

Linde Material Handling

 Linde connect

Linde

SAFE AND EFFICIENT FLEET MANAGEMENT



LINDE CONNECT

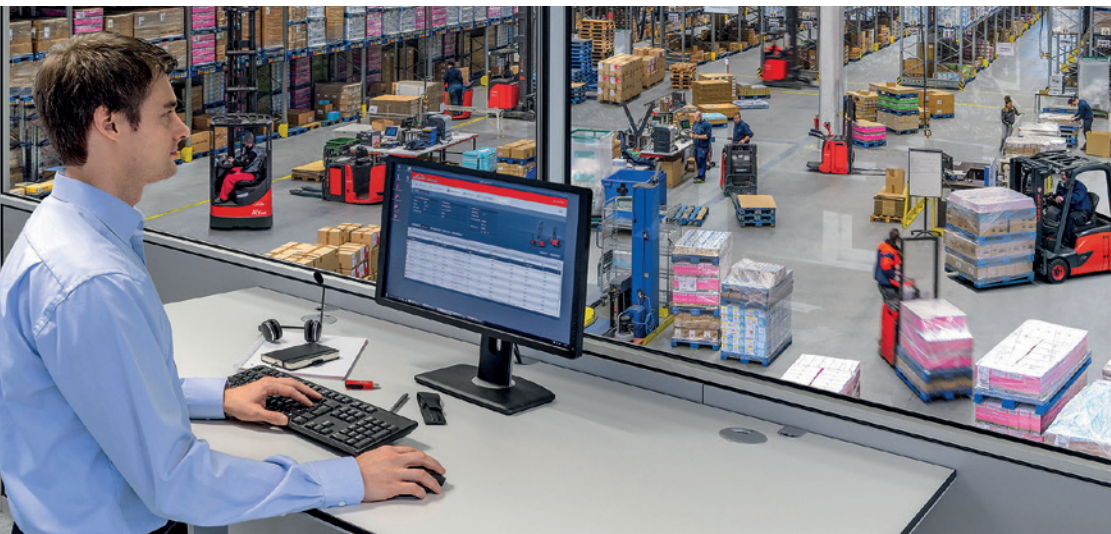
We make your fleet intelligent


Our software and hardware connect your vehicles and deliver comprehensive information, allowing you to make efficient use of your fleet.


Exploit the opportunities offered by digitization: Modern machinery constantly collects data that gives an insight into its state and its capacity utilization. We at Linde connect make this data available to you locally or via the Internet. With the connect product family, we have developed a fleet management solution that connects your vehicles and your staff, meaning you are always up to date on the status of your


logistics in your production plants or your warehouses. This transparency makes using your fleet safer and more economical, and increases the availability of each vehicle.

- Transparency
- Cost-effectiveness
- Security
- Service optimization





 Simple vehicle and driver management


 Effective access control

 More safety in traffic on premises



 Clear analysis of fleet usage

 Predictive maintenance

 Visible reduction of violent damage

Portfolio

How Linde connect products interact to make your day-to-day work easier.

→ 4

Infrastructure

Whether Bluetooth, Wi-Fi or mobile broadband technology, all the options are available for your fleet data communications.

→ 8

Software

Plan fleet usage, manage drivers' details, monitor and manage vehicles, analyze data, and generate reports: thanks to our programs, you can handle all of this effortlessly from your desk.

→ 6

Reports and Analysis

Make your fleet as efficient as possible. Over 15 different interactive reports are available for that purpose.

→ 10

Training

The Linde Academy offers courses for connect:desk users focusing on a variety of subjects.

→ 12

Hardware

Our hardware will reliably communicate with a vehicle, collate information, and transmit it wirelessly.

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App

The connect pre-op check app simplifies vehicle checks and simultaneously provides access control.

→ 13

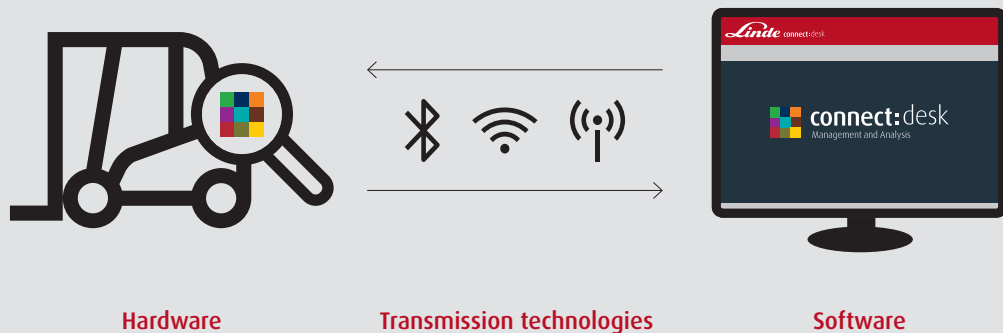
Functional

Our connect portfolio is modular in design, allowing you to choose precisely the functions for your fleet that you actually need.

→ 15

MODULAR FLEET MANAGEMENT

Our fleet management solution consists of various hardware and software modules. connect offers you transparent data on usage and vehicle deployment, as well as an overview of planned service intervals and upcoming driver training. For you that means improved on-site traffic safety, higher vehicle availability and increased cost-effectiveness.



The connect hardware components connect your vehicles and databases using communication technology. The hardware collects data from sensors and control unit and passes it on.

Transmission technologies of the fleet management systems are diverse. According to requirements and equipment you can choose the technology that suits you best.

- Data transmission via GPRS, Bluetooth or Wi-Fi
- Wireless transmission of firmware and function updates
- Straightforward retrofitting of existing vehicles thanks to simple installation

The connect software gives you a clear view of all your fleet data. It is used to manage vehicle and driver data, and it makes it easy to generate reports.

- Data constantly updated
- Tailored and automated reporting
- Suitable for all fleet sizes
- A wide range of customization options and intuitive operation

Access control

With connect:ac, you can control access to your fleet: who is currently behind the wheel of which vehicle? This creates the basis for your planned fleet usage.

- ac connect:ac** access control Electronic key
- ac connect:ac** pre-operational check Pre-shift check via app

Vehicle data

connect:dt documents the usage of fleet vehicles: Has a vehicle been used a lot or has it often been idle? Have there been accidents? Is the vehicle functional?

- dt connect:dt** crash detection Electronic damage monitor
- dt connect:dt** operating hours Digital logbook
- dt connect:dt** trouble codes Automated error code transmission from truck

Usage analysis

connect:an enables fleet managers to analyze and monitor the performance of their fleets: How often does a vehicle make a trip or lift something? How much energy does it consume?

- an connect:an** usage analysis Digital usage analysis
- an connect:an** battery management Digital battery maintenance

SOFTWARE

connect:desk – the data cockpit

The connect:desk application is the centerpiece of our connect portfolio. This is where all the data collected by the hardware comes together and is analyzed and monitored. The software is used to manage the drivers, the vehicles, and the fleet as a whole, putting all the relevant information at your fingertips.



Organized

connect:desk displays information broken down by company organization and assigns the drivers accordingly.

Planned

connect:desk reminds you about regular fleet maintenance and driver training, and assists you in planning work rotas to accommodate these measures.

Vehicle ID	Manufacturer	Stock type	Status	Date of purchase	Operating hours	Purchase price	Year	Load capacity	Speed	Fuel tank	Driving hours
40302174	40302174	SMAN	400	200	2000	1000	12/10/2017	4.51	2000	2000	1000
40302175	40302175	SMAN	400	200	2000	1000	12/10/2017	4.51	2000	2000	1000
40302176	40302176	SMAN	400	200	2000	1000	12/10/2017	4.51	2000	2000	1000
40302177	40302177	SMAN	400	200	2000	1000	12/10/2017	4.51	2000	2000	1000
40302178	40302178	SMAN	400	200	2000	1000	12/10/2017	4.51	2000	2000	1000
40302179	40302179	SMAN	400	200	2000	1000	12/10/2017	4.51	2000	2000	1000
40302180	40302180	SMAN	400	200	2000	1000	12/10/2017	4.51	2000	2000	1000
40302181	40302181	SMAN	400	200	2000	1000	12/10/2017	4.51	2000	2000	1000
40302182	40302182	SMAN	400	200	2000	1000	12/10/2017	4.51	2000	2000	1000
40302183	40302183	SMAN	400	200	2000	1000	12/10/2017	4.51	2000	2000	1000
40302184	40302184	SMAN	400	200	2000	1000	12/10/2017	4.51	2000	2000	1000
40302185	40302185	SMAN	400	200	2000	1000	12/10/2017	4.51	2000	2000	1000
40302186	40302186	SMAN	400	200	2000	1000	12/10/2017	4.51	2000	2000	1000
40302187	40302187	SMAN	400	200	2000	1000	12/10/2017	4.51	2000	2000	1000
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40302190	40302190	SMAN	400	200	2000	1000	12/10/2017	4.51	2000	2000	1000
40302191	40302191	SMAN	400	200	2000	1000	12/10/2017	4.51	2000	2000	1000
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40302196	40302196	SMAN	400	200	2000	1000	12/10/2017	4.51	2000	2000	1000
40302197	40302197	SMAN	400	200	2000	1000	12/10/2017	4.51	2000	2000	1000
40302198	40302198	SMAN	400	200	2000	1000	12/10/2017	4.51	2000	2000	1000
40302199	40302199	SMAN	400	200	2000	1000	12/10/2017	4.51	2000	2000	1000
40302200	40302200	SMAN	400	200	2000	1000	12/10/2017	4.51	2000	2000	1000

Transparent

connect:desk presents you with the key vehicle data, clearly displayed on a customized dashboard – or in the form of detailed analyses and reports relating to individual vehicles, drivers, or divisions.

Number of users and features of the software are fully scalable and the user interface is intuitive. connect:desk is therefore equally suited to vehicle fleets both large and small. Not only experienced fleet managers with complex tasks, but also occasional users who only need individual functions find it easy to use.

connect:desk is normally installed on a PC or notebook. There is also an optional browser version. Simply ask your dealer about it. The database can be hosted on a local server or at Linde Material Handling. This gives you full control of your data. Any number of users can be incorporated, and their access rights and available functions can be configured individually.

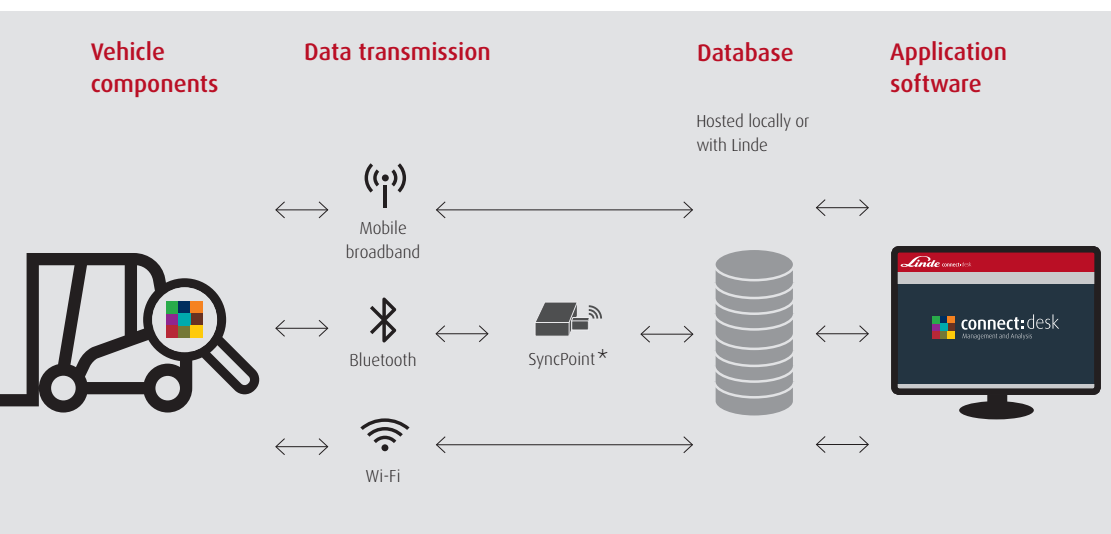
- Maps the organizational structures of individual divisions or of the entire company
- Assignment of drivers and vehicles to one or more organizational levels
- Management of access rights based on the vehicle type, driver's license, and period of validity
- Planning and monitoring of vehicle maintenance

- Planning of training and refresher courses
- Digital archiving driver and vehicle documents
- Generating interactive reports in the form of tables and diagrams
- Generating analyses of fleet optimization and vehicle usage
- Automatic e-mail dispatch of individually configured reports and messages

INFRASTRUCTURE

Data Communication

Communication between the vehicle and connect:desk can be realized with various systems. You can choose the best way to transmit your data: Bluetooth, Wi-Fi or mobile broadband.



Which requirements determine your infrastructure?

Choose the perfect transmission technology for your needs. You do not have to worry about other processes! All three transmission methods automatically run in the background without the driver or fleet manager actively having to play a part. Incidentally, all three options can be combined and used in one fleet. The data can be hosted locally with you or at Linde Material Handling.

* SyncPoints

... are industrial computers or PCs with a Linde Bluetooth stick that collect data from vehicles via Bluetooth. The software controls communication, processes the data and delivers it to the database so that it is available in connect:desk.

Bluetooth

When the vehicle comes within range of a SyncPoint, data is automatically accessed and transmitted via Bluetooth.

Wi-Fi

Data is transferred directly from the vehicle to the database within the wireless network.

Mobile broadband

Data is transmitted to the database over the mobile broadband network.

Your benefits at a glance

- **No interference in Wi-Fi network**
- **Cost-effective:** As a rule, already factory installed. A few SyncPoints on your company grounds are already sufficient for data transmission.
- **Data security:** Data remains inside the company.
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Vehicle components

- **Retrofit kit:** The Bluetooth retrofit kit is available for older vehicles that do not have Bluetooth. It can be ordered from the central spare parts warehouse in Kahl.
- The vehicle has to be equipped with a **Wi-Fi box**, which is available as a retrofit kit.
- Almost all new vehicles can be ordered with an online box fitted in the factory.
- Retrofit kits are available for many older vehicle models; they can be fitted in a few simple steps.

On-site infrastructure

- **SyncPoints** are installed at favourable locations in the plant where trucks always pass (e.g. at charging stations, traffic hubs or parking spaces).
- Experts from connect carry out the **one-time setup** procedure on site.
- **Cooperation** with the company's IT department is necessary to implement Wi-Fi transmission.
- **No additional infrastructure**, such as Syncpoints or Wi-Fi hotspots, is required for data transmission.

REPORTS AND ANALYSIS

More than 15 interactive reports about your fleet

The connect:desk software enables you to access over 15 different interactive reports on the entire fleet and individual areas, vehicles or drivers. The data is represented in easy-to-understand diagrams and tables. You will always know exactly who used which truck when and how.

These categories of reports are available:



Logbook
List of all recorded events for each vehicle



Usage
Overview of usage and utilization of all vehicles

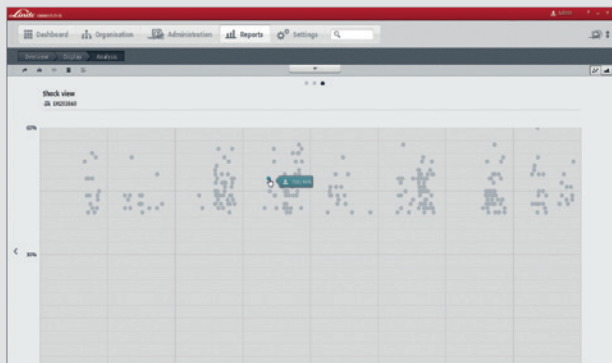


Service
Service and maintenance schedules of all vehicles at a glance

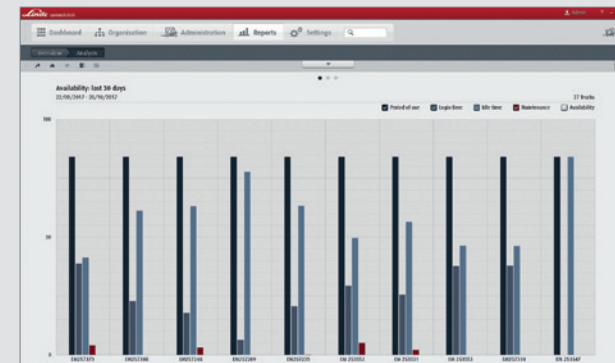


Coordination
Overview of driver data and vehicle availability and distribution

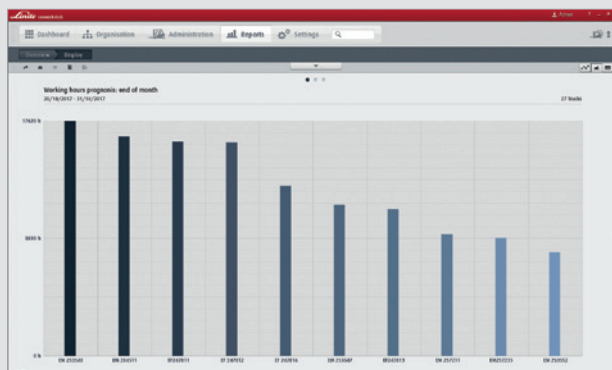
The most important reports at a glance:



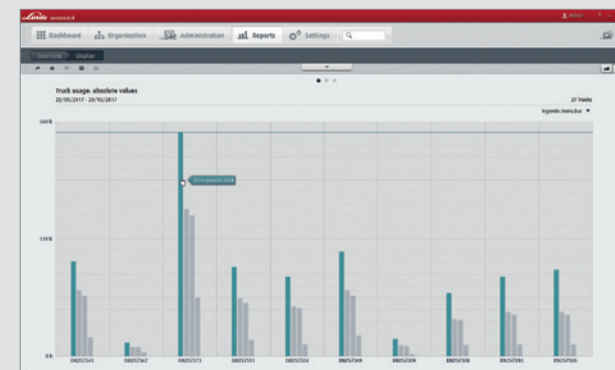
Shocks: The shock data enables you to find out when a driver has given a vehicle a jolt – e.g. caused by a collision or a pothole. This increases drivers' sense of responsibility.



Availability: This diagram shows whether vehicles are being used, have been parked or are being serviced or repaired. The bars indicate how much potential operational capacity individual vehicles and the entire fleet still have.



Operating hours forecast: Expected fleet operating hours are calculated on the basis of real vehicle usage data. You can determine whether the system should predict the number of operating hours up to a specific time or the time at which a specific number of operating hours is reached.



Truck usage: Here you will find detailed information about how a vehicle is used: How long is a driver logged in? How high is the proportion of journeys and lifts during that time?

APP

Vehicle check via smartphone

Simplify the vehicle check before each shift and at the same time create effective access control – with the aid of the pre-op check app and the connect:ac pre-operational check function.



Completing a smartphone checklist ensures that the truck can only be started when a check has been carried out and the vehicle is fully operational. Damage or irregularities can be documented with a photo and immediately reported to the fleet manager.

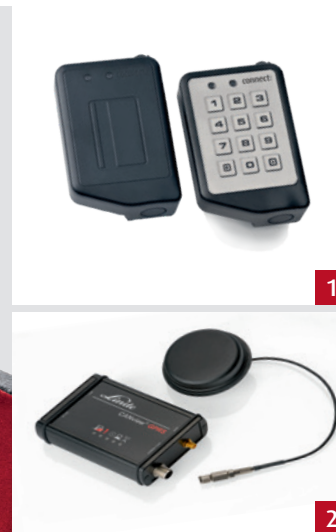
The checklist configurator allows the fleet manager to freely define the desired questions on vehicle condition to suit the requirements of the job or the location. It is also possible to specify when a check is successful and the vehicle can be started, as well as the conditions under which it shuts down or requires a photo to be taken for documentation purposes.

- **Improved safety on company grounds**
- **Automatic email report of the checklist results in real time**
- **Photographic record of vehicle damage or irregularities**
- **Regular survey of vehicle condition**
- **Freely definable questions**
- **Recording of questions and answers for later analysis possible**

HARDWARE

Teaching your forklift to talk

The various connect hardware components are the link between your fleet, the database, and the connect software. They collect and transfer control and sensor data or serve as an electronic ignition switch. Our hardware components can be ordered ex works with new vehicles or are available as a retrofit kit.



1 connect:access unit (CAM)

The access unit (CAM) is available in two different versions: drivers can identify themselves to a vehicle either by means of a personal PIN or using an RFID chip. Vehicle data such as shock readings are transmitted to the SyncPoints via Bluetooth. This unit is likewise available as a retrofit solution.

2 Connectivity retrofit kits

Is part of your fleet not equipped with your chosen transmission technology? Then it is easy to upgrade to wireless data communications with the appropriate retrofit kit for Bluetooth, Wi-Fi or mobile broadband.

3 connect:data unit (CDX)

The data unit (CDX) logs the data on the vehicle and transmits it to the Linde cloud via the cell phone network. It can also send commands back to the vehicle controls. The unit also downloads firmware updates and additional functions via the cell phone network.

Retrofitting the connect:data unit is easy and takes very little time. The unit is directly connected to the vehicle controls and is operational immediately.

TRAINING AND SUPPORT

The Linde Academy in Aschaffenburg offers various training courses for using connect:desk. Our trainers will also happily travel to your premises to provide group training sessions.



We sit down with you and put together just the right training components to suit your needs. We help you choose and install everything from the necessary infrastructure all the way up to the finalized connect solution. If questions arise during ongoing operations, support is provided by experts from your contract partner or Linde Service.

For more information on the subject of training please contact us:

→ www.linde-mh-akademie.de



The electronic key



Pre-shift check via app



Electronic damage monitor



Digital logbook



Automated error code transmission from truck



Digital usage analysis



Digital battery maintenance

Linde connect

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Are you interested in Linde connect? Please contact your Linde dealer who will be happy to provide information and advice.

 Linde connect

Linde Material Handling

Linde

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Dashboard

Organisation

Administration

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ac

connect:ac

access control

The electronic key: With connect:ac access control, you can control access to your fleet. You always know who drove what vehicle and when.



You always know who is behind the wheel of which vehicle because the drivers have to identify themselves by means of a PIN or using an RFID chip. With connect:ac access control, you make using your fleet safer and more transparent.

The benefits at a glance:

- **Unauthorized use** of vehicles no longer possible
- **Access can be controlled** based on the person, a period of validity, driving permission, and the vehicle
- Evidence of **vehicle usage** available anytime
- Driver-specific **vehicle settings** e.g. speed throttler
- **Loss of keys** no longer possible
- **Drivers are more aware** of how they use vehicles
- Contactless **identification** by means of an RFID transponder or PIN entry via a numeric keypad
- Also available as a **retrofit solution**

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ac

connect:ac

pre-operational check

Electronic pre-shift check: The connect:ac pre-operational check and associated smartphone app simplify the vehicle check before every shift.



The electronic vehicle check enables you to ensure that the vehicle can only be started when the check has been carried out and the vehicle is fully operational. The connect:ac pre-operational check improves safety on your premises and keeps up up-to-date on the condition of your vehicles.

The benefits at a glance:

- **Increased operational safety** because vehicles can only start after a check has been carried out
- **Simplified pre-shift check** with digital test results
- Vehicle condition is **regularly inspected**
- **Automatic email report** in real time in the event of vehicle damage or irregularities
- **Photographic record** of vehicle damage or irregularities possible
- **Great flexibility** because the fleet manager can freely define questions in the checklist configurator
- **Recording** of all defined questions and answers
- App works on all **mobile Android devices** with NFC technology
- Available as **retrofit solution**

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dt

connect:dt

crash detection



The electronic damage monitor: connect:dt crash detection notifies you of collisions and major shocks incurred by the vehicle. The cause of damage or the person behind the damage can be determined.



Was there an accident? Is there somewhere in the company grounds that's uneven? Is a driver not driving cautiously enough? With connect:dt crash detection, the time and magnitude of major shocks that may result in damage to a vehicle are logged.

The benefits at a glance:

- **Identification of dangerous spots** or damaged surfaces in the company grounds
- Identification of the driver in the case of intentional **misuse** or rough **driving**
- **Reduction of damage** caused by inappropriate treatment
- Reduction in the **cost of repairs**
- Early **detection of vehicle damage**
- **Automatic speed throttling** can be set for the driver
- Individually adjustable **recording threshold**
- **Identification of the driver** in the case of an accident or damage to a building
- Drivers are more aware of how they use vehicles
- Greater safety in the **company grounds**
- Also available as a **retrofit solution**

 Dashboard Organisation Administration Reports SettingsThe "dt" logo, consisting of the letters "dt" in white on a dark blue square background.

connect:dt

operating hours

The digital driver's logbook: With connect:dt operating hours, you document your vehicles' hours in service. At all times, you know how long your forklifts or warehouse equipment have been in use.

Is a vehicle rarely used? Is a vehicle at risk of exceeding the hours in service as agreed with the leasing partner? With connect:dt operating hours, your vehicles' hours in service are regularly recorded – giving you an overview of how your fleet is used at all times.

The benefits at a glance:

- **Hours in service** are automatically logged and transmitted
- Individually adjustable **reading interval**
- **No workload** caused by manually logging hours in service
- **No operational disruptions**
- Greater **transparency**
- Improved **usage planning** and optimized fleet capacity utilization
- Maintenance intervals are **easier to plan**
- Unnecessary **vehicle outages** are avoided
- Early **identification** of bottlenecks
- Warning if a **number of hours in service** is exceeded
- **Reduced overuse** of vehicles
- **Reports available** for individual vehicles
- **Data transfer** via cell phone network, no additional infrastructure needed
- Also available as a **retrofit solution**

Dashboard

Organisation

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dt

connect:dt

trouble codes


The automated error code transmitter: connect:dt trouble codes notifies you of vehicle errors before more serious damage can occur.



Does a wearing part need to be replaced? Does a vehicle need to be taken out of service to avoid more severe damage? With connect:dt trouble codes, you are provided with qualified information regarding vehicle errors – including errors that do not immediately limit the vehicle’s functionality or performance.

The benefits at a glance:

- **Early detection** of malfunctions or damage
- **Makes preventative maintenance possible**
- **Reduced vehicle outages**
- Improved vehicle **availability**
- Optimized **service processes** with shorter repair times
- **Transparency** regarding the sources of errors
- Automatic notification of the **service organization** is possible
- Automatic **e-mail reports**
- Also available as a **retrofit solution**

 Dashboard Organisation Administration Reports SettingsThe logo for connect:an, consisting of a dark brown square with the word "an" in white lowercase letters.

connect:an

usage analysis

The digital usage analyzer: With connect:an usage analysis, you can keep an eye on just how your vehicles are used. You are constantly kept up to date on your vehicles' capacity utilisation.



What is the split between a vehicle traveling and lifting items? Does its usage tally with the vehicle's performance profile? With connect:an usage analysis, you can examine your fleet's capacity utilisation in detail, keeping you abreast of vehicle usage, idle times, and maintenance at all times.

The benefits at a glance:

- An overview of vehicle **availability**
- Shows the actual **fleet performance**
- Easy **identification** of underused vehicles
- **Potential for improvement** within the fleet is brought to your attention
- **Buying new vehicles** or using replacement vehicles can be avoided
- Fleet usage **transparency**
- Inferences about **driver behavior** are made possible
- **Data transmission** possible via various communication technologies

Dashboard

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an

connect:an

battery management

The digital battery manager: With connect:an battery management, you can monitor your vehicles' batteries. You then always know whether batteries are being handled correctly.



Is a battery being serviced correctly? Are batteries often charged when it's too soon or already too late? The state of a battery is assessed on the basis of the parameters recorded and incorrect usage is identified. With connect:an battery management, you can keep your fleet's power cells in good shape.

The benefits at a glance:

- **Avoid damage and loss of performance** caused by incorrect charging or servicing
- **Battery parameters** presented transparently at a glance
- **Incorrect usage** can be ascribed to the driver(s) in question
- Increased **vehicle availability**
- Notification when **limits are reached**
- **Identification** of rarely used or overused batteries
- Avoid unnecessary **maintenance or acquisition costs**
- **Energy consumption** made clearly quantifiable
- **Raises drivers' awareness of** energy management