TYPE APPROVAL CERTIFICATE

Certificate no.:
TAA0000034
Revision No:
3

This is to certify:

that the Peripheral Equipment

with type designation(s)
Remote I/O LB/FB/MFT

issued to
Pepperl+Fuchs SE
Mannheim, Baden-Württemberg, Germany

is found to comply with
DNV rules for classification – Ships, offshore units, and high speed and light craft

Application:

Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV.

Location classes:

Temperature	**D**
Humidity	**B**
Vibration	**A**
EMC	**B (Limitation on page 6)**
Enclosure	**Required protection according to DNV Rules shall be provided upon installation on board**

Issued at **Hamburg** on **2024-10-08**
This Certificate is valid until **2025-05-07**.
DNV local unit: **Augsburg**

for **DNV**

Approval Engineer: **Holger Jansen**

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid.
The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to 300,000 USD.

Product description

LB and FB remote I/O modules are signal conditioning devices for interfacing signals from the field to controllers or process control systems. The modules have simple plug and play design.

Type	Type designation – FB Modules	Description
1	**Stations**	
S	FB9xxx-xxx-x-x-x-x-x (2)	Standard FB enclosure to accept I/O modules, communication units and power supplies
S	FB9xxx-xxx-x-x-x-x-x-Yxxxxxx (2)	Customized FB enclosure to accept I/O modules, communication units and power supplies
2	**Backplanes**	
BP	FB92xxBPxxxxx.x	Backplane to accept I/O modules, communication units and power supplies
3	**Power supplies**	
PS	FB9206xxxxx (1)	Power supply 24 V DC
PS	FB9215xxxxx (1)	Power supply 230 V AC
PS	FB9216xxxxx (1)	Power supply 115 V AC
PS	FB9205xxxxx (1)	Power supply 95-230 V AC
4	**Bus termination modules**	
BT	FB9293xxxxx (1)	Bus termination module for service bus
BT	FB9294xxxxx (1)	Bus termination module for field bus
BT	FB9295xxxxx (1)	Bus termination module for field- and service bus
5	**Communication units**	
BK	FB8x05xxxxx (1)	PROFIBUS ComUnit (Standard)
BK	FB8x06xxxxx (1)	EasyCOM ComUnit (PROFIBUS)
BK	FB8x07xxxxx (1)	MODBUS ComUnit
BK	FB8x08xxxxx (1)	PROFIBUS ComUnit (Timestamp)
BK	FB8x09xxxxx (1)	PROFIBUS ComUnit (UniCom)
BK	FB8x10xxxxx (1)	FF ComUnit
BK	FB8x11xxxxx (1)	MODBUS TCP/IP ComUnit
BK	ISCM8x00xxxxx (1)	HDLC Fieldbus ComUnit
6	**Digital input**	
BI	FB1x01xxxxx (1)	Digital inputs
BI	FB1x02xxxxx (1)	Digital inputs
BI	FB1x03xxxxx (1)	Digital inputs
BI	FB1x04xxxxx (1)	Digital inputs
BI	FB1x08xxxxx (1)	Digital inputs
BI	FB1x09xxxxx (1)	Digital inputs
7	**Digital output with feedback**	
BO/BI	FB2x01xxxxx (1)	Digital output with feedback
BO/BI	FB2x02xxxxx (1)	Digital output with feedback
BO/BI	FB2x03xxxxx (1)	Digital output with feedback
BO/BI	FB2x04xxxxx (1)	Digital output with feedback
BO/BI	FB2x05xxxxx (1)	Digital output with feedback
BO/BI	FB2x12xxxxx (1)	Digital output with feedback
BO/BI	FB2x13xxxxx (1)	Digital output with feedback
8	**Analog input (current)**	
AI	FB3x01xxxxx (1)	Analog input
AI	FB3x02xxxxx (1)	Analog input
AI	FB3x03xxxxx (1)	Analog input
AI	FB3x04xxxxx (1)	Analog inputs
AI	FB3x05xxxxx (1)	Analog inputs
9	**Analog output (current)**	
AO	FB4x01xxxxx (1)	Analog output
AO	FB4x02xxxxx (1)	Analog output
AO	FB4x04xxxxx (1)	Analog outputs
AO	FB4x05xxxxx (1)	Analog outputs
10	**Analog input (Voltage/Thermocouple)**	
AI	FB5x01xxxxx (1)	Analog input (resistor)
AI	FB5x02xxxxx (1)	Analog input (mV /thermocouple)
AI	FB5x04xxxxx (1)	Analog inputs (resistor)
AI	FB5x05xxxxx (1)	Analog inputs (mV /thermocouple)

AI	FB5x06xxxxx (1)	Analog input (mV)
11	**Digital output (Relay)**	
BO	FB6x01xxxxx (1)	Digital outputs
BO	FB6x05xxxxx (1)	Digital outputs
BO	FB6x06xxxxx (1)	Digital outputs
12	**Digital output active (low power source)**	
BO	FB6x08xxxxx (1)	Digital outputs
13	**Digital output, active (high power source)**	
BO	FB6x10xxxxx (1)	Digital outputs
BO	FB6x11xxxxx (1)	Digital outputs
BO	FB6x13xxxxx (1)	Digital outputs
BO	FB6x14xxxxx (1)	Digital outputs
BO	FB6x15xxxxx (1)	Digital outputs

(1) The first "x" in the module type labelling is a placeholder for classification regarding Ex - features and product lines (LB: no Ex, Ex- i; FB: Ex- i, Ex- e).
The "xxxxx" at the end of the module type labelling are placeholders for additional specifications regarding module variants with very less differences to the standard modules e.g.:
- product line classification LB/FB,
- definition regarding connecting leads by Ex- e modules (length of lead, shielded/unshielded),
- identification marker for additional functions (e.g. shutdown input, LFD),
- ComUnit firmware version,
- classification regarding input filter,
- classification regarding output values (V/mA).

(2) The placeholder's "x" are for additional specifications of the enclosure e.g.:
- Enclosure material
- Enclosure size
- Cable gland size and type

S = Station; BP = Backplane; PS = Power supply; BT = Bus termination; BI = Digital input; BO = Digital output; AI = Analog input; AO = Analog output; Z = Accessories

Type	Type designation – LB Modules	Description
1	**Stations**	
S	LB9xxx-xxx-x-x-x-x-x (2)	Standard LB enclosure to accept I/O modules, communication units and power supplies
S	LB9xxx-xxx-x-x-x-x-x-Yxxxxxx (2)	Customized LB enclosure to accept I/O modules, communication units and power supplies
2	**Backplanes**	
BP	LB9022xxxxx (1)	Redundancy backplane - slots: 2x ComUnit, 3x Power supply, 22x I/O-modules
BP	LB9023xxxxx (1)	Base backplane - slots: 1x ComUnit, 1x Power supply, 8x I/O-modules
BP	LB9024xxxxx (1)	Extension backplane - slots: 3x Power supply, 24x I/O-modules
BP	LB9025xxxxx (1)	Extension backplane - slots: 1x Power supply, 8x I/O-modules
BP	LB9026xxxxx (1)	Base backplane - slots: 1x ComUnit, 2x Power supply, 16x I/O-modules
BP	LB9027xxxxx (1)	Extension backplane - slots: 2x Power supply, 16x I/O-modules
BP	LB9029xxxxx (1)	Redundancy backplane - slots: 2x ComUnit, 3x Power supply, 12x I/O-modules
BP	LB9035xxxxx (1)	Base backplane - slots: 1x ComUnit, 1x Power supply, 5x I/O-modules
3	**Power supply**	
PS	LB9006xxxxx (1)	
4	**Comunications unit**	
BK	LB8x05xxxxx (1)	PROFIBUS ComUnit (Standard)
BK	LB8x06xxxxx (1)	EasyCOM ComUnit (PROFIBUS)
BK	LB8x07xxxxx (1)	MODBUS ComUnit
BK	LB8x08xxxxx (1)	PROFIBUS ComUnit (Timestamp)
BK	LB8x09xxxxx (1)	PROFIBUS ComUnit (UniCom)
BK	LB8x10xxxxx (1)	FOUNDATION Fieldbus ComUnit
BK	LB8x11xxxxx (1)	MODBUS TCP/IP ComUnit
BK	ISCM8x00xxxxx (1)	HDLC Fieldbus ComUnit
5	**Digital Input**	
BI	LB1x01xxxxx (1)	Digital inputs
BI	LB1x02xxxxx (1)	Digital inputs
BI	LB1x03xxxxx (1)	Digital inputs

BI	LB1x04xxxxx (1)	Digital inputs
BI	LB1x07xxxxx (1)	Digital inputs
BI	LB1x08xxxxx (1)	Digital inputs
BI	LB1x09xxxxx (1)	Digital inputs
BI	LB1x14xxxxx (1)	Digital inputs
BI	LB1x15xxxxx (1)	Digital inputs
6	**Digital output with feedback**	
BO/BI	LB2x01xxxxx (1)	Digital output with feedback
BO/BI	LB2x02xxxxx (1)	Digital output with feedback
BO/BI	LB2x03xxxxx (1)	Digital output with feedback
BO/BI	LB2x04xxxxx (1)	Digital output with feedback
BO/BI	LB2x05xxxxx (1)	Digital output with feedback
BO/BI	LB2x12xxxxx (1)	Digital output with feedback
BO/BI	LB2x13xxxxx (1)	Digital output with feedback
7	**Analog input (current)**	
AI	LB3x01xxxxx (1)	Analog input
AI	LB3x02xxxxx (1)	Analog input
AI	LB3x03xxxxx (1)	Analog input
AI	LB3x04xxxxx (1)	Analog inputs
AI	LB3x05xxxxx (1)	Analog inputs
AI	LB3x06xxxxx (1)	Analog inputs
8	**Analog output (current)**	
AO	LB4x01xxxxx (1)	Analog output
AO	LB4x02xxxxx (1)	Analog output
AO	LB4x04xxxxx (1)	Analog outputs
AO	LB4x05xxxxx (1)	Analog outputs
AO	LB4x06xxxxx (1)	Analog outputs
9	**Analog input (Voltage/Themocouple)**	
AI	LB5x01xxxxx (1)	Analog input (resistor)
AI	LB5x02xxxxx (1)	Analog input (mV / thermocouple)
AI	LB5x04xxxxx (1)	Analog inputs (resistor)
AI	LB5x05xxxxx (1)	Analog inputs (mV / thermocouple)
AI	LB5x06xxxxx (1)	Analog input (mV)
10	**Digital output (Relay)**	
BO	LB6x01xxxxx (1)	Digital outputs
BO	LB6x05xxxxx (1)	Digital outputs
BO	LB6x06xxxxx (1)	Digital outputs
11	**Digital output, active (low power source)**	
BO	LB6x08xxxxx (1)	Digital outputs
12	**Digital output, active (high power source)**	
BO	LB6x10xxxxx (1)	Digital outputs
BO	LB6x11xxxxx (1)	Digital outputs
BO	LB6x12xxxxx (1)	Digital outputs
BO	LB6x13xxxxx (1)	Digital outputs
BO	LB6x14xxxxx (1)	Digital outputs
BO	LB6x15xxxxx (1)	Digital outputs
13	**Universal input / output**	
AI/AO	LB7x04 xxxxx (1)	Universal I/O with 4 channels

(1) The first "x" in the module type labelling is a placeholder for classification regarding Ex - features and product lines (LB: no Ex, Ex- i; FB: Ex- i, Ex- e).
The "xxxxx" at the end of the module type labelling are placeholders for additional specifications regarding module variants with very less differences to the standard modules e.g.:

- product line classification LB/FB,
- definition regarding connecting leads by Ex- e modules (length of lead, shielded/unshielded),
- identification marker for additional functions (e.g. shutdown input, LFD),
- ComUnit firmware version,
- classification regarding input filter,
- classification regarding output values (V/mA).

(2) The placeholder's "x" is for additional specifications of the enclosure e.g.:

- Enclosure material
- Enclosure size
- Cable gland size and type

S = Station; BP = Backplane; PS = Power supply; BT = Bus termination; BI = Digital input; BO = Digital output; AI = Analog input; AO = Analog output; Z = Accessories

Type	Type designation LB/FB-accessories	Name
1	**LB/FB- accessories**	
Z	LB9007A	Screw terminals connector, 6- pole, green
Z	LB9107A	Screw terminals connector, 6- pole, blue
Z	LB9013A	Screw terminals connector, 8- pole, green
Z	LB9113A	Screw terminals connector, 8- pole, blue
Z	LB9125A	Screw terminals connector, 8- pole, blue
Z	LB9014A	Screw terminals connector, 2 x 8- pole, green
Z	LB9124A	Screw terminals connector, 2 x 8- pole, blue
Z	LB9008A	Cover for connector, 6-pole, green
Z	LB9108A	Cover for connector, 6-pole, blue
Z	LB9010A	Cover for connector, 8-pole, green
Z	LB9120A	Cover for connector, 8-pole, blue
Z	LB9011A	Cold junction module with hood, green
Z	LB9111A	Cold junction module with hood, blue
Z	LB9012A	Screw terminals connector with voltage divider
Z	LB9107P	Wire clamp connector, 6-pole, blue
Z	LB9009A	Wire clamp connector, 6-pole, green
Z	LB9015A	Wire clamp connector, 8-pole, green
Z	LB9115A	Wire clamp connector, 8-pole, blue
Z	LB9126A	Wire clamp connector, 8- pole, blue
Z	LB9130A	Wire clamp connector, 2 x 8-pole, blue
Z	LB9131A	Wire clamp connector, 2 x 8-pole, green
Z	LB9016A	Wire clamp connector, 2 x 8- pole, green
Z	LB9116A	Wire clamp connector, 2 x 8- pole, blue
Z	LB9017A	Front screw terminals connector, 6- pole, green
Z	LB9117A	Front screw terminals connector, 6- pole, blue
Z	LB9018A	Front screw terminals connector, 8- pole, green
Z	LB9118A	Front screw terminals connector, 8- pole, blue (1..8)
Z	LB9127A	Front screw terminals connector, 8- pole, blue (9..16)
Z	LB9019A	Front screw terminals connector, 2 x 8- pole, green
Z	LB9119A	Front screw terminals connector, 2 x 8- pole, blue
Z	LB9020A	Coding strip
Z	LB9099A	Dummy I/O module with socket 8-pole, green
Z	LB9199A	Dummy I/O module with socket 8-pole, blue
Z	LB9109A	DIN A4 label for TAG
Z	LB9153A	LB- connecting cable
Z	LB9001A	SUB D connector (out left)
Z	LB9002A	SUB D connector (out vertical)
Z	LB9003A	SUB D connector (out left) with busmonitor
Z	LB9110A	SUB D connector (out left)
Z	LTBM8001	Letterbug module with rotary switch (plugs into ISCM8x00)
Z	FB9271-xxx(3)	FB- connecting cable redundancy/basic
Z	FB9273-xxx(3)	FB- connecting cable redundancy/extension
Z	FB9272-xxx(3)	FB- connecting cable basic/extension
Z	FB9283-xxx(3)	FB- connecting cable BK/BK red
Z	542520	NAMUR replacement network for mech. Contacts
Z	542555 540233 540235 542160	Service bus converter RS232/RS485 inclusive wire set
Z	541039 541037 541038	Service bus converter USB inclusive wire set
Z	GHG4171302R0001	EMC line filter
Z	MFT-Base.2P.xxx (2)	Socket for Multi Functional Terminal 2-pole
Z	MFT-Base.4P.xxx (2)	Socket for Multi Functional Terminal 4-pole
Z	MFT-F.xxxx (2)	Multi Functional Terminal Fuse
Z	MFT-2F.xxxx (2)	Multi Functional Terminal Dual Fuse
Z	MFT-R.xxxx (2)	Multi Functional Terminal Resistor
Z	MFT-2R.xxxx (2)	Multi Functional Terminal Dual Resistor

Z	MFT-D.xxxx (2)	Multi Functional Terminal Diode
Z	MFT-2D.xxxx (2)	Multi Functional Terminal Dual Diode
Z	MFT-2L.xxxx (2)	Multi Functional Terminal Jumper
Z	MFT-FT.xxxx (2)	Multi Functional Terminal Bus Termination
Z	MFT-RNO.xxxx (2)	Multi Functional Terminal Relay; contact normal open
Z	MFT-RNC.xxxx (2)	Multi Functional Terminal Relay; contact normal closed
Z	MFT-T.xxxx (2)	Multi Functional Terminal Semiconductor Relay
Z	FB9349	Remote I/O enclosure
Z	FB9358	Remote I/O enclosure
(2) xxxx are placeholder for identifiers regarding different variants (e.g. value of resistor, value of fuse) (3) xxx length of the cable.		
S = Station; BP = Backplane; PS = Power supply; BT = Bus termination; BI = Digital input; BO = Digital output; AI = Analog input; AO = Analog output; Z = Accessories		

Approval conditions

The Type Approval covers hardware listed under Product description. When the hardware is used in applications to be classed by DNV, documentation for the actual application is to be submitted for approval by the manufacturer of the application system in each case. Reference is made to DNV Rules for Ships Pt.4 Ch.9 Control and Monitoring Systems.

Ex-certification is not covered by this certificate. Application in hazardous area to be approved in each case according to the Rules and Ex-Certification/ Special Condition for Safe Use listed in valid Ex-certificate issued by a notified/recognized Certification Body.

Application/Limitation

EMC in the range 2 GHz to 6 GHz according to DNV-CG-0339, August 2021 has not been documented. EMC up to 6 GHz must additionally be documented for installation on ships contracted for construction on or after 2022-01-01.

For the use on a ship the following conditions must be fulfilled to satisfy EMC requirements according to P+F Installation Instruction and Standard for Certification – DNVGL-CG-0339, November 2016 for EMC

Emission and Immunity:
- Hardware installed in metal cabinet
- EMC-Cable gland or separate screen rails inside the enclosure or
- Cabinet to connect the screen of the signal cables
- Shielded signal cables
- EMC line filter (only relevant for EMC class B applications)

More information can be found in Pepperl + Fuchs GmbH Installation instruction for Remote I/O named “Application Note”.

Type Approval documentation

Tests carried out

Applicable tests according to class guideline DNVGL-CG-0339, November 2016

Marking of product

The products to be marked with:
- manufacturer name: (Pepperl+Fuchs),
- model name
- serial number

Periodical assessment

The scope of the periodical assessment is to verify that the conditions stipulated for the type are complied with, and that no alterations are made to the product design or choice of systems, software versions, components and/or materials.

The main elements of the assessment are:
- Ensure that type approved documentation is available
- Inspection of factory samples selected at random from the production line (where practicable)
- Review of production and inspection routines, including test records from product sample tests and control routines
- Ensuring that systems, software versions, components and/or materials used comply with type approved documents and/or referenced system, software, component and material specifications
- Review of possible changes in design of systems, software versions, components, materials and/or performance, and make sure that such changes do not affect the type approval given

- Ensuring traceability between manufacturer's product type marking and the type approval certificate

A renewal assessment will be performed at renewal of the certificate.

END OF CERTIFICATE