

## Turn-Key Data Center



**Benefits:**

- high efficiency
- plannable costs
- short delivery times
- limited enlargement possible
- can be enlarged later within certain limits
- varying degrees of availability
- flexible location
- serviceable without requiring your presence on site
- certification

- Performance characteristics:**
- 4 basic types with 6, 12, 18 or 24 server cabinets or IT equipment
  - complete with UPS and emergency power supply
  - availability: simple, redundant n+1 or 2N
  - 'cold corridor' for server cabinets
  - A and B power feeding to server cabinets
  - precision cooling technology
  - early fire detection
  - fire extinguishing system
  - access controls and burglary prevention
  - burglar-proofed doors
  - video monitoring
  - remote monitoring
  - remote control
  - service and maintenance performed outside of the server room
- Protection against:**
- break-in/theft
  - vandalism
  - unauthorised access (access control)
  - fire (early fire detection)
  - power failure and power interruptions
  - interference due to electromagnetic fields
  - dust/dirt
  - storm damage
  - water
  - smoke

**Remote Monitoring**

The E-TEC Remote Control (ERC) system consists of a site manager and a site monitor. These receive status signals from the various sensors for temperature, humidity, motion, fuel level, etc.. Current, voltage, and output values are measured and transmitted as well. This way, any operating-status parameter can be monitored and reported from anywhere at all. ERC is distinguished for its ease of installation: It can be retrofitted; equipment already in place can easily be integrated, or additional sensors added. The ERC system is integrated into the existing customer network, the limit and threshold values set and the escalation process determined.

The system is characterized by a high degree of flexibility: Hardware and software can be adjusted to suit individual customer infrastructure. If predefined limit values are exceeded, a message to this effect is transmitted directly to a designated competent contact person responsible for dealing with the matter. These status messages can be communicated through any of a range of optional media such as text messaging, fax, Intranet, Internet, etc..



We can also install a Data Center conforming to this concept in your existing building.

**Types and Dimensions**

Type	Number of 19" racks or 'stand-alone' devices	Data Center dimensions, L x W x H
1	1 - 6	9,75 x 5,40 x 3,32 m
2	7 - 12	12,24 x 5,54 x 3,32 m
3	13 - 18	13,48 x 5,54 x 3,32 m
4	19 - 24	16,58 x 5,54 x 3,32 m

Larger types upon request

- **of the property**  
Doors open – closed, doors locked
- **of the rooms for**  
temperature, humidity, motion, fire, leakage and water
- **of the power supply**  
power failure, electricity, voltage, output (kW), crest factor (cos phi)
- **of the individual devices**  
low-voltage distribution, switch positions 0/1, electricity consumption in individual areas, tripped fuse, short-circuit, overload, etc.
- **of the utility backup system**  
for fuel shortage, service readiness, overload
- **of the cooling units**  
excess temperature, disturbance, etc.
- **of the UPS systems**  
normal operation, battery operation, bypass operation, battery temperature, etc.
- **of the fire alarm and extinguisher**  
status displays such as e.g. extinguisher activated, communications equipment deactivated, disturbance

Further options upon request.

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[www.e-tecpowerman.com](http://www.e-tecpowerman.com)

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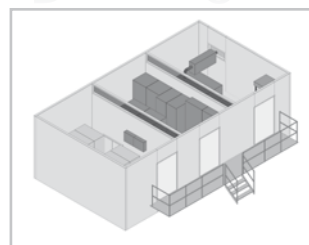
## Turn-Key Data Center by E-TEC



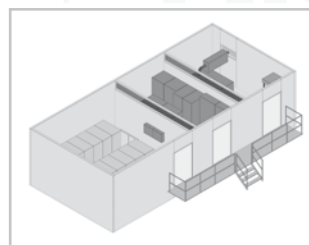
# Turn-Key Data Center by E-TEC in detail

## The Situation:

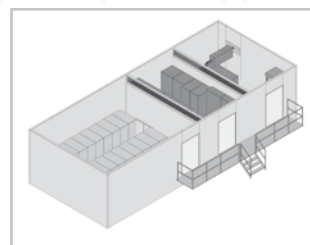
Your company's reliance on data processing is constantly growing. This makes it more important than ever to ensure that servers and IT equipment are installed in a safe location. Often, however, finding an appropriate location nearby proves itself to be very difficult. Elaborate structural alterations, at great expense in terms of time and money, are the only way to build a data center. The result is a considerable interruption of business, and the question remains: what shall we do as we continue to grow? Will this scenario repeat itself, or will we have to come up with something entirely different? The need for a safe location – and the constantly evolving demands for data processing – calls for a very detailed awareness of the issues involved. Steadily rising levels of heat generated by the servers are just one of the challenges that must be resolved. Added to this is the need to select the right suppliers for the individual services. On top of the everyday workload, finding a technologically and economically sustainable solution is a very time-consuming task.



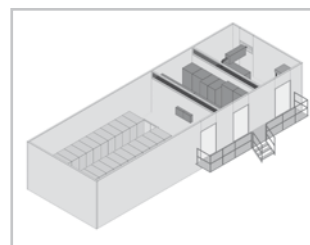
Type 1



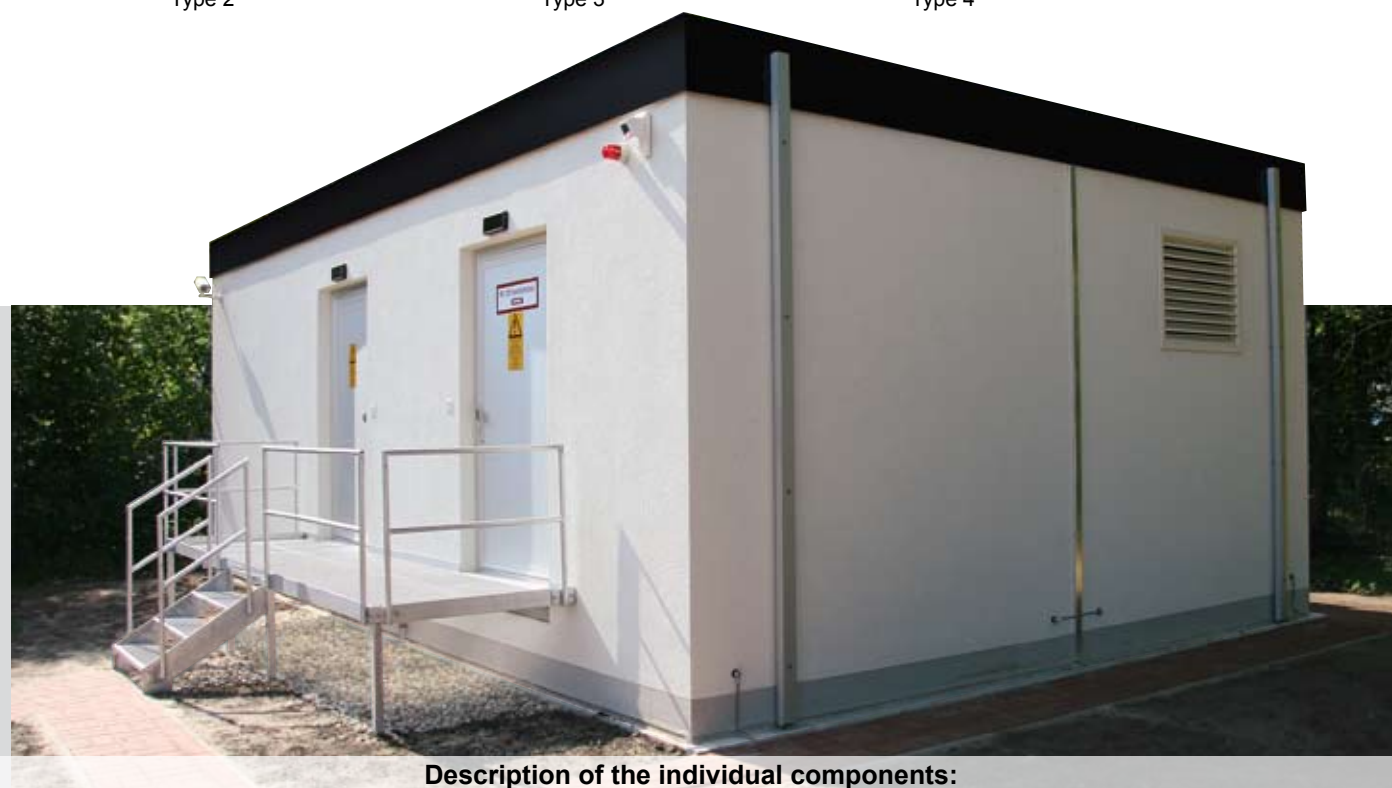
Type 2



Type 3



Type 4



Description of the individual components:

## turn-key data center

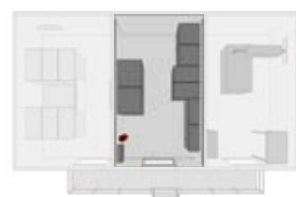
## The Solution:

The solution is the Turn-Key Data Center by E-TEC. It is available in a range of sizes, precision-tailored to your requirements. With a well thought-out, forward-looking concept, we plan and build a data center that meets your performance and equipment needs. This reduces needless interfaces while providing calculable costs and a fixed completion date at the same time. Then, as you grow, we enlarge your data center.

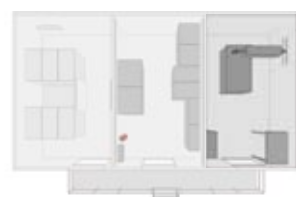
Essentially, the E-TEC Data Center consists of three rooms. In the server room, 19-inch equipment racks are set up using the 'cold corridor' system. Redundant A/B sub-distribution boards supply the racks with power. The equipment room contains precision cooling units, a fire alarm and fire-extinguisher, and the low-voltage main distribution board and UPS systems. Both the server and equipment rooms are fitted with raised floors. The third room houses the diesel generator. If a service or maintenance call is required, service technicians can complete necessary maintenance or repairs in the equipment room, without having to enter your server room.



Server room



Equipment room



Diesel generator room

### Concrete Cell

The concrete cell is designed in accordance with DIN ISO and features an integrated collecting tray. The heat-insulated flat roof is also made of poured reinforced concrete and is floated atop the concrete cell. The cell is sealed at the top using all-round corrugated aluminium facing. Two downspouts provide drainage for the roof surface. Power, water and fibreglass cables are fed into the cell from underneath. Soundproof, anti-theft framed aluminium doors with lateral braces and all-round seals are used, with interior strips, door filling of high-tenacity alloys with mechanical door holder. The door design is PEHLA-tested according to DIN 0670 Part 611. (Impact test pursuant to IEC 68-2-62). The door to the data center is fitted with an upper door closer. The exterior walls are made of 100/120mm poured reinforced concrete. The roof surface and outer walls are insulated with insulation material 100mm thick. The surface is provided with textured exterior rendering and RAL paint according to the customer's request. The steel reinforcements in the individual walls and the roof are connected electronically with one another. The entire concrete cell is earthed. In terms of fire protection, the concrete cell, as a self-contained fire compartment, satisfies DIN Standard 4102.

### Equipment

The concrete cell consists of three rooms: Server room, equipment room and a room for the diesel generator. Both the server and equipment rooms are fitted with a raised floor with the appropriate load-bearing capacity. The equipment room houses the cooling unit, fire-extinguisher, fire alarm, UPS and low-voltage main distribution board. All rooms contain adequate numbers of light and electrical outlets. Air-intake and outlet openings are fitted with weatherproofing screens.



cold corridor

### Server Room

In the server room, 19-inch equipment racks are set up using the 'cold corridor' system. The system is based on the principle of complete separation from warm and cold air currents, leading to considerable improvements in cooling efficiency. The racks are set up to create a cold corridor sealed with glass panels at the top and at the front through installation of sliding doors; this prevents the cool air from escaping. The cool air is pressed up through the raised floor and into the cold corridor through ventilation tiles. This way, the racks constitute a self-contained unit. The cold area is located inside the sealed corridor, while the rest of the server room is the warm area. The advantages are obvious: There is nearly no temperature difference between the floors and ceilings of the racks. The servers can be installed at any location throughout the 19" equipment rack. This makes it possible to increase the cooling temperature or the power density of the servers.

### 19" Racks

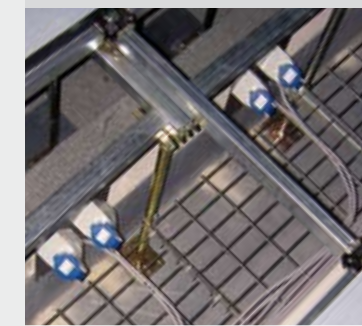
The installed 19" equipment racks with a height of 42HE meet the usual standard. The design provides ample room on the reverse for A and B power-supply outlet strips. The racks are 600 mm wide and 1000 mm deep, providing room for all conventional servers. We can also install your preferred 19" equipment racks in the Data Center.

### Electricity Supply

Under normal circumstances, the entire energy supply comes from the public grid. In the event of a power failure, the supply of power for the entire Data Center automatically switches to diesel generator operation. While the diesel generator is starting, the UPS systems take over the task of providing power to the servers and the other key-users such as access control, alarm system, fire alarm system, etc. The servers are linked directly to the UPS system. The diesel generator supplies power to the cooling units. Once the power supply has been restored, the diesel generator automatically switches over to mains operation. The 19" equipment-racks are individually supplied by the sub-distribution board installed in the server room. Each rack has a monitored, secure circuit of its own. For each rack, there are two CEE electrical outlets for A and B power feeds mounted on the mesh cable tray on the raised floor. The rack PDUs (power distribution units) are connected to these power outlets.

### Data Cabling

Data cabling is fed to the individual equipment racks through separate cable trays located in the raised floor. The scope of delivery does not include switches and hubs.



Raised Floor



cooling units

### Diesel Generator

(Emergency Power Generator) DIN ISO 8528, Class 2

The diesel generator room houses the backup power generator that automatically starts in the event of a longer power failure, ensuring the supply of electrical power to the Data Center. Given adequate stocks of fuel, this emergency operation can be sustained over a longer period of time, e.g. 48 hours. The cooling water for the backup power generator is heated in the process. This heating is thermostatically controlled. Also installed in the utility backup room are anti-freeze heaters, a handheld light, emergency power control, and an auxiliary drive. Complete soundproofing ensures that noise emissions are appropriate to the locations involved.

Diesel Generator



### UPS System

In the event of power interruptions, the constant online operation of the UPS system ensures that the server continues to receive an uninterrupted supply of clean power. Standard-installed is a UPS system compliant with EN 62040-1-2-3 with a sealed battery for 15 minutes of backup power. To enhance availability, an additional UPS system can be installed to work redundantly with the first system. If a system should fail or be undergoing maintenance, the other system then assumes the task of ensuring uninterrupted power. Each UPS system has its own battery. In accordance with Eurobat, the batteries are designed with a service life of up to 10 years. An external manual bypass switch enables uninterrupted release of every UPS system for service and maintenance. The delivery also includes 'shutdown' and monitoring software with which to 'shut-down' the servers safely in the event of a longer power failure.

UPS-System



### Raised Floor

At a height of approx. 400 mm, the raised floor in the server and utility rooms offers the right dimensions for the supply of cool air. The conducting panels in the raised floor are 600 x 600mm in size and 40mm thick and removable. The floor is designed to withstand loads of 1000kg/m<sup>2</sup> in the utility area and 500kg/m<sup>2</sup> in the server room. The materials comply with the requirements of DIN 4102 for fire-resistant materials.

### Cooling

Optimal cooling conditions are a basic prerequisite for reliable operation of a high-availability data center. Redundant cooling units are a standard part of the design. The sequence control ensures that the cooling units are subjected to even loads. A key to high availability is a holistic air-conditioning concept and a requirement-tailored design of the air-conditioning system itself. To regulate humidity within the server room, the air-conditioning systems are equipped with humidifier and heater capabilities. Free-Cooling Equipment (optional) Great energy savings can be achieved through precision-cooling systems that use cool exterior air for indirect, 'free' cooling of the data center. Modern control electronics activate power-intensive, compressor-driven cooling only when it is really necessary. This saves lots of kilowatts of electricity.

### Burglar Alarm, Access System and Video Monitoring

The building is standard-equipped with a keyless access system using chip cards. This system is monitored online. The building is also secured with a burglar alarm (VdS 2311, B Class), with motion detectors and video cameras. Break-ins, should they occur, are reported through the central alarm system and can also be communicated to a security service. The doors are fitted with a self-locking electronic lock system. A non-contact reader (key ring) releases the doors. A concealed half-cylinder lock provides emergency locking. This procedure is documented, and access monitored online.

Alarm, access and video monitoring systems



### Fire Alarm and Extinguisher Systems (DIN 14675)

There is also a modular fire alarm and extinguisher control system that meets the requirements of EN54-Part 2 and 4, EN12094-1, VDE 0833 and VdS. The smoke detectors are installed on the ceilings and floors of the server and utility rooms. If a smoke detector or manual report identifies an incipient fire, a fire alarm is sounded. Following a brief delay, the pressure-filled extinguisher canisters open. The extinguishing compound, Novec<sup>TM</sup> 1230, flows to the jets and floods the fire-protection area, extinguishing any fire in progress there. As the extinguishing compound, which works both physically and chemically, is neither corrosive nor electrically conductive, it does not cause any damage to sensitive components. It deprives the flame of heat and interrupts the combustion reaction. (Other extinguishing compounds, such as argon gas, etc., can also be delivered.)

Extinguisher



Pressure relief valve

