



防爆合格证

证号: GYJ19.1232U

由 PEPPERL+FUCHS AG

(地址: Lilienthalstrasse 200, 68307 Mannheim, Germany)

制造的产品:

名称 FB I/O 模块

型号规格 FB2216* / FB2217* / FB6216* / FB6217*

防爆标志 Ex d e q [ia Ga] II C Gb

[Ex iaD]
[Ex ia Ma] I

产品标准 /

图样编号 /

经图样及技术文件的审查和样品检验, 确认上述产品符合 GB 3836.1-2010、GB 3836.2-2010、GB 3836.3-2010、GB 3836.4-2010、GB 3836.20-2010、GB/T 3836.7-2017、标准, GB 12476.1-2013、GB 12476.4-2010 特颁发此证。

本证书有效期: 2019年9月17日至2024年9月16日

备注 1. 安全使用注意事项见本证书附件。
2. 防爆合格证号后缀“U”表示Ex元件, 与其他电气设备或系统一起使用时需附加认证, 不能单独使用。
3. 电气安全参数见本证书附件。
4. 本安电气参数见本证书附件。

站长

国家级仪器仪表防爆安全监督检验站

颁发日期二〇一九年九月十七日

本证书仅对与认可文件和样品一致的产品有效。

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EXPLOSION PROTECTION

CERTIFICATE OF CONFORMITY

Cert NO.GYJ19.1232U

This is to certify that the product

FB I/O module

manufactured by PEPPERL+FUCHS AG

(Address:Lilienthalstrasse 200, 68307 Mannheim, Germany)

which model is FB2216* / FB2217* / FB6216* / FB6217*

Ex marking Ex d e q [ia Ga] IIC Gb
[Ex iaD]
[Ex ia Ma]I

product standard /

drawing number /

has been inspected and certified by NEPSI, and that it conforms
to GB 3836.1-2010,GB 3836.2-2010,GB 3836.3-2010,GB 3836.4-2010,
GB 3836.20-2010,GB/T 3836.7-2017,GB 12476.1-2013,GB 12476.4-2010

This Approval shall remain in force until 2024.09.16

Remarks

- 1.Conditions for safe use are specified in the attachment to this certificate.
- 2.When the sign "U" is placed after the certificate number, it indicates that the device is Ex component, which is not intended to be used alone and requires additional certification when incorporated into electrical apparatus or systems for use in potentially explosive atmospheres.
- 3.Safe parameters specified in the attachment to this certificate.
- 4.Intrinsic safety parameters specified in the attachment to this certificate.

Director

National Supervision and Inspection Centre for
Explosion Protection and Safety of Instrumentation

Issued Date 2019.09.17

This Certificate is valid for products compatible with the documents and samples approved by NEPSI.

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国家级仪器仪表防爆安全监督检验站

National Supervision and Inspection Centre for Explosion Protection and Safety of Instrumentation

(GYJ19.1232U)

(Attachment I)

GYJ19.1232U防爆合格证附件 I

由 PEPPERL+FUCHS AG 生产的FB2216* / FB2217* / FB6216* / FB6217*型FB I/O模块（简称FB IO），符合FB概念参数，经国家级仪器仪表防爆安全监督检验站（NEPSI）检验，符合下列标准的相关要求：

GB3836.1 - 2010	爆炸性环境	第1部分：设备 通用要求
GB3836.2 - 2010	爆炸性环境	第2部分：由隔爆外壳“d”保护的 设备
GB3836.3 - 2010	爆炸性环境	第3部分：由增安型“e”保护的 设备
GB3836.4 - 2010	爆炸性环境	第4部分：由本质安全型“i”保护的 设备
GB/T 3836.7 - 2017	爆炸性环境	第7部分：由充砂型“q”保护的 设备
GB3836.20 - 2010	爆炸性环境	第20部分：设备保护级别（EPL）为Ga级的 设备
GB12476.1 - 2013	可燃性粉尘环境用电气设备	第1部分：通用要求
GB12476.4 - 2010	可燃性粉尘环境用电气设备	第4部分：本质安全型“iD”

产品防爆标志：Ex d e q [ia Ga] II C Gb

[Ex iaD]

[Ex ia Ma] I

防爆合格证编号为GYJ19.1232U。

防爆合格证号后缀“U”表示Ex元件，与其他电气设备或系统一起使用时需附加认证，不能单独使用。

使用环境温度范围：-40℃~+60℃（环境温度范围的测量点位于FB IO前部中心30mm处）

工作温度范围：-40℃~+99℃

一、产品安全使用特殊条件

1. FB IO模块须安装于FB926系列和B927系列FB远程I/O底板、与FB BT总线终端模块、FB PS电源模块和FB8220B.1.EL*型、FB8221B.1.EL*型、FB8222B.1.EL*型FB8230B.1.EL*型FB远程I/O网关配合使用。

2. FB IO模块由FB PS电源模块供电，电源必须为“安全性特低电压”（SELV）系统或“保护性特低电压”（PELV）系统，最高电压Um为60V。

3. FB IO模块适于安装在受控的低污染等级环境（1级或2级）使用。
4. FB IO需要安装在符合GB3836.1-2010规定的防爆型式并具有防爆合格证书的外壳之内，同时外壳防护等级不得低于GB/T 4208-2017规定的IP54。
5. 与FB IO连接的电路至少为GB/T 16935.1标准规定要求的II级过电压等级电路。
6. 网关最大预期输入电流为50A。

二、产品使用注意事项

1. 电气参数：

非本安参数：

底板连接件	电气参数
Pin 6+, Pin 5- (电源 12V)	工作电压(Un): 12V _{DC} (-2/+4%), SELV/PELV 额定电压(Ur): 12.48V _{DC} 最高电压(Um): 60V _{DC} (共模)
Pin 2, Pin 3 (总线信号/通讯信号)	工作电压(Un): ±2.5V, 参考电平 2.5V (曼彻斯特信号) 额定电压(Ur): 12.48V _{DC} (-2/+4%) (SELV/PELV, 参考地与电源相同) 最高电压(Um): 60V _{DC} (共模)
Pin 1+, Pin 5- (拉断信号)	工作电压(Un): 12V _{DC} (-2/+4%), SELV/PELV 取自于电源模块, (例如 FB9206) 额定电压(Ur): 12.48V _{DC} 最高电压(Um): 60V _{DC} (共模)

本安参数：

型号：FB2216* (数字量输出)					
端子代号	最高输出电压 U _o (V)	最大输出电流 I _o (mA)	最大输出功率 P _o (mW)	最大内部等效参数	
				C _i (nF)	L _i (mH)
Ch1:1(+), 4/5/6(-)	24.2	108	654	12	0
最大外部参数	组 别				
	Ex ia I	Ex ia II A	Ex ia II B / Ex iaD	Ex ia II C	
电容 Co (μF)	5.15μF	3.25μF	898nF	110nF	
电感 Lo ((mH)	40.0mH	24.3mH	12.1mH	3.04mH	

型号: FB6216* (数字量输出)					
端子代号	最高输出电压 U _o (V)	最大输出电流 I _o (mA)	最大输出功率 P _o (mW)	最大内部等效参数	
				Ci (nF)	Li (mH)
Ch1:1(+), 4/5/6/8(-) Ch2:7(+), 4/5/6/8(-)	24.2	108	654	12	0
最大外部参数	组别				
	Ex ia I	Ex ia II A	Ex ia II B / Ex iaD	Ex ia II C	
电容 Co (μF)	5.15μF	3.25μF	898nF	110nF	
电感 Lo ((mH)	40.0mH	24.3mH	12.1mH	3.04mH	

型号: FB2217* (数字量输出)					
端子代号	最高输出电压 U _o (V)	最大输出电流 I _o (mA)	最大输出功率 P _o (mW)	最大内部等效参数	
				Ci (nF)	Li (mH)
Ch1:1(+), 4/5/6(-)	17.8	162	721	12	0
最大外部参数	组别				
	Ex ia I	Ex ia II A	Ex ia II B / Ex iaD	Ex ia II C	
电容 Co (μF)	10.4μF	7.88μF	1.82μF	309nF	
电感 Lo ((mH)	17.7mH	10.83mH	5.41mH	1.35mH	

型号: FB6217* (数字量输出)					
端子代号	最高输出电压 U _o (V)	最大输出电流 I _o (mA)	最大输出功率 P _o (mW)	最大内部等效参数	
				Ci (nF)	Li (mH)
Ch1:1(+), 4/5/6/8(-) Ch2:7(+), 4/5/6/8(-)	17.8	162	721	12	0
最大外部参数	组别				
	Ex ia I	Ex ia II A	Ex ia II B / Ex iaD	Ex ia II C	
电容 Co (μF)	10.4μF	7.88μF	1.82μF	309nF	
电感 Lo ((mH)	17.7mH	10.83mH	5.41mH	1.35mH	

型号: FB6216* (数字量输出, 双通路并联)					
端子代号	最高输出电压 U _o (V)	最大输出电流 I _o (mA)	最大输出功率 P _o (mW)	最大内部等效参数	
				C _i (nF)	L _i (mH)
Ch1+2: 1/7(+),4/5/6/8(-)	24.2	216	1308	24	0
最大外部参数	组 别				
	Ex ia I	Ex ia II A	Ex ia II B / Ex iaD	Ex ia II C	
电容 Co (μF)	5.14μF	3.24μF	886nF	n.a.	
电感 Lo ((mH)	10.0mH	6.09mH	3.04mH	n.a.	

型号: FB6217* (数字量输出, 双通路并联)					
端子代号	最高输出电压 U _o (V)	最大输出电流 I _o (mA)	最大输出功率 P _o (mW)	最大内部等效参数	
				C _i (nF)	L _i (mH)
Ch1+2 1/7(+), 4/5/6/8(-)	17.8	324	1442	24	0
最大外部参数	组 别				
	Ex ia I	Ex ia II A	Ex ia II B / Ex iaD	Ex ia II C	
电容 Co (μF)	10.3μF	7.87μF	1.81μF	297nF	
电感 Lo ((mH)	4.44mH	2.70mH	1.35mH	0.338mH	

型号: FB2216* / FB2217* (数字量输入, 仅用于无源传感器)					
端子代号	最高输出电压 U _o (V)	最大输出电流 I _o (mA)	最大输出功率 P _o (mW)	最大内部等效参数	
				C _i (nF)	L _i (mH)
Ch1: 2(+), 4/5/6(-) Ch2: 3(+), 4/5/6(-)	10	13	33	12	0
最大外部参数	组 别				
	Ex ia I	Ex ia II A	Ex ia II B / Ex iaD	Ex ia II C	
电容 Co (μF)	177μF	99.7μF	19.7μF	2.97μF	
电感 Lo ((mH)	100mH	100mH	100mH	100mH	

注: 以上均为线性输出特性, 上述电容和电感数值使用时应注意下列要求:

- (1) 符合下列任何一项条件时, 外部最大电容 (Co) 和外部最大电感 (Lo) 应为数据表内的数值:
- 外部电路 (不包括电缆) 的最大内部电容 (Ci) 小于1%电容 (数据表内电容), 或
 - 外部电路 (不包括电缆) 的最大内部电感 (Li) 小于1%电感 (数据表内电感)

(2) 同时符合下列两项条件时，外部最大电容（ C_o ）和外部最大电感（ L_o ）应为数据表内数值的50%：

- 外部电路（不包括电缆）的最大内部电容（ C_i ）大于或等于1%电容（数据表内电容），和
- 外部电路（不包括电缆）的最大内部电感（ L_i ）大于或等于1%电感（数据表内电感）

其中，外部最大电容 C_o （包括电缆）不得大于 $1\mu F$ （I，II B，II A，iaD）和600nF（II C）。

2. 用户不得自行对产品进行更换、维修和维护，应会同产品制造商共同解决运行中出现的故障或以原生产商的产品加以替换。

3. 产品的安装、使用和维护应同时遵守产品说明书、GB3836.13-2013“爆炸性环境第13部分：设备的修理、检修、修复和改造”、GB/T 3836.15-2017“爆炸性环境 第15部分：电气装置的设计、选型和安装”、GB/T 3836.16-2017“爆炸性环境第16部分：电气装置的检查与维护”、GB15577-2018“粉尘防爆安全规程”和GB50257-2014“电气装置安装工程爆炸和火灾危险环境 电气装置施工及验收规范”的有关规定。

三、制造厂责任

1. 产品制造厂必须将上述安全使用特殊条件和使用注意事项纳入上述系列远程I/O系统使用说明书。
2. 制造厂必须严格按照NEPSI认可的文件资料生产。
3. 产品铭牌中至少包括下列内容：
 - 1) NEPSI认可标志（见防爆合格证书）
 - 2) 产品防爆标志
 - 3) 防爆合格证号
 - 4) 安全参数或说明

国家级仪器仪表防爆安全监督检验站

二〇一九年九月十七日

国家级仪器仪表防爆安全监督检验站

National Supervision and Inspection Centre for Explosion Protection and Safety of Instrumentation

(GYJ19.1232U)

(Attachment I)

Attachment I (Translation)

FB I/O module (FB IO in short) type FB2216* / FB2217* / FB6216* / FB6217*, manufactured by PEPPERL+Fuchs AG, meet the relevant parameters of FB Concept, have been approved by National Supervision and Inspection Center for Explosion Protection and Safety of Instrumentation (NEPSI) in accordance with the following standards:

- GB3836.1-2010 Explosive atmospheres – Part 1: Equipment – General requirements
- GB3836.2-2010 Explosive atmospheres – Part 2: Equipment protection by flameproof enclosure “d”
- GB3836.3-2010 Explosive atmospheres – Part 3: Equipment protection by increased safety “e”
- GB3836.4-2010 Explosive atmospheres – Part 4: Equipment protection by intrinsic safety “i”
- GB/T 3836.7-2017 Explosive atmospheres – Part 7: Equipment protection by powder filling “q”
- GB3836.20-2010 Explosive atmospheres – Part 20: Equipment with equipment protection level (EPL) Ga
- GB12476.1-2013 Electrical apparatus for use in the presence of combustible dust
 - Part 1: Equipment – General requirements
- GB12476.4-2010 Electrical apparatus for use in the presence of combustible dust
 - Part 4: Protection by intrinsic safety “iD”

Ex Marking: Ex d e q [ia Ga] IIC Gb

[Ex iaD]

[Ex ia Ma] I

The certificate number is GYJ19.1232U.

When the sign “U” is placed after the certificate number, it indicates that the device is Ex component, which is not intended to be used alone and requires additional certification when incorporated into electrical apparatus or systems for use in potentially explosive atmospheres.

Permissible maximum ambient temperature range: - 40°C~+60°C

(Ambient temperature range is referenced to measurement point in a distance of 30mm perpendicular to the center of the front of the component FB IO)

Service temperature range: - 40°C~+99°C

I. SPECIAL CONDITIONS FOR SAFE USE

- 1.1 FB IO shall only be used together with approved backplanes FB BP, power supply FB PS, gateway FB GW and bus termination FB BT.

- 1.2 Supply the FB IO with a power supply that meets the requirements for safety extra-low voltage (SELV) or protected extra-low voltage (PELV) with a maximum voltage of $U_m = 60V$.
- 1.3 FB IO shall be provided with protection that ensures a pollution degree 2 or degree 1.
- 1.4 FB IO shall be installed and operated only in surrounding enclosures that comply with the safety requirements for enclosures with Ex marking certified separately according to GB3836.1-2010, and rated with the degree of protection IP54
- 1.5 All circuits connected to the FB IO shall comply with the overvoltage category II (or better) according to GB/T 16935.1.
- 1.6 The permitted maximum prospective current of supply for the FB IO is 50A.

II. SPECIAL REQUIREMENTS

2.1 Electrical parameters:

Non-IS electrical parameters:

FB BP backplanes Connector Pin	Electrical parameters
Pin 6+, Pin 5- (Power supply 12V)	Nominal voltage (U_n): 12V _{DC} (-2/+4%), SELV/PELV Rated voltage (U_r): 12.48V _{DC} Maximum voltage (U_m): 60V _{DC} (common mode)
Pin 2, Pin 3 (Bus signal / Communication signal)	Nominal voltage (U_n): $\pm 2.5V$ signal with reference level 2.5V _{DC} (Manchester-Signal) Rated voltage (U_r): 12.48V _{DC} (SELV/PELV, same GND reference as power supply) Maximum voltage (U_m): 60V _{DC} (common mode)
Pin 1+, Pin 5- (shut-Down signal)	Nominal voltage (U_n): 12V _{DC} (-2/+4%), SELV/PELV derived from Power supply module FB PS (e.g. FB9206) Rated voltage (U_r): 12.48V _{DC} Maximum voltage (U_m): 60V _{DC} (common mode)

IS electrical parameters:

Type: FB2216* (digital output)					
Pin code	Max.output voltage U_o (V)	Max.output current I_o (mA)	Max.output power P_o (mW)	Maximum internal parameters	
				C_i (nF)	L_i (mH)
Ch1:1(+), 4/5/6(-)	24.2V	108mA	654mW	12nF	0
External parameters	Group				
	Ex ia I	Ex ia IIA	Ex ia IIB / Ex iaD	Ex ia IIC	
Capacitance C_o (μF)	5.15 μF	3.25 μF	898nF	110nF	
Inductance L_o (mH)	40.0mH	24.3mH	12.1mH	3.04mH	

Type: FB6216* (digital output)					
Pin code	Max.output voltage U _o (V)	Max.output current I _o (mA)	Max.output power P _o (mW)	Maximum internal parameters	
				Ci (nF)	Li (mH)
Ch1:1(+), 4/5/6/8(-) Ch2:7(+), 4/5/6/8(-)	24.2V	108mA	654mW	12nF	0
External parameters	Group				
	Ex iaI	Ex ia IIA	Ex ia IIB / Ex iaD	Ex ia IIC	
Capacitance Co (μF)	5.15μF	3.25μF	898nF	110nF	
Inductance Lo ((mH)	40.0mH	24.3mH	12.1mH	3.04mH	

Type: FB2217* (digital output)					
Pin code	Max.output voltage U _o (V)	Max.output current I _o (mA)	Max.output power P _o (mW)	Maximum internal parameters	
				Ci (nF)	Li (mH)
Ch1:1(+), 4/5/6(-)	17.8V	162mA	721mW	12nF	0
External parameters	Group				
	Ex iaI	Ex ia IIA	Ex ia IIB / Ex iaD	Ex ia IIC	
Capacitance Co (μF)	10.4μF	7.88μF	1.82μF	309nF	
Inductance Lo ((mH)	17.7mH	10.83mH	5.41mH	1.35mH	

Type: FB6217* (digital output)					
Pin code	Max.output voltage U _o (V)	Max.output current I _o (mA)	Max.output power P _o (mW)	Maximum internal parameters	
				Ci (nF)	Li (mH)
Ch1:1(+), 4/5/6/8(-) Ch2:7(+), 4/5/6/8(-)	17.8V	162mA	721mW	12nF	0
External parameters	Group				
	Ex iaI	Ex ia IIA	Ex ia IIB / Ex iaD	Ex ia IIC	
Capacitance Co (μF)	10.4μF	7.88μF	1.82μF	309nF	
Inductance Lo ((mH)	17.7mH	10.83mH	5.41mH	1.35mH	

Type: FB6216* (digital output, double channel in parallel)					
Pin code	Max.output voltage Uo (V)	Max.output current Io (mA)	Max.output power Po (mW)	Maximum internal parameters	
				Ci (nF)	Li (mH)
Ch1+Ch2: 1/7(+),4/5/6/8(-)	24.2V	216mA	1308mW	24nF	0
External parameters	Group				
	Ex iaI	Ex ia IIA	Ex ia IIB / Ex iaD	Ex ia IIC	
Capacitance Co (μF)	5.14μF	3.24μF	886nF	n.a.	
Inductance Lo ((mH)	10.0mH	6.09mH	3.04mH	n.a.	

Type: FB6217* (digital output, double channel in parallel)					
Pin code	Max.output voltage Uo (V)	Max.output current Io (mA)	Max.output power Po (mW)	Maximum internal parameters	
				Ci (nF)	Li (mH)
Ch1+Ch2 1/7(+), 4/5/6/8(-)	17.8V	324mA	1442mW	24nF	0
External parameters	Group				
	Ex iaI	Ex ia IIA	Ex ia IIB / Ex iaD	Ex ia IIC	
Capacitance Co (μF)	10.3μF	7.87μF	1.81μF	297nF	
Inductance Lo ((mH)	4.44mH	2.70mH	1.35mH	0.338mH	

Type: FB2216* / FB2217* (digital input, for passive sensor only)					
Pin code	Max.output voltage Uo (V)	Max.output current Io (mA)	Max.output power Po (mW)	Maximum internal parameters	
				Ci (nF)	Li (mH)
Ch1: 2(+), 4/5/6(-) Ch2: 3(+), 4/5/6(-)	10V	13mA	33mW	12nF	0
External parameters	Group				
	Ex iaI	Ex ia IIA	Ex ia IIB / Ex iaD	Ex ia IIC	
Capacitance Co (μF)	177μF	99.7μF	19.7μF	2.97μF	
Inductance Lo ((mH)	100mH	100mH	100mH	100mH	

Note: The above parameters are liner characteristic, Co and Lo apply where:

- 1.1 The maximum values of the external capacitance and the external inductance are listed in the table above if one of the following conditions is met:
- The total Ci of the external circuit (excluding the cable) is < 1% of the capacitance value or
 - The total Li of the external circuit (excluding the cable) is < 1% of the inductance value.

1.2 The maximum values of the external capacitance and the external inductance shall be reduced to 50% the values listed in the table above when both of the following conditions are met:

- The total C_i of the external circuit (excluding the cable) is \cong 1% of the capacitance value and
- The total L_i of the external circuit (excluding the cable) is \cong 1% of the inductance value.

The reduced capacitance of the external circuit (including the cable) shall not be greater than $1\mu\text{F}$ for I / II B / II A/iaD and 600nF for IIC.

2.2 The device must not be repaired, changed, or manipulated. In case of failure, always replace the device with an original device.

2.3 During installation, operation and maintenance, users shall comply with the relevant requirements of the product instruction manual, GB3836.13-2013 "Explosive atmospheres-Part 13: Equipment repair, overhaul and reclamation", GB/T 3836.15-2017 " Explosive atmospheres-Part 15: Electrical installations design, selection and erection", GB/T 3836.16-2017 " Explosive atmospheres-Part 16: Electrical installations Inspection and maintenance ", GB15577-2018 "Safety regulations for dust explosion prevention and protection" and GB50257-2014 "Code for construction and acceptance of electric device for explosion atmospheres and fire hazard electrical equipment installation engineering".

III. MANUFACTURER'S RESPONSIBILITY

3.1 The instruction manual shall include all the clauses mentioned above.

3.2 The manufacturer shall exactly conform to the documents approved by NEPSI.

3.3 The nameplate shall include the following:

3.3.1 Identification of NEPSI.

3.3.2 Marking.

3.3.3 Certificate No.

3.3.4 Electrical parameters or specification

National Supervision and Inspection Centre
For Explosion Protection and Safety of Instrumentation

Sep. 17, 2019