IECEx Certificate of Conformity

INTERNATIONAL ELECTROTECHNICAL COMMISSION
IEC Certification System for Explosive Atmospheres

for rules and details of the IECEx Scheme visit www.iecex.com

Certificate No.: **IECEx ITS 21.0024X**

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Certificate history:
Issue 0 (2021-10-07)

Status: **Current**

Issue No: 1

Date of Issue: 2022-06-09

Applicant: **HYDRODYNE TEIKOKU (INDIA) PRIVATE LIMITED**
SURVEY NO. 18, HISSA. NO. 3, 4 & 5 OF VILLAGE
GHODBUNDER NEAR RTO OFFICE, MIRA BHAYANDAR ROAD,
MIRA ROAD (EAST)
THANE 401107
India

Equipment: **Sealless Canned Motor Pumps**

Optional accessory:

Type of Protection: **Flameproof**

Marking: Ex db IIC * Gb #

See Equipment Description

* T5....T1

-20°C≤Ta≤+40°C/60°C

IECEx ITS 21.0024X

Approved for issue on behalf of the IECEx Certification Body: **P Moss**

Position: **Certification Officer**

Signature: (for printed version)

paul Moss
2022.06.09
13:42:57
+01'00'

Date: (for printed version)

1. This certificate and schedule may only be reproduced in full.
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3. The Status and authenticity of this certificate may be verified by visiting www.iecex.com or use of this QR Code.

Certificate issued by:

Intertek Testing & Certification Limited
ITS House, Cleeve Road
Leatherhead
Surrey, KT22 7SA
United Kingdom

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Date of issue: 2022-06-09 Issue No: 1

Manufacturer: **HYDRODYNE TEIKOKU (INDIA) PRIVATE LIMITED**
SURVEY NO. 18, HISSA. NO. 3, 4 & 5 OF VILLAGE
GHODBUNDER NEAR RTO OFFICE, MIRA BHAYANDAR ROAD,
MIRA ROAD (EAST)
THANE 401107
India

Manufacturing locations:

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 equipment 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 60079-1:2014-06 Explosive atmospheres - Part 1: Equipment protection by flameproof enclosures "d"
Edition:7.0

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 equipment listed has successfully met the examination and test requirements as recorded in:

Test Reports:

GB/ITS/ExTR14.0052/00 GB/ITS/ExTR14.0052/01

Quality Assessment Report:

IN/KLCS/QAR22.0001/00

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EQUIPMENT:
Equipment and systems covered by this Certificate are as follows:

The Sealless Canned Motor Pump comprises a canned motor, a terminal box, a bearing monitor and pump assembly. The stator and the rotor of motor are contained in hermetically sealed chambers. The terminal box is made of SG connected with the stator through the reducer part welded to stator chamber. The stator is isolated from the liquid. The hermetic rotor chamber is exposed to the liquid being pumped and will not therefore be in flammable atmosphere.

See Annex No. 1

SPECIFIC CONDITIONS OF USE: YES as shown below:

1. For the operation of the canned motor pump the system of suction and delivery pipe and, thus, the rotor space of the canned motor must be permanently filled with pumping liquid.
2. The maximum motor inlet liquid temperature shall not exceed the values as shown in the instruction manual according to the temperature class requested.
3. Special Hexagonal fasteners used in the equipment shall have minimum SS of A2-70 or Grade 12.9 of CS with yield strength ≥240MPa.
4. Flame paths shall not be repaired.

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DETAILS OF CERTIFICATE CHANGES (for issues 1 and above)
Issue 1 G105096186

This new issue of the certificate is issued to show that the ExCB responsible for the QAR has now been changed to IN/KLCS/QAR22.0001/00

Annex:

SFT IECEx OP 19f Annex 1 for IECEx CoC Hydrodyne_1.pdf

Annex to IECEx Certificate of Conformity

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Technical Documents

Title:	Drawing No.:	Rev. Level:	Date:
CROSS SECTIONAL DRAWING FRAME- I to V	HPAT-1001R1 SHEET 01 of 11	1	05/08/2021
GENERAL DRAWING OF STATOR ASSEMBLY FRAME-I	HPAT-1002R1 SHEET 02 of 11 & 01 of 07	1	05/08/2021
STATOR LINER FRAME-I	HPAT-1915120R1 SHEET 02 of 07	1	05/08/2021
FRONT END BELL FRAME-I	HPAT-3815121R1 SHEET 03 of 07	1	05/08/2021
REAR END BELL FRAME-I	HPAT-3915122R1 SHEET 04 of 07	1	05/08/2021
STATOR BODY FRAME-I	HPAT-4115123R1 SHEET 05 of 07	1	05/08/2021
STATOR SLEEVE FRAME-I	HPAT-4315124R1 SHEET 06 of 07	1	05/08/2021
JACKET ASSEMBLY FRAME-I	HPAT-45D15125R1 SHEET 07 of 07	1	05/08/2021
GENERAL DRAWING OF STATOR ASSEMBLY FRAME-II	HPAT-1003R1 SHEET 03 of 11 & 01 of 07	1	05/08/2021
STATOR LINER FRAME-II	HPAT-1925127R1 SHEET 02 of 07	1	05/08/2021
FRONT END BELL FRAME-II	HPAT-3825128R1 SHEET 03 of 07	1	05/08/2021
REAR END BELL FRAME-II	HPAT-3925129R1 SHEET 04 of 07	1	05/08/2021
STATOR BODY FRAME-II	HPAT-4125130R1 SHEET 05 of 07	1	05/08/2021
STATOR SLEEVE FRAME-II	HPAT-4325131R1 SHEET 06 of 07	1	05/08/2021
JACKET ASSEMBLY FRAME-II	HPAT-45D25132R1 SHEET 07 of 07	1	05/08/2021
GENERAL DRAWING OF MAIN TERMINAL BOX ASSEMBLY FRAME-I&II	HPAT-1004R1 SHEET 04 of 11 & 01 of 12	1	05/08/2021
GASKET (TERMINAL BOX)	HPAT-27B05133R1 SHEET 02 of 12	1	05/08/2021
GASKET (TERMINAL COVER)	HPAT-27C05134R1 SHEET 03 of 12	1	05/08/2021
TERMINAL BOX	HPAT-27D05141R1 SHEET 04 of 12	1	05/08/2021
E-BEARING MONITOR BODY	HPAT-29A05142R1 SHEET 05 of 12	1	05/08/2021
E-BEARING MONITOR HOUSING	HPAT-29B05143R1 SHEET 06 of 12	1	05/08/2021
E-BEARING MONITOR SLEEVE	HPAT-29C05144R1 SHEET 07 of 12	1	05/08/2021
LOCK NUT	HPAT-29D05145R1 SHEET 08 of 12	1	05/08/2021
GASKET	HPAT-29G05146R1 SHEET 09 of 12	1	05/08/2021
TERMINAL COVER E-BEARING MONITOR	HPAT-61A05147R1 SHEET 10 of 12	1	05/08/2021

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Technical Documents			
Title:	Drawing No.:	Rev. Level:	Date:
TERMINAL SUPPORT	HPAT-6205148R1 SHEET 11 of 12	1	05/08/2021
TERMINAL PLATE ASSEMBLY	HPAT-65A05149R1 SHEET 12 of 12	1	05/08/2021
GENERAL DRAWING OF STATOR ASSEMBLY FRAME-III	HPAT-1005R1 SHEET 05 of 11 & 01 of 07	1	05/08/2021
STATOR LINER FRAME-III	HPAT-1935165R1 SHEET 02 of 07	1	05/08/2021
FRONT END BELL FRAME-III	HPAT-3835166R1 SHEET 03 of 07	1	05/08/2021
REAR END BELL FRAME-III	HPAT-3935167R1 SHEET 04 of 07	1	05/08/2021
STATOR BODY FRAME-III	HPAT-4135168R1 SHEET 05 of 07	1	05/08/2021
STATOR SLEEVE FRAME-III	HPAT-4335169R1 SHEET 06 of 07	1	05/08/2021
JACKET ASSEMBLY FRAME-III	HPAT-45D35170R1 SHEET 07 of 07	1	05/08/2021
GENERAL DRAWING OF STATOR ASSEMBLY FRAME-IV	HPAT-1006R1 SHEET 06 of 11 & 01 of 07	1	05/08/2021
STATOR LINER FRAME-IV	HPAT-1945172R1 SHEET 02 of 07	1	05/08/2021
FRONT END BELL FRAME-IV	HPAT-3845173R1 SHEET 03 of 07	1	05/08/2021
REAR END BELL FRAME-IV	HPAT-3945174R1 SHEET 04 of 07	1	05/08/2021
STATOR BODY FRAME-IV	HPAT-4145175R1 SHEET 05 of 07	1	05/08/2021
STATOR SLEEVE FRAME-IV	HPAT-4345176R1 SHEET 06 of 07	1	05/08/2021
JACKET ASSEMBLY FRAME-IV	HPAT-45D45177R1 SHEET 07 of 07	1	05/08/2021
GENERAL DRAWING OF STATOR ASSEMBLY FRAME-V	HPAT-1007R1 SHEET 07 of 11 & 01 of 07	1	05/08/2021
STATOR LINER FRAME-V	HPAT-1955179R1 SHEET 02 of 07	1	05/08/2021
FRONT END BELL FRAME-V	HPAT-3855180R1 SHEET 03 of 07	1	05/08/2021
REAR END BELL FRAME-V	HPAT-3955181R1 SHEET 04 of 07	1	05/08/2021
STATOR BODY FRAME-V	HPAT-4155182R1 SHEET 05 of 07	1	05/08/2021
STATOR SLEEVE FRAME-V	HPAT-4355183R1 SHEET 06 of 07	1	05/08/2021
JACKET ASSEMBLY FRAME-V	HPAT-45D55184R1 SHEET 07 of 07	1	05/08/2021
GENERAL DRAWING OF MAIN TERMINAL BOX ASSEMBLY-III, IV, V	HPAT-1008R1 SHEET 08 of 11 & 01 of 12	1	05/08/2021

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Technical Documents

Title:	Drawing No.:	Rev. Level:	Date:
GASKET (TERMINAL BOX) (7.5kW to 75kW)	HPAT-27B05185R1 SHEET 02 of 12	1	05/08/2021
GASKET (TERMINAL COVER) (7.5kW to 75kW)	HPAT-27C05186R1 SHEET 03 of 12	1	05/08/2021
TERMINAL BOX (7.5kW to 75kW)	HPAT-27D05187R1 SHEET 04 of 12	1	05/08/2021
E-BEARING MONITOR BODY	HPAT-29A05142R1 SHEET 05 of 12	1	05/08/2021
E-BEARING MONITOR HOUSING	HPAT-29B05143R1 SHEET 06 of 12	1	05/08/2021
E-BEARING MONITOR SLEEVE	HPAT-29C05144R1 SHEET 07 of 12	1	05/08/2021
LOCK NUT	HPAT-29D05145R1 SHEET 08 of 12	1	05/08/2021
GASKET	HPAT-29G05146R1 SHEET 09 of 12	1	05/08/2021
TERMINAL COVER (7.5kW to 75kW)	HPAT-61A05188R1 SHEET 10 of 12	1	05/08/2021
TERMINAL SUPPORT (7.5kW to 75kW)	HPAT-6205189R1 SHEET 11 of 12	1	05/08/2021
TERMINAL PLATE (7.5kW to 75kW)	HPAT-65A05190R1 SHEET 12 of 12	1	05/08/2021
GENERAL DRAWING OF MAIN TERMINAL BOX ASSEMBLY-V	HPAT-1009R1 SHEET 09 of 11 & 01 of 12	1	05/08/2021
GASKET (TERMINAL BOX) (90kW to 120kW)	HPAT-27B55191R1 SHEET 02 of 12	1	05/08/2021
GASKET (TERMINAL COVER) (90kW to 120kW)	HPAT-27C55192R1 SHEET 03 of 12	1	05/08/2021
TERMINAL BOX (90kW to 120kW)	HPAT-27D55193R1 SHEET 04 of 12	1	05/08/2021
E-BEARING MONITOR BODY	HPAT-29A05142R1 SHEET 05 of 12	1	05/08/2021
E-BEARING MONITOR HOUSING	HPAT-29B05143R1 SHEET 06 of 12	1	05/08/2021
E-BEARING MONITOR SLEEVE	HPAT-29C05144R1 SHEET 07 of 12	1	05/08/2021
LOCK NUT	HPAT-29D05145R1 SHEET 08 of 12	1	05/08/2021
GASKET	HPAT-29G05146R1 SHEET 09 of 12	1	05/08/2021
TERMINAL COVER (90kW to 120kW)	HPAT-61A55194R1 SHEET 10 of 12	1	05/08/2021
TERMINAL SUPPORT (90kW to 120kW)	HPAT-6255195R1 SHEET 11 of 12	1	05/08/2021
TERMINAL PLATE (90kW to 120kW)	HPAT-65A55196R1 SHEET 12 of 12	1	05/08/2021
GENERAL DRAWING OF AUXILIARY TERMINAL BOX ASSEMBLY-I TO V	HPAT-1010R1 SHEET 10 of 11 & 01 of 07	1	05/08/2021
GASKET (TERMINAL BOX)	HPAT-27B05133R1 SHEET 02 of 07	1	05/08/2021
GASKET (TERMINAL COVER)	HPAT-27C05134R1	1	05/08/2021

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Technical Documents			
Title:	Drawing No.:	Rev. Level:	Date:
	SHEET 03 of 07		
TERMINAL BOX	HPAT-27D05135R1 SHEET 04 of 07	1	05/08/2021
TERMINAL COVER	HPAT-61B05136R1 SHEET 05 of 07	1	05/08/2021
TERMINAL SUPPORT	HPAT-6205137R1 SHEET 06 of 07	1	05/08/2021
TERMINAL PLATE (AUXILIARY)	HPAT-65B05138R1 SHEET 07 of 07	1	05/08/2021
DRAWING OF SPECIFICATION FOR NAME PLATE AND CAUTION PLATE	HPAT-1011R1 SHEET 11 of 11	1	05/08/2021
MATERIAL OF CONSTRUCTION FOR THE ENCLOSURE	HPAT-1012R1 SHEET 01 of 01	1	05/08/2021
INSTRUCTION MANUAL INSTALLATION, OPERATION & MAINTENANCE	IM/Ex/100R1	1	August 2021
INSTRUCTION MANUAL INSTALLATION, OPERATION & MAINTENANCE	IM/Ex/TBE R1	1	August 2021
INSTRUCTION MANUAL INSTALLATION, OPERATION & MAINTENANCE	IM/Ex/TBS R1	1	August 2021

DESCRIPTION OF THE EQUIPMENT OR PROTECTIVE SYSTEM

The Sealless Canned Motor Pump comprises a canned motor, a terminal box, a bearing monitor and pump assembly. The stator and the rotor of motor are contained in hermetically sealed chambers. The terminal box is made of SG connected with the stator through the reducer part welded to stator chamber. The stator is isolated from the liquid. The hermetic rotor chamber is exposed to the liquid being pumped and will not therefore be in flammable atmosphere.

Close coupled, Impeller and Rotor are mounted on same shaft. A part of pumping liquid enters the air gap between stator and rotor thus lubricating bush bearings and taking away heat generated by motor. Both Motor windings & Rotor stampings are separated by thin metal sheet compatible to the pumping media thus preventing the liquid from entrance to the motor windings.

Sealless Canned Motor is cooled by pumping liquid itself and / or outside cooling jacket for installation in explosive atmosphere.

Heating jacket for certain purposes are also fitted on motor body. Stator body is protected by flameproof enclosure. Terminal box is protected by flameproof enclosure. Thermostat embedded in hot spot of windings trips the Motor and prevents from any damage in case temperature of windings exceeds the limit, disconnects the supply of the motor. Mechanical Bearing Monitor mounted on rear bearing housing provides the indication of bearing wear for replacement. Electrical Bearing Monitor - a bearing wear indication instrument is located on top of Terminal box and protected by flame proof protection.

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Sealless Canned Motor Pumps comply with Cable Entries of M20 x 1.5mm, M25 x 1.5mm, M32 x 1.5mm, M40 x 1.5mm in Frame I and II, M20 x 1.5mm, M25 x 1.5mm, M32 x 1.5mm, M40 x 1.5mm, M50 x 1.5mm, M62.5 x 1.5mm and M75x1.5mm in Frame III, IV & V with equivalent NPT threads.
The Sealless Canned Motor Pump complies the requirement for IP66.

Sr. no.	Frame Size	Frequency (Hz)	RPM, No. of Poles 2	RPM, No. of Poles 4	Wattage (kW)	Voltage (V) AC
1	I	50	3000	1500	0.75, 1.5 & 2.2	415/460/690
		60	3600	1800		
2	II	50	3000	1500	2.6, 3.7 & 5.5	415/460/690
		60	3600	1800		
3	III	50	3000	1500	7.5, 9, 11, 12, 15 & 18.5	415/460/690
		60	3600	1800		
4	IV	50	3000	1500	22, 26, 30, 37, 45 & 50	415/460/690
		60	3600	1800		
5	V	50	3000	1500	55, 60, 75, 90, 110, & 120	415/460/690
		60	3600	1800		

Model Description

Hydrodyne designates the model with combination of pump casing and motor. Model designation key is given below for understanding specific service requirement.

Model designation key:-

HD 40 250 15 H 2 GB C
1 2 3 4 5 6 7 8

(1) Model designation (1st character)

HD - Basic pump
HDJ - Basic Jacket pump
HM - High Melting pump
HT - High Temperature pump
HTHP - High Temperature High Pressure Pump
HTM - High Temperature Melting pump.
HTMM - High Temperature Mechanical Seal pump
HR - Reverse Circulation pump
HS - Slurry pump
HSV -Gas Seal Slurry pump
VB - Vertical Barrel pump
MT - Multi Stage pump

(2) Pump size (Delivery size)
(3) Impeller size
(4) KW rating
(5) H - Class of motor insulation
(6) 2 – No. of poles of motor

(7) Material Code:-

Pump Material Code	Bearing Material Code
D - CI , WCB, Cast Steel	B – Carbon
G - Stainless Steel	Q – Silicon Carbide
M3 - Hastalloy	V – Ceramic
N - Alloy 20	T - GFT

(8) C – Cooling Jacket (If Provide)

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Temperature class from T1 to T5 shall be set based on Maximum Ambient Temperature & Maximum Liquid Temp. In addition, Cooling Jacket/Heat Exchanger requirement, Winding Temp. Tripping Device and Tripping set point temp. for corresponding Temp. class is mentioned in below table.

Ambient Temp. Max. °C (#)	Max. Liquid Temperature °C	Temperature Class (*)	Cooling Jacket/Heat Exchanger	Winding Temp. Tripping	Tripping Temp. for Winding °C
-20 °C ≤ Ta ≤ +60°C	70	T4	---	Thermostat	130
	130	T3	C.J	Thermostat	180
	145	T2	C.J	Thermostat	180
	190	T3	H/E, C.J	Thermostat	180
	290	T2	H/E, C.J	Thermostat	180
	350	T1	H/E, C.J	Thermostat	180
-20 °C ≤ Ta ≤ +40°C	40	T5	---	Thermostat	95

TEMPERATURE CLASSIFICATION TABLE						
FRAME SIZE			FRAME - I to V			
WATTAGE (kW)			0.75 TO 120			
VOLTAGE			415 V, 460 V, 690 V +/- 10%			
FREQUENCY			50 Hz, 60 Hz			
MOTOR POLES			2 P, 4 P			
PUMP TYPE			HD, HR, MT	HD, HR, MT	HT,HTM,HTMM	HM
COOLING JACKET or HEATING JACKET			None	C.J. 1)	C.J. 1)	H.J.
HEAT EXCHANGER			None	None	H/E	H/E
AMBIENT TEMP MAX. °C (#)	MAX. LIQ. TEMP. °C	TEMP. CLASS (*)				
-20°C ≤ Ta ≤ +60°C	70	T4	0.75 - 120	0.75 - 120		
-20°C ≤ Ta ≤ +60°C	130	T3	0.75 - 120	0.75 - 120		
-20°C ≤ Ta ≤ +60°C	145	T2	0.75 - 120	0.75 - 120		
-20°C ≤ Ta ≤ +60°C	145	T3			0.75 - 120	0.75 - 120
-20°C ≤ Ta ≤ +60°C	190	T3			0.75 - 120	
-20°C ≤ Ta ≤ +60°C	290	T2			0.75 - 120	
-20°C ≤ Ta ≤ +60°C	350	T1			0.75 - 120	
-20°C ≤ Ta ≤ +40°C	40	T5	0.75 - 120	0.75 - 120		

Remarks : 1) C.J. :Cooling Jacket source is water at 0.8 to 3.0 m3/hr. and max. temp. 35 °C
2) H.J. : Heating Jacket. Heating source is steam and temperature is max. 100 °C
3) Temperature of liquid pumped to be observed when determining the Temperature Class of the pump
4) Temp. Class has been calculated considering max. surface temp. 85°C and ambient of 29.5°C.

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Required Manufacturer Routine Testing		
Test	Title/Description of Test	Standard and Clause
1	A routine overpressure test in accordance with IEC 60079-1:2014 Clause 16 shall be carried out by the manufacturer on Sealless Canned Motor Pump enclosures at pressure 20.0 bar / 290 PSI for a period of at least 10 seconds and test results recorded. The overpressure test shall be considered satisfactory if no permanent deformation or damage invalidating the type of protection observed, the joints shall in no place have been permanently enlarged and no leakage through the walls of the enclosure and cemented joints shall be observed	IEC 60079-1:2014 Clause 16.0