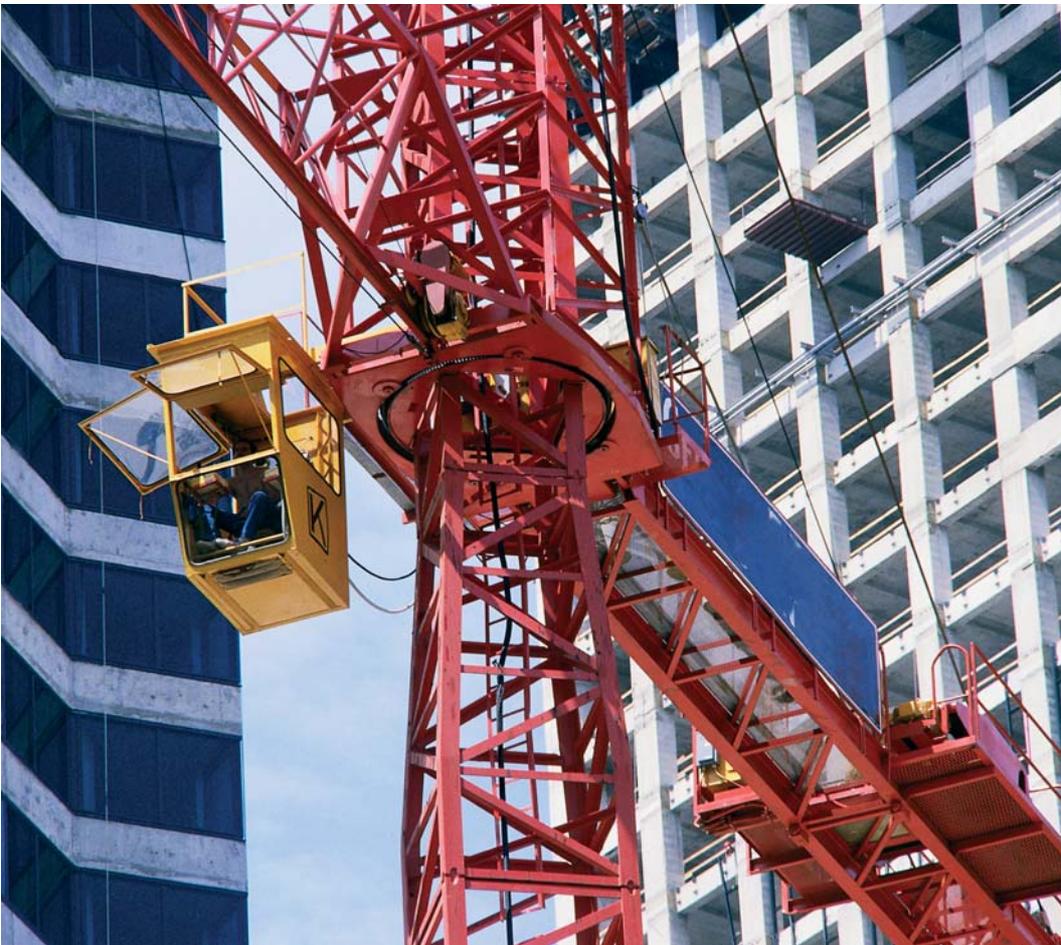


Mechatronic brake system **INTORQ Control**

for industrial trucks, escalators and cranes



INTORQ

setting the standard

The mechatronic brake system = INTORQ Control + INTORQ BFK458 spring-applied brake

Spring-applied brakes are used as modular components in electrical drives to decelerate or bring masses to a defined stop – even in the event of the loss of the power supply. Spring-applied brakes are generally used as “on or off brakes”, whereby the availability of the power supply determines the activation and deactivation of the braking torque.

However, it is often necessary to decelerate the drive with variable braking torque. This option is supported by the mechatronic brake system, which comprises a standard INTORQ BFK458 spring-applied brake and the INTORQ Control electronic control unit. The mechatronic brake system makes it possible to set the braking torque of spring-applied brakes precisely with an “electronic brake pedal”.

Similarly, the brake control is also able to detect the wear status of the brake. This means that brake maintenance can be carried out as and when required and the reliability of the brake system is increased. Furthermore, the INTORQ Control features a CAN bus connection which supports remote diagnosis of the brake, remote control of all functions and the operation of the brake control as part of a networked system.

INTORQ Control can be combined with three-phase DC and AC motors and support drive dynamics in numerous applications.

The following operating modes, which can be parameterised easily on a PC with Windows software, have been implemented for flexibility of application:

- Pedal-controlled braking
(manual selection of braking torque)
- Ramp-controlled braking
(time-controlled selection of braking torque)
- Sensor-controlled braking
(load-dependent selection of braking torque)
- Speed-controlled braking
(stopping time independent of load and speed)
- Control via CAN bus
(networking of brakes and frequency inverters)



Features

- INTORQ Control is suitable for use in combination with brake sizes INTORQ BFK458-08...18
- Variable braking torque: $M = 20\% - 100\% M_k$
- Operating voltages: 24 V DC and 48 V DC
- High braking torque within compact dimensions
- Flexible connection of sensors (pedal sensor, load and speed sensors, CAN bus)
- Quantitative wear monitoring
- Brake function monitoring
- Integrated elapsed time meters enable the operating conditions of the brake system to be evaluated
- Brake reaction is independent of brake wear
- Networking via CAN bus supports versatile application
- Use in a variety of applications thanks to individual parameter settings
- Uses less than 50% energy than uncontrolled brakes



INDUSTRIAL TRUCKS ARE FITTED WITH SPRING-APPLIED BRAKES ON THE TRAVEL MOTOR AND WITH ELECTROMAGNETIC LOAD WHEEL BRAKES.



CRANES



ESCALATORS

Sensors

INTORQ BFK458 brake



24 V DC/48 V DC



Industrial trucks

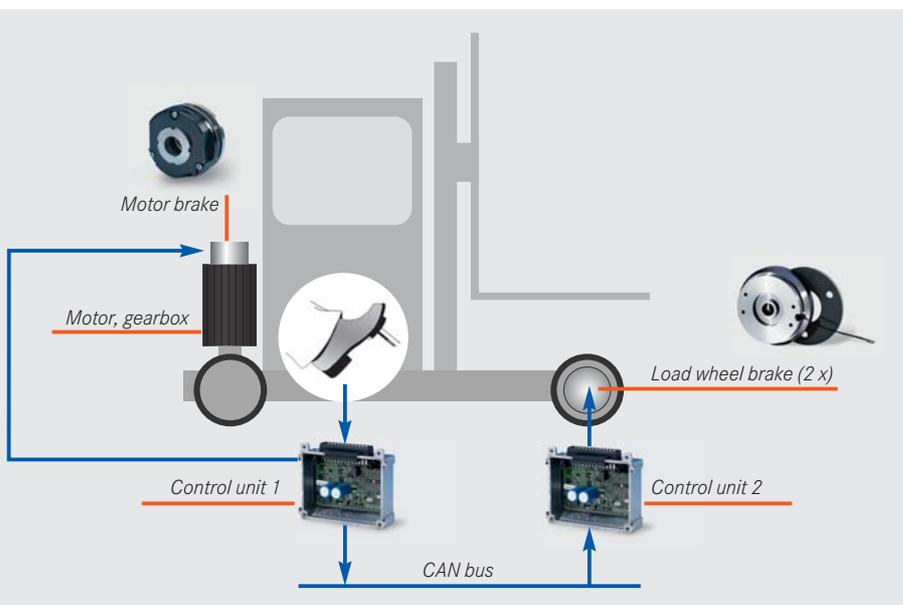
- Automatic braking (time-controlled)
- Braking with pedal (load-dependent)
- Co-ordination of a number of brake systems (load wheel brake concepts)

In “pedal control” mode (when performing the function of an electronic brake pedal), the INTORQ Control brake system generates a brake reaction identical to that in a passenger car. It safeguards the dynamic driving style of the industrial truck as well as ensuring jerk-free approach on a ramp. “Pedal control” mode can be combined with “ramp control” mode. Releasing the control arm, or a seat or foot switch activities time-controlled braking for automatic

and safe deceleration without inducing the risk of skidding or locking. The vehicle is brought to a standstill without having to be controlled by the operator. Another option is to use e.g. a pressure sensor to detect the vehicle load so that INTORQ Control can decelerate the vehicle independent of load.

Two brake systems with INTORQ Control and CAN bus networking

Larger vehicles (e.g. reach fork lift trucks) can be fitted with both a spring-applied brake on the drive motor and electromagnetic load wheel brakes. In this context, the interplay between the two INTORQ Control units enables the brake forces to be co-ordinated, so that optimum deceleration is ensured at all times. Thanks to INTORQ Control, in the future it will be possible to implement fork lift brakes, previously built using electric or hydraulic units as networked and purely electric brake systems.

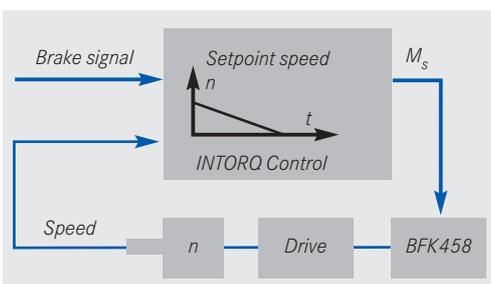


Escalators

- Defined stopping distance, independent of load, initial speed and direction of movement
- Defined stopping distance in the event of a power failure with emergency power supply via a battery

The brake path on escalators must not exceed specific tolerances and will vary in accordance with load. What is crucial is whether load accelerates or slows the drive during braking. Particularly in use with high efficiency helical or planetary gearboxes the brake takes on increasing importance.

It is in cases such as this that the INTORQ Control brake control is used in “speed-controlled braking” mode. The motor speed is detected by a pulse encoder. The brake control regulates the torque of the brake during braking in order to achieve the required level of deceleration and stay within the brake path, regardless of direction of travel and load. Once the vehicle has come to a standstill, the spring-applied brake will generate the full holding torque.



Cranes

- Synchronisation of torque transmission between brake and drive
- Remote sensing of wear status

On cranes with reduced torsional stiffness, it is essential to avoid significant oscillation of the jib and the associated high mechanical loads. Soft braking with defined braking torque ramp is possible with INTORQ Control on the slewing gear in “ramp control” mode. This means that INTORQ Control can be used to avoid load peaks on the mechanical structure.

Technical data

The following are required for operation:

- Control unit
- AMP connector with contacts
- Configuration file

Information required for the configuration file:

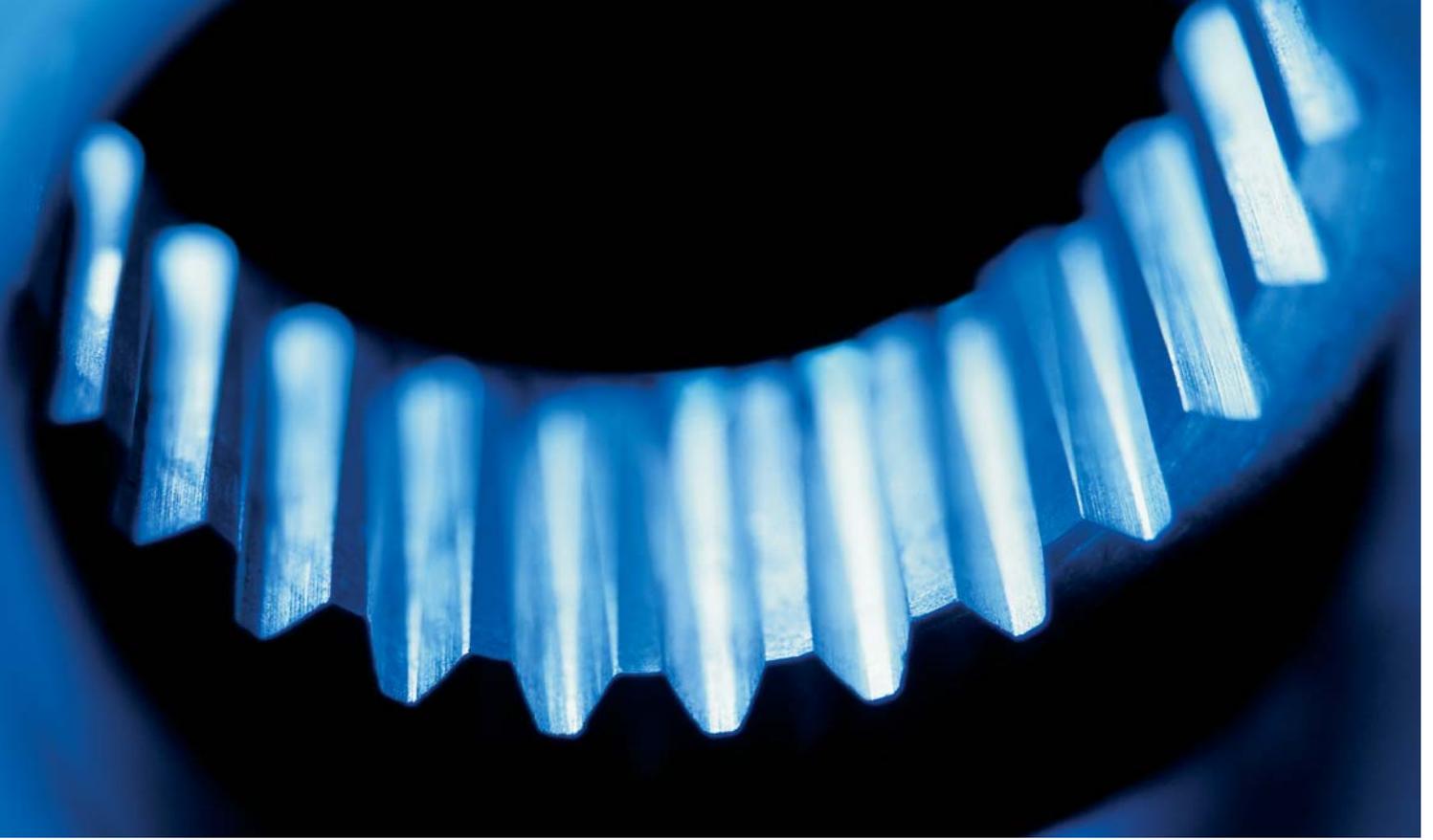
- Brake size
- Braking torque and supply voltage (INTORQ will supply the required configuration file for the corresponding brake).

The following are required for local parameterisation:

- Starter kit
- PC

The starter kit contains the required software for Windows applications, the CAN adapter, the Operating Instructions and the connecting cable for parameterising and operating the brake system.





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