillance	video surveillance in whole CDC,
Access control principles	access control on all doors with RFID, biometrics upon request
Remote control	Integrated comprehensive remote control and monitoring system of all support infrastructure, installed in CDC, with http/https and SMTP support

This is the basic layout of the NTR CDC 40f+ with key internal dimensions:



3.3 BASIC COMPONENTS

The NTR CDC 40f+ containerized data centre is designed as an independent unit. In case of power outages, 48-hour local power supply is guaranteed. Longer autonomy can be achieved with appropriate fuel delivery. NTR CDC 40f+ is built with carefully selected components designed to be used in data centres. Components are optimal for working under extreme conditions and special attention was put into their integration and container data centre implementation. The following producers provide components for the centre:

- Basic components:
 - Modular fire prevention walls with fire resistance EI90 according to EN 13 501-2;
 - Fire resistant and smoke proof door;
 - Antistatic raised floor;
 - Roxtec water and gas proof cable ducts.
- Power supply:
 - Diesel generator set with Perkins engine and Stamford generator;
 - UPS systems Piller with Hoppecke batteries;
 - Eaton – Moeller switch gears;



- Rittal electrical switchboard and PDU units.
- Technical cooling systems:
 - Weiss Klimatechnik data centre cooling systems with direct free cooling;
 - Cold and Hot aisle separation.
- IT equipment installation infrastructure:
 - Rittal system and communication racks;
 - Metz Connect communication network.
- Security systems:
 - Siemens fire suppression system with early detection;
 - Security surveillance with access control;
 - Mobotix video surveillance with IP cameras.
- Local management infrastructure and remote control:
 - WAGO PLC and control units;
 - Certech SCADA system.
 - B&R industrial computer and touch screen display,

3.4 POWER SUPPLY

Key features:

- Input voltage 400V/50Hz 3ph or 230V/50HZ 1ph AC, other versions upon request;
- Mains input power approx. 80-105 kVA;
- In-built spare power source with diesel genset, standby power approx. 100 kVA;
- Internally designed and optimized genset with automatic startup and automatic transfer switch for power transfer between main and spare power source;
- Upon request possibility of synchronous power transfer without interruption between mains and spare power source;
- Diesel genset with pre heating unit for fast start up of the genset;
- In-built day fuel tank with additional main fuel tank. Both together have the capacity to ensure autonomous operation for 48 hours;
- Two independent UPS systems (2N redundancy) with nominal power of 40 kVA and batteries that ensure autonomous operation for 15 min;
- Upon request two independent UPS systems with nominal power of 60 kVA;
- Independent switch and distribution boards for each UPS system;
- Redundant power cabling to each system and communication rack. Each rack is equipped with two independent PDU units;
- PDU units with C13 and C19 outlets. Final layout is made according to customer's needs;
- Upon request implementation of two independent Static Transfer switches for automatic transfer between two UPS systems;
- LED lighting with motion detection;
- Upon request possibility for lighting exterior of CDC with motion detection.

3.5 SYSTEM AND EMC PROTECTION

Key features:

- CDC system designed as Faraday cage;



- Meshed equipotential bonding;
- Upon request additional EMC protection on all cable ducts;
- Surge protection implemented on power inputs;
- Raised floor with antistatic properties;
- Upon request Tempest protection.

3.6 TECHNICAL COOLING SYSTEM

Key features:

- High efficiency technical cooling system with direct free cooling. In case of low external temperatures, it utilizes external air for direct cooling of IT equipment. In bad weather conditions, it uses the mechanical cooling principle. The system is designed for maximum power savings; therefore, it is capable of utilizing both cooling principles;
- Fully redundant technical cooling system with 2N redundancy;
- DX cooling device with FC capabilities;
- Under floor cold air distribution to the Cold aisle;
- Cold and Hot aisle separation in the system room;
- Recommended temperature for Cold aisle is from 23 to 27 °C;
- Additional cooling of Power supply room with fire separation between System and Power supply room;
- External unit of cooling systems are installed on the top of the CDC;
- Additional service door for external maintenance of cooling devices without the need for entrance into the System room.

3.7 ENERGY EFFICIENCY

Energy efficiency of the NTR CDC 40f+ is one of its most important features. Due to optimization of technical cooling and power consumption of the support systems, NTR CDC 40f+ can achieve PUE as low as 1.2. Results of power efficiency depend on several conditions, including environment, general power consumption in CDC, and preferred temperature in the Cold aisle. Key reasons for low PUE are:

- Cold and Hot aisle separation;
- Utilization of direct free cooling;
- Relatively high recommended temperature in Cold aisle;
- High energy efficiency of UPS and other support systems.

End PUE depends on the end installation location and environmental conditions. Under ideal circumstances, PUE can be as low as 1.08 in extreme locations.

3.8 SECURITY AND SURVEILLANCE SYSTEMS

Security is, along with reliability, another key advantage of the NTR CDC 40f+. In CDC implemented security and surveillance systems include:

- Three separate fire protected rooms;
- Early fire detection and alarm system in all rooms with analog addressable fire alarm control panel and additional aspirating detectors in the System room;
- Fire suppression system with NOVEC 123 fire suppression supply;
- Security, fire and smoke resistant doors between rooms;
- Technical surveillance and mechanical protection with separate security zones in all rooms;
- Access control with RFID cards and personal PIN number;



- Upon request, the option of biometric access control;
- Door opening alarm on all doors with option for interlocking between main entrance and System room entrance door;
- Remote control and supervision of all doors and security systems;
- Video surveillance in all rooms in CDC.

3.9 REMOTE CONTROL AND LOCAL MANAGEMENT INFRASTRUCTURE

One of the key factors for secure and reliable operation of all data centres is remote control and management of data centre infrastructure. Therefore, an advanced remote control and management system with local management infrastructure is built in to the NTR CDC 40f+. Its main features are:

- Monitoring and control of power supply system:
 - Electrical measurements of mains inlets;
 - Electrical measurements and control of ATS;
 - Measurement and control of genset operation;
 - Automatic genset testing;
 - Measurement and monitoring of fuel system;
 - Monitoring of all switches, protection and other devices in electrical distribution panels;
 - Measurement and control of UPS systems;
 - Electrical measurement on each system rack and PDU unit;
 - Electrical measurement of cooling systems.
- Monitoring and control of cooling system:
 - Remote control and monitoring of cooling units;
 - Independent measurement and monitoring of temperatures on different locations inside CDC;
 - Control and monitoring of free cooling system;
 - On line measurement of instant PUE, daily, weekly and yearly average PUE.
- Monitoring of security systems:
 - Monitoring of doors in CDC;
 - Monitoring of other security systems;
 - Transfer of alarm signals to remote location.
- Alarm management;
- Comprehensive historization;
- On/off line trending;
- Local management display with synoptic overview of the whole CDC;
- Remote access to the LMI through secured HTTPS;
- SMTP support for alarm and information transfer to other management systems;
- Alarm transfer via e-mail and upon request via SMS.