TÜV NORD

(1) # EU-Type-Examination Certificate

(2) Equipment and protective systems intended for use in potentially explosive atmospheres, **Directive 2014/34/EU**

(3) **Certificate Number** **TÜV CY 20 ATEX 0206305 X**

(4) for the equipment: Electro-hydraulic devices with solenoids
Types: PEAC * * * * * * *
PEAD * * * * * * *

(5) of the manufacturer: **O.M.F.B. S.p.A.**

(6) Address: Via Cave 7/9, 25050 Provaglio d'Iseo (BS).- Italy

Order number: 0206305

Date of issue: 2020-10-30

(7) The design of this equipment or protective system and any acceptable variation thereto are specified in the schedule to this EU-Type-Examination Certificate and the documents therein referred to.

(8) TÜV CYPRUS Ltd, notified body No. 2261 in accordance with Article 17 of the Council Directive of 2014/34/EU of February 26, 2014, certifies that this equipment or protective system has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres given in Annex II to the Directive. The examination and test results are recorded in the confidential report No. 20 0206305.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:
EN 60079-0:2018 **EN 60079-18:2014 + AMD1:2017**

(10) If the sign "X" is placed after the certificate number, it indicates that the equipment or protective system is subject to special conditions for safe use specified in the schedule to this certificate.

(11) This EU-Type-Examination Certificate relates only to the design, examination and tests of the specified equipment in accordance to the Directive 2014/34/EU. Further requirements of the Directive apply to the manufacturing process and supply of this equipment which are not covered by this certificate.

(12) The marking of the equipment or protective system must include the following:
II 2G Ex mb IIC T4 Gb
II 2D Ex mb IIIC T135°C Db

TÜV CYPRUS Ltd (TUV NORD Group),

The head of the notified body,

D. Demosthenous

Notified Body TÜV CYPRUS Member of TUV Nord 2261

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(13) **SCHEDULE**

(14) **EU-Type-Examination Certificate No. TÜV CY 20 ATEX 0206305 X**

(15) Description of equipment

The PEAC and PEAD modules are electric devices with solenoids that control the pressure at the ends of an oil distributor according to a specific variable input. They are used for remote control of hydraulic devices. The electric and electronic components are encapsulated in the enclosure, the equipment is provided with permanently connected cable, the cable gland and the cable are encapsulated to the enclosure. The type of protection is encapsulation "Ex mb" and the equipment is suitable for gas Group IIC and dust Group IIIC.

Different control options and functional modes come are identified in the Identification codes.

Type key:

Identification codes:

Type: **PEAC** * * * * * * * solenoids with electronic board

PEAC	*	*	*	*	*	*	*
	Certifications	**Type of Control**	**Version**	**Control Signal**	**Cable type** (n. wires x section)	**Seals type**	**Variants**
	X= ATEX (cast-iron housing only)	Numeral (Not relevant for certification)	Numeral (Not relevant for certification)	Numeral (Not relevant for certification)	3=Cable LAPP (7x0.75mm2)	Numeral (Not relevant for certification)	Numeral (Not relevant for certification)
	A= ATEX and SIL2 (cast-iron housing only)				4= Cable LAPP (4x1mm2)		
					5= Cable IGUS (7x0.5mm2)		
					6= Cable IGUS (4x1mm2)		

Type: **PEAD** * * * * * * * solenoids without electronic control board

PEAD	*	*	*	*	*	*	*
	Certifications	**Supply Voltage**	**Cable type** (n. wires x section)	**Coil Position**	**Gauge Ports**	**Seals type**	**Variants**
	X= ATEX (cast-iron housing only)	3= 12Vdc – PWM	3=Cable LAPP (7x0.75mm2)	Numeral (Not relevant for certification)	Numeral (Not relevant for certification)	Numeral (Not relevant for certification)	Numeral (Not relevant for certification)
		4= 24Vdc – PWM	4= Cable LAPP (4x1mm2)				
		5= 12Vdc – ON/OFF					
		6= 24Vdc – ON/OFF					

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Technical data:

Power supply:

Type	Nominal Voltage	Rated Voltage
PEAC	10Vdc up to 30Vdc	Max 30Vdc
PEADX*	12Vdc	16Vdc
	24Vdc	30Vdc

* See identification codes

The equipment must be connected by means of the cable leads to an external fuse, fitted in a safe area, with the following characteristics:

- For the PEACX ****** (Vn= 10÷30Vdc, Rated voltage=30Vdc) a time delay fuse In=0.8 A.
- For type PEADX3 ***** (PWM, Vn=12Vdc, Rated Voltage= 16Vdc) a time delay fuse In=0.8 A;
- For typePEADX4 ***** (PWM, Vn=24Vdc, Rated voltage=30Vdc) a time delay fuse In=0.315 A;
- For type PEADX5 ***** (ON-OFF, Vn=12Vdc, Rated voltage=16Vdc) a time delay fuse In=0.250 A;
- For type PEADX6 ***** (ON-OFF, Vn=24Vdc, Rated voltage=30Vdc) a time delay fuse In=0.125 A.

The short-circuit breaking capacity of these fuses shall be minimum 1500 A with rated voltage equal to or higher than the rated voltage of the equipment.

Permissible range of ambient temperature:
Ambient Temperature: -35°C ÷ + 55°C
Fluid Temperature: -20 ÷ +80°C

IP Rating
The equipment has been declared by the manufacturer to have a degree of protection of IP 6X according to IEC60529 and IP X6, IP X7 and IP X9K according to ISO 20653.

Warning Markings:
Warning: See Installation Instruction Document

(16) Test documents are listed in the test report No. 20 0206305

(17) Special conditions for safe use

- The equipment shall be protected by a suitable external fuses as indicated in technical data and in the safety instruction.
- The module has permanently connected cable. The free end of the cable has to be connected in an enclosure made in one of type protection listed in EN 60079-0 or outside of hazardous area.

(18) Essential Health and Safety Requirements
This certificate covers the Essential Health and Safety Requirements related to the Directive 2014/34/EU.

TÜV CYPRUS
Member of TÜV NORD Group

ATEX Assessment Report 20 0206305 dated 2020-10-30

Customer:	O.M.F.B. S.p.A. Via Cave 7/9 25050 Provaglio d'Iseo (BS) ITALY
Order number:	0206305
Test object:	Electro-hydraulic devices with solenoids type: PEAC******* PEAD*******
Evaluation principles:	Harmonized standards/ EHRS EN 60079-0:2018 General requirements EN 60079-18:2014 + AMD1:2017 Encapsulation "m"
Test laboratory :	TÜV CYPRUS Ltd 2 Papaflessa Str., 2235, Latsia, Lefkocia P.O.Box: 20732 Nicosia 1663
Test location :	Republic of Croatia – Ministry of the Interior - Laboratory EXLAB Industrijska 25 - 10431 - Sveta Nedelja, Croatia FIDITAS Ltd. Laboratory for Explosion Protection Karlovačka cesta 197, 10250 Zagreb-Lučko, Croatia O.M.F.B. S.p.A. 25050 Provaglio d'Iseo (BS) Via Cave 7/9
Date of receipt of the test object:	2019 October
Test date:	From 2019 October to 2020 October
Interpretation s:	The test results confirm the compliance of the "equipment" with the requirements of the Evaluation principles mentioned above.

Compiled
The Inspector:
(Pietro Scavello)

Approved
The Reviewer:
(Marco Ghisu)

1. Order description :

Assessment of PEAC and PEAD electro-hydraulic actuators for issuing of EU Type examination certificate according to ATEX directive 2014/34/UE Annex III.

2. Spe ci fication of the test object :

Description :

The PEAC and PEAD modules are electric devices with solenoids that control the pressure at the ends of an oil distributor according to a specific variable input. They are used for remote control of hydraulic devices. The electric and electronic components are encapsulated in the enclosure, the equipment is provided with permanently connected cable, the cable gland and the cable are encapsulated to the enclosure. The type of protection is encapsulation “Ex mb” and the equipment is suitable for gas Group IIC and dust Group IIIC.

Different control options and functional modes come are identified in the Identification codes.

Type key:

Identification codes:

Type: PEAC * * * * * * * solenoids with electronic board (Supply voltage 10 ÷ 30Vdc)

PEAC	*	*	*	*	*	*	*
	Certifications	Type of Control	Version	Control Signal	Cable type (n. wires x section)	Seals type	Variants
	X= ATEX (cast-iron housing only)	Numeral (Not relevant for certification)	Numeral (Not relevant for certification)	Numeral (Not relevant for certification)	3=Cable LAPP (7x0.75mm2 wires)	Numeral (Not relevant for certification)	Numeral (Not relevant for certification)
	A= ATEX and SIL2 (cast-iron housing only)				4= Cable LAPP (4x1mm2 wires)		
					5= Cable IGUS (7x0.5mm2 wires)		
					6= Cable IGUS (4x1mm2 wires)		

Type: PEAD * * * * * * * solenoids without electronic control board

PEAD	*	*	*	*	*	*	*
	Certifications	Supply Voltage	Cable type (n. wires x section)	Coil Position	Gauge Ports	Seals type	Variants
	X= ATEX (cast-iron housing only)	3= 12Vdc – PWM	3=Cable LAPP (7x0.75mm2 wires)	Numeral (Not relevant for certification)	Numeral (Not relevant for certification)	Numeral (Not relevant for certification)	Numeral (Not relevant for certification)
		4= 24Vdc – PWM	4= Cable LAPP (4x1mm2 wires)				
		5= 12Vdc – ON/OFF					
		6= 24Vdc – ON/OFF					

Technical data:

Power supply:

Type	Nominal Voltage	Rated Voltage
PEAC	10Vdc up to 30Vdc	Max 30Vdc
PEADX*	12Vdc	16Vdc
	24Vdc	30Vdc

* See identification codes

The equipment must be connected by means of the cable leads to an external fuse, fitted in a safe area, with the following characteristics:

- For the PEACX ****** (Vn= 10÷30Vdc, Rated voltage=30Vdc) a time delay fuse In=0.8 A.
- For type PEADX3 ***** (PWM, Vn=12Vdc, Rated Voltage= 16Vdc) a time delay fuse In=0.8 A;
- For typePEADX4 ***** (PWM, Vn=24Vdc, Rated voltage=30Vdc) a time delay fuse In=0.315 A;
- For type PEADX5 ***** (ON-OFF, Vn=12Vdc, Rated voltage=16Vdc) a time delay fuse In=0.250 A;
- For type PEADX6 ***** (ON-OFF, Vn=24Vdc, Rated voltage=30Vdc) a time delay fuse In=0.125 A.

The short-circuit breaking capacity of these fuses shall be minimum 1500 A with rated voltage equal to or higher than the rated voltage of the equipment.

Warning labels:

"Warning: See Installation Instruction Document"

Allowable ambient temperature range:
Ambient Temperature: -35°C ÷ + 55°C
Fluid Temperature: -20 ÷ +80°C

IP Rating
The equipment has been declared by the manufacturer to have a degree of protection of IP 6X according to IEC60529 and IP X6, IP X7 and IP X9K according to ISO 20653.

3. Marking of test object :

II 2G Ex mb IIC T4 Gb
II 2D Ex mb IIIC T135°C Db

4. Details to the evaluation principles :

The above mentioned equipment is tested according the standards on the first sheet.

5. Tests performed :

1. Service temperature - EN IEC 60079-0 26.5.1.2
2. Maximum surface temperature – EN IEC 60079-0 26.5.1.3
3. Maximum temperature - EN IEC 60079-18 8.2.2
4. Cable pull test EN IEC 60079-18 8.2.5
5. Dielectric strength test EN IEC 60079-18 8.2.4
6. Surface resistance test of parts of the enclosure of non-metallic materials – EN IEC 60079-0 26.13
7. Thermal endurance to heat - EN IEC 60079-0 26.8
8. Thermal endurance to cold - EN IEC 60079-0 26.9

9. Resistance to impact - EN IEC 60079-0 26.4.2
10. Resistance to UV light – EN IEC 60079-0 26.10
11. Water absorption test (on the compound) - EN IEC 60079-18 8.1.1
12. Dielectric strength test (on the compound) - EN IEC 60079-18 8.1.2

6. Test documents submitted :

Designation	Number	N. Pag.	Date
Technical Files			
Technical file	M.76.A	30	2020.05.03
Risk analysis: PEA_X modules	M.74.A	5	2020.03.02
Manufacturing Procedure			
Assembly Instructions PEA_X	I.277.A	8	2020.10.04
Resin Instructions PEA_X	I.279.A	8	2020.10.04
Dielectric Strenght Test PEA_X	I.280.A	6	2020.10.04
Control Plan PEA_X	I.281.A	3	2020.02.19
A-PRO2 Technical Spec. Electronic Board	0001/20	18	2020.02.11
Bill of materials			
BOM Electronic Board Version 02_00	BOM OMFB_VALVE_DRIVER_002_00 _20200115	7	2020.01.15
BOM Electronic Board Version 03_00	BOM OMFB_VALVE_DRIVER_003_00 _20200518	7	2020.05.18
Test Report			
Ministry of Interior EXLAB Laboratory Test Report Dokument	20TR008	7	2020.03.25
Fiditas Laboratory Test Report	TR 20 LAB 002	7	2020.05.13
O.M.F.B. Test Report - Service and maximum surface temperatures	AT 0206305 TUV Nord Witnessing	23	2019.12.17
Instruction Manual			
Electrohydraulic actuators safety instruction	99701020002	22	2020.04.29
Drawings			
Electrohydraulic Module 12 V PWM	50055060280	1	2020.06.18
Electrohydraulic Module 24 V PWM	50055060299	1	2020.06.18
Electrohydraulic Module 12 V ON-OFF	50055060306	1	2020.06.18
Electrohydraulic Module 24 V ON-OFF	50055060315	1	2020.06.18
Electrohydraulic Module closed loop 10-30 V and Verification of Distances EN 60079-18	50055060333 50055060333_quoted	2	2020.06.18
Electrohydraulic Module open loop 10-30V	50055060217	1	2020.06.18
Electrohydraulic Module closed loop 10-30 V. HPV,	50055060351	1	2020.06.18
Electrohydraulic Module closed loop 10-30 V. HPV,	50055060191	1	2020.06.11
COIL 12V Proportional	50056020062	1	2019.06.12
Coil 24V Proporzional	50056020071	1	2019.06.12
Coil 12V ON-OFF	50056020080	1	2019.06.12
Coil 24V ON-OFF	50056020099	1	2019.06.12
Position sensor coil LVDT	50056020044	1	2020.06.22
Enclosure Box	50900002330	1	2020.07.17

Connector plate	50900002349	1	2020.02.24
Label	51302300014	1	2020.07.01
OMFB_Valve_Driver_PCB_Layout	20200110_02_00	12	2020.01.10
Electronic Board Electrical Scheme	31600500023_rev002	7	2020.01.15
Electronic Board Electrical Scheme	31600500023_rev003	7	2020.05.18
Data Sheets			
Enclosure			
Plastic Material Enclosure	LATIOHM_62-03_PD01_G_20 – LET01c	4	2015.11.17
Label material	Bollettino Tecnico 3690	5	2018.02
3M Scotchcal™ Graphic Film			
Electronic Components			
F1 – F3 – F4 Fuses Littelfuse PTC Data Sheet: PICOSMDC012S-2, NANOSMDC016F-2	Littelfuse_PTC_NANOSMD	26	2016
F2- F5 Fuses PFMF.050.2	Schurter-PFMF.050.2-datasheet	3	2014.10.01
U4 - LM1117MPX-3.3/NOPB	Texas Instruments lm1117	41	2020.06
U13 - LMR14206XMK/NOPB	Texas Instruments LMR14206	21	2013.04
U5 - STM32F303CCT6	STM Arm Cortex STM32F303	149	2018.10
eFuse U1 - TPS26625DRCT	Texas Instruments TPS2662x	47	2019.08
U8.- U9 - U12 - VND5160JTR-E	STM VND5160J-E	31	2013.09
Resins			
Elan-Tron resin PU 515/PH 27	Elan-tron PU 515/PH 27	5	2019.06
Cable			
IGUS CF78.UL.05.07 (7G0.5)C	12201103649	2	-
IGUS CF78.UL.10.04 (4G1)C	12201103658	2	-
LAPP OLFLEX PETRO FD 865 CP (7G0.75) 0023315	12201103667	5	2019.04.01
LAPP OLFLEX PETRO FD 865 CP (4G1) 0023324	12201103694	5	2019.04.01
Cable Gland 12201103676	Cembre Data Sheet 2900.M20N	2	2018.07.12
Nut for Cable Gland 12201103685	Cembre	1	-
EU Decl. of Conformity	M75.A	1	2020.04.20

7. Test result:

The individual tests are documented in the confidential test protocol 20 0206305

8. Ambient co nditions :

Temperature: As specified above
Air humidity: no requirements

9. P icture documentation:
See Test Reports above listed.

10. Measurement equipment used:
See Test Reports above listed.

11. Notes for the erection and operation:
Symbol "X" in the certification number for special condition of use.

- The equipment shall be protected by a suitable external fuses as indicated in technical data and in the safety instruction.

- The module has permanently connected cable. The free end of the cable has to be connected in an enclosure made in one of type protection listed in EN 60079-0 or outside of hazardous area.

12. Routine tests :

- The visual inspection in compliance with clause 9.1 of EN 60079-18
- Dielectric strength test in compliance with clause 9.2 of EN 60079-18

--- End of the Assessment Report ---