mipick

Pick-by-Light System

User Manual

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mipick Pick Display System

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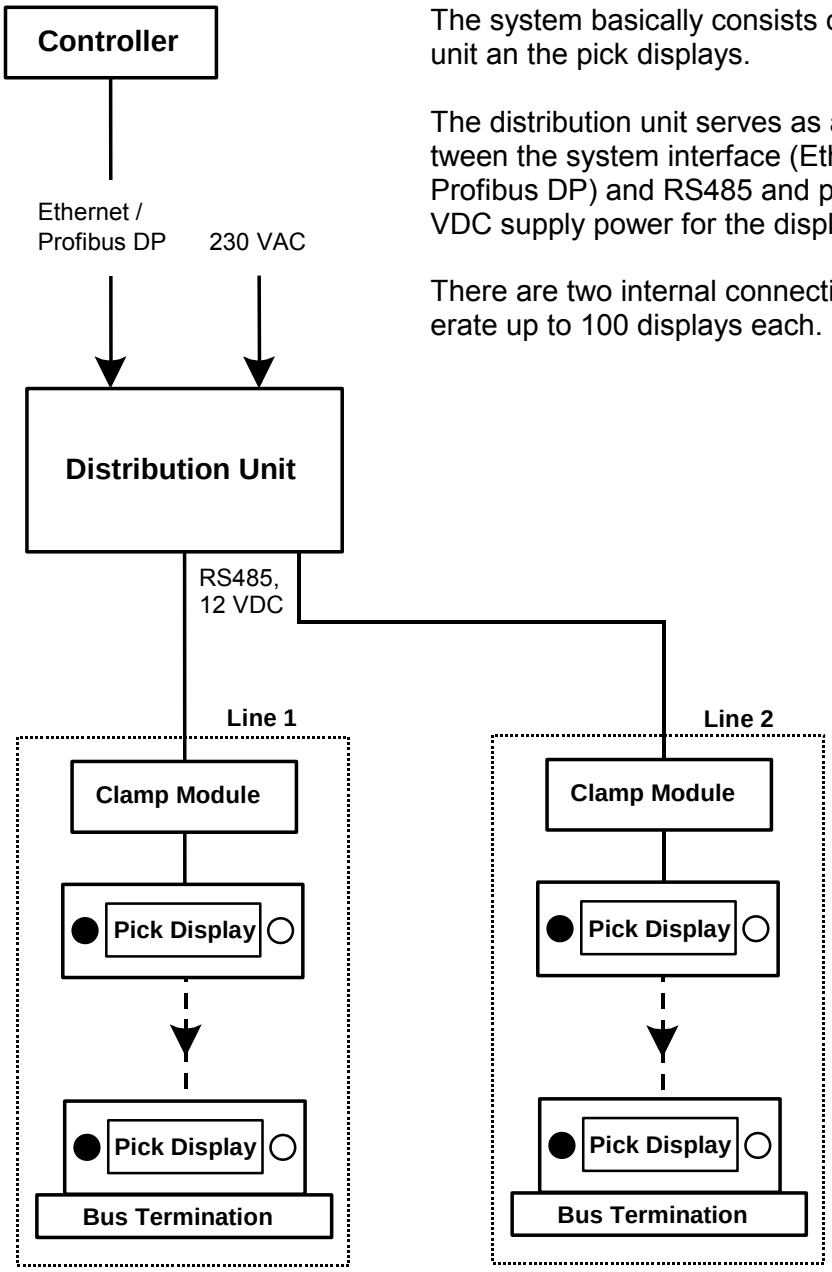
mipick Pick Display System

1 System Overview



The system basically consists of a distribution unit an the pick displays.

The distribution unit serves as a converter between the system interface (Ethernet TCP/IP or Profibus DP) and RS485 and provides the 12 VDC supply power for the displays.

There are two internal connections, that can operate up to 100 displays each.

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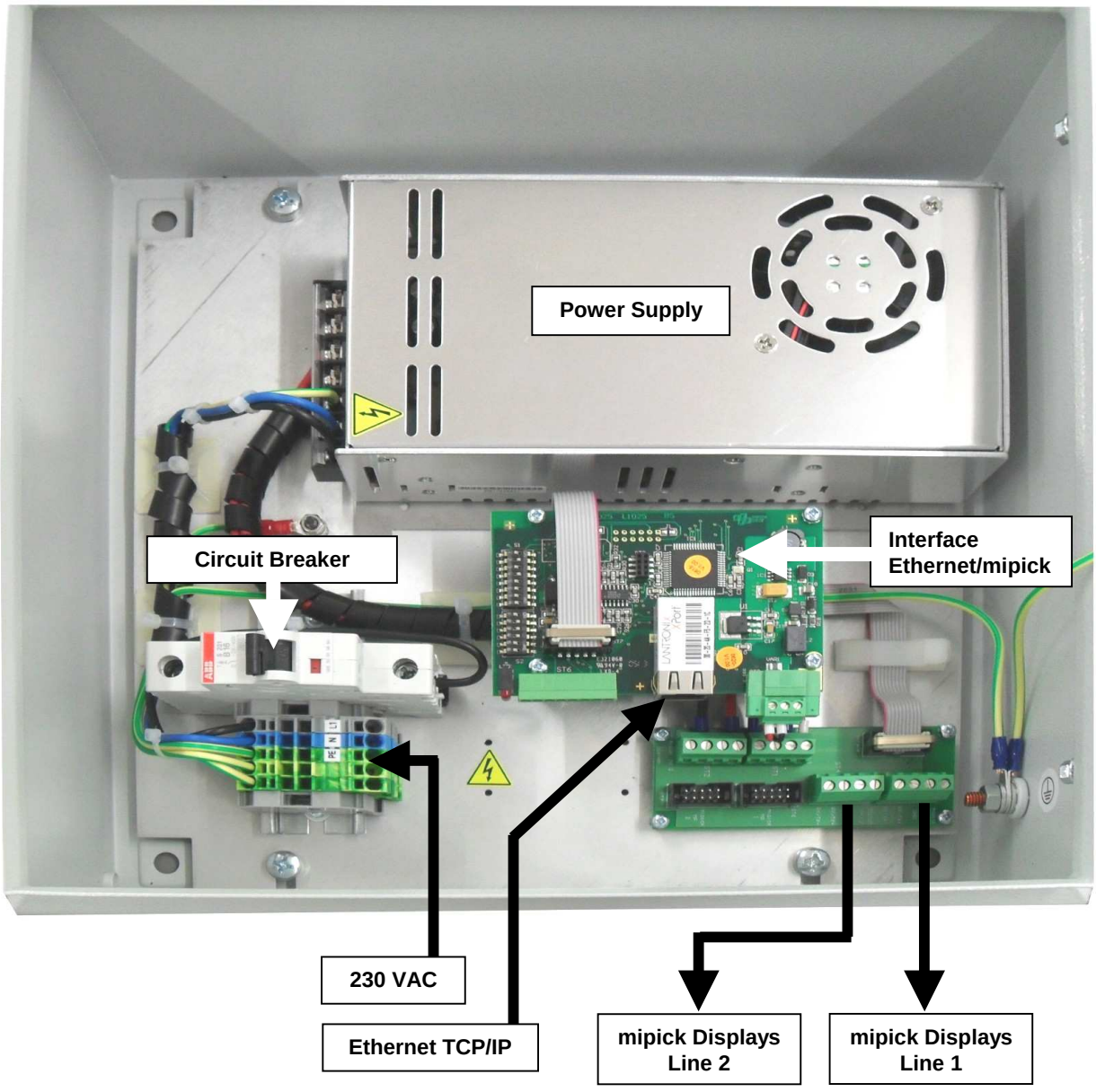
2 Components

2.1 Distribution Unit

2.2 Distribution Unit for Ethernet TCP/IP



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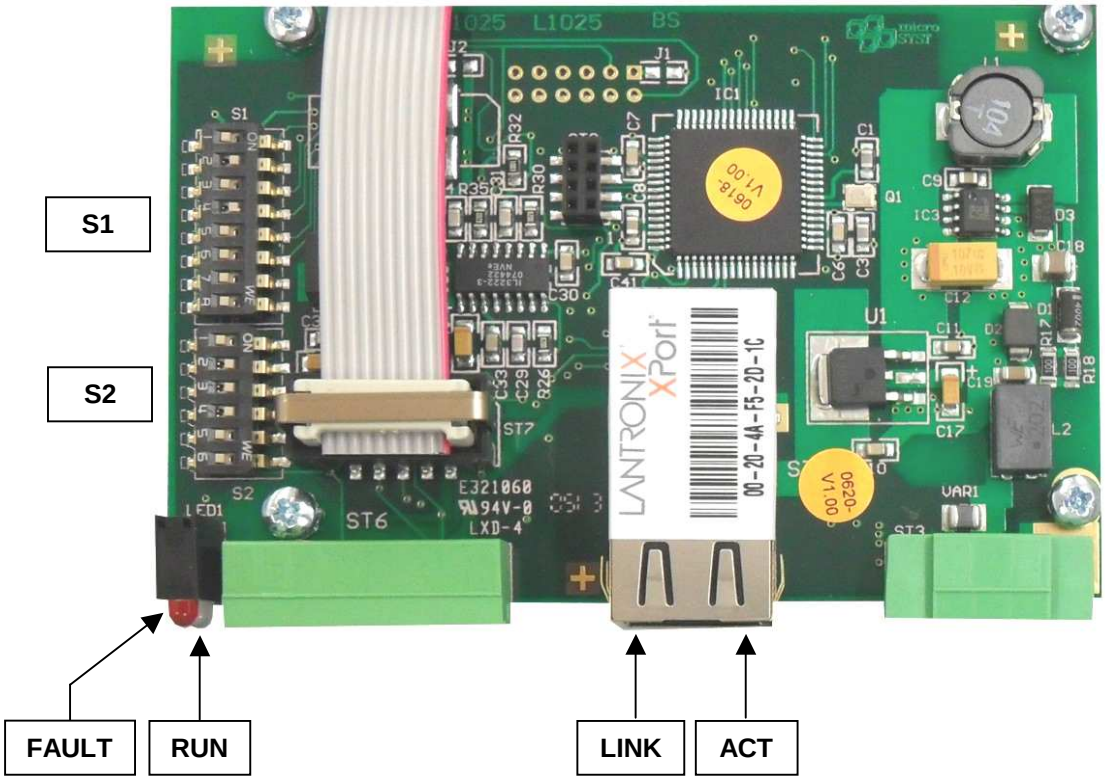
Inteface Ethernet / mipick



LED	Status	Meaning
ACT	Green	Full-Duplex
	Yellow	Half-Duplex
	Off	No network activity
LINK	Green	Physical network connection with 100 MBaud
	Yellow	Physical network connection with 10 MBaud
	Off	No physical network connection
FAULT	Red	No active TCP/IP connection
	Off	Active TCP/IP connection
RUN	Green	No data traffic at the serial interface
	Blinking	Data traffic at the serial interface

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Positions marked with "■ " are fixed and must not be changed!

Switch S1: Options

DIP	ON	OFF
1	Test mode: All displays show their own RS485 address or the LED is switched on (if no displays available). There should not be Ethernet communication at the same time!	Normal mode
2	Use 128 RS485 addresses (0...127) for the RS485 cycle, enable the bus message C2	Use 64 RS485 addresses (0...63) for the RS485 cycle, bus message C2 locked
3		■
4	Send bus member messages (C1, C2) automatically at a change (and after the Ethernet connection has been established)	Send bus member messages (C1, C2) only at a query (C0, C1 or C2)
5		■
6		■
7		■
8		■

Standard setting: DIP2, 4 = ON, remaining switches = OFF

Switch S2: RS485 Bus Termination

DIP	ON	OFF
1		■
2	■	
3	■	
4	■	
5	Bus termination is set	No bus termination
6	Bus termination is set	No bus termination

Standard setting: DIP1 = OFF, remaining switches = ON

The bus termination must be set, if the interface is connected at the first position within the RS485 bus.

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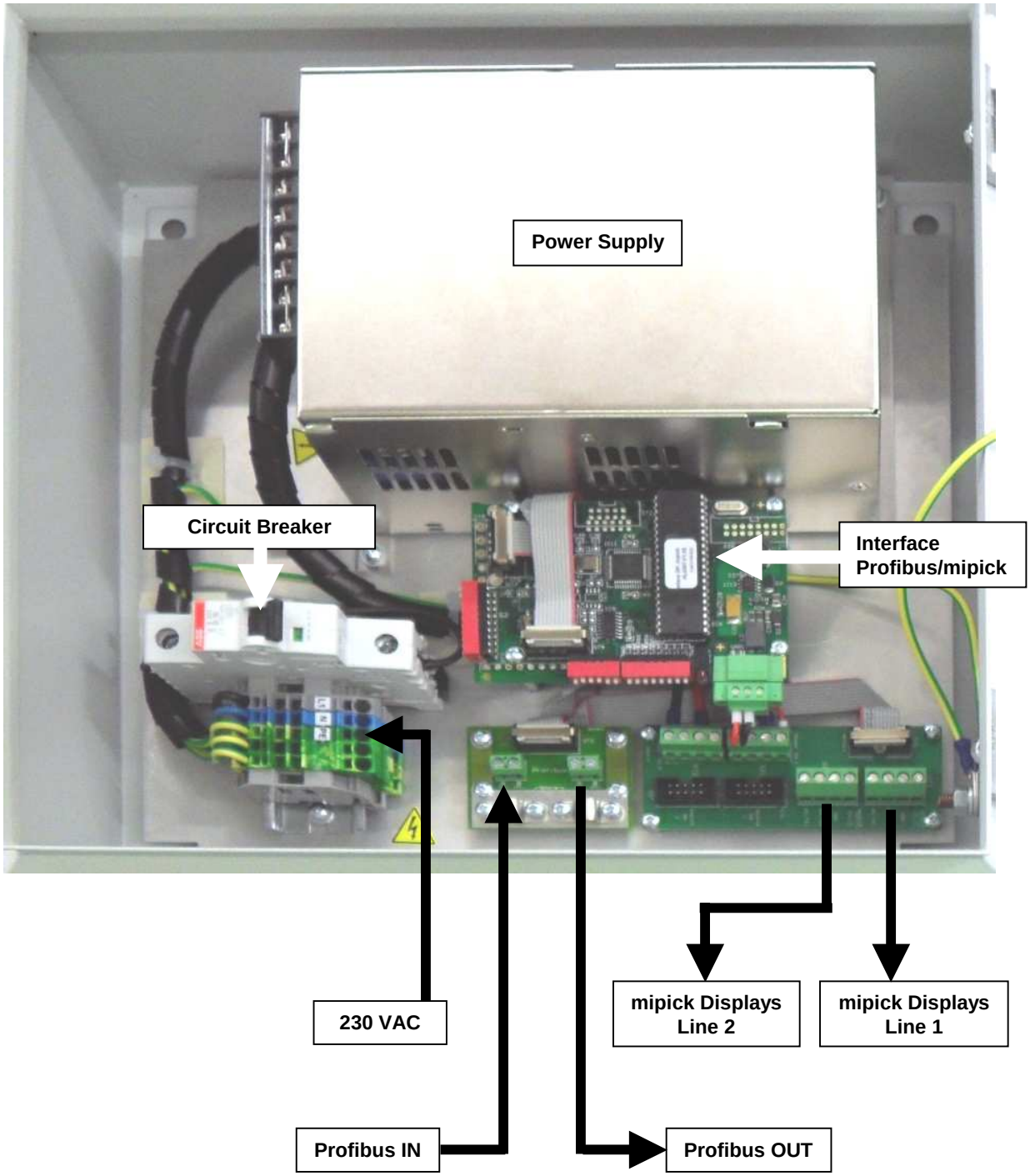
2.2.1 Distribution Unit for Profibus DP



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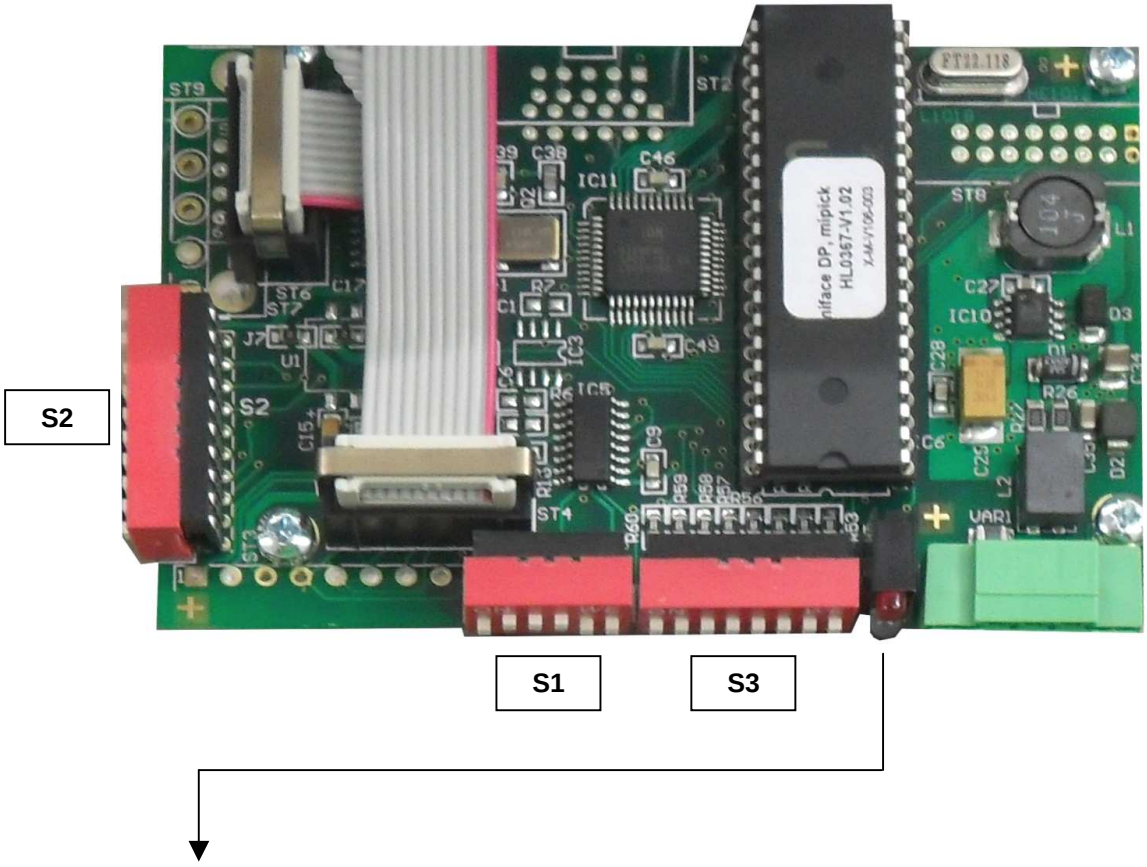
Interface Profibus / mipick



LED	Status	Meaning
red (FAULT)	off	Profibus DP connection established
	on	no cyclical Profibus DP communication or RAM error (if green LED is off)
	blinking	no RS485 response (within the last 500 ms) or RS485 communication stopped, because a new status message is existent and the former status message has not been confirmed (DP-OUT-QBS must be set to DP-IN-TBS)
green (RUN)	off	Controller is not working (hardware error)
	on	Controller is working
	short off (flickering)	Profibus DP toggle byte was changed (command or status message transmitted)

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Positions marked with "■ " are fixed and must not be changed!

Switch S1: RS485 Bus Termination

DIP	ON	OFF
1		■
2	■	
3	■	
4	■	
5	Bus termination is set	No bus termination
6	Bus termination is set	No bus termination

Standard settings: DIP1 = OFF, remaining switches = ON
-> RS485 bus termination is set

Switch S2: DP Address, DP Bus Termination

DIP	Function
1	DP address Bit 2^0 (ON = 1)
2	DP address Bit 2^1 (ON = 2)
3	DP address Bit 2^2 (ON = 4)
4	DP address Bit 2^3 (ON = 8)
5	DP address Bit 2^4 (ON = 16)
6	DP address Bit 2^5 (ON = 32)
7	DP address Bit 2^6 (ON = 64)
8	reserved (= OFF ■)
9	both ON: Profibus bus termination set
10	both OFF: no Profibus bus termination

Only DP addresses 0...126 are allowed.

Standard settings: DIP1, 2 = ON, remaining switches = OFF
-> Profibus address = 3, no Profibus bus termination

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Switch S3: Options

DIP	ON	OFF
1	Test mode: All displays show their own RS485 address or the LED is switched on (if no displays available). There should not be Profibus communication at the same time!	Normal mode
2	Use 128 RS485 addresses (0...127) for the RS485 cycle, enable the bus message C2	Use 64 RS485 addresses (0...63) for the RS485 cycle, bus message C2 locked
3	Transmit every status message immediately (separately) to the DP master (-> easier handling but slower)	Accumulate status messages until DP-IN buffer is full or the current polling cycle is finished.
4	Send bus member messages (C1, C2) automatically at a change (and after power-up and every restart of DP communication	Send bus member messages (C1, C2) only at a query (C0, C1 or C2)
5		■
6		■
7		■
8		■

Standard setting: DIP2, 4 = ON, remaining switches = OFF

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2.3 Pick Displays

Technical Data

Display type:	7 segment LED
Character height:	29 mm
Digits:	on request
Display colour:	red, green and on request
Operating voltage:	10 to 12 VDC, depending on variant
Current consumption:	up to max 360 mA, depending on variant
Display:	LED, 0 to 9, ASCII character set + special characters
Addresses:	0 to 99
Safety push button:	metal design mechanical service life: 1,000,000 cycles diameter: 12 mm individually replaceable
Signal lamp:	LED (red, green) LED diameter: 10 mm Metal mount Individually replaceable
Housing:	aluminium, anodized
Shaft depth:	30 mm
Housing colour:	natural or coloured, anodized
Mounting:	snap-on mounting
Protection:	front panel up to IP54
Operating temp.:	0 to 50 ℃
Storage temp.:	-25 to +70 ℃

Example:

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Address Setting

All pick displays of a line must have an explicit address. For this, a DIP switch at the backside is used.

Switch	Address	OFF	ON
DIP 1	2^0	0	1_D
DIP 2	2^1	0	2_D
DIP 3	2^2	0	4_D
DIP 4	2^3	0	8_D
DIP 5	2^4	0	16_D
DIP 6	2^5	0	32_D
DIP 7	2^6	0	64_D
DIP 8	-	-	-

Please see labeling of the DIP switch for the ON / OFF position.

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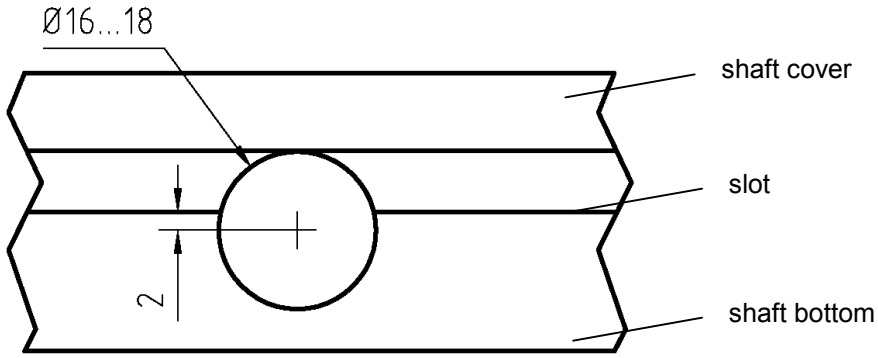
3 Assembly

3.1 Shaft Machining

The following machining must be done before the mounting of the shaft:

3.1.1 Light Sensor (optional)

Machining:



Mounting:

The holder is mounted with two screws or rivets (if possible).

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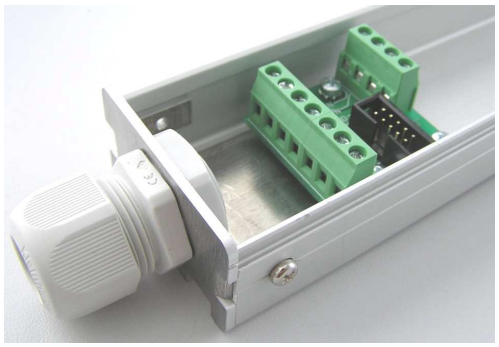
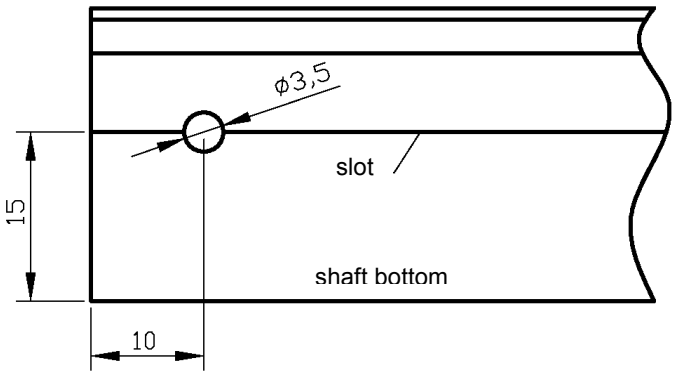
3.1.2 Shaft Termination / Clamp Module

Every shaft is terminated. For this, covers with and without cable entries are available:



Covers with cable entry have four screw sockets for the mounting of the clamp module. The clamp module splits the incoming cable to a flat ribbon cable and single conductors. Depending on the locality, it can be necessary to insert a second clamp module at the shaft end which bundles the conductors again in order to get to the next shaft.

Hole pattern:



3.2 Mounting the Shaft

The mounting of the display shaft happens with holes in the shaft bottom. Please use enough fixing points for adequate stability.

3.3 Mounting the Distribution Unit

The distribution unit is mounted with 4 screws M8 via holes in the housing bottom.

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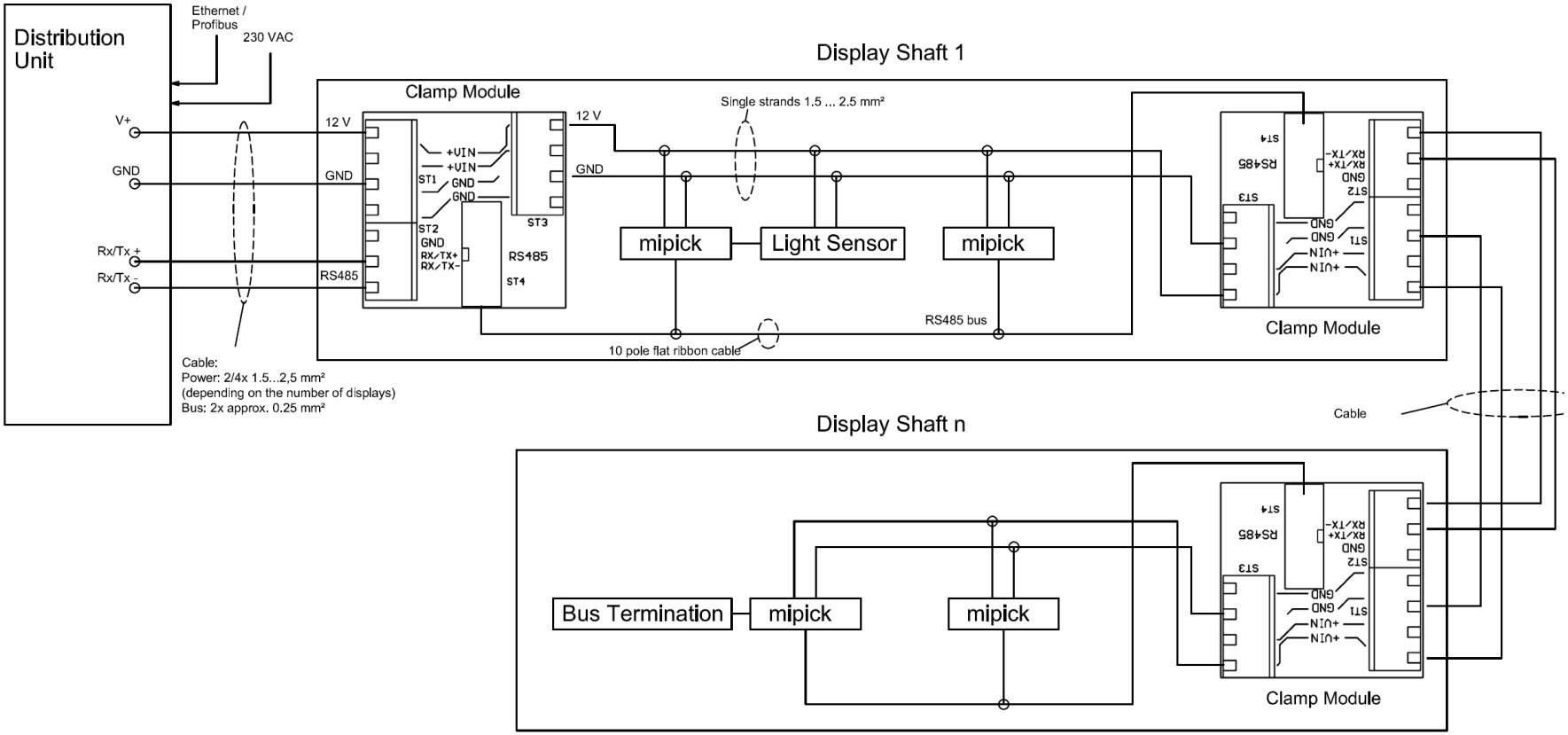
4 Wiring



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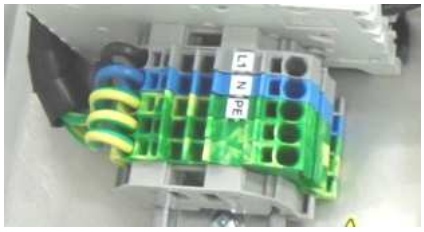
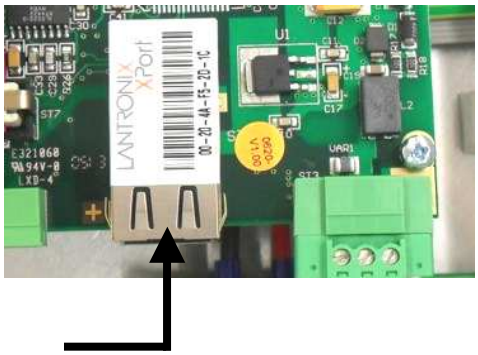
4.1 Distribution Unit

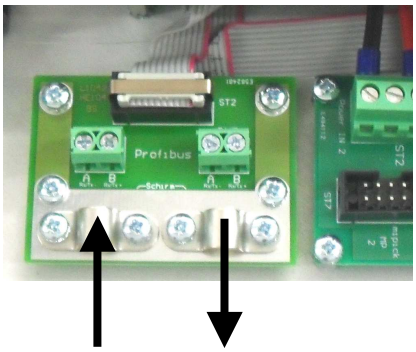
Supply Power (230 VAC)



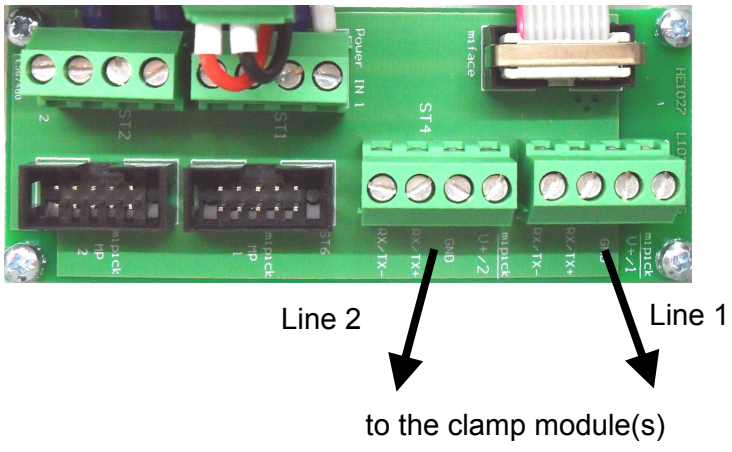
System Interface
Ethernet:



Profibus DP



Display Interface
Supply power and RS485 bus for both display lines



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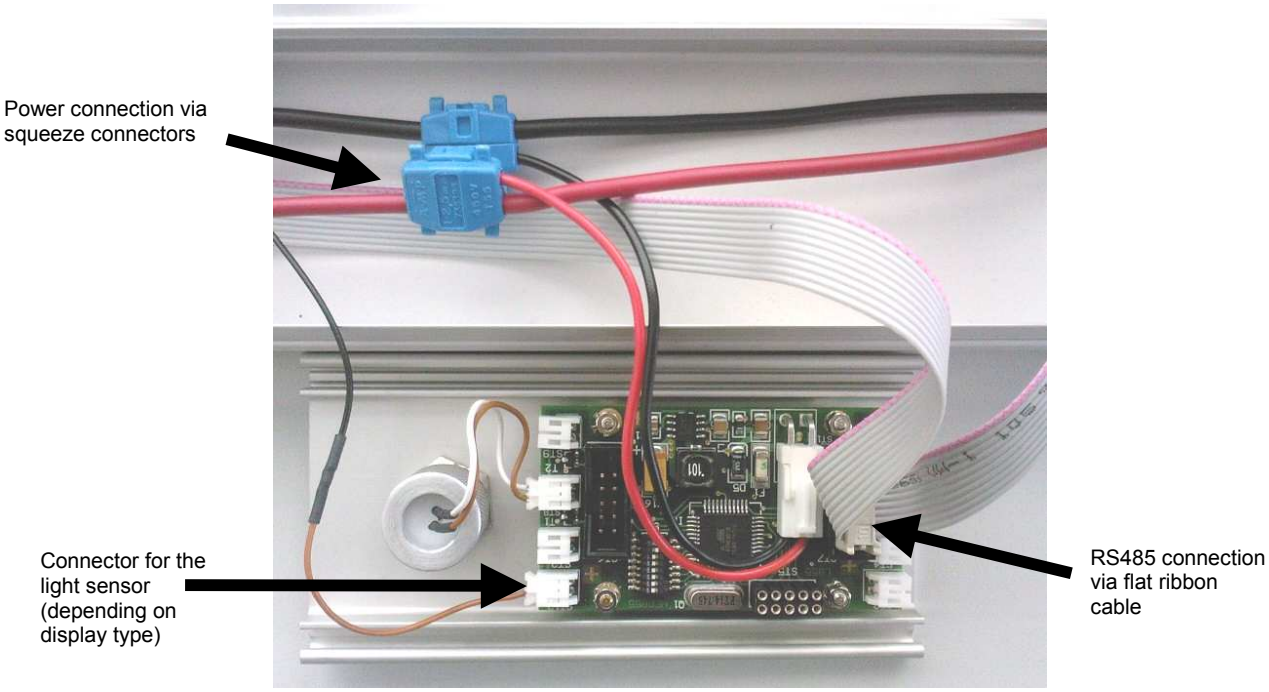
4.2 Clamp Module

The connections V+ and GND of the distribution unit are connected to the +VIN and GND terminals of the clamp module.
RX/TX+ and RX/TX- of the distribution unit are connected to the RX/TX+ und RX/TX- terminals of the clamp module.
From here we continue with a 10-pole flat ribbon cable for the RS485 and single conductors for the supply power of the displays:

4.3 Pick Displays



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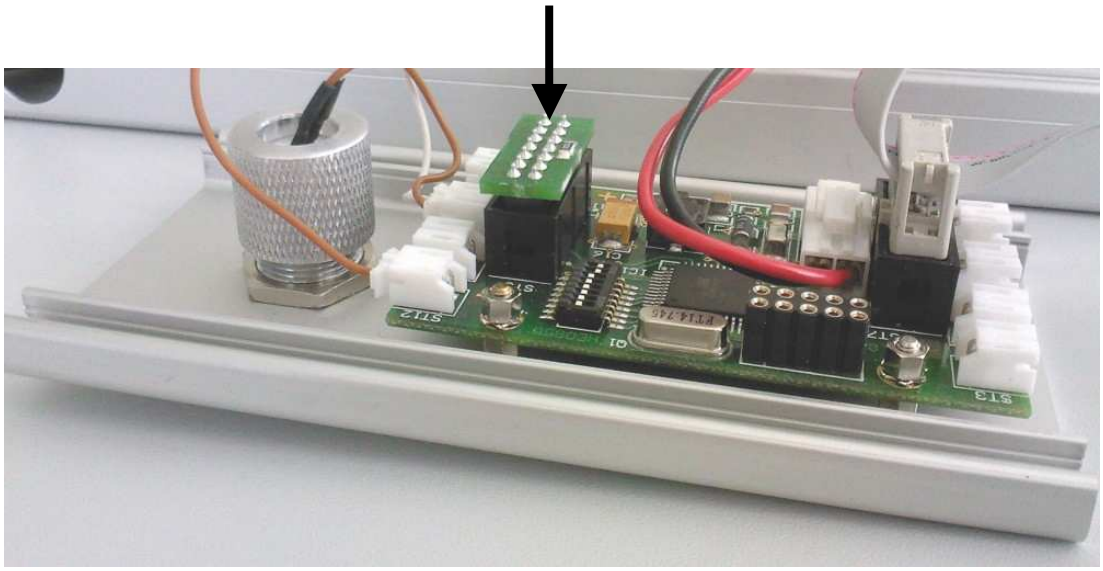
4.4 Bus Termination Board

The last pick display of a line is equipped with a bus termination board. This board is plugged at its free RS485 connection (10-pole flat ribbon connector):



4.5 Light Sensor (optional)

The power is taken from the continuous strand via squeeze connectors (like the pick displays).

The signal line of the sensor is connected to the related pick display.

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5 Ethernet

5.1 Configuration of the Ethernet Interface

The distribution unit is preset with the following network settings:

IP address: 192.168.4.200
Net mask: 255.255.255.0
Port: 10001

To change these parameters, proceed as follows:

Advice for Windows 7 users:
The Telnet client must be activated:
Start -> Control Panel -> Programs -> Turn Windows features on or off -> Telnet Client

- Switch on the supply power and connect the distribution unit to the network hub with an RJ45 cable (1:1 cable) or directly to a PC (crosslink cable).
- Start the “MS DOS entry prompt” at your Windows PC.
  With Windows 7 you must have extended rights:
  Start -> All Programs -> Accessories -> double-click at Command Promp -> Run as Administrator
- Enter the desired IP address for the device to the ARP table:
  ARP -S XXX.XXX.XXX.XXX xx-xx-xx-xx-xx-xx <CR>

  XXX.XXX.XXX.XXX : desired IP address
  xx-xx-xx-xx-xx-xx : Ethernet MAC address of the interface (see label at the housing)

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- Establish a Telnet connection to port 1:
  TELNET XXX.XXX.XXX.XXX 1 <CR>

  This connection will fail (disconnect within 3 seconds). However, the IP address of the interface is temporarily changed.
  Close the Telnet window after acknowledging the error message.

- Establish a Telnet connection to port 9999:
  TELNET XXX.XXX.XXX.XXX 9999 <CR>

  After the connection has been established, immediately press the enter key (within 5 seconds) in order to enter the setup mode.

- **Please do never select "7" (Defaults). Those settings do not match for the system.**

- Enter "0" (Server).

- Enter the desired IP address and press the enter key.

- Repeatedly press the enter key until
  "Netmask: Number of Bits for Host Part (…)" appears.
  Enter here the number of free bits for the IP address,
  f.e. "8" for the netmask 255.255.255.0
  (=11111111.11111111.11111111.00000000) or
  "11" for the netmask 255.255.248.0
  (=11111111.11111111.11111000.00000000) and press the enter key.

- Repeatedly press the enter key until "Your choice?" appears.

- Press "9" to save all settings (-> the Telnet connection is interrupted).

Configuration of the Ethernet interface is now complete.
Now, the control frame can be transmitted via the selected IP address (TCP/IP connection via port 10001).

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5.2 Ethernet Communication

The Ethernet interface of the distribution unit serves for the communication between a controller (for example PC or PLC) and the mipick devices.

“Commands” are sent from the controller to the interface via Ethernet and then forwarded to the particular mipick devices.

“Status messages” are sent from the mipick devices to the interface via RS485 and then forwarded to the controller via Ethernet.

The Ethernet interface acts as bus master at RS485 side.

As long as no “commands” are available, the bus-sharing units (mipick devices) are polled cyclically (order: address 0 to 63, 0 to 63, … or 0 to 127, 0 to 127,…). If there happens an event at this (for example “button was pressed”), the mipick replies with a corresponding frame and then a related “status message” is sent via Ethernet.

If there is a “command” available for a certain RS485 address, it is sent to the bus-sharing unit instead of the polling frame. The response of the mipick device is acknowledged via the Ethernet.

If there is identified that a new bus-sharing unit was added or a former existing bus sharing unit does not respond (correctly), a special frame is received via the Ethernet. The controller can explicitly request this “bus member message” in order to get the current bus status.

“Commands” and “status messages” are described (generally and in combination with the relating display) in the following chapters. They have the following structure:

A	**L**	**D**
Address of RS485 device	**L**ength of the data	**D**ata
1 Byte	1 Byte	1...20 Bytes

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5.2.1 Transmit “Commands“

The transmission of the “commands” happens from the controller to the Ethernet interface and then via a RS485 bus to the concerning mipick devices.

With every TCP/IP frame, one ore several commands (without gap) are transmitted to the Ethernet interface. Every command has the structure “address”, “length”, “data”.

A new command must only then be sent to a certain address, if the last command has been answered or at least approximately 1 second has elapsed. Then, the bus member has not answered or not answered correctly.

After a “broadcast command” you have to wait for the command confirmations first (one per existing bus member) before you send a new command. 1 second is enough.

Please note: If you wait for several command confirmations, they must not necessarily arrive in the same order like the corresponding commands have been sent. It’s possible that an “event message” or “bus member message” intervenes between the single command confirmation frames!

Example:

The value „12“ shall be shown at display (mipick R324) with address 4:

Send command via TCP/IP (in hexadecimal presentation):
04 05 33 31 32 00 00
(address = 4, length = 5 bytes, data = 33 31 32 00 00)

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5.2.2 Receive “Status Messages”

There are three types of status messages:

1. Command confirmation (= command response)
2. Event messages (for example “button was pressed“)
3. Bus member message (“device removed or added”)

Status messages are sent to the controller with a TCP/IP frame. Every TCP/IP frame can contain one or more status messages (without gap). Every status message has the structure “address”, “length”, “data”.

Examples:

a) Command confirmation to the command above:

Receive the status message “command confirmation” via TCP/IP (in HEX representation):
04 01 33
(address = 4, length = 1, data = 33)

b) Button of display 4 was pressed short:

Receive the status message “event message“ via TCP/IP (in HEX representation):
04 03 00 01 0C
(address = 4, length = 3, data = 00 01 0C)

Note: Only one status message is transferred in the examples above but if there are several status messages, they are received simultaneously.

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6 Profibus DP

6.1 Configuration of the Profibus Interface

6.1.1 GSD File

The device database file „micr05D0“, which is part of the delivery, is used for the integration of the Profibus DP interface (DP slave) to the Profibus. Among other things, it contains the necessary identifiers for the configuration of the input- output data widths (see next chapters).

6.1.2 Configuration Data

With the configuration, the user has the possibility to set an individual data width of the cyclic data exchange. Therefore, the following identifiers (max. 30) must be selected in any desired order.

The DP master transmits the identifier to the DP slave before it starts the cyclic data exchange.

Byte no.	Data identifier	Number of bytes	Function / Description
x	0x10	1	Input Data
x	0x11	2	Input Data
	:	:	
x	0x1F	16	Input Data

x	0x20	1	Output Data
x	0x21	2	Output Data
	:	:	
x	0x2F	16	Output Data

x	0x30	1/1	Input-/Output Data (1 byte each)
x	0x31	2/2	Input-/Output Data (2 bytes each)
	:	:	
x	0x3F	16/16	Input-/Output Data (16 bytes each)

The minimum number of input or output bytes is 6 bytes each.

The maximum number of input or output bytes is 200 bytes each, but an overall length of 300 bytes (input + output) must not be exceeded.

⇨ Standard configuration: 0x3F, 16 input-/ output bytes.

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6.1.3 User Parameter Data

User parameter data are not utilized by the interface. However, a test is run to determine whether or not the Profibus master transfers user parameter data. If user parameter data are transferred, Profibus initialization is disabled and the slave's parameters must be reconfigured.

Note:
Standard parameters configuration is required and is normally installed by the utilized DP configurators.

6.1.4 Diagnosis Data

The interface does not support any extended diagnosis data. Default diagnosis is utilized.

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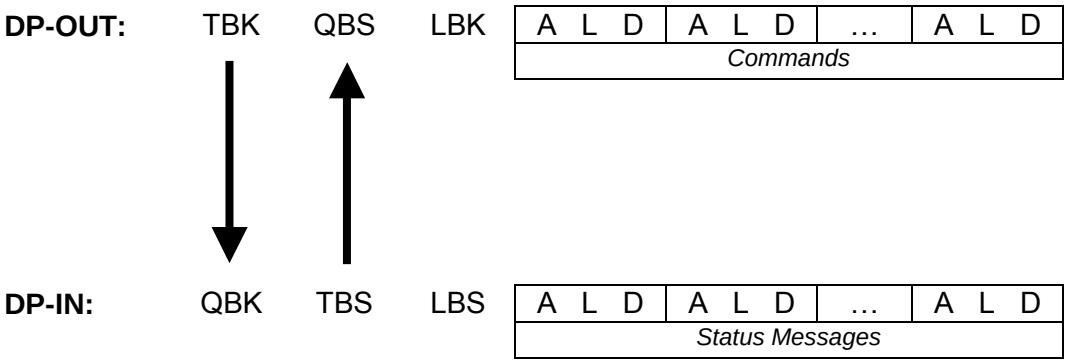
6.2 DP Communication

The DP master handles the Profibus interface (DP slave) as a standard I/O device. This means, there are DP output data, which are cyclically transmitted to the slave and DP input data, which are cyclically received from the slave.

The structure of those I/O data is like follows:



TBK: Toggle byte for the commands
QBK: Confirmation byte for the commands (= TBK after data adoption)
LBK: Length byte for the commands

TBS: Toggle byte for the status messages
QBS: Confirmation byte for the status messages (= TBS after data adoption)
LBS: Length byte for the status messages

A: Address of the RS485 bus sharing unit (pick display)
L: Length of the data
D: Data (max. 20 bytes)

Notes:

After the (new) start of the Profibus DP communication, all DP OUT bytes and all DP IN bytes have the value 0.

With the help of the configuration, the number of DP IN bytes and DP OUT bytes must be chosen leastwise as large, that the largest possible command or the largest possible status message has enough space. The maximum I/O width must not be exceeded (see chapter „configuration data“).

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6.2.1 Transmit “Commands”

The „commands“ specify, what shall be shown at the displays or how they shall behave. The transmission of the commands happens from the DP master to the Profibus interface (DP slave) and from here via the RS485 bus to the respective displays.

Procedure:

1. In the DP OUT area „commands“, you must enter the command or even several commands (without gap). Every command consists of „address“, „length“ and „data“.

2. The length of all command bytes must be entered at „LBK“.

3. Finally, „TBK“ is increased by one value.

4. Now, the DP slave starts to evaluate the commands and forward it to the corresponding displays. After this procedure is finished, the „QBK“ is set to the value of the previous changed „TBK“.

5. If there are further commands, you can continue with point 1.

Example:

The value „12“ shall be shown at display 4 (mipick R324):

1. Input the command:

   DP-OUT(hex) = 00 XX 00 04 05 33 31 32 00 00

2. Set „LBK“:

   DP-OUT(hex) = 00 XX 07 04 05 33 31 32 00 00

3. Increase „TBK“:

   DP-OUT(hex) = 01 XX 07 04 05 33 31 32 00 00

4. Wait for „QBK“:

   DP-IN(hex) = 00 XX XX XX ...
   ->
   DP-IN(hex) = 01 XX XX XX ...

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6.2.2 Receive “Status Messages”

There are three types of „status messages“:

4. Command confirmations (= command response)
5. Event messages (for example „button has been pressed“)
6. Bus member messages („device has been removed/added“)

The status messages must be fetched from the DP master as fast as possible, otherwise the RS485 communication with the displays can slow down or even stop (until the status messages are fetched)!!!

Procedure:

1. If the „TBS“ changes, there are status messages available for pickup.

2. Now, the status messages to be fetched are available in the DP IN area „status messages“ (without gap, overall „LBS“ bytes). Every status message consists of „address“, „length“ and „data“.

3. After the status messages have been read out, the DP master must set the „QBS“ to the value of „TBS“. This should happen as fast as possible (in order not to slow down the RS485 communication).

4. Continue with point 1.

Examples:

a) Command confirmations to the command above:

1. „TBS“ changes:

   DP-IN(hex) = XX 00 XX XX XX ...
   ->
   DP-IN(hex) = XX 01 03 04 01 33

2. Read out the status message:

   “LBS” = 3
   „Address“ = 4
   „Length“ = 1
   „Data“ = 33_H (command confirmation)

3. Set „QBS” to the value of “TBS”:

   DP-OUT(hex) = XX 01 XX XX XX …

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b) Button of display 4 was pressed short:

1. „TBS“ changes:

   DP-IN(hex) = XX 01 XX XX XX …
   ->
   DP-IN(hex) = XX 02 05 04 03 00 01 0C

2. Read out the status message:

   “LBS” = 5
   „Address“ = 4
   „Length“ = 3
   „Data“ = 00_H 01_H $0C_H$ (event message: button pressed short, display value = „12“)

3. Set „QBS” to the value of “TBS”:

   DP-OUT(hex) = XX 02 XX XX XX …

Note:

In the examples above, only one status message is transmitted at once.

If there are more status messages available, they are transmitted at the same time in order to utilize the available DP IN bytes as far as possible and accelerate the communication.

If DIP switch S3-3 is in ON position, every status message is reported separately (to simplify the evaluation at the DP master side).

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7 Frame Structure

7.1 Structure of Commands

			Data			
▶	**Address**	**Length**	**Command**	**1 th Parameter**	**... Parameter**	**n th Parameter**
	0 to 127, 255*	Number of following bytes	for example 33_H = “control display”			

*Address = 255: broadcast command:
This command is sent to all possible bus addresses (0...63 or 0...127). Only the really existing MIPICKS of the bus, which are supported by the command, evaluate it and respond with a “command confirmation”.

7.2 Structure of Status Messages

7.2.1 Command Confirmation

			Data	
◀	**Address**	**Length**	**Command confirmation**	**Possible response data**
	0 to 127	>= 1	for example 33_H	

Every command is receipted with a command confirmation. With this, the complete communication cycle from the controller to the MIPICKS and back again is guaranteed. If necessary, response data from the MIPICK is forwarded.

7.2.2 Event Message

			Data			
◀	**Address**	**Length**	**Event message**	**Status byte**	**1 th Parameter**	**... Parameter**	**n th Parameter**
	0 to 127	Number of following bytes	00_H	Contains (bit-coded) information to the event, that happened	Additional event information (if the status byte is not enough)		

All existing MIPICKs of the RS485 bus (addresses 0 to 63 or 0 to 127) are always polled. If the “status byte” in unequal to 0 OR at least an additional “parameter byte” is received, an event is available. It is forwarded from the interface to the controller then.

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7.2.3 Bus Member Message

◄

		Data			
Address	**Length**	**Bus Member Message**	**BTN0**	**BTN...**	**BTN7**
255 (comes directly from the interface)	9	$C1_H$ (bus addresses 0 to 63) $C2_H$ (bus addresses 64 to 127, only if 128 addresses are set with DIP switch)	Bus member states of the addresses 0 to 7 or 64 to 71: (bit 0 to 7) 1 = device available, 0 = device not available	...	Bus member states of the addresses 56 to 63 or 120 to 127: (bit 0 to 7): 1 = device available, 0 = device not available

The bus member messages can be requested by transmitting the following „interface commands“:

►

		Data
Address	**Length**	**„Interface Command“**
255 (directly to the interface)	1	$C1_H$: Request bus member message $C1_H$ $C2_H$: Request bus member message $C2_H$ (if 128 addresses) $C0_H$: Request bus member messages $C1_H$ and $C2_H$ (if 128 addresses)

If the corresponding DIP switch is in position „ON“, the bus member messages are sent automatically ...

- after every change (new bus member identified or not available anymore)
- every restart of the communication = establishing the Profibus connection (after completion of the currently running polling cycle).

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7.3 General Frames

The following frames proceed basic functions and are supported by most displays.

7.3.1 Show Address

Command:

1	2	3
Address	**Length**	**Command**
0 to 127, 255 = Broadcast	1	01_H

Command confirmation:

1	2	3
Address	**Length**	**Command**
0 to 127	1	01_H

7.3.2 Delete Display

Command:

1	2	3
Address	**Length**	**Command**
0 to 127, 255 = Broadcast	1	02_H

Command confirmation:

1	2	3
Address	**Length**	**Command**
0 to 127	1	02_H

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7.3.3 Query Device Type

Command:

1	2	3
Address	**Length**	**Command**
0 to 127, 255 = Broadcast	1	03_H

Command confirmation:

1	2	3	4
Address	**Length**	**Command**	**Device type**
0 to 127	2	03_H	= command byte

7.3.4 Lamp Test

Command:

1	2	3	4
Address	**Length**	**Command**	**Lamp text**
0 to 127, 255 = Broadcast	2	04_H	01_H = start 00_H = stop

Command confirmation:

1	2	3
Address	**Length**	**Command**
0 to 127	1	04_H

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7.3.5 Query Display Content

Command:

1	2	3
Address	**Length**	**Command**
0 to 127, 255 = Broadcast	1	05_H

Command confirmation:

1	2	3	4	...
Address	**Length**	**Command**	**Digit 1**	**...**
0 to 127	X	05_H	ASCII code or real value (then, from MSB to LSB if valuation > 255)	„

Note:
The number of display and the visualisation (ASCII or binary) can vary depending display type.

7.3.6 Query Software Version

Command:

1	2	3
Address	**Length**	**Command**
0 to 127, 255 = Broadcast	1	06_H

Command confirmation:

1	2	***Data***			
Address	**Length**	**Command**			
0…127	13	06_H	‘H’	‘L’	ASCII code

Data					
ASCII code	ASCII code	ASCII code	‘-’	‘V’	ASCII code

Data		
‘.’	ASCII code	ASCII code

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7.4 Device-Specific Frames

The device-specific frames can be found in the separately enclosed frame description.

Example: mipick R225

Command:

1	2	3	4	5
Address	**Length**	**Command**	**Digit 1**	**Digit 2**
0 to 127 255 = Broadcast	6	49_H	Bit 0 to 6: ASCII code 30 to 39_H Bit 7=1: Decimal point ON	,,

6	7
Options 1	**Options 2**
Bit 0=0: LED on =1: LED off Bit 1=1: LED blinks slow Bit 2=1: LED blinks fast Bit 3: reserved (=0) Bit 4=1: Display blinks slow Bit 5=1: Display blinks fast Bit 7, 6: Brightness: 00 = bright 01 = : 10 = : 11 = dark	Bit 0=1: Disable LED automatically, if confirmation button is pressed Bit 1=1: Disable display automatically, if confirmation button is pressed Bit 2=1: Disable LED automatically, if button “Ø“ is pressed Bit 3=1: Disable display automatically if button “Ø“ is pressed Bit 4=1: Disable LED automatically, if button “INV“ is pressed Bit 5=1: Disable display automatically, if button “INV“ is pressed Bit 6=0: Suppress leading zeros =1: Enable leading zeros Bit 7: reserved (=0)

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Optionen 3
Bit 0=1: +/- buttons locked Bit 1=1: +/- buttons count unlimited (0…99) =0: +/- buttons count from 0 to preset value Bit 2 to 7: reserved (=0)

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Command Confirmation:

1	2	3
Address	**Length**	**Command**
0 to 127	1	49_H

Event Message:

1	2	3	4	5
Address	**Length**	**Event Message**	**Status byte**	**Value**
0 to 127	2 / 3	00_H	Bit 0=1: Confirmation button was pressed Bit 1=1: Confirmation button was pressed 2 seconds at least Bit 2=1: Button “Ø“ was pressed Bit 3=1: Button “Ø“ was pressed 2 seconds at least Bit 4=1: button “INV“ was pressed Bit 5=1: button “INV“ was pressed 2 seconds at least Bit 6=1: LED error Bit 7=1: Display error	Only if any button has been pressed (at least one of the bits 0 to 5 of the status byte = 1) 0 to 99

Response after Query the Display Content:

1	2	3	4
Address	**Length**	**Command**	**Value**
0 to 127	2	05_H	0 to 99

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8 Versions Overview

Version	Date	Remarks, Descriptions
1.00	03.08.09	Document created (German language)
1.10	17.01.11	Document translated
1.20	08.02.11	Chapter “Device-Specific Frames” changed (R225)
1.30	31.03.14	Interface (Ethernet, Profibus) changed
1.30m	04.08.14	Metrix links added

Certified per **DIN EN ISO 9001**.

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