KOBE STEEL GROUP

Kobelco's Service Network

KOBELO NET WORK
Kobelco has set up a sales/service network around the world to meet customers' requirements more efficiently. This network can provide various services from daily technical support to technology proposals.
Our sales and service staff carefully listen to customers' opinions, and transfer them to technology departments to guide development of Kobelco's compressors. We also provide useful advice to our customers with the most suitable and the highest quality compressors.

Heart to Heart
our way of saying that we view things from our customer's perspective. Through this market-oriented approach to doing business, we want to contribute to society.

Specifications and descriptions herein may change without notice.

ERD-AG-01 SH01312
Core technology of Kobelco, Crystallized technology for many years, Powerful guarantee of air quality!

High quality products need high quality process technology, especially for compressed high quality air is very important throughout the manufacturing process. End products will be affected by the oil in compressed air.
Emeraude series oil free screw compressors are crystals of Kobelco’s 100 plus years experiences for compressor research and technology, to offer you 100% oil free compressed air.

**Absolute oil free, clean compressed air**
Kobelco proprietary design and manufactures. No oil in compression chamber results in 100% oil free air.
Kobelco’s RoD (Rotary Diaphragm) design provides stainless steel sealing rings in the seals to avoid producing carbon powder.

**2 vent holes**
Kobelco propriety 2 vent holes combination to avoid oil entering compression chamber through seals even the compressor has been running unattended for a long time.

**State-of-the-art Airend from Japan**
Emeraude series adopts Kobelco’s latest airds imported from Japan, to ensure high quality and high performance.

**High efficient 2 stages compression**
2 stages compression results in lower specific power, higher cooling effect, and decreased pressure drop. Its performance improves 5%~10%.

**Emeraude**
Emeraude is derived from French language meaning Emerald. It represents gorgeous, eternal and brilliant. We choose it as this series name to stand for Kobelco’s advanced technology in oil free compressor.

- **FE15~55A**
- **FE37~55AV**
- **ALE45A/W~400W**
- **ALE75A/W~250WV**

- **High efficiency and energy saving**
  2 stages compression results in lower specific power.
  V inverter model adopts Internal Permanent Magnet motor.
  Kobelco patent – Energy Saving Logic.

- **Optimized controller**
  Function-rich ITCS controller facilitates operation and saves time.
  2 machines can coordinate running by simply connecting them with wires.
  Multiple units coordination can be achieved by a group controller.

- **Thermosetting coating**
  There are supreme thermosetting coatings on the surfaces of screws and housing inner wall, to prevent corrosion, as well as reducing internal leakage by reducing clearance.

- **Low noise**
  Lower pulsation noise, improve tone quality.

- **Proven reliable technology**
  Kobelco has been innovating the best compressed air solution for customers since it produced Japan’s first oil free screw compressor in 1956.

- **Easy maintenance**
  Simple maintenance with long time intervals.

- **Environment friendly**
  There is an oil mist filter to keep your factory clean when release pressure in the gearbox.
**Inverter Drive, the Perfect High Efficiency and Energy Saving!**

It combines advanced motor and inverter technologies by adopting the latest Internal Permanent Magnet motor and high efficient inverter. It represents excellent reliability and energy saving.

### Reduce energy consumption by optimized capacity and constant pressure controls

Kobelco's unique inverter and Energy Saving Logic control can optimize energy saving effect, no matter how the load condition of it is. They can trace the pressure changes quickly and maintain the pressure fluctuation within ±0.01MPa, and supply necessary air volume by optimized power.

- **Inverter control**
  - Regulated motor speed
  - Optimized capacity control
  - Constant pressure control
  - Perfectly control energy consumption

### Energy saving by constant pressure control

Pressure fluctuation can be controlled within ±0.01MPa,

- **F.V. model**
  - Energy saving effect (Energy saving Logic)
  - Old model

### Regulate flow capacity by changing rotating speed

- **Energy saving characteristics**

### Energy saving sample (37AV compare with old model)

#### Internal Permanent Magnet motor as a standard configuration

It has a much better efficiency than standard and premiuim induction motors. In addition, it has a better energy saving effect by adopting high efficient inverter compared to previous inverter.

- Motor maintenance workload is reduced by prolonged re-grease interval because IPM motor has a low bearing temperature.

#### Soft start of inverter

Reduce starting current and torque to realize steady soft startup, as well as lower electrical devices cost.

- **Starting current**

#### Combined efficiency

- **Kobelco V (IPM + induction inverter)**
  - General V (induction motor + inverter)

#### Other characteristics

High frequency reactor is a standard configuration to filter out high frequency harmonics produced by inverter (according to JEMA high frequency harmonics suppression directive).

- Forced cooling on inverter prevents trip at high temperature in summer.
- Coating on electronic panel can resist dust and moisture effectively and endurably.

#### Wide Range Control

Expand flow capacity range in low pressure to increase its maximum capacity, as well as supply optimized solution for energy saving.

- Transfer the method from benchmarking to utilization.

- **Flow capacity changes under Wide Range control for FE37AV**
  - Discharge pressure (bar)
  - Capacity (m³/min)
  - Added flow capacity (%)

#### Energy saving by adopting small models

Customer needs capacity of 6.4m³/min, pressure 0.4MPa

- **Old model**
  - 45kW 6600rpm

- **Smaller model**
  - Emuraede FE37AV

- **Smaller model**
  - Emuraede FE37AV
  - 37kW 6600rpm

- **Annual savings**
  - Old model electricity cost
  - Smaller model electricity cost
  - Annual savings

- Assumption:
  - Annual running 7000 hours, electricity price 1.2 JPY/kWh (compare with 0.5-0.6 unloaded operation)
A century's core technology offers you pure and clean oil free compressed air!

Emeraude series has Kobelco's proven oil free screw compressor technology. It supplies absolute oil free compressed air, as well as guarantees efficiency and reliability.

- **High efficient two stages compression**
  Two stages compression not only saves energy, but also reduces discharge temperature and improves reliability. Its efficiency improves 9-34% compared with single stage oil free screw compressor.

- **Efficiency comparison**
  New developed screw profile is designed by finite element analysis. It minimizes air leakage from discharge end to suction end due to non-contact rotation, realizing high efficiency.

- **Two vent holes construction**
  Two vent holes construction ensures no oil entering compression chamber through the seals even if the compressor is unloading for a long time.

- **Minimize pressure fluctuation**
  To reduce pressure fluctuation, Kobelco adopted pivotal unloading valve and achieved to reduce pressure fluctuation from 0.14MPa to 0.006MPa, which eliminates eliminating energy consumption caused by unnecessary pressure rise.

- **Energy Saving Logic**
  It can unload the compressor in advance if unloaded cycle is longer than setting time (at least 23a). Thus eliminate energy consumption caused by unnecessary pressure rise.

- **Direct drive transmission**
  There is a gearbox between airends and motor without coupling, in order to reduce mechanical losses. ISO 5 / AGMA 12 high accuracy gears have advantages of long service life, less transmission losses, low noise and low vibrations, etc.

- **Supreme thermosetting coating**
  Screws' surfaces and inner walls of airend housing are coated by PTFE or MoS2 thermosetting coating which has super strong adhesion, anti-corrosion and high thermostability properties.

- **Coordinate of two units**
  2 units can be coordinated running by simply wiring them, without group controller. Its own controller can set start sequence. Standard configured wiring terminals for connection with ordinary group controllers.
Detailed Elaborate Design

Unloading valve
The pivotal unloading valve has very sensitive response. It will be only affected slightly even if there is severe air turbulence. The valve disc has long service life (it can withstand 3 million motion tests). It is operated by pneumatic boxes, so oil cannot enter compression chamber even if any accident happens. Of course oil can’t enter condensate from intercooler nor aftercooler.

Endure high ambient temperature
Big cooling fan is horizontally installed beneath the coolers. Cooling capability is 60% higher than old model. The compressor can run stably even if ambient temperature reaches 45°C. Plate-fin-tube type cooler for ALE water cooled model reduces internal pressure loss to 1/5 of ordinal shell and tube cooler, and achieve extreme high package performance.

High efficient motor
Motors are Class F insulation, totally enclosed fan cooled, prevent dust and water from entering it. In addition, standard configured phase sequence detector prevents motor from rotating reversely, which protects air compressor. Thirdly, standard configured thermocouple monitors temperature in motor coil to protect motor. (Option for ALE series)

Energy saving solenoid
Timer controlled solenoid valve for drain are on intercooler and aftercooler. It stops draining when unloading to avoid unnecessary air losses and pressure decrease in air net. In addition, manual drainings are standard configurations.

Individual oil pump motor
Adopt individual oil pump motor to guarantee oil pressure during startup and stop. Ensure proper lubrication on mechanical parts to prolong their service life.

Energy saving and environment friendly
Standard configured oil mist filter not only releases pressure in gearbox, but also keeps workshop clean. Oil mist recovery rate is 99.5% and above. It is installed within the bodywork and recovered oil flows back automatically. It needn’t additional piping installation.

High performance air filter
It is a solution for dusty environment. Separates dust by centrifugal + filter two steps. Dust filtering accuracy is 99.99% according to ISO 5011.

Standard configured dust strainer
The strainer ensures clean air entering, as well as suppresses noise. It pre-filters dust and prolongs air filter’s service lifetime. Prevents dust from blocking and stabilize coolers’ performances. Prevents motor from dirt and stabilize motor’s performance.

Perfect electrical protections
- Setting for transient electricity outage... within 0.5 sec.
  The compressor doesn’t stop if electricity outage is within the setting time. The compressor will stop only when electricity outage exceeds the setting time.
- Setting for automatic restart after electricity outage... 0.5~30sec. (Example as right) Resuming electricity is set at 5 seconds, delay setting is 15 seconds after electricity resumes.
- Installed 12,000V surge protector and noise filter inside.

ISO 8573-1 Class 0 certified air quality in ALE series
All Emeraude-ALE series have passed the latest ISO8573-1:2010 Class 0 Oil-free Certification, which is the highest grade for compressed air’s oil free (dissens) quality. This certification is also an acknowledgement of Kobeio’s oil free compressor technology!
Function Rich Big ITCS Controller

- Standard configured crystal display electronic controller
  - IP65 protection, high resolution display with LCD background lighting.
  - Chinese, Japanese, English three languages display.
  - It monitors not only running status of compressor, but also sets parameters such as discharge pressure, etc.
  - It can also record operation, display chart, set weekly timer, manage daily and weekly information.

- Standard configured MODBUS connector to monitor compressor’s status remotely
  - Modbus module reads compressor’s pressures, temperatures, current, etc. by Modbus protocol (communication program), to realize remote inputs of run/stop/stop, etc.
  - Remotely monitor compressor status timely, facilitating operating management and response quickly when abnormal condition appears.

- EconoMild group controller – optimized energy saving solution
  - EconoMild can control up to 8 compressors as a group. This controller starts units in a circular sequence to balance their running hours and number of starts. This controller optimizes running units according to required flow capacity, to realize the most energy saving solution.

Many data such as oil supply pressure, oil supply temperature, running current, wirings’ suction and discharge temperatures, main motor coil temperature, running hours in loading number of loading, etc.

Up to 36 self-diagnose functions, display maintenance/caution/emergency stop signals timely, and corresponding troubleshooting measures. Facilitate daily inspection/maintenance management, as well as preventing compressor from breaking suddenly to ensure safe production.

Up to 7 start/stop settings in a week.

Running current data display (every 5 seconds).

Operation data display (each hour of the latest 24 hours).

Display contents: 2nd stage discharge pressure, 1st stage suction pressure, 2nd stage discharge temperature, Running current, Number of loading rate.

- Electricity consumption comparison
  - Calculation example:
    - Model: 37kW, 4 units
    - Unit: Model: SCV60NT, 1.5
    - Annual running hours: 8000
    - Average loading rate: 1.5

  - Energy saving combination 1: 88.800 kWh
    - Energy saving combination 2: 78.900 kWh
    - Saving: 14.70% (Saving 6.6% + Saving 9.1%)

  - Energy saving combination 3: 74.000 kWh
    - Saving: 18.40% (Saving 6.6% + Saving 11.8%)
    - Saving: 16.7%
## FE Series

### Model name explanation

**FE 37 A H**

### FE Series Specifications

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<th>Flow capacity (l/min)</th>
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### Notes

- Power supply: 380V/50Hz/3 phases 3/4/10A
- Flow capacity: Values connected are for air conditions
  - Ambient temperature: 1 bar, 20°C, 2%