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**Small-size reciprocating air
compressors**

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Foreword

This translation has been made based on the original Japanese Industrial Standard revised by the Minister of Economy, Trade and Industry through deliberations at the Japanese Industrial Standards Committee as the result of proposal for revision of Japanese Industrial Standard submitted by The Japan Society of Industrial Machinery Manufacturers (JSIM)/Japanese Standards Association (JSA) with the draft being attached, based on the provision of Article 12 Clause 1 of the Industrial Standardization Law applicable to the case of revision by the provision of Article 14.

Consequently **JIS B 8342** : 1986 is replaced with this Standard.

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Small-size reciprocating air compressors

1 Scope

This Japanese Industrial Standard specifies the feed-oil type or non-feed-oil type single-acting air-cooled single-stage reciprocating air compressors having the maximum pressure of 0.2 MPa to 1.0 MPa and the single-acting air-cooled two-stage reciprocating air compressors having the maximum pressure of 0.7 MPa to 1.4 MPa, actuated with electric motors with a rated output of not more than 11 kW or internal combustion engines equivalent thereto, which can be used as the compressor main body by itself or as mounted on an air tank, or as housed in a soundproof cover, to be used as various types of air-supply source (hereafter referred to as “compressors”).

The gas handled in the compressors shall be air having a temperature of -5°C to 40°C at the atmosphere. The case where antifreezing measures are particularly required because of the temperature 0°C or lower shall be subject to the agreement between the parties concerned.

NOTE : The maximum pressure refers to the pressure under which the automatic start-stop apparatus (pressure switch), the capacity control apparatus (automatic unloader) or the electronic control device actuates.

2 Normative references

The standards shown in Annex A contain provisions which, through reference in this text, constitute provisions of this Standard. The most recent editions of the standards (including amendments) indicated in the Annex shall be applied.

3 Types

The compressors shall be divided into the types as shown in table 1 by the lubricating system, number of stages, rated output of the electric driving motor and the maximum pressure of the compressors. The intermediate values in table 1 may be taken as the maximum pressure.

Table 1 Classification of air compressor

Lubricating system (symbol)	Number of stages (symbol)	Rated output of electric driving motor kW and symbol		Max. pressure of compressor MPa			
Feed-oil type (L) or Non-feed-oil type (F)	Single-stage (1)	0.2	M	0.2	0.5	0.7	1
		0.4	M	0.2	0.5	0.7	1
		0.75	M		0.5	0.7	1
		1.5	M		0.5	0.7	1
		2.2	M		0.5	0.7	1
		3.7	M		0.5	0.7	1
		5.5	M		0.5	0.7	1
		7.5	M		0.5	0.7	1
		11.0	M		0.5	0.7	1
	Two-stage (2)	0.4	M		0.5	0.7	1 1.4
		0.75	M		0.5	0.7	1 1.4
		1.5	M		0.5	0.7	1 1.4
		2.2	M		0.5	0.7	1 1.4
		3.7	M		0.5	0.7	1 1.4
		5.5	M		0.5	0.7	1 1.4
		7.5	M		0.5	0.7	1 1.4
		11.0	M		0.5	0.7	1 1.4

Where an internal combustion engine is used as the driving prime mover, it shall have a continuous rating that is equivalent to the rated output of the electric driving motor indicated in table 1.

Table 1 presents the values which assume the use of an electric motor for the driving prime mover, and therefore the symbol “M” shown after the rated output values stands for “motor”.

For the symbol to be used in the case where an internal combustion engine is used as the driving prime mover, the letter “E” shall be added after the value of rated output.

Example: 2.2 E, 3.7 E

4 Rated voltage, rated frequency and change in working voltage

The rated voltage shall be not more than 250 V single-phase a.c. or not more than 600 V 3-phase a.c., and the rated frequency shall be 50 Hz and 60 Hz or 50 Hz/60 Hz for common use.

Operation shall be smooth even when supply voltage of the electric motor fluctuates $\pm 10\%$ from the rated voltage.

5 Performance

5.1 Air volume

The air volume of the compressor shall be the value converted into those under the suction conditions and when the test in 9.3 is performed, the result shall be not less than the value indicated in table 2. The air volume in the case where the maximum pressure is a pressure of intermediate values shall be equal to or more than the value calculated by the rule of proportional calculation.

Table 2 Air volume

Unit: L/min

Number of stages	Rated output of electric driving motor kW	Air volume				
		For maximum pressure of compressor 0.2 MPa	For maximum pressure of compressor 0.5 MPa	For maximum pressure of compressor 0.7 MPa	For maximum pressure of compressor 1.0 MPa	For maximum pressure of compressor 1.4 MPa
Single-stage	0.2	40 (38)	25 (23)	15 (14)	—	—
	0.4	83 (79)	60 (57)	45 (42)	23 (21)	—
	0.75	—	85 (81)	71 (68)	50 (48)	—
	1.5	—	182 (173)	155 (147)	114 (109)	—
	2.2	—	270 (256)	232 (220)	175 (166)	—
	3.7	—	470 (446)	406 (386)	310 (294)	—
	5.5	—	700 (665)	616 (585)	490 (465)	—
	7.5	—	940 (890)	820 (778)	640 (610)	—
	11.0	—	1 390 (1 320)	1 208 (1 148)	935 (890)	—
Two-stage	0.4	—	—	41	36	29
	0.75	—	—	78	69	57
	1.5	—	—	160	142	118
	2.2	—	—	250	218	175
	3.7	—	—	430	372	295
	5.5	—	—	660	565	440
	7.5	—	—	670	754	600
	11.0	—	—	1 230	1 080	880
For a compressor for common use of 50 Hz/60 Hz, the above values shall apply to the air volume at 60 Hz. The numerical values in () give the air volume in the case of the compressors of non-feed-oil type.						

5.2 Fill-up time

The fill-up time is the time required to fill up the tank when the compressor is tested in accordance with **9.5**, and shall not exceed the values indicated in table 3. Where the maximum pressure is an intermediate pressure, the fill-up time shall be equal to or less than the value calculated by the rule of proportional calculation.

5.3 Shaft power

The shaft power for the compressor at the maximum pressure shall not exceed 105 % of the rated output of the electric driving motor when tested in accordance with **9.4**. The values of the full load current should not exceed 110 % of the value of the marked currents.

The coil temperature rise of the electric driving motor during continuous operation by automatic start-stop device shall not be so great that the insulation of coil cannot be sustained.

5.4 Operating condition

The operating condition (bearing temperature, vibration and noise) shall be tested in accordance with **9.6** and comply with the requirement of **JB.3** in **JIS B 8341**.

5.5 Pressure drop

The pressure drop shall be tested in accordance with **9.7** and comply with the requirement of **JA.9** in **JIS B 8341**.

5.6 Performance of automatic start-stop apparatus (pressure switch) and capacity control apparatus (automatic unloader)

The performance of automatic start-stop apparatus (pressure switch) and capacity control apparatus (automatic unloader) shall be tested in accordance with **9.8** and comply with the requirement of **JA.8** in **JIS B 8341**.

Table 3 Fill-up time

Unit: min

Number of stages	Rated output of electric driving motor kW	Fill-up time per 100 L of air tank volume				
		For maximum pressure of compressor 0.2 MPa	For maximum pressure of compressor 0.5 MPa	For maximum pressure of compressor 0.7 MPa	For maximum pressure of compressor 1.0 MPa	For maximum pressure of compressor 1.4 MPa
Single-stage	0.2	4.54 (4.77)	22.6 (23.9)	34.7 (36.6)	—	—
	0.4	2.19 (2.30)	11.2 (11.9)	17.2 (18.4)	26.2 (28.0)	—
	0.75	—	5.34 (5.61)	9.49 (9.88)	15.7 (16.3)	—
	1.5	—	2.49 (2.74)	4.27 (4.46)	6.97 (7.05)	—
	2.2	—	1.68 (1.77)	2.76 (2.91)	4.38 (4.62)	—
	3.7	—	0.97 (1.01)	1.63 (1.71)	2.63 (2.77)	—
	5.5	—	0.65 (0.69)	1.06 (1.11)	1.68 (1.74)	—
	7.5	—	0.48 (0.51)	0.80 (0.85)	1.28 (1.36)	—
	11.0	—	0.33 (0.34)	0.55 (0.58)	0.88 (0.94)	—
Two-stage	0.4	—	—	15.50	25.20	38.20
	0.75	—	—	8.15	13.80	21.30
	1.5	—	—	3.97	6.49	9.85
	2.2	—	—	2.54	4.54	7.26
	3.7	—	—	1.48	2.67	4.31
	5.5	—	—	0.96	1.78	2.89
	7.5	—	—	0.73	1.32	2.12
	11.0	—	—	0.52	0.90	1.41
The actual fill-up time for the volume of an individual air tank shall be calculated in proportion to its volume. The () shows the case of non-feed oil type.						

5.7 Performance of safety valve of air tank attached to compressor

The performance of safety valve of air tank attached to compressor shall be tested in accordance with **9.9** and comply with the requirement of **JA.7** in **JIS B 8341**.

6 Construction

6.1 Construction of compressor

The compressor shall have the construction as shown in figure 1 to figure 8 and be constituted of the following main parts.

The attachment of an electric motor, internal combustion engine, air tank and bed is not mandatory: it may be omitted if so requested by the purchaser.

- Compressor main body
- Electric motor or internal combustion engine
- Air tank (including safety device)
- Drive unit
- Running control apparatus
- Bed
- Soundproof cover (for the soundproofing type)

6.2 Construction in general

The construction in general of the compressor shall comply with the following:

- a) The parts subjected to air pressure shall have sufficient strength.
- b) Each part shall not easily cause mechanical or electrical failures.
- c) In service, the compressors shall be able to run normally without noticeable vibrations.
- d) The internal threads in the fitting parts for pipes and air hoses, and for the safety valve, cock, plug and the like shall conform to **JIS B 0202** or **JIS B 0203**.
- e) Earthing shall be easily practicable from the electric motor or any metal part connected thereto.
- f) The pressure gauge shall be of Grade 1.6 of **JIS B 7505** or one equal or superior to this in function and precision.
- g) The V-belt shall be that of **JIS K 6323** or **JIS K 6368** or one equal or superior to this in function.
- h) The rotary part of V-belt pulley, V-belt and the like shall be equipped with the safety cover.

6.3 Compressor main body

The construction of the compressor main body shall comply with the following:

- a) Every part shall have interchangeability and the renewal of any part shall cause no significant change in performance.
- b) No particularly thin part shall be present in the cylinder wall or cylinder cover that is directly subjected to pressure.