

# SCREW REFRIGERATION COMPRESSORS

INVERTER **iZ**  $\alpha$  SERIES

STANDARD **SH**  $\alpha$  SERIES

INVERTER **iZ** **S** SERIES



**Safety Precautions**

1. Before operation, make sure to read the instruction manual carefully for your safety and the equipment safety as well.
2. Never attempt to perform unauthorized equipment modifications. Unauthorized modifications could lead to damage or injury.
3. The compressors are designed to compress specified refrigerant. Never use them with other gases. Doing so could result in accidents or break downs.

- The allowable tolerances for cooling capacity and power consumption noted in the catalogue conform to JRA 4037 standards.
- The indicators, photos and evaluations in the catalogue that do not display the compliance standards are only reference information to explain the general features and performance of Kobelco's products. They do not constitute any guarantees by Kobelco.
- Information in this catalogue may change without notice in the future. Please contact a sales representative for the latest edition.

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KOBELCO iZ Series was granted awards for outstanding energy-saving equipment.





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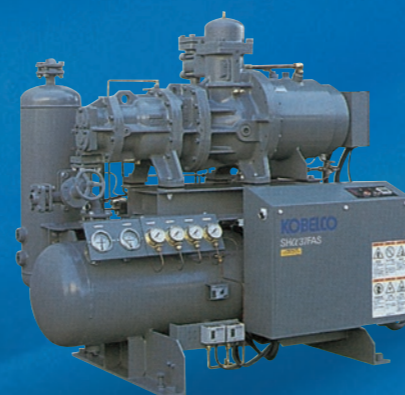
# R404A Screw Refrigeration compressors Products line-up



INVERTER  
**iZα** SERIES

Two stage screw compressor / Inverter drive(-30°C~-65°C)

Motor Nominal output (kW)	18	24	30	37	45	55	65	75	90	55×2	65×2	75×2	90×2
iZα Water cooled Condensing unit	●	●	●	●	●	●	●	●	●	●	●	●	●
iZα Receiver unit	●	●	●	●	●	●	●	●	●	●	●	●	●



STANDARD  
**SHα** SERIES

Two stage screw compressor / Fixed speed drive(-30°C~-65°C)

Motor Nominal output (kW)	15	22	37	55
SHα Water cooled Condensing unit	●	●	●	●
SHα Receiver unit	●	●	●	●



INVERTER  
**iZS** SERIES

Single stage screw compressor / Inverter drive(0°C~-40°C)

Motor Nominal output (kW)	30	37	45	55	75
iZS Water cooled Condensing unit	●	●	●	●	●



## BASIC iZα SERIES SHα SERIES



It always started with KOBELCO

Since Kobe Steel perfected Japan's first domestically produced compressor in 1915, KOBELCO has been at the forefront of Japanese innovation in compressor technology, responding with dedication to each new challenge and need. As evidenced by its success at marketing Japan's first screw compressor in 1956, KOBELCO continues today to reaffirm its commitment to developing the most innovative technology, proven quality, and industry leadership.

### Quiet

Quiet operation achieved by Kobelco's low-noise technology in every possible aspect

### Reliability

Continuous operation for 24,000 hours ensured

### Compact in size

Space saving ensured by downsized unit design

### High Performance

Operation efficiency maximized by Kobelco's original profile super rotors

### Labor saving

Labor-saved routine inspections available

## INDEX

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# KOBELCO's *four* Big Features

## 1/ Outstanding energy saving performance by Kobelco inverter drive compressor.

iZα series can control its cooling capacity with its inverter drive linear speed control to avoid excessive cooling, thereby permitting outstanding energy saving performance. Piston valve used for capacity control has been replaced to inverter drive capacity control to ensure optimum operation in accordance with cooling capacity fluctuation.

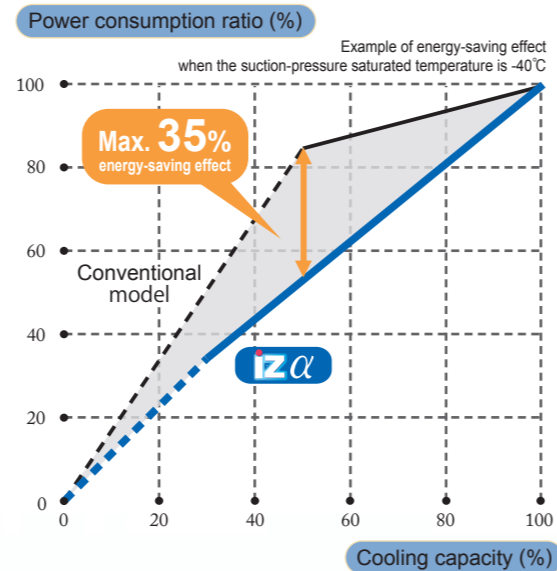
Outstanding energy saving performance according to partial loading

Partial load Energy save

50% **35%**

70% **17%**

80% **10%**



Saving merit per one year run

<b>SH</b> SHa37F × 2units (Fixed speed model/37kW motor ×2)	<b>CO2 reduced</b> <b>27 tons</b>	<b>Electric cost saved by</b> <b>US\$9,000</b>
<b>iZαII</b> iZa110wII (Inverter drive model/65kW motor ×1)		

<Conditions> Yearly average loading ratio: 70%, Running hrs: 6,000 hrs, Electric cost: US\$0.136/kWh ET/CT = -40°C/+40°C (50Hz area)

## 2/ Maximum 40% increasable cooling capacity by accelerating rotating speed by inverter drive

(compared with Kobelco conventional model in 50Hz area)

Conventional refrigeration compressor has been unavoidable to reduce cooling capacity significantly accompany with evaporating temperature drops. Accelerating motor speed technology with inverter drive (Patent registered) enable iZα series increase its cooling capacity at lower temperature than -30°C

iZα series can perform equally in both of 50Hz and 60Hz area, which is a big merit for 50Hz area users where 20% less performance than 60Hz area has been unavoidable. Those functions enable to select smaller compressor than before.

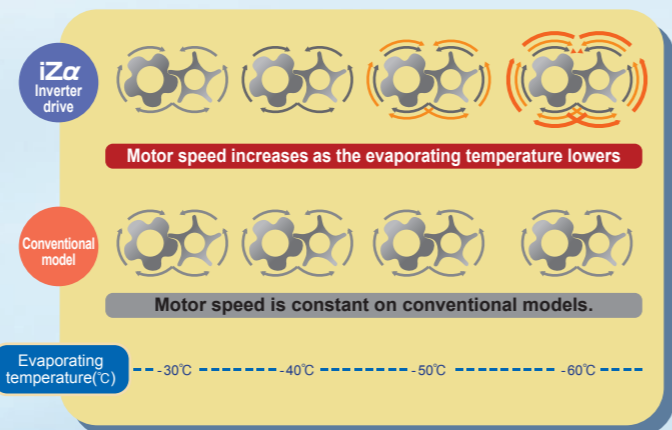
When suction pressure saturation temperature is -40°C cooling capacity is...

inincreasable approx **20%** in 60 Hz area

inincreasable approx **40%** in 50 Hz area

Patent Registered  
No. 3950304 US Patent #6484522

iZα Series motor speed accelerates accompany with evaporative temperature drop.



## 3/ "New iZ monitor" with various function for quick and proactive trouble shooting.

New iZ monitor indicates compressor running conditions, various alarms and those histories. Also stops compressor automatically against emergency waning.

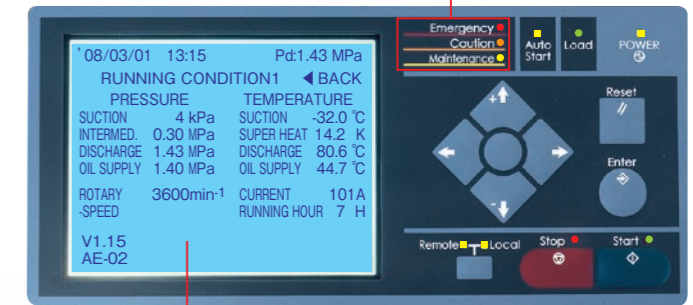
### iZ monitor

[iZα]



**E/C/M lamp**  
E: Emergency stop  
C: Caution  
M: Maintenance

[iZS]



**E/C/M lamp**  
E: Emergency stop  
C: Caution  
M: Maintenance

**Liquid crystal display (LCD)**  
Translucent screen (with backlight) for a clear view even in the dark.

※Since this series is single stage compressor, intermediate pressure sensor is not installed. "0.00MPa" appears on a monitor.

### Alternative running applications

Alternative linear capacity control or step capacity control can be selected due to clients demands.

### Suction pressure / Remote temperature capacity control

Linear capacity control with originally equipped suction pressure sensor and also optionally installed temperature sensor (requested users to supply) at freezing site are available.

### Additional indication

Super heat is added to monitor compressor situation more clearly.

### Linear capacity control

Inverter fixes its rotating speed sensing with originally equipped suction pressure sensor otherwise optionally equipped temperature sensor (the sensor and 4-20mA DC signal are requested users to supply) at freezing site. Controlling factor of suction pressure at the freezing site is requested to preset.

### Step control

Capacity step control function is also equipped with iZ monitor, its setting value is available to change flexibly

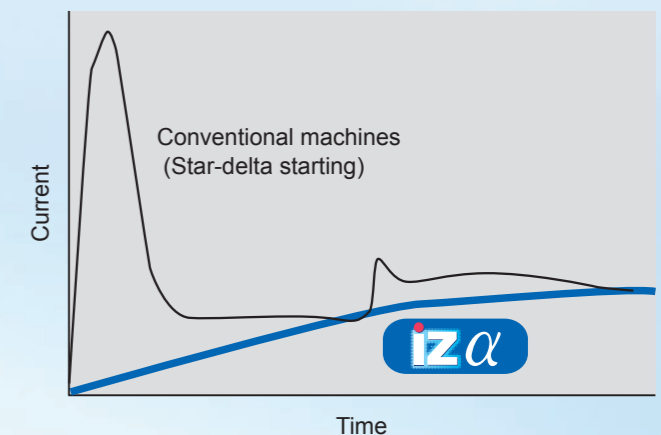
### Compressor protective functions

- Discharge temperature
- Discharge pressure
- Motor temperature
- Oil pressure differential
- Over current

## 4/ Merits of motor start up by inverter drive

### Smooth motor startup by inveter drive eliminates inrush current and hot start

The effect of equipped inverter drive can be found when to startup compressor. Since conventional star-delta startup induces inrush current and requires approx 10 minutes interval before restarting. Thanks to the equipped inverter that allows smooth starting, iZα series can restart quickly without any interval. The smooth starting mechanism permits compressor to stop even in the conventional condition of interruption is not allowed. This mechanism enables more effective energy saving and down sizing of the power facility.



TWO STAGE INVERTER



Water cooled Condensing unit

Standard Specifications (-30 to -65°C)

Item	Unit type	iZa30WII	iZa40WII	iZa50WII	iZa70WII	iZa80WII	iZa90WII	iZa110WII	
Frequency		50/60Hz							
Refrigerant		R404A							
Power source		Main:3 phase 200,220,380,400,415,440,460,480 (50/60Hz) Control circuit:1 phase 200~230V (50/60Hz)							
Number of compressor		1 unit							
Capacity control	*1*2*3	Continuous control mode or step control mode (3 steps: 50%, 75%, and 100%)							
Motor	Nominal output kW	18	24	30	37	45	55	65	
	Type	Water-cooled semi-hermetic; 4-pole; 3-phase induction type							
	Starting method	Inverter							
Condenser	Type	Horizontal shell and tube (serving also as a receiver)							
	Receiver capacity ℓ	35	35	35	58	161	76	76	
	Refrigerant spatial volume ℓ <sup>*4</sup>	91	91	89	145	231	220	220	
Connections	Refrigerant gas inlet	50A	50A	50A	80A	80A	80A	100A	
	Refrigerant liquid outlet	19.05mm	25.4mm	25.4mm	31.8mm	31.8mm	31.8mm	34.9mm	
	Cooling water inlet/outlet	Condenser	Rc 2	Rc 2	Rc 2	Rc 3	Rc 3	Rc 3	Rc 3
		Oil cooler	Oil coolerless specification			Rc 1	Rc 1	Rc 1	Rc 1
	Motor	Rc 1	Rc 1	Rc 1	Rc 1	Rc 1	Rc 1	Rc 1	
Lubricating oil (IDEMITSU Daphne Hermetic Oil FVC32D) ℓ <sup>*5</sup>		10	10	13	14	21	22	29	
Noise dB(A) <sup>*6</sup>		71	73	75	75	75	79	78	
Dimensions W x D x H	mm	1380x1110x1320	1380x1110x1320	1405x1150x1365	1675x1200x1425	2490x1265x1525	2485x1260x1555	2485x1290x1560	
Weight	kg	825	840	885	1245	1460	1485	1825	

Item	Unit type	iZa140WII	iZa160WII	iZa180WII	iZa220WII	iZa280WII	iZa320WII	
Frequency		50/60Hz						
Refrigerant		R404A						
Power source		Main:3 phase 200,220,380,400,415,440,460,480 (50/60Hz) Control circuit:1 phase 200~230V (50/60Hz)						
Number of compressors		1 unit			2 units			
Capacity control	*1*2*3	Continuous control mode or step control mode (3 steps: 50%, 75%, and 100%)						
Motor	Nominal output kW	75	90	55x2	65x2	75x2	90x2	
	Type	Water-cooled semi-hermetic; 4-pole; 3-phase induction type						
	Starting method	Inverter						
Condenser	Type	Horizontal shell and tube (serving also as a receiver)						
	Receiver capacity ℓ	183	183	278	278	398	398	
	Refrigerant spatial volume ℓ <sup>*4</sup>	278	278	434	434	562	562	
Connections	Refrigerant gas inlet	100A	100A	80Ax2	100Ax2	100Ax2	100Ax2	
	Refrigerant liquid outlet	38.1mm	38.1mm	40A	40A	50A	50A	
	Cooling water inlet/outlet	Condenser	Rc 3	Rc 3	Rc 4	Rc 4	150A	150A
		Oil cooler	Rc 1	Rc 1	Rc1x2	Rc1x2	Rc1x2	Rc1x2
	Motor	Rc 1	Rc 1	Rc1x2	Rc1x2	Rc1x2	Rc1x2	
Lubricating oil (IDEMITSU Daphne Hermetic Oil FVC32D) ℓ <sup>*5</sup>		29	53	53	60	84	84	
Noise dB(A) <sup>*6</sup>		79	82	82	81	82	85	
Dimensions W x D x H	mm	3000x1320x1720	3000x1420x1765	3025x1970x1750	3025x2055x1790	2960x2140x1890	2960x2140x1890	
Weight	kg	1930	2020	2710	3300	4380	4440	

\*1: The minimum capacity depends on production range and operation conditions (25%-50%)  
 \*2: Requested to enter proper signal due to selected running mode.  
 \*3: Partial loading value for step control is changeable flexibly.  
 \*4: Condenser spatial volume for refrigerant is calculated by subtracting the volume of the heat exchanger tube from the inside volume of the condenser.  
 \*5: Oil quantity is minimum charge only for condensing unit. Actual oil quantity for whole of the plant (system) should be determined at the site referring the oil level of sight glasses during compressor running. Charge oil on site and replenish when the level gets lower than requested. Use specified refrigerant machine oil (Oil is requested users to supply)  
 \*6: Noise level (scale A) indicates the values measured at 1meter away from the compressor and 1meter above from the floor level when the suction pressure saturated temperature is -40°C without any echo influence. In the actual installed conditions the noise level maybe different from indicated value because of the influence of surrounding noise and echo.  
 • : Hot gas defrost model is available optionally.  
 • : When suction pressure saturated temperature is required below -50°C modification for ultra low temperature with cost up is needed.  
 • : Noise control and harmonic suppression measurement should be taken as necessary according to respective guidelines.  
 • : Electric power for control circuit is requested users to supply.

# WATER COOLED



Cooling capacity(kW)

Refrigerant : R404A

Condensing temperature °C	Saturated temp. at suction press. °C	iZa													
		30WII	40WII	50WII	70WII	80WII	90WII	110WII	140WII	160WII	180WII	220WII	280WII	320WII	
35	-30	37.1	53.3	67.1	77.0	97.4	107.9	128.1	159.0	185.6	215.8	256.2	318.0	371.2	
	-35	34.5	49.2	62.1	71.0	90.0	99.9	118.1	146.7	171.4	199.8	236.2	293.4	342.8	
	-40	31.3	44.9	56.6	63.3	80.3	89.0	105.5	131.3	153.2	178.0	211.0	262.6	306.4	
	-45	27.1	39.1	49.3	54.8	69.6	77.0	91.7	113.8	133.1	154.0	183.4	227.6	266.2	
	-50	22.5	32.8	41.1	45.9	58.5	64.6	77.2	96.3	112.1	129.2	154.4	192.6	224.2	
	-55	18.3	27.3	34.3	37.5	47.7	52.7	63.4	79.0	92.0	105.4	126.8	158.0	184.0	
	-60	14.3	21.9	27.3	29.9	38.0	42.0	51.1	63.6	74.2	84.0	102.2	127.2	148.4	
40	-30	36.5	52.6	66.2	75.8	96.2	106.4	126.1	156.3	182.7	212.8	252.2	312.6	365.4	
	-35	33.9	48.5	61.1	69.9	88.7	98.3	116.2	144.5	169.0	196.6	232.4	289.0	338.0	
	-40	30.5	43.7	55.1	61.6	78.2	86.6	102.8	127.8	149.5	173.2	205.6	255.6	299.0	
	-45	26.3	38.0	47.9	53.2	67.6	74.8	89.2	110.8	129.6	149.6	178.4	221.6	259.2	
	-50	21.9	31.9	39.9	44.6	56.7	62.7	75.3	93.5	109.1	125.4	150.6	187.0	218.2	
	-55	17.7	26.4	33.2	36.2	46.2	51.0	61.6	76.6	89.2	102.0	123.2	153.2	178.4	
	-60	13.8	21.1	26.4	28.9	36.7	40.5	49.5	61.7	71.8	81.0	99.0	123.4	143.6	
	-65	10.5	16.4	20.7	22.2	28.2	30.9	38.8	48.3	55.6	61.8	77.6	96.6	111.2	

\* : This is a case for superheat 0°C and economizer middle stage evaporative temperature +10°C (iZa30WII, 40WII, 50WII case is +5°C)  
 • : Please contact Kobelco in case of using suction pressure saturating temperature is less than -50°C

Power consumption(kW)

Condensing temperature °C	Saturated temp. at suction press. °C	iZa													
		30WII	40WII	50WII	70WII	80WII	90WII	110WII	140WII	160WII	180WII	220WII	280WII	320WII	
35	-30	21.2	28.1	32.9	40.3	50.2	55.3	66.8	82.4	94.9	110.6	133.6	164.8	189.8	
	-35	22.2	30.2	34.2	41.0	51.2	56.2	68.0	83.8	97.4	112.4	136.0	167.6	194.8	
	-40	22.3	29.9	35.0	40.5	50.5	55.7	67.9	84.5	98.9	111.4	135.8	169.0	197.8	
	-45	22.7	30.4	34.8	40.3	50.0	55.4	67.7	83.9	98.5	110.8	135.4	167.8	197.0	
	-50	22.0	29.0	34.0	38.6	48.6	53.6	66.7	82.5	96.7	107.2	133.4	165.0	193.4	
	-55	22.2	29.0	34.3	37.2	46.7	51.5	65.6	80.0	93.5	103.0	131.2	160.0	187.0	
	-60	21.4	27.7	31.7	36.1	45.2	49.8	63.8	77.5	90.3	99.6	127.6	155.0	180.6	
40	-30	22.6	30.3	35.0	43.0	54.1	58.8	69.7	86.0	100.6	117.6	139.4	172.0	201.2	
	-35	23.8	32.1	36.3	43.9	54.3	59.7	70.7	88.2	102.5	119.4	141.4	176.4	205.0	
	-40	23.9	31.9	37.1	43.5	53.8	59.1	71.6	89.0	104.4	118.2	143.2	178.0	208.8	
	-45	24.5	32.7	37.2	43.4	53.2	58.5	71.1	88.2	103.9	117.0	142.2	176.4	207.8	
	-50	23.7	31.1	36.2	41.5	52.0	57.0	70.3	86.7	101.7	114.0	140.6	173.4	203.4	
	-55	23.9	31.4	36.7	40.1	49.5	55.1	69.1	83.9	98.2	110.2	138.2	167.8	196.4	
	-60	23.1	29.6	34.3	38.9	48.3	53.8	67.4	81.8	95.0	107.6	134.8	163.6	190.0	
	-65	23.2	29.8	32.4	37.4	46.1	50.6	65.0	79.5	91.0	101.2	130.0	159.0	182.0	



TWO STAGE INVERTER



Receiver unit

Standard Specifications (-30 to -65°C)

Item	Unit type									
	iZα30ARIII	iZα40ARIII	iZα50ARIII	iZα70ARIII	iZα90ARIII	iZα140ARIII	iZα180ARIII	iZα280ARIII		
Frequency	50/60Hz									
Refrigerant	R404A									
Power source	Main:3 phase 200,220,380,400,415,440,460,480 (50/60Hz) Control circuit:1 phase 200~230V (50/60Hz)									
Number of compressor	1 unit				2 units					
Capacity control	*1*2*3 Continuous control mode or step control mode (3 steps: 50%, 75%, and 100%)									
Motor	Nominal output kW	18	24	30	37	55	75	55x2	75x2	
	Type	semi-hermetic; 4-pole; 3-phase induction type								
	Starting method	Inverter								
Receiver capacity ℓ	76	109	109	177	235	380	504	599		
Connections	Refrigerant gas inlet (suction)	50A	50A	50A	80A	80A	100A	80Ax2	100Ax2	
	Refrigerant gas outlet (discharge)	25A	25A	32A	32A	40A	50A	65A	80A	
	Refrigerant liquid inlet (return)	25.4mm	31.8mm	31.8mm	38.1mm	38.1mm	50A	65A	80A	
	Refrigerant liquid outlet	19.05mm	25.4mm	25.4mm	31.8mm	31.8mm	38.1mm	40A	50A	
Lubricating oil (IDEMITSU Daphne Hermetic Oil FVC32D) ℓ*4	10	10	13	13	19	25	47	75		
Noise dB(A)*5	71	73	75	75	79	79	82	82		
Dimensions W x D x H mm	1650x1085x1170	2235x1155x1275	2235x1165x1275	2095x1305x1510	2205x1305x1510	3105x1330x1720	2810x1980x1645	3300x2150x1885		
Weight kg	795	830	895	1130	1230	1560	2210	3280		

\*1: The minimum capacity depends on production range and operation conditions (25%-50%)  
 \*2: Requested to enter proper signal due to selected running mode.  
 \*3: Partial loading value for step control is changeable flexibly.  
 \*4: Oil quantity is minimum charge only for condensing unit. Actual oil quantity for whole of the plant (system) should be determined at the site referring the oil level of sight glasses during compressor running. Charge oil on site and replenish when the level gets lower than requested. Use specified refrigerant machine oil (Oil is requested users to supply)  
 \*5: Noise (scale A) indicates the values measured at 1 meter away from the compressor and 1 meter above from the floor level when the suction pressure saturated temperature is -40°C without any echo influence. In the actual installed conditions the noise level maybe different from indicated value because of the influence of surrounding noise and echo.  
 \* : When suction pressure saturated temperature is required below -50°C modification for ultra low temperature with cost up is needed.  
 \* : Noise control and harmonic suppression measurement should be taken as necessary according to respective guidelines.  
 \* : Electric power for control circuit is requested users to supply.

Cooling capacity(kW)

Refrigerant : R404A

Condensing temperature °C	Saturated temp. at suction press. °C	Refrigerant : R404A							
		iZα30ARIII	iZα40ARIII	iZα50ARIII	iZα70ARIII	iZα90ARIII	iZα140ARIII	iZα180ARIII	iZα280ARIII
35	-30	43.8	53.8	71.8	84.2	108.2	151.5	216.4	303.0
	-35	40.5	49.6	66.6	77.0	99.8	139.1	199.6	278.3
	-40	36.7	44.8	60.7	68.2	88.2	123.7	176.4	247.4
	-45	31.7	38.8	51.2	57.9	76.0	106.7	151.9	213.5
	-50	26.4	32.5	41.3	48.0	63.6	89.7	127.1	179.4
	-55	20.8	26.6	33.3	37.7	50.5	73.3	101.1	146.7
	-60	15.8	20.8	25.4	28.8	39.1	58.1	78.1	116.3
40	-30	41.1	53.0	70.6	82.8	106.3	149.0	212.6	298.1
	-35	37.7	48.7	65.3	75.6	98.0	136.8	195.9	273.5
	-40	34.0	44.0	59.6	66.9	86.5	121.4	173.0	242.9
	-45	29.1	38.0	50.1	56.8	74.4	104.8	148.9	209.7
	-50	24.1	31.8	40.5	46.8	62.2	88.0	124.4	176.0
	-55	18.9	25.9	32.5	36.8	49.4	71.9	98.8	143.7
	-60	14.1	20.2	24.7	28.0	38.0	56.9	75.9	113.9
45	-30	39.5	51.0	67.9	79.6	102.3	143.6	204.6	287.1
	-35	36.4	47.0	63.1	72.9	94.5	132.2	189.0	264.3
	-40	32.9	42.5	57.6	64.7	83.7	117.7	167.3	235.4
	-45	28.2	36.8	48.6	55.0	72.1	101.8	144.2	203.6
	-50	23.4	30.7	39.2	45.3	60.2	85.4	120.4	170.9
	-55	18.2	25.0	31.4	35.5	47.7	69.7	95.3	139.3
	-60	13.5	19.3	23.7	26.9	36.4	54.9	72.7	109.8
50	-30	37.8	49.3	66.2	78.0	101.7	143.0	204.0	286.5
	-35	34.7	45.2	62.1	73.9	97.6	136.0	195.0	271.5
	-40	31.6	41.1	57.0	68.8	93.5	130.0	188.0	261.5
	-45	28.5	37.0	52.9	64.7	89.4	125.0	181.0	251.5
	-50	25.4	32.9	48.8	60.7	85.3	120.0	176.0	241.5
	-55	22.3	28.8	44.7	56.6	81.2	115.0	171.0	231.5
	-60	19.2	24.7	40.6	52.5	77.1	110.0	166.0	221.5

\* : This is a case for superheat 0°C and economizer middle stage evaporative temperature +10°C (iZα30ARIII, 40ARIII, 50ARIII case is +5°C)  
 \* : Please contact Kobelco in case of using suction pressure saturating temperature is less than -50°C

Power consumption(kW)

Condensing temperature °C	Saturated temp. at suction press. °C	Refrigerant : R404A							
		iZα30ARIII	iZα40ARIII	iZα50ARIII	iZα70ARIII	iZα90ARIII	iZα140ARIII	iZα180ARIII	iZα280ARIII
35	-30	25.9	30.7	37.8	47.8	59.6	84.9	119.2	169.7
	-35	27.1	33.3	40.0	48.7	61.3	86.7	122.6	173.5
	-40	27.5	33.2	41.4	48.6	60.9	88.3	121.8	176.6
	-45	33.8	33.8	40.3	47.7	60.9	87.7	121.9	175.4
	-50	27.2	32.4	38.5	45.5	59.3	86.6	118.6	173.3
	-55	37.8	32.2	37.8	42.7	56.1	84.4	112.3	168.8
	-60	25.2	30.5	34.1	40.4	53.6	82.2	107.2	164.3
40	-30	27.9	33.5	40.6	51.5	64.0	89.4	128.0	178.9
	-35	29.3	35.7	42.9	52.6	65.7	92.2	131.5	184.3
	-40	29.9	35.9	44.6	52.9	65.6	94.3	131.1	188.7
	-45	30.4	36.7	43.5	51.9	65.0	93.1	129.9	186.1
	-50	29.6	35.1	41.3	49.4	63.7	91.9	127.3	183.8
	-55	29.2	35.3	40.9	46.6	60.6	89.4	121.2	178.7
	-60	27.4	32.9	37.3	44.0	58.4	87.5	116.9	175.1
45	-30	29.8	35.8	43.5	55.1	68.5	95.7	137.0	191.4
	-35	31.5	38.4	46.1	56.6	70.3	98.6	140.7	197.2
	-40	32.5	39.2	48.6	57.7	70.5	100.9	141.0	201.9
	-45	33.3	40.2	47.6	56.8	70.2	100.5	140.3	201.0
	-50	32.6	38.6	45.5	54.3	69.4	100.2	138.8	200.3
	-55	32.1	38.9	44.9	51.3	66.1	97.9	132.2	195.7
	-60	29.9	35.9	40.6	47.9	63.7	95.8	127.4	191.7
50	-30	28.2	34.2	42.1	53.7	67.1	94.1	135.0	195.0
	-35	29.9	36.9	45.8	57.4	70.8	97.8	138.7	201.7
	-40	30.9	37.9	46.8	58.4	71.8	98.8	139.7	202.7
	-45	31.9	38.9	47.8	59.4	72.8	99.8	140.7	203.7
	-50	32.9	39.9	48.8	60.4	73.8	100.8	141.7	204.7
	-55	33.9	40.9	49.8	61.4	74.8	101.8	142.7	205.7
	-60	34.9	41.9	50.8	62.4	75.8	102.8	143.7	206.7

TWO STAGE STANDARD **SHα**SERIES Water cooled Condensing unit

Standard Specifications (-30 to -65°C)

Item	Unit type	SHα15F	SHα22F	SHα37F	SHα55F
Frequency		50/60Hz			
Refrigerant		R404A			
Power source		Main: 3 phase 200/200•220,380,400/400•440(50/60Hz) Control circuit:1 phase 200~230V (50/60Hz)			
Number of compressor		1 unit			
Capacity control	%	50%, 100%			
Motor	Nominal output kW	15	22	37	55
	Type	Water-cooled semi-hermetic; 2-pole; 3-phase induction type			
	Starting method	Star-delta			
Condenser	Type	Horizontal shell and tube (serving also as a receiver)			
	Receiver capacity ℓ	35	49	154	171
	Refrigerant spatial volume ℓ*1	91	117	221	258
Connections	Refrigerant gas inlet	40A	50A	65A	80A
	Refrigerant liquid outlet	19.05mm	25.4mm	31.8mm	31.8mm
	Cooling water inlet/outlet	Rc 2	Rc 3	Rc 3	Rc 3
Noise	Condenser	Rc 1	Rc 1	Rc 1	Rc 1
	Oil cooler	Rc 1	Rc 1	Rc 1	Rc 1
	Motor	Rc 1	Rc 1	Rc 1	Rc 1
Lubricating oil (IDEMITSU Daphne Hermetic Oil FVC32D) ℓ*2		10	13	21	27
Noise dB(A)*3		70	72	75	76
Dimensions W x D x H mm		1340x845x1320	1480x985x1430	2525x1050x1505	2850x1170x1595
Weight kg		680	890	1210	1690

\*1: Water cooled condenser spatial volume is calculated by subtracting the volume of the heat exchanger tube from the inside volume of the condenser.  
 \*2: Oil quantity is minimum charge only for condensing unit. Actual oil quantity for whole of the plant (system) should be determined at the site referring the oil level of sight glasses during compressor running. Charge oil on site and replenish when the level gets lower than requested. Use specified refrigerant machine oil (Oil is requested users to supply)  
 \*3: Water cooled type noise (scale A) indicates the values measured at 1 meter away from the compressor and 1 meter above from the floor level when the suction pressure saturated temperature is -40°C without any echo influence. In the actual installed conditions the noise level maybe different from indicated value because of the influence of surrounding noise and echo.  
 \* : Hot gas defrost model is available optionally.  
 \* : When suction pressure saturated temperature is required below -50°C modification for ultra low temperature with cost up is needed.  
 \* : Noise control and harmonic suppression measurement should be taken as necessary according to respective guidelines.  
 \* : Electric power for control circuit is requested users to supply.  
 \* : Gauges for suction and discharge gas temperature are optional.

Cooling capacity(kW)

Refrigerant : R404A

Condensing temperature °C	Saturated temp. at suction press. °C	SHα15F		SHα22F		SHα37F		SHα55F	
		50Hz	60Hz	50Hz	60Hz	50Hz	60Hz	50Hz	60Hz
35	-30	25.3	30.3	43.7	52.4	73.6	88.3	101.9	122.2
	-35	21.3	25.5	36.5	43.8	61.4	73.7	85.0	102.0
	-40	17.8	21.4	30.7	36.9	50.8	61.0	70.3	84.4
	-45	14.8	17.8	25.4	30.5	41.3	49.5	57.2	68.5
	-50	12.0	14.4	20.6	24.7	33.0	39.6	45.7	54.8
	-55	9.5	11.4	16.5	19.8	25.8	31.0	35.7	42.9
	-60	7.2	8.6	12.9	15.5	19.9	23.9	27.5	33.1
40	-30	24.3	29.2	41.9	50.3	72.1	86.5	99.8	119.7
	-35	20.3	24.4	35.2	42.2	60.1	72.1	83.2	99.8
	-40	17.2	20.6	29.6	35.5	49.5	59.4	68.5	82.2
	-45	14.3	17.1	24.3	29.2	40.2	48.2	55.6	66.7
	-50	11.5	13.8	19.8	23.7	31.8	38.2	44.0	52.9
	-55	9.1	10.9	15.8	19.0	25.0	30.0	34.6	41.5
	-60	6.9	8.3	12.5	15.0	19.1	22.9	26.4	31.7
45	-30	23.3	28.2	40.9	49.3	70.5	84.9	98.2	118.1
	-35	19.3	23.4	34.2	41.5	59.3	71.3	82.4	98.4
	-40	16.2	19.6	28.6	34.5	48.3	58.2	67.3	81.0
	-45	13.5	16.2	23.0	27.6	38.0	45.6	52.6	63.1
	-50	10.8	13.0	18.6	22.3	29.9	35.9	41.4	49.8
	-55	8.5	10.2	14.8	17.8	23.5	28.2	32.5	39.0
	-60	6.4	7.7	11.5	13.8	17.6	21.1	24.4	29.3

\* : This is a case for superheat 0°C and economizer middle stage evaporative temperature +10°C

Power consumption(kW)

Condensing temperature °C	Saturated temp. at suction press. °C	SHα15F		SHα22F		SHα37F		SHα55F	
		50Hz	60Hz	50Hz	60Hz	50Hz	60Hz	50Hz	60Hz
35	-30	16.5	19.8	24.3	29.1	37.2	44.6	51.5	61.7
	-35	15.5	18.6	22.8	27.3	34.2	41.0	47.3	56.7
	-40	14.6	17.5	21.3	25.6	31.9	38.3	44.2	53.0
	-45	13.8	16.5	20.1	24.1	29.7	35.6	41.1	49.3
	-50	12.9	15.5	18.8	22.6	27.9	33.5	38.6	46.4
	-55	12.3	14.7	17.8	21.4	26.2	31.4	36.3	43.5
	-60	11.6	13.9	16.9	20.3	24.6	29.5	34.0	40.8
40	-30	18.0	21.6	26.3	31.6	39.5	47.4	54.7	65.6
	-35	17.0	20.4	24.8	29.8	36.3	43.6	50.2	60.3
	-40	16.1	19.3	23.4	28.1	33.9	40.7	46.9	56.3
	-45	15.2	18.2	22.2	26.6	31.7	38.0	43.9	52.6
	-50	14.3	17.2	20.9	25.1	29.8	35.8	41.2	49.5
	-55	13.5	16.2	19.8	23.7	28.1	33.7	38.9	46.6
	-60	12.8	15.3	18.7	22.4	26.5	31.8	36.7	44.0
45	-30	17.1	20.7	25.4	30.7	38.6	46.5	53.8	64.7
	-35	16.1	19.3	23.5	28.2	33.6	40.3	46.5	55.8
	-40	15.2	18.3	22.3	26.7	30.2	36.1	42.0	50.1
	-45	14.3	17.2	20.9	25.1	29.8	35.8	41.2	49.5
	-50	13.5	16.2	19.8	23.7	28.1	33.7	38.9	46.6
	-55	12.8	15.3	18.7	22.4	26.5	31.8	36.7	44.0
	-60	12.1	14.5	17.7	21.2	25.0	30.0	34.6	41.5

TWO STAGE STANDARD **SHα**SERIES Receiver unit

Standard Specifications (-30 to -65°C)

Item	Unit type	SHα15FAR	SHα22FAR	SHα37FAR	SHα55FAR
Frequency		50/60Hz			
Refrigerant		R404A			
Power source		Main: 3 phase 200/200•220,380,400/400•440(50/60Hz) Control circuit:1 phase 200~230V (50/60Hz)			
Number of compressor		1 unit			
Capacity control	%	50% 100%			
Motor	Nominal output kW	15	22	37	55
	Type	Semi-hermetic; 2-pole; 3-phase induction type			
	Starting method	Star-delta			
Receiver capacity	Type	Horizontal shell and tube (serving also as a receiver)			
	Receiver capacity ℓ	76	109	198	265
	Refrigerant gas inlet (suction)	40A	50A	65A	80A
Connections	Refrigerant gas outlet (discharge)	25A	32A	40A	50A
	Refrigerant liquid inlet (return)	25.4mm	31.8mm	38.1mm	38.1mm
	Refrigerant liquid outlet	19.05mm	25.4mm	31.8mm	31.8mm
Lubricating oil (IDEMITSU Daphne Hermetic Oil FVC32D) ℓ*1		8	12	19	19
Noise dB(A)*2		70	72	75	76
Dimensions W x D x H mm		1685x845x1125	2235x940x1245	1795x1100x1475	2300x1145x1515
Weight kg		600	715	955	1285

\*1: Oil quantity is minimum charge only for condensing unit. Actual oil quantity for whole of the plant (system) should be determined at the site referring the oil level of sight glasses during compressor running. Charge oil on site and replenish when the level gets lower than requested. Use specified refrigerant machine oil (Oil is requested users to supply)  
 \*2: Receiver unit cooled type noise (scale A) indicates the values measured at 1 meter away from the compressor and 1 meter above from the floor level when the suction pressure saturated temperature is -40°C without any echo influence. In the actual installed conditions the noise level maybe different from indicated value because of the influence of surrounding noise and echo.  
 \* : When suction pressure saturated temperature is required below -50°C modification for ultra low temperature with cost up is needed.  
 \* : Noise control and harmonic suppression measurement should be taken as necessary according to respective guidelines.  
 \* : Electric power for control circuit is requested users to supply.  
 \* : Gauges for suction and discharge gas temperature are optional.

Cooling capacity(kW)

Condensing temperature °C	Saturated temp. at suction press. °C	SHα15FAR		SHα22FAR		SHα37FAR		SHα55FAR	
		50Hz	60Hz	50Hz	60Hz	50Hz	60Hz	50Hz	60Hz
35	-30	24.2	28.9	41.7	50.1	70.3	84.3	97.3	116.7
	-35	20.2	24.2	34.7	41.6	58.3	70.0	80.7	96.9
	-40	16.8	20.2	29.0	34.8	47.9	57.6	66.3	79.6
	-45	13.9	16.7	23.8	28.6	38.7	46.4	53.6	64.2
	-50	11.2	13.5	19.3	23.1	30.9	37.1	42.8	51.3
	-55	8.8	10.6	15.3	18.4	24.0	28.8	33.2	39.9
	-60	6.6	7.9	11.8	14.2	18.2	21.9	25.2	30.3
40	-30	23.2	27.8	39.9	48.0	68.7	82.5	95.2	114.1
	-35	19.2	23.1	33.3	40.0	56.9	68.3	78.8	94.5
	-40	16.4	19.6	28.1	33.8	47.1	56.5	65.1	78.2
	-45	13.5	16.2	23.0	27.6	38.0	45.6	52.6	63.1
	-50	10.8	13.0	18.6	22.3	29.9	35.9	41.4	49.8
	-55	8.5	10.2	14.8	17.8	23.5	28.2	32.5	39.0
	-60	6.4	7.7	11.5	13.8	17.6	21.1	24.4	29.3
45	-30	22.3	26.8	37.8	45.4	65.0	78.0	90.0	108.0
	-35	18.5	22.3	31.5	37.8	53.8	64.6	74.5	89.4
	-40	15.8	18.9	26.6	31.9	44.5	53.4	61.6	73.9
	-45	13.1	15.7	21.8	26.1	36.0	43.2	49.8	59.7
	-50	10.5	12.6	17.6	21.1	28.3	34.0	39.2	47.1
	-55	8.2	9.9	14.0	16.9	22.2	26.6	30.7	36.9
	-60	6.1	7.3	10.9	13.1	16.7	20.0	23.1	27.7

\* : This is a case for superheat 0°C and economizer middle stage evaporative temperature +10°C

Power consumption(kW)

Condensing temperature °C	Saturated temp. at suction press. °C	SHα15FAR		SHα22FAR		SHα37FAR		SHα55FAR	
		50Hz	60Hz	50Hz	60Hz	50Hz	60Hz	50Hz	60Hz
35	-30	17.1	20.5	25.2	30.1	38.5	46.2	53.3	63.9
	-35	16.1	19.3	23.7	28.4	35.6	42.6	49.2	59.0
	-40	15.3	18.4	22.4	26.9	33.5	40.2	46.4	55.7
	-45	14.5	17.3	21.1	25.3	31.2	37.4	43.2	51.8
	-50	13.6	16.4	19.8	23.8	29.4	35.3	40.7	49.0
	-55	13.0	15.6	18.9	22.7	27.8	33.3	38.5	46.1
	-60	12.4	14.8	18.0	21.6	26.2	31.4	36.2	43.5
40	-30	18.8	22.6	27.5	33.0	41.3	49.5	57.2	68.6
	-35	17.9	21.4	26.0	31.3	38.1	45.8	52.7	63.3
	-40	17.1	20.6	24.9	29.9	36.1	43.3	49.9	60.0
	-45	16.1	19.3	23.5	28.2	33.6	40.3	46.5	55.8
	-50	15.2	18.3	22.3	26.7	30.2	36.1	42.0	50.1
	-55	14.3	17.2	20.9	25.1	29.8	35.8	41.2	49.5
	-60	13.5	16.2	19.8	23.7	28.1	33.7	38.9	46.6
45	-30	20.1	24.2	29.4	35.3	44.2	53.0	61.2	73.4
	-35	19.2	23.0	28.0	33.6	41.0	49.2	56.7	68.1
	-40	18.7	22.4	27.2	32.6	39.4	47.3	54.5	65.4
	-45	17.6	21.1	25.8	30.9	36.8	44.1	51.0	61.1
	-50	16.8	20.2	24.5	29.4	34.9	41.9	48.3	58.0

SINGLE STAGE INVERTER **IZS SERIES** Water cooled Condensing unit

Standard Specifications (0 to -40°C)

Item	Unit type	iZS100W	iZS130W	iZS160W	iZS220W	iZS260W
Refrigerant		R404A				
Power source (50/60Hz)		Main:3 phase 200,220,380,400,415,440,460,480 (50/60Hz) Control circuit:1 phase 200~230V (50/60Hz)				
Capacity control	*1~*2~*3	Continuous control mode or step control mode (3 steps: 50%, 75%, and 100%)				
Motor	Nominal output kW	30	37	45	55	75
	Type	Semi-hermetic; 4-pole; 3-phase induction type				
Condenser	Starting method	Inverter				
	Type	Horizontal shell and tube (serving also as a receiver)				
	Receiver capacity ℓ	43	68	52	107	87
Connections	Refrigerant spatial volume ℓ <sup>*4</sup>	143	193	180	289	280
	Refrigerant gas inlet	50A	65A	65A	80A	80A
Connections	Refrigerant liquid outlet	31.8mm	38.1mm	38.1mm	40A	40A
	Cooling water inlet/outlet (Condenser)	Rc 3			JIS10K-125A	
Lubricating oil (IDEMITSU Daphne Hermetic Oil FVC32D) ℓ <sup>*5</sup>		18	23	23	39	39
Noise dB(A) <sup>*6</sup>		72	73	79	82	83
Dimensions W x D x H mm		2225x915x1455	2250x960x1505	2250x1045x1505	2745x1165x1645	
Weight kg		985	1030	1090	1475	1515

\*1: The minimum capacity depends on production range and operation conditions  
 \*2: Requested to enter proper signal due to selected running mode.  
 \*3: Partial loading value for step control is changeable flexibly.  
 \*4: Condenser spatial volume for refrigerant is calculated by subtracting the volume of the heat exchanger tube from the inside volume of the condenser.  
 \*5: Oil quantity is minimum charge only for condensing unit. Actual oil quantity for whole of the plant (system) should be determined at the site referring the oil level of sight glasses during compressor running. Charge oil on site and replenish when the level gets lower than requested. Use specified refrigerant machine oil (Oil is requested users to supply)  
 \*6: Noise level (scale A) indicates the values measured at 1meter away from the compressor and 1meter above from the floor level when the suction pressure saturated temperature is -15°C without any echo influence. In the actual installed conditions the noise level maybe different from indicated value because of the influence of surrounding noise and echo.  
 \* : Hot gas defrost model is available optionally.  
 \* : Noise control and harmonic suppression measurement should be taken as necessary according to respective guidelines.

Cooling capacity(kW)

Condensing temperature °C	Saturated temp. at suction press. °C	iZS100W	iZS130W	iZS160W	iZS220W	iZS260W
35	0	120.8	151.4	189.3	260.0	315.3
	-5	108.3	135.7	169.6	230.4	279.4
	-10	96.8	121.3	151.6	204.2	247.7
	-15	84.7	106.2	132.7	176.7	214.3
	-20	73.8	92.4	115.5	152.1	184.3
	-25	63.2	79.2	99.0	129.0	156.4
	-30	52.1	65.3	81.7	107.2	130.1
	-35	42.3	53.1	65.5	86.5	104.8
	-40	33.2	41.1	48.8	68.7	83.2
40	0	117.3	147.0	183.8	252.4	306.1
	-5	104.5	131.0	163.7	222.4	269.7
	-10	92.9	116.4	145.5	196.0	237.7
	-15	80.8	101.3	126.6	168.6	204.5
	-20	70.0	87.7	109.6	144.3	174.9
	-25	59.6	74.7	93.4	121.7	147.5
	-30	48.9	61.3	76.6	100.6	122.0
	-35	39.5	49.5	61.1	80.7	97.8
	-40	30.8	38.1	45.3	63.7	77.2

\* : This is a case for superheat 0°C and economizer middle stage evaporative temperature +5°C

Power consumption(kW)

Condensing temperature °C	Saturated temp. at suction press. °C	iZS100W	iZS130W	iZS160W	iZS220W	iZS260W
35	0	29.3	35.6	43.5	58.5	71.1
	-5	30.0	36.4	44.4	59.5	72.4
	-10	30.6	37.2	45.2	60.3	73.7
	-15	31.0	37.5	45.7	60.8	74.1
	-20	31.4	38.1	46.4	60.9	74.5
	-25	31.8	38.4	46.8	61.1	74.8
	-30	31.9	38.5	47.1	61.0	74.8
	-35	32.2	38.7	47.0	59.9	73.6
	-40	32.6	38.5	45.1	58.9	72.2
40	0	33.3	40.4	49.4	66.5	80.8
	-5	34.1	41.4	50.5	67.6	82.3
	-10	34.8	42.3	51.4	68.5	83.7
	-15	35.2	42.6	51.9	69.1	84.2
	-20	35.7	43.3	52.7	69.2	84.7
	-25	36.1	43.6	53.2	69.4	85.0
	-30	36.2	43.8	53.5	69.3	85.0
	-35	36.6	44.0	53.4	68.1	83.6
	-40	37.0	43.8	51.3	66.9	82.1

About Maintenance

The Importance of Preventative Maintenance and Inspection

Regular maintenance can keep your compressor **“safe”** and **“trouble-free”**, and will provide you **“peace of mind”** throughout your ownership.

Neglecting regular maintenance can increase running cost and degrade the cooling performance. It might also cause failure and damage, eventually it might increase the cost of replacing defective parts. Please refer this booklet for your future ownership

[Maintenance Checklist]

Maintenance plan is scheduled according to the actual operation time or the time mesured from the delivered date, whichever comes first. Warranties do not cover regular maintenance.

Inspection Parts	every 3,000 hrs / 6 months	every 6,000 hrs / 1 year	every 12,000 hrs / 2 years	every 24,000 hrs / 4 years	Remarks
Operating check	Pressure sensor		Inspection / Replacement		Inverter
	Temperature sensor		Inspection / Replacement		Inverter
	Controller monitor		Inspection		Inverter
	Safety valve *1		Inspection		Common
	High pressure limit switch *1		Inspection		Common
	Pressure gauge		Inspection / Replacement		Fixed Speed Drive
	Temperature gauge		Inspection / Replacement		Fixed Speed Drive
	Oil pressure relay		Inspection		Fixed Speed Drive
	Dis. temperature monitoring relay		Inspection		Fixed Speed Drive
Element	Suction filter element *2	Inspection / Cleaning			
	Oil filter element *3	Inspection / Replacement			
Refrigeration Oil		*4 Inspection / Replacement		Replacement	
Dryer		Replacement			
Compressor Overhaul	Bearing				Replacement
	O-ring				Replacement
	Rotor *5				Replacement
Main Inverter	Cooling Fan *5		Inspection	Replacement	Inverter
Monitor	Battery			Replacement	Inverter

Water Cooled Condensing Unit \*6

Inspection Parts	every 3,000 hrs / 6 months	every 6,000 hrs / 1 year	every 12,000 hrs / 2 years	every 24,000 hrs / 4 years	Remarks
Cooling Tube	Condenser		Cleaning		Inverter
	Oil Cooling Unit		Cleaning		Inverter

\*1: Safety valve and high pressure limit switch are required annual operating check.  
 \*2: The defective suction filter element should be replaced or cleaned up after inspection.  
 \*3: Oil filter element should be replaced in advance in case that pressure drop (discharge pres. minus supplied oil pres.) gets higher than 0.25MPa.  
 \*4: Refrigeration oil needs to be checked regularly and changed frequently according to the safety guideline.  
 \*5: If any irregularities are found during inspection, they should be replaced.  
 \*6: We suggest to analyze the cooling water quality every year.



About Maintenance

The Importance of the Oil Replacement

Oil is injected to screw compressor for the compression process. **Three Key Functions** of Lubricant Oil.



Oil and Oil Filter Element should be changed regularly

Oil repeats the procedure of being injected in the screw compressor, where it is mixed with refrigerant then comes out together to oil separator, where they are separated into oil and refrigerant again and come back to compressor. While repeating this cycle, oil keeps itself at high temperature for a long period and it would cause failures and problems such as starts damaging, clogging oil filter and making sludge, eventually losing its original functions.

**DO NOT MIX other brands/grades oil. It would cause serious damages.**  
**Only use KOBELCO specified lubricants, and Kobelco genuine oil filter element.**



About Maintenance

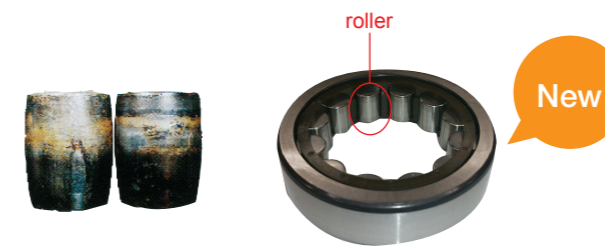
Compressor Overhauling

The screw compressor unit is the heart of the whole refrigeration compressor unit. Recommend **regular overhaul** performed by KOBELCO professional staff.

Kobelco compressor unit is constructed with major components such as screw rotors, bearings, motor and casings. The overhaul work includes replacement of bearings, o-rings and other deteriorated items, check-out rotors and casings and refresh them.

Bearing Replacement

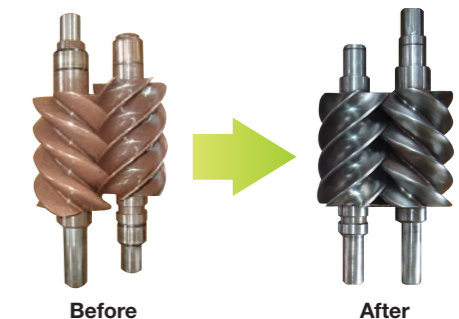
In order to prevent serious trouble such as making abnormal sounds and vibration or fatal damage, preventative maintenance should be performed. In addition, it helps to reduce its cost and to maintain the original performance of compressor.



Damaged rollers of bearing due to insufficient lubricant.

Screw Rotor Overhaul

Screw rotors are rotating at high speed in clearance of less than 0.3 mm to each other. Therefore foreign materials contained in the lubricant would cause damage on surface of the rotors. Major services of the overhaul are polishing the surface of rotor and adjust clearance value to make sure them rotate with good condition.



[Two stage Compressor]

