[1] # EC-TYPE EXAMINATION CERTIFICATE

[2] **Equipment or Protective System intended for use in Potentially Explosive Atmospheres Directive 94/9/EC**

[3] EC-Type Examination Certificate Number: **DEMKO 10 ATEX 0915070X Rev. 3**

[4] Equipment or Protective System: **Brushless servomotor, G493, G495 and G496 models**

[5] Manufacturer: **Moog Controls (India) PVT Ltd.**

[6] Address: **KIADB Industrial Area, No. 99, 100P & 41P, Electronics City Phase II, Hosur Road, Bangalore - 560 100, Karnataka, India**

[7] This equipment or protective system and any acceptable variation thereto are specified in the schedule to this certificate and the documents therein referred to.

[8] UL International Demko A/S, notified body number 0539 in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment or protective system has been found to comply with the Essential Health and Safety Requirements relating to 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 confidential report no. **13CA31502**

[9] Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN 60079-0:2009 **EN 60079-1:2007** **EN 60079-31:2009**

[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 EC-Type examination certificate relates only to the design, examination and tests of the specified equipment or protective system in accordance to the Directive 94/9/EC. Further requirements of the Directive apply to the manufacturing process and supply of this equipment or protective system.
These are not covered by the certificate.

[12] The marking of the equipment or protective system shall include the following:

II 2 G Ex d IIC T3-T6 Gb

II 2 D Ex tb IIIC T200°C-T85°C Db IP65/67

Certification Manager
Jan-Erik Storgaard

Notified Body

Date of issue: 2011-02-08
Re-issued: 2013-09-15

UL International Demko A/S, Borupvang 5A, 2750 Ballerup, Denmark
Tel. +45 44 85 65 65, info.dk@ul.com, www.ul.com

[13] **Schedule**

[14] **EC-TYPE EXAMINATION CERTIFICATE No.**

DEMKO 10 ATEX 0915070X Rev. 3

Report: 13CA31502

[15] Description of Equipment or protective system

Product is a brushless servomotor for use in gas and dust atmospheres of model numbers G493, G495, and G496. The three models are similar in design but vary in size, volume and electrical parameters. The motor has two versions for IP rating, IP 65 and IP 67. The motor has a built-in temperature-limiting device of NTC, PTC or KTY type. A primary thermistor which is a PTC type only and is to be connected to a temperature monitoring device, which would trip power supply to drive on field. An optional secondary thermistor which can be of the PTC/NTC or KTY type can also be connected. The enclosure is made of aluminum alloy. The dimensions and flame paths remain constant for a particular motor model and only the torque and power ratings vary. The motor is available in various stack lengths.

Nomenclature for types G493 and G495:

FAS G	3	L	M	2	010	00	00	01	01	000
I	II	III	IV	V	VI	VII	VIII	IX	X	XI

I – Motor Series
G (Global) – Series designation

II – Motor Size
3 (493) – 70 mm square flange
5 (495) – 140 mm square flange
6 (496) – 190 mm square flange

III – Design
L – Moog Ex Design UL

IV – Winding Voltage
M – Low voltage
V – High voltage

V – Stack Length
0 – Non-standard stack length, between L05 and L40 for G493, between L10 and L50 for G495 and between L15 and L90 for G496
2 – L05 (G493) or L10 (G495) or L15 (G496)
4 – L15 (G493) or L20 (G495) or L30 (G496)
6 – L25 (G493) or L30 (G495) or L45 (G496)
8 – L40 (G493) or L50 (G495) or L60 (G496)
9 – L90 (G496)

VI – Nominal Speed, RPM
Any number between X – XXX, followed by motor RPM code, where the RPM code designation given as = RPM/100

VII – Electrical Option

	Brake Options		Cable gland position	
	1	2	Top	Back
00	-	-	X	-
01	X	-	X	-
02	-	X	X	-
03	-	-	-	X
04	X	-	-	X
05	-	X	-	X
99	Special version – not affecting the electrical performance or protection methods of the device as described in the documents			

Brake option

Brake Option				
Motor Size		G493	G495	G496
Low -T	1	2 Nm	14.5 Nm	22 Nm
High -T	2	4.5 Nm	22 Nm	72 Nm
	Code			

[13]

[14]

Schedule
EC-TYPE EXAMINATION CERTIFICATE No.
DEMKO 10 ATEX 0915070X Rev. 3
Report: 13CA31502

VIII – Mechanical Option

	Keyway	Shaft exit seal
00	None provided	X
01	X	X
99	Special version – not affecting the electrical performance or protection methods of the device as described in the documents	

IX – Feedback Option

Any two digit number - Not related to the protection method

X – Ignition Temperature Class

	Ignition Temperature Class / Ambient (℃) +													
	-20 to +40	-20 to +50	-20 to +60	-20 to +70	-20 to +80	-20 to +90	-20 to +100	-40 to +40	-40 to +50	-40 to +60	-40 to +70	-40 to +80	-40 to +90	-40 to +100
00	-	-	-	-	-	-	-	-	-	-	-	T4	-	-
01	-	T4	-	-	-	-	-	-	-	-	-	-	-	-
02	-	-	T4	-	-	-	-	-	-	-	-	-	-	-
03	T4	-	-	-	-	-	-	-	-	-	-	-	-	-
04	-	-	-	T4	-	-	-	-	-	-	-	-	-	-
05	-	-	-	-	T4	-	-	-	-	-	-	-	-	-
06	-	-	-	-	-	-	-	T4	-	-	-	-	-	-
07	-	-	-	-	-	-	-	-	T4	-	-	-	-	-
08	-	-	-	-	-	-	-	-	-	T4	-	-	-	-
09	-	-	-	-	-	-	-	-	-	-	T4	-	-	-
10	T5	-	-	-	-	-	-	-	-	-	-	-	-	-
11	-	-	-	-	-	-	-	T5	-	-	-	-	-	-
12	T6	-	-	-	-	-	-	-	-	-	-	-	-	-
13	-	-	-	-	-	-	-	T6	-	-	-	-	-	-
14	T3	-	-	-	-	-	-	-	-	-	-	-	-	-
15	-	T3	-	-	-	-	-	-	-	-	-	-	-	-
16	-	-	T3	-	-	-	-	-	-	-	-	-	-	-
17	-	-	-	T3	-	-	-	-	-	-	-	-	-	-
18	-	-	-	-	T3	-	-	-	-	-	-	-	-	-
19	-	-	-	-	-	T3	-	-	-	-	-	-	-	-
20	-	-	-	-	-	-	T3	-	-	-	-	-	-	-
21	-	-	-	-	-	-	-	T3	-	-	-	-	-	-
22	-	-	-	-	-	-	-	-	T3	-	-	-	-	-
23	-	-	-	-	-	-	-	-	-	T3	-	-	-	-
24	-	-	-	-	-	-	-	-	-	-	T3	-	-	-
25	-	-	-	-	-	-	-	-	-	-	-	T3	-	-
26	-	-	-	-	-	-	-	-	-	-	-	-	T3	-
27	-	-	-	-	-	-	-	-	-	-	-	-	-	T3
99	Special version – not affecting the electrical performance or protection methods of the device as described in the documents													

+ - T3 ignition temp class for size 3 & 5 up to 80℃ only.

XI – Special Version

Any three digit number - Not related to the protection method

Temperature range

The ambient ranges and the temperature class details are given below. The temperature class and ambient are related based on the power supply rating to the motor at a specific ambient range.

For G493 and G495 motors:

The relation between ambient temperature and the assigned temperature class is as follows:

Ambient temperature range	Temperature class
-40 °C to +40 °C -20 °C to +40 °C	See Electrical data
-40 °C to +50 °C -20 °C to +50 °C	See Electrical data
-40 °C to +70 °C -20 °C to +70 °C	See Electrical data
-40 °C to +80 °C -20 °C to +80 °C	See Electrical data

[13]

[14]

Schedule
EC-TYPE EXAMINATION CERTIFICATE No.
DEMKO 10 ATEX 0915070X Rev. 3
Report: 13CA31502

For G496 motors:

The relation between ambient temperature and the assigned temperature class is as follows:

Ambient temperature range	Temperature class
-40 °C to +40 °C -20 °C to +40 °C	See Electrical data
-40 °C to +50 °C -20 °C to +50 °C	See Electrical data
-40 °C to +70 °C -20 °C to +70 °C	See Electrical data
-40 °C to +80 °C -20 °C to +80 °C	See Electrical data
-40 °C to +90 °C -20 °C to +90 °C	See Electrical data
-40 °C to +100 °C -20 °C to +100 °C	See Electrical data

Electrical data

Power ratings with corresponding range of parameters for motors are as below:

For G493:

Stack Length	Power, W	Speed, rpm	Rated Torque, Nm	Peak Torque, Nm	Ambient Rating, ℃	Temperature Class
L05	0	0	0.52	1.6	-40 to +40 -20 to +40	T4/T135℃
	359	7800	0.44	1.6		
L40	0	0	3.26	13.2		
	1117	3800	2.82	13.2		
L05	0	0	0.5	1.6	-40 to +50 -20 to + 50	T4/T135℃
	341	7800	0.42	1.6		
L40	0	0	3.13	13.2		
	1059	3800	2.66	13.2		
L05	0	0	0.46	1.6	-40 to +60 -20 to +60	T4/T135℃
	304	7800	0.37	1.6		
L40	0	0	2.88	13.2		
	942	3800	2.37	13.2		
L05	0	0	0.41	1.6	-40 to +70 -20 to +70	T4/T135℃
	253	7800	0.31	1.6		
L40	0	0	2.56	13.2		
	786	3800	1.97	13.2		
L05	0	0	0.34	1.6	-40 to +80 -20 to +80	T4/T135℃
	177	7800	0.22	1.6		
L40	0	0	2.14	13.2		
	552	3800	1.38	13.2		
L05	0	0	0.43	1.6	-40 to +40 -20 to +40	T5/T100℃
	273	7800	0.33	1.6		
L40	0	0	2.74	13.2		
	847	3800	2.12	13.2		
L05	0	0	0.32	1.6	-40 to +40 -20 to +40	T6/T85℃
	118	7800	0.14	1.6		
L40	0	0	1.99	13.2		
	364	3800	0.91	13.2		

[13]

[14]

Schedule
EC-TYPE EXAMINATION CERTIFICATE No.
DEMKO 10 ATEX 0915070X Rev. 3
Report: 13CA31502

For G495:

Stack Length	Power, W	Speed, rpm	Rated Torque, Nm	Peak Torque, Nm	Ambient Rating, ℃	Temperature Class
L10	0	0	5.79	12.2	-40 to +40 -20 to +40	T4/T135℃
	2173	4800	4.32	12.2		
L50	0	0	25.39	61.2		
	4388	2000	20.95	61.2		
L10	0	0	5.47	12.2	-40 to +50 -20 to +50	T4/T135℃
	1969	4800	3.92	12.2		
L50	0	0	24	61.2		
	4046	2000	19.32	61.2		
L10	0	0	5.15	12.2	-40 to +60 -20 to +60	T4/T135℃
	1746	4800	3.47	12.2		
L50	0	0	22.6	61.2		
	3682	2000	17.58	61.2		
L10	0	0	4.81	12.2	-40 to +70 -20 to +70	T4/T135℃
	1489	4800	2.96	12.2		
L50	0	0	21.14	61.2		
	3283	2000	15.67	61.2		
L10	0	0	4.3	12.2	-40 to +80 -20 to +80	T4/T135℃
	1035	4800	2.06	12.2		
L50	0	0	18.87	61.2		
	2604	2000	12.43	61.2		
L10	0	0	5.09	12.2	-40 to +40 -20 to +40	T5/T100℃
	1581	4800	3.15	12.2		
L50	0	0	22.35	61.2		
	3474	2000	16.6	61.2		
L10	0	0	4.03	12.2	-40 to +40 -20 to +40	T6/T85℃
	645	4800	1.47	12.2		
L50	0	0	17.68	61.2		
	1640	2000	7.83	61.2		

For G496:

Stack Length	Power, W	Speed, rpm	Rated Torque, Nm	Peak Torque, Nm	Ambient Rating, ℃	Temperature Class
L15	0	0	13	40	-40 to +40 -20 to +40	T3/T200℃
	3464	4000	8	40		
L90	0	0	70	240		
	8378	2000	40	240		
L15	0	0	13	40	-40 to +50 -20 to +50	T3/T200℃
	3179	4000	8	40		
L90	0	0	66	240		
	8378	2000	40	240		
L15	0	0	12	40	-40 to +60 -20 to +60	T3/T200℃
	2886	4000	7	40		
L90	0	0	64	240		
	8378	2000	40	240		
L15	0	0	11	40	-40 to +70 -20 to +70	T3/T200℃
	2346	3200	7	40		
L90	0	0	58	240		
	6053	1700	34	240		
L15	0	0	10	40	-40 to +80 -20 to +80	T3/T200℃
	1926	2800	7	40		
L90	0	0	53	240		
	5027	1500	32	240		
L15	0	0	9	40	-40 to +90 -20 to +90	T3/T200℃
	1330	2300	6	40		
L90	0	0	46	240		
	4241	1500	27	240		
L15	0	0	8	40	-40 to +100 -20 to +100	T3/T200℃
	928	2000	4	40		
L90	0	0	40	240		
	3142	1250	24	240		

[13]

[14]

Schedule
EC-TYPE EXAMINATION CERTIFICATE No.
DEMKO 10 ATEX 0915070X Rev. 3
Report: 13CA31502

For G496 (Continued):

Stack Length	Power, W	Speed, rpm	Rated Torque, Nm	Peak Torque, Nm	Ambient Rating, ℃	Temperature Class
L15	0	0	13	40	-40 to +40 -20 to +40	T4/T135℃
	3464	4000	8	40		
L90	0	0	70	240		
	8378	2000	40	240		
L15	0	0	13	40	-40 to +50 -20 to +50	T4/T135℃
	3179	4000	8	40		
L90	0	0	66	240		
	8378	2000	40	240		
L15	0	0	12	40	-40 to +60 -20 to +60	T4/T135℃
	2622	4000	6	40		
L90	0	0	62	240		
	7459	1800	39	240		
L15	0	0	11	40	-40 to +70 -20 to +70	T4/T135℃
	2346	3200	7	40		
L90	0	0	58	240		
	6053	1700	34	240		
L15	0	0	10	40	-40 to +80 -20 to +80	T4/T135℃
	1926	2800	7	40		
L90	0	0	53	240		
	5027	1500	32	240		
L15	0	0	10	40	-40 to +40 -20 to +40	T5/T100℃
	1875	2700	7	40		
L90	0	0	55	240		
	4765	1300	35	240		
L15	0	0	9	40	-40 to +40 -20 to +40	T6/T85℃
	1256	2100	6	40		
L90	0	0	47	240		
	3110	1100	27	240		

The above ratings are continuous 100% duty cycle. The change in torque ratings with respect to duty cycle is as given below:

Duty Cycle	Torque rating increases by
25%	85%
40%	50%
60%	25%

The duty cycle for peak torque condition is 10% i.e. 6 seconds ON and 54 seconds OFF, in a cycle time of 1 minute.

For ratings between the above stack lengths, refer to page 4 of schedule drawings CA91180, CA91181 and CB35199.

All the above ratings are at DC bus voltage of 325 volts, maximum DC bus voltage rating is 750 volts, ratings remain the same for all voltages and hence the losses also remain the same.

Installation instructions:
All cable entry devices and blanking elements shall be certified in type of explosion protection flameproof enclosure “d”, dust protection “tb”, suitable for the conditions of use and correctly installed.

Unused apertures shall be closed with suitable blanking elements.

For ambient temperatures below –10 °C and above +60 °C use field wiring suitable for both minimum and maximum ambient temperature.

Mounting instructions:
Refer to “Instructions”.

Routine tests
Routine tests hydrostatic pressure test according to EN 60079-1 cl. 16 are to be carried out in accordance with work instruction WI005306, for type G493 motors rated below -20°C as the enclosures have been tested at 1.5 times the reference pressure. All other type G493 motors rated -20°C and above have successfully been tested at four times the reference pressure and routine tests are not required.

Routine tests according to EN 60079-1 cl. 16 are not required, for all the type G495 and G496 motors as the enclosures have been successfully tested at four times the reference pressure.

[13] **Schedule**

[14] **EC-TYPE EXAMINATION CERTIFICATE No.**

DEMKO 10 ATEX 0915070X Rev. 3

Report: 13CA31502

[16] Report No.

Project Report No.: 13CA31502 (Hazardous Location Testing)

Documents:

Description:	Drawing No.:	Rev. Level:	Date:
Certification Drawing - G493L Ex Motors (4 Sheets)	CA91180	U	2013-08-21
Certification Drawing - G495L Ex Motors (4 Sheets)	CA91181	U	2013-08-21
Certification Drawing - G496L Ex Motors (4 Sheets)	CB35199	B	2013-08-21
Name plate (For Gas Only)	CA94541	G	2013-08-21
Name plate (For Gas and Dust)	CB05597	G	2013-08-21
Installation instructions	CB07398-001	H	2013-07
Warning Label	C88053	B	2013-01-21

[17] Special conditions for safe use:

- For ambient temperatures below –10 °C and above +60 °C use field wiring suitable for both minimum and maximum ambient temperature.
- Contact Moog for information on the dimensions of the flameproof joints.
- Yield strength of the front and rear cover assembling fasteners shall not be less than 640 MPa.
- The class of fit between the fasteners and stator frame shall be of medium fit 6H/6g.
- All cable entry devices and blanking elements shall be ATEX certified in type of explosion protection flameproof enclosure “d”, dust protection “tb”, suitable for the conditions of use and correctly installed.
- The drive used along to the servomotor shall be of specification as specified by manufacturer and suitable for the motor electrical specifications and operating characteristics.
- The o-rings and seal material on which the IP protection is relied on shall not be replaced.
- The motor can withstand peak torque for maximum 10% of the time.
- Each motor shall use a suitable thermal protector based on its rated ambient and surface temperature class (T-code).
- Every motor covered under this certificate shall be connected to a temperature monitoring device in field. The temperature monitoring device connected to the PTC temperature sensor in the motor shall be ATEX certified to latest edition of the EN 50495 standard.

[18] Essential Health and Safety Requirements

Concerning ESR this Schedule verifies compliance with the ATEX directive only. The manufacturer's Declaration of Conformity declares compliance with other relevant Directives.

Additional information

The servo motor models G493, G495, and G496 have in addition passed the tests for Ingress Protection to IP 65 and IP67 as applicable in accordance with EN60529: 1991/A1 2001.

The manufacturer shall inform the notified body concerning all modifications to the technical documentation as described in ANNEX III to Directive 94/9/EC of the European Parliament and the Council of 23 March 1994.