

# Flame Proof Motors For Hazardous Environment

# JHX



**ABB**

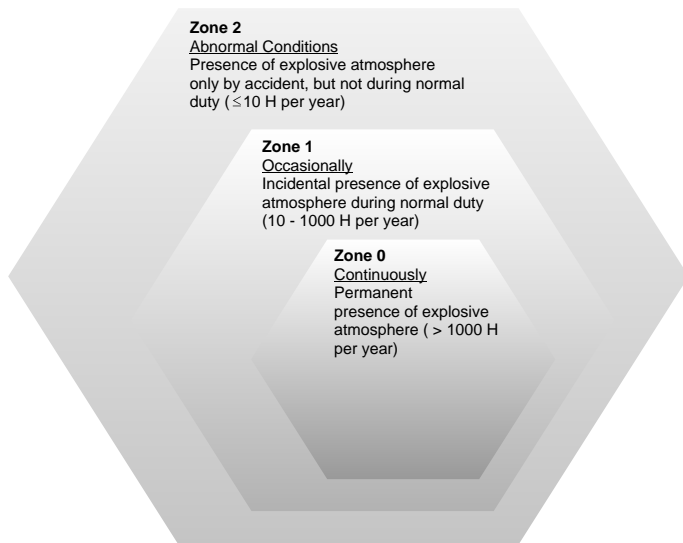
## Introduction

The use of electrical motors in potentially explosive atmospheres is quite frequent these days. These motors have to be constructed in such a way that there is no risk of an explosion. An Explosion occurs when the following situations occur:

- presence of potentially explosive atmosphere
- existence of a source of ignition
- possibility of transmission of the explosion

## Classification of Hazardous Environment:

According to IS: 5572, Hazardous areas are classified in the following ways depending on the degree of probability of the presence of hazardous atmosphere.



Zone	Criteria presence of gas
Zone 0	Continuously of very long period
Zone 1	Present in normal operations
Zone 2	Unlikely, but if present, only for a short time

In Zone 0, no electrical motors can be installed. Most common motor for Zone 1 is the flameproof design, but it can also be used in Zone 2.

## Application Groups:

Depending on the intended use, explosion-proof electrical operating equipment is divided into two major groups:

Group I	Equipment for coal mines (only specially designed motors for mines can be used)
Group II	Electrical equipment for use other than mines (surface industry)
Group II	motors with flameproof enclosures are still further divided into gas groups:
II A	Propane
II B	Ethylene
II C	Hydrogen

## Temperature Classes:

Combustible gas or vapour and explosion-protected electrical equipment are divided into temperature of the gas or to T6 with regard to the ignition temperature of the gas or vapour and the maximum surface temperature of the component.

Temperature class	Ignition temperature for the gas / vapour °C	Maximum permitted temperature of electrical equipment °C
T1	>450	450
T2	>300 <450	300
T3	>200 <300	200
T4	>135 <200	135
T5	>100 <135	100
T6	>85 <100	15

## Flame proof motors, type "d"

ABB motors of flame proof design (type JHX) are TEFC, 3 phase squirrel cage induction motor (as per IS:2148 - 2004) for operation in hazardous location classified as Zone 1 and Zone 2 areas as per IS:5572

**Note:** Other frame sizes are available on request.

The motor enclosure has been designed in such a way that no internal explosion can be transmitted to the explosive atmosphere surrounding the machine. The enclosure must withstand, without damage, any pressure levels caused by an internal explosion, the shape, length and gap of part assembly joints at shaft opening, cable entries, etc., shall be designed to allow for throttling and cooling of hot gases escaping outside. The standard emphasise the impact of an explosive atmosphere (for instance, explosion pressure) over constructional requirements of such apparatus.

Range: 0.25 ..... 15kW, 0.33 ..... 20hp

Frame: JHX71 ..... JHX160

Pole: 2 ..... 8

## Features:

1. Motors suitable for high ambient temperature 50°C.
2. Keeps an explosion which takes place inside the enclosure from propagating through gaps to the ambient.
3. Withstands the explosion pressure created inside the enclosures.
4. Benefits when dealing with special operating modes such as heavy stars and special applications.
5. All surface temperatures are selected to comply with the temperature class.
6. Suitability for use in temperature classes T1 to T4.
7. Can be used both in Zone 1 and Zone 2.

TEFC, S1 Duty  
 415 ± 10% V, 50 ± 5%Hz.  
 Combined Variation of ±10%

Insulation Class F, Ambient Temp. = 50° C  
 Temperature rise class B (70° C)  
 Gas Group IIA & IIB

## 2 Pole

Output kW	HP	Frame Size	Rated Speed (rpm)	Current		Efficiency %			Power Factor			Torque			T <sub>hot</sub> (Sec)	T <sub>cold</sub> (Sec)	Gd2 Kgm2	Weight Kg
				I <sub>n</sub> (A)	I <sub>s</sub> /I <sub>n</sub> (A)	FL	3/4FL	1/2FL	FL	3/4FL	1/2FL	T <sub>s</sub> /T <sub>n</sub>	T <sub>max</sub> /T <sub>n</sub>	T <sub>n</sub> (Nm)				
0.37	0.50	JHX71C2	2790	0.9	4.2	66.0	68.0	64.0	0.84	0.77	0.50	2.0	2.4	1.3	5	12	0.001	17
0.55	0.75	JHX71D2	2790	1.3	4.3	68.0	66.0	60.0	0.82	0.75	0.64	2.0	2.5	1.9	5	12	0.002	17
0.75	1.0	JHX80C2	2780	1.7	4.8	73.0	72.0	68.0	0.90	0.84	0.74	2.1	2.3	2.6	7	16	0.003	21
1.1	1.5	JHX80D2	2790	2.5	5.0	76.0	74.0	71.0	0.88	0.81	0.70	2.1	2.4	3.8	7	16	0.004	22
1.5	2.0	JHX90SLC2	2865	2.9	6.0	81.0	81.0	77.0	0.90	0.84	0.74	2.2	3.0	5.0	5	10	0.008	33
2.2	3.0	JHX90SLD2	2865	4.2	6.0	81.5	81.5	77.5	0.90	0.84	0.74	2.1	3.0	7.3	6	12	0.009	35
3.7	5.0	JHX100LB2	2830	7.2	6.0	80.0	79.5	77.5	0.87	0.84	0.74	2.2	2.7	12.5	6	12	0.044	55
5.5	7.5	JHX132SMB2	2870	10.0	6.0	84.0	84.0	83.0	0.88	0.86	0.83	2.1	3.0	18.3	7	14	0.052	83
7.5	10.0	JHX132SMC2	2870	13.5	6.0	86.0	86.0	85.0	0.90	0.88	0.85	2.4	3.0	25.0	7	14	0.072	92
9.3	12.5	JHX132SME2	2870	16.0	6.0	86.5	86.5	85.5	0.91	0.89	0.86	2.5	3.0	30.9	9	20	0.092	100
11.0	15.0	JHX160MLB2	2900	20.0	6.0	88.0	88.0	87.0	0.87	0.85	0.82	2.2	2.8	36.2	12	28	0.128	139
15.0	20.0	JHX160MLD2	2900	26.0	6.0	89.0	89.0	88.0	0.87	0.85	0.82	2.2	3.0	49.4	12	28	0.152	151
18.5	25.0	JHX160MLE2	2900	32.0	6.0	91.0	91.0	90.0	0.90	0.87	0.84	2.5	2.9	60.9	12	28	0.182	164

## 4 Pole

Output kW	HP	Frame Size	Rated Speed (rpm)	Current		Efficiency %			Power Factor			Torque			T <sub>hot</sub> (Sec)	T <sub>cold</sub> (Sec)	Gd2 Kgm2	Weight Kg
				I <sub>n</sub> (A)	I <sub>s</sub> /I <sub>n</sub> (A)	FL	3/4FL	1/2FL	FL	3/4FL	1/2FL	T <sub>s</sub> /T <sub>n</sub>	T <sub>max</sub> /T <sub>n</sub>	T <sub>n</sub> (Nm)				
0.25	0.33	JHX71B4	1370	0.7	3.5	63.0	61.0	55.0	0.80	0.68	0.54	1.9	2.4	1.7	7	16	0.003	16
0.37	0.50	JHX71C4	1370	1.1	3.5	64.0	62.0	56.0	0.80	0.68	0.54	2.0	2.4	2.6	7	16	0.004	17
0.55	0.75	JHX80D4	1400	1.5	3.5	65.0	64.0	60.0	0.76	0.65	0.52	2.0	2.4	3.8	6	14	0.007	21
0.75	1.00	JHX80E4	1380	2.0	3.5	68.0	67.0	62.0	0.76	0.65	0.52	2.0	2.4	5.2	5	12	0.008	22
1.1	1.5	JHX90SLD4	1420	2.5	5.5	76.0	76.0	74.0	0.80	0.71	0.56	2.0	2.7	7.4	5	10	0.015	34
1.5	2.0	JHX90SLE4	1420	3.4	5.5	77.0	77.0	75.0	0.81	0.73	0.62	2.0	2.7	10.1	5	12	0.017	36
2.2	3.0	JHX100LB4	1405	4.8	5.5	78.0	78.0	76.0	0.81	0.73	0.62	2.2	2.7	15.0	5	12	0.026	55
3.7	5.0	JHX112MB4	1425	7.6	6.0	83.0	83.0	81.0	0.81	0.74	0.63	2.1	2.8	24.8	5	14	0.050	67
5.5	7.5	JHX132SMC4	1430	11.0	6.0	85.0	85.0	83.0	0.82	0.75	0.64	2.0	2.8	36.7	7	16	0.088	91
7.5	10	JHX132SME4	1430	14.5	6.0	85.5	85.5	83.5	0.83	0.76	0.64	2.0	2.8	50.1	8	16	0.112	99
9.3	12.5	JHX160MLB4	1455	18.8	6.0	88.0	88.0	86.0	0.81	0.74	0.63	2.2	2.8	61.0	8	18	0.028	138
11	15	JHX160MLD4	1455	21.0	6.0	89.0	89.0	87.0	0.82	0.76	0.66	2.1	2.8	72.2	12	28	0.252	151
15	20	JHX160MLE4	1450	28.0	6.0	89.0	89.0	87.0	0.82	0.76	0.66	2.1	2.8	98.8	14	30	0.272	162

## 6 Pole

Output kW	HP	Frame Size	Rated Speed (rpm)	Current		Efficiency %			Power Factor			Torque			T <sub>hot</sub> (Sec)	T <sub>cold</sub> (Sec)	Gd2 Kgm2	Weight Kg
				I <sub>n</sub> (A)	I <sub>s</sub> /I <sub>n</sub> (A)	FL	3/4FL	1/2FL	FL	3/4FL	1/2FL	T <sub>s</sub> /T <sub>n</sub>	T <sub>max</sub> /T <sub>n</sub>	T <sub>n</sub> (Nm)				
0.25	0.33	JHX80D6	880	0.7	3.5	64.0	62.0	58.0	0.73	0.65	0.52	1.8	2.0	2.7	10	24	0.008	21
0.37	0.50	JHX80D6	885	1.0	3.5	67.0	65.0	61.0	0.73	0.65	0.52	2.1	2.4	4.0	10	24	0.008	22
0.55	0.75	JHX80E6	880	1.5	3.5	66.0	64.0	60.0	0.73	0.65	0.52	1.9	2.2	6.0	10	24	0.009	23
0.75	1.0	JHX90SLD6	915	2.0	3.5	73.0	73.0	70.0	0.70	0.60	0.52	1.8	2.1	7.8	10	24	0.015	34
1.1	1.5	JHX90SLE6	915	2.9	3.5	74.0	74.0	71.0	0.70	0.60	0.52	1.8	2.1	11.2	12	25	0.017	36
1.5	2.0	JHX100LB6	935	4.0	4.5	75.5	75.5	72.5	0.70	0.61	0.52	2.2	2.5	15.3	10	24	0.026	55
2.2	3.0	JHX112MB6	940	5.9	5.0	78.5	78.5	76.5	0.70	0.61	0.54	2.0	2.5	21.9	10	20	0.050	67
3.7	5.0	JHX132SMC6	955	8.3	5.5	83.0	83.0	81.0	0.70	0.66	0.54	2.2	2.6	36.8	8	19	0.088	90
5.5	7.5	JHX132SME6	955	12.2	5.5	83.5	83.5	81.5	0.72	0.68	0.62	2.2	2.6	54.4	10	20	0.120	98
7.5	10	JHX160MLC6	960	15.5	5.5	87.5	87.5	86.5	0.77	0.72	0.60	1.9	2.5	74.6	8	18	0.326	142
9.3	12.5	JHX160MLD6	965	19.0	6.0	88.0	88.0	86.0	0.77	0.72	0.60	2.0	2.5	92.0	8	18	0.372	150
11	15	JHX160MLE6	965	23.0	6.0	88.0	88.0	86.0	0.77	0.72	0.60	2.0	2.5	109.0	9	20	0.446	162

## 8 Pole

Output kW	HP	Frame Size	Rated Speed (rpm)	Current		Efficiency %			Power Factor			Torque			T <sub>hot</sub> (Sec)	T <sub>cold</sub> (Sec)	Gd2 Kgm2	Weight Kg
				I <sub>n</sub> (A)	I <sub>s</sub> /I <sub>n</sub> (A)	FL	3/4FL	1/2FL	FL	3/4FL	1/2FL	T <sub>s</sub> /T <sub>n</sub>	T <sub>max</sub> /T <sub>n</sub>	T <sub>n</sub> (Nm)				
0.37	0.50	JHX90SLA8	680	1.4	2.8	58.0	55.0	48.0	0.65	0.55	0.40	1.6	1.9	5.20	10	24	0.012	30
0.55	0.75	JHX90SLD8	680	1.9	3.2	63.0	60.0	54.0	0.63	0.55	0.40	1.8	2.1	7.70	10	24	0.015	34
0.75	1.0	JHX100LA8	695	3.1	3.0	63.0	62.0	57.0	0.56	0.50	0.37	1.8	2.1	10.3	10	24	0.02	50
1.1	1.5	JHX100LB8	695	3.9	3.0	62.5	62.0	57.0	0.59	0.51	0.38	1.8	2.3	15.1	10	24	0.026	55
1.5	2.0	JHX112MA8	700	4.8	3.5	69.0	67.0	63.0	0.60	0.51	0.41	1.8	2.3	20.5	9	20	0.044	64
2.2	3.0	JHX132SMB8	710	6.3	4.1	77.0	76.0	71.0	0.65	0.55	0.42	1.9	2.4	29.6	8	19	0.06	83
3.7	5.0	JHX160MLB8	715	8.0	5.1	82.5	82.5	79.5	0.77	0.70	0.55	1.8	2.4	49.4	9	20	0.288	137
5.5	7.5	JHX160MLD8	715	12.0	5.1	84.5	83.5	81.5	0.79	0.72	0.59	1.8	2.5	73.5	13	29	0.372	149
7.5	10.0	JHX160MLE8	715	16.0	5.1	85.0	84.0	82.0	0.79	0.72	0.59	1.8	2.5	98.8	15	30	0.446	161

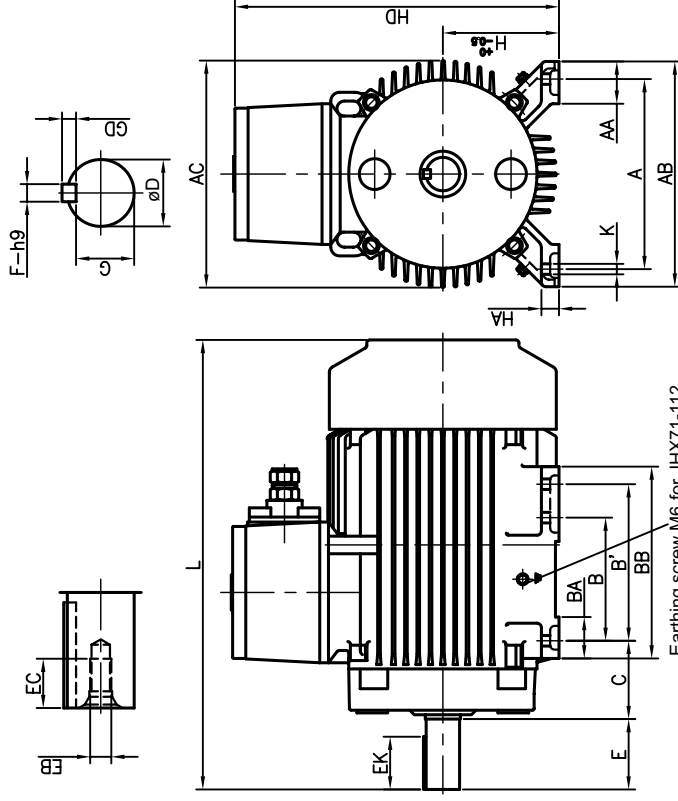
I<sub>n</sub> = Nominal or rated current  
 T<sub>n</sub> = Nominal or rated torque in Nm  
 T<sub>max</sub> = Maximum torque  
 T<sub>cold</sub> = Cold withstand time

I<sub>s</sub> = Starting current  
 T<sub>s</sub> = Starting torque  
 T<sub>hot</sub> = Hot withstand time

Note : 1. All performance figures are subject to IS tolerances.  
 2. Max. load GD<sup>2</sup> has been calculated assuming load torque is proportional to square of speed.

Note : Owing to continuous upgradation of our design, performance parameters and dimensions are subject to change without prior notice.

**Dimension Drawing Foot Mounted Flame Proof Motors 71....160**  
**Mounting Designation B3, B6, B7, B8, V5, V6**

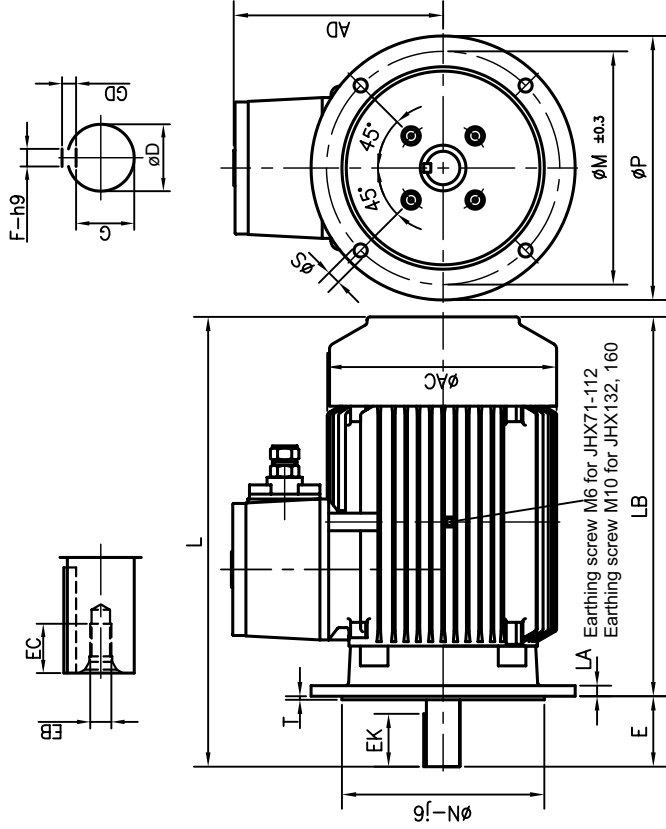


Earthing screw M6 for JHX71-112  
 Earthing screw M10 for JHX132, 160

Type	A	AA	AB	AC	B	B'	BA	BB	C	D	Tol.	E	EB	EC	EK
	JHX 71	112	25	130	140.5	90	-	26	110	45	14	j6	30	M5	12
JHX 80	125	25	147	158	100	-	30	126	50	19	j6	40	M6	17	24
JHX 90SL	140	27	162	174	100	125	40	158	56	24	j6	50	M8	19	32
JHX 100L	160	42	200	203	140	-	47	180	63	28	j6	60	M10	22	42
JHX 112M	190	48	230	225	140	-	47	180	70	28	j6	60	M10	22	42
JHX 132SM	216	48	256	258	140	178	47	218	89	38	k6	80	M12	28	60
JHX 160ML	254	60	310	305	210	254	65	310	108	42	k6	110	M16	36	90

Type	F	G	GD	H	HA	HD	K	L	Bearings		
									D	N	
JHX 71	5	11	5	71	9	218	7	268	6203ZZC3	6202ZZC3	
JHX 80	6	15.5	6	80	10	234	10	314	6204ZZC3	6203ZZC3	
JHX 90SL	8	20	7	90	13	252	10	363	6205ZZC3	6205ZZC3	
JHX 100L	8	24	7	100	15	317	12	400	6306ZZC3	6206ZZC3	
JHX 112M	8	24	7	112	18	337	12	420	6307ZZC3	6206ZZC3	
JHX 132SM	10	33	8	132	20	374	12	511	6308ZZC3	6307ZZC3	
JHX 160ML	12	37	8	160	22	457	15	702	6309ZZC3	6308ZZC3	

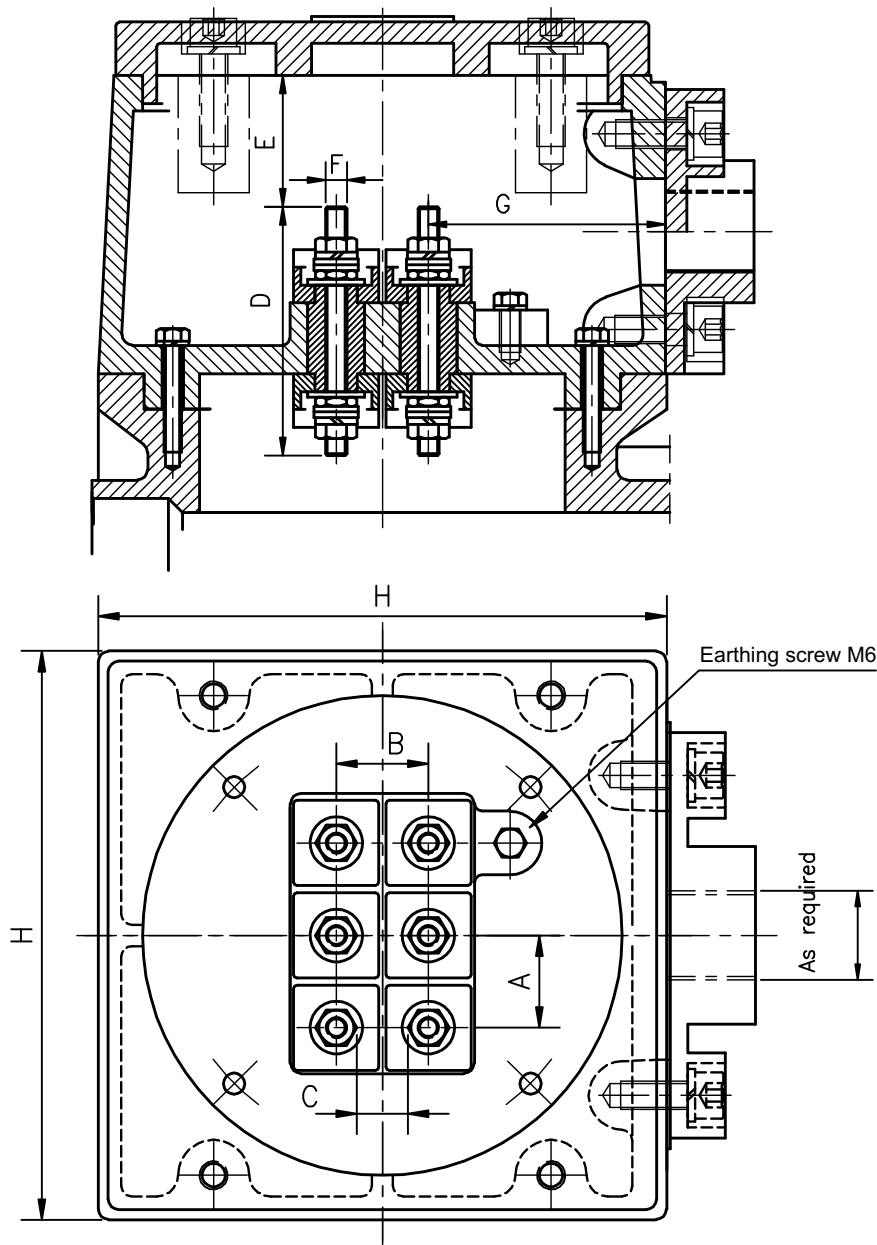
**Dimension Drawing Flange Mounted Flame Proof Motors 71....160**  
**Mounting Designation B5, V1, V3**



Type	AC	AD	E	EB	EC	EK	F	G	GD
	JHX 71	140.5	147	30	M5	12	16	5	11
JHX 80	158	154	40	M6	17	24	6	15.5	6
JHX 90SL	174	162	50	M8	19	32	8	20	7
JHX 100L	203	217	60	M10	22	42	8	24	7
JHX 112M	225	225	60	M10	22	42	8	24	7
JHX 132SM	258	242	80	M12	28	60	10	33	8
JHX 160ML	305	297	110	M16	36	90	12	37	8

Type	L	LA	M	N	P	S	T	Bearings		
								D	N	
JHX 71	268	9	130	110	160	10	3.5	6203ZZC3	6202ZZC3	
JHX 80	314	10	165	130	200	12	3.5	6204ZZC3	6203ZZC3	
JHX 90SL	363	10	165	130	200	12	3.5	6205ZZC3	6205ZZC3	
JHX 100L	400	11	340	180	250	15	4	6306ZZC3	6206ZZC3	
JHX 112M	420	11	360	180	250	15	4	6307ZZC3	6206ZZC3	
JHX 132SM	511	12	431	230	300	15	4	6308ZZC3	6307ZZC3	
JHX 160ML	702	16	592	300	350	19	5	6309ZZC3	6308ZZC3	

## Terminal Box



Type	A	B	C	D	E	F	G	H
JHX 71 - 90	20	20	10.5	50	27	M5	42	115
JHX 100-132	26	26	13.5	75	32	M6	66.5	160
JHX 160	32	32	12	95	39	M8	94	210

\* For JHX160, conduit entry is double

## Certifications and Approvals for ABB Make Flame - Proof Motors

CMRI/ERTL Certificate No.	CCE Certificate No.	DGFASLI Certificate No.	BIS Certificate No.	Frame
CIMFR/TC/P/113 Dt. 12.05.2009	A/P/HQ/MH/104/1889 (P234925/1) Dt. 27.07.2009	66/7/2009 - Tech Dt. 02.07.2009	CML 1327946	JHX71
CIMFR/TC/P/60 Dt. 05.05.2009	A/P/HQ/MH/104/1856 (P233102/1) Dt. 15.06.2009	66/7/2009 - Tech Dt. 02.07.2009	CML 1327946	JHX80
CMRI/TC/P/H409 Dt. 28.08.2006	A/P/HQ/MH/104/1270 (P187868) Dt. 23.11.2006	66/07/2006 - Tech Dt. 15.11.2006	CML 1327946	JHX90
CIMFR/TC/SR/H969 Dt. 19.02.2008	A/P/HQ/MH/104/1564 (P214909) Dt. 04.07.2008	66/05/2005 - Tech Dt. 14.08.2008	CML 1327946	JHX100
ERTL(E)/TES/A356/0076/03-08 Dt. 02/04/2008	A/P/HQ/MH/104/1545 (P213402/1) Dt. 30.05.2008	66/05/2008 - Tech Dt. 09.06.2009	CML 9342275	JHX112
ERTL(E)/TES/A356/0077/03-08 Dt. 02/04/2008	A/P/HQ/MH/104/1545 (P213402/2) Dt. 30.05.2008	66/05/2008 - Tech Dt. 09.06.2009	CML 9342275	JHX132
ERTL(E)/TES/A356/0075/03-08 Dt. 02/04/2008	A/P/HQ/MH/104/1545 (P213402/3) Dt. 30.05.2008	66/05/2008 - Tech Dt. 09.06.2009	CML 9342275	JHX160



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