

MITSUI SEIKI

OIL INJECTION AIR COMPRESSOR

ZgairdX

MITSUI SEIKI

<http://www.mitsui-seiki.co.jp>



JQA-0904



JQA-EM2883

Home office plant



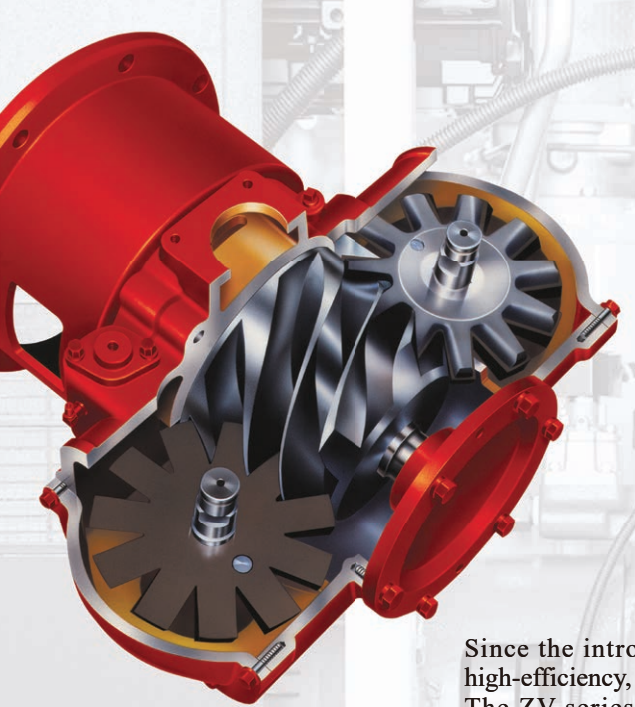
MITSUI SEIKI KOGYO CO., LTD.


6-13 Hachiman, Kawajima-Machi, Hiki-Gun,
Saitama, 350-0193, JAPAN
Phone +81-49-297-8711 Fax +81-49-297-5377

MITSUI SEIKI (THAILAND) CO.,LTD.

204/956 City Park Moo1, Soi Emthai, Teparak (k.m.22),
T. Bangsaothong, A. Bangsaothong, Samutprakarn, 10540, THAILAND
Phone +66 (0) 2-313-1881 Fax +66 (0) 2-313-1883

Contact information
Trusted Mitsui Seiki distributors



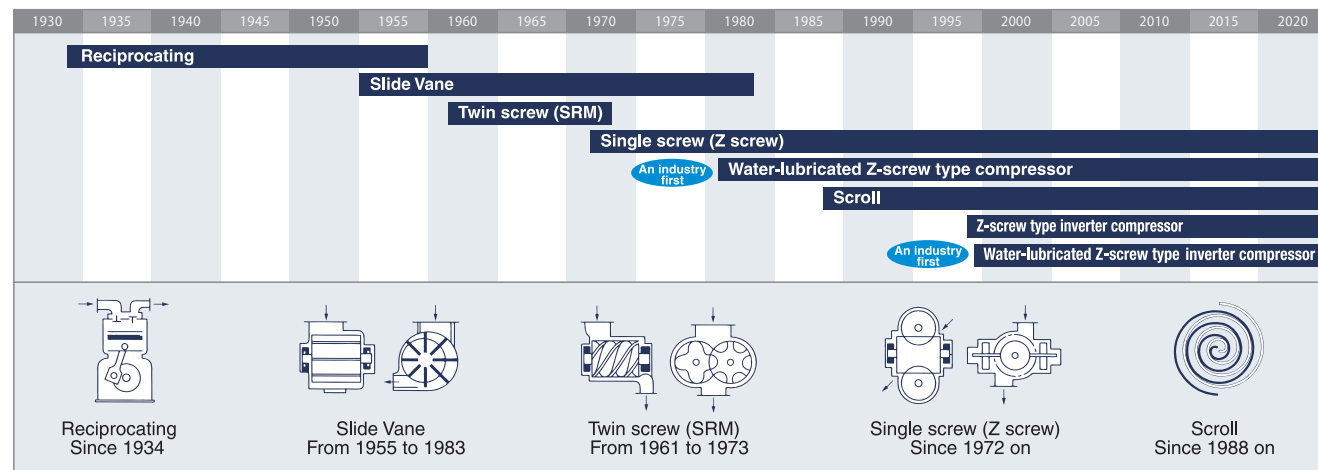


**a world-class
compression mechanism**

**The evolution of the Z-screw is
the evolution of the Air compressor**

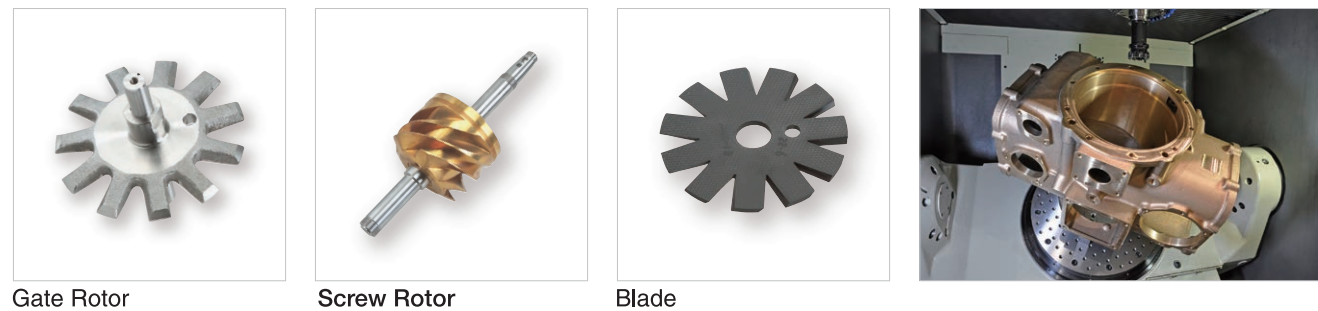
Since the introduction of the Z-Screw compressor in 1972, we have evolved into a high-efficiency, energy-saving compressor to meet the demands of the ever-changing age. The ZV series of inverter-controlled models have been improved to meet modern environmental issues. Currently, in addition to high efficiency and energy saving, we have added an advanced model (Zgaiard) that is even lower noise and space saving to our lineup to meet your expectations. The Escal scroll compressor, which has been well acclaimed since its introduction in 1988, has also been upgraded to higher efficiency and energy savings. Energy savings and superior environmental performance, demanded by industries and earth. This is what we have here.

Compressors design



High reliability resulting from accuracy

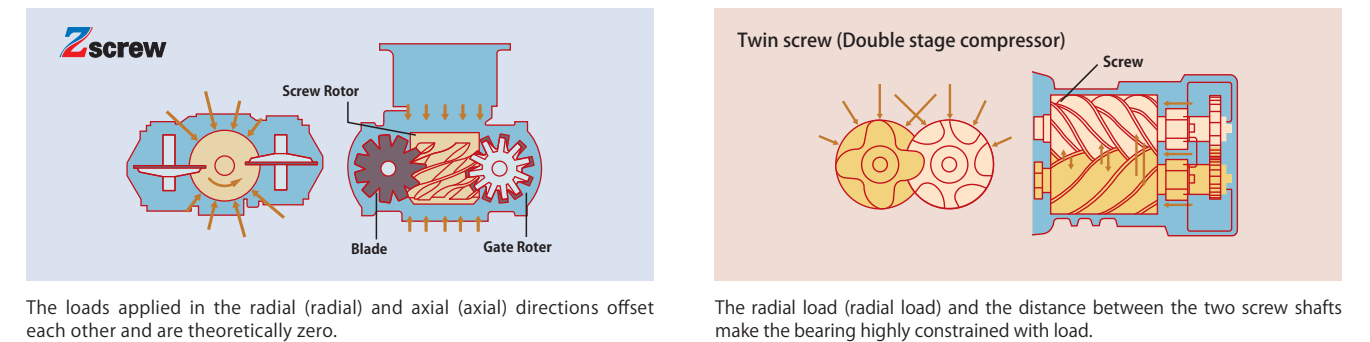
The high precision technology of Mitsui Seiki, a machine tool manufacturer, is utilized in the machining of the compression section to support the Z-screw compression mechanism, which boasts high efficiency and high stability.



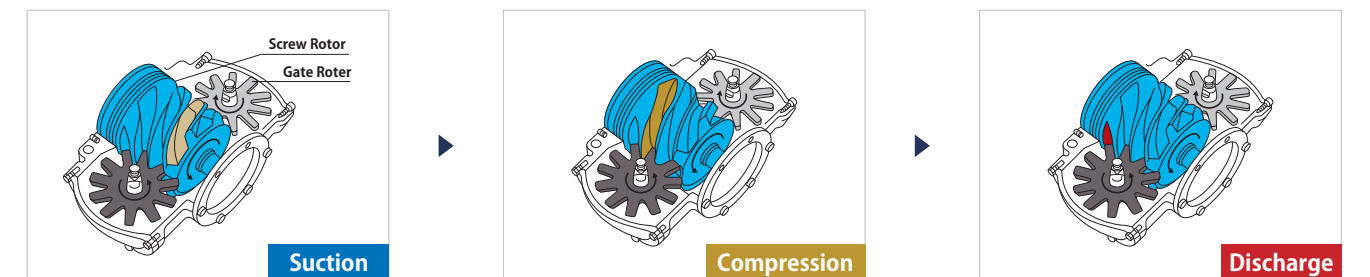
Simple structure and sealing affect for high level of performance

One screw rotor and two symmetrically arranged gate rotors. Because of this simple structure, the Z-screw has a good pressure balance against the rotary axis and does not place any extra burden on the bearings. This is one reason for the high efficiency. In addition, an oil or water seals the gaps in the compression chamber as a lubricant. By preventing compressed air leakage, sufficient discharge volume can be obtained even at low speed rotation. This also suppresses noise and vibration, and the cooling effect of the lubricating oil suppresses temperature increases in the compression process, significantly improving the efficiency, safety, and durability of the compression process. The unique compression mechanism provides significant energy savings in a variety of fields.

Comparison of Z-screw and twin screw



Air flow



Model

Motor output (kW)	Inverter		Fixed speed	
	Air cooled	Water cooled	Air cooled	Water cooled
3.7				
5.5				
7.5				
11				
15				
22				
37				
55				
75				
150				

For other water-cooled models, please contact us.

COMPRESSOR SERIES

Achieving No.1 in discharge air volume

ZgaiardX3

Inverter compressor
Air cooled 7.5 - 15kW

7.5kW / 11kW / 15kW

Inverter	Red-CX
IE3 motor	

Fixed speed
Air cooled 7.5 - 15kW

7.5kW / 11kW / 15kW

IE3 motor	Red-CX
-----------	--------



Inverter compressor
Air cooled 22 / 37kW
(Option: Water cooled 22 / 37kW)

Inverter	Z-Mate II optional
IPM motor	IT touch panel
Z-Cloud optional	Red-CX

Fixed speed
Air cooled 22 / 37kW
(Option: Water cooled 22 / 37kW)

IE3 motor	IT touch panel
Z-Cloud optional	Red-CX



P.5,P.6

Achieving both high efficiency and energy savings

ZgaiardX

Inverter compressor
Air cooled 7.5 - 15kW

7.5kW / 11kW / 15kW

Inverter	Red-CX optional
IE3 motor	

Fixed speed
Air cooled 7.5 - 15kW

7.5kW / 11kW / 15kW

IE3 motor	Red-CX optional
-----------	-----------------



Inverter compressor
Air cooled 22 - 75kW

Water cooled 55~75kW
(Option: 22 / 37kW)

22kW / 37kW / 55kW / 75kW

Inverter	Z-Mate II optional
IPM motor	IT touch panel
Z-Cloud optional	Red-CX optional

Fixed speed
Air cooled 22 - 75kW

Water cooled 55~75kW
(Option: 22 / 37kW)

22kW / 37kW / 55kW / 75kW

IE3 motor	Red-CX optional
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P.7,P.8

High-power large series

Zgaiard

Inverter compressor
Air / Water cooled 150kW

Inverter	IPM motor
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Fixed speed
Air / Water cooled 150kW

IE3 motor



P.9

Advanced scroll type

Escal series



Air cooled 3.7 / 5.5kW

IE3 motor

P.10

Remote monitoring system
with IoT solutions

Cloud Remote Monitoring System

Z-Cloud

P.11,P.12

Compressor Remote Monitoring System

Z-Mate II

P.13

Optimal unit control system
adapted to conditions

Plural control system

Red CX

P.14

Receiver tank

P.15

OIL FREE COMPRESSOR SERIES

P.16

ZgaiardX3 series Inverter compressor / Fixed speed 7.5~37kW

Main motor power 7.5 - 37 kW Free air delivery 1.15 - 7.35 m³/min

Specification P.17



No. 1 in discharge air Volume

Highest class discharge air volume

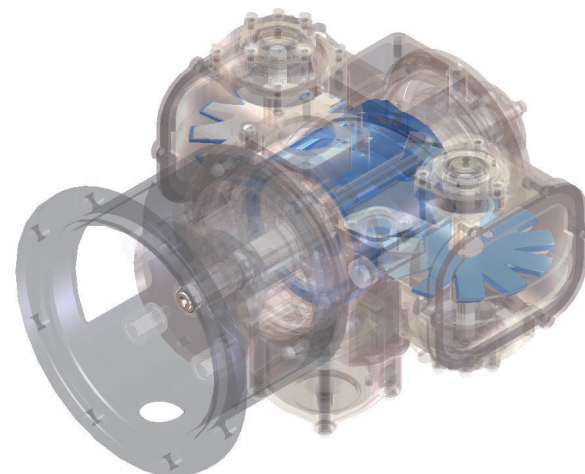
Machine Tool Manufacturer, Mitsui Seiki Kogyo Combines Passion and Pride in Manufacturing Pursuing the highest performance of world-class Z-screws by repeating the latest machining technology and analysis Unrivalled original compression mechanism has been evolved to achieve the largest discharge air volume in its class.

Main motor power (kW)	Dimension (W×L×H)
7.5-15	1030×740×1400
22	1250×800×1490
37	1700×800×1550

Top-class high efficiency

Reduced pressure loss by improving the shape of the A/E discharge port

- Optimum compression geometry achieved by the latest machining technology and structural analysis
- Largest discharge air volume in its class as an oil-lubricated machine, made possible by its high efficiency



Safety

Compatible with ambient temperature of 50° C

- The cooling circuits for intake and exhaust air have been redesigned to enable operation without abnormal shutdown even at an ambient temperature of 50° C.
- High-efficiency, high inlet temperature dryer with a CFC alternative R-410A
Continuous operation at ambient temperatures above 40° C (104° F) will shorten the life of the lubricating oil, O-rings, electrical components, etc., more than normal.

Pre-warning for overheating

- Abnormal warning (displayed as intake air temperature warning) at ambient temperature of 45° C or higher

Emergency Stop Button

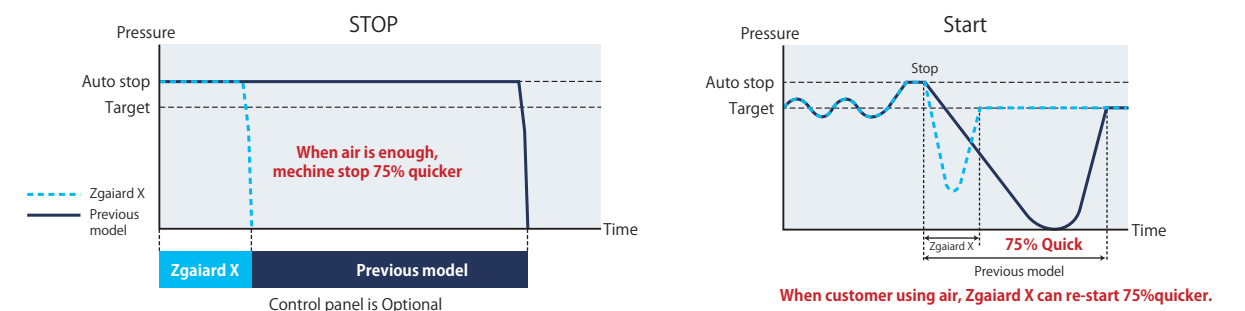
- Standard equipment for this series



Extensibility

Instantaneous startup system

- AUCS (Auto Unloader Control System) plus instant activation system
- Improved end compression tracking and greatly reduced idle time in automatic start/stop operation, number-controlled operation, etc.



Units control operation function (supported only for machines equipped with LCD monitor)

- Up to 6 compressors can be controlled by wired connection.

Compressor remote monitoring system function (optional)

Z-Cloud (cloud-based remote monitoring system) for domestic use only in Japan

- Data can be stored in the cloud and compressors can be monitored over the Internet.

Z-Mate II (in-house networked remote monitoring system)

- Compressors connected to an Ethernet line, such as an internal LAN, can be monitored.



Zgaiard

X

series

Inverter compressor / Fixed speed

7.5~37kW

Main motor power

7.5 - 37 kW

Free air delivery

1.21 - 7.0 m³/min



Inverter compressor 7.5kW – 75kW

Model	Zgaiard X ZV08AX-R	Zgaiard X ZV11AX-R	Zgaiard X ZV15AX-R	Zgaiard X ZV22AX-R	Zgaiard X ZV37AX-R
Delivered air pressure (MPa)	0.7 [0.60 – 0.93]		0.7 [0.54 – 0.93]	0.7 [0.53 – 0.93] (0.5) ※	
Free air delivery (m³/min)	1.86		2.64	4.2	7.0
Intake air pressure & temperature	Atmospheric pressure (2 – 40°C)				
Main motor power (kW)	11		15	22	37
Power source voltage (50/60Hz,V)	200/200•220				
Motor type	3-phase squirrel cage, 2P totally-enclosed external fan (IE3 motor)			Totally enclosed fan cooled IPM motor	
Starter	Inverter starter				
Drive system	Direct coupled motor				
Cooling system	Air cooled				
Fan motor power (kW)	0.4 (Inverter control)		0.9 (Inverter control)	0.75 (Inverter control)	2.2 (Inverter control)
Oil fill ration (L)	7		9	15	20
Dryer	Air dew point at outlet (°C)		10 (under applied pressure) ※		
	Electricity consumption (kW)		0.360/0.44 0 •0.46 0		0.568/0.612•0.64 0
	Used refrigeration		R-407C		
	Refrigeration amount (g)		260		
Discharge pipe diameter (R)	3/4		1		1 1/2
Dimension	Width (mm)		1050		1280
	Length (mm)		750		
	Height (mm)		1400		1490
Total mass (Dry state) (kg)	480		550	590	830
Noise level (dB (A))	53		54	54	58

※: Values in () are the free air delivery for 0.5MPa specification (option)
* Values with ambient temperature of 30; and rated discharge pressure.
● Noise values measured in noiseless environment at distance of 1.5meters from front, at height of 1m, with load of 100% (at 0.7MPa)

Fixed speed 7.5kW – 37kW

Model	Zgaiard X Z085AX-R	Zgaiard X Z086AX-R	Zgaiard X Z115AX-R	Zgaiard X Z116AX-R	Zgaiard X Z155AX-R	Zgaiard X Z156AX-R	Zgaiard X Z225AX-R	Zgaiard X Z226AX-R	Zgaiard X Z375AX-R	Zgaiard X Z376AX-R		
Delivered air pressure (MPa)	0.7											
Free air delivery (m³/min)	1 . 21		1.86		2.64		4.1		6.9			
Intake air pressure & temperature	Atmospheric pressure (2 – 40°C)											
Capacity control method	Power-saving AUCS Automatic start/stop selection											
Main motor power (kW)	7.5		11		15		22		37			
Power source voltage (50/60Hz,V)	200/200•220											
Motor type	3-phase squirrel cage, 2P totally-enclosed external fan (IE3 motor)											
Starter	Direct ON start					3-contactor, star delta start						
Drive system	Direct coupled motor											
Cooling system	Air cooled											
Fan motor power (kW)	0.4			0.9			0.75		2.2			
Oil fill ration (L)	7			9			15		20			
Dryer	Air dew point at outlet (°C)			10 (under applied pressure) *								
	Electricity consumption (kW)	0.352	0.408•0.432	0.360	0.440•0.460	0.528	0.612•0.640	1.1	1.3	1.4	1.7	
	Used refrigeration			R-407C			R-410A					
	Refrigeration amount (g)			240			260			300		
				650			1050					
Discharge pipe diameter (R)	3/4			1			1 1/2					
Dimension	Width (mm)			1050			1280			1750		
	Length (mm)			705			750					
	Height (mm)			1400			1490			1550		
	Total mass (Dry state) (kg)			400			470			540		
			680			970						
Noise level (dB (A))	53			55			56			54		
			59									

※: Values in () are the free air delivery for 0.5MPa specification (option)
* Values with ambient temperature of 30; and rated discharge pressure.
● Noise values measured in noiseless environment at distance of 1.5meters from front, at height of 1m, with load of 100% (at 0.7MPa)

Zgaiard

X

series

Inverter compressor / Fixed speed

55 / 75kW

Main motor power

55 / 75 kW

Free air delivery

10 - 13.4 m³/min

Specification P.18

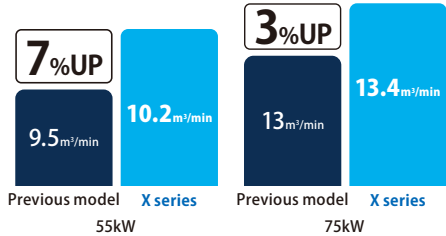


New design screw rotor and high efficient permanent magnetic motor (IPM) achieved ultimate energy-saving efficient air compressor ever. Layout of components are totally re-designed and become surprisingly compact.
When compared to previous model, many environmental aspects are increased; low noise, fewer parts, needs less oil and ambient temperature up to 50°C.
Zgaiard X series compressor will provide future innovative solution to customers.

High Discharge Volume

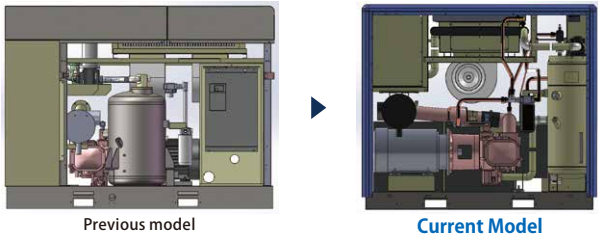
- High precision manufacturing air end.
- New design screw rotor to better compression efficiency.
- 7% air volume up than previous model(55kW)
- Lubricate oil injection process is optimized.

Main motor power (kW)	Dimension (W×L×H)
55/75	2008×1183×1750



Compact Machine Space

- Re-designed layout of components to more compact.
- Tank size become smaller, to be realized to reduce 22L oil volume than previous.
- Number of parts 20% reduced.
- Most Compact Design Compressor.



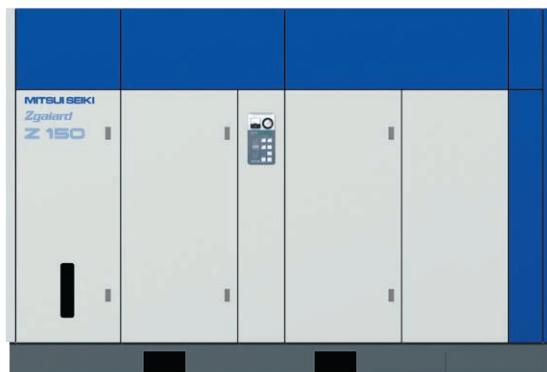
Tough Against Global Warming

- Machine will not stop even ambient temperature become 50°C.
- High-efficiency, high inlet temperature dryer.

Main motor power 150 kW Free air delivery 26.0 - 27.0 m³/min

Specification P.17

Only Zscrew can realize high efficiency equal to single or double stage compressor.



The effectiveness can be maximized with Basic machine operates at full load and inverter machine to absorb load fluctuation.

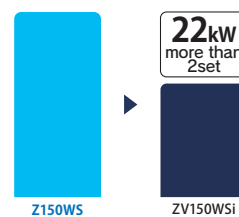
Energy Saving

150kW

Reduced power amounts
33% Reduced
Annual power consumption
4.5 million yen / year Reduced
Annual CO₂
176 t / CO₂ Reduced
(Air Discharge Volume of 60%) (150 kW)

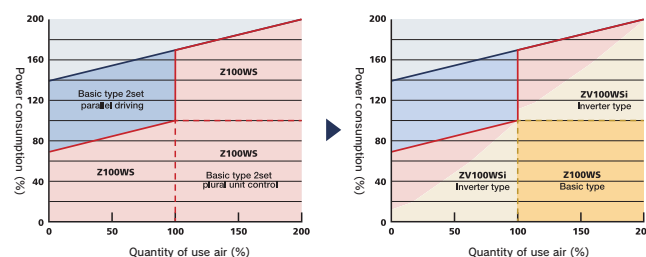
- Air Discharge Volume:60%
- Power Charges:15yen/kWh
- Running Time:6,000h/year

150kW Air Discharge Volume:60%



Combination of Fixed Speed Machine and Inverter Machine

Inverter type + Plural unit control



7-inch display (touch panel type)

7-inch display as standard equipment for easier management

Operation data logging function (enables monitoring of operation status by recording and saving to USB memory)
Scheduled operation function (operation and shutdown can be set for any day of the week and time)
Instantaneous power loss protection function (can be set optionally for up to 10 seconds)
Alternate operation function (alternate operation is possible only by wiring between units with LCD monitors)

Communication function for compressor (optional)

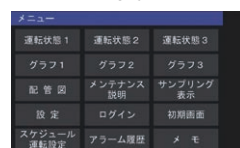
Combined with Z-mate II software (optional) for PC monitoring and Z-cloud (optional), close control can be achieved.

External output signal selection

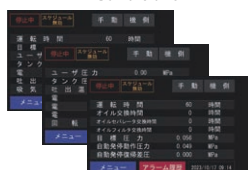
Selection of operation signal (including standby), etc. is possible.



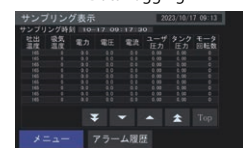
Menu



Conditions



Data-logging



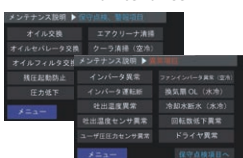
Schedule mode



Piping



Maintenance

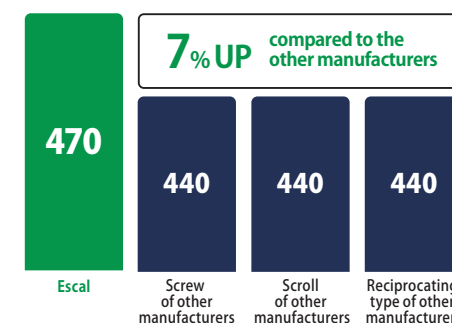


Main motor power 3.7 / 5.5 kW Free air delivery 470 - 730 ℓ/min

Specification P.17

Escal's power

Delivery air volume comparison 3.7kW unit:



Scroll air compressor to deal with environment and energy saving.



Energy saving

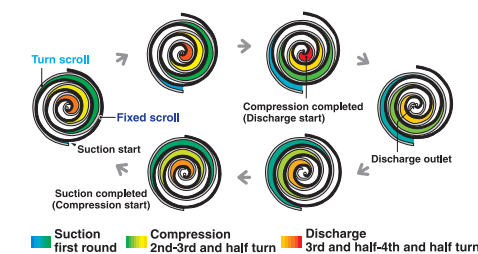
- Auto start/stop system combined with the high energy saving unloader system.
- Also applicable to set the continuous unloader system depending on the air application condition.
- Auto dry timer as standard equipment to prevent the occurrence of drain.
- Applicable to set the advance operation of the Dryer.

Quiet Performance

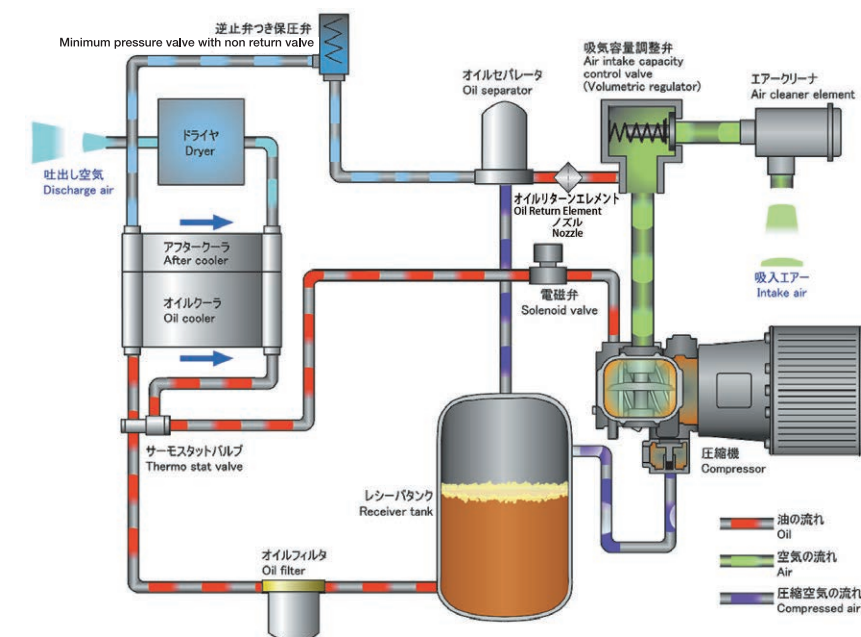
Non-contact and low noise, low vibration scroll rotation without tip sealing is achieved by the high precision machining center of MITSUI SEIKI.

Main motor power (kW)	Dimension (W×L×H)
3.7/5.5	785×505×1140

Compression process of the Scroll compressor

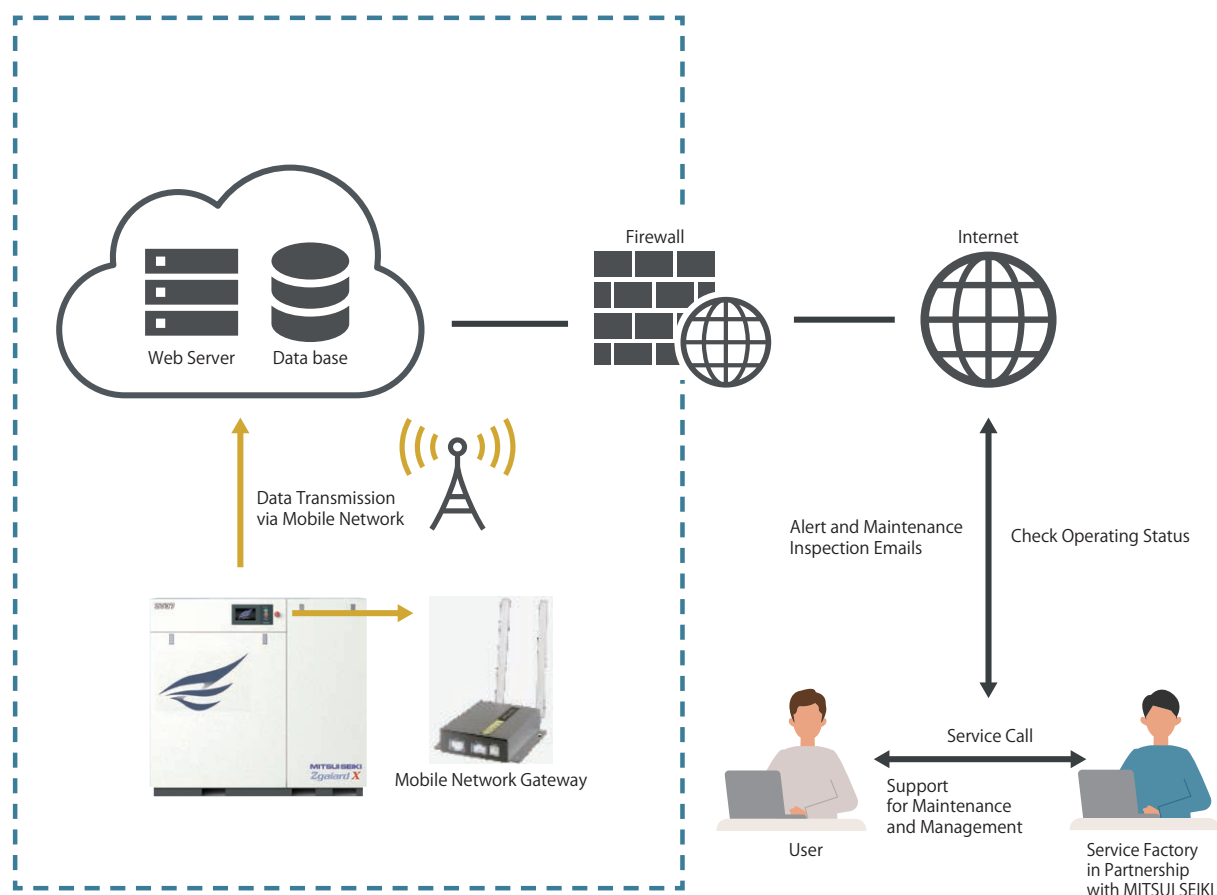


Unprecedented compression mechanism implemented by long experience (Type:Screw)



Real-time monitoring and sharing of operational status

Compressor operation status can be checked 24 hours a day from a remote location.

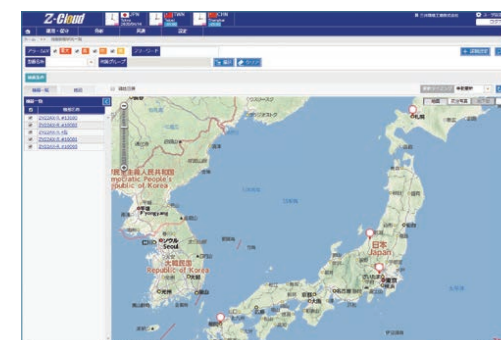


- Improved efficiency of maintenance and inspection work and easier management of operation information.
- Remote monitoring allows real-time checking of operation status.
- Automatic e-mail transmission in the event of abnormalities and maintenance, and prompt support by checking the details of the abnormality and operating status.

Note: Only models with LCD monitors can be connected to the compressor.

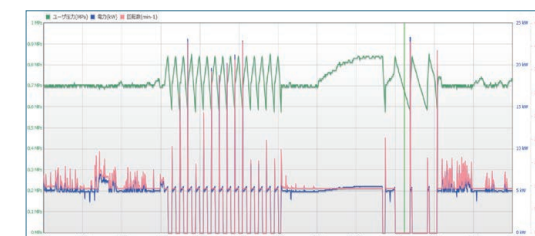
Operation Status Check

Remote monitoring to check compressor operation status



Energy-saving effects

Analyze operating status on trend graphs to check current status and improve operations



List of Features

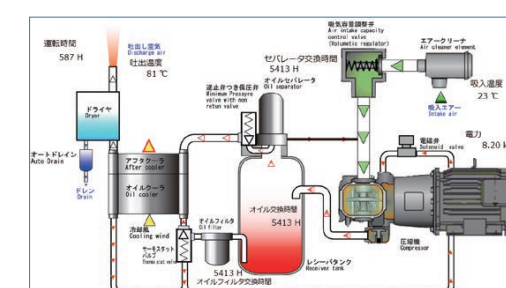
Optimal Maintenance

Confirmation of operation status and preventive maintenance via alarm notification and maintenance inspection e-mail

[illegible]

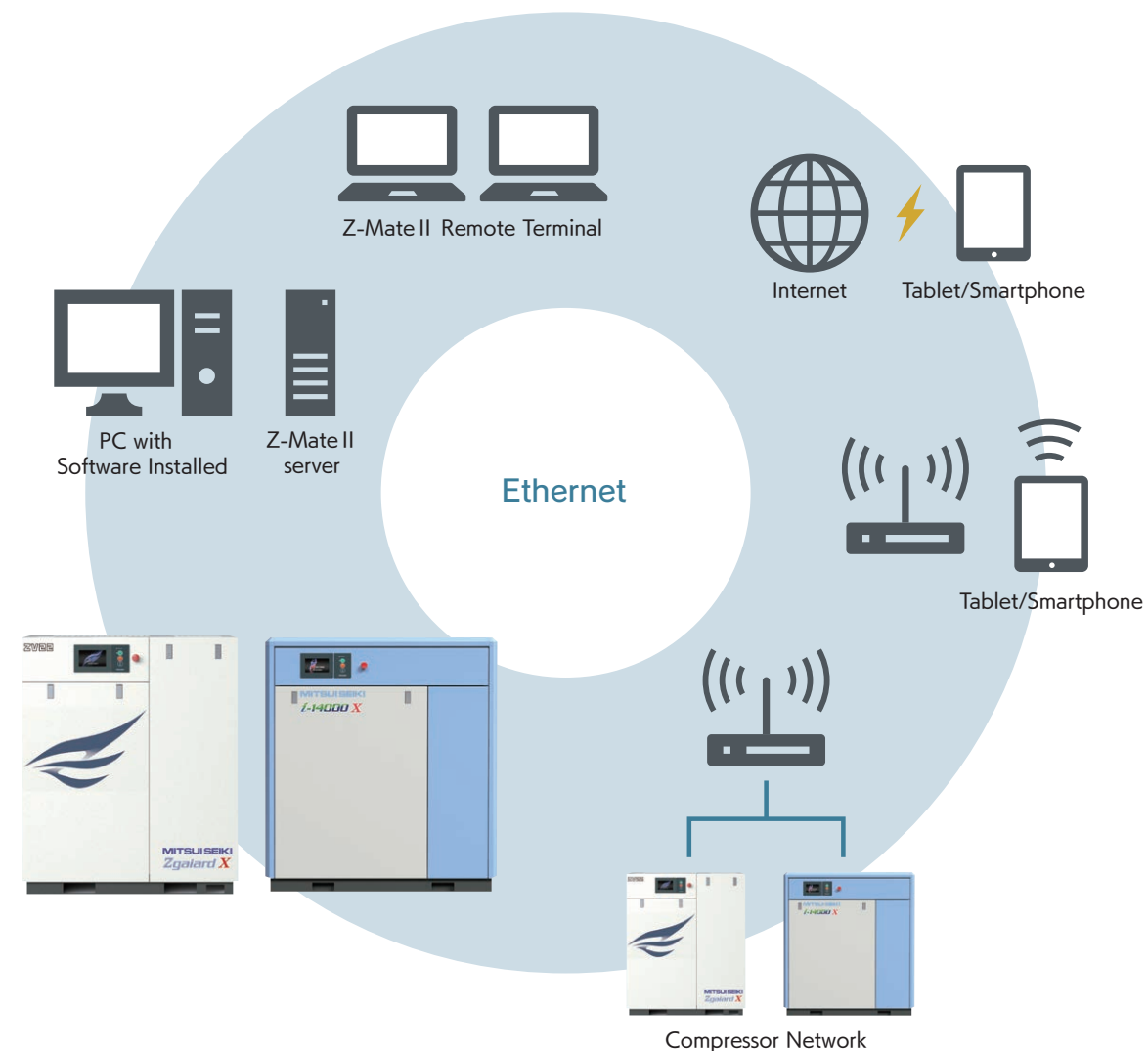
Layout Monitoring

Graphic monitoring of data is available



Z-Mate II Compressor Remote Monitoring System

Z-Mate II is a system that monitors and operates the operational status of each compressor (models with LCD monitors) connected to an Ethernet line such as an internal LAN using a personal computer.



Compressor operation can be easily managed, and compressors can be operated and stopped from a PC. Up to 50 compressors can be connected.

Note : "Z-Mate II Software" is required to use Z-Mate II. Only compressors with a Z-Mate II compatible LCD monitor can be connected. Please contact us for details on the applicable products.

Red CX

Regulate Eco Drive Controller

Attempts energy saving by driving minimum required numbers of plural air compressors according to air consumption (Maximum controlled unit: eight unit.). Digital pressure indication enables driving of the minimum number in precise pressure range. Further energy saving is materialized by combination of inverter machine and standard un-loader machine or plural unit control of inverter machine only.



Plural units control examples

ZV&Z Control ZV 75kW x 1set + Z 75kW x 3set Free air delivery 52m³/min

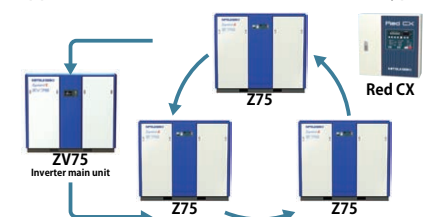
In case of 1 set of inverter machine

Inverter machine runs first and stops last. Ideal driving is enabled as the standard machine runs with full load whereas the inverter machine runs by controlled number of the rotation depending on load fluctuation.

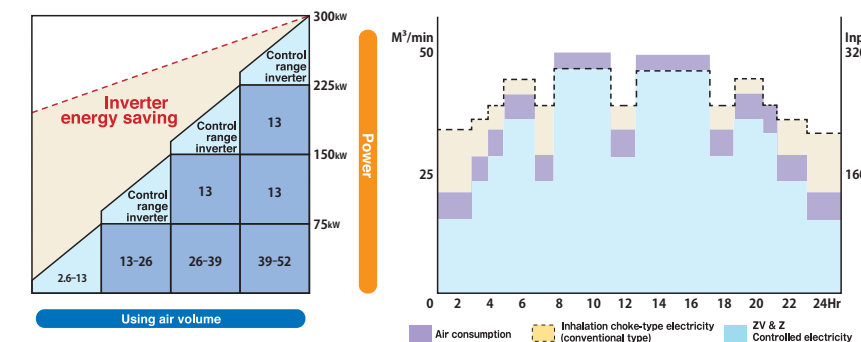
In case of plural number of inverter machines

Double loop driving with rotation function of inverter machine is viable.

Applicable to control the inverter unit for all types

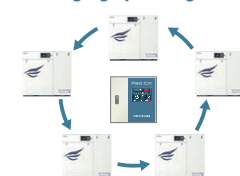


Simulation of Air usage conditions: Max46m³/min ↔ Min20m³/min



Function of plural unit control system

Averaging operating time



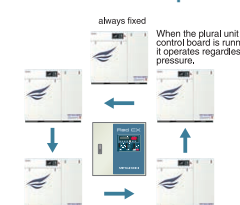
Pressure sensor detects air pressure and starts / stops compressor. Red CX chooses which compressor to start / stop in order to average the operating time. Having operated for a certain time, running compressor averages the operating time in rotating.

Alternate operation



You can operate main machine and subordinate machine alternately. When the main machine has run for a certain time, subordinate one starts to run in exchange so that operating time is averaged.

Permanent fixed operation



You can set which compressor to run all the time. The fixed compressor starts to operate first and continue running. The other compressors can be running in all operation pattern.

Start and stop in fixed order



If you set starting order, units will be started and stopped in order.

Averaging the operating time of inverter machine



If you use both standard machine and inverter machine Standard machine runs in the way averages the operating time. Inverter machine rotates in optional time.

Turn back control



If sizes of machines are different Set starting order. Compressors start to run in that order stop reversely.

2 pattern of pressure setting by weekly timer

ex.) You can set different pressure day and night / weekdays and the weekend.

Receiver tank

Material	SS400-SM490A	Attachment	safety valve, pressure gauge, drain valve
Color	Munsell 7.5Y7/1	Certification	the second sort pressure vessel certificate

Tank Selection Chart

Applicable compressor	Tank capacity (L)
3.7-5.5kW	200
7.5-15kW	200-500
22kW	500-700
37kW	700-1000
55kW	1000-2000
75kW	1500-3000

※Further, for general application, it is recommended to install the air tank of delivery air capacity 10~20%.

※Please ask us when you choose vessel's volume in terms of pressure, air consumption or holding time.



Model	Tank capacity (L)	Maximum allowable pressure MPa	Mass (Kg)	Outer diameter D (ømm)	Height H (mm)	Air outlet / inlet connection diameter	
						Socket	Flange
MTA-02	201	1.00	120	462	1660	Rc1	
MTA-03	298	1.00	150	512	1921	Rc1-1/2	
MTA-05	498	1.00	270	666	1978	Rc1-1/2	
MTA-07	698	1.00	330	766	2072		50A
MTA-10	991	1.00	470	868	2253		50A

※About 100, 400, 1500 – 6000L vessels, please ask us.

※If you use oil-free air, we recommend having inside epoxy-coated (option).

※There is no duty to submit registration of vessel setting, please observe safety regulation of boilers and pressure vessels based on Industrial Safety and Health Act.

※Designs of product may be changed without prior notice. Ask us about detailed information.

Clean air system

Put a combination of various filters in the piping in proportion to the required air cleanness to obtain much more clean compressed air.

use	result
Line filter	
Air tool, Air motor, Air press, general painting, spray lubrication	Dry air nominal filtering rating: 1- 5 μ m In such a case that inclusion of a certain oil or dust after waterelimination was allowed.
Line filter + mist filter	
For instrumentation, static painting, dry, electronic parts	Dry and oil eliminated air nominal filtering rating: 0.1~0.01 μ m In such a case that the air eliminated almost all the water, oil and dust was required.
Line filter + mist filter + activated carbon filter	
For medicament, food, brewing, ozone generator, scientific analysis equipment and caisson shielding	Dry, oil and smell eliminated air nominal filtering rating: 0.003~0.01 umin In such a case that the air eliminated almost all the water, oil, dust and smell was required.

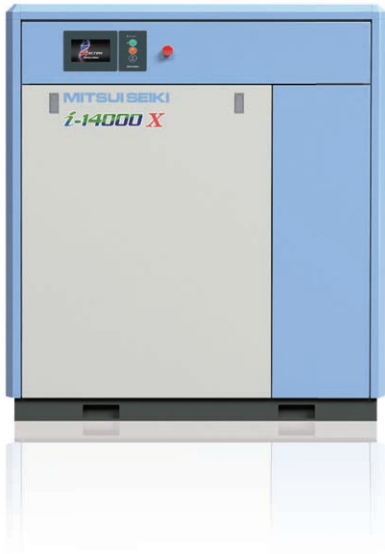
Customizing specification option

Low voltage volume increase specification	Discharge air volume shall be lowered to increase the delivery air volume (applicable to the Increasing type ZV 22kW~75kW)
380V-440V different voltage	Applicable to change the main circuit voltage. Electricity 200V shall be self supplied to the Operation circuit and Dryer power supply through the Down transformer.
Cold region specification (-10℃)	Countermeasure shall be supplied for the cold region to operate the unit in a safe condition. The unit shall automatically keep the heat when the atmosphere temperature dropped to prevent the Dryer and Drain from freezing up.
Outdoor specification	Waterproof package applicable to install outdoor to confront the rain flooding.
Water cooling type	Applicable to replace the cooling unit with a water cooling type when the application of the air cooling type was difficult under environmental condition such as not possible to ensure the ventilation (applicable to 22W and 37kW)
Food grade oil	Change into H1 grade oil.

※Some specifications are not applicable depending on the unit type. Please contact us for details.

OIL FREE COMPRESSOR SERIES

i-14000X series



Oil free inverter compressor

Air cooled 15 - 37kW
(Option: Water cooled 15 / 22 / 37kW)

15kW / 22kW / 37kW

Inverter	Z-Cloud optional	Z-Mate II optional
IPM motor	IT touch panel	Red-CX optional

i-14000 series



Inverter oil free compressor

Air cooled 30 - 75kW

30kW / 45kW / 55kW / 75kW

Water cooled 55 - 220kW
(Option: Water cooled 30 / 45kW)

55kW / 75kW / 100kW / 150kW / 180kW / 220kW

Inverter	Z-Cloud optional	Z-Mate II optional
IPM motor	IT touch panel	Red-CX optional

u-14000 series



Oil free compressor

Air cooled 15 - 75kW

15kW / 22kW / 37kW / 55kW / 75kW

Water cooled 55 / 75kW
(Option: Water cooled 22 / 37kW)

Fixed speed	Z-Cloud optional	Z-Mate II optional
IE3 motor	IT touch panel	Red-CX optional

Zgaiard X ZV series

Inverter 7.5kW–75kW

Model	Zgaiard X ZV08AX3-R	Zgaiard X ZV11AX3-R	Zgaiard X ZV15AX3-R	Zgaiard X ZV22AX3-R	Zgaiard X ZV37AX3-R	Zgaiard X ZV55AX-R	Zgaiard X ZV75AX-R	Zgaiard X ZV55WX-R	Zgaiard X ZV75WX-R	
Delivered air pressure (MPa)	0.7 [0.53~0.93] (0.5) ※									
Free air delivery (m³/min)	1.25	1.90	2.70	4.35	7.35	10.2 (11.5) ※	13.4 (14.7) ※	10.2 (11.5) ※	13.4 (14.7) ※	
Intake air pressure & temperature	Atmospheric pressure (2~40℃)									
Main motor power (kW)	7.5	11	15	22	37	55	75	55	75	
Power source voltage (50/60Hz/V)	200/200~220									
Motor type	3-phase squirrel cage, 2P totally-enclosed external fan (IE3 motor)			Totally enclosed fan cooled IPM motor						
Starter	Inverter starter									
Drive system	Direct coupled motor									
Cooling system	Air cooled							Water cooled		
Fan motor power (kW)	0.4		0.9	0.75(inverter control)	2.2(inverter control)	1.5(inverter control)	2.2(inverter control)	0.08/0.12	0.15/0.22	
Oil fill ration (L)	7		9	15	20	38				
Dryer	Air dew point at outlet (℃)	10 (under applied pressure) ※								
	Electricity consumption (kW)	0.36/0.42~0.44	0.37/0.45~0.44	0.53/0.65~0.68	1.2/1.4~1.4	1.4/1.7~1.7	1.8/2.2	2.3/2.7	1.8/2.2	2.3/2.7
	Used refrigeration	R-407C								
	Refrigeration amount (g)	240	260	300	650	1050	1050	1450	1050	1450
Discharge pipe diameter (R)	3/4		1		1 1/2		2			
Dimension	Width (mm)			1030		1250		1700		2008
	Length (mm)			740		800		1183		
	Height (mm)			1400		1490		1550		1750
Total mass (Dry state) (kg)	450	460	530	600	800	1350	1500	1350	1500	
Noise level (dB (A))	52	53	54	55	59	64	66	63	65	

Cautions: Dryer of low pressure specifications (option) shall be separate type.
Please contact us for dryer dimensions and mass.

※ : Values in () are the free air delivery for 0.5MPa specification (option)
* Values with ambient temperature of 30; and rated discharge pressure.

◎Noise values measured in noiseless environment at distance of 1.5meters from front, at height of 1m, with load of 100% (at 0.7MPa)

◎Specifications for 22 to 37kW water-cooled unit available on request (option)

◎Cooling water volume (water temp. 32); 55kW: 80L/min; 75kW: 110L/min

Notation

Z

V

–

2

2

A

X

3

–

R

① ZV Series

② 22kW

③ Air-cooling

④ Type name

⑤ Built-in air dryer

Z

–

2

2

A

X

3

–

R

① Z Series

② 22kW

③ Air-cooling

④ Type name

⑤ Built-in air dryer

Zgaiard ZV series

Inverter 150kW

Model	ZV150AS2i	ZV150WS2i	
Delivered air pressure (MPa)	0.7 (0.54–0.93)		
Free air delivery (m³/min)	26.0	26.0	
Intake air pressure & temperature	Atmospheric pressure (2–40℃)		
Main motor power (kW)	150	150	
Power source voltage (50/60Hz/V)	400※		
Motor type	Totally enclosed fan cooled IPM motor		
Starter	Inverter starter		
Drive system	Direct coupled motor		
Cooling system	Air cooled	Water cooled	
Fan motor power (kW)	5.5	0.15/0.22	
Oil fill ration (L)	100	100	
Discharge pipe diameter (R)	JIS 10K 3B (80A) Flange		
Dimension	Width (Dryer less) (mm)	(3600)	(2650)
	DimensionLength (mm)	1350	
	Height (mm)	2155	1750
	Total mass (Dry state) (kg)	3400	3200
Noise level (dB (A))	78	74	

◎Noise values measured in noiseless environment at distance of 1.5meters from front, at height of 1m, with load of 100% (at 0.7MPa)

◎Cooling water volume (water temp. 32); 150kW: 200L/min

Notation

Z

V

–

5

5

W

X

–

R

① ZV Series

② 55kW

③ Water-cooling

④ Type name

⑤ Built-in air dryer

E

S

C

A

L

4

5

A

2

–

R

① ESCAL Series

② 4=3.7kW

③ 5=50Hz

④ Air-cooling

⑤ Type name

⑥ Built-in air dryer

ESCAL series

Scroll 3.7kW / 5.5kW

Model		ESCAL 45A2-R	ESCAL 46A2-R	ESCAL 65A2-R	ESCAL 66A2-R
Delivered air pressure (MPa)		0.83			
Free air delivery (m³/min)		470		730	
Intake air pressure & temperature		Atmospheric pressure (2–40℃)			
Main motor power (kW)		Select the auto start/stop or unloader type			
Power source voltage (50/60Hz,V)		3.7		5.5	
Motor type		200/200•220			
Starter		3-phase squirrel cage 4P totally enclosed external fan (IE3 motor)			
Drive system		Direct ON start			
Cooling system		V belt drive			
Fan motor power (kW)		Air cooled			
Oil fill ration (L)		3.5		4.5	
Dryer	Air dew point at outlet (℃)	10 (under applied pressure) *			
	Electricity consumption (kW)	0.296	0.260•0.236	0.296	0.260•0.236
	Used refrigeration	R-407C			
	Refrigeration amount (g)	280			
Discharge pipe diameter (R)		1/2			
Dimension	Width (mm)	785			
	Length (mm)	505			
	Height (mm)	1140 (790)			
Total mass (Dry state) (kg)		240		260	
Noise level (dB (A))		49		52	

* Values with ambient temperature of 30; and rated discharge pressure.

◎Noise values measured in noiseless environment at distance of 1.5meters from front, at height of 1m, with load of 100% (at 0.83MPa)

Zgaiard X / Zgaiard Z series

Fixed speed 7.5kW–37kW

Model	Zgaiard X Z085AX3-R	Zgaiard X Z086AX3-R	Zgaiard X Z115AX3-R	Zgaiard X Z116AX3-R	Zgaiard X Z155AX3-R	Zgaiard X Z156AX3-R	Zgaiard X Z225AX3-R	Zgaiard X Z226AX3-R	Zgaiard X Z375AX3-R	Zgaiard X Z376AX3-R		
Delivered air pressure (MPa)	0.83				0.7							
Free air delivery (m³/min)	1.15		1.75		2.70		4.35		7.35			
Intake air pressure & temperature	Atmospheric pressure (2–40℃)											
Capacity control method	Power-saving AUCS or Automatic start/stop selection											
Main motor power (kW)	7.5		11		15		22		37			
Power source voltage (50/60Hz/V)	200/200•220											
Motor type	3-phase squirrel cage, 2P totally-enclosed external fan (IE3 motor)											
Starter	Direct in						3-contactor, star delta start					
Drive system	Direct coupled motor											
Cooling system	Air cooled											
Fan motor power (kW)	0.4				0.9		0.75(inverter control)		2.2(inverter control)			
Oil fill ration (L)	7				9		15		20			
Dryer	Air dew point at outlet (℃)				10 (under applied pressure) *							
	Electricity consumption (kW)	0.36	0.42•0.44	0.37	0.45•0.44	0.53	0.65•0.68	1.2	1.4	1.4	1.7	
	Used refrigeration		R-407C				R-410A					
	Refrigeration amount (g)		240		260		300		650		1050	
Discharge pipe diameter (R)	3/4				1						1 1/2	
Dimension	Width (mm)		1030				1250		1700			
	Length (mm)		740				800					
	Height (mm)		1400				1490		1550			
	Total mass (Dry state) (kg)		430		470		530		800		1100	
Noise level (dB (A))	53		55		56		55		60			

* Values with ambient temperature of 30; and rated discharge pressure.
◎We have 0.83 / 0.88 / 0.93 MPa version (option). Please contact us for details.

◎Noise values measured in noiseless environment at distance of 1.5meters from front, at height of 1m, with load of 100% (at 0.7MPa)

◎Specifications for 22 to 37kW water-cooled unit available on request (option)

Fixed speed 55kW–75kW

Model	Zgaiard X Z555AX-R	Zgaiard X Z556AX-R	Zgaiard X Z755AX-R	Zgaiard X Z756AX-R	Zgaiard X Z555WX-R	Zgaiard X Z556WX-R	Zgaiard X Z755WX-R	Zgaiard X Z756WX-R	
Delivered air pressure (MPa)	0.7								
Free air delivery (m³/min)	10		13.2		10		13.2		
Intake air pressure & temperature	Atmospheric pressure (2~40℃)								
Capacity control method	Power-saving AUCS or Automatic start/stop selection								
Main motor power (kW)	55		75		55		75		
Power source voltage (50/60Hz/V)	200/200•220								
Motor type	3-phase squirrel cage, 2P totally-enclosed external fan (IE3 motor)								
Starter	3-contactor, star delta start								
Drive system	Direct coupled motor								
Cooling system	Air cooled				Water cooled				
Fan motor power (kW)	3.7				0.08	0.12	0.15	0.22	
Oil fill ration (L)	38								
Dryer	Air dew point at outlet (℃) 10 (under applied pressure) *								
	Electricity consumption (kW)	1.72	2.13	2.3	2.8	1.72	2.13	2.3	2.8
	Used refrigeration	R-410A							
	Refrigeration amount (g)	1050		1450		1050		1450	
Discharge pipe diameter (R)	2								
Dimension	Width (mm) 2008								
	Length (mm) 1183								
	Height (mm) 1750								
	Total mass (Dry state) (kg) 1600								
Noise level (dB (A))	66		69		65		66		

* Values with ambient temperature of 30; and rated discharge pressure.
◎We have 0.83 / 0.88 / 0.93 MPa version (option). Please contact us for details.

◎Noise values measured in noiseless environment at distance of 1.5meters from front, at height of 1m, with load of 100% (at 0.7MPa)

◎Cooling water volume (water temp. 32); 55kW: 80L/min; 75kW: 110L/min

Fixed speed 150kW

Model 形 式	Z1505AS2	Z1506AS2	Z1505WS2	Z1506WS2
Delivered air pressure (MPa)	0.7			
Free air delivery (m³/min)	27.0	26.0	27.0	26.0
Intake air pressure & temperature	Atmospheric pressure (2~40℃)			
Capacity control method	Power-saving AUCS or Automatic start/stop selection			
Main motor power (kW)	150			
Power source voltage (50/60Hz/V)	400	440	400	440
Motor type	3-phase squirrel cage, 2P totally-enclosed external fan (IE3 motor)			
Starter	3-contactor, star delta start			
Drive system	Direct coupled motor			
Cooling system	Air cooled		Water cooled	
Fan motor power (kW)	5.5		0.08	0.12
Oil fill ration (L)	100			
Discharge pipe diameter (R)	JIS 10K 3B (80A) Flange			
Dimension	Width (Dryer less) (mm)	3200		2860
	DimensionLength (mm)	1350		1350
	Height (mm)	2155		1750
	Total mass (Dry state) (kg)	3410		3050
	Noise level (dB (A))	78		74

Compressor installation

Precautions for installation location

Some installation environments can damage the compressor or cause malfunctions. Please follow the precautions below in order to ensure the efficient, safe, and long-term use of your compressor.

Installation environment

- ▲ Avoid installing outdoors, in semi-outdoor locations, in locations exposed to rain, and the like.
- ▲ Avoid installing in locations exposed to dust or toxic gases.
- ▲ Install in a location with an ambient temperature between 2 and 40. (We recommend the optional cold-weather specification if installing in temperatures of 2; and lower)

Location

- ▲ Install on a firm, level floor.
- ▲ Install in a spacious, well lit location enabling operation to be monitored easily.
- ▲ There should be no impediments to transporting the unit to/from the location or performing maintenance.

Electrical wiring

- ▲ All electrical wiring during installation must be done in accordance with technical standards. Electrical leaks, worn insulation, overcurrent, short circuits, open-phase driving, and defective protective equipment could cause sparks from the electrical wiring or electronic circuits.
- ▲ Install a non-fuse breaker on the main power line if the model so requires.
- ▲ Connect a ground cable to prevent electrical leaks.
- ▲ Never remove protective equipment or perform modifications that disables an electronic circuit's protective features.

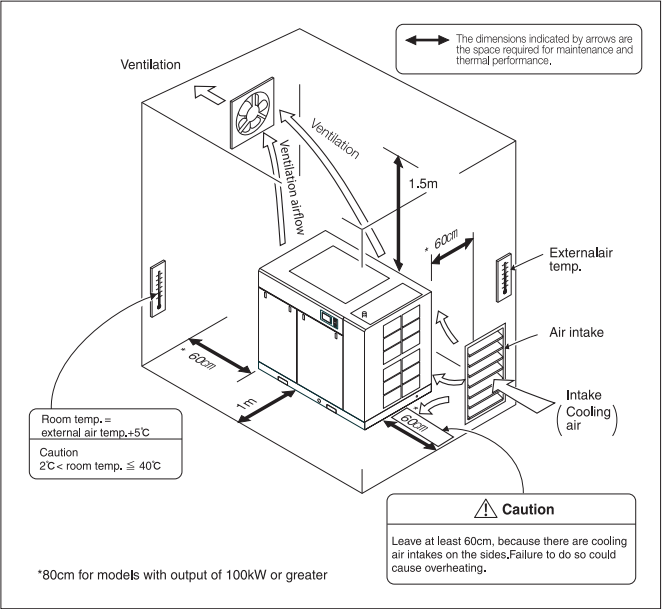
Maintenance

- ▲ We recommend conducting maintenance and inspection ahead of the standard schedule in accordance with the installation environment and location.

Ventilation

- ▲ The compressor room must be ventilated. Install a ventilation fan, duct, or the like so that the ambient temperature does not exceed 40. Failure to do so could cause the compressor to overheat, or damage the insulation of electrical components.

Installation space



Installation Requirements

Model	Non-fuse breaker		Power transformer	Secondary wiring cable				Cooling tower
	Below 22kW less 10m, Over 37kW less 20m				For CT outlet temp. of 32℃			
	200 / 220V	400 / 440V	Capacity(200 / 400V)	200 / 220V		Grounding cable	400 / 440V	Grounding cable
Z08AX3-R	100AF-60AT	50AF-40AT	15KVA	8mm ² M5	5.5mm ² M5	3.5mm ² M4	5.5mm ² M4	—
Z11AX3-R	100AF-100AT	50AF-50AT	20KVA	14mm ² M5	14mm ² M5	5.5mm ² M4	14mm ² M5	—
Z15AX3-R	100AF-100AT	100AF-60AT	25KVA	22mm ² M8	14mm ² M5	14mm ² M5	14mm ² M5	—
Z22AX3-R	225AF-200AT	100AF-100AT	35KVA	38mm ² M10	22mm ² M5	22mm ² M8	22mm ² M5	10t or more
Z37AX-3R	※1 NV250-SEV,HEV NF250-SEV,HEV-225AT	NV250-SEV,HEV NF250-SEV,HEV-150AT	55KVA	100mm ² M10	22mm ² M5	38mm ² M8	22mm ² M5	10t or more
Z55AX-R	NV400-SEW,HEW NF400-SEW,HEW-400AT	225AF-225AT	75KVA	150mm ² M12	38mm ² M8	60mm ² M10	38mm ² M8	—
Z55WS4-R / Z55WX-R	NV400-SEW,HEW NF400-SEW,HEW-400AT	225AF-225AT	75KVA	150mm ² M12	38mm ² M8	60mm ² M10	38mm ² M8	15t or more
Z75AX-R	※2 NV400-SEW,HEW NF400-SEW,HEW-400AT	※1 NV250-SEV,HEV NF250-SEV,HEV-225AT	105KVA	200mm ² M12	38mm ² M8	100mm ² M10	38mm ² M8	—
Z75WS4-R / Z75WX-R	※2 NV400-SEW,HEW NF400-SEW,HEW-400AT	※1 NV250-SEV,HEV NF250-SEV,HEV-225AT	105KVA	200mm ² M12	38mm ² M8	100mm ² M10	38mm ² M8	20t or more
Z150AS2	—	NV400-SEW,HEW NF400-SEW,HEW-400AT	300KVA	—	—	250mm ² M12	60mm ² M8	—
Z150WS2	—	NV400-SEW,HEW NF400-SEW,HEW-400AT	300KVA	—	—	250mm ² M12	60mm ² M8	40t or more
ZV08AX3-R	50AF-50AT	30AF-30AT	20KVA	5.5mm ² M6	5.5mm ² M6	2mm ² M6	2mm ² M6	—
ZV11AX3-R	100AF-75AT	50AF-40AT	25KVA	8mm ² M6	8mm ² M6	3.5mm ² M6	3.5mm ² M6	—
ZV15AX3-R	225AF-125AT	100AF-60AT	30KVA	22mm ² M8	14mm ² M8	8mm ² M6	8mm ² M6	—
ZV22AX3-R	225AF-150AT	100AF-75AT	45KVA	38mm ² M8	22mm ² M8	14mm ² M6	14mm ² M6	10t or more
ZV37AX3-R	225AF-225AT	225AF-125AT	65/75KVA	100mm ² M10	38mm ² M10	22mm ² M8	22mm ² M8	10t or more
ZV55AX-R	400AF-400AT	225AF-175AT	120KVA	100mm ² M12	38mm ² M12	60mm ² M8	22mm ² M8	—
ZV55WX-R	400AF-400AT	225AF-175AT	120KVA	100mm ² M12	38mm ² M12	60mm ² M8	22mm ² M8	15t or more
ZV75AX-R	400AF-400AT	225AF-200AT	125KVA	150mm ² M12	38mm ² M12	60mm ² M10	22mm ² M10	—
ZV75WX-R	400AF-400AT	225AF-200AT	125KVA	150mm ² M12	38mm ² M12	60mm ² M10	22mm ² M10	20t or more
ZV150AS2i	—	400AF-350AT	250KVA	—	—	100mm ² M12	38mm ² M12	—
ZV150WS2i	—	400AF-350AT	250KVA	—	—	100mm ² M12	38mm ² M12	40t or more
ESCAL4A2-R	30AF-30AT	30AF-20AT	7KVA	3.5mm ² M4	3.5mm ² M4	2mm ² M4	2mm ² M4	—
ESCAL6A2-R	50AF-50AT	30AF-30AT	10KVA	5.5mm ² M4	5.5mm ² M4	3.5mm ² M4	3.5mm ² M4	—
ZV150WSD	M1:Inverter	400AF-400AT	125KVA	150mm ² M12	38mm ² M12	—	—	40t or more
	※2 M2:Fixed speed	NV400-SEW,HEW NF400-SEW,HEW-400AT	105KVA	200mm ² M12	38mm ² M12	—	—	

- ◎ Use a recommended SEW or HEW circuit breaker (made by Mitsubishi Electric Corporation). (If changing in same frame)
◎ If you use our designated NF series of non-fuse circuit breakers, use the NV series of designated leak-electricity circuit breakers (made by Mitsubishi Electric Corporation).
◎ Use power lines with a size of 55kW or less when the continuous maximum allowed temp. is 75; (e.g. NIV power lines). If the ambient temperature is 50; or less, it is assumed that the wiring separation will be 20m or less.
◎ Use power lines with a size of 75kW or more when the continuous maximum allowed temp. is 90; (e.g. LMFC power lines). If the ambient temperature is 50; or less, it is assumed that the wiring separation will be 20m or less.
※ Use tripping current adjustable size (x14) breaker

Ventilating the compressor room

Be very careful to ventilate the compressor room!

The compressor room must be ventilated. Install a ventilation fan, duct, or the like so that the ambient temperature does not exceed 40°C. Failure to do so could cause the compressor to overheat, or damage the insulation of electrical components.

Ventilation volume

Some installation environments can damage the compressor or cause malfunctions. Please follow the precautions below in order to ensure the efficient, safe, and long-term use of your compressor.

Installation environment

- ▲ Avoid installing outdoors, in semi-outdoor locations, in locations exposed to rain, and the like.
- ▲ Avoid installing in locations exposed to dust or toxic gases.
- ▲ Install in a location with an ambient temperature between 2 and 40. (We recommend the optional cold-weather specification if installing in temperatures of 2; and lower)

	Figure A. Overall ventilation	Duct ventilation	Install a ventilation fan in the duct
Ventilation method			
Precautions	When whole compressor room ventilation without duct, please see below (A) figures. (These figures are when ΔT=5.) Ventilation fan should be located high near ceiling and air intake should be located low near compressor air inlet side. Air speed at air intake should be less than 2m/sec. Air intake=Ventilation(A)+ Free air delivery	Please calculate the duct size based on calculation of duct resistance from compressor exhaust volume; pressure loss should be below 29.4Pa (3mmAq). Ventilation duct should be removable flom compressor so that maintenance work become easier. Please note noise from compressor might leak through ventilation duct. Exhaust fan is needed even ventilation duct is supplied. This is for dryer exhaust. Air intake=Ventilation(B)+ Heat exhaust (C) + Free air delivery	Please calculate the duct size based on calculation of duct resistance from compressor exhaust volume; pressure loss should be below 29.4Pa (3mmAq). Please note noise from compressor might leak through ventilation duct. Please surely keep 300~400mm space between exhaust duct inlet port and exhaust outlet port of the cooler. Please do not make a short space or directly connect to air compressor because it cause for the breakdown due to the over cooling. Air intake=Ventilation(D) + Free air delivery

Ventilation volume Please consult with Mitsui Seiki or a designated service shop for details

Model	Heat output (MJ/h)		Room ventilation		Duct ventilation		Exhaust(m³/min)(C)(50/60Hz)		Install a ventilation fan in the duct	
			Ventilation volume(m³/min)(A)		Ventilation volume(m³/min)(B)(50/60Hz)		Exhaust(m³/min)(C)(50/60Hz)		Ventilation volume(m³/min)(D)(50/60Hz)	
	Compressor	Dryer	Dryer less	Built-in dryer type	Dryer less	Built-in dryer type	Compressor	Dryer less	Built-in dryer type	Built-in dryer type
Z08AX3-R	39	8	108	130	5	27	24	34/27	56/49	
Z11AX3-R	57	10	158	185	8	36	29	34/43	62/70	
Z15AX3-R	78	15	215	256	11	52	39	53/58	94/99	
Z22AX3-R	114	11	315	345	16	46	53	80	110	
Z37AX3-R	192	19	530	583	27	79	78	120	173	
Z55AX-R	218	25	602	669	31	98	172/204	237/275	304/342	
Z55WS4-R	40	28	109	185	—	—	—	—	—	
Z55WX-R	44	25	121	188	—	—	—	—	—	
Z75AX-R	297	33	821	911	42	131	198/191	279/270	369/360	
Z75WS4-R	54	33	149	240	—	—	—	—	—	
Z75WX-R	60	33	165	254	—	—	—	—	—	
Z150AS2	540	—	1500	—	75	—	400/430	—	—	
Z150WS2	108	—	300	—	—	—	—	—	—	
ZV08AX3-R	39	8	108	130	5	27	24	34/27	56/49	
ZV11AX3-R	57	10	158	185	8	36	29	34/43	62/70	
ZV15AX3-R	78	15	215	256	11	52	39	53/58	94/99	
ZV22AX3-R	114	11	315	345	16	46	53	80	110	
ZV37AX3-R	192	19	530	583	27	79	78	120	173	
ZV55AX-R	212	25	585	652	30	97	165	228	295	
ZV55WX-R	43	25	117	184	—	—	—	—	—	
ZV75AX-R	289	33	798	887	40	130	205	286	376	
ZV75WX-R	58	33	159	249	—	—	—	—	—	
ZV150AS2i	540	—	1500	—	75	—	400	—	—	
ZV150WS2i	108	—	300	—	—	—	—	—	—	
ESCAL4A2-R	14	3	39	44	2	8	15	20	28	
ESCAL6A2-R	20	3	55	62	3	11	19	26	34	
ZV150WSD	108	—	300	—	—	—	—	—	—	

● For other models, please contact us.

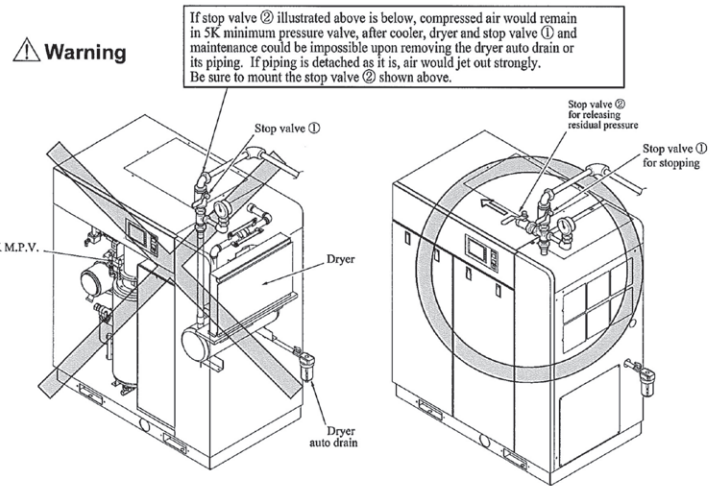
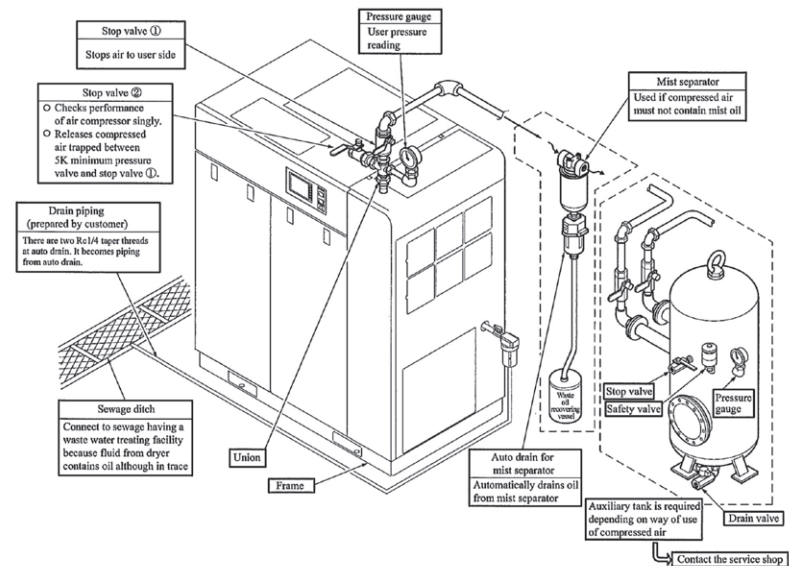
Calculating ventilation requirement

Q= n x H x 1000 / 1.2 x ΔT x 60

Q: Required ventilation volume (m³/min)
H: Heat output per unit (MJ/h)
n: Number of units
ΔT: Tolerated temperature rise (t1-t0)
(t1: tolerated indoor temp. (°C); t0: outside tem. (°C)) T is generally calculated as 5°C.

Piping

- Do not connect pipes with union joints or flange joints, so that they do not impede overhauls and the like.
- Make sure that the diameter of the main pipe is at least as large as the discharge outlet, in order to minimize the drop pressure. Install an approximately 1/100 slope to enable draining from the piping.
- Use a pipe diameter with enough leeway to reduce resistance, in accordance with the installed length of the piping.
- Install stop valves on the compressor discharge outlet, on both the user side and discharge side, in order to facilitate maintenance.
- Install air tanks, filters, and the like as needed, in accordance with the plant's air usage.
- See the installation manual for further details.



Stop valve ② is mandatory.

Pure oil

MITSUI genuine Compressor oil is lubrication oil developed for the Z screw. It is made up to fully perform its function and survive the long time operation. Please care to use the MITSUI genuine oil for the MITSUI products. Also pay attention not to use it mixed with another type oil.



Z-6000



Z-3000

Maintenance

[Oil type]

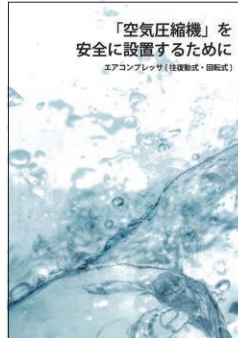
- Check the oil level of the Compressor every day.
- Adjust the amount of the drain (water) from the oil chamber in proportion to the load condition.
- Life cycle of the compressor oil is approximately 6,000 hours (for genuine oil Z-6000 compressor oil)
Replace the oil immediately after passed the life cycle.
Sooner replacement, if necessary as the dirt condition even not attained 6,000 hours, would help maintain good condition.

- Life cycle of the oil separator element is approximately 6,000 hours. Replace the oil separator element immediately after passed the life cycle.
- Life cycle of the oil filter is approximately 6,000 hours. Replace the oil filter immediately after passed the life cycle.
(Replacement period for the compressor oil, oil separator and oil filter shall become sooner according to the application circumstance).
- If a dust filter is blocking, it cause trouble. Clean filters regularly.
- Replace the Air cleaner element if the Monitor lamp lights up.
- Use Mitsui Seiki dedicated parts for maintenance part certainly.
- Execute other maintenance work based on Instruction Manual.

Have maintenance performed by a Mitsui Seiki Kogyo-certified technician (a service shop designated by Mitsui Seiki Kogyo).



We distribute guides for safely installing and maintaining your compressor (published by the Japan Society of Industrial Machinery Manufacturers). Please read them together with your operation manual.



"Safe air compressor installation"



"Maintenance tips for safe, energy-efficient use of air compressors"

Laws and regulations relating to compressors

Industrial Health and Safety Law "Ordinance on Safety of Boilers and Pressure Vessels"

[Overview]

- Vessels with maximum pressure of 0.2MPa or higher, with capacity of 40L or higher
- Vessels with maximum pressure of 0.2MPa or higher, with internal diameter of 200mm or more, and length of 1,000mm or more

[Documents to submit]

- Second-class Pressure Vessel Description Handling Instructions
- Second-class Pressure Vessel Description (Original)

◎Note: It is not necessary to submit these document, but keep them in a secure place, because they are important.

[Installation and use]

- Pressure vessels cannot be modified
- Perform self inspections at least once a year, and keep a record
- Adjust pressure delivered by safety valve
- Use a pressure gage with a maximum meter reading of 1.5 to 3 times the maximum pressure used, with a display that makes it easy to check the maximum pressure used.

Basic Environment Law "Noise Abatement Act/Vibration Control Law"

[Overview]

- Applies to compressors with rated drive output of 7.5kW or more. Check with the Pollution Section of your municipal office, because the regulation values differ by prefecture.

[Documents to submit]

- At least 30days before installing the compressor, you must submit a notice of start or change of construction to your prefectural government via the Pollution Section of your municipal government.

[Installation and use]

- The noise and vibration at the boundary of the plant grounds must be within the regulated levels.

"Law Concerning the Recovery and Destruction of Fluorocarbons" (Japanese Law)

The users of Classified Product(Commercial Refrigeration and A/C with CFC, HCFC and HFC) are required to conducted below three items.
①Products must be installed at adequate location.
②Periodical check (once per 3month) by user and recording the result.
③When leakage was found, user have the responsibility of repairing the products. Re-filling of refrigerant without repair is prohibited.
In case of bigger size refrigerate products.
In case of products with refrigerator capacity of bigger than 7.5kW, annual inspection by engineer with enough experience and knowledge (such as manufacturer and refrigerator maintenance engineer) is required by law.

Laws and regulations relating to the environment and energy conservation

Energy conservation laws (Energy Conservation Act) Enacted April 1, 2006 (revision)

- Purpose
Reduce average annual energy per unit of production by at least 1%.
- Key points of revision
Improve energy efficiency measures of factories and offices obligated to conserve energy through the central management of heating and electricity.

Global warming laws (Law for the Promotion of Measures to Deal with Global Warming) Enacted April 1, 2006 (revision)

- Kyoto Protocol Target Achievement PlanThe target is to reduce CO₂ emissions from industry by 8.6% from 1990 levels by the year 2010.
- Key points of revisionA system for calculating, reporting, and publishing greenhouse gases was introduced.