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EU-TYPE EXAMINATION CERTIFICATE

[2] Directive 2014/34/EU of the European Parliament and of the Council of 26 February 2014

[3] EU-Type Examination Certificate Number: **DNV 20 ATEX 61565X** **Issue 3**

[4] Product: **Self-Contained Electro-Hydraulic Actuator / Electric Fail Safe Actuator, Type: EHF series**

[5] Manufacturer: **Rotex Manufacturers and Engineers Private Limited**

[6] Address: **R-852/853, MIDC, TTC Industrial Area, Rabale, Navi Mumbai – 400 701, Maharashtra, INDIA.**

[7] This product and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

[8] DNV Product Assurance AS, notified body number 2460, in accordance with Article 17 of Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, certifies that this product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products intended for use in potentially explosive atmospheres, given in Annex II to the Directive.

The examination and test results are recorded in confidential reports listed in item 16.

[9] Compliance with the Essential Health and Safety Requirements has been assured by compliance with: **EN IEC 60079-0:2018, EN 60079-1:2014, EN 60079-31:2014, EN 80079-36:2016 & EN 80079-37:2016.**

Where additional criteria beyond those given here have been used, they are listed at item 18 in the Schedule.

[10] If the sign "X" is placed after the certificate number, it indicates that the product is subject to the "Specific Conditions of Use" listed under item 17 of this certificate.

[11] This EU-TYPE EXAMINATION CERTIFICATE relates only to the technical design of the specified product in accordance to the Directive 2014/34/EU. Further requirements of the Directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.

[12] The marking of the product shall include the following:


II 2 G Ex db h IIC T4 Gb
II 2 D Ex h tb IIIC T135°C Db



Date of issue:
2025-05-05




Asle Kaastad
 For DNV Product Assurance AS
 The Certificate has been digitally signed.

[13]

Schedule

[14]

EU-Type Examination Certificate No:

DNV 20 ATEX 61565X

Issue 3

[15]

Description of Product

EHF series Self-Contained Electro-Hydraulic Actuator/Electric Fail Safe Actuator mainly comprises of EHF housing, Main Manifold and Integral Squirrel cage/DC Motor Assembly. One thermostat of 125°C/ 132°C is installed within the motor windings.

The EHF Housing has three interconnected compartments with Individual covers

- Terminal Compartment with integral Terminal Blocks for mounting terminals
- Controller Compartment with LCD Cover, Where the Cover has the glass window cover and controller assembly and compartment house the electronics.
- Limit Switch compartment with LED Cover and for LED Indication and houses Solenoid Valves, Pressure Transmitter/Transducer, also it may consist Limit Switch and Position Transmitter/Transducer Assembly.

The equipment also contains manifold assembly which is protected by type of protection Ex h. Oil tank containing hydraulic oil is mounted on manifold assembly, Oil grades for specific ambient range is mentioned in Table 2 below. The equipment is made from cast aluminium alloy LM 6, alternate material may be stainless steel grade CF8 / CF8M or carbon steel WCB 216 or SG Iron 520/7.

Terminal box cover is fixed on EHF housing with socket head cap screws of size M8 X 30L (Qty.- 6 nos.) forming a spigot joint. O-ring (Ø3.53mm) made of Nitrile rubber (NBR) / FluoroSilicone Rubber (FVMQ) is provided on terminal box cover and secured in O-ring groove. Glass window is cemented on controller assembly cover. The controller assembly cover is fixed on EHF housing with socket head cap screws of size M8 X 30L (Qty.- 8 nos.) forming a spigot joint. O-ring (Ø3.53mm) made of Nitrile rubber (NBR) / FluoroSilicone Rubber (FVMQ) is provided on controller assembly cover and secured in O-ring groove. Plastic knobs (Qty.- 02 numbers) are provided on controller assembly cover, the knobs are magnetically latched to the sensor mounted inside the enclosure for local controls.

The limit switch assembly cover is fixed on EHF housing with hex. head screws of size M12 X 35L (Qty.- 6 nos.) forming a spigot joint. O-ring (Ø2.62mm) made of Nitrile (NBR) rubber / FluoroSilicone Rubber (FVMQ) is provided on limit switch assembly cover and secured in O-ring groove. Operating rod pass through the cover. On top of the cover, indicator cover made of Polycarbonate plastic material is provided to indicate position of valve "Open/ Close", alternatively cover may have LED Indication option.

Manifold assembly is fixed on EHF housing with hex. head screws of size M12 X40L (Qty.- 4 nos.) forming a spigot joint. O-ring (Ø2.62mm) made of Nitrile (NBR) rubber / FluoroSilicone Rubber (FVMQ) is provided on manifold housing and secured in O-ring groove.

Motor is mounted on manifold with socket head cap screws of size M8 X 30L (Qty.- 4 nos.) forming a spigot joint. O-ring (Ø3.53mm) made of Fluorocarbon rubber (Viton) / FluoroSilicone Rubber (FVMQ) rubber is provided between motor flange and manifold and secured in O-ring groove. The equipment carries degree of protection IP67 and found to be comply with IEC 60529.

Motor cable is running through the cavity in the manifold to the terminal box assembly for supply connection. The nickel plated phosphor bronze bush is forming cylindrical joint with manifold and motor shaft.

Internal gross volume of the EHF housing is 20.17 litre and net volume is 9.47 litre.

The equipment is provided with maximum six cable entries of size M25 X 1.5P and one cable entry of size M32 X 1.5P with threaded axial length of 16 mm. Alternate size of the cable entry can be six cable entries of size 3/4" NPT and one cable entry of size 1 1/4" NPT or six cable entries of size M20 X1.5P and one cable entry of size M25 X 1.5P.

Continuous duty operation of the equipment when the motors are de-rated to 50% of the rated power.

The actuator may have following cover options:

- 1) Controller assembly cover- LCD Cover V2 (Glass Window - 105 X 65 mm)
- 2) Controller assembly cover- LCD Cover (Glass Window - Ø 65 mm)
- 3) Limit Switch assembly cover – LED Indication (Glass Window - Ø 47 mm)
- 4) Limit Switch assembly cover – Mechanical Indication
- 5) Terminal Box Cover- Blind cover

Type designation

Based on the cover options, four models are de-coded in below table;

Model	Configurations
EHF A	Controller assembly cover- LCD Cover V2 Limit Switch assembly cover – LED Indication
EHF B	Controller assembly cover- LCD Cover V2 Limit Switch assembly cover – Mechanical Indication
EHF C	Controller assembly cover- LCD Cover Limit Switch assembly cover – Mechanical Indication
EHF D	Controller assembly cover- LCD Cover Limit Switch assembly cover – LED Indication

Electrical Data

EHF series self-contained electro-hydraulic actuator mainly can be provided with following types of motors mentioned in table 1.

Electrical rating of Motors:

Motors are manufactured in different rating as shown in table below with three phase and single phase electrical supply. The three phase motors are rated up to 480 VAC, 50/60Hz and single phase motors are rated up to 240 VAC 50/60 Hz with supply variation no more than +/- 10% on voltage and +/-5% on frequency.

For DC supply voltage, the motors are rated up to 48VDC supply.

Table 1:

Motor Description	Phases	Frequency (Hz)	Stator Length (mm)	Speed (RPM)	Power (kW-15min)	Power (kW-Continuous)	Gross Volume (L)
Motor 1	3	50	75	3000	0.50	0.25	1.87
Motor 2	3	60	75	3600	0.50	0.25	1.87
Motor 3	3	60	75	3600	0.60	0.30	1.87
Motor 4	1	50	90	3000	0.40	0.20	2.24
Motor 5	1	60	90	3600	0.40	0.20	2.24
Motor 6	1	50	90	3000	0.40	0.20	2.24
Motor 7	1	50	90	3000	0.40	0.20	2.24
Motor 8	1	60	90	3600	0.40	0.20	2.24
Motor 9	3	50	85	3000	1.50	0.75	2.12
Motor 10	3	60	85	3600	1.25	0.63	2.12
Motor 11	3	50	85	3000	1.50	0.75	2.12
Motor 12	3	60	85	3600	1.25	0.63	2.12

Motor 13	3	60	90	3600	0.90	0.45	2.24
Motor 14	3	50	75	1500	0.50	0.25	1.87
Motor 15	3	60	75	1800	0.50	0.25	1.87
Motor 16	3	60	75	1800	0.60	0.30	1.87
Motor 17	1	50	90	1500	0.20	0.10	2.24
Motor 18	1	50	90	1500	0.30	0.15	2.24
Motor 19	1	60	90	1800	0.20	0.10	2.24
Motor 20	1	60	90	1800	0.20	0.10	2.24
Motor 21	1	50	40	1500	0.10	0.05	1.00
Motor 22	1	50	40	1500	0.20	0.10	1.00
Motor 23	3	50	65	1500	0.40	0.20	1.62
Motor 24	3	60	90	1800	0.90	0.45	2.24
Motor 25	3	50	85	1500	0.90	0.45	2.12
Motor 26	1	50	90	1500	0.40	0.20	2.24
Motor 27	1	60	90	1800	0.30	0.15	2.24
Motor 28	1	60	90	1800	0.30	0.15	2.24
Motor 29	1	60	90	1800	0.30	0.15	2.24
Motor 30	1	50	100	1500	0.30	0.15	2.49
Motor 31	1	60	100	1800	0.30	0.15	2.49
Motor 32	3	50	85	1500	0.70	0.35	2.12
Motor 33	3	50	75	3000	0.50	0.25	1.87
Motor 34	3	50	75	750	0.10	0.05	1.87
Motor 35	3	50	75	1500	0.50	0.25	1.87
Motor 36	3	60	85	3600	1.25	0.63	2.12
Motor 37	3	60	85	1800	0.90	0.45	2.12
Motor 38	3	50	85	3000	1.50	0.75	2.12
Motor 39	3	50	85	1500	0.90	0.45	2.12
Motor 40	3	50	75	1500	0.50	0.25	1.87
Motor 41	3	60	75	1800	0.50	0.25	1.87
Motor 42	3	50	40	1500	0.10	0.05	1.00
Motor 43	3	50	40	1500	0.10	0.05	1.00
Motor 44	1	60	40	1800	0.10	0.05	1.00
Motor 45	1	60	40	1800	0.10	0.05	1.00
Motor 46	3	50	90	1500	0.40	0.20	2.24
Motor 47	3	50	85	1500	0.80	0.40	2.12
Motor 48	3	50	85	1500	0.90	0.45	2.12
Motor 49	3	50	75	1000	0.20	0.10	1.87
Motor 50	3	60	75	1200	0.20	0.10	1.87
Motor 51	3	50	75	750	0.10	0.05	1.87
Motor 52	3	60	75	900	0.10	0.05	1.87
Motor 53	1	50	75	750	0.10	0.05	1.87

Motor 54	1	50	75	750	0.10	0.05	1.87
Motor 55	1	60	90	3600	0.40	0.20	2.24
Motor 56	1	50	75	750	0.10	0.05	1.87
Motor 57	1	50	40	1500	0.10	0.05	1.00
Motor 58	1	50	100	1500	0.30	0.15	2.49
Motor 59	3	50	40	3000	0.40	0.20	1.00
Motor 60	3	50	62	3000	0.50	0.25	1.55
Motor 61	3	60	40	3600	0.30	0.15	1.00
Motor 62	3	50	40	3000	0.40	0.20	1.00
Motor 63	3	60	40	3600	0.40	0.20	1.00
Motor 64	3	50	62	3000	0.50	0.25	1.55
Motor 65	3	60	62	3600	0.50	0.25	1.55
Motor 66	3	60	62	3600	0.60	0.30	1.55
Motor 67	3	50	85	3000	1.50	0.75	2.12
Motor 68	3	60	85	3600	1.25	0.63	2.12
Motor 69	3	50	125	3000	2.50	1.25	3.12
Motor 70	3	60	125	3600	3.00	1.50	3.12
Motor 71	3	50	85	1500	0.80	0.40	2.12
Motor 72	3	50	85	3000	1.50	0.75	2.12
Motor 73	3	60	85	3600	1.25	0.63	2.12
Motor 74	3	50	85	1500	0.70	0.35	2.12
Motor 75	3	50	40	1500	0.20	0.10	1.00
Motor 76	3	50	62	1500	0.40	0.20	1.55
Motor 77	3	50	90	1500	0.80	0.40	2.24
Motor 78	3	50	40	1500	0.20	0.10	1.00
Motor 79	3	60	40	1800	0.20	0.10	1.00
Motor 80	3	60	62	1800	0.30	0.15	1.55
Motor 81	3	50	62	1500	0.40	0.20	1.55
Motor 82	3	60	62	1800	0.40	0.20	1.55
Motor 83	3	60	90	1800	0.60	0.30	2.24
Motor 84	3	50	90	1500	0.80	0.40	2.24
Motor 85	3	60	85	1800	1.00	0.50	2.12
Motor 86	3	50	125	1500	2.00	1.00	3.12
Motor 87	3	60	85	1800	1.00	0.50	2.12
Motor 88	3	60	85	3600	1.25	0.63	2.12
Motor 89	3	60	85	1800	0.90	0.45	2.12
Motor 90	1	50	40	3000	0.50	0.25	1.00
Motor 91	1	50	125	3000	3.00	1.50	3.12
Motor 92	1	50	40	1500	0.10	0.05	1.00
Motor 93	1	50	40	1500	0.30	0.15	1.00
Motor 94	1	50	90	1500	0.70	0.35	2.24

Motor 95	3	60	40	1800	0.10	0.05	1.00
Motor 96	1	50	90	1500	0.70	0.35	2.24
Motor 97	1	50	40	1500	0.30	0.15	1.00
Motor 98	1	50	125	3000	3.00	1.50	3.12
Motor 99	1	50	40	3000	0.50	0.25	1.00
Motor 100	3	60	125	1800	1.50	0.75	3.12
Motor 101	3	50	125	1500	2.00	1.00	3.12
Motor 102	3	50	125	3000	2.50	1.25	3.12
Motor 103	1	50	40	1500	0.10	0.05	1.00
Motor 104	1	60	40	3600	0.50	0.25	1.00
Motor 105	1	60	125	3600	3.00	1.50	3.12
Motor 106	1	60	40	1800	0.10	0.05	1.00
Motor 107	1	60	40	1800	0.30	0.15	1.00
Motor 108	1	60	90	1800	0.70	0.35	2.24
Motor 109	0	NA	85	3000	3.10	1.55	4.23
Motor 110	0	NA	85	1500	0.90	0.45	4.23
Motor 111	0	NA	85	3000	2.92	1.46	4.23
Motor 112	3	50	145	1500	4.40	2.20	6.30
Motor 113	0	NA	125	1500	0.27	0.14	4.23
Motor 114	0	NA	125	1500	0.54	0.27	4.23
Motor 115	0	NA	125	1500	1.10	0.55	4.23

Degrees of protection (IP Code)

IP 67

Ambient temperature:

The equipment is suitable for use within an ambient temperature range of $-20^{\circ}\text{C} \leq T_a \leq +70^{\circ}\text{C}$ and $-50^{\circ}\text{C} \leq T_a \leq +70^{\circ}\text{C}$ on the basis of elastomeric material and oil used in the construction of the equipment as below in Table 2.

Table 2: Relation between O-ring material and ambient temperature range

Ambient range	Elastomeric material	Cementing material
$-20^{\circ}\text{C} \leq T_a \leq +70^{\circ}\text{C}$	Nitrile rubber (NBR-NT70, COT -40°C to $+100^{\circ}\text{C}$) & Fluorocarbon rubber (Viton-VT70, COT -30°C to $+220^{\circ}\text{C}$)	RTV Silicon compound anabond grade 666. (COT -50°C to $+250^{\circ}\text{C}$)
$-50^{\circ}\text{C} \leq T_a \leq +70^{\circ}\text{C}$	FluoroSilicone Rubber (FVMQ- FSL 70, COT -70°C to $+220^{\circ}\text{C}$)	

Table 2: Relation between Hydraulic Oil and ambient temperature range

Sr. No.	Oil	Make / Model	Pour Point	Flash point	Viscosity	Ambient range
1	DTE 10 EXCEL 68	Mobil	ASTM D97 - -38°C	CLEVELAND OPEN CUP, ASTM D92- 240°C	KINEMATIC VISCOSITY @ 40°C , ASTM D445- 68.4 MM ² /S	$-20^{\circ}\text{C} \leq T_a \leq +70^{\circ}\text{C}$

2	QUINTOLUBRIC 888-46	Quaker Houghton	ASTM D97 - -30 °C	CLEVELAND OPEN CUP, ASTM D92- 300 °C	KINEMATIC VISCOSITY @ 40°C - 47.5 MM ² /S	
3	AEROSHELL FLUID 4	SHELL	< -60 °C	FLASHPOINT (PENSKY MARTIN CLOSED CUP)- 105 °C	KINEMATIC VISCOSITY @ - 56°C - 2300 - 3000 MM ² /S	
4	UNIVIS HVI 13	Mobil	ASTM D97 - -60 °C	CLEVELAND OPEN CUP, DIN EN ISO 2592- >100 °C	KINEMATIC VISCOSITY @ - 40°C, ASTM D445- 371 MM ² /S	-50°C ≤ Ta ≤ +70°C
5	SCH 626	Mobil	ASTM D97 - -54 °C	CLEVELAND OPEN CUP, ASTM D92- 225 °C	KINEMATIC VISCOSITY @ 40°C, ASTM D445- 68MM ² /S	

Routine tests

The equipment has not been subjected to a 4 times overpressure test and therefore the manufacturer needs to conduct a routine pressure test on each and every unit at a pressure of **13.5 bar** for 10 seconds for ambient temperature range of -20°C to +70°C & at a pressure of **33.5 bar** for 10 seconds for ambient temperature range of -50°C to +70°C. No permanent deformation of the joints or damage to the enclosure shall occur.

[16] **Report No.:** 2020-9197 Rev. 3
Project No.: PRJN-185853-2020-PA-IND

[17] Specific Condition(s) of Use

1. It is the responsibility of the installation engineer to ensure that suitably IECEx/ATEX equipment certified Ex db, Ex tb, IIC cable glands and blanking plug are installed in accordance with IEC60079-14 to ensure that the IP rating of IP67 is maintain on the enclosure.
2. It is the responsibility of the installation engineer to ensure that suitably rated cable and cable glands are used to install this equipment. see product label and instruction "Use Cable and Cable Glands suitable for 75°C."
3. Dust layers shall be prevented from building up on the outside surface of the enclosure, and the enclosure shall be routinely cleaned.
4. The equipment presents a potential electrostatic charging hazard. See the manufacturer's instruction for further information. The manual contains instruction as "The external surface of the equipment must only be cleaned with damp cloth in order to avoid ignition hazard caused by static electricity" and the equipment must not be located in a direct or dust laden air-stream.
5. The fastening screws shall be stainless steel socket head cap screws of property class A2-70 and yield stress 450 MPa.
6. Repairs of the flameproof joints must be made in accordance with structural specifications provided by the manufacturer. Repairs must not be made on the basis of the values provided in IEC 60079-1.

[18] Essential Health and Safety Requirements

Met by compliance with the requirements mentioned in item 9.

[19] Drawings and documents

Number	Title	Rev.	Date
12-60-134-597-I	ASSEMBLY DRAWING OF EHF-IECEX	09	31-05-2024
12-60-134-598-I	LCD COVER DRAWING	00	22-01-2020
12-60-134-599-I	MACHINING DRAWING OF LCD COVER	00	22-01-2020
12-60-134-600-I	NAMEPLATE DRAWING FOR EHF- IECEX	09	20-05-2024
12-60-134-601-I	TOP COVER DRAWING – MECHANICAL INDICATION	00	22-01-2020

12-60-134-602-I	TOP COVER DRAWING – LED INDICATION	00	22-01-2020
1-02-02-C-04611	NAME PLATE FOR EHF (CONTINUOUS)-IECE _x	03	24-05-2024

[20] Certificate History

Issue	Description	Issue date	Report no.
0	Original issue	2020-09-23	2020-9197
1	Addition of "Continuous dusty cycle" Range and addition of motors with 48V DC to the scope.	2023-01-04	2020-9197 Rev. 1
2	<ul style="list-style-type: none"> i. To add an ambient temperature range of -50°C to +70°C. ii. To introduce the option no. 2 for flame path joint (Spigot-cylindrical) between Manifold and Motor with diameter of 172mm. iii. To amend the operating voltage range for the motors. iv. To amend the equipment name as Self-Contained Electro-Hydraulic Actuator/Electric Fail Safe Actuator. v. To allow the paint thickness up to 800 microns. vi. To add O-ring material FluoroSilicone Rubber (FVMQ) 	2024-11-29	2020-9197 Rev. 2
3	<ul style="list-style-type: none"> i. Time duration corrected to 15min instead of 5min and Oil make corrected to DTE 10 EXCEL 68 instead of DTE 10 ECEL 68. ii. Specific condition of safe use, point 6 added as per DNV 20 ATEX 61565X, Issue 1. iii. Electrical data is updated with frequency tolerance of +/-5%. iv. Alternate O-ring material FluoroSilicone Rubber (FVMQ) is included in the product description. v. Routine test updated for different ambient temperature range -50°C to +70°C & -20°C to +70°C. 	2025-05-05	2020-9197 Rev. 3

Compliance of the product with the applicable safety requirements of the relevant industrial standards has not been verified and is not covered by this certificate.

END OF CERTIFICATE