

## Hardware Manual

# commModule MBP



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If you are interested in our source modifications and sources used, please contact: [info@softing.com](mailto:info@softing.com)

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# 1 Introduction

## 1.1 About this document

This document is addressed to hardware engineers, giving them a detailed description about the electrical, mechanical and functional specifics of the single-sided communication module, commModule MBP.

## 1.2 Related documentation

For further details about the commModule MBP and the configuration workflow of the firmware see the *CommScripter* user guide and *commModule MBP Evaluation Kit* hardware guide available by [download](#).

## 1.3 Conventions used

The following conventions are used throughout Softing customer documentation:



### CAUTION

This symbol indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.



### Note

This symbol is used to call attention to notable information that should be followed during installation, use, or servicing of this device.



### Hint

This symbol is used when providing you with helpful user hints.

## 1.4 Document history

Document version	Changes since last version
1.00	First version
1.10	Reference to related documentation updated. Trademark notice and Open Source notice added. New layout and structure of chapters.
1.20	Classification of protection type "intrinsic safety" changed to Ex II 1D Ex ia IIIC Da. See also Chapter <a href="#">CE Compliance</a> <sup>23</sup> .
1.21	Section on <a href="#">ordering information</a> <sup>6</sup> updated. Small editorial changes.
1.21-1	Note changed regarding <a href="#">PCB library</a> <sup>17</sup> (now available from Softing support).
1.21-2	References to ATEX / IECEx <a href="#">certificates</a> <sup>14</sup> updated. Section <a href="#">Port input and output</a> <sup>11</sup> updated.
1.21-3	Non-potted version now without metal shield. IECEx certificate updated.

## 2 commModule MBP

The commModule MBP is a surface mountable fieldbus communication module with minimum footprint. It is typically integrated into an intelligent field device mapping industrial intrinsic safe fieldbus Profibus PA and FOUNDATION Fieldbus to the field device.

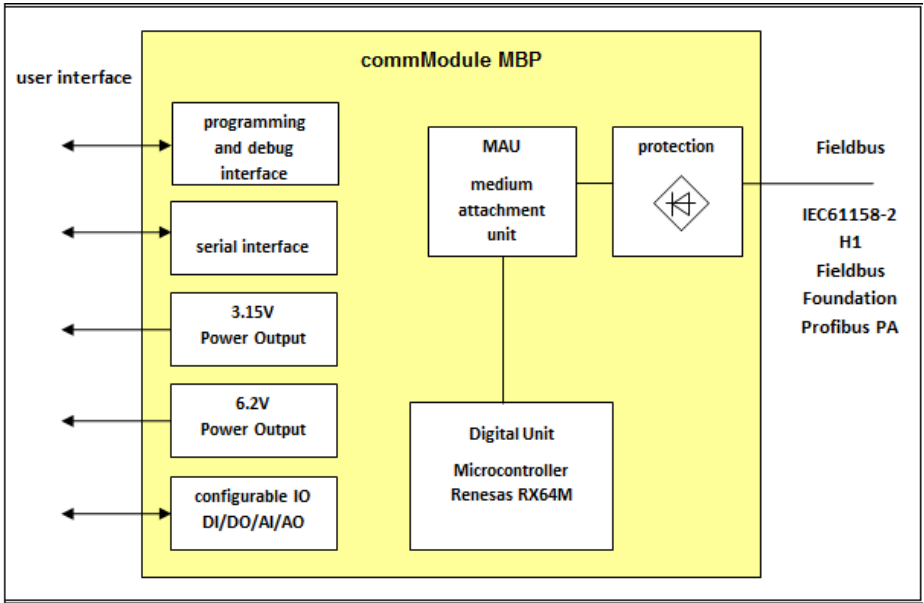


### CAUTION

The commModule MBP is certified for hazardous areas if used in accordance with its specification and operating conditions. See also [Operating conditions for use in hazardous environment](#) <sup>13</sup>.

### 2.1 Diagram

The block diagram below shows the design of the commModule MBP:



### 2.2 Intended use

This product has been designed to be integrated as a system component by qualified hardware engineers.

### 2.3 Ordering information

The commModule MBP is available as a potted version (#STD), not suitable for reflow soldering and a non-potted version (#STD\_NOP), suitable for reflow soldering.

The Ex approval of commModule MBP STD\_NOP/HW is void without potting. See [certificates](#) <sup>24</sup> for details. Potting must be applied on final assembly. Requirements specified in Section 6.6 of EN IEC 60079-11 must be met. Potting process and the compound have to be assessed by the notified body of the manufacturer of the complete equipment. Both versions can be ordered in units of 90 (VPE90). For evaluation purposes sample packs in units of 5 (VPE5) are available.

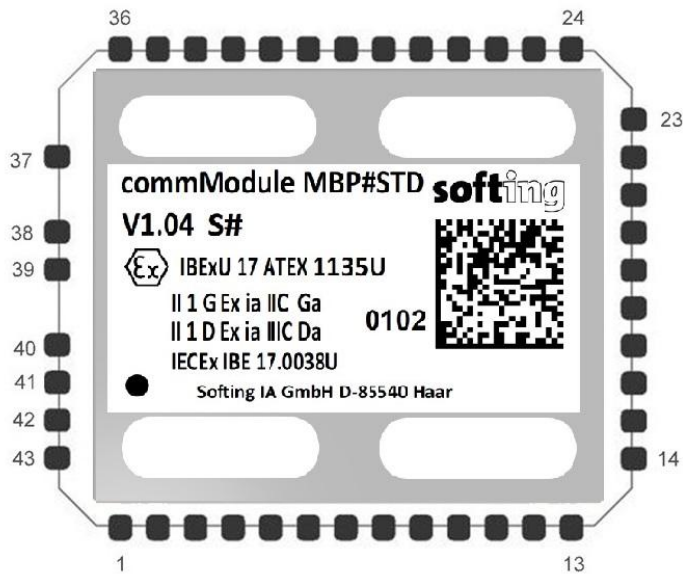
Type	Part number	Units
commModuleMBP #STD/HW	EIA-KS-022200	VPE90
commModuleMBP #STD/HW sample pack	EIA-KS-022400	VPE5
commModuleMBP #STD_NOP/HW	EIA-KS-022220	VPE90
commModuleMBP #STD_NOP/HW sample pack	EIA-KS-022420	VPE5

### 3 Interface

This section describes the signals available on the module via the PCB solder pads on the edge of the PCB.

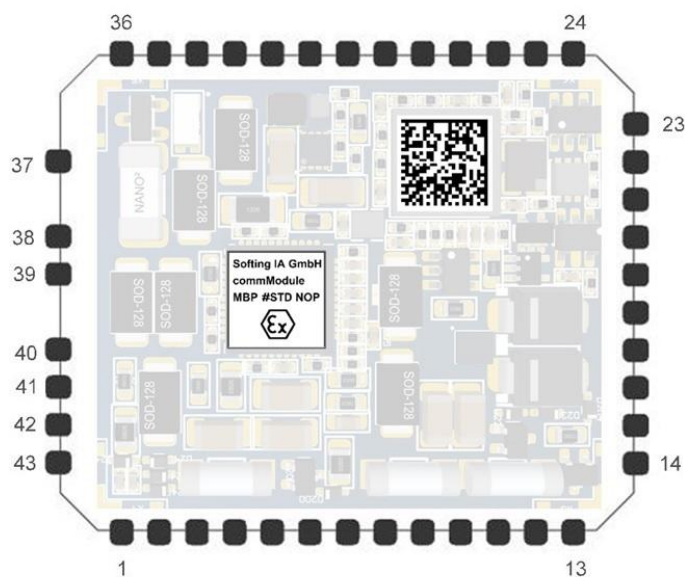
#### 3.1 Orientation

##### Top view of the potted module



The position of Pin 1 is marked ● on the label.

##### Top view of the non-potted module



### 3.2 Pin number and signal description

Signal Name	Pin No.	I/O*	Description
TXD9_PB7	1	DO	TX Interface signal for HART
#RTS9_PB5	2	DO	Low active RTS signal for HART
RXD9_PB6	3	DI	RX Interface signal for HART
GPIO_PA4	4	GPIO	For future use
GPIO_PE6	5	GPIO, AI	For future use
#CTS9_PB4	6	DI	Low active CTS signal for HART
3V15	7	VCC	Do not use. Internal supply voltage
GND	8	Ground	Ground
GPIO_PE2	9	GPIO	For future use
GPIO_PE5	10	GPIO, AI	For future use
GPIO_PE7	11	GPIO, AI	For future use
GPIO_PE1	12	GPIO	For future use
PROT_SEL_P27 / TCK	13	DI	Protocol Select: FF/PA, Programming interface
TDO	14	DBG	Programming interface
GND	15	Ground	Ground
RXD7_P92	16	DI	RX Interface signal for Debug Console (PD 33k)
TXD7_P90	17	DO	TX Interface signal for Debug Console
DA1	18	AO	For future use
GND	19	Ground	Ground
3V_OUT	20	PO	Power Output 3.15V
6V2_OUT	21	PO	Power Output 6.2V
SIM_EN_P31	22	DBG	Simulate Enable
GPIO_P23	23	GPIO	For future use
GPIO_P22	24	GPIO	For future use
GPIO_P21	25	GPIO	For future use
GPIO_P20	26	GPIO	For future use
GPIO_PC6	27	GPIO	For future use
GPIO_PC7	28	DBG/GPIO	For future use
GPIO_PC5	29	GPIO	For future use
GPIO_PC4	30	GPIO	For future use
EMLE	31	DBG	Programming Interface
TDI	32	DBG	Programming interface

Signal Name	Pin No.	I/O*	Description
GPIO_PD2	33	GPIO	For future use
#RESET	34	DBG	Programming interface
FINED	35	DBG	Programming interface (do not pullup)
GND	36	Ground	Ground
FB_P_NF	37	FB	Do not use
FIELDBUS_N	38	FB	Fieldbus
FIELDBUS_P	39	FB	Fieldbus
FDE_PO	40	FB	FDE, connect to Pin 41
FDE_PI	41	FB	FDE, connect to Pin 40
FDE_NO	42	FB	FDE, connect to Pin 43
FDE_NI	43	FB	FDE, connect to Pin 42

\* AI = Analog Input, AO = Analog Output, DI = CMOS Digital Input, DO = CMOS Digital Output, GPIO = General Purpose CMOS Digital Input/Output, PO = Power Output, DBG = Programmer Interface, FB = Fieldbus, PD Pulldown, PU Pullup

### 3.3 Pullups and pulldowns

Weak pullups are provided on all GPIO pins. Pullups for TDO and TDI are not included on the commModule MBP and must be included on the application base board (pullup to Pin 7 of commModule MBP).

RXD7\_P92: internal pulldown 33k

### 3.4 Flash programming and debugging interface

The following signals of the microcontroller are required for programming with the Renesas Flash Programmer.

See the [commModule MBP Evaluation Kit](#) user guide for details. The usage of the debugging interface is detailed in document "E1/E20 Emulator – additional document for User's Manual (RX User System Design) from Renesas".

Signal Name	Description	14-pin Renesas Fine Interface
TDO	Not required for debugging. Only used for internal flash programming with Renesas Flash Programmer	5
TDI	Not required for debugging. Only used for internal flash programming with Renesas Flash Programmer	11
FINED	Programming Interface	7
PC7	Programming Interface	10
#RESET	Programming Interface	13
GND	Ground	2, 12, 14
3V15	Internal supply voltage	8



#### CAUTION

Some memory blocks are reserved for the bootloader or the firmware. They must not be modified as this will invalidate the software and you will no longer be able to boot the commModule MBP. Only programming project files provided by Softing must be used to reprogram the module. Do not select the programmer option "Erase Chip"

### 3.5 Fault Disconnect Equipment

External fault disconnect equipment (FDE) can be optionally added using the assigned FDE pins. If not in use, connect signal FDE\_PO to FDE\_PI and signal FDE\_NO to FDE\_NI.

### 3.6 Simulate enable

Fieldbus conformance testing requires switching the application to simulation mode. Simulation mode is enabled by signaling low on pin SIM\_EN\_P31.

For the registration of the final device by the FieldComm Group this signal must be accessible to the fieldbus testing personnel.

## 4 Electrical specifications

### 4.1 Protocol select

This pin is scanned during start-up.

Fieldbus Protocol	PROT_SEL_P27	Description
FOUNDATION Fieldbus FF	High (internal pullup)	Leave open The commModule MBP is operating in FOUNDATION Fieldbus (FF) mode.
Profibus PA	Low	connect to GND The commModule MBP is operating in Profibus PA mode.

### 4.2 Operating conditions

Unless otherwise noted, all specifications apply over the specified operating temperature range.

### 4.3 Port input and output

The communication module has the following port input and port output specification at  $V_{CC} = 3.2V \pm 4\%$ .

Parameter	Symbol	Min	Max	Unit	Test Conditions
DI: input low voltage	$V_{IL}$		$V_{CC} \times 0.2$	V	
DI: input high voltage	$V_{IH}$	$V_{CC} \times 0.8$		V	
DO: output low voltage	$V_{OL}$		0.5	V	$I_{OL} = 1mA$
DO: output high voltage	$V_{OH}$	$V_{CC} - 0.5$		V	$I_{OH} = -1mA$

#### Analog Input

The commModule MBP incorporates a 12bit-A/D converter with a reference voltage of 3.0V

#### Power Output:

The power budget to supply a connected system from fieldbus is limited.

It is dependent on the rated current from fieldbus, which is adjustable in software from  $I_r = 10mA$  to  $26mA$ .

#### Available output power:

$P_{omax} = \text{approx. } 90mW \text{ on } 6V2\_OUT, \text{ with } I_{PO\_6V2} = I_r - 10mA$

or:

$P_{omax} = \text{approx. } 70mW \text{ on } 3V\_OUT, \text{ with } I_{PO\_3V\_OUT} = (I_r - 10mA) / 0.7$

When both power outputs are used, the available power budget is between 70 and 90mW. The slew rate is controlled. The rise time is 1.43ms. The output current is not limited on the commModule MBP.

**Note**

If the available power budget is exceeded the commModule MBP may reset.

Parameter	Nom	Min	Max	Unit
3V_OUT	3.2	3.1	3.3	V
6V2_OUT open circuit with source impedance 10 Ohms	6.2	5.9	6.3	V

**Fieldbus:**

- Physical Layer according to IEC 61158-2 type 3 voltage mode, 31.25kBit/s.
- Rated current adjusted in software to  $I_r = 10\text{mA}$  up to  $26\text{mA}$ .
- Powered from Fieldbus 9V to 32V (non hazardous location).

**Use in hazardous locations:**

Limitation on fieldbus power supply applies for different use cases. See also [Operating conditions for use in hazardous environment](#)<sup>13</sup>.



## 5 Environmental specifications

### 5.1 Temperature

**Absolute Maximum Ratings:**

Storage temperature: -40°C to + 125°C.

Stresses exceeding maximum ratings may damage the device. Maximum ratings are stress ratings only. Functional operation above the recommended operating conditions is not implied. Extended exposure to stresses above the recommended operating conditions may affect device reliability.

**Normal Operating Conditions (module soldered):**

Fieldbus current adjustable from 10mA to 26mA.

Parameter	Units	Min	Max	Note
operating temperature	°C	-40	80	
storage temperature	°C	-40	125	
humidity	°rH	10	90	non-condensing

**Operating conditions for use in hazardous environment:**

Operating temperature is dependent on intrinsic safe input parameters.

Use Case	Input Supply	Temperature Class	Ambient Temp. Range
commModule Internal fused with 62mA	FISCO or: EX ia IIB, Ui =17.5V, li =380mA or: EX ia IIC, Ui = 24V, li = 250mA	T4	-40°C to +80°C

**Operating Conditions for use in hazardous environment with external fuse:**

Additional requirements apply for the design of the host PCB.

For further information see the [ATEX EC type examination certificate](#) <sup>24</sup>.

### 5.2 MTBF calculation

MTBF calculated according to SN29500:

@40°C: 3.655.879 hours

@70°C: 1.142.849 hours

Conditions: Standard SN29500, continuous operation

## 5.3 Certifications

### ROHS

The commModule MBP is ROHS compliant.

### ATEX / IECEx:

IECEx IBE 17.0038U

Ex ia IIC Ga

Ex ia IIIC Da

IBExU17ATEX1135 U



II 1G Ex ia IIC Ga

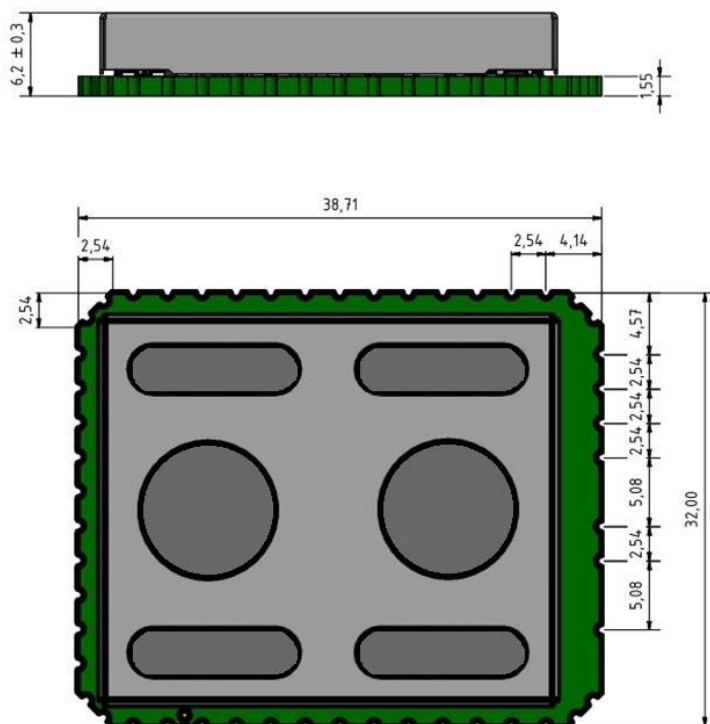


II 1D Ex ia IIIC Da

## 6 Mechanical specification

## 6.1 Potted module

The dimensions of the potted module are shown below in millimeters. The weight of a potted variant (commModule MBP#STD) is about 15 gram.

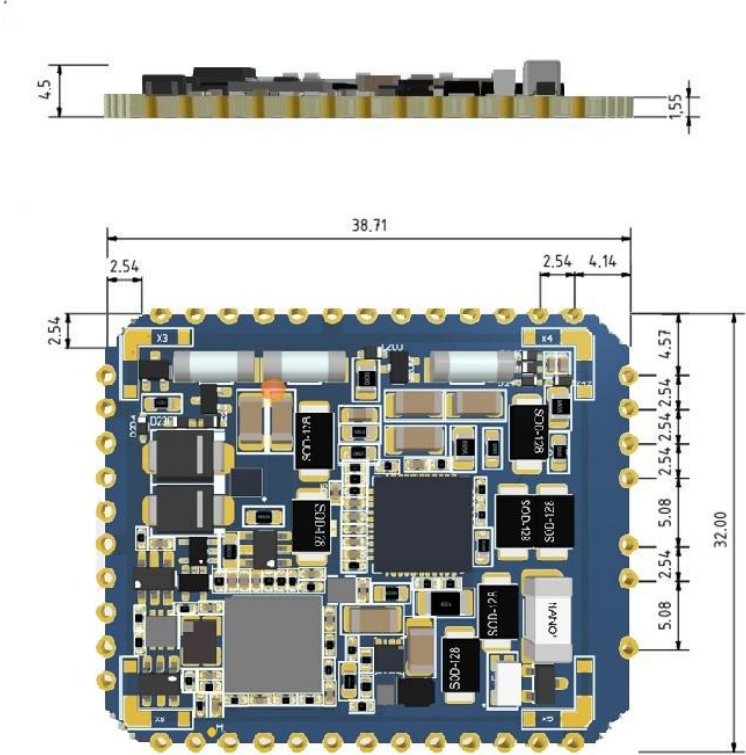


### Bottom view



## 6.2 Non-potted module

The dimensions of the non-potted module are shown below in millimeters. The weight of the non-potted variant (commModule MBP#STD\_NOP) is about 6.2 gram.

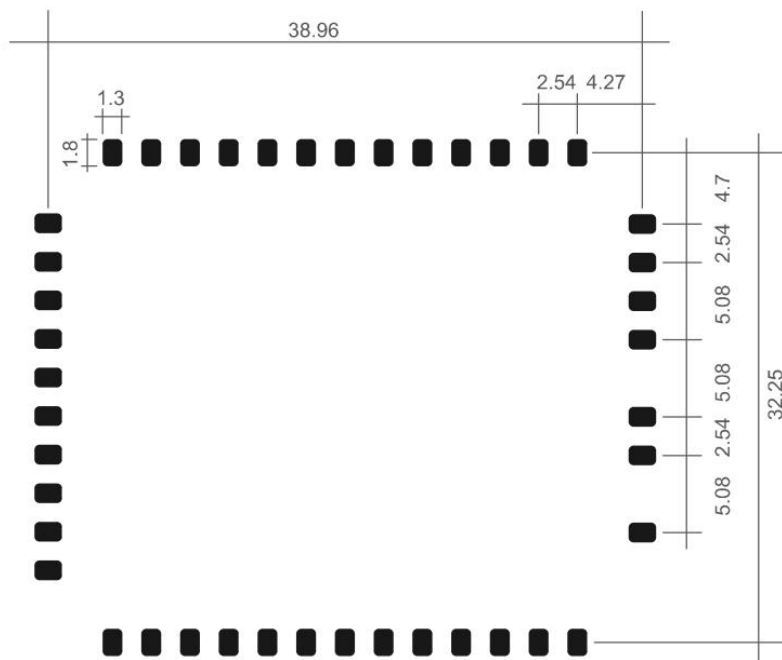


Bottom view



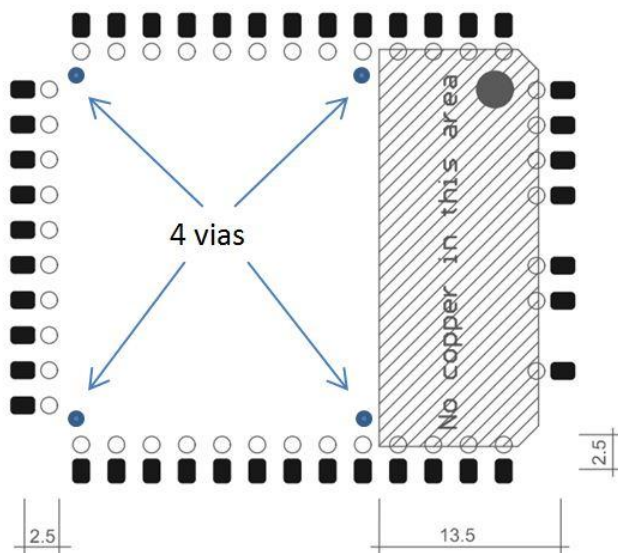
## 6.3 Host PCB layout

### Recommended footprint



The PCB footprint dimensions may be modified based on user experience and/or process capability.

### Routing under the CommModule MBP



#### Note

The host PCB footprint must not contain any exposed copper under the module except the pads interfacing the commModule MBP to avoid any contact with traces on the module.

**Note**

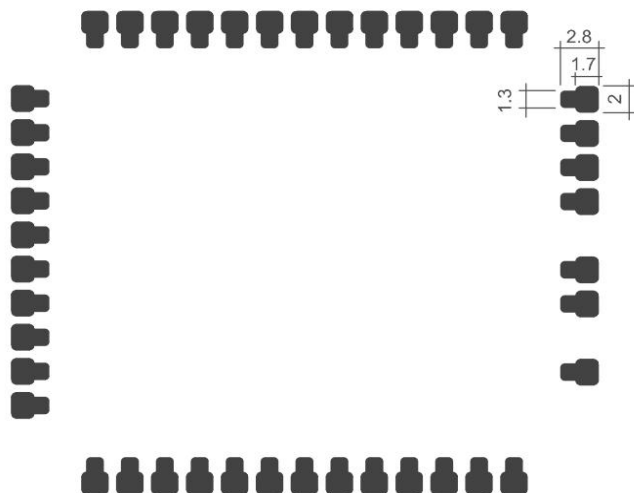
It is recommended to include 4 vias on the host PCB near the corners (not in keep out area) to avoid tilting of the commModule MBP during soldering.

**Intrinsic safety:**

1. Ensure there is no copper within 0.5mm of the marked Keep Out Area on the host PCB.
2. Ensure a clearance of 2mm between signals from pins 40 to 43 to all other pins.
3. Ensure a clearance of 2mm between fieldbus from pins 37 – 39 to all other pins and the corresponding testpads on the bottom.

**Note**

The bottom of the module is connected to digital GND covered by soldermask and has round testpads (1.2mm in diameter). When calculating creepage distances please bear in mind that there is no soldermask near the pads on the bottom..

**Solder paste****Note**

The recommended stencil thickness is 0.12 to 0.15mm.

**Note**

Please contact Softing [support.automation@softing.com](mailto:support.automation@softing.com) for a copy of the schematic library and the PCB library for the Altium Designer.

## 6.4 Mounting process

The PCB is made of FR4 and has a NiAu surface finish. We strongly recommend that commModule MBP modules are not soldered more than once after shipping by Softing.

The soldering of the communication module is compliant with RoHS directive 2011/65.



### Note

It is recommended to perform electrical, climate, stress and vibration tests on the final assembled product to verify that the manufacturing process has not damaged the commModule MBP. The commModule MBP is a moisture sensitive device.

### Reflow recommendations

The following temperatures and times are recommended for variant commModule MBP #STD\_NOP:

- Ramp up rate 3°C/second max
- Maximum time maintained above 217°C 40 -60 seconds
- Peak reflow temperature 245°C
- Ramp down rate 4°C/second max



### CAUTION

commModule MBP #STD must be soldered by hand.

## 6.5 ESD handling precautions



The commModule MBP contains highly sensitive electronic circuitry and is an Electrostatic Sensitive Device (ESD). Observe precautions for safe handling! Failure to observe these precautions can result in severe damage to the module.

## 6.6 Packaging and labeling

The commModule MBP #STD is a moisture sensitive device. They are shipped in ESD safe trays measuring approximately 136 x 315 mm.

### Storage and Drying

The packaging may not exceed the max. temperature of 60°C.

### Labeling

**commModule MBP#STD softing**

Ordernumber      REV:

S# Serialnumber range

QTY: 90



Softing Industrial Automation GmbH, D-85540 Haar  
Made in Germany

## 7 Special conditions for safe use

Please read and follow the instructions in this manual.

- If the safety notes are not observed or in case of inappropriate handling of the device, our liability is waived.
- The details of this user manual have to be observed as have to be the conditions for use and the applicable details stated on the marking, type labeling and accompanying documentation of each device.
- The device is only approved for intended and appropriate use. In case of non-compliance, the warranty and manufacturer's liability do no longer apply!
- It has to be ensured that only such equipment is installed which complies with the types of protection applicable to the relevant zones!
- All connected electrical equipment has to be suitable for the respective intended use.

Equipment Protection Level Ga requires an enclosure according to IEC 60079-0. Mechanical strength tests on enclosures, e.g. degree of protection (IP), thermal endurance tests, impact test, fall test are not applicable for the commModule MBP as a bare module.

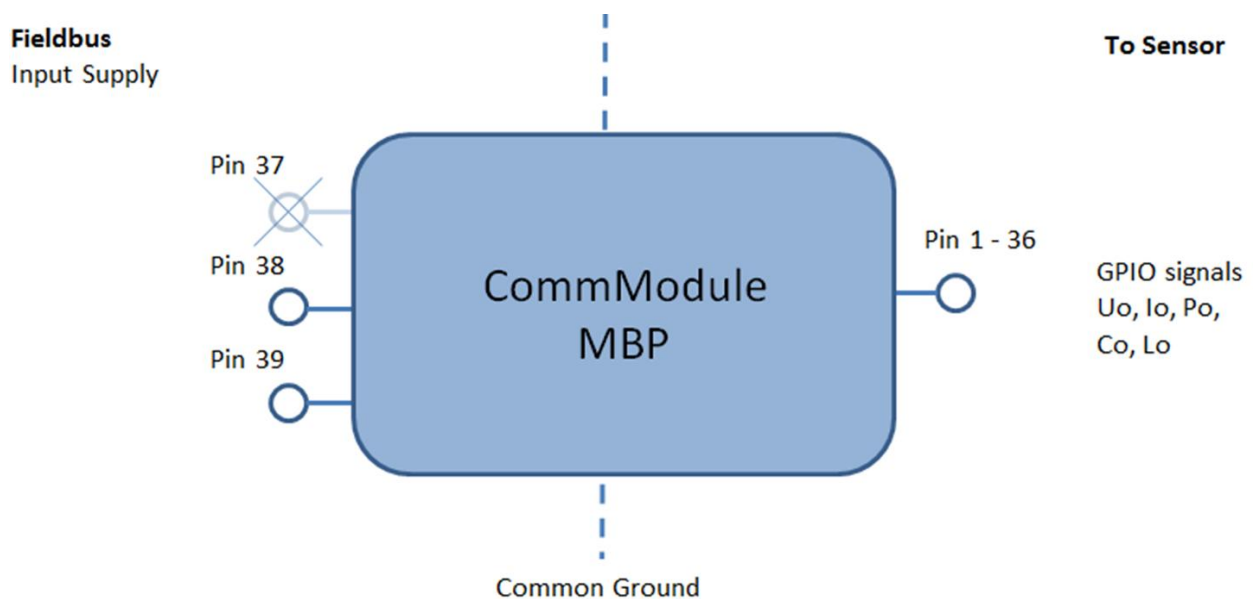


### CAUTION

The circuits of the commModule MBP have no galvanic isolation. All signals have a galvanic connection.

### 7.1 Safety block diagram

The following block diagram shows the commModule MBP:





## 7.2 Installation

The commModule MBP must be installed by qualified personnel only.

Ensure that the equipment installed complies with the types of protection relevant to the applicable zones and categories and with local requirements for electrical equipment used in explosive areas associated with explosive atmosphere.

The following points must be considered when deploying the unit:

- The device must be used as intended by the manufacturer
- Do not use this device when damaged.
- Do not use this device when certification information is illegible.
- Observe storage conditions.
- Clean installation space.
- Installation done according to instructions.
- Do not put stress on the system by bending or torsion.
- Connecting improper or non Ex certified equipment invalidates Ex approval of device.
- Electrical parameters of connected devices must match the values described in the technical section.
- Local requirements for electrical equipment for use with hazardous location associated with explosive atmosphere shall be considered for installation.
- This device has no housing and must be protected in a cabinet against splash water, dirt, moisture mechanical force exceeding pollution degree 1.

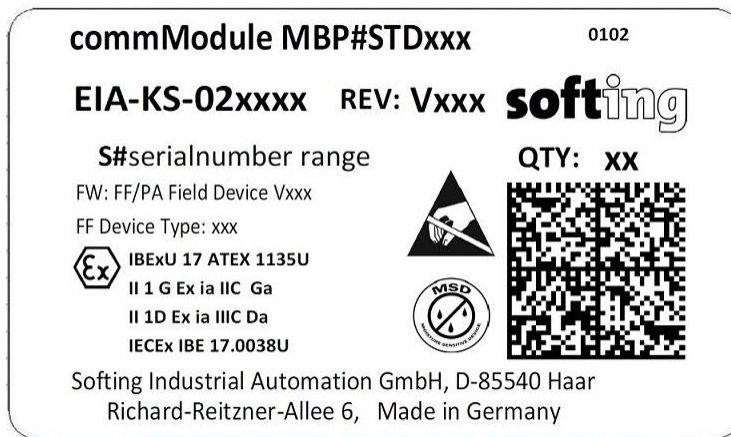
## 7.3 Isolation and creepage distances

Following creepage and clearance distances and separations must be observed when integrating the commModule MBP.

Pin	Signal	Creepage and clearance
Pin 1 to 36	GPIO, GND, DBG	No requirement on creepage distances between these signals. Clearance and creepage distance to all other signals with level of protection 10V according to table 5 in IEC 60079-0
Pin 37	FB_P_NF	Clearance and creepage distance to all other signals except FIELDBUS_N with level of protection 30V according to table 5 in IEC 60079-0
Pin 38, 39	FIELDBUS_P, FIELDBUS_N	No requirement on creepage distances between these signals. Clearance and creepage distance to all other signals with level of protection 30V according to table 5 in IEC 60079-0
Pin 40 to 43	FDE_PO, FDE_PI, FDE_NO, FDE_NI	No requirement on creepage distances between these signals. Clearance and creepage distance to all other signals with level of protection 30V according to table 5 in IEC 60079-0

## 7.4 Label

The commModule MBP #STD is marked with a label similar to the example below. The Ex marking for commModule MBP #STD\_NOP is printed on the packaging, as the module is too small to show entire full marking.



## 7.5 Maintenance and spare parts

The device does not require any maintenance.

In case of malfunctioning or failure, disassemble the device or the affected part and return this device to Softing for repair.





## 8 CE Compliance



This device complies with the following EC directives:

- EC directive 2014/30/EU "EMC directive"
- EC directive 2014/34/EU "ATEX"
- EC directive 2011/165/EU "RoHS", amended by Commission Delegated Directive (EU) 2015/863

## 8.1 ATEX EC type examination certificate

<b>IBExU Institut für Sicherheitstechnik GmbH</b> An-Institut der TU Bergakademie Freiberg	
[1]	<b>EU-TYPE EXAMINATION CERTIFICATE - Translation</b>
[2]	Components intended for use on / in an equipment or protective systems intended for use in potentially explosive atmospheres, Directive 2014/34/EU
[3]	EU-type examination certificate number <b>IBExU17ATEX1135 U</b>   Issue 1
[4]	Product: <b>CommModule</b> Type: MBP #STD, MBP #STD-NOP, MBP #F32, MBP #F32-NOP and MBP #ML
[5]	Manufacturer: Softing Industrial Automation GmbH
[6]	Address: Richard-Reitzner-Allee 6 85540 Haar GERMANY
[7]	This product and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.
[8]	IBExU Institut für Sicherheitstechnik GmbH, notified body number 0637 in accordance with Article 17 of Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, certifies that this product has been found to comply with the essential health and safety requirements relating to the design and construction of products intended for use in potentially explosive atmospheres given in Annex II to the Directive.
	The examination and test results are recorded in the confidential test report IB-19-3-0186.
[9]	Compliance with the essential health and safety requirements has been assured by compliance with: EN IEC 60079-0:2018 and EN 60079-11:2012 except in respect of those requirements listed at item [18] of the schedule.
[10]	If the sign "U" is placed after the certificate number, it indicates that this certificate must not be mistaken for a certificate intended for an equipment or protective system. This partial certification may be used as a basis for certification of an equipment or protective system.
[11]	This EU-type examination certificate relates only to the design and construction of the specified product. Further requirements of the Directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.
[12]	The marking of the product shall include the following:
	 <b>II 1G Ex ia IIC Ga</b>  <b>II 1D Ex ia IIIC Da</b>
	IBExU Institut für Sicherheitstechnik GmbH Fuchsmühlenweg 7 09599 Freiberg, GERMANY
	By order  Dipl.-Ing. [FH] Henker
	 (notified body number 0637)
	Tel: + 49 (0) 37 31 / 38 05 0 Fax: + 49 (0) 37 31 / 38 05 10
	Certificates without signature and seal are not valid. Certificates may only be duplicated completely and unchanged. In case of dispute, the German text shall prevail.
	Freiberg, 2019-11-15
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	FB106101   0

**IBExU Institut für Sicherheitstechnik GmbH**  
An-Institut der TU Bergakademie Freiberg

[13] **Schedule**

[14] **Certificate number IBExU17ATEX1135 U | Issue 1**

[15] **Description of product**

The CommModule MBP is a communication interface from an industrial intrinsic safe fieldbus Profibus PA and Foundation Fieldbus according to IEC 61158-2 to an intelligent field device, for instance a sensor. According to FISCO, IEC 60079-11 annex G, it is a field device.

The CommModule MBP is an electronic assembly which is integrated into the intelligent field device. It is usually part of the field device because it enables a field device to be connected to a fieldbus. The enclosure must be suitable for the requirements for the type of protection "intrinsic safety". The manufacturer of this field device is responsible to approve the system containing the CommModule MBP according to the legal regulations.

The device may be used in different variants regarding to the incoming fieldbus power and used fuses. This results in different intrinsically input parameters. The parameters are listed in the table below. For details see Safety Blockdiagram in User Manual.

Table 1 contains the intrinsic safe parameters regarding the fieldbus, the incoming side, respectively the external power supply. The parameters  $C_i$  and  $L_i$  are negligible. Those versions marked with '#F' contain a 32 mA fuse instead of the standard 62 mA.

Table 1

No	Use case	Input Supply	Temperature Class / max. thermal power	Ambient temperature range
#1 #F1	External fused with 32 mA	FISCO or EX ia IIB, $U_i = 17.5V$ , $I_i = 380\text{ mA}$ or EX ia IIC, $U_i = 24V$ , $I_i = 250\text{ mA}$	T4  $P_i = 1.31\text{ W}$	$-40\text{ °C} \dots +80\text{ °C}$
#2 #F2	External fused with 32 mA	FISCO or EX ia IIB, $U_i = 17.5V$ , $I_i = 380\text{ mA}$ or EX ia IIC, $U_i = 24V$ , $I_i = 250\text{ mA}$	T6  $P_i = 1.31\text{ W}$	$-40\text{ °C} \dots +50\text{ °C}$
#3 #F3	External fused with 32mA, only FISCO	FISCO or EX ia IIB, $U_i = 17.5V$ , $I_i = 380\text{ mA}$	T6  $P_i = 0.95\text{ W}$	$-40\text{ °C} \dots +60\text{ °C}$
#4	Internal fused with 62 mA	FISCO or EX ia IIB, $U_i = 17.5V$ , $I_i = 380\text{ mA}$ or EX ia IIC, $U_i = 24V$ , $I_i = 250\text{ mA}$	T4  $P_i = 2.53\text{ W}$	$-40\text{ °C} \dots +80\text{ °C}$
#5 #F5	External fused with 32 mA and External supply	FISCO or EX ia IIB, $U_i = 17.5V$ , $I_i = 380\text{ mA}$ or EX ia IIC, $U_i = 24V$ , $I_i = 250\text{ mA}$ , all: $P_{iFB} = 1.31\text{ W}$ each external supply: $U_i = 5\text{ V}$ , $P_{iAS} = 1.06\text{ W}$	T4  $P_i = 2.37\text{ W}$	$-40\text{ °C} \dots +80\text{ °C}$

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No	Use case	Input Supply	Temperature Class / max. thermal power	Ambient temperature range
#6 #F6	External fused with 32 mA and External supply or Internal fused with 32 mA and External supply	EX ia IIC, $U_i = 28V$ , $I_i = 93\text{ mA}$ , $P_{iFB} = 1.53\text{ W}$ and external: $U_i = 5\text{ V}$ , $P_{iAS} = 1.06\text{ W}$	T4  $P_i = 2.59\text{ W}$	-40 °C .. +70 °C
#7	External fused with 32 mA and External supply 1,36 W  ( new: MBP #ML )	EX ia IIC, $U_i = 28\text{ V}$ , $I_i = 93\text{ mA}$ or FISCO or EX ia IIB, $U_i = 17,5\text{ V}$ , $I_i = 380\text{ mA}$ or EX ia IIC, $U_i = 24\text{ V}$ , $I_i = 250\text{ mA}$ , all: $P_{iFB} = 1.31\text{ W}$ each with external supply: $U_i = 5\text{ V}$ , $P_{iAS} = 1.36\text{ W}$	T4  $P_i = 2.89\text{ W}$	-40 °C .. +60 °C

The intrinsically safe ratings at user terminals (output) are:

Table 2

Pin 1-6, 7, 9-14, 16-18, 20-35	IIB	IIC
$U_o$	4.94 V	4.94 V
$\Sigma P_o$ #1, #F1, #2, #F2, #3, #F3	390 mW	390 mW
$\Sigma P_o$ #4	750 mW	750 mW
$\Sigma P_o$ #5, #F5, #6, #7	1450 mW	1450 mW
$\Sigma P_o$ #7	1750 mW	1750 mW
$C_i$	20 $\mu\text{F}$	20 $\mu\text{F}$
$C_o$	200 $\mu\text{F}$	22 $\mu\text{F}$
$L_i$	negligible	negligible
$L_o$	1 $\mu\text{H}$	1 $\mu\text{H}$
Pin 21 6V2 out	IIB	IIC
$U_o$	7.14 V	7.14 V
$I_o$	380 mA	250 mA
$C_i$	12 $\mu\text{F}$	12 $\mu\text{F}$
$C_o$	100 $\mu\text{F}$	1.5 $\mu\text{F}$
$L_i$	negligible	negligible
$L_o$	5 $\mu\text{H}$	1 $\mu\text{H}$

Variations compared to issue 0 of this certificate:

**Variation 1**

The Ex Component fulfils the requirements of EN IEC 60079-0:2018.

**Variation 2**

The Ex Component may be manufactured according to the changed documents.

**Variation 3**

The intrinsically safe output parameter have been changed.

**[16] Test report**

The test results are recorded in the confidential test report IB-19-3-0186 of 2019-11-13.  
The test documents are part of the test report and they are listed there.



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*Summary of the test results*

The communication module CommModule MBP including version MBP #ML further fulfils the requirements of explosion protection for Ex components of Group II and Category 1G and 1D in type of protection intrinsic safety "ia" for explosion groups IIC and IIIC.

**[17] Specific conditions of use**

1. The module shall be installed a suitable enclosure. The separation distances and thermal parameter have to be considered.
2. To achieve the thermal ratings of the CommModule MBP thermal heat dissipation to the base-board is required. The Module should be soldered on FR4 board with minimum size 58 x 47 mm<sup>2</sup>, thickness 1.5 mm, with copper plane for heat spreading to the housing or similar thermal heat dissipation.
3. The user has to ensure that the external fuse meets the requirements according to clause 7.3 of EN 60079-11:2012.
4. Following creepage and clearance distances and separations must be observed when integrating CommModule MBP:

Pin	Signal	Creepage and clearance
Pin 1 to 36	GPIO, GND, DBG	No requirement on creepage distances between these signals. Clearance and creepage distance to all other signals with level of protection 10 V according to EN 60079-11:2012
Pin 37	FB_P_NF	Clearance and creepage distance to all other signals except FIELDBUS_N with level of protection 30 V according to table 5 in EN 60079-11:2012
Pin 38, 39	FIELDBUS_P, FIELDBUS_N	No requirement on creepage distances between these signals. Clearance and creepage distance to all other signals with level of protection 30 V according to table 5 in EN 60079-11:2012
Pin 40 to 43	FDE_PO, FDE_PI, FDE_NO, FDE_NI	No requirement on creepage distances between these signals. Clearance and creepage distance to all other signals with level of protection 30 V according to table 5 in EN 60079-11:2012

5. Variants #STD-NOP and #F32-NOP certification is void without potting. Potting must be applied on final assembly. The requirements as specified in clause 6.6 of EN 0079-11 have to be met. Potting process and the compound have to be assessed by the notified body of manufacturer of the complete equipment.
6. Final assembly requires marking as FISCO Field device.
7. The CommModule MBP #ML contains one diode instead of the full bridge. It needs to be supplied by an external diode to reach "ia" – level and an external 32 mA fuse to limit the power.
8. The maximum surface temperature or the temperature class may be determined according to Table 1 of this certificate depending on maximum dissipating power and ambient temperature.

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**[18] Essential health and safety requirements**

In addition to the essential health and safety requirements (EHSRs) covered by the standards listed at item [9], the following are considered relevant to this product, and conformity is demonstrated in the test report:  
None

**[19] Drawings and Documents**

The documents are listed in the test report.

IBExU Institut für Sicherheitstechnik GmbH  
Fuchsmühlenweg 7  
09599 Freiberg, GERMANY

By order



Dipl.-Ing. [FH] Henker

Freiberg, 2019-11-15



## 8.2 IECEx Certificate of Conformity

		<h1>IECEx Certificate of Conformity</h1>	
<p align="center"><b>INTERNATIONAL ELECTROTECHNICAL COMMISSION</b>  <b>IEC Certification System for Explosive Atmospheres</b>  <small>for rules and details of the IECEx Scheme visit <a href="http://www.iecex.com">www.iecex.com</a></small>  <b>Ex COMPONENT CERTIFICATE</b></p>			
Certificate No.:	<b>IECEx IBE 17.0038U</b>	Page 1 of 4	<u>Certificate history:</u>
Status:	<b>Current</b>	Issue No: 2	Issue 1 (2019-11-15) Issue 0 (2017-11-24)
Date of Issue:	2022-04-05		
Applicant:	<b>Softing Industrial Automation GmbH</b> Richard-Reitzner-Allee 6 85540 Haar <b>Germany</b>		
Ex Component:	CommModuleMBP #STD, MBP #STD-NOP, MBP #F32, MBP #F32-NOP		
<i>This component is NOT intended to be used alone and requires additional consideration when incorporated into other equipment or systems for use in explosive atmospheres (refer to IEC 60079-0).</i>			
Type of Protection:	<b>intrinsic safety</b>		
Marking:	Ex ia IIC Ga Ex ia IIC Da		
Approved for issue on behalf of the IECEx Certification Body:		<b>Kai Willamowski</b>	
Position:		<b>Head of department Certification Body</b>	
Signature: (for printed version)			
Date: (for printed version)			
1. This certificate and schedule may only be reproduced in full. 2. This certificate is not transferable and remains the property of the issuing body. 3. The Status and authenticity of this certificate may be verified by visiting <a href="http://www.iecex.com">www.iecex.com</a> or use of this QR Code.			
Certificate issued by: <b>IBExU Institut für Sicherheitstechnik GmbH</b> <b>Fuchsmühlenweg 7</b> <b>09599 Freiberg</b> <b>Germany</b>			



## IECEx Certificate of Conformity

Certificate No.: **IECEx IBE 17.0038U**

Page 2 of 4

Date of issue: 2022-04-05

Issue No: 2

Manufacturer: **Softing Industrial Automation GmbH**  
Richard-Reitzner-Allee 6  
85540 Haar  
**Germany**

Manufacturing  
locations: **Softing Industrial Automation GmbH**  
Richard-Reitzner-Allee 6  
85540 Haar  
**Germany**

This certificate is issued as verification that a sample(s), representative of production, was assessed and tested and found to comply with the IEC Standard list below and that the manufacturer's quality system, relating to the Ex products covered by this certificate, was assessed and found to comply with the IECEx Quality system requirements. This certificate is granted subject to the conditions as set out in IECEx Scheme Rules, IECEx 02 and Operational Documents as amended

**STANDARDS :**

The component and any acceptable variations to it specified in the schedule of this certificate and the identified documents, was found to comply with the following standards

**IEC 60079-0:2017** Explosive atmospheres - Part 0: Equipment - General requirements  
Edition: 7.0

**IEC 60079-11:2011** Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"  
Edition: 6.0

This Certificate **does not** indicate compliance with safety and performance requirements other than those expressly included in the Standards listed above.

**TEST & ASSESSMENT REPORTS:**

A sample(s) of the component listed has successfully met the examination and test requirements as recorded in:

Test Reports:

**DE/IBE/ExTR16.0054/00**  
**DE/IBE/ExTR16.0054/03**

**DE/IBE/ExTR16.0054/01****DE/IBE/ExTR16.0054/02**

Quality Assessment Report:

**DE/PTB/QAR11.0002/05**



## IECEx Certificate of Conformity

Certificate No.: **IECEx IBE 17.0038U**

Page 3 of 4

Date of issue: 2022-04-05

Issue No: 2

### Ex Component(s) covered by this certificate is described below:

The CommModule MBP is a communication interface from an industrial intrinsic safe fieldbus Profibus PA or Foundation Fieldbus according to IEC 61158-2 to an intelligent field device, for instance a sensor. According to FISCO, IEC 60079-11 annex G, it is a field device.

The CommModule MBP is an electronic assembly which is integrated into the intelligent field device. It is usually part of the field device because it enables a field device to be connected to a fieldbus. The enclosure must be suitable for the requirements for the type of protection "intrinsic safety". The manufacturer of this field device is responsible to approve the system containing the CommModule MBP according to the legal regulations.

The device may be used in different variants regarding to the incoming fieldbus power and used fuses. This results in different intrinsically input parameters (see Annex).

### SCHEDULE OF LIMITATIONS:

- The module shall be installed in a suitable enclosure. The separation distances and thermal parameter have to be considered.
- To achieve the thermal ratings of the CommModule MBP thermal heat dissipation to the baseboard is required. The Module should be soldered on FR4 board with minimum size 58 x 47 mm<sup>2</sup>, thickness 1.5 mm, with copper plane for heat spreading to the housing or similar thermal heat dissipation.
- The user has to ensure that the external fuse meets the requirements according to clause 7.3 of IEC 60079-11:2011.
- Following creepage and clearance distances and separations must be observed when integrating CommModule MBP:

Pin	Signal	Creepage and clearance
Pin 1 to 36	GPIO, GND, DBG	No requirement on creepage distances between these signals. Clearance and creepage distance to all other signals with level of protection 10 V according to table 5 in IEC 60079-11:2011
Pin 37	FB_P_NF	Clearance and creepage distance to all other signals except FIELDBUS_N with level of protection 30V according to table 5 in IEC 60079-11:2011
Pin 38, 39	FIELDBUS_P, FIELDBUS_N	No requirement on creepage distances between these signals. Clearance and creepage distance to all other signals with level of protection 30V according to table 5 in IEC 60079-11:2011
Pin 40 to 43	FDE_PO, FDE_PI, FDE_NO, FDE_NI	No requirement on creepage distances between these signals. Clearance and creepage distance to all other signals with level of protection 30V according to table 5 in IEC 60079-11:2011

- Variant #STD-NOP and #F32-NOP certification is void without potting. Potting must be applied on final assembly. The Requirements as specified in clause 6.6 of IEC60079-11 have to be met. Potting process and the compound have to be assessed by ExCB certifying the complete equipment.
- Final assembly requires marking as FISCO Field device.
- The CommModule MBP #ML contains one diode instead of the full bridge. It needs to be supplied by an external diode to reach "ia" – level and an external 32 mA fuse to limit the power.
- The maximum surface temperature or the temperature class may be determined according to Table 1 of this certificate depending on maximum dissipating power and ambient temperature.



## IECEx Certificate of Conformity

Certificate No.: **IECEx IBE 17.0038U**

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Date of issue: 2022-04-05

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**DETAILS OF CERTIFICATE CHANGES (for issues 1 and above)**

- The Ex Component may be manufactured according to the changed documents.
- New type plate for very small components used.

**Annex:**

[Annex\\_IBE17.0038U\\_03.pdf](#)



## IECEx Certificate of Conformity - Annex



Certificate No: IECEx IBE 17.0038U

Issue No: 3

Date of Issue: 2022-03-25

Page 1 of 2

### Technical data:

No	Use case	Input Supply	Temperature class / max. thermal power loss	Ambient temperature range
#1 #F1	External fused with 32 mA	FISCO or EX ia IIB, $U_i = 17.5\text{ V}$ , $I_i = 380\text{ mA}$ or EX ia IIC, $U_i = 24\text{ V}$ , $I_i = 250\text{ mA}$	T4  $P = 1.31\text{ W}$	$-40\text{ °C} \dots +80\text{ °C}$
#2 #F2	External fused with 32 mA	FISCO or EX ia IIB, $U_i = 17.5\text{ V}$ , $I_i = 380\text{ mA}$ or EX ia IIC, $U_i = 24\text{ V}$ , $I_i = 250\text{ mA}$	T6  $P = 1.31\text{ W}$	$-40\text{ °C} \dots +50\text{ °C}$
#3 #F3	External fused with 32 mA, only FISCO	FISCO or EX ia IIB, $U_i = 17.5\text{ V}$ , $I_i = 380\text{ mA}$	T6  $P = 0.95\text{ W}$	$-40\text{ °C} \dots +60\text{ °C}$
#4	Internal fused with 62 mA	FISCO or EX ia IIB, $U_i = 17.5\text{ V}$ , $I_i = 380\text{ mA}$ or EX ia IIC, $U_i = 24\text{ V}$ , $I_i = 250\text{ mA}$	T4  $P = 2.53\text{ W}$	$-40\text{ °C} \dots +80\text{ °C}$
#5 #F5	External fused with 32 mA + External supply	FISCO or EX ia IIB, $U_i = 17.5\text{ V}$ , $I_i = 380\text{ mA}$ or EX ia IIC, $U_i = 24\text{ V}$ , $I_i = 250\text{ mA}$ , all: $P_{iFB} = 1.31\text{ W}$ each external supply: $U_i = 5\text{ V}$ , $P_{iAS} = 1.06\text{ W}$	T4  $P = 2.37\text{ W}$	$-40\text{ °C} \dots +80\text{ °C}$
#6 #F6	External fused with 32 mA + External supply or Internal fused with 32 mA + External supply	EX ia IIC, $U_i = 28\text{ V}$ , $I_i = 93\text{ mA}$ $P_{iFB} = 1.53\text{ W}$ and external: $U_i = 5\text{ V}$ , $P_{iAS} = 1.06\text{ W}$	T4  $P = 2.59\text{ W}$	$-40\text{ °C} \dots +70\text{ °C}$
#7	External fused with 32 mA and External supply 1.36 W  ( new: MBP #ML )	EX ia IIC, $U_i = 28\text{ V}$ , $I_i = 93\text{ mA}$ or FISCO or EX ia IIB, $U_i = 17.5\text{ V}$ , $I_i = 380\text{ mA}$ or EX ia IIC, $U_i = 24\text{ V}$ , $I_i = 250\text{ mA}$ , all: $P_{iFB} = 1.31\text{ W}$ each with external supply: $U_i = 5\text{ V}$ , $P_{iAS} = 1.36\text{ W}$	T4  $P = 2.89\text{ W}$	$-40\text{ °C} \dots +60\text{ °C}$

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## IECEx Certificate of Conformity - Annex



Certificate No: IECEx IBE 17.0038U Issue No: 3  
Date of Issue: 2022-03-25 Page 2 of 2

The intrinsically safe ratings at user terminals (output) are:

Pin 1-6, 7, 9-14, 16-18, 20-35	IIB	IIC
U <sub>o</sub>	4.94 V	4.94 V
ΣP <sub>o</sub> #1, #F1, #2, #F2, #3, #F3	390 mW	390 mW
ΣP <sub>o</sub> #4	750 mW	750 mW
ΣP <sub>o</sub> #5, #F5, #6	1450 mW	1450 mW
ΣP <sub>o</sub> #7	1750 mW	1750 mW
C <sub>i</sub>	20 μF	20 μF
C <sub>o</sub>	200 μF	22 μF
L <sub>i</sub>	negligible	negligible
L <sub>o</sub>	1 μH	1 μH
Pin 21 6V2 out	IIB	IIC
U <sub>o</sub>	7.14 V	7.14 V
I <sub>o</sub>	380 mA	250 mA
C <sub>i</sub>	12 μF	12 μF
C <sub>o</sub>	100 μF	1.5 μF
L <sub>i</sub>	negligible	negligible
L <sub>o</sub>	5 μH	1 μH

The output power is always the sum of all output pins.

### 8.3 Declaration of Conformity

## EU-Konformitätserklärung EU Declaration of Conformity



Wir  
We

**Softing Industrial Automation GmbH**  
**Richard-Reitzner-Allee 6**  
**D-85540 Haar**

erklären hiermit in alleiniger Verantwortung, dass das Produkt  
*declare under our sole responsibility that the product*

Modell / Typ  
*Model / Type*

**commModule MBP#STD V1.04**  
**commModule MBP#STD\_NOP V1.04**

mit den Anforderungen der folgenden Richtlinien übereinstimmt  
*complies with the requirements of the following directives:*

**ATEX-Richtlinie 2014/34/EU**

*ATEX directive 2014/34/EU*

**EMV Richtlinie 2014/30/EU**

*EMC directive 2014/30/EU*

**ROHS-Richtlinie 2011/65/EU, ergänzt um Delegierte Richtlinie (EU) 2015/863**

*ROHS directive 2011/65/EU, amended by commission delegated directive (EU) 2015/863*

Angewandte harmonisierte Normen  
*Applied harmonised standards:*

**EN 55032:2015, Class B**

**EN 61326-1:2013**

**EN 61000-6-2:2005/AC :2005**

**EN IEC 60079-0:2018**

**EN 60079-11:2012**

**EN 50581: 2012 / EN IEC 63000:2018**

*HAAR 18.04.2021*

Ort, Datum  
*Place, Date*

Geschäftsführer  
*Managing Director*



**Softing Industrial Automation GmbH**

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