



**INTORQ**

setting the standard

## **Electromagnetic braking systems**

for industrial trucks

[www.intorq.de](http://www.intorq.de)

## We set the standards

The INTORQ brand stands for reliable brake solutions of the highest standard. Whether in cranes, wind turbines or lift systems – INTORQ products are used in the most diverse of applications. Rely on us to create the right solution for your drive – individually and reliably.

With its broad scope of different versions, the modular range of INTORQ products is used in many motors and geared motors and has set standards worldwide. With the establishment of facilities in Shanghai and Atlanta, we have also consistently expanded our international presence. So wherever you are in the world, our network of sales and service staff is always close at hand to support you.



### INTORQ at a glance

- Products: electromagnetic brakes and clutches
- Sales volume €45 million per year
- 800,000 units per year
- 8,000 m<sup>2</sup> production area
- Development and production in Aerzen
- Companies in Shanghai and Atlanta
- 200 employees
- 63 sales partners in 49 countries
- Certified to DIN ISO 9001 and DIN ISO 14001



## Competence in innovative solutions: Braking systems for industrial trucks

Our products setting standards for years and they meet the most demanding requirements. Our knowledge of what customers need during the development phase, our expertise in selecting the right materials, and our competence in the production phase are all reflected in our products. Our success proves we are doing the right thing. Our brakes and clutches are well known. They stand for quality, fully developed technology, and innovation.

Thanks to our sites in Germany, the USA and Asia, we achieve a reliable, top-quality performance as a supplier.

### Used in these kinds of vehicle

- Electric forklift pallet truck, with and without a driver's platform
- Electric forklift truck for standing or sitting
- Electric pallet stacker with wheel support
- Electric side-seat stacker with wheel support
- Electric reach forklift truck
- Horizontal picking truck
- Vertical picking truck
- High-bay stacker
- Driverless transport systems (DTS)



Forklift truck for  
standing or sitting



Forklift truck



Electric forklift  
pallet truck

## Tried and tested solutions for your individual application

In stacker drive technology, INTORQ brakes have been tried and tested in electric vehicles a thousand times. Given our current development of vehicles with AC technology, we are able to supply braking systems which are adapted to the changed requirements.

Our customers benefit from standard solutions that stem from our years of accumulated expertise and from our competence in project solutions.



Spring-applied brake  
INTORQ BFK458



Spring-applied brake  
INTORQ BFK457



Spring-applied brake  
INTORQ BFK457  
flat design



2-stage spring-applied brake  
INTORQ BFK442



Spring-applied brake  
INTORQ BFK457  
with electric and  
hydraulic control



Electromagnetic load wheel brake  
INTORQ EMB 115

## The versatile modular system: BFK458



Our modular system forms the basis of a product portfolio that offers variants specially adapted for almost any task. The BFK458 spring-applied brake is a universally usable standard product, but thanks to its modularity it can also meet the requirements of specialised industries. Its strength is its versatility.

### Features

- Braking torques: 1.5–600 Nm
- 9 sizes
- Thermal class F (155°C)
- Air gap precisely preset
- Braking torque reducible (E model)
- Long, low-wear rotor /hub guide
- Manual release devices for all sizes
- Optional monitoring of air gap and wear

## Compact and easily fitted: BFK457



A brake is frequently required only to perform its basic function. The BFK457 is suited for this purpose. Speedy fitting with integrated fixing screws and a fixed-setting air gap enhance this spring-applied brake's attractiveness as a product.

### Features

- Braking torques: 0.12–125 Nm
- 11 sizes
- Thermal class F (155°C)
- Compact design with rotor and flange
- Integrated fixing screws for quick, easy fitting
- Air gap with fixed setting

## For forklift trucks, flat design: BFK457



The modified BFK457 spring-applied brake is generally used in drives where there is not much space. Adapted to the envelope radius, the brake has a compact, flat design combined with a high braking torque.

### Features

- Modified BFK457, for example size 10 with a braking torque of 20 Nm
- Compact, flat design adapted to the envelope radius
- Closed design

### Variants

- Friction plate
- Low-wear rotor
- Plug matched to connecting cable
- Emergency manual release

## Load-dependent 2-stage spring-applied brake: BFK442



The BFK442 2-stage spring-applied brake is optimised for applications where load-dependent braking torques are required. The graduated braking torque guarantees that the brakes perform in accordance with the load situation.

### Features

- Sizes 12 – 18
- Both braking torque stages can be given individual settings
- High endurance thanks to wear-resistant linings
- Brake can be adjusted repeatedly according to wear

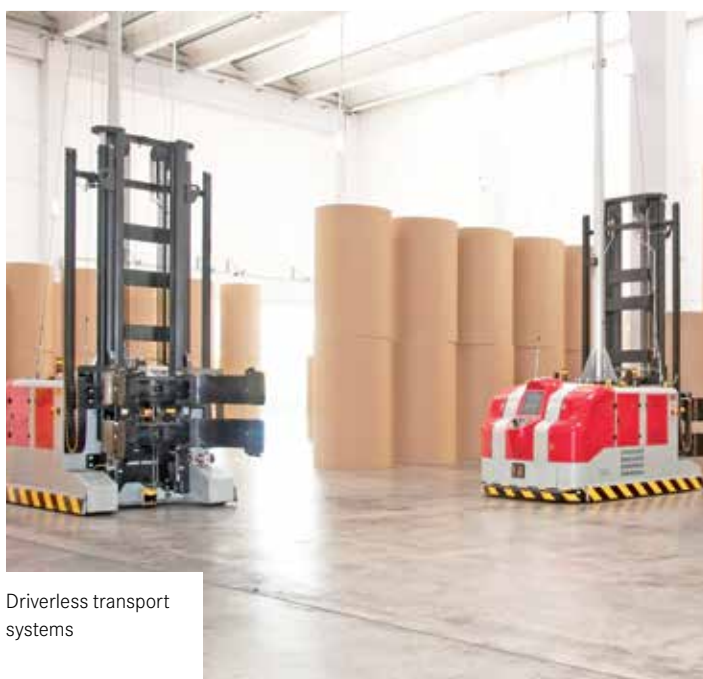
## Spring-applied brake with hydraulic support: BFK457



The hydraulically supported BFK457 is suited for applications where a load-dependent braking torque is required. Normal braking is generator-based, and in emergency stops the electro-hydraulic control takes over the braking function.

### Features

- Modified BFK457, e.g. size 12 with a braking torque of 12 Nm to 45 Nm (with hydraulic support)
- Thanks to specially adapted friction-lining halves, the brake complies fully with the legally prescribed deceleration for no-load, partial-load and full-load operation regardless of the driving direction
- The basic torque is guaranteed by the high-precision factory setting of the spring force, and it controls the emergency-stop braking from the no-load range
- An optimised magnetic circuit provides the brake with a large working air gap
- Also, a wear-resistant rotor can double the length of the interval before the air gap has to be adjusted



Driverless transport systems



## Electromagnetic load wheel brake: EMB115



The INTORQ electromagnetic brake is conceived as a load wheel brake. The additional controlled braking of the load wheels results in a better deceleration of the vehicle. At the same time it minimises wear on the drive wheel and increases safety during the transport of heavy loads. The CAN bus allows complete system integration.

### Features

- Modified EMB115, e.g. size 20 with a braking torque of 450 Nm
- High braking torques in a small space, and the brake is fully integrated into the load wheel
- Simple structure, and there is no need to adjust the air gap
- Long service life thanks to long wear distances
- Brake release free of residual torque (no wear on the armature on the stator)
- Easy detection of wear from outside, making disassembly unnecessary
- Stepless braking torque, dependent on the operating current

### Noise-reduced design

Our brakes can be supplied with optional noise-reduction. The rotor comes in a plastic sleeve that reduces the rattling noises in the rotor-hub connection. At the same time, this also increases the service life.



### Features

- Low wear between rotor and hub for longer maintenance intervals
- Noise-reduced design



## Spring-applied brake with integrated speed sensor

### Integrated speed sensor

The inductive sensor system can be used in brake motors to register the speed and the direction of rotation. The speed sensor and the analysis electronics can replace the sensor bearings that are used in industrial trucks today. The components are integrated in a way that does not change the overall length of the brake motor.

### Features

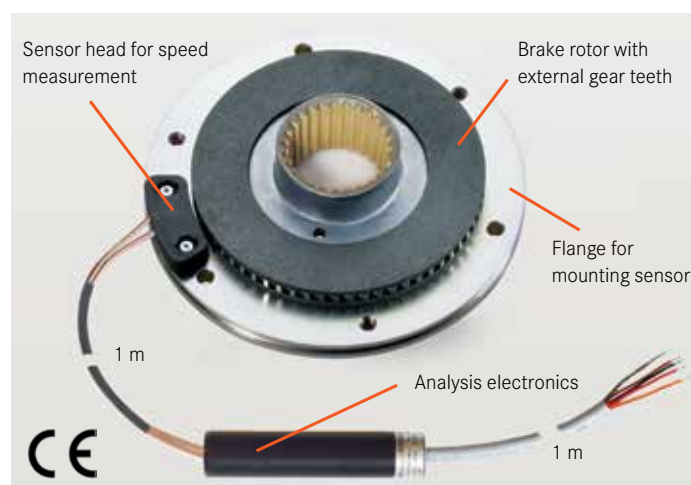
- Inductive sensor system for recognising speed and direction of rotation
- The pulses are provided by a brake rotor with external teeth
- Range of speed recognition: 5 to 6,000 r/min (size 08: 7 to 6,000 r/min)
- The analysis electronics are part of the system

### Technical specifications

- Brake types: BFK457 (Basic) and BFK458 (N/E/L)
- Size 08: 48 pulses/revolution
- Sizes 10, 12: 64 pulses/revolution
- Supply voltage: 24 V DC
- Temperature of sensor head: -20°C... +130°C
- Temperature of electronics: -20°C... +70°C
- Output: Rectangular signals, A and B channels (open collector)

### Benefits

- No change in the length of the motor
- Speed recognition without time-consuming and costly changes to the motor
- Better value than expensive and sensitive sensor systems
- Immune to interference from magnetic fields
- Impervious to brake dust
- Temperature-proof sensor head; analysis electronics in separate housing
- Rotor with toothed intermediate ring



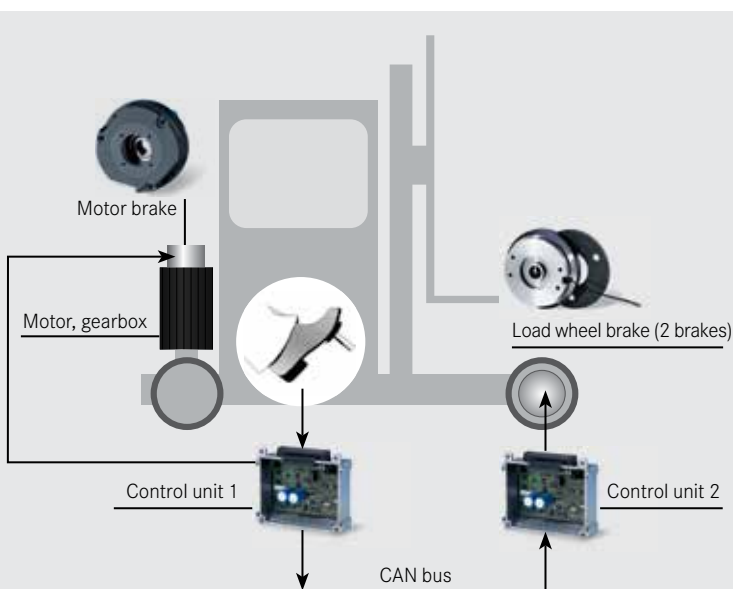
## The mechatronic braking system INTORQ Control



The mechatronic braking system is suited for controlled braking in battery-driven stacker vehicles. The combination of a spring-applied brake with an intelligent control provides an optimal load-dependent braking torque control (load-independent stopping distance). The control range covers 20 % to 100 % of the rated torque. The parameterisation of the INTORQ Control is done via the Windows user interface.

### Features

- Operating modes:
  - Pedal-controlled braking
  - Ramp-controlled braking
  - Pedal-ramp-controlled braking
  - Sensor-controlled braking
  - Speed-controlled braking
- INTORQ Control can communicate with the vehicle control via the integrated CAN bus
- INTORQ Control has an integrated safety system that monitors wear, temperature and operating voltage and also registers any blocking of the drive wheel (a kind of ABS function)
- Operating voltage range: 24 V and 48 V
- Needed for operation:
  - INTORQ Control drive, Starter Kit incl. software, plugs and contacts
- INTORQ Control can be used for:
  - Spring-applied brakes INTORQ BFK458-N, sizes 08 – 16
  - Electromagnetic brakes 14.115, sizes 06 – 20



Example of a completely controlled braking system

## Setting standards in the market, worldwide

We are available to our customers at all times and in all locations. Major customers and projects are supported directly by our Key Account Sales Team at our HQ in Aerzen (Germany) or by our locations in Shanghai (China) and Atlanta (USA).

Please send service requests directly to your local sales partner or to our HQ in Aerzen, Germany:

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In addition to this, we work with a global network of local trading partners and cooperate with Lenze's global sales organisation.

You can find more information on our products, as well as catalogues and operating instructions available for download, on our website at [www.intorq.de](http://www.intorq.de)



