Berlin I June 23, 2022

Sensorik als Unterstützung des ECM

Ständige Verbesserung

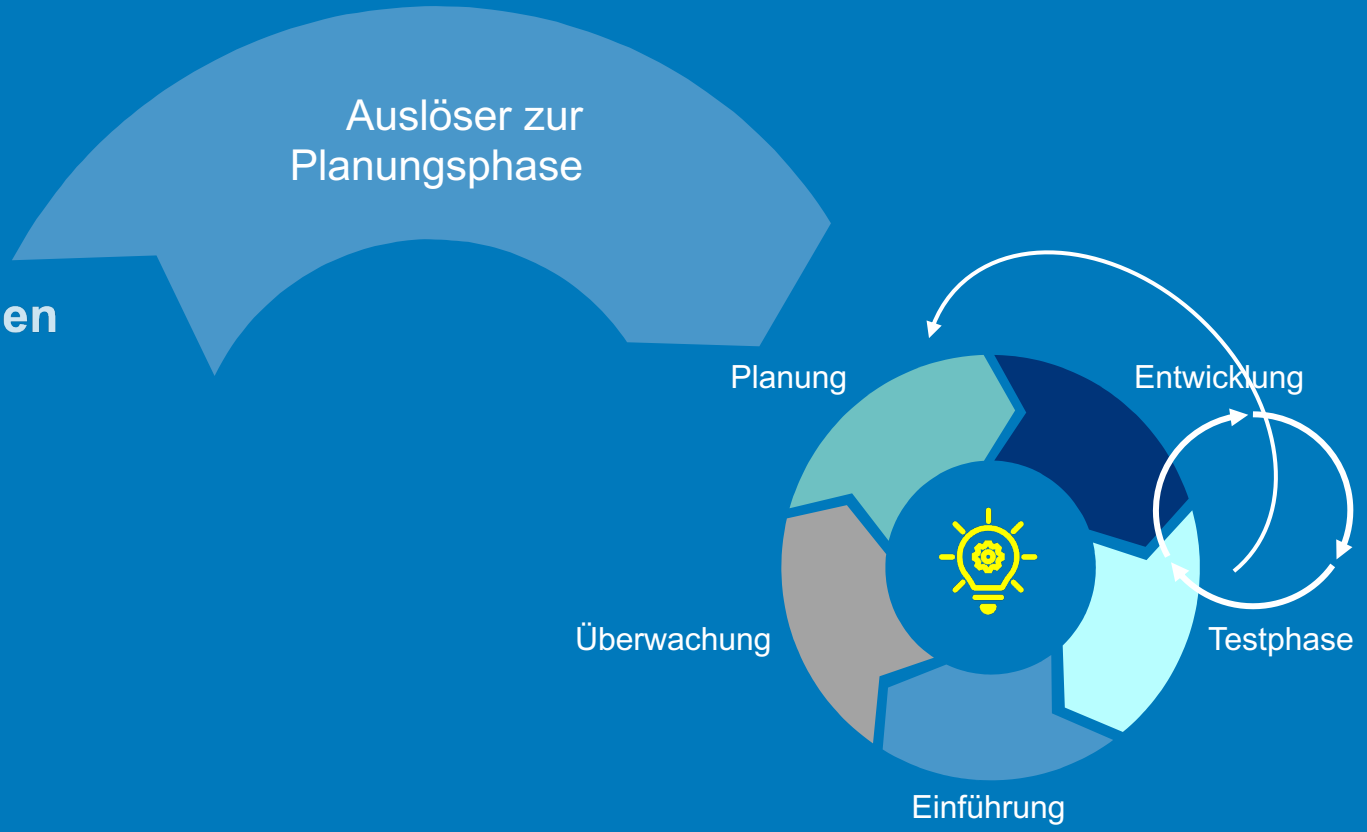
ECM VO 2019/779: Funktion I, Managementfunktion, Punkt 4

Ständige Verbesserung — ein strukturierter Ansatz für die Auswertung der durch regelmäßige Überwachung, Audits oder aus anderen einschlägigen Quellen gewonnenen Informationen und Verwendung der Ergebnisse, um daraus zu lernen und vorbeugende Maßnahmen oder Abhilfemaßnahmen zur Aufrechterhaltung oder Verbesserung des Sicherheitsniveaus zu treffen

e) einschlägige Informationen bezüglich der Untersuchung und Ursachen von Unfällen, Störungen, Beinaheunfällen und anderen gefährlichen Vorkommnissen werden verwendet, um daraus zu lernen und nötigenfalls Maßnahmen zur Verbesserung des Sicherheitsniveaus zu treffen;

Auslöser und Umsetzung

- Audits
- **Sektor Informationen**
- Innovationen
- **Ereignisse**
- Auswertungen
- Erfahrungen
- Usw.

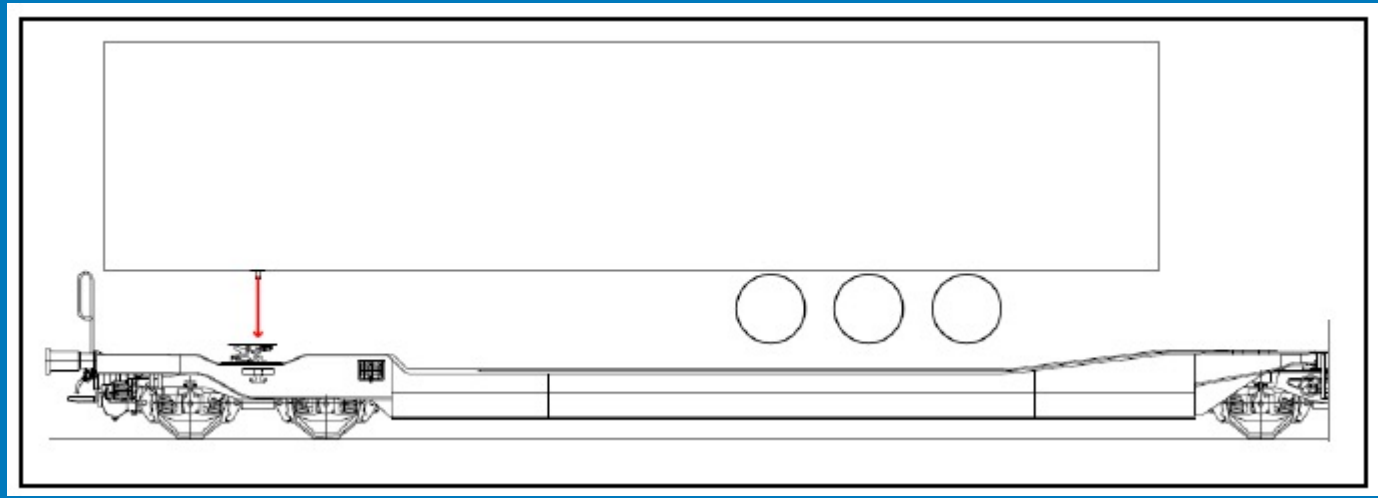


”

Quelle DVZ

Ereignisse Großer Belt 2019 u. 2021:

Die besonderen Verhältnisse an der Brücke und der Beladung der Taschenwagen haben dazu geführt das sich LKW-Trailer vom Stützbocksystem gelöst haben.



Quelle NIB DK

Auslöser und Umsetzung

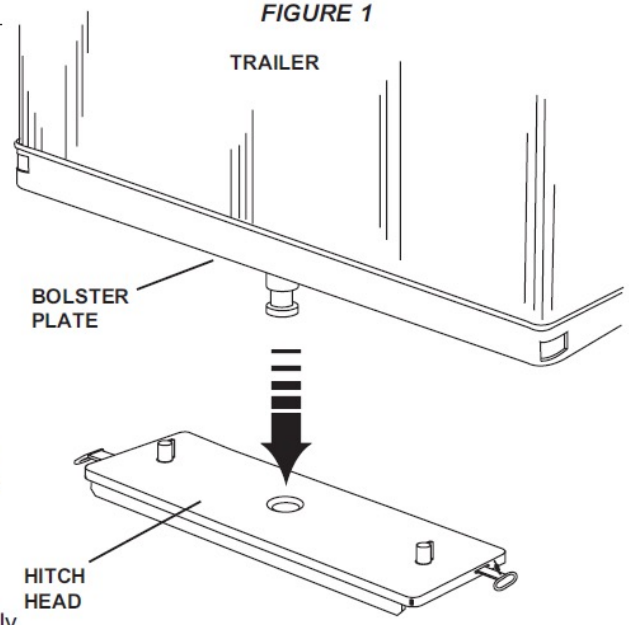
- **Sektor Informationen**
- **Ereignisse**
  - Untersuchungen:
    - Wind
    - Umgebung
    - Strecke
    - Instandhaltung
    - Technik
    - Beladung
      - Checks
      - Prozedur

COUPLING PROCEDURES (Loading):

1. **Check out the hitch plate before coupling.**
   - A. Check the hitch plate and mounting base for a secure mount. If not secure, correct before using.
   - B. The hitch plate must be properly lubricated.
   - C. The hitch plate is in closed position before loading and does not have to be opened.
2. **Coupling operation.**
   - A. The wheels of the trailer must be exactly over the pockets in the railcar. Lower the trailer on the railcar while centering the kingpin over the hitch plate lock area.
   - B. Continue to lower the trailer until the kingpin engages and the trailer bolster plate rests flat on the hitch plate and supports the trailer. ***(See Figure 1.)***

NOTE: The hitch plate lock automatically retracts to allow the kingpin to enter, then automatically closes as the kingpin enters the lock. ***(See Figure 2.)***

FIGURE 1



Kingpin automatically retracts lock upon entering "lock opening"

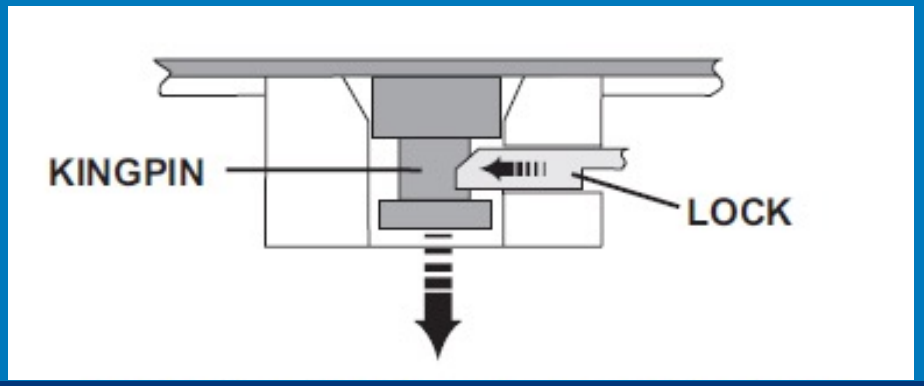
FIGURE 2

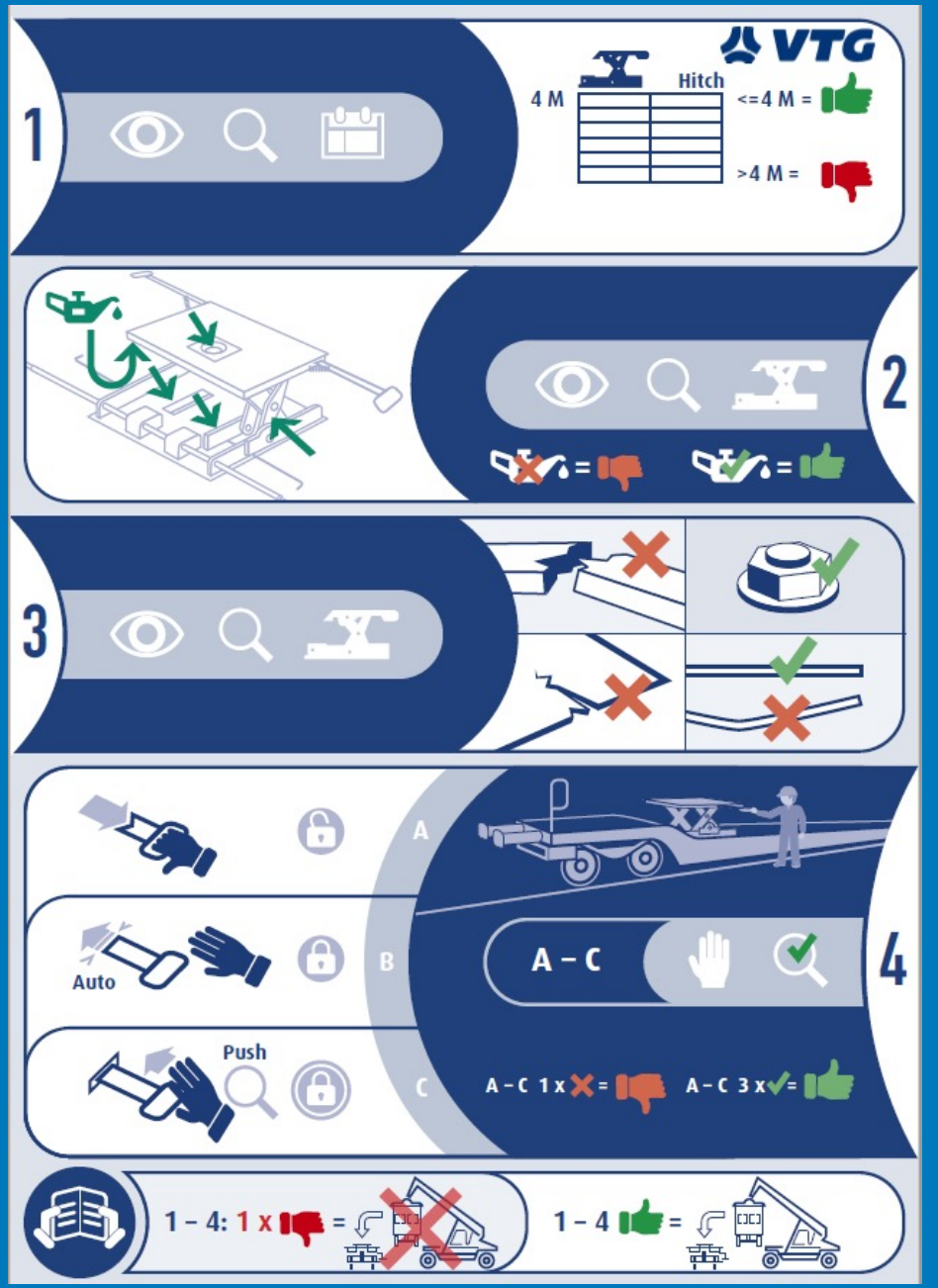
Lock automatically engages as kingpin is lowered into "lock opening"

CSM Betrachtung

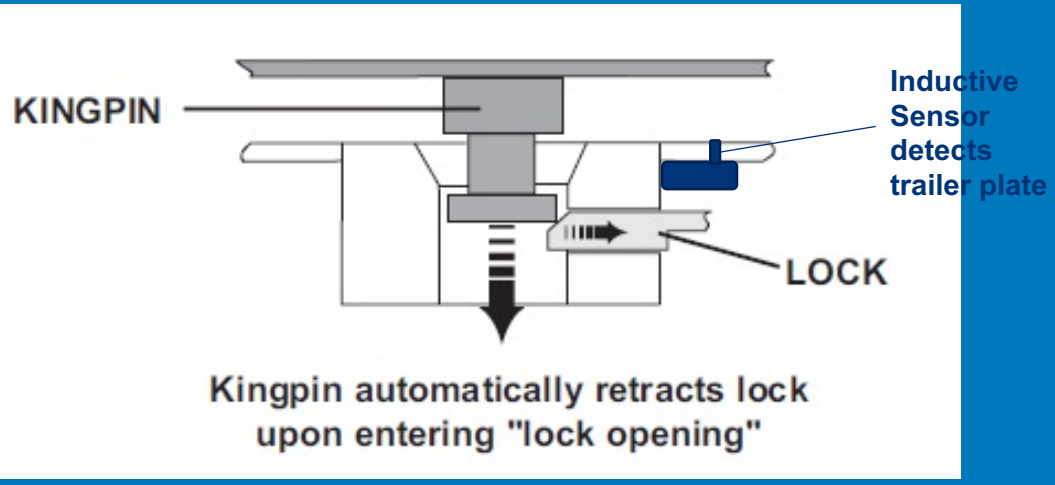
Ein Ergebnis:

- **Bessere Information über die korrekte Beladung / über den Beladungszustand des Trailers im Taschenwagen und auf dem Stützbock**
  - Verbesserung der Beladeanweisungen
  - Visualisierung der Anweisungen
  - Anzeigen am Stützbock
    - King Pin im Stützbocktrichter
    - King Pin Verriegelung in Endposition Verriegelt
    - Trailer in der Wagentasche





First ideas of VTG and challenges

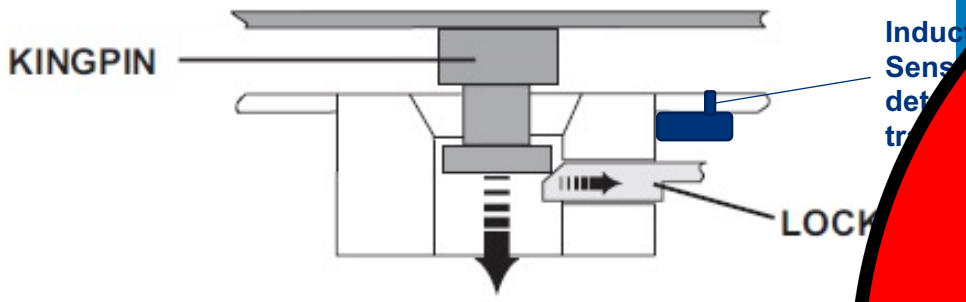


Check the locking of the kingpin with 2 sensors:

1. Trailer plate in contact with hitch plate
2. Lock in closed position

A blue LED indicates for 30 seconds, all 2 sensors are all right. A red one shows the opposite.

First ideas of VTG and chall



Check the locking of the kingpin with 2 sensors

1. Trailer plate in contact with hitch plate
2. Lock in closed position

A blue LED indicates for 30 seconds, all 2 sensors are all right. A red one shows the opposite.

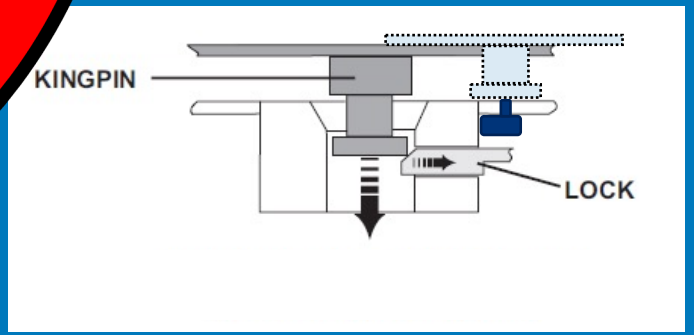
K.O. criteria

Advantages:

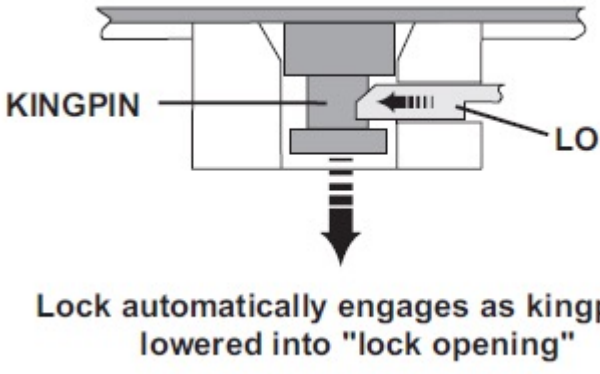
- Fits for all hitch types
- Easier installation
- Less production costs

Disadvantages:

Says „Kingpin in“ although the pin has been put on the plate (not inside the tub) or even in front of it.



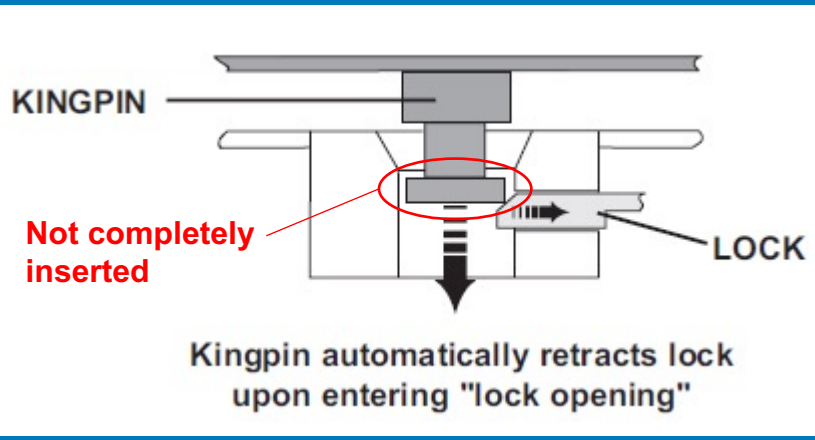
Improvement and development of serial product



Check the locking of the king pin with 2 sensors:

1. Kingpin in hitch head
2. Lock in closed position

A blue LED indicates for 30 seconds, all 2 sensors are all right.



Check the locking of the kingpin with 2 sensors:

A red LED indicates for 30 seconds a mistake:

1. Kingpin in hitch head
2. Lock not in closed position

Improvement and development of serial product

Goal:
Increase the safety by developing a system which shows the loading personel the real status for the hitch

- Develop sensors for all wagon and hitch types
- Visualise the live status via displays, which are also visibile for the crane driver

…But:

- Tolerances of hitch components were unknown. Some developers of the hitch types are not anymore in the market.

- Limited space for fitment of sensors
- Sensors must work in any position of the hitch

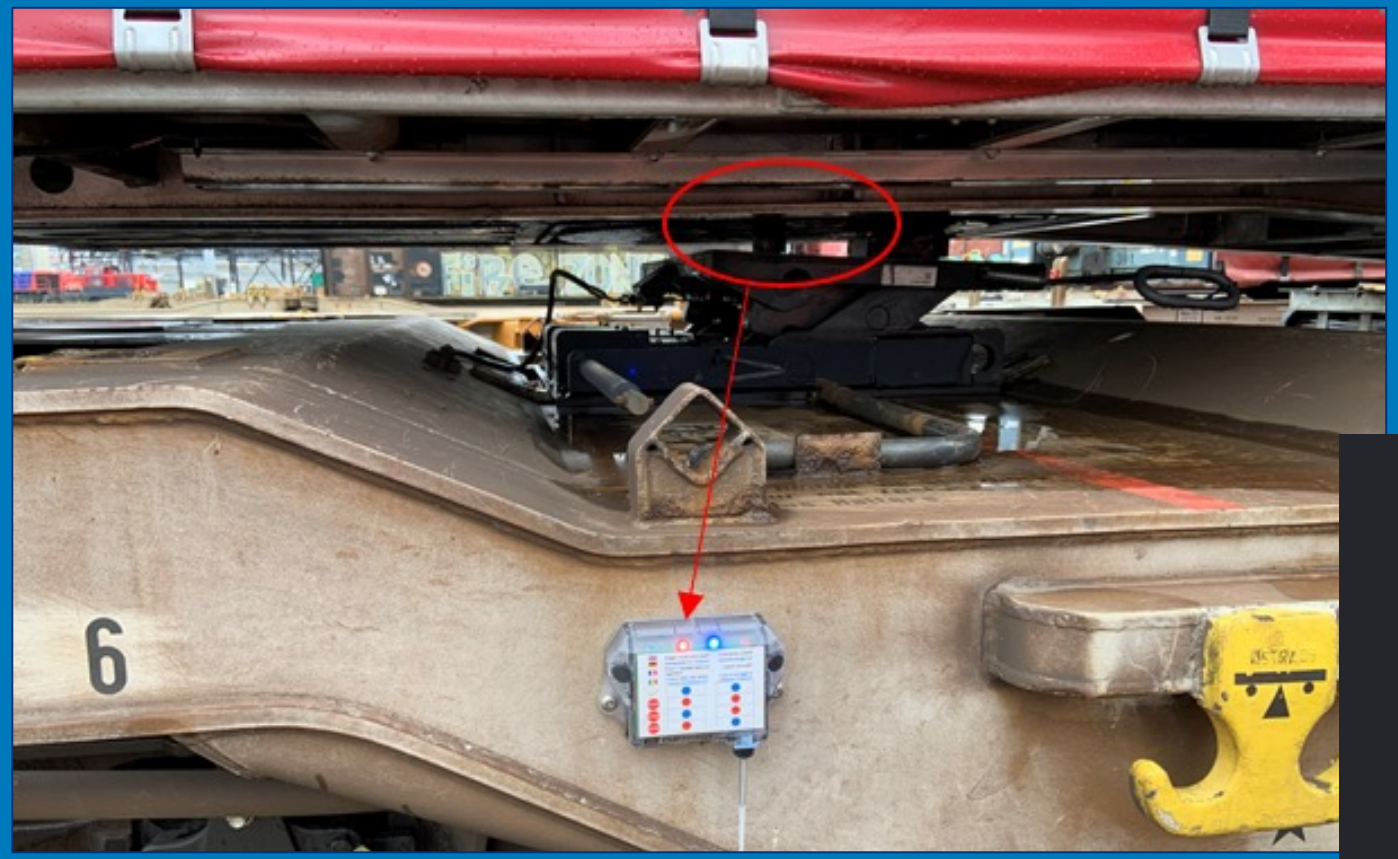
  (88cm – 118cm height)

TWIN I

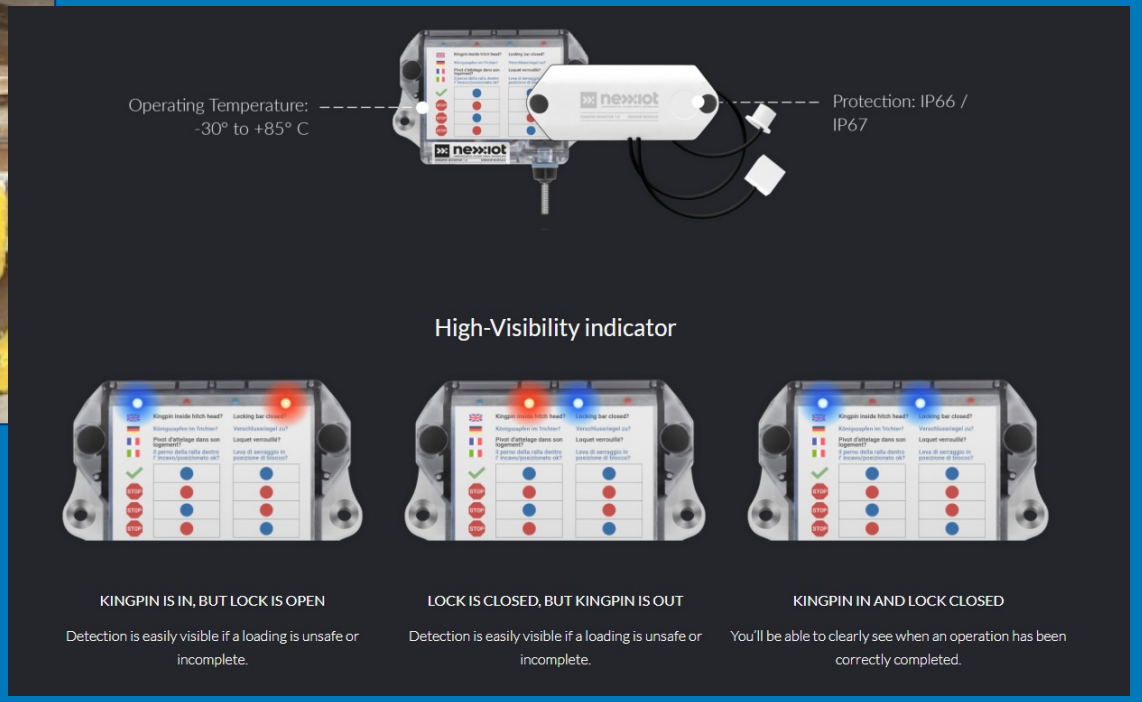
T 3000

TWIN II

TWIN III



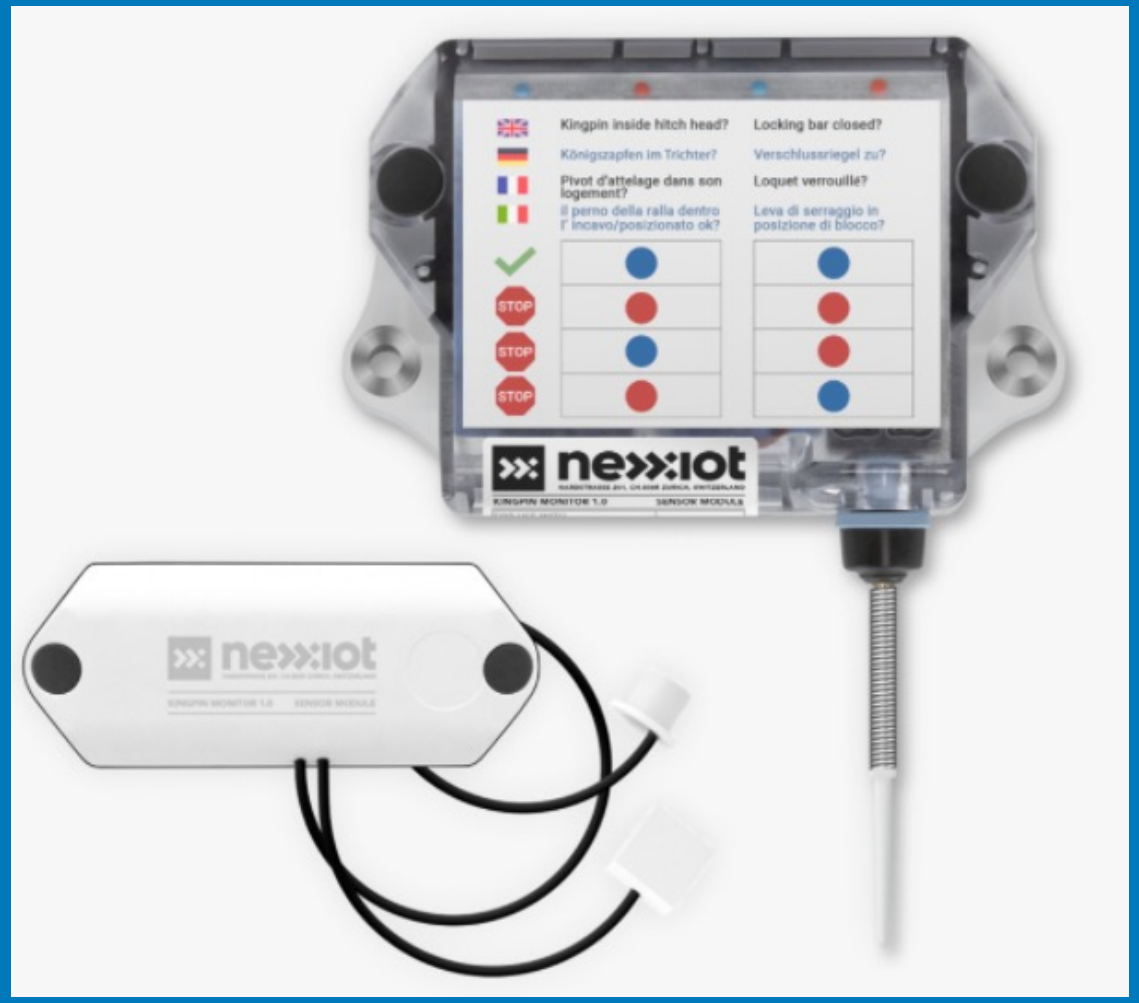
LED status can be recalled in any time by pressing the button on the display



VTG Kingpin Sensor

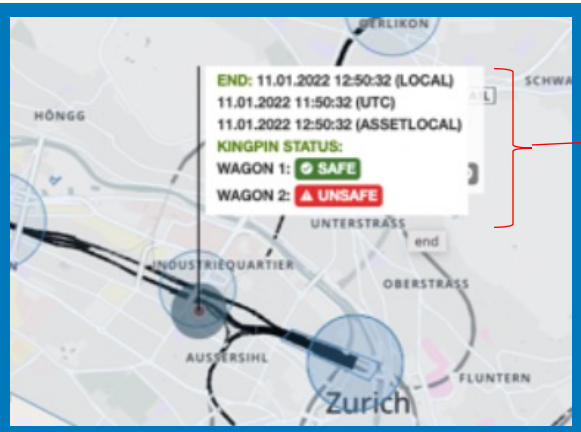
Technical Facts

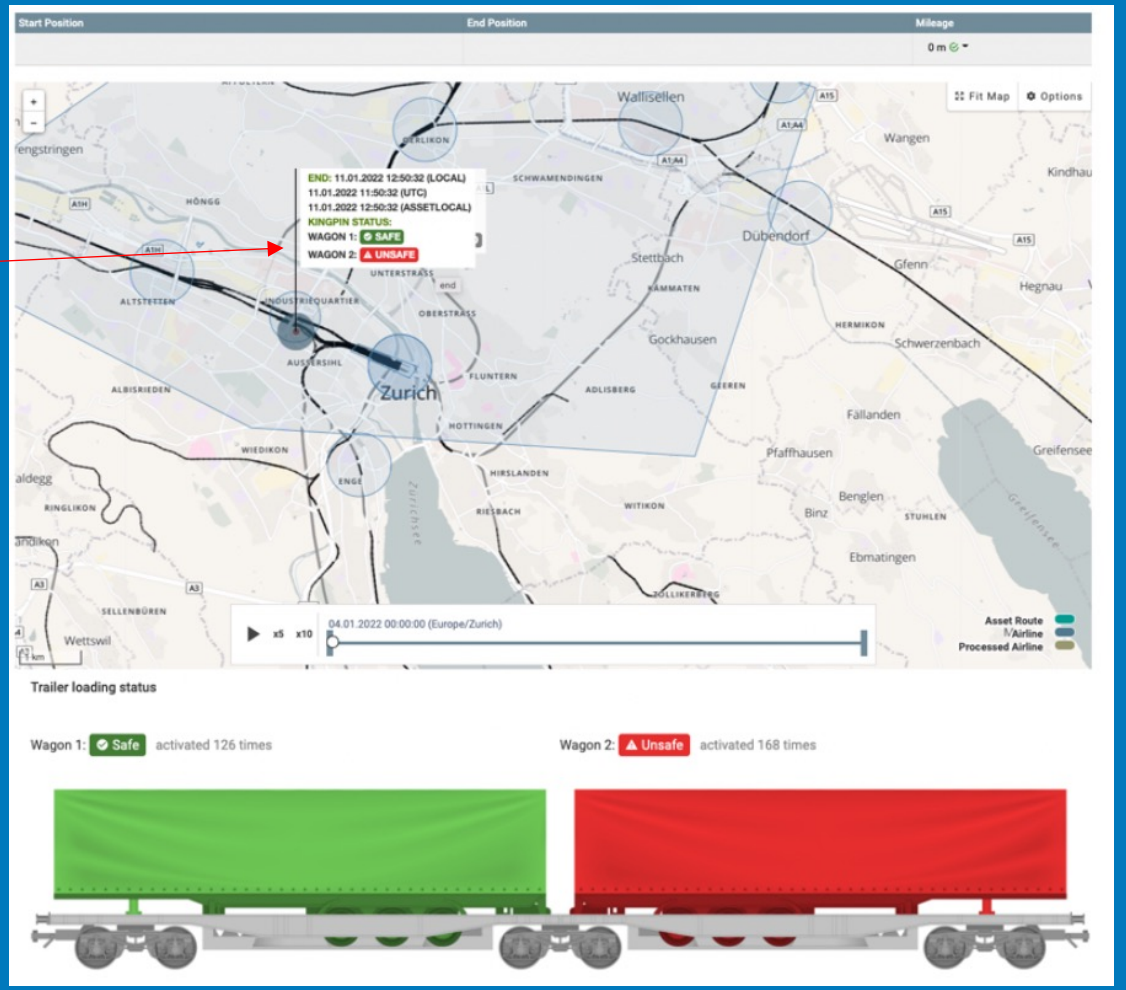
- ✓ Maintenance-free hardware
- ✓ Sends data to the VTG Connect
- ✓ Battery with a lifetime up to 12 years
- ✓ Supporting the operational business
- ✓ Increases the safety
- ✓ Wireless data transmission
- ✓ Loading personal is able to check whether the hitch is unlocked before the unloading via remote control



VTG Kingpin Sensor

Additional information for double pocket wagons is displayed in our online portal VTG Connect/traigo:





- A shape of a trailer shows whether the wagon is correctly loaded
- The components Kingpin/Wheels lighten up in green or red if they have been detected/not detected

Fazit: Sensorik zur Unterstützung des ECM

Digitalisierung, Telematik und Sensorik sind gute Hilfsmittel um bei der Umsetzung eines ECM System:

- zu unterstützen.
- damit die Sicherheit zu erhöhen.
- die Systeme besser zu überwachen und Auswertungen vorzunehmen.
- die Informationen besser zu verteilen / zugänglicher zu machen.

Danke

Frank Sadowski Head of Division Technical Support & Safety, ECM & Safetymanager

2021