

# TURBO MACHINE

TURBO MACHINE BULGARIA LTD.

До

„АЕЦ Козлодуй“ ЕАД

3321 гр. Козлодуй

На вниманието на: г-н Наско Михов – Изпълнителен Директор

Копие: г-н Христо Пачев - Гл. експерт "Маркетинг"

От

„Турбо Машина България“ ЕООД

гр. Варна, п.к. 9000, ул. „Марин Дринов“ №7, ет.1, ап.2

Лице за контакт: Камен Динков Желев

Телефон/факс: 02/971 21 88

Ел. поща: office@turbomachinebg.com

## БЮДЖЕТНА ОФЕРТА

№: BUDG202012001/09.12.2020

Уважаеми г-н Михов,

Във връзка с провеждането на пазарна консултация No 45613 с предмет „Доставка на 3 броя прибори за непрекъснат мониторинг на разтворени газове и влага в диелектрични масла - Hydran® M2, резервни части и материали, необходими за обслужването им”, за нас е удоволствие да Ви представим нашата индикативна оферта, както следва:

- ☐ **Обект:** „АЕЦ Козлодуй“ ЕАД;
- ☐ **Цел:** „Доставка на 3 броя прибори за непрекъснат мониторинг на разтворени газове и влага в диелектрични масла - Hydran® M2, резервни части и материали, необходими за обслужването им“;
- ☐ **Стойност:** 96690.00 лева;
- ☐ **Срок на изпълнение:** 7-9 седмици след поръчка/договор и осигуряване на подписания документ от т.2 от Забележките към настоящата оферта;
- ☐ **Гаранции:** 24 месеца от датата на доставка;
- ☐ **Начин на плащане:** 100% плащане по банков път;

Стр. 1 от 4

# TURBO MACHINE

**T U R B O M A C H I N E B U L G A R I A L T D .**

---

- ☐ **Срок на плащане:** 30 дни след доставка;
- ☐ **Валидност на офертата:** 30 дни;
- ☐ **Приложения:** Подробна ведомост;
- ☐ **Забележки:**
  1. Предложената цена е за оборудването, доставено DDP (INCOTERMS 2010) – „АЕЦ Козлодуй“ ЕАД, без начислен ДДС.
  2. Преди поръчка/договор за доставката, Възложителят следва да представи подписано приложение 1: APPENDIX A - NUCLEAR LIABILITY PROTECTION

Искрено се надяваме, че нашата оферта ще удовлетвори Вашите условия !

С УВАЖЕНИЕ:

Камен Желев

# TURBO MACHINE

TURBO MACHINE BULGARIA LTD.

До  
„АЕЦ Козлодуй” ЕАД

Оферта: BUDG202012001  
Дата: 09.12.2020

## ПОДРОБНА ВЕДОМОСТ

Поз.	Описание	К-во /бр./	Ед.цена /лева/	Обща цена /лева/
1.	<p><b><u>HYDRAN M2-X - прибор за непрекъснат мониторинг на разтворени газове и влага в диелектрични масла с включени:</u></b></p> <ul style="list-style-type: none"> <li>- <b><u>1 бр. аналогов вход 4-20 mA</u></b></li> <li>- <b><u>2 бр. аналогови изходи 4-20 mA</u></b></li> <li>- <b><u>комплект резервни части</u></b></li> </ul> <p><b><u>НЕПРЕКЪСНАТИ ИЗМЕРВАНИЯ на HYDRAN M2-X:</u></b></p> <ol style="list-style-type: none"> <li>1. <i>Ниво на газови компоненти:</i> чрез чувствителен елемент с възможност за откриваемост на ниска концентрация на четири газа: <ul style="list-style-type: none"> <li>- Водород (H<sub>2</sub>);</li> <li>- Въглероден окис (CO);</li> <li>- Етилен (C<sub>2</sub>H<sub>4</sub>);</li> <li>- Ацетилен (C<sub>2</sub>H<sub>2</sub>);</li> </ul> </li> <li>2. <i>Ниво на влагосъдържание (H<sub>2</sub>O) в обхвата 0-100% RH:</i> чрез тънкослоен капацитивен сензор за влага;</li> <li>3. <i>Температура на сензора:</i> чрез термистор, вграден в сензора, за измерване на собствена температура.</li> </ol> <p><b><u>ХАРАКТЕРИСТИКИ на HYDRAN M2-X:</u></b></p> <ul style="list-style-type: none"> <li>- Клемореден блок в следната конфигурация: <ul style="list-style-type: none"> <li>○ 1 бр. клеморед за захранване (изисквания към захранващото напрежение са дадени по-долу);</li> <li>○ 5 бр. сигнални контакти, свободно конфигурируеми, вкл. за наличие на повреда в системата;</li> <li>○ 1 бр. TDM порт с изходен сигнал съвместим с контролери Hydran 201Ci – с възможност за визуализиране на ниво на газови компоненти, но не и ниво на влагосъдържание;</li> <li>○ 1 бр. аналогов вход 4-20 mA;</li> <li>○ 2 бр. аналогови изходи 4-20 mA;</li> <li>○ 1 бр. RS-485 входен порт и 1 бр. RS-485 изходен порт;</li> <li>○ 1 бр. RS-232 порт (с конектор DP-9) за локална връзка с компютър за конфигуриране на системата чрез софтуер Perception (предоставя се с прибора);</li> </ul> </li> <li>- Дисплей: течнокристален (LCD), 128 x 64 pixels;</li> </ul>	3	32230.00	96690.00

# TURBO MACHINE

TURBO MACHINE BULGARIA LTD.

	<ul style="list-style-type: none"> <li>- Бутони: 8 бр. бутони за настройка на прибора и потвърждаване на аларми;</li> <li>- Захранващо напрежение: 180-264 VAC, 47-63 Hz, 1-ph, 650 VA max;</li> <li>- Висока устойчивост срещу пренапрежения, радио-честотни смущения и електростатични разряди;</li> <li>- Широк температурен диапазон на работа - при температура на околната среда -40...+55 °C, относителна влажност 95% RH (без конденз);</li> <li>- Температура на съхранение: +5...+45 °C, при максимален период на съхранение до 6 месеца.</li> </ul> <p><b><u>ВЪЗМОЖНОСТИ на HYDRAN M2-X:</u></b></p> <ul style="list-style-type: none"> <li>- няколко регулируеми състояния за сигнализация, свързани с отчитане на газ, отчитане на влага, аналогови входове и повреди в системата;</li> <li>- автоматично записване на данни (6 файла) на измерванията за: краткосрочен период; дългосрочен период; събития; сигнализация (аларми), сервисна карта и карта на сензора;</li> <li>- периодично автоматично тестване на сензора и рапорт за състоянието му 2 пъти месечно – на 1-во и 15-то число на месеца;</li> <li>- динамично вземане на маслени проби, без необходимост от помпа, използвайки цикъл на температурна конвекция на маслото;</li> <li>- самостоятелна работа, която не изисква основен компютър;</li> <li>- работа в мрежа.</li> </ul> <p><b><u>ВКЛЮЧЕН КОМПЛЕКТ РЕЗЕРВНИ ЧАСТИ:</u></b></p> <ul style="list-style-type: none"> <li>- 1 бр. Входно-изходна платка тип аналогов вход 4-20 mA (Продуктов номер 16528);</li> <li>- 1 бр. Входно-изходна платка тип аналогов изход 4-20 mA (Продуктов номер 16529).</li> </ul>			
--	--	--	--	--

# Hydran M2 device comparison



Transformers are key and expensive components of the electrical grid and knowledge of their health condition is essential to having a reliable network. When a transformer's insulation system is overstressed, gases are produced that dissolve in the oil. Dissolved Gas-in-oil Analysis (DGA) is recognized as the best indicator of developing faults in a transformer.

GE recently introduced its next generation of field-proven family of Hydran DGA monitoring solutions the Hydran M2-X. Below table shall help to better understand the differences and similarities to the predecessor Hydran M2.



## Hydran M2 to M2-X Comparison

	Hydran™ M2	Hydran™ M2-X
<b>SENSOR</b>		
Composite Gas Sensor	●	●
Hydrogen (H <sub>2</sub> ) Only Gas Sensor		●
Integrated Capacitive Moisture Sensor	●	●
Vacuum resistant sensor	●	●
Continuous Measurement	●	●
10 Year sensor life*		●
<b>LOCAL INTERFACE</b>		
LCD display	●	●
Interactive Keypad	●	●
Local port RS-232	●	●
<b>EXPANDABLE</b>		
4-20mA Analog inputs	●	●
4-20mA Analog outputs	●	●
Dual Digital inputs	●	●
IEEE ® Models calculations	●	●
<b>OUTPUT RELAYS</b>		
1 x System Fail output relay contact	●	●
2 x Dissolved Gas output relay contacts	●	●
2 x Moisture output relay contacts	●	●

\*Fuel cell sensor life projection based on accelerated aging test showing estimated MTTF of 11.5 years



## Hydran M2 to M2-X Comparison (continued)

	Hydran™ M2	Hydran™ M2-X
COMMUNICATION PROTOCOLS		
Modbus®	●	●
DNP	●	●
IEC®61850	●	●
COMMUNICATION MEDIUM		
Serial (RS-485)	●	●
TCP/IP over wired connection	●	●
TCP/IP Fiber Optic (ST connectors)	●	●
GPRS wireless modem	●	●
CONFIGURABLE ALARMS		
Gas Level and ROC	●	●
Moisture Level and ROC	●	●
Analog inputs	●	●
Separate System alarms	●	●
Models calculation outputs	●	●
SPECIFICATIONS		
Gas measurement range	25-2,000 ppm	25-2,000 ppm
Moisture measurement range	0-100%RH	0-100%RH
Installation	Single FNPT valve	Single FNPT valve
Ambient Operating temp -40°C to +55°C	●	●
External oil sampling port, for use with glass syringe with Luer stopcock	●	●
AC multi-voltage Power Supply	90-132 Vac ; 180-264 Vac	90-132 Vac ; 180-264 Vac
IP Rating enclosure rating	Nema® 4X, IP56	Nema® 4X, IP56
Product warranty	1 Year	7 Years
PRODUCT COMPATIBILITY		
Mineral Oil	●	●
Synthetic Ester Fluid	●	●
Natural Ester Fluid	●	●

GE Grid Solutions  
Lissie Industrial Estate East  
Unit 1, 7 Lissie Walk  
Lisburn BT28 2LU  
United Kingdom  
Tel: +44 (0) 2892 622915

[GEGridSolutions.com](http://GEGridSolutions.com)

GE, the GE monogram and Hydran are trademarks of General Electric Company.

Android is a registered trademark of Google, Inc. Modbus is a registered trademark of Schneider Automation, Inc. IEC is a registered trademark of Commission Electrotechnique Internationale. Nema is a registered trademark of National Electrical Manufacturers Association.

GE reserves the right to make changes to specifications of products described at any time without notice and without obligation to notify any person of such changes.

Copyright 2018, General Electric Company. All Rights Reserved.

M2 - MX Comparison  
English  
181127



imagination at work

# Hydran M2-X

## Enhanced Monitoring with Extended Sensor Life

When a transformer's insulation system is overstressed, the oil and paper undergo chemical degradation producing both hydro-carbon gases and moisture that dissolve into the insulating oil. This increased ageing will shorten the transformer's life, impact its reliability and in some cases can even lead to catastrophic failures.

The Hydran M2-X is the next generation of the field-proven family of Hydran DGA monitoring solutions. It provides continuous monitoring of gas and moisture levels to alert users of developing faults and minimize the risk of unplanned outages. The M2-X builds on GE's strong domain expertise to deliver an optimized, low maintenance monitoring device with an extended sensor life.

### Key Benefits

- Small form factor, no moving parts, low maintenance, and support for APM software analytics, enabling fleet level deployments
- Condition monitoring for a wide range of transformers with mineral insulating oils or ester based fluids (natural and synthetic)
- Extending beyond DGA monitoring, through the connection of sensors, the Hydran M2-X can monitor other parameters such as top oil temperature, load current and through the use of IEEE based mathematical models, can provide further insight on changing transformer conditions
- Providing critical transformer gas behavior data for Asset Performance Management (APM) strategies, facilitating planning of site intervention and maintenance activities
- Supports a wide range of communication methods and protocols to enable easy and secure integration with GE's digital platforms including Perception™ transformer fleet management software, DS Agile substation HMI, PREDIX™, and other APM software tools, historians and SCADA systems

### Applications

Advanced, flexible and expandable DGA monitoring solution tailored for utility and industrial transformers.

Easily integrates with Kelman multi-gas DGA devices and the Multilin 845 protection & control relay to provide continuous synchronization of chemical and electrical measurements for enhanced transformer monitoring.



## Proven Technology

- Field proven solution, delivering online DGA solutions for over 40 years
- Over 50,000 Hydran units sold worldwide
- Estimated sensor life in excess of 10 years\*
- 7 year product warranty

## Expandable

- Compatible with various transformer oil types (standard mineral insulating oils and newer natural and synthetic ester based fluids)
- Available with the traditional Hydran composite gas (H<sub>2</sub>, CO, C<sub>2</sub>H<sub>2</sub>, C<sub>2</sub>H<sub>4</sub>) sensor or with a discrete Hydrogen only (H<sub>2</sub>) sensor
- Easily upgradable in the field to accept analogue signals to monitor other key transformer parameters
- Computation of winding hot spot and other IEEE transformer models for enhanced diagnostics of the transformer's condition (depending on sensors installed)
- Integrates with Kelman multi-gas DGA devices

## Intuitive

- Easy to install on a single existing transformer valve, often without an outage required
- Integrated display and keypad for simplified local user interaction and data visualization
- Built-in moisture sensor provides water in oil measurement, critical to identifying paper degradation and leaking gaskets
- Compatible with GE's acclaimed Perception™ software to download, trend and analyze transformer health data





# Technical Specifications

## MEASUREMENTS

Fuel cell type sensor behind a gas permeable membrane in contact with transformer insulating oil

<b>Range</b>	H <sub>2</sub> : 25-2000 ppm (volume/volume H <sub>2</sub> equivalent)
<b>Accuracy**</b>	±10 % of reading ±25 ppm
<b>Response time</b>	10 minutes (90 % of step change)

### "Composite Gas" Sensor

<b>Relative sensitivity</b>	H <sub>2</sub> : 100 % of concentration CO: 15 ± 4 % of concentration C <sub>2</sub> H <sub>2</sub> : 8 ± 2 % of concentration C <sub>2</sub> H <sub>4</sub> : 1.5 ± 0.5 % of concentration
<b>Repeatability</b>	Highest of ±5 % of reading or ±5 ppm

### "Discrete H<sub>2</sub>" Gas Sensor (Mineral oil only)

<b>Relative sensitivity</b>	H <sub>2</sub> : 100 % of concentration Interference from CO, C <sub>2</sub> H <sub>2</sub> and C <sub>2</sub> H <sub>4</sub> less than 3 % of concentration
<b>Repeatability</b>	Highest of ±5 % of reading or ±10 ppm

## Moisture Sensor

Thin film capacitive type sensor immersed in insulating oil

<b>Range</b>	0-100 % RH
<b>Accuracy</b>	± 2 % RH
<b>Repeatability</b>	± 2 % RH

## FEATURES

### Display

Backlit LCD, 128 x 64 pixels

Keypad to setup unit and acknowledge alarms

## Communications

Standard RS-232 port (DB-9 connector), for local connection to computer for configuring the system

Standard RS-485 (terminal block), isolated to 2000Vac RMS, for remote communication or connection to local Hydran network

Optional: TCP/IP over Ethernet Copper or Fiber Optic 10/100Mbps/s

## Protocols

Standard: Modbus®, DNP 3.0  
Optional: IEC 61850 over TCP/IP

## Alarms

Gas and Moisture Alert (Hi), Gas and Moisture Alarm (HiHi), System Alarms

Gas alarms can be set on gas level reached or on hourly or daily trend (gas level rate of change)

Moisture alarms can be set on level reached or average level

Alarms can also be configured for optional additional analogue inputs or for calculation results from optional transformer models

5 dry contact relays (type C, SPDT), NO/NC, 3A@250Vac resistive load, 3A@30Vdc resistive load

## Manual Sampling

Easily accessible external oil sampling port, for use with glass syringe with Luer stopcock

## ENVIRONMENT

### Conditions

<b>Operating ambient temperature</b>	-40 °C to +55 °C (-40 °F to +131 °F)
<b>Operating ambient humidity</b>	0-95 % RH, non-condensing
<b>Oil temperature at valve</b>	-40 °C to +105 °C (-40 °F to +221 °F) with finned heat sink adapter option
<b>Oil pressure at valve</b>	0-700KPa (0-100psi) Vacuum resistant sensor

## Enclosure

Material: Aluminum  
Rating: NEMA Type 4X certified, meets requirements of IP56

## Power Requirements

90-132 Vac or 180-264 Vac switch mode universal power supply, 47-63 Hz, 650VA max

## Mechanical

Has a 1.5" NPT male thread, can mount on 1.5" NPT valve or greater using optional adapters

<b>Dimensions</b>	315 x 219 x 196 mm 12.4 x 8.63 x 7.72 "
-------------------	--

**Installed weight** 7.5 Kg (16.5 lb)

**Shipping weight** 9.0 Kg (20 lb)

## PRODUCT OPTIONS & SENSORS

Finned heat sink adapter (1.5") for use when ambient temp > 40 °C (104 °F) or oil temp > 90 °C (194 °F).

Valve adaptors 2" to 1.5"

Transformer models calculations (for mineral oil only)

Analogue input cards, 4-20mA, 10V load max, isolated to 2000Vac RMS

Dual digital input cards for dry contacts, internal wetting 24Vdc, isolated 2000Vac

Analogue output cards, 4-20mA, 10V load max, isolated to 2000Vac RMS

PSTN analogue modem V92/56K

GSM/GPRS wireless modem

Network Ethernet communication using copper or multimode fiber optic (ST)

Oil temperature sensor, magnetic mount, (4-20mA)

Split core load CT (4-20mA)

Ambient temperature sensor (4-20mA)

Anodized Aluminum Enclosure - CRC required (minimum quantities applicable)

Hydran M2X	-	Ox	Sx	Ax	Bx	Cx	Dx	Px	Gx	VCx	Vx	Ex	Mx	Lx	Selection Description
Oil type		O1 NE SE													Mineral Oil Natural Ester Oil (CRC Required) Synthetic Ester Oil (CRC Required)
Sensor type			S1 H2												Composite gas sensor Hydrogen only sensor
Card slot A,B,C,D				A0 A1 A2 A3	B0 B1 B2 B3	C0 C1 C2 C3	D0 D1 D2 D3								No analogue card Analogue Input card, 4-20mA Analogue Output card, 4-20mA Digital dual input card
Communication Protocol Options								P0 P1 P2 P3 P4 P5							Modbus/DNP3 over RS 232/RS 485 Standard Modbus/DNP3 over TCP/IP Ethernet Card wired connection, 10/100 Mbps/s Modbus/DNP3 over TCP/IP Ethernet MM Fibre, ST connectors, 10/100 Mbps/s Modbus/DNP3 over PSTN Analog Modem Modbus/DNP3 over GPRS/3G/4G Wireless Modem (CRC Required) IEC-61850 Protocol over TCP/IP, with RJ45 Connector (CRC Required)
Valve Type									G0 G1						Installation on gate valve (standard) Installation on globe valve
Valve Connection										VC0 VC1 VC2					Standard Connection - 1.5" Male NPT Valve adaptor 2" Male NPT to 1.5" Female NPT Valve adaptor 1" Male NPT to 1.5" Female NPT
Heat Finned Adaptor											V0 V1				No Finned Heat-Skin Adaptor Finned Heat-Skin Adaptor - 1.5" Male NPT
Enclosure												E0			Aluminum - Standard
Transformer Models													M0 M1		No Transformer Models Transformer Models Enabled (Requires additional sensors)
Language														L0 L1 L2 L3 L4	English labels and manuals French labels and manuals Spanish labels and manuals German labels and manuals Russian labels and manuals

\*Fuel cell sensor life projection based on accelerated aging test showing estimated MTTF of 11.5 years

\*\* Accuracy is quoted for the sensors at calibration, for H<sub>2</sub> equivalent performance

GE Grid Solutions  
Lissie Industrial Estate East  
Unit 1, 7 Lissie Walk  
Lisburn BT28 2LU  
United Kingdom  
Tel: +44 (0) 2892 622915

**GEGridSolutions.com**

GE, the GE Monogram, Hydran, Perception, DS-Agile and PREDIX are trademarks of the General Electric Company.

Modbus is a registered trademark of Schneider Automation, Inc. IEEE is a registered trademark of the Institute of Electrical and Electronics Engineers Inc. IEC is a registered trademark of Commission Electrotechnique Internationale.

GE reserves the right to make changes to specifications of products described at any time without notice and without obligation to notify any person of such changes.

© Copyright 2020, General Electric Company. All Rights Reserved.

HydranM2-X-Brochure-EN-2020-10-Grid-GA-1644





## APPENDIX A - NUCLEAR LIABILITY PROTECTION 20111272303

### A. FINANCIAL PROTECTION

Purchaser shall obtain and maintain, without cost to Seller, financial protection for nuclear liability in the amount and scope of coverage as required by Bulgarian law. Neither the Purchaser nor any insurers or other providers of financial protection (including the Bulgarian State) shall have any right of subrogation, recourse or otherwise against Seller or its suppliers.

### B. LIABILITY PROTECTION

1. This sale of products and/or services and any delivery or performance obligations pursuant to this sale are conditional upon there being in full force and effect in the Republic of Bulgaria a system of protection for nuclear liability to third parties under the 1963 Vienna Convention on Civil Liability for Nuclear Damage, acceded to by the Republic of Bulgaria on 24 November 1994 pursuant to Act of 27 July 1994; the Act on the Safe Use of Nuclear Energy, as amended to date; and, the 1988 Joint Protocol Relating to the Application of the Vienna Convention and the Paris Convention, acceded to by the Republic of Bulgaria on 24 August 1994; and, that such system of protection for nuclear liability will continue in effect at all times until decommissioning of the Plant and until the Plant has been removed from supervision under laws on atomic energy by the competent Bulgarian authorities. Purchaser shall provide protection as required by any new Bulgarian law implementing the 1997 Protocol to Amend the Vienna Convention on Civil Liability for Nuclear Damage and/or the Convention on Supplementary Compensation for Nuclear Damage, if and when such enter into effect in the Republic of Bulgaria.

2. In the event that the system of protection for nuclear liability referred to in Paragraph B.1 above is repealed, expires or changed in a manner that reduces the level of protection afforded Seller or its suppliers, Purchaser will establish, without cost to Seller, until the decommissioning of the Plant and until the Plant has been removed from supervision under laws on atomic energy by the competent Bulgarian authorities, a substitute system of protection against such liability which will, in its overall effect, provide protection equivalent to the protection afforded to Seller and its suppliers under the original system and this Appendix A. Purchaser and Seller will consult together to determine how such protection will be provided. Purchaser shall promptly advise Seller in writing of any changes to or amendment of the system of protection referred to in Paragraph B.1 prior to their entry into effect.

3. Purchaser shall, without cost to Seller, fully comply with the Convention(s), Joint Protocol and domestic law referred to in Paragraph B.1 above to the effect that Purchaser (and not the Seller) shall at all times be the responsible Operator of the Plant and to the effect that Purchaser shall be solely and directly liable in accordance therewith for any and all Liability for Nuclear Damage.

4. Purchaser hereby waives all rights of recourse against Seller and its suppliers with respect to any and all Liability for Nuclear Damage arising out of or resulting from the equipment or services on or off the premises of the Plant, and nothing contained herein shall be construed as creating any rights of recourse, action or otherwise against Seller or its suppliers with respect to Liability for Nuclear Damage.

5. Purchaser hereby indemnifies and holds Seller and its suppliers harmless against any and all Liability for Nuclear Damage arising out of or resulting from the equipment or services not covered under the arrangements provided under other provisions of this Appendix A.

6. Neither Seller nor its suppliers shall have any Liability for Nuclear Damage to Purchaser or its insurers or other providers of financial protection (including the Bulgarian State). Purchaser shall cause its insurers or other providers of financial protection to effect a waiver of all recourse or subrogation rights against Seller in any insurance policies or other financial protection maintained by Purchaser covering nuclear damage.

7. In the event the full protection to be provided by Purchaser in this Appendix A is not in place at the time of the scheduled performance of services or scheduled delivery of equipment, Seller shall not be required to perform services or deliver equipment but may withhold services and place the equipment in storage. Title to the equipment shall not pass to Purchaser and/or Operator, and the equipment shall not be removed from storage until such protection is afforded. However, for purposes of payment, delivery will be deemed to have been made upon placement of equipment into storage, and Purchaser will continue to make payments to Seller in accordance with the payment provisions of the contract.

8. Purchaser shall not remove the equipment or the product which incorporates the equipment or upon which the services were performed or to which the services relate from the Plant site or sell or otherwise transfer any interest therein without first providing written assurances of protection against any and all Liability for Nuclear Damage following that proposed removal or transfer at least equivalent to that afforded to Seller and its suppliers as provided in this Appendix A, including the Convention(s), the Joint Protocol and domestic law referenced in Paragraph B.1 above, and the provision General Limitations of Liability and other provisions of the contract. Purchaser shall provide to Seller written confirmation that, in the event of a transfer, such assurances shall be obtained by Purchaser from the transferee. Removal or transfer contrary to this Paragraph B.8 shall, in addition to any other legal or equitable rights of Seller, make Purchaser the indemnitor of Seller and its suppliers to the same extent that Seller and its suppliers would have been protected had no such removal or transfer taken place.

9. The entity executing this contract warrants that it has authority to execute this agreement on behalf of itself, the Operator, the Republic of Bulgaria, and any and all other entities having an ownership interest in the Plant or property used or intended for use at the Plant, including any new reactors; that Purchaser and Operator have legal capacity and financial power to fulfill the obligations of this Appendix A; and, that nothing in this agreement is inconsistent with any provision of Bulgarian law.

## C. SURVIVAL

The provisions of this Appendix A, the provision General Limitations of Liability, and other provisions of the contract providing for protection against Liability for Nuclear Damage of Seller and its suppliers shall survive any termination, expiration or cancellation of the contract, as well as the completion of work, and shall apply notwithstanding any other provision of this or any other contract between the parties.

## D. DEFINITIONS AND OTHER PROVISIONS

As used in this Appendix A, the following terms (whether or not capitalized) shall have the meanings set forth below:

1. “Liability for Nuclear Damage” means any liability for damage of any kind, whether based on contract, warranty, indemnity, tort (including negligence of whatever degree), strict liability or otherwise, which in whole or in part is caused by, arises out of, results from or is in any way related, directly or indirectly, to either the radioactive, toxic, explosive or other hazardous properties of “nuclear material” or involves a “nuclear incident,” as such two terms are defined in Articles I.1(h) and I.1(l) of the 1997 Protocol to Amend the Vienna Convention on Civil Liability for Nuclear Damage, including amounts paid in settlements of claims or litigation, amounts paid to satisfy judgments or awards, interest, legal costs (including costs in initiating, prosecuting, investigating, settling or defending claims or suits), and fees of counsel, regardless of the jurisdiction where the claim is asserted or the liability is imposed. The foregoing includes, but is not limited to liability for, loss of, or damage to, or loss of use of, any real, personal or mixed property, fixtures or equipment located at the Purchaser's Plant (whether used or to be used in connection with the Plant or not and whether owned by the Purchaser or any third party) or elsewhere or in the course of transportation to or from the Plant including handling or storage incidental thereto (including any equipment supplied by the Seller, any nuclear material, and any means of transport), injury, sickness, disease, disability or death, loss of actual or anticipated profits, loss by reason of Plant shutdown, nonoperation or increased expense of manufacturing or operation, service interruptions, claims of the Purchaser's customers, subcontractors or suppliers, governmental fines or penalties against the Purchaser, loss of use of capital or revenue, cost of money, radioactive contamination, measures of reinstatement of impaired environment, worker claims, preventive measures, replacement power costs, acts of terrorism or sabotage, rumor damage, interest, legal costs (including costs in initiating, prosecuting, investigating, settling or defending claims or suits), and fees of counsel.
2. “Suppliers” means Seller’s subcontractors and suppliers of every type and tier.
3. “Plant” means the Kozloduy Nuclear Power Plant in Kozloduy, Bulgaria, and includes all of the existing and to be constructed nuclear reactors and ancillary installations, as well as all real, personal and mixed property, fixtures, equipment, activities and operations at such location and atomic energy utilization object.

4. “Operator” means the organization designated or licensed by the competent Bulgarian Government authority as the operator of the Plant, which cannot be the Seller.

5. “Purchaser” means\_\_\_\_\_, acting on behalf of and for the benefit of the designated Operator and owner or owners of the Plant.

6. Each Party hereby acknowledges and agrees that the provisions of this *sui generis* Appendix A are fair and reasonable having regard to the circumstances as the date hereof.

7. The provisions of this Appendix A shall be severable. Should any part of this Appendix A be rendered or declared invalid by a court of competent jurisdiction, such invalidation of such part or portion of this Appendix A should not invalidate the remaining portions thereof, and they shall remain in full force and effect. The provisions of this Appendix A shall be liberally constructed to effectuate its purposes.



To Whom It May Concern

GE Renewable Energy

GE Grid Solutions(UK) Ltd  
Lissue Industrial Estate East  
Lissue Road  
Lisburn  
BT28 2RE

T 028 926 22915

F 028 926 22202

#### AUTHORIZATION LETTER

Subject: Market survey No. 45613 "Delivery of 3 pcs. of instruments for continuous monitoring of dissolved gasses and moisture in dielectric oils - Hydran M2, spare parts and materials for service maintenance".

We, GE Grid Solutions (UK) Ltd, hereby authorize TURBO MACHINE BULGARIA EOOD to submit an offer to Kozloduy NPP EAD, Bulgaria, for the referred equipment "instruments for continuous monitoring of dissolved gasses and moisture in dielectric oils - Hydran M2, spare parts and materials for service maintenance" and subsequently negotiate and sell the equipment on the territory of Bulgaria.

Заличено на основание ЗЗЛД

Marcos Pérez  
Sales Manager, Monitoring & Diagnostic  
M +34 627 965 290

