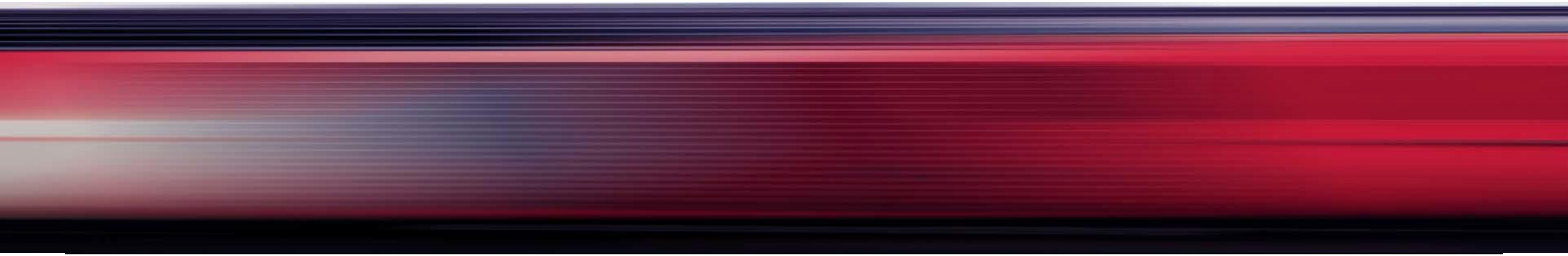
LBFoster

# KELTRACK® On Board

The future of Railway Friction Management



# What is KOB?

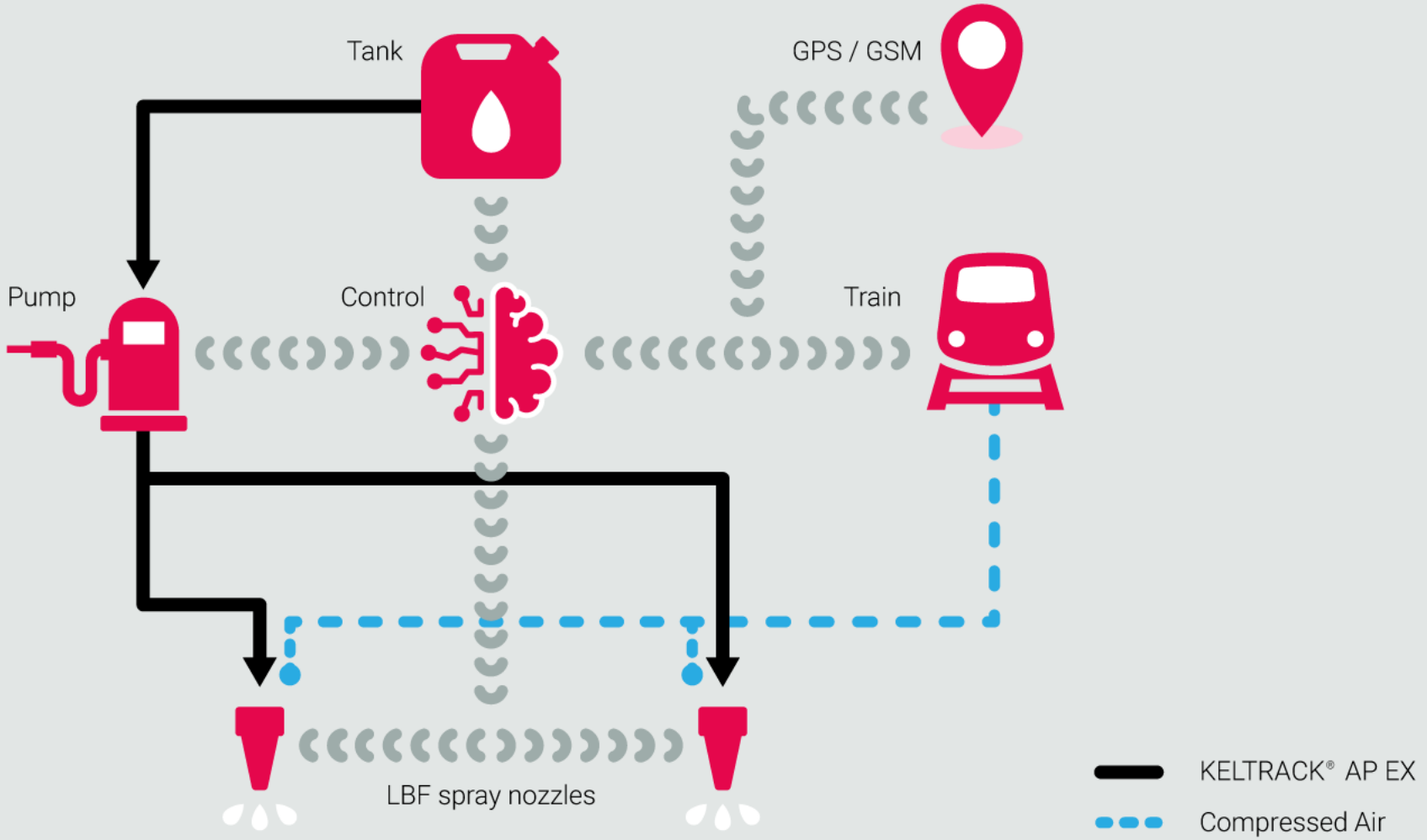
- *KELTRACK® On-Board (KOB)* is a vehicle mounted spray system that dispenses water-based Friction Modifier material directly to the top-of-rail.
- The system is specifically designed to work with *KELTRACK® AP EX* friction modifier.
- It is the only commercially available system that is approved with *KELTRACK® AP EX*.
- *KOB SL* (slimline) is refined for use on passenger rolling stock.
- The larger *KOB* is focused on the freight market.

# KOB SL - Technical Specifications

| | KELTRACK® OnBoard SL | |
|---|---|---|
| Air | 6-10 bar<br>500L/min<br>ISO 8573-1 | |
| Power | 24 VDC (125W) | |
| | Dimensions (mm) | Mass (kg) |
| Spray Nozzle | 140(w)x140(d)x150(h) | 1.8 |
| Dispensing & Control | 385(w)x610(d)x335(h) | 50 |
| Electrical & HMI | 316(w)x205(d)x296(h) | 10 |
| Tank Volume | 20L | |
| Signal Interface | Speed<br>Braking*<br>Sanding*<br>Direction*<br>Location* | |
| Approvals | EN 61373<br>EN13749<br>EN44545-2<br>EN50121-3-2<br>EN60068<br>EN50125-1 | |

*Can be managed by TCMS to give clearance to spray

# System Architecture



# System components

The complete system comprises of three sub-systems:

- Dispensing & controls tank
- Human & electrical interface
- Spraying nozzle(s)

Each of these components will be discussed in further detail on the following slides.

# System components – Dispensing & Controls Tank

The dispensing and control tank contains the following functions/ components:

- KELTRACK® product reservoir (20 liters*) c/w level sensors
- Controller (the brain of the system)
- Dispensing pump/ motor manifold
- Compressed air manifold & regulator
- Solenoid manifold

*other reservoir capacities are available

# System components – Dispensing & Controls Tank (cont.)

(1) AIR (from vehicle)

(2) Atomizing Air out*

(3) Control Air Out*

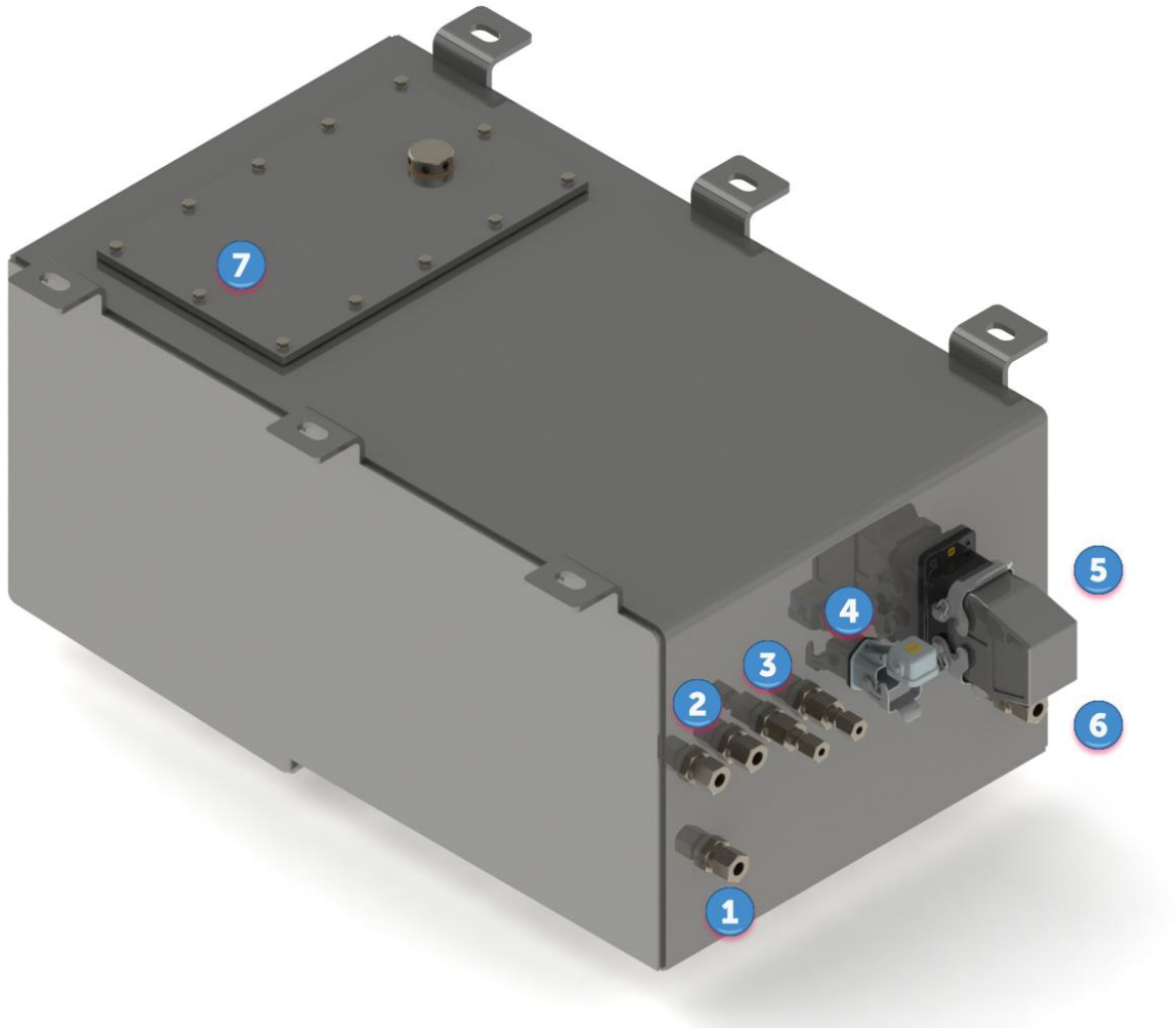
(4) Software update port

(5) Power In

(6) KELTRACK Out*

(7) Removable access panel

*outlets flow to *left* and *right* rails



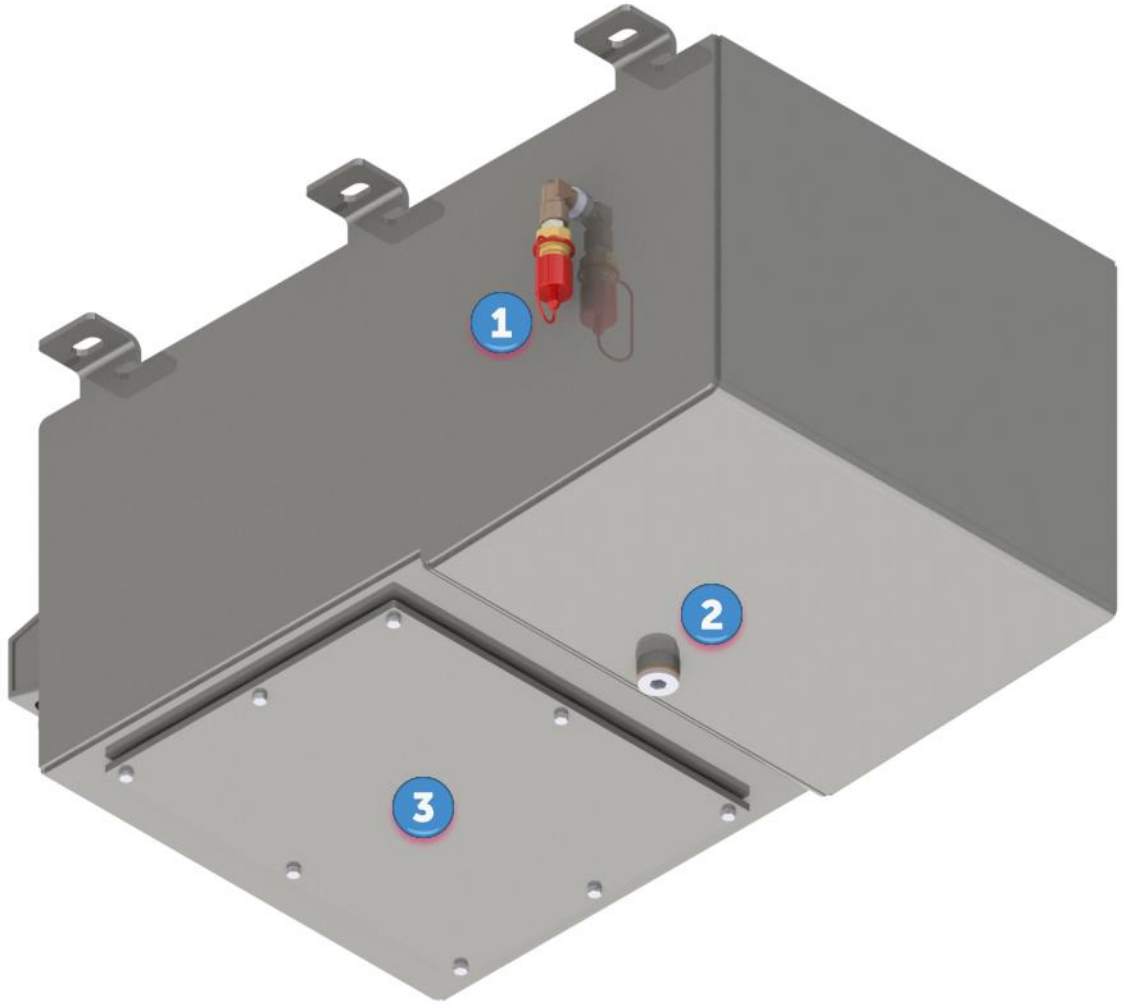
# System components – Dispensing & Controls Tank (cont.)

(1) KELTRACK® Bulk Filling Port – allows automatic filling and shut-off when used with bulk filler

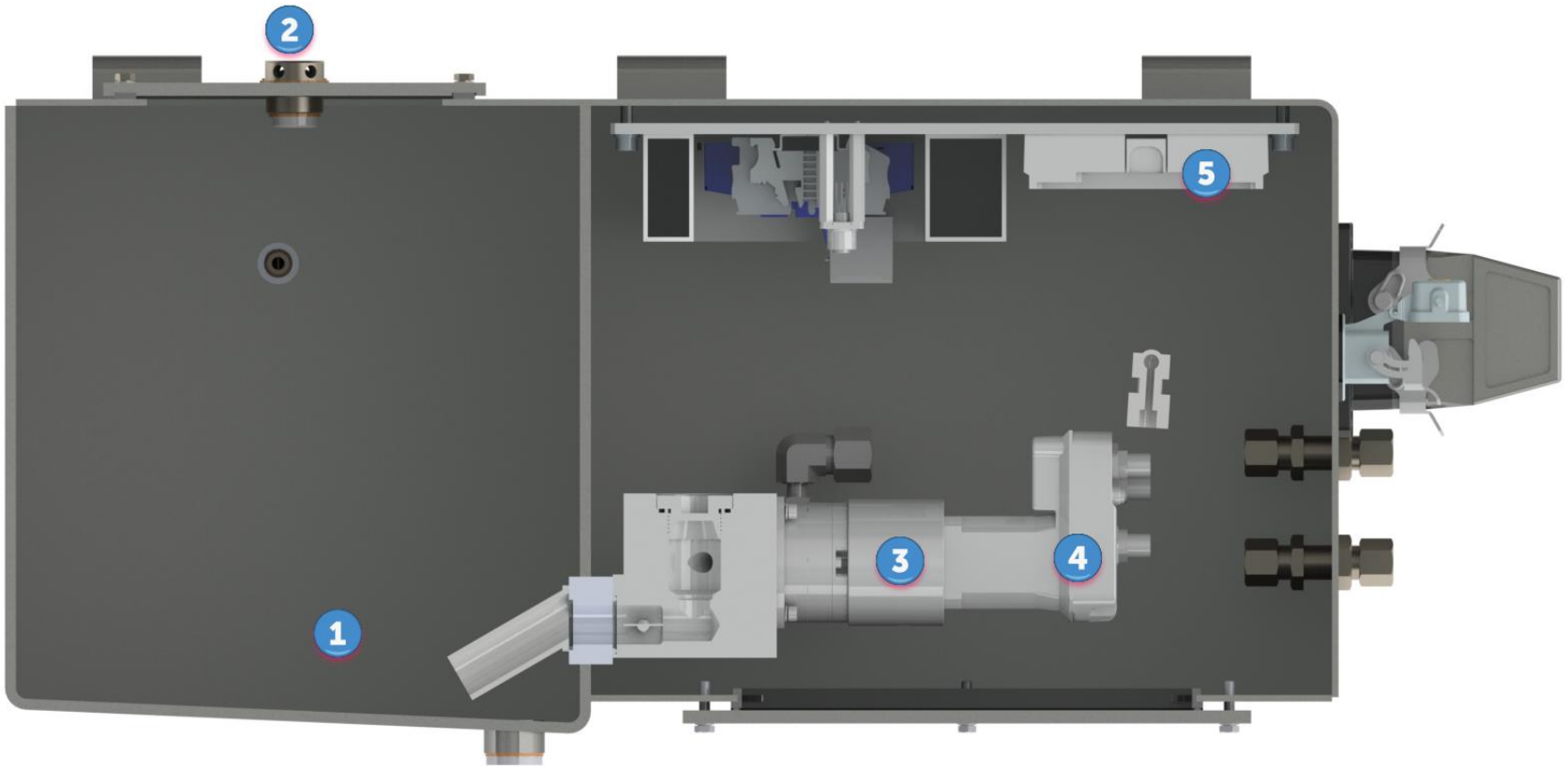
(2) KELTRACK® Drainage Port

(3) Removable access panel*

*allows access to electrical and pump/ motor components



# System components – Dispensing & Controls Tank (cont.)




(1) KELTRACK® Product Reservoir – standard 20L capacity for KOB SL.

(2) Breather Valve

(3) Dispensing Pump

(4) Dispensing Motor

(5) System Controller

# System components – Human & Electrical Interface

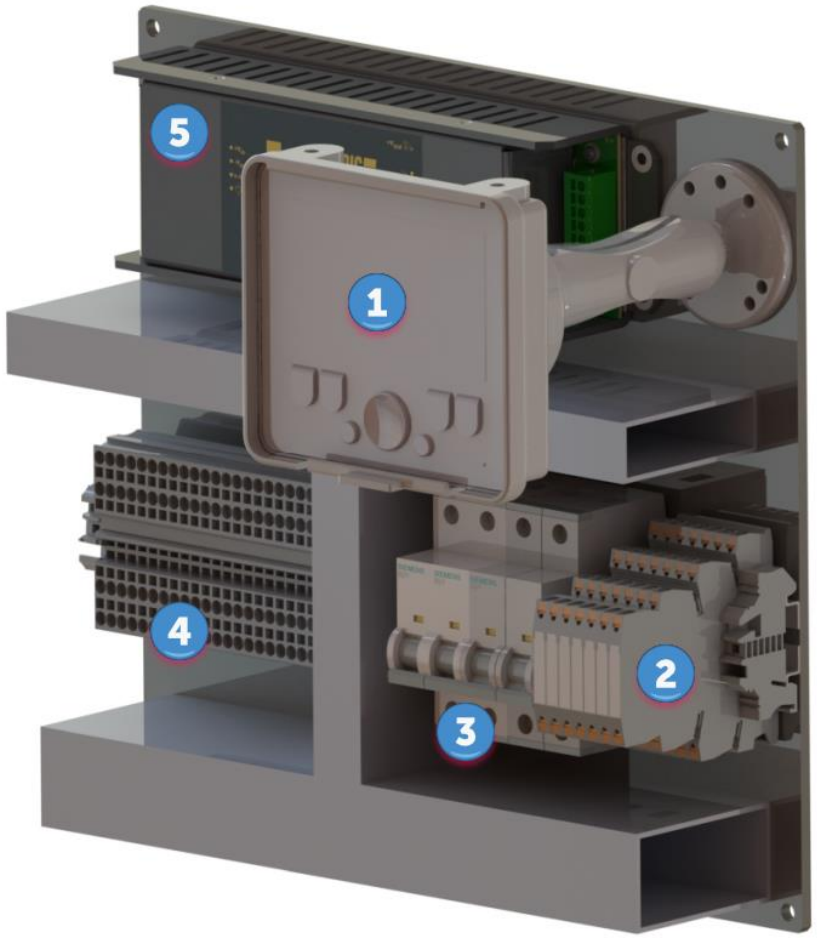
(1) Human Media Interface (HMI) – this allows the operator to review the system status, perform tests, and modify system parameters etc.

(2) Optocouplers: Voltage free couplers used to transfer signals (fault, warning, speed, spray etc.) between the vehicle and LB Foster's spraying system.

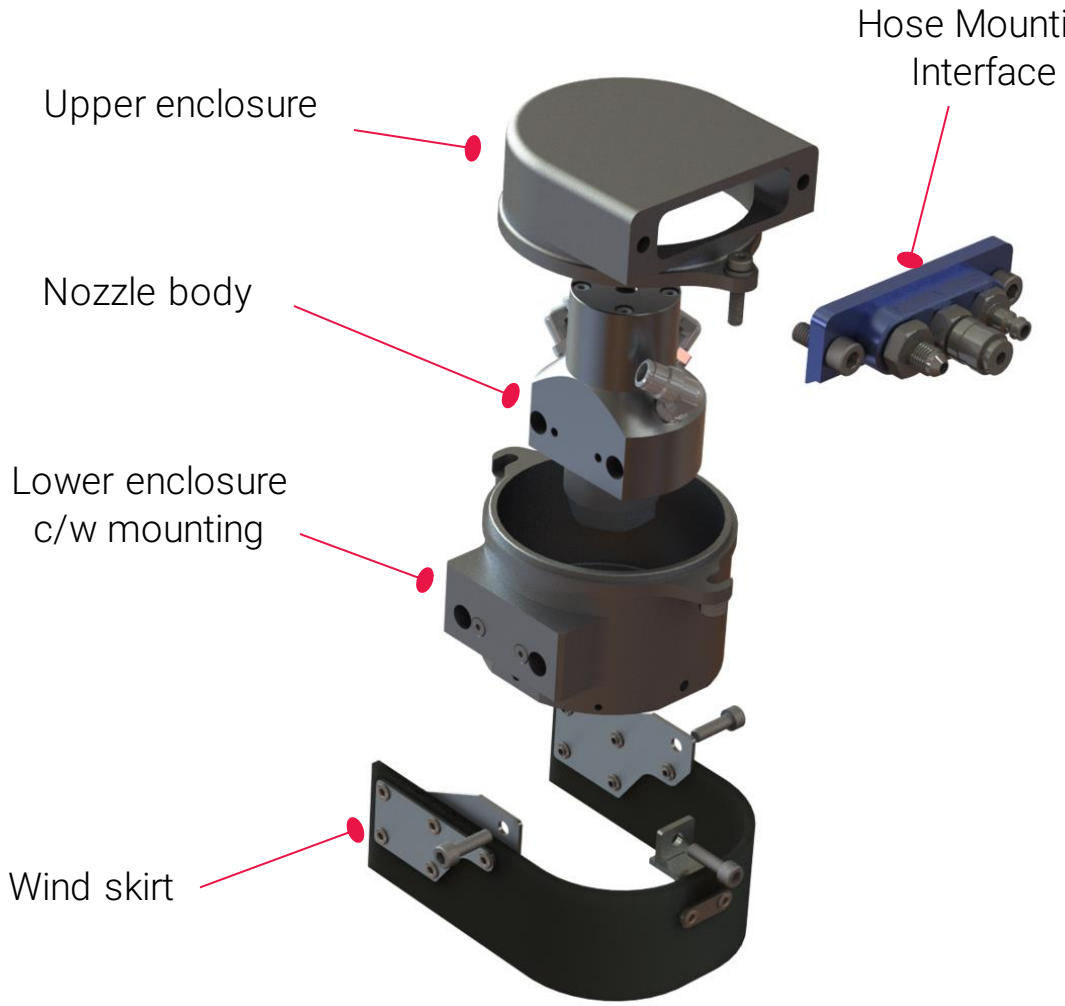
(3) Circuit breakers

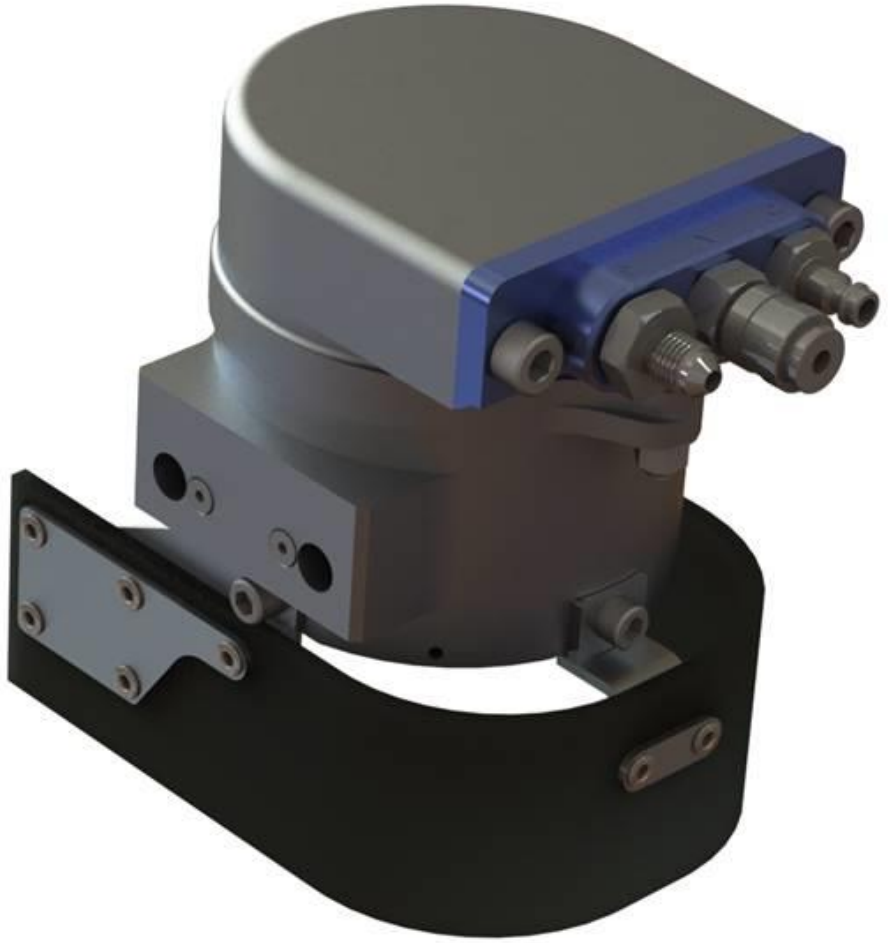
(4) Wiring terminals

(5) DC/DC converter: used to transform vehicle DC supply down to 24VDC



# System components – Spraying Nozzles



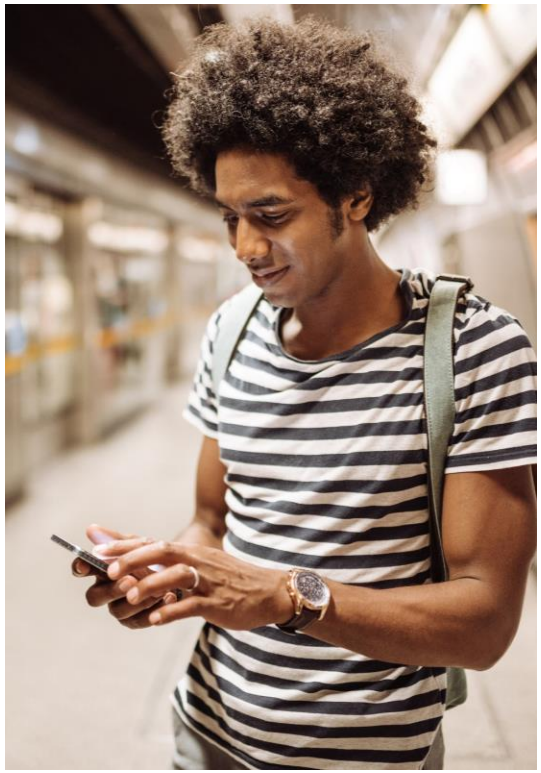
# Features, advantages, benefits

> Saving time
> Saving costs
> Saving lives

# Features and benefits

> Saving time

| FEATURES | ADVANTAGES | BENEFITS |
|---|---|---|
| Remote Condition Monitoring* | System allows remote interrogation, system health is constantly monitored | Rolling stock and track performance maximized |
| System is train mounted | Easier to maintain – unit uptime maximized through enhanced maintenance regime | Consumable costs controlled & minimized<br>Assets protected at all times |
| Intelligent refilling system | System automatically refills | Guaranteed maximum uptime and system protection |



*optional module

# Features and benefits

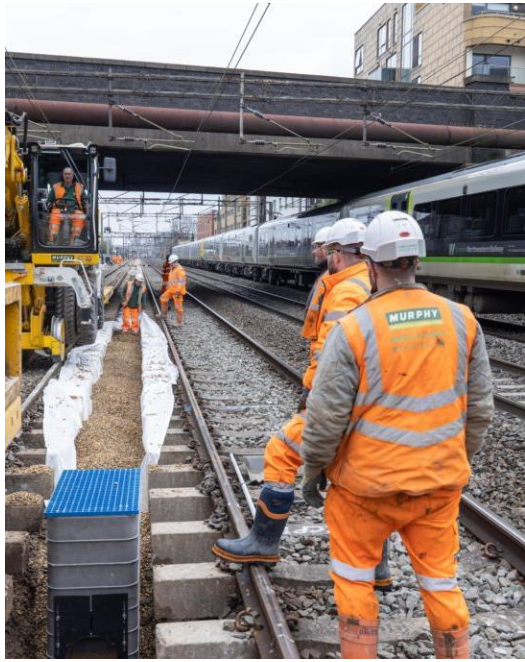
> Saving costs

| FEATURES | ADVANTAGES | BENEFITS |
|---|---|---|
| Accurately controlled output | Product use optimized | Running costs optimized |
| Excellent product retentivity | Residual benefits without need for 100% fleet outfit | Saving on CAPEX and ongoing running costs |

# Features and benefits

> Saving lives

| FEATURES | ADVANTAGES | BENEFITS |
|---|---|---|
| Remote condition monitoring* | System can be remotely interrogated | Safety levels improved for operator staff |
| System is trainbourne | Maintenance is performed in depot – no on track presence necessary | |




*optional module

# AP EX - Features

- Low freezing point of -25°C.
- Longer lasting “intermediate friction levels” based on twin disc retentivity testing.
- Positive friction characteristics.
- Stable application rates in the temperature range of -20°C to +40°C.
- Good sprayability through KOB hardware in the temperature range of -20°C to +40°C.
- Good product stability based on accelerated settling tests.
- The product does not propagate steel corrosion.
- The product does not contain nonylphenol-ethoxylate (NPEO) additives or other highly hazardous ingredients. It is classified as non-hazardous and environmentally benign.

# KELTRACK® AP EX - Technical Specifications

| | Method | Unit | KELTRACK AutoPilot EX |
|---|---|---|---|
| Label | | | AP3 |
| Appearance | - | - | Gray Thixotropic Gel |
| Base | - | - | Water |
| Viscosity at 77 °F (25 °C) | Brookfield RV5 at 80 rpm | cP | 1,300-1,600 |
| Density at 77 °F (25 °C) | ASTM D1475 | g/cm³ | 1.06 - 1.08 |
| Freezing Point | ASTM D2386-97 | °C | -25 |
| pH | ASTM E70 | - | 9.4 – 9.8 |
| Operating Temperature Range | - | °C | -20 to +40 |
| Friction Coefficient | L.B. Foster Twin Disc Methodology | - | Intermediate friction coefficient (0.3 - 0.4) |
| Retentivity | | - | Excellent |
| Friction Characteristics | | - | Positive friction characteristics |
| Corrosion Mitigation | L.B. Foster Method | | Excellent |
| Aquatic Toxicity | OECD 203 | - | (Non-toxic to freshwater fish, LC50 > 100 mg/L (ppm) |
| Flammability | - | - | Non-Flammable |
| Environment | - | - | Not classified as hazardous to aquatic life |

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# Thank you