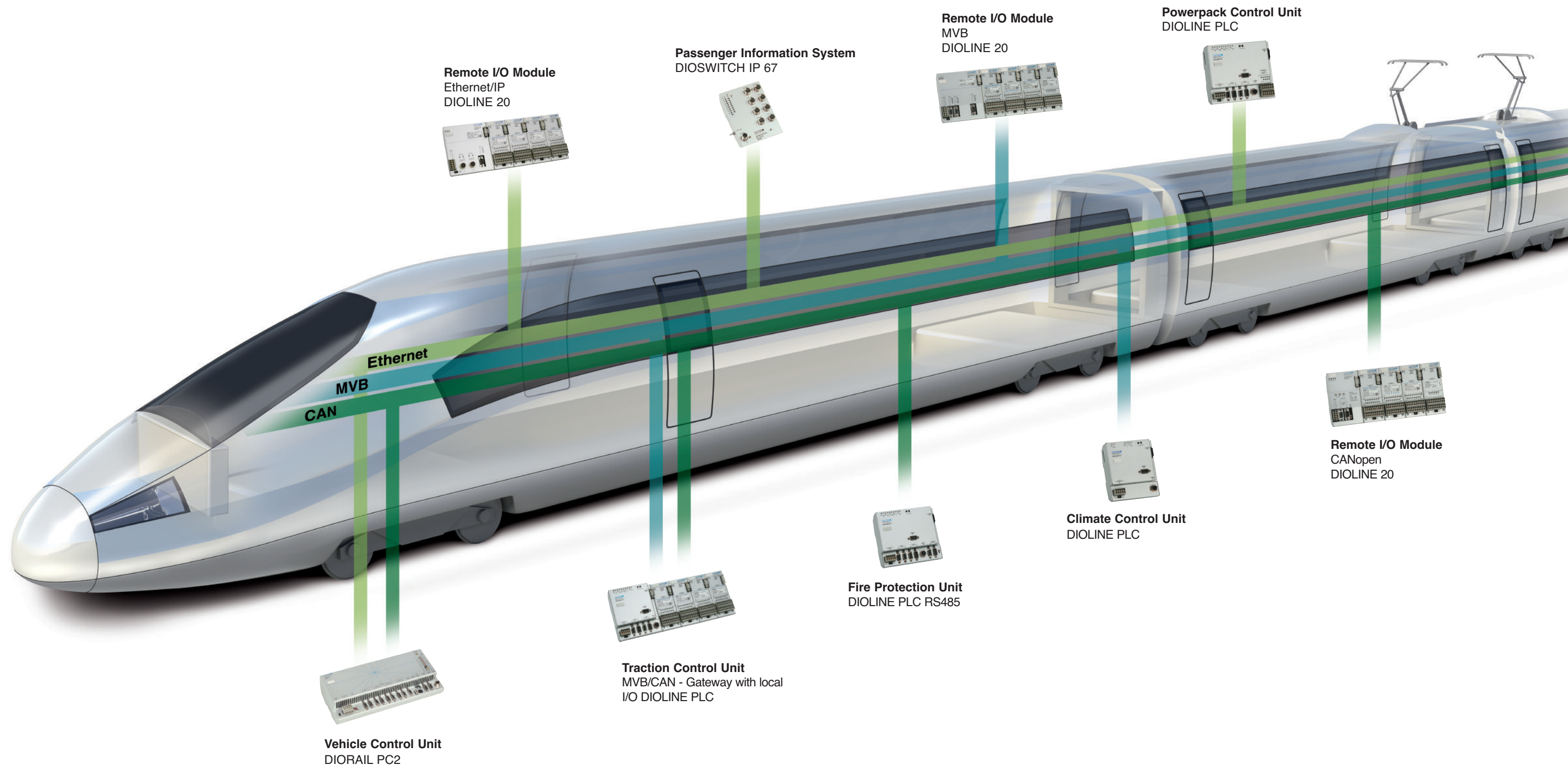Transportation Solutions

LÜTZE
Rail Technology

**Product overview
Control Technology**

IRIS
Certification

LÜTZE
TRANSPORTATION

Remote I/O Module
MVB
DIOLINE 20

Powerpack Control Unit
DIOLINE PLC

Passenger Information System
DIOSWITCH IP 67

Remote I/O Module
Ethernet/IP
DIOLINE 20

Ethernet

MVB

CAN

Remote I/O Module
CANopen
DIOLINE 20

Climate Control Unit
DIOLINE PLC

Fire Protection Unit
DIOLINE PLC RS485

Traction Control Unit
MVB/CAN - Gateway with local
I/O DIOLINE PLC

Vehicle Control Unit
DIORAIL PC2

Control and diagnostic systems play a key role in modern rail vehicles. Customizable platform concepts are required to ensure that vehicles are designed and manufactured efficiently in the face of control technology's ever increasing requirements.

Control technology components from LÜTZE are flexible to use and consistently accommodate this trend. So intelligent, special purpose solutions such as LÜTZE powerpack control unit are just as available as whole control technology systems, with perfectly coordinated individual components.

An example of this is the DIOLINE system, which comprises not just the vehicle control system but also the I/O level for all the usual signal voltages found in the railway sector.

LÜTZE TRANSPORTATION is following as an IRIS certified company strict quality guidelines and processes as basis for the development of hardware and software. This leads to the fact, that all systems have been developed under the compliance of following national and international standards:

- EN 50155
- EN 61373
- EN 50126
- EN 50129
- EN 50121-3-2
- EN 50124-1
- EN 50128
- EN 45545

DIOLINE PLC - Flexible Control System
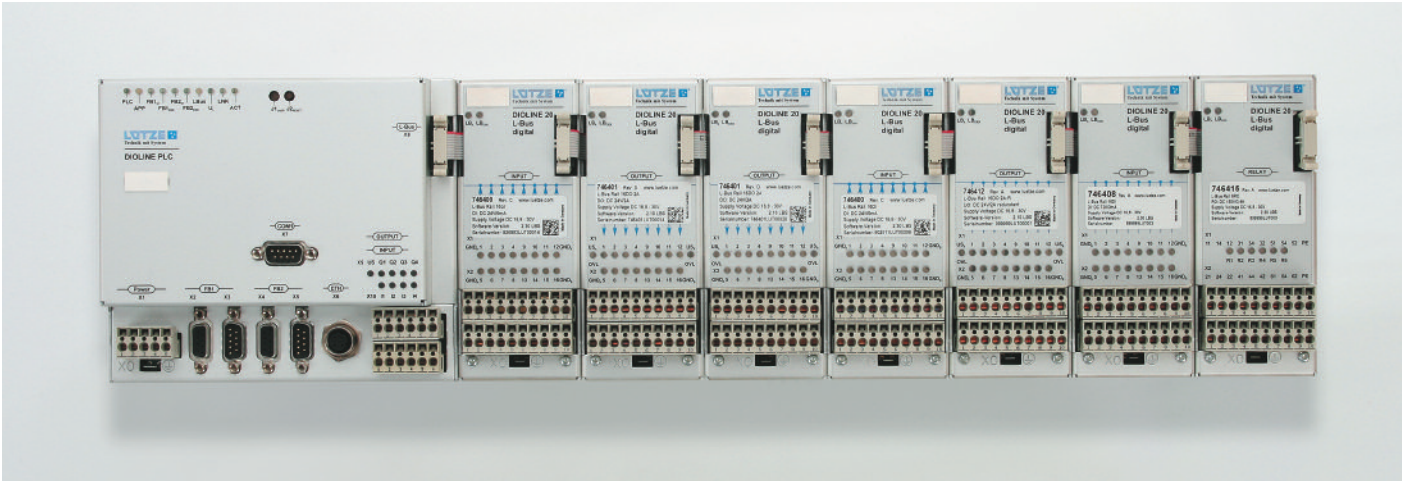
The DIOLINE PLC is a flexible powerful compact control unit. It has been exclusively designed and developed for use in rail vehicles. The operating temperature range is between -40 °C and +70 °C and the power supply is DC 24 V.

The PLCs are freely programmable in a comfortable IEC 61131-3 development environment and all versions have an L-Bus interface for connection of modular I/O modules. The integrated field busses are available in following versions: MVB, CANopen, CAN2.0 (J1939), RS485 and Ethernet TCP/IP.

The DIOLINE PLC can be used as a Gateway with additional control tasks as well as a powerful subsystem control unit. Existing programs can be transferred easily to several versions of the DIOLINE PLC, when it is necessary to use a PLC with a different fieldbus interface.
By the use of existing solution concepts for complex functions like load ratio control or diagnostic storage algorithms for system data, the engineering efforts and the time-to-market can be minimized. On request there are more communication protocols available, like MODBUS, Ethernet/IP or Profinet.

Overview Variants - DIOLINE PLC CAN

| Part. No.	Description
746026	CANopen Master / CANopen Master
	L-Bus, RS232, Ethernet, SD-Card-Slot, 123 mm width
746027	CANopen Master / CAN2.0 (J1939)
	L-Bus, RS232, Ethernet, SD-Card-Slot, 123 mm width
746029	CANopen Master / RS485
	L-Bus, RS232, Ethernet, SD-Card-Slot, 163 mm width
746032	CANopen Slave / CANopen Master
	L-Bus, RS232, Ethernet, SD-Card-Slot, 123 mm width
746039	CANopen Slave
	L-Bus, RS232, Ethernet, SD-Card-Slot, 123 mm width
746034	Ethernet
	L-Bus, RS232, SD-Card-Slot, 123 mm width
746041	CANopen Slave / CAN 2.0 (J1939)
	L-Bus, RS232, Ethernet, SD-Card-Slot, 123 mm width

LÜTZE

Overview Variants - DIOLINE PLC MVB

| Part. No.	Description
746028	MVB / CAN2.0 (J1939)
	L-Bus, RS232, Ethernet, SD-Card-Slot, 123 mm width
746033	MVB / CANopen Master
	L-Bus, RS232, Ethernet, SD-Card-Slot, 123 mm width
746036	MVB / CAN2.0 (J1939) / RS485
	L-Bus, RS232, Ethernet, SD-Card-Slot, 163 mm width
746037	MVB / CAN2.0 (J1939) / 4DI 24 V
	L-Bus, RS232, Ethernet, SD-Card-Slot, 163 mm width
746038	MVB / CANopen Master / 4DI 24 V / 4 DO 24 V
	L-Bus, RS232, Ethernet, SD-Card-Slot, 163 mm width
746040	MVB Slave (ESD+) / CANopen Master
	L-Bus, RS232, Ethernet, SD-Card-Slot, 123 mm width
746042	MVB Slave (ESD+) / CANopen Master / 4DI 24 V / 4 DO 24 V
	L-Bus, RS232, Ethernet, SD-Card-Slot, 163 mm width
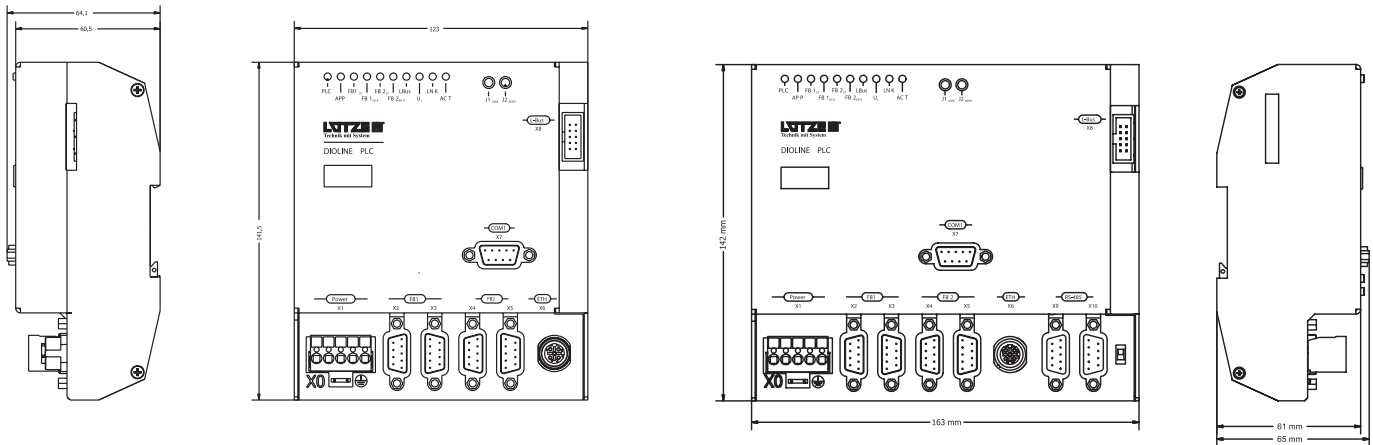
Software Engineering Tools

The IEC 61131 PLC programming system MULTIPROG from KW-Software is the central standard engineering component of the LÜTZE PLC controller platform. MULTIPROG accelerates project handling and creation of the PLC application in all programming languages of the IEC 61131.

It supports the integration of fieldbus configuration and diagnostic tools for visualization and parameterization tasks. For this reason it is particularly suited to programming complex networks with distributed control components and also for diagnostics during the starting up and the series operation. High-performance engineering functions such as multi-user operation or automatic project generation enable flexible integration for train manufacturers and operators.
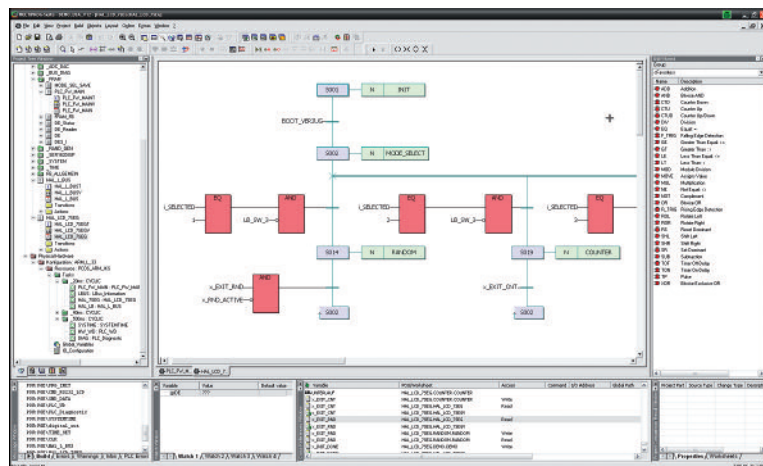
On request, the LÜTZE engineering team can support you to find solutions for your tasks in order to finish your project successfully.

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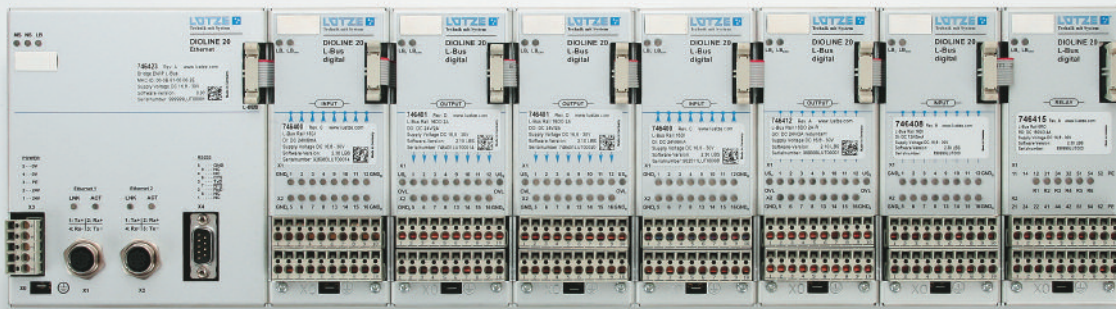
The robust I/O system DIOLINE 20 has been exclusively designed and developed for use in rail vehicles.

Thanks to the modularity, the bus coupler with a specific fieldbus interface as well as any I/O module can be exchanged easily fitting to the current operation. The flat mechanical design allows the system to be installed in areas with reduced space conditions, like for example under driver's desks.
The operating temperature range is between -40 °C and +70 °C and the power supply is DC 24 V.

Overview Bus Couplers

Part. No.	Description
746423	DIOLINE Bus Coupler Ethernet/IP
	CIP communication-adapter with internal 3-Port-Switch for line-topology
	RS232 as diagnostic- and configuration interface
	The adressing can be configured by DHCP, BOOTP or a fix IP-Address

Part. No.	Description
746416	DIOLINE Bus Coupler MVB
	MVB EMD Slave Class 1.3
	RS232 as diagnostic- and configuration interface
	The configuration can be defined and downloaded to the system
	by the LÜTZE MVB Slave Configurator software tool

Part. Nr.	Description
746409	DIOLINE Bus Coupler CANopen
	CANopen DS301 and DS401
	integrated switchable termination resistor
	The configuration of the bus parameters like baudrate and Node-ID
	can be performed by three rotary switches

Overview I/O Modules

Part. No.	Description
Digital Inputs	
746400	16 digital Inputs DC 24 V, 2 potential groups
746417	16 digital Inputs DC 24 V, 4 potential groups
746428	16 digital Inputs DC 36 V, 2 potential groups
746408	16 digital Inputs DC 72 V, 2 potential groups
746425	16 digital Inputs DC 72 V, 4 potential groups
746413	16 digital Inputs DC 110 V, 2 potential groups
Digital Outputs	
746401	16 digital Outputs DC 24 V / 2 A, 2 potential groups
746412	16 digital Outputs DC 24 V / 2 A reverse current flow protection, 2 potential groups
746419	8 digital Outputs DC 24 V / 2 A , 4 potential groups, with extended diagnostics
746420	8 digital Outputs DC 24 V / 2 A, 2 potential grous, reverse current flow protection, with extended diagnostics
746424	6 digital Outputs DC 24 V … 110 V / 2 A, 3 potential groups
746414	6 digital Outputs DC 24 V … 110 V / 0,6 A reverse current flow protection, 3 potential groups
746415	6 change - over relay outputs DC 150 V / AC 250 V
Analog Inputs	
746403	4 analog Inputs 0 … 10 V
746426	4 analog Inputs -10 … +10 V
746404	4 analog Inputs 0 … 20 mA
746421	4 analog Inputs 0 … 24 mA
746410	4 analog Inputs PT100
746411	4 analog Inputs PT1000
Analog Outputs	
746405	4 analog Outputs 0 … 10 V
746427	4 analog Outputs -10 … +10 V
746406	4 analog Outputs 4 … 20 mA
746422	4 analog Outputs 0 … 20 mA
Combined Modules	
746402	8 digital Inputs DC 24 V
	8 digital Outputs DC 24 V / 2 A
746407	2 analog Inputs configurable
	0…20 mA / 0…24 mA / 4…20 mA / 0…40 mA / 0…10 V / -10…10 V / PT100 / PT1000
	2 analog Outputs configurable
	0…20 mA / 0…24 mA / 4…20 mA / 0…10 V / -10…10 V / -5…5 V

Part. No.	Description
Redundant Modules	
746430	16 redundant digital Inputs DC 24 V, 2 potential groups
746431	16 redundant digital Inputs DC 24 V, 4 potential groups
746432	16 redundant digital Outputs DC 24 V / 1 A, 2 potential groups
746433	8 redundant digital Inputs DC 24 V, 8 redundant digital Outputs DC 24 V / 2 A
746434	8 redundant digital Outputs DC 24 V / 2 A, 4 potential groups, with extended diagnostics
746435	16 redundant digital Inputs DC 72 V, 4 potential groups
746436	6 redundant digital Outputs DC 24 V … 110 V / 2 A, 3 potential groups
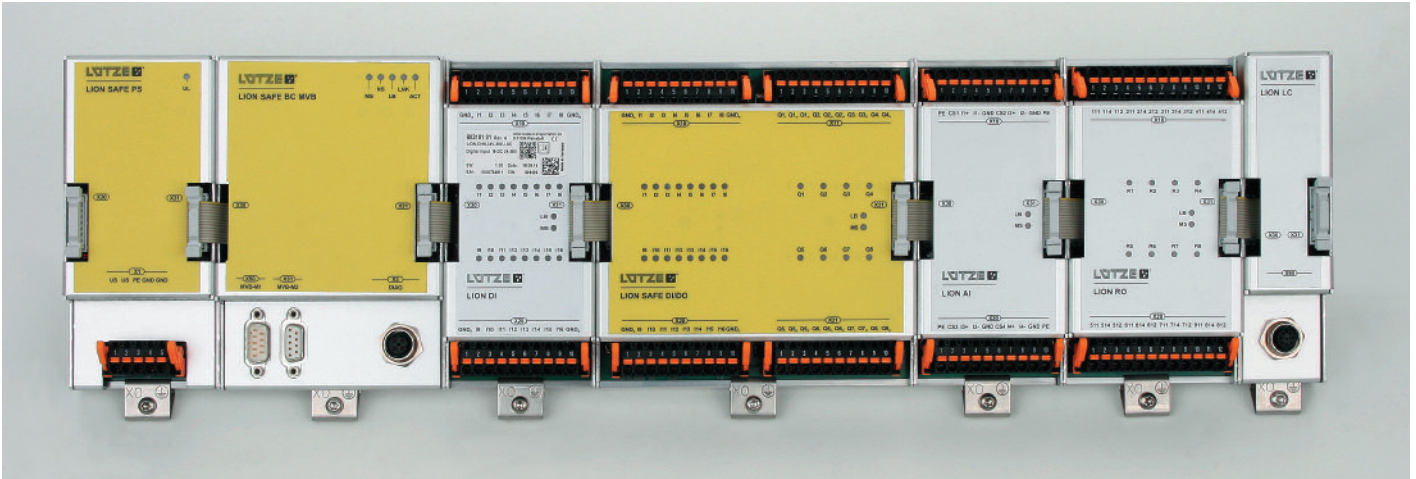
LION is the new intelligent decentralized safety I/O system of LÜTZE. LION means LÜTZE Input Output Network and has been exclusively designed and developed for use in rail vehicle applications up to a safety integrity level of SIL2.
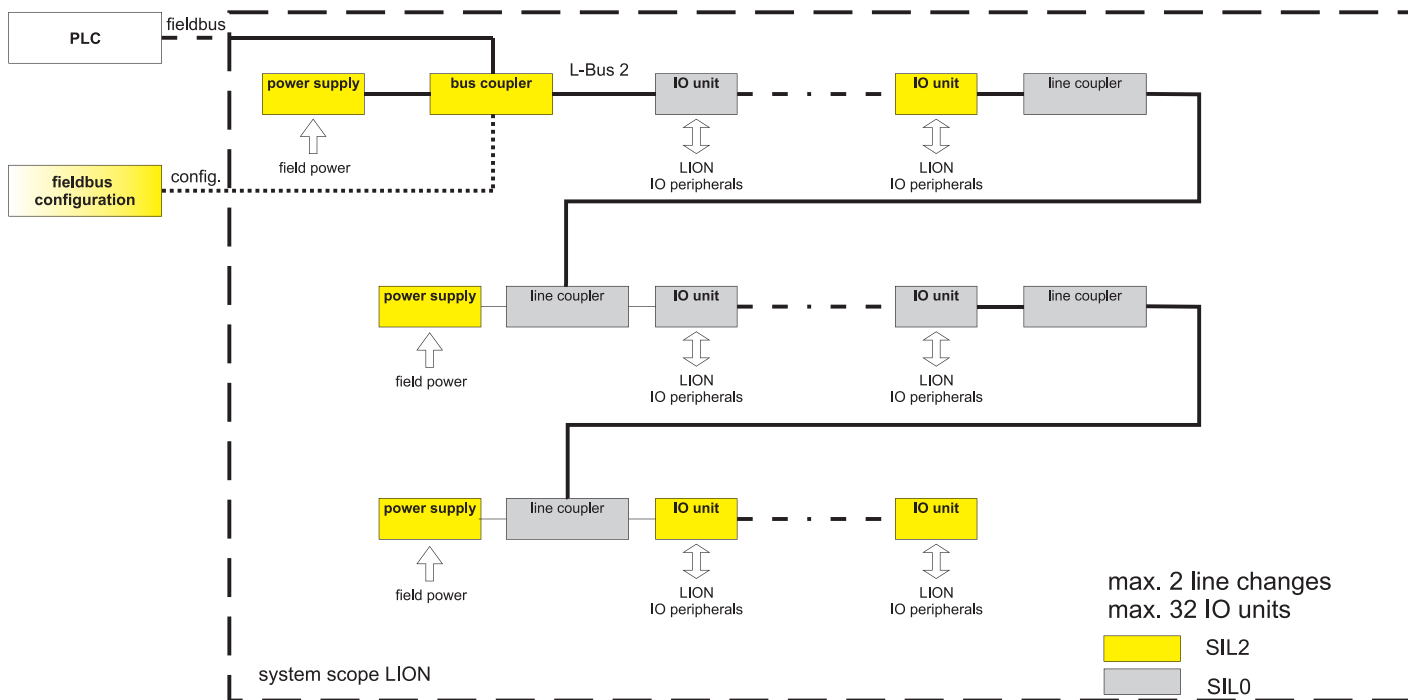
The modular structure of LION enables the user to adapt the composition of the I/O station to the respective area of application by combining different available modules regarding the tasks and functionalities. Therefore Power Supplies, Bus Couplers, Digital and Analog Modules with safe and non-safe Inputs and Outputs are available.

LION provides flexibility offering different fieldbus interfaces. Bus Couplers with MVB or Ethernet interfaces are available.

Product Overview - LION

Type	Part. No.	Description
Infrastructure Components	800101	Power supply unit 70W with wide range input
		DC 24V … 110V and redundant input connector
	800103	Power supply unit 35W with wide range input DC 24 V … 110 V
	800102	Line Coupler L-Bus M12
Bus Coupler	803001	Bus Coupler MVB (optional: SIL2 with Safety-Layer)
	803002	Bus Coupler Ethernet
Digital Inputs	803101	Digital Input module, 16 channels, DC 24 V … 36 V
	803102	Digital Input module, 16 channels, DC 72 V … 110 V
Digital Outputs	803202	Digital Output module, 16 channels, DC 24 V
	803203	Digital Output module, 8 channels, DC 24 V … 110 V
	803201	Relay Output module, 8 channels, DC 24 V … 150 V
Analog Inputs	803301	Analog Input module, 4 channels, 0…10 V
	803302	Analog Input module, 4 channels, 0…20 mA
	803303	Analog Input module, 4 channels, PT100
	803304	Analog Input module, 4 channels, PT1000
Analog Outputs	803401	Analog Output module, 4 channels, 0…10 V
	803402	Analog Output module, 4 channels, 0…20 mA
Safe Input and Outputs	803501	Safe Digital Input / Output Module SIL2
		16 safe input channels, DC 24…36 V
		8 safe output channels, DC 24 V … 110 V
	803502	Safe Digital Input / Output Module SIL2
		16 safe input channels, DC 72…110 V
		8 safe output channels, DC 24 V … 110 V

LÜTZE

System Description LION

PLC — fieldbus

fieldbus configuration — config.

power supply — bus coupler — L-Bus 2 — IO unit — IO unit — line coupler

field power — LION IO peripherals — LION IO peripherals

power supply — line coupler — IO unit — IO unit — line coupler

field power — LION IO peripherals — LION IO peripherals

power supply — line coupler — IO unit — IO unit

field power — LION IO peripherals — LION IO peripherals

max. 2 line changes
max. 32 IO units

SIL2

SIL0

system scope LION

LION safe (SIL2) and non-safe (SIL0) modules can be operated together on the same bus system. A separate network installation for the processing of safety-relevant signals is no longer necessary.

An I/O station can be operated with up to 32 I/O modules in any combination. With the use of Line Couplers it is possible to connect I/O modules with a distance of up to 10 meters.
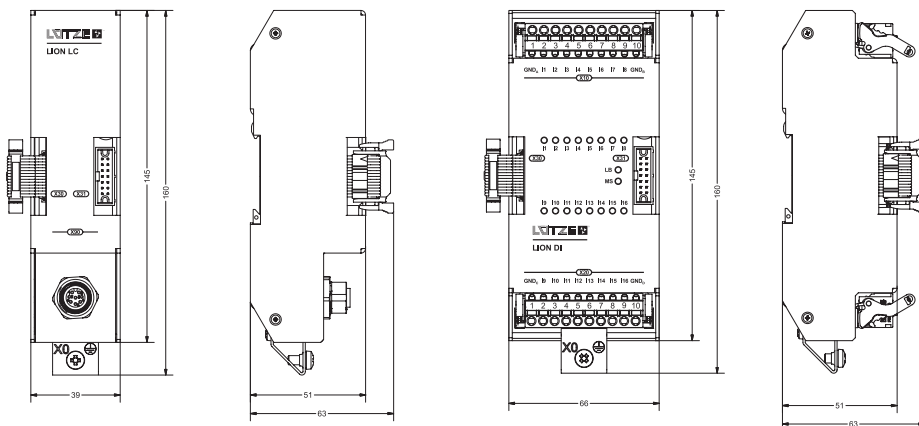
The flat design of the modules and the freely selectable mounting position on the DIN-Rail allows a perfect installation of the system in areas with limited space, like e.g. under the driver's desk of a locomotive.

Vehicle Communication Systems

DIORAIL PC2 - powerful vehicle control unit

Part. No.	Description
746024	DIORAIL PC2
	2 CANopen Master / 2 CAN2.0 (J1939) / RS485 / L-Bus / Ethernet
	PC104 / RS232 / VGA / USB / PS2 / ready output / CF-Card

The DIORAIL PC2 is a powerful vehicle control unit with extremely low power dissipation. The operating temperature range is between -40 °C and +70 °C and the power supply is DC 24 V. The controllers are freely programmable in a comfortable IEC 61131-3 development environment and all versions have an L-Bus interface for connection of modular I/O modules. The numerous fieldbus interfaces allow the integration of subsystem controllers, the link to remote I/O modules and the communication with passenger information systems.

DIOSWITCH IP 67

Part. No.	Description
745569	DIOSWITCH IP67

The DIOSWITCH IP67 is a robust, high-quality industrial Ethernet switch for the use in rail vehicles. The operating temperature range is between -40 °C and +70 °C and the power supply is DC 24 V. The ports can be interfaced over 8 M12 connectors d-coded. The switch supports numerous features like Autonegotiation, Autocrossing, Autopolarity. The latency time has been minimized by the store and forward switch mode. Additionally, the switch is qualified for operation in Profinet networks (Conformance Class CC-A).

LÜTZE

Railway Technology Competence
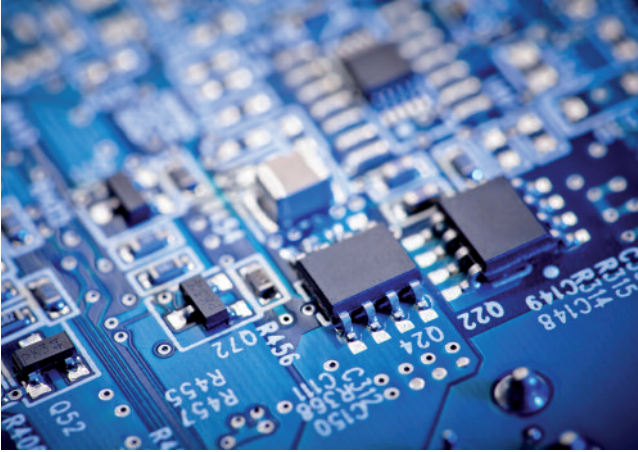
LÜTZE has been developing and manufacturing electrical components for rail vehicles for over 20 years. Our extensive product range of standard components carries out many automation tasks in the most diverse vehicle applications. Are you still looking for the appropriate product adapted to suit your specific application?

Get in touch with us. Our developers help you to find the best solution for your product, including the specification and design for the application on the vehicle, regardless of whether you need components for your control technology, interface components or optical and acoustic signals.
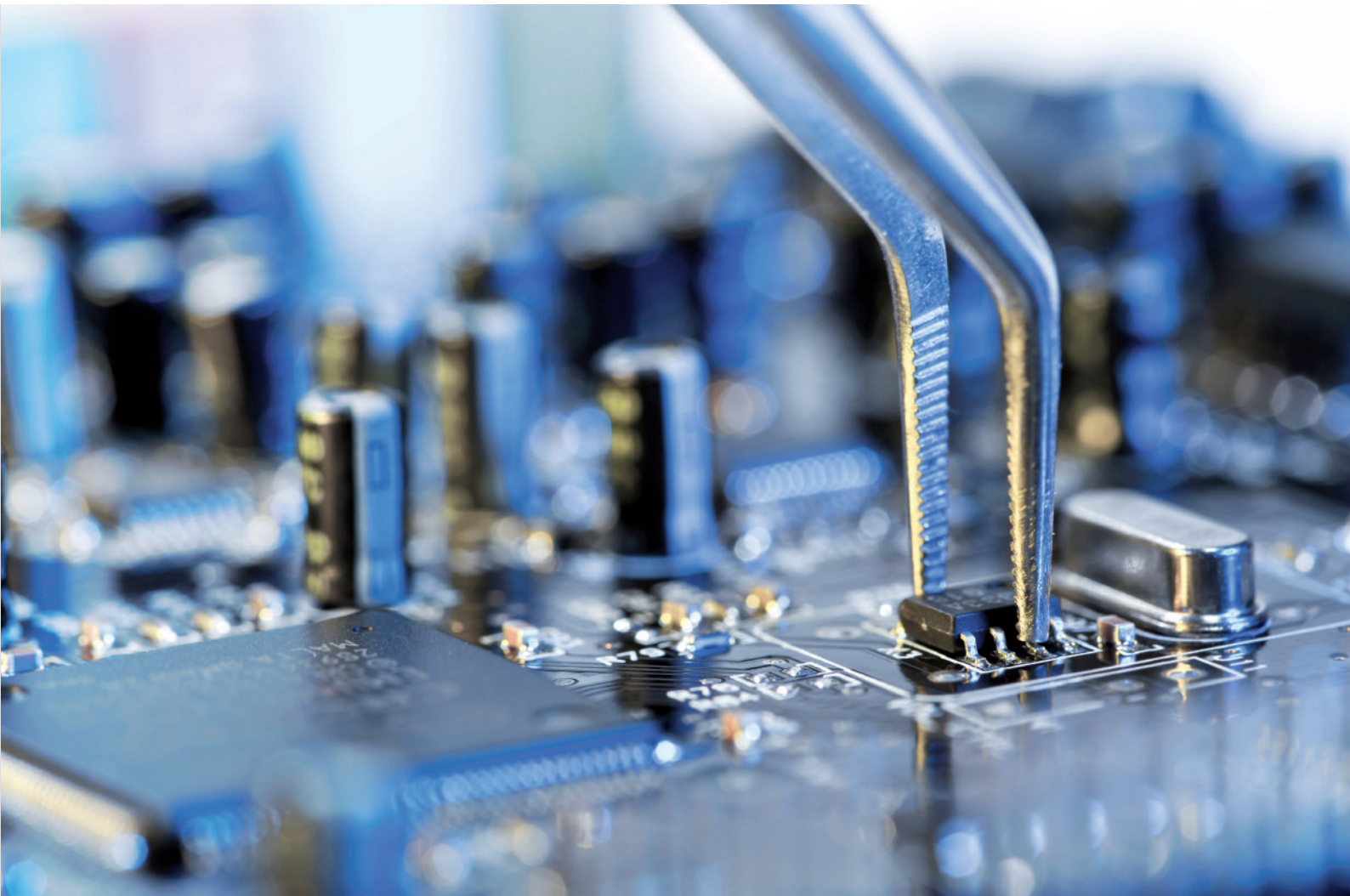
Application examples

Powerpack Control Unit

Train Control & Management System (TCMS)

MVB

CAN J1939

digital/analog I/O

Electronic Diesel Control (EDC)
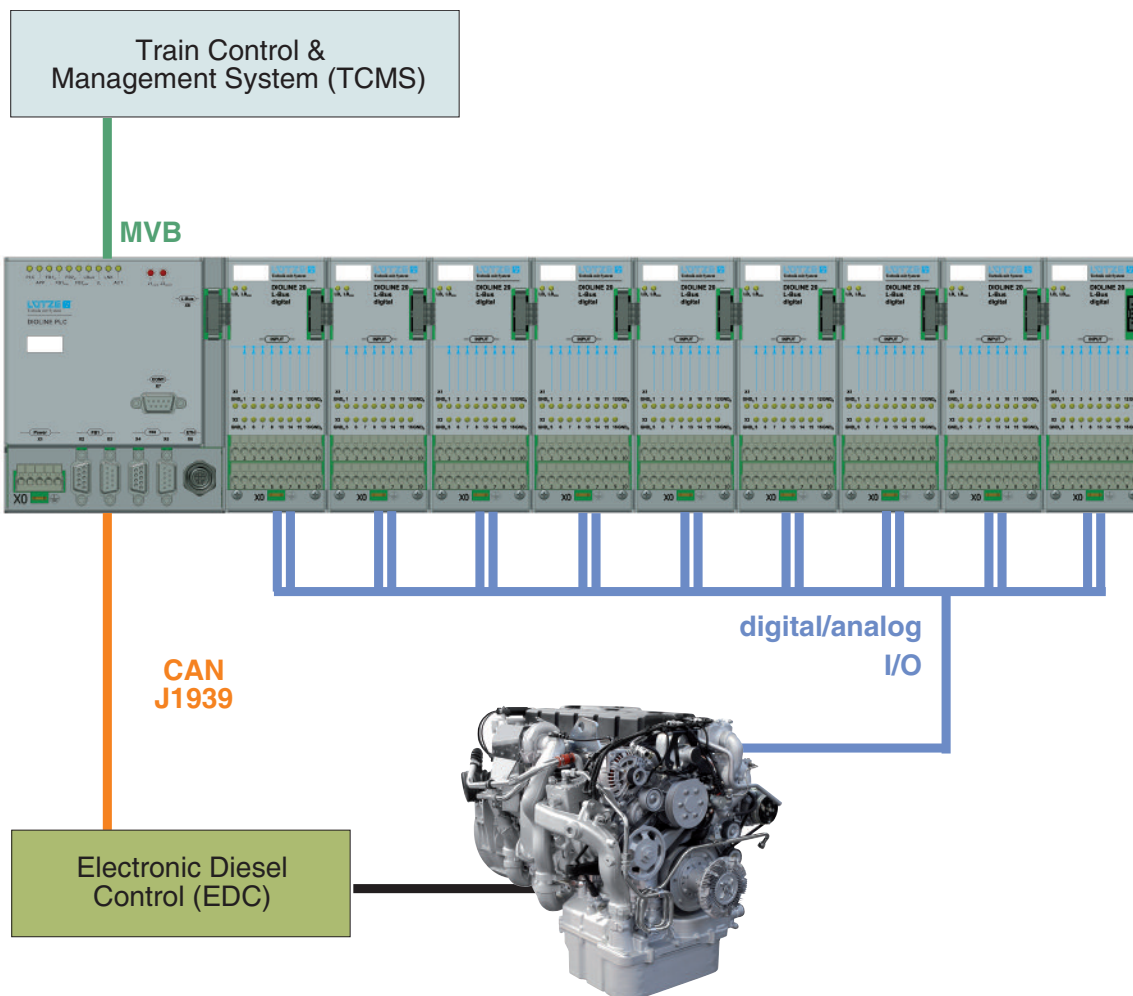
A typical application for the DIOLINE PLC compact control unit is the powerpack control unit in diesel-electric trains. The modularized preprocessing of all signals can be performed inside of the DIOLINE PLC. The compact control unit makes the decentralized intelligence of functions below the main control level possible.

The advantages are:

· Discharge of the central control unit and the field bus system
· Shortening of response times to critical signals
· Simplified error tracing
· High reliability and availability

LUTZE

Fire Protection Unit
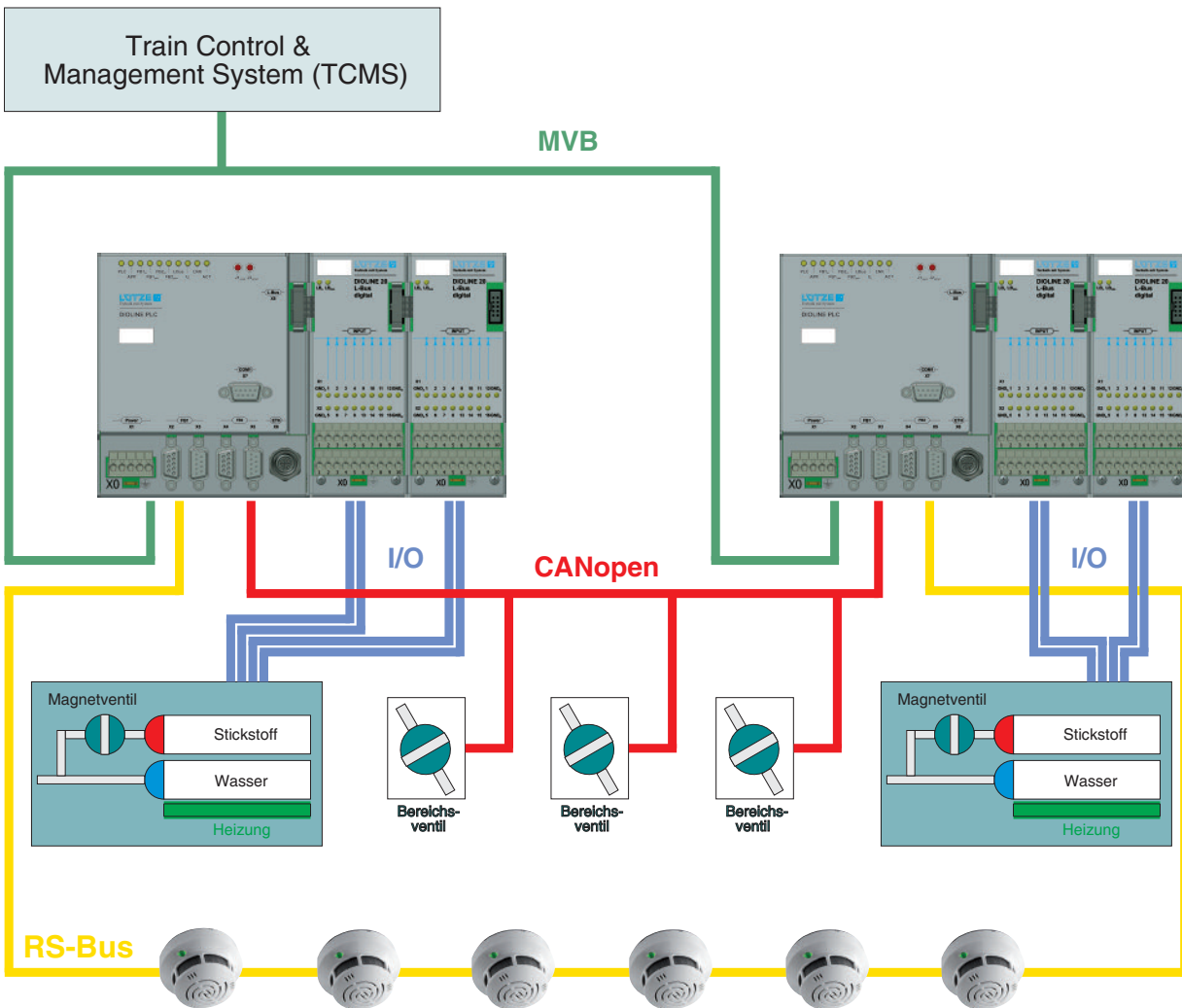
The DIOLINE PLC can easily control complex subsystems and self-operated systems in trains with different communication interfaces (MVB, CANopen, RS485, and Ethernet). This is pointed out here on the example of a Fire Protection Unit. The process of fire detection as well as the fire suppression is fixed in national and international standards. Based on the individual programming, the DIOLINE PLC makes the fieldbus-integration of the smoke detectors and the control of the suppression system uncomplicated and very flexible. It is also possible to build up redundancies of the components by modularity of the DIOLINE system for reasons of availability.

The operator is able without complex training of the maintenance staff to adhere to the maintenance schedule of the system over the individually adaptable diagnostic software and visualization system.

Certificate

LÜTZE is IRIS 02 certified

In 2010, LÜTZE was among the first 25 companies worldwide to obtain the new
Railway Industry Standard IRIS 02 certification.
The new IRIS Revision 02 goes significantly further than the requirements of the
ISO 9001 standard and incorporates additional railway-specific requirements.

CERTIFICATE

awarded to

Friedrich Lütze GmbH
Bruckwiesenstrasse 17-19
71384 Weinstadt
Germany

DQS GmbH

confirms, as an IRIS approved certification body, that the Management System of the
above organization has been assessed and found to be in accordance with the

International Railway Industry Standard (IRIS)
Revision 02, May 2009

for the activity of Design and development & Manufacturing
for the scopes of certification 9 (On board vehicle control)
Electrical and electronic components and solutions for the automation technology

Certificate valid from: 21/05/2013   Certificate valid until: 20/05/2016 *

Current date: 08/07/2013
Certificate-Register-No.: 001737 IRIS

* Providing that the subsequent surveillance audits are successful before the anniversary of this validity date.
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Enclosure 1 of Certificate No.: 001737 IRIS

Friedrich Lütze GmbH
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The location is supported by the following remote locations:

Address	Scope / Process
Lütze Transportation GmbH Bruckwiesenstrasse 17-19 71384 / Germany	Sales Marketing

The location is supported by the following site extensions:

Address	Scope / Process
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Current date: 08/07/2013
Certificate-Register-No.: 001737 IRIS

* Providing that the subsequent surveillance audits are successful before the anniversary of this validity date.
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As a specialist for electronic components in rail vehicles, LÜTZE is aware of the high standards that your applications require from our products. Based on this quality awareness and our claim of supporting you with the latest technologies and designing your products reliably and cost-effectively, we have developed into the leading supplier in this market. In addition to the certification according to DIN EN ISO 9001:2000 and as a Q1 supplier of the DB AG, LÜTZE also documents its leading position by means of a certified management system in accordance with the International Railway Industry Standard, IRIS. LÜTZE was one of the first companies worldwide to implement the guidelines of this standard as early as 2006. LÜTZE has also assumed a leading role in the implementation of the significantly more stringent current Revision 02 and already obtained certification in 2010 for implementing the standard.

IRIS is a standardized method used worldwide for assessing the management systems of suppliers, which takes specific standards for the rail vehicle industry into account. With the IRIS certification, we have made another important step in the continual improvement of collaboration with you, our customers from the rail industry and we are looking forward to support you even better in your next projects.

We are on Track!
Electronic control for rail vehicles
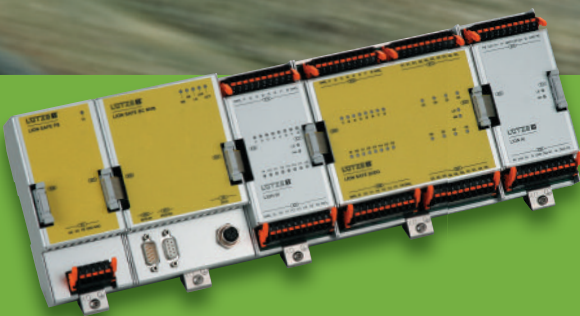
Control Technology

Interface

Indication

LÜTZE
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TRANSPORTATION