Operating Instructions

DIOLINE PLC

CAN-NFB, Part-No. 746039

Version 05

LUTZE TRANSPORTATION

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LÜTZE TRANSPORTATION

Table of Contents

1 Introduction

This manual is a component of the product:
DIOLINE PLC.

To avoid hazardous situations, these instructions must be read and understood before installing, operating, maintaining, or dismantling the device

NOTICE This applies to every person who is getting in touch with the product. Trained personnel and experts, especially qualified persons who have worked with similar products before, have to read and understand this document as well.

Risk of injury and damage to equipment caused by failure to read and observe the operating instructions

These instructions contain important information on safety, commissioning, operation, maintenance and disposal of the corresponding device.

Before installation or use, carefully read these instructions in order to rule out possible dangers and damage and to ensure correct use.

Always keep the document ready at hand

This applies until the product is disposed of. In case of sale, rental or in case of disposal, pass the instructions on to the authorized person.

These instructions and further information are available on the website of the Lütze Transportation GmbH:
www.luetze-transportation.com

Search for either the article number, or the product name

„DIOLINE PLC“.

2 General information

2.1 Symbol description

This document contains safety information, which is characterized by a signal word in combination with a specific colour to indicate the warning level. The information highlights possible dangers and gives instructions on how to avoid them.

DANGER	**Indicates a dangerous situation which leads to death or serious injuries if not observed.**
WARNING	**Indicates a dangerous situation which can lead to death or serious injuries if not observed.**
CAUTION	**Indicates a dangerous situation which can lead to slight or moderate injuries if not observed.**
NOTICE	**Indicates a situation which could damage the product or the environment. This notice does not apply to personal injuries.**

2.1.1 Handling notes

You will also find icons that indicate important information and action steps:

	**Indicates technically important information to operate the device safely.**
	**Indicates the use of tools.**

2.2 Copyright

This document is intended for the operator and his staff. It is prohibited to give the content to a third party, to duplicate, exploit or impart it. The Lütze Transportation GmbH has to allow it explicit in writing.

General data, text, images, and drawings are copyrighted and are subject to industrial property rights. Contravention will be prosecuted. The named brands and product names in this document are trademarks or registered trademarks owned by the respective titleholder.

2.3 Disclaim of liability

This document was written under consideration of the applied standards, regulations and the current state of technology.
The content is verified of accuracy. Discrepancies are not excluded. For these discrepancies we disclaim liability. Applicable changes and additional information will be in the next version of this document.

The following causes are not covered by the Lütze Transportation GmbH's liability policy:

- Nonobservance of this document
- Untrained and unqualified employees
- Non-conventional use
- Non-approved reconstructions and functional modifications of the product
- Using non-original or non-admitted parts or equipment
- The real-time capability of the controllerRelated Documents

2.4 Related documents

The programming environment of the DIOLINE PLC is a product of the company KW Software and Hilscher. The companies are responsible for the documentation and the compliance of standards. This document contains short parts of the software documentation. In particular, cases apply to:

PHOENIX CONTACT
Software GmbH

Campusallee 6
D-23657 Lemgo

Tel. +49 52 61/93 73-0
Fax. +49 52 61/93 73-26

Hilscher Gesellschaft für Systemautomation mbH
Rhein Straße. 15
65795 Hattersheim
Tel. +49 61909907-0
Fax. +49 61909907-50

2.5 Application manual valid with these operating instructions

An application manual is valid together with these operating instructions.
It summarizes the general instructions for the DIOLINE PLC. All product-specific and supplementary information can be found in these operating instructions.

3 Safety

3.1 Content of this manual

Read and follow the manual before using the product the first time.

This applies to every person which is getting in touch with the product. Trained employees and experts especially qualified persons which had worked with similar products before have to read and understand the manual.

3.2 Intended use

The DIOLINE PLC is designed for the exclusive use in railway vehicles.

For:

- automation of simple vehicles
- as a subsystem controller or
- as a high capacity gateway for the realization of different vehicle specific bus signals

Use the DIOLINE PLC just for the listed cases and just with external devices recommended and allowed by Lütze Transportation GmbH.

3.3 Recipients

This document addresses planners, project managers and programmers. It also addresses the operating personnel who are responsible for the initial operation, the operation and for the maintenance of the products and systems. Regarding the personnel, three qualification levels can be distinguished.

3.4 Operating personnel

Risk of injury by deploying insufficiently qualified operating personnel

Inappropriate deployment of not-qualified or insufficiently qualified personnel can cause property damage and personal injuries.

- Tasks that apply special procedures should be done by trained and qualified personnel or experts, especially electricians.

Trained personnel

The employee was trained by the employer on the task and possible hazardous situations. The employee does not have any technical knowledge.

Experts

The employee has a technical education, knowledge and/or experience in the required field. The employee is capable to do specific operations on and with the product.

Qualified electrician

The employee has a technical education in the required field. The employee is capable to do special operations on and with the product.The different sections of this document refer to the different qualifiation levels of the operating personnel.

3.5 Responsibility of the operator

Since the device is used in a commercial area, the operator of the device is subject to legal obligations for occupational safety:

- The operator of the device is obliged to instruct the operating personnel and to inform himself about the industrial safety regulations.
- The operator must ensure that safety, accident prevention and environmental protection regulations are observed.
- The operator must make an appropriate risk assessment on the workplace/ location to detect and warn of special hazards.
- The document must be kept in the immediate vicinity of the device.
- The information in the operating instructions must be followed.
- The device may only be operated in technically perfect condition.

3.6 Protective clothing and equipment

If working with or on the PLC, special ESD clothing and equipment is mandatory.

NOTICE

- **Destroyed parts and malfunction of the product**
  Inappropriate clothing can cause electrification and can damage the product.
- **Wear appropriate ESD protective clothing**
  Static charging can damage individual components and lead to a defect in the device.
- **Always follow the employer's instructions and regulations**

3.7 Labeling

Oberve the adhesive labels.

- Keep them readable.
- In case of a malfunction the part number and the serial number might be needed.

The label contains the following information as an example:

1. Part number
2. Hardware revision
3. Type (assembly designation/module designation)
4. Software version
5. Serial number

3.7.1 QR-Code – Product information

The QR-code will lead you to additional product information of the manufacturer.

3.8 Reconstruction and modifications of the product

Reconstructions and modifications of the product can cause property damages or personal injuries

Do not reconstruct or modify the product if the manufacturer does not allow it explicit in writing.

3.9 Safety arrangement

Do not bypass protection equipment and safety arrangements

The product can be damaged by overvoltage and electric shocks are possible.

3.10 Special safety messages

Use a nominal operating voltage of 24 Volts

The lower (16.8 Volts) and upper (30 Volts) threshold voltage is given in the technical data. A higher voltage can cause electric shocks and damage the product.

Dismount all electronic modules and their connections from the frame, if you intend to do some welding

The product can be damaged by compensating current.

4 Product Overview

4.1 Product description

The DIOLINE PLC is a programmable compact controller in the automation system DIOLINE 20. The product is powered by an effective ARM microprocessor (Advanced Risk Machine). It is possible to connect several I/O modules via the L-Bus interface. The L-Bus is a Lütze invention.

The product can provide up to 4 bus interfaces. The interfaces can be configured flexibly.

The DIOLINE PLC is a flexible, powerful compact control. It was developed exclusively for use in rail vehicles. The controls are freely programmable in a convenient IEC 61131-3 development environment, and have an L-bus interface for the connection of local I/O modules.

The DIOLINE PLC can be programmed and configured by the application development system MULTIPROG from KW software.

The software can handle multiuser projects over a network access. There are several options regarding the interfaces and software.

The DIOLINE PLC can be used to automate simple vehicles, as a subsystem controller or as a powerful gateway to implement various vehicle-specific bus signals.

The integrated fieldbuses are available in the following designs:

- MVB Slave Class 1.3 as EMD or ESD+
- CANOpen Master or CANOpen Slave
- CAN2.0 (SAE J1939)
- RS232 or RS422/485
- Ethernet TCP/IP
- TRDP
- Profibus Master or Profibus Slave

NOTICE

Detailed and further information on technical data, standards, hardware options, system overview, application areas can be found in the related operating instructions.

NOTICE

Application examples can be found below on page 14.

4.2 Hardware options

Option	Item Number
DIOLINE PLC-COM-COM-LUE	746026
DIOLINE PLC-COM-CAN-LUE	746027
DIOLINE PLC-MVB(EMD)-CAN-LUE	746028
DIOLINE PLC-COM-NFB-RS485-LUE	746029
DIOLINE PLC-COS-COM-LUE	746032
DIOLINE PLC-MVB(EMD)-COM-LUE	746033
DIOLINE PLC-NFB-NFB-LUE	746034
DIOLINE PLC-MVB(EMD)-CAN-RS485-LUE	746036
DIOLINE PLC-MVB(EMD)-CAN-DI-LUE	746037
DIOLINE PLC-MVB(EMD)-COM-DIO-LUE	746038
DIOLINE PLC-CAN-NFB-LUE	746039
DIOLINE PLC-MVB(ESD+)-COM-LUE	746040
DIOLINE PLC-COS-CAN-LUE	746041
DIOLINE-PLC-MVB(ESD+)-COM-CIO-4/4-LUE	746042
DIOLINE-PLC-MVB(EMD)-PBM-LUE	746050
DIOLINE-PLC-MVB(EMD)-PBS-LUE	746051

Legend:	
CAN	Controlled Area Network
COM	CANOpen Master
COS	CANOpen Slave
DI	Local Digital Inputs (24V)
DO	Local Digital Outputs (24V)
MVB	Multi Vehicle Bus (Slave) (EMD)
MVB+	Multi Vehicle Bus (Slave) (ESD+)
NFB	No Fieldbus
PBM	Profibus Master
PBS	Profibus Slave
RS485	Two Wire Serial Bus
RSBUS	One Wire Serial Bus

4.3 Software Options

Option	Description	Item Number
SW-MP550-EL-SYCON	SOFTWARE PLC Programming environment MULTIPROG DEVELOPMENT PRO+ V5.5	805101
SW-PG-PC-MP55-ST	SOFTWARE PLC Programming environment MULTIPROG SUITE+ V5.5	805102

4.4 System Overview

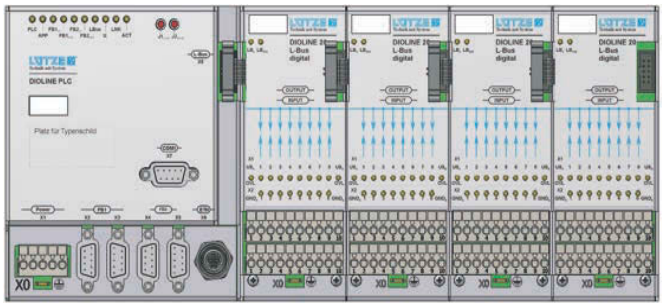
The DIOLINE PLC can be integrated in the product line of the DIOLINE 20 automating system as follows.

The DIOLINE product line contains modular components. A unit consists of a controller with an integrated CPU and an extension module.

It is possible to connect max. 10 local I/O extension modules on the controller. The extension modules are connected via the L-Bus.

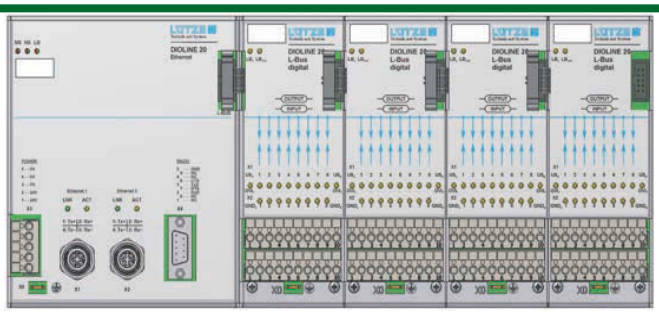
DIOLINE PLC

Compact Control Unit



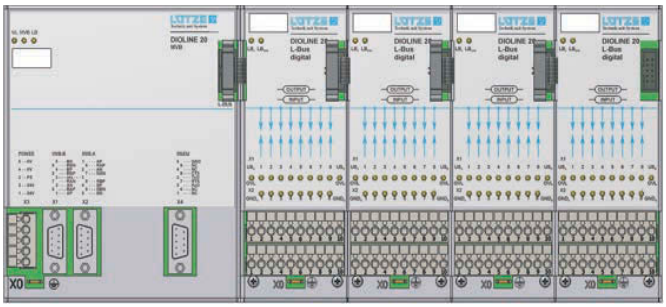
DIOLINE20

Bus coupler Ethernet IP Adapter Remote I/O Modules



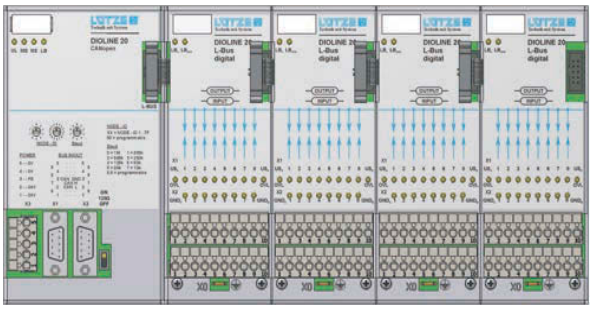
DIOLINE20

Bus coupler MVB Slave Remote I/O Modules



DIOLINE20

Bus coupler CANOpen Slave Remote I/O Modules



4.5 Field of Application

The DIOLINE PLC is designed for use in railway vehicles. It can be used for automation of simple vehicles, as subsystems or for high-capacity gateways to transfer vehicle specific bus signals. The graphic below shows possible application areas in trains:

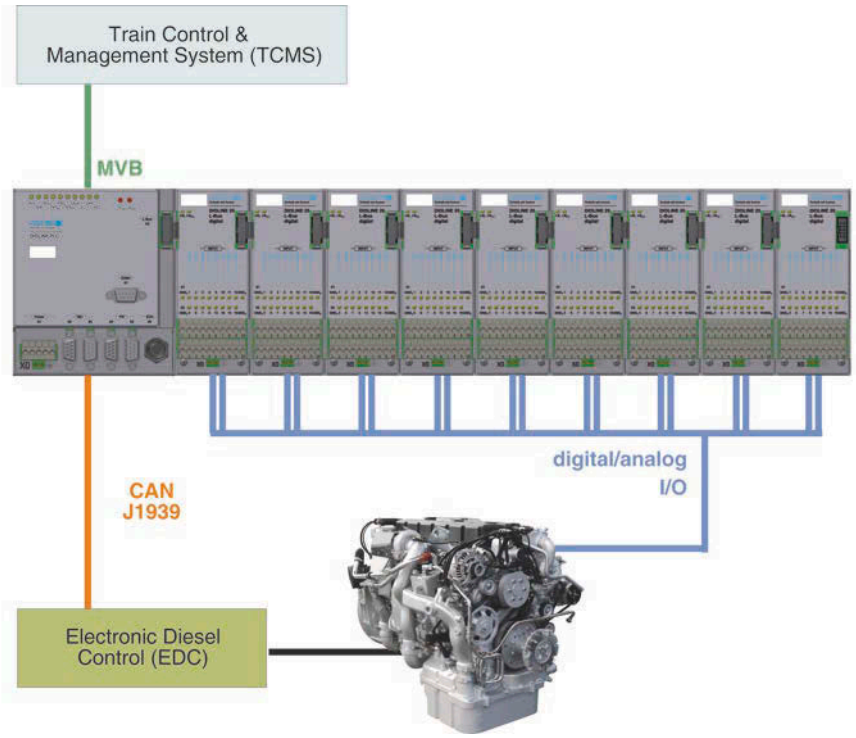


Fig. 1: Example Application 1: Powerpack Control Unit

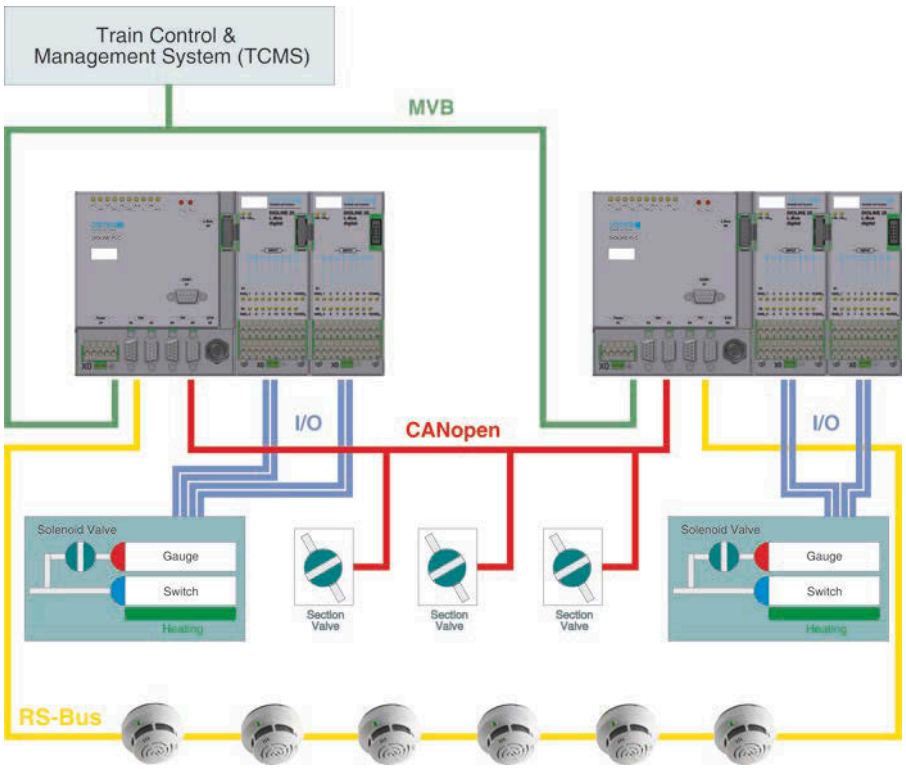


Fig. 2: Example Application 2: Fire Protection Control Unit

5 Transport and storage

NOTICE

- **Product damage caused by humidity**
  Store the products in a dry environment between -40° and 85°C.
- **Product damage caused by non-safely packed products**
  Wrap the products safely for transport to absorb possible crushes.
- **Product damage caused by dust**
  The circuit board of the PLC is coated. Try to store and transport them in a dust-free environment to avoid damage to the PLC.
- **Product damage by electrostatic discharge**
  Store and transport electronic components only in ESD-safe and conductive packaging.

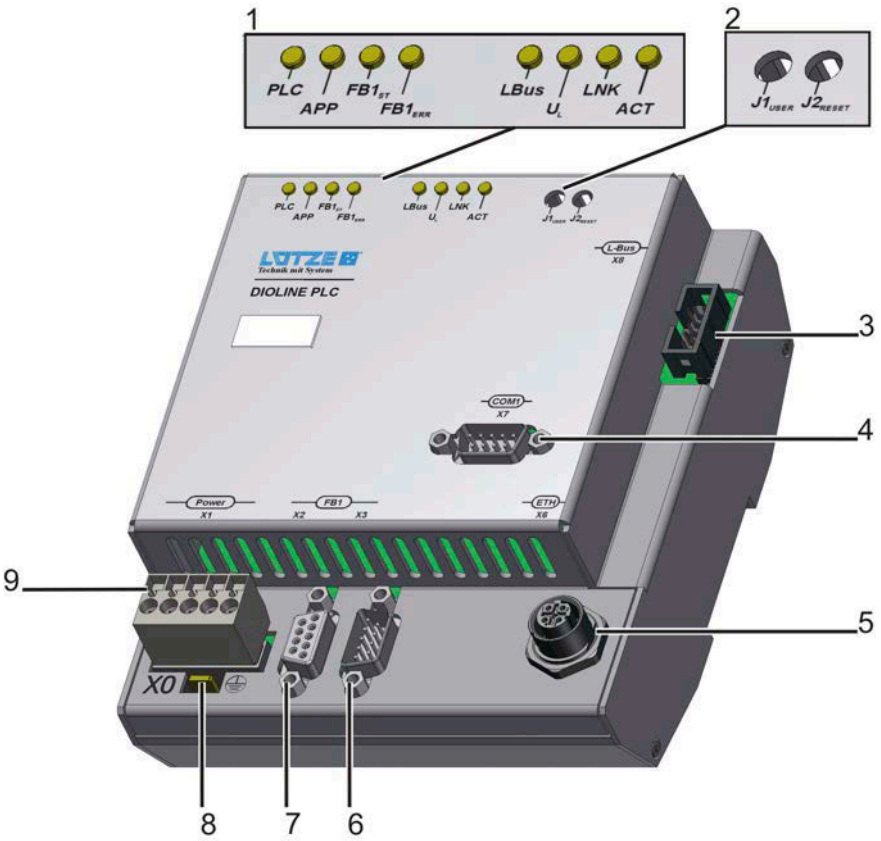
6 Scope of delivery

NOTICE

The software for the DIOLINE PLC can be requested by
Support.Transportation@luetze.de

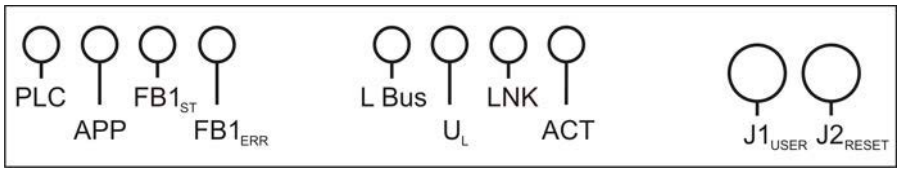
- DIOLINE PLC
- Dummy connector for L-Bus interface
- Shielding cover for SUB-D interface
- Instruction Leaflet

7 Product Assembly



Number	Description	PIN
1	LED-Diagnosis Display	
2	User and Reset Button	
3	L-Bus Interface	X8
4	RS 232 Interface	X7
5	Ethernet Interface	X6
-	Fieldbus 2 – No Fieldbus (NFB)	-
-	Fieldbus 2 – No Fieldbus (NFB)	-
6	Fieldbus 1 – CAN2.0 Interface outgoing	X3
7	Fieldbus 1 – CAN2.0 Interface incoming	X2
8	Mounting Tab	X0
9	Power Supply	

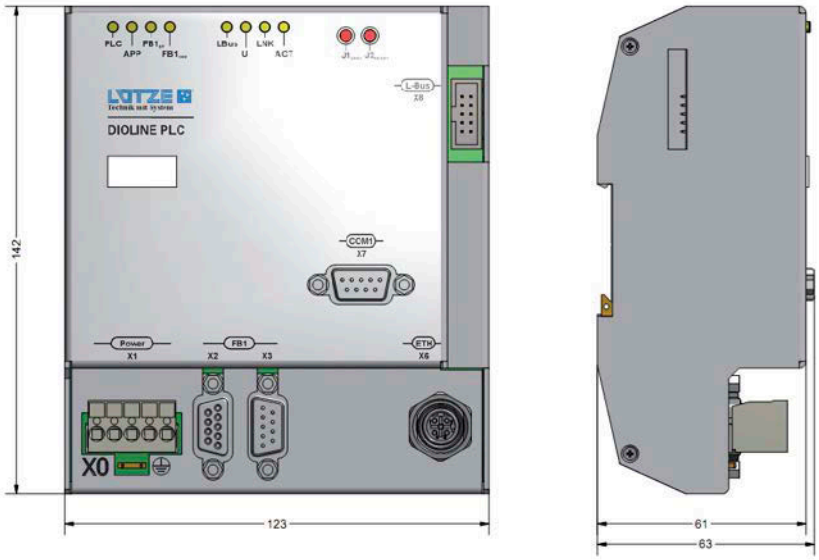
7.1 LED Display



LED	Color	State	Description
PLC	yellow	0.1s on/0.9s off 0.5s on/0.5s off 0.8s on/0.2s off on off	PLC is ready – no project PLC is in STOP mode PLC alert an error PLC is in RUN mode PLC is defective
APP	green red	on on	User defined green User defined red
$FB1_{ST}$– CAN2.0	green	on off	The device is connected to all configured participants and the communication is active Error: ▪ Communication error or ▪ wiring error The LED $FB1_{ERR}$ is on
$FB1_{ERR}$– CAN2.0	red	on off	The device has found a communication problem in one note at least No error
L-Bus	green red	flashing on on	Initialization of L-Bus is OK, waiting on PLC L-Bus in RUN mode configuration is OK L-Bus error
UL	green	on off	Power supply of the logic is OK Power supply is defective
LNK	green	on off	Ethernet connection is OK No Ethernet connection
ACT	yellow	flashing off	Ethernet data transfer is OK No Ethernet data transfer

Push buttons	Description
J1 User	Function programmable in user program
J2 Reset	Reset (warm start of the PLC)

8 Technical Data



Mechanics	
Dimensions	123x141.5x64.1mm (wxhxd)
Weight	0.550 kg/piece
Housing	Aluminum, anodized surface
Mounting	Top Hat Rail TS 35 7.5 mm

Electrical characteristics	
Power Supply	DC 24 V (voltage range 16.8-30 V)
Ripple	Max. 10 %
Power Consumption	5 W + L-Bus Module Consumption
Protective Device	Inverse-polarity protection, overvoltage protection
Potential Separation	AC 500 V electronic and CAN interface AC 500 V electronic and Ethernet interface

Interfaces	
Diagnosis & Update	▪ Ethernet 100Base TX ▪ SD Card Slot
I/O Interface	▪ L-BUS
Fieldbus Interfaces	▪ CAN2.0 (Fieldbus 1) ▪ RS232

Software	
Operating System	Real-Time Operating System rcX
Controller Software	IECX 61131 Soft-PLC ProConOS KW Software

CPU	
Processor	ARM9-CPU NetX 500, 32 Bit
Monitoring	External Watchdog voltage monitor of the control software
Boot time	Run up time state: “ready“ after switching on the power supply <15s

Memory	
Internal Serial Flash Memory	4 MB Serial Flash Memory
Internal RAM	32 MB SDRAM
Internal FRAM	4 kB
Internal parallel Flash Memory	2 MB

Diagnostics	
Diagnostics Interface	Ethernet 100BaseTX
Diagnostics LED	8 LED for visual device diagnostics
Switches/Key-Buttons	1 reset key button, 1 key button, evaluated in the control software

Environmental condition	
Operating Temperature	-40°C to +70°C
Storage Temperature	-40°C to +85°C
Relative Humidity	100% short time condensation allowed
International Protection Class (IP)	IP20

Standards	
EN 50155	Electronic Equipment on Railway Vehicles
EN 50121-3-2	Electromagnetic Compatibility
EN 50124-1	Insulation Coordination
EN 61373	Vibration and Shock
EN 45545-2	Fire Protection on Railway Vehicles

9 Mounting

CAUTION

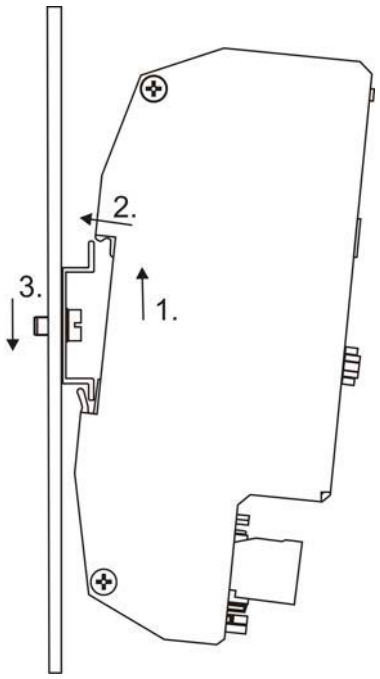
Risk of injury by electric current

Persons can be injured by electric current and the product can be damaged. De-energize the system before mounting.

NOTICE

Mount the product with a distance of 5 mm minimum to other products to provide good air conditions.

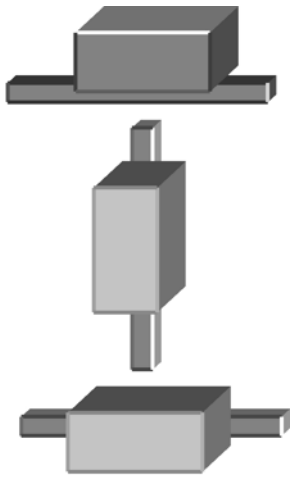
1. Hook the product into the lower part of the top-hat rail.
2. Push the product a little bit up.
3. Push the product back that it catches the top-hat rail.



9.1 Mounting options

The DIOLINE PLC can be mounted on a top-hat rail. Following mounting options are possible:

- horizontal
- vertical
- across



10 Initial operation – hardware

NOTICE

Initial commissioning must be carried out by electrically skilled personnel.

It is possible to read four discrete signals directly through the PLC using the local digital inputs. It is also possible to select an MVB configuration file with several profiles using the digital inputs when the PLC first starts up.

10.1 Power supply

CAUTION

Short circuits and electric shocks due to incorrect voltage application and incorrect wiring

Disconnect the entire system from the power before wiring. Make sure that the connections are wired correctly before switching the power supply back on. Use a DC voltage of 24 V in accordance with the EN 50155 standard.

CAUTION

Do not operate the product without the protective conductor

If the product is defective, the housing could be live, resulting in electric shocks.

1. Switch off the power.

2. Connect the devices regarding the pin assignment:

Connector	Signal	Description
1	VCC	24 V Supply voltage
2	VCC	24 V Supply voltage
3	PE	Protective earth
4	0 V	0 V Supply voltage
5	0 V	0 V Supply voltage

3. Switch on the power.

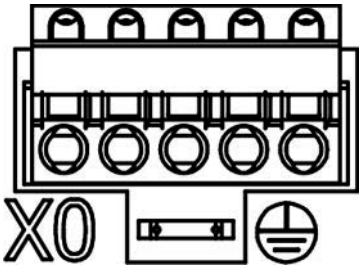
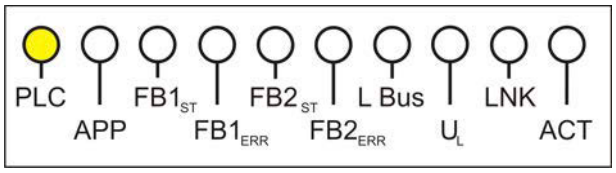


Fig. 3: Cage Clamp with Mounting Tab X1, X0

4. The device boots up.
5. The **PLC LED** is flashing yellow:



NOTICE

If the LED does not flash or is permanently lit, the product may be defective.

If problems continue to occur, do not hesitate to contact Lütze Transportation GmbH.

10.2 L-Bus interface

WARNING

Switch off the power supply when connecting or disconnecting the I/O modules

Failure to do so may damage the entire system. Hot plugging is not supported by the system.

NOTICE

Connect a maximum of 10 I/O modules via the L-bus interface.

Note the current consumption of the individual modules. In the appendix on page 135 you will find a table with the corresponding values. A total current of max. 1 A is possible on the L-Bus.

1. Switch off the power.
2. Observe the pin assignment

3. Connect the devices regarding the pin assignment.

Connector	Signal	Description
1	24 V	Supply voltage
2	24 V	Supply voltage
3	GND	0 V potential
4	/L_Bus_RESET	Module reset
5	BUS_END	Identifier bus end
6	OUT_OK	Data confirmation
7	SDIN	Receiving serial data
8	SCK	Clock
9	SDOUT	Transmitting serial data
10	GND	0 V potential

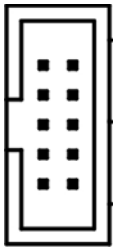


Fig. 4: L-Bus Master, X8

NOTICE

It is not possible to change the pin assignment.

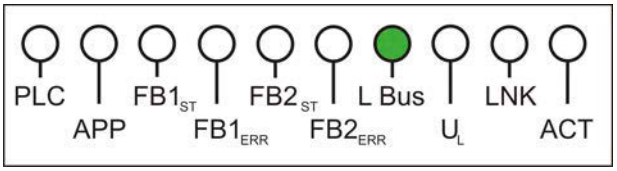
4. Connect the DIOLINE 20 I/O modules via the L-Bus interface.

Fig. 5: L-Bus connector

5. Switch on the power.

Fig. 6: PLC with connected I/O modules

6. The **LB LED** is green.
   The device is ready.



10.3 Serial interface

It is not possible to program or parameterize the PLC via the serial interface RS232. The serial interface can be programmed by MULTIPROG and should be used for diagnosis only. The access to the serial interface is only possible by the user-specific application software.

1. Connect the PLC and the devices with a suitable cable. “Hot plugging“ is possible.

Pin	Signal	Description
Connector Housing	PE	Protective Earth
1	NC	Not connected
2	RXD	Receiving data
3	TXD	Transmitting data
4	NC	Not connected
5	GND	0 V potential
6	NC	Not connected
7	RTS	Request to send
8	CTS	Clear to send
9	NC	Not connected

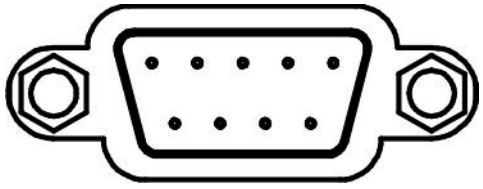


Fig. 7: Serial Interface Sub-D, X7

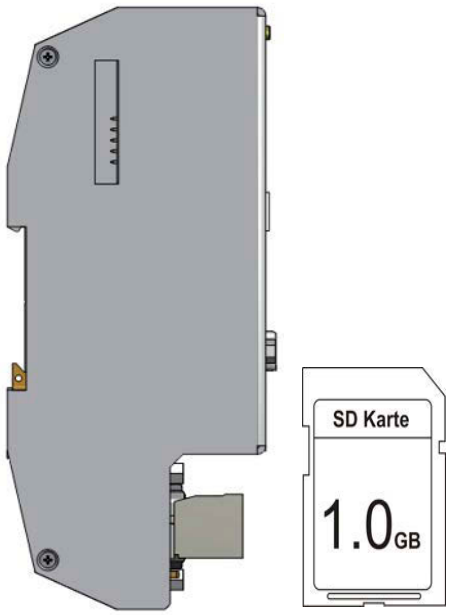
10.4 SD card slot

The PLC comes with a SD card slot. You can find the slot for the card on the left side of the PLC housing. The slot is covered by a foil to protect the PLC from incoming dust and other environmental influences.

NOTICE

If a large amount of data is stored on the SD card, there may be a delay in L-Bus communication.

- The recommended and delivered SD card by Lütze has a 1 GB memory. It is possible to use an SD card with a maximum of 2 GB. The PLC uses internally a file system FAT 16. For this reason, SD cards must be formatted with FAT 16. If SD cards are > 2 GB, then they must be partitioned with FAT 16.
- The card can be used for saving maintenance data.



NOTICE

Lütze Transportation recommends the SD card versions 1.0 or 1.1 with a capacity of max. 2 GB and specified for industrial use.

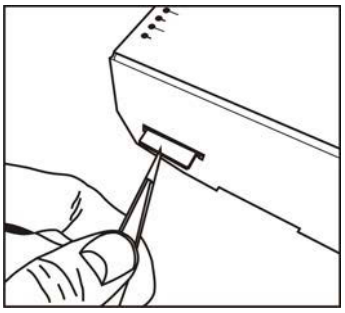
10.4.1 Changing the SD card

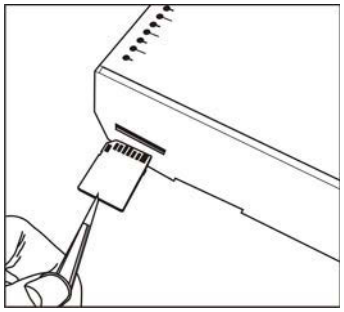
NOTICE

If you replace an old SD card with a new one, make sure that it is a special industrial card specified by Lütze.

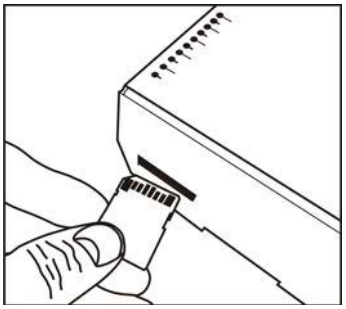
To change the SD card, proceed as follows:

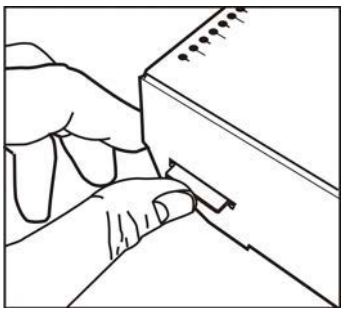
1. Pull out the card by using tweezers. See figure.





2. Insert the new card by pushing it as far as possible into the slot.





10.5 Ethernet interface

The Ethernet interface is used for communication between PLC and PC. Via this interface the PLC can be programmed, visualized, parameterized and debugged in the application software.

NOTICE

The Ethernet interface is hot plugging compatible.

There is no need to switch off the power when connecting or disconnecting the Ethernet interface.

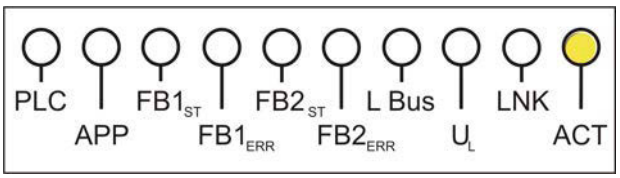
1. Connect the PLC with the PC with a suitable cable via the Ethernet interface

.

2. The Ethernet connection is active. The ***ACT LED*** is lit

Pin	Signal	Description
Connector Housing	PE	Protective Earth
1	TXD+	Transmitting Data
2	RXD+	Receiving Data
3	TXD-	Transmitting Data
4	RXD-	Receiving Data

Fig. 8: Ethernet Interface M12, X6



10.6 Fieldbus 1 Interface – CAN 2.0

1. Switch off the power.
2. Connect the PLC with the devices over a suitable bus cable.

Pin	Signal	Description
Connector Housing	PE	Protective Earth
1	PE	Not connected
2	CANL	CAN-Signal low
3	DGND	CAN-Signal ground
4	NC	Not connected
5	NC	Not connected
6	NC	Not connected
7	CANH	CAN-Signal high
8	NC	Not connected
9	NC	Not connected

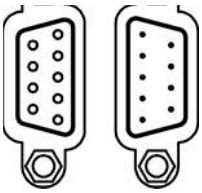
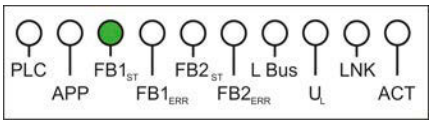


Fig. 9: Fieldbus 1 Interface, Sub-D, 9-pole, X2, X3

3. Switch on the power.
4. The ***FB_{1st} LED*** is green, if all devices are communicating.



NOTICE

If the $FB1_{ERR}$ LED is red, an error occurred. *Please see chapter "LED Display" on page 18..*

10.7 Fieldbus 2 Interface – NFB

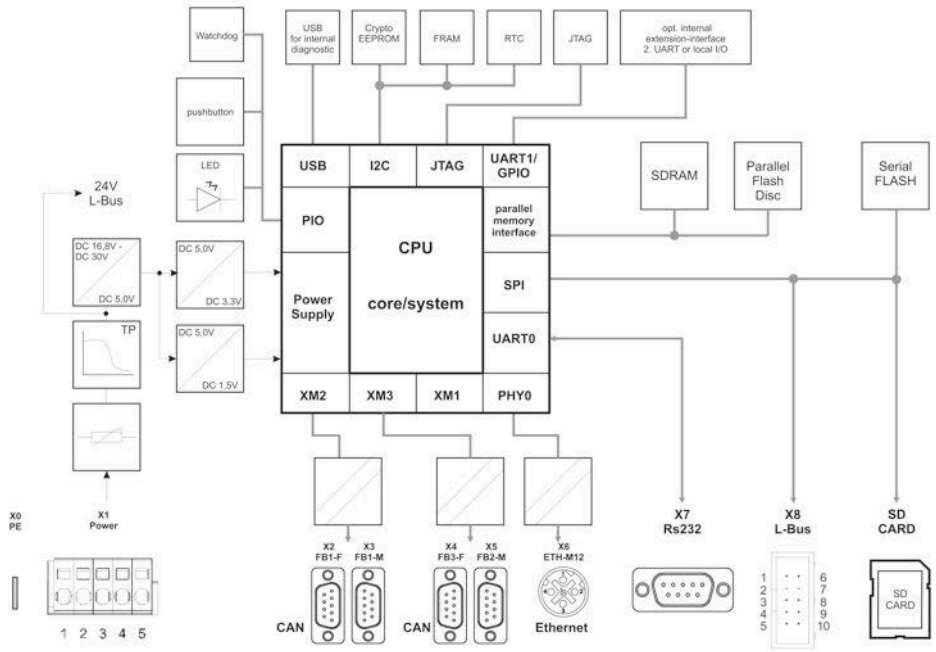
There is no Fieldbus 2.

11 Initial operation – software

NOTICE	**For more information on the initial operation of the software, refer to the "Application Manual".**

12 Operation

12.1 Hardware architecture



PFD
The Parallel Flash Disk has a size of 2 MB. Saves diagnostic data permanently, e.g. errors.

Watchdog
The watchdog monitors the PLC and is controlled via the function block IKS Digital Monitor. If the watchdog does not receive a request or a signal from the PLC after 2 seconds, it will restart the PLC.

Crypto
It contains the license of the CANOpen Master. For the CANOpen Slave, a license is not necessary.

FRAM
The Ferroelectric Random Access Memory is a non-persistent memory with a size of 4 kB. It saves the retain variables.

RTC
Real Time Clock

JTAG
Programming interface

UART1
Extended interface RSBUS or RS485 bus.

SDRAM (Synchronous Dynamic Random Access Memory)
The memory of the PLC with a size of 32 MB. For the project software <1 MB can be used, because of the PLC performance.

Serial Flash

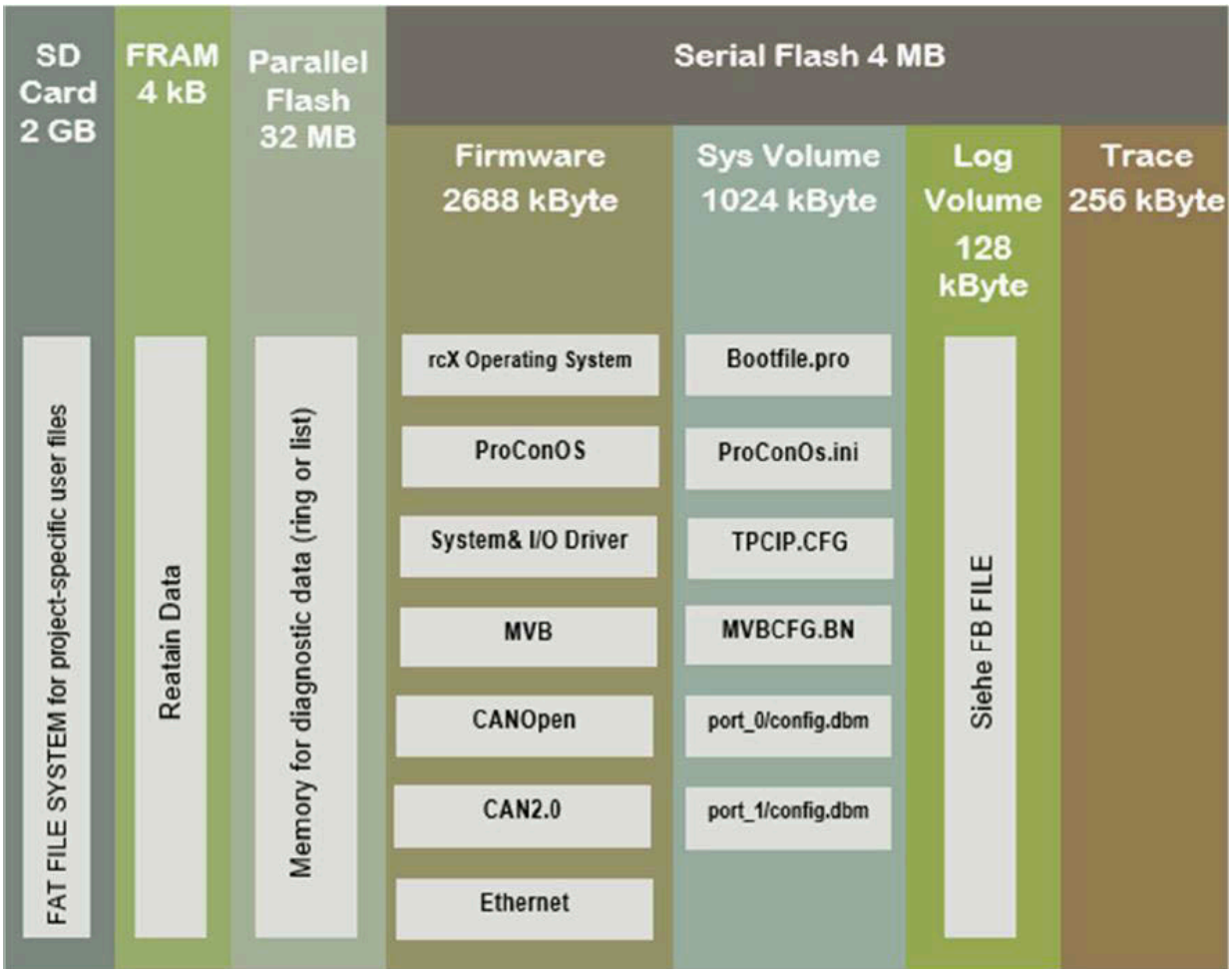
The serial flash stores the rcXOperating system, the ProConOs runtime environment, the PLC firmware, the boot project and the configuration files. The data are read from the flash memory, and written to the SDRAM when the PLC is started.

UART0
Connection of the serial interface RS232.

XM2 and XM3
Connection of the fieldbuses.

PHY0 and PHY1
Connection of the Ethernet.

12.2 Memory architecture (non-volatile memory)



SD Card

For saving project specific user files.

FRAM

For saving retain data. Because of data mirroring 4 kB are effective available. The smallest unit of the FRAM are 4 byte. The FRAM can be triggered by a function block or by setting a time value in the PROCONOS.INI.

Parallel Flash

Saves diagnosis data. It is divided in two sections. The borders of sections are defined in the PROCONOS.INI. *Refer to the Application Manual for more information*.

Serial Flash

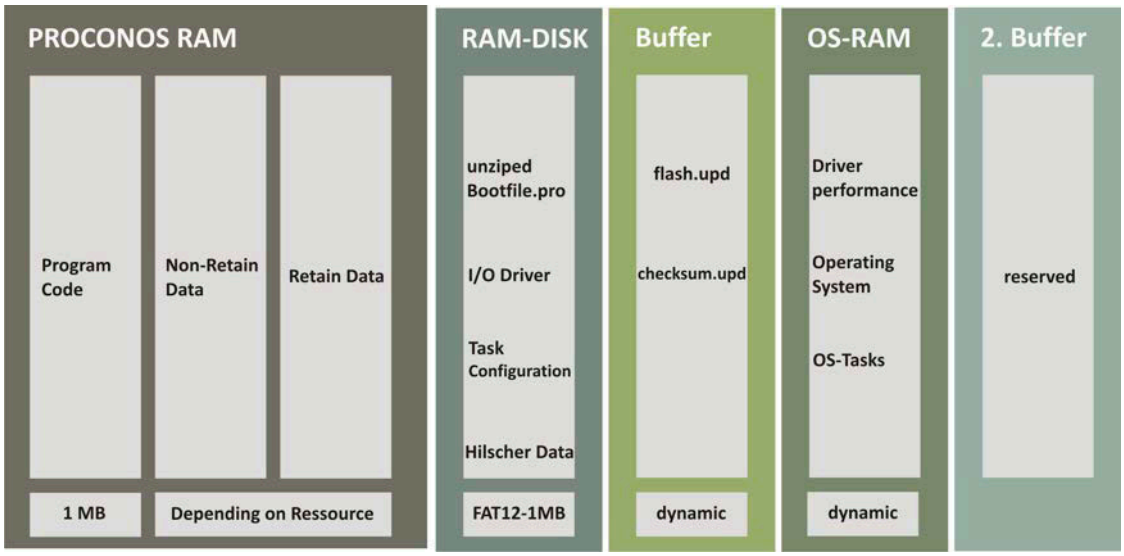
The total size is 4 MB. This is divided into firmware, SysVolume, LogVolume and trace. The firmware area contains all firmware components.

The SysVolume area is freely writable and modifiable and can be viewed and changed via FTP, for example. It contains the configuration files like the Proconos.ini or the MVB configuration.

The LogVolume is available for diagnostics data and can be written to via the FILE library with the two FBs TimeUserLog and SystemTimeUserLog. General information is provided via the FB LogVolumeInfo in the IKS library. The trace area is not accessible for customers and is used exclusively for diagnostic purposes for Lütze Transportation.

12.2.1 RAM architecture (volatile memory)

The RAM is the main memory of the PLC. Every PLC has a memory of 32 MB. The RAM is divided in 5 different sizes and functionalities:



PROCONOS RAM
For processing the program code 1 MB is provided. The amount of free memory can be seen in the control dialog>program memory. This memory area stores the code of all POUs of the multiprog project. The full amount of the actual used program code can be seen in the control dialog > POU in the column “Code“.

Additional the Non-Retain and Retain Data are saved in the PROCONOS RAM. The size of the memory area depends on the used resource. The data area always starts at byte 2000, because of that 2 kB have to be subtracted from the reserved resource sizes:

Resource	Reserved Size	Effective usable size
PCOS_ARM_IKS	128 kB	126 kB
PCOS_ARM_IKS_M	256 kB	254 kB
PCOS_ARM_IKS_L	512 kB	510 kB

RAM-DISK
The size of the RAM-DISK is 1 MB and it is organized as a FAT 12 System. In the RAM-DISK a part of the Bootproject is unzipped and some Hilscher specific control data (TASK Configuration/ I/O Driver etc.) are saved. Also the fieldbus configuration (max. per FB 100 kB) can be saved here. Because of the big amount of data, the bootfile should be not bigger than 820 kB (80% of the RAM-DISK).

Buffer
The checksum.upd and flash.upd is saved here during a firmware update via MULTIPROG or SD Card. After the data are saved a CRC and size check is done. The size is limited to 3 MB. After a successful check the data are automatically copied in the serial Flash.

OS-RAM
Is used for different Operating System Tasks.

2. Buffer
The second Buffer is reserved for further operation.

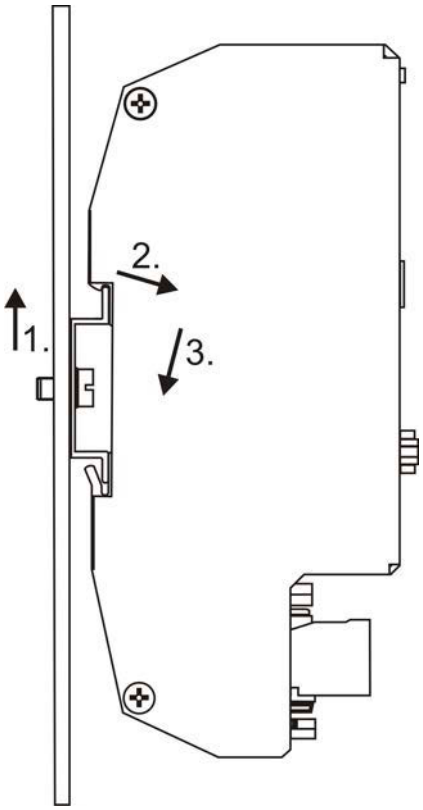
13 Maintenance

13.1 Maintenance software

NOTICE	**For more information on the firmware updates and configuration of the software, refer to the “Application Manual“.**

14 Demounting

1. Push the PLC upwards.
2. Pull the PLC off the top hat rail.
3. Press the PLC down and remove the PLC from the rail.



15 Shutdown and disposal

Observe the valid environmental regulations of your country for the final shutdown and disposal.

Disassemble the device and completely dismantle it before disposal.

Dispose of electric parts in line with the regulation for Waste of Electrical and Electronic Equipment (WEEE DE 65543672). You assume the obligation to properly dispose of the delivered goods after termination of use at your own expense in accordance with the statutory provisions and release Friedrich Lütze GmbH from the obligations under § 19 section 3 ElektroG (obligation of manufacturers of electrical and electronic equipment to take back electrical and electronic equipment) and related claims of third parties.

If you have handled the device to a commercial third party without any contractual acceptance of the disposal, you have to take back the device after the final shutdown on your own cost and the legal liability.

The claim of Friedrich Lütze GmbH for takeover / indemnification by the customer shall not become time-barred before the expiration of two years after the final termination of the use of the equipment. The two-year period of suspension of expiry shall commence at the earliest upon receipt by Friedrich Lütze GmbH of a written notification on its part of the termination of use.

16 Service

If you have any further questions regarding the product or our repair service, please contact us at:

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71384 Weinstadt
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Phone: +49 (0) 7151 6053-545
Fax: +49 (0) 7171 6053-6545

E-Mail: Sales.Transportation@luetze.de

17 Revision of the document

Version	Revision	Date
01	Release of the document	06/14/2012
02	▪ Change of version numbering ▪ Update chapter *Software Maintenance*	12/17/2012
03	Change of Product – Fieldbus changed to CAN2.0	02/12/2014
04	Correction of LED color for the function block IKS Monitor Digital	05/17/2016
05	Completeley revised document structure	02/27/2023