MIRACLE BOY

High-Performance Industrial Oil Filtration Device

Issues of oil quality

Deterioration of Oil

Sludge | Oxide | Moisture

Sludge, Oxide, Moisture are primary matters that badly affects oil condition.

Bad Effects to Hydraulic Machineries

Dirty oil causes machine defection & low product quality.


Die-Cast Machine


Screw Compressor


Gear Box

Press Machine

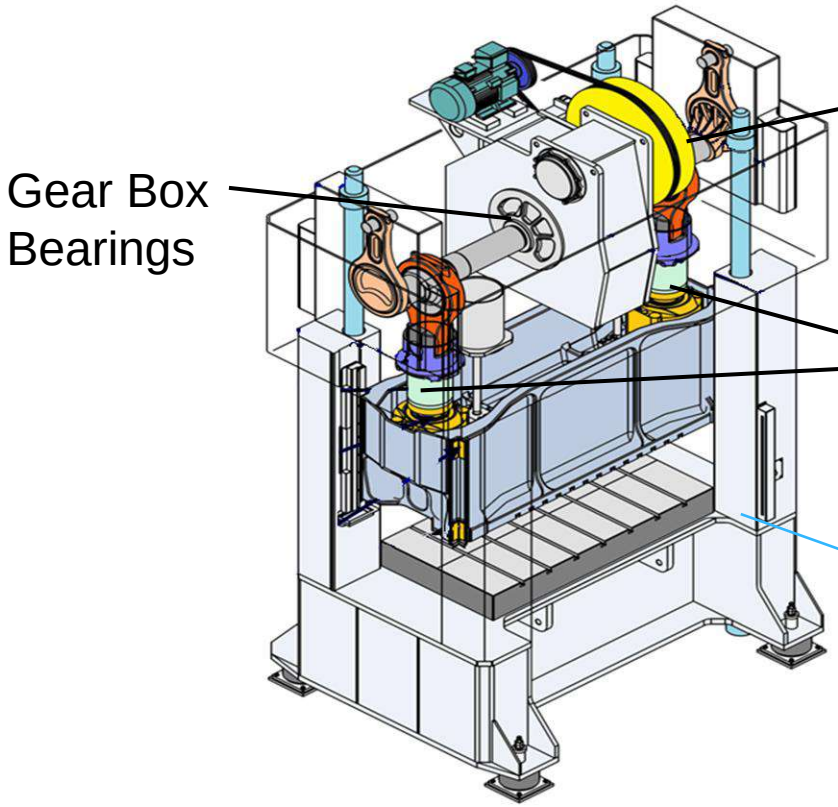

Turbine

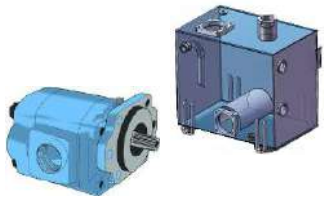

Rotating Machine

- Bearing
- Seal (Oil leak)
- Solenoid Valve
- Cylinder
- Gear Box
- Hydraulic Pump
- Turbine
- Accumulator
- Other hydraulic & lubricate equipment

Approx. 80% of trouble relates to hydraulic oil quality

For Press Machine



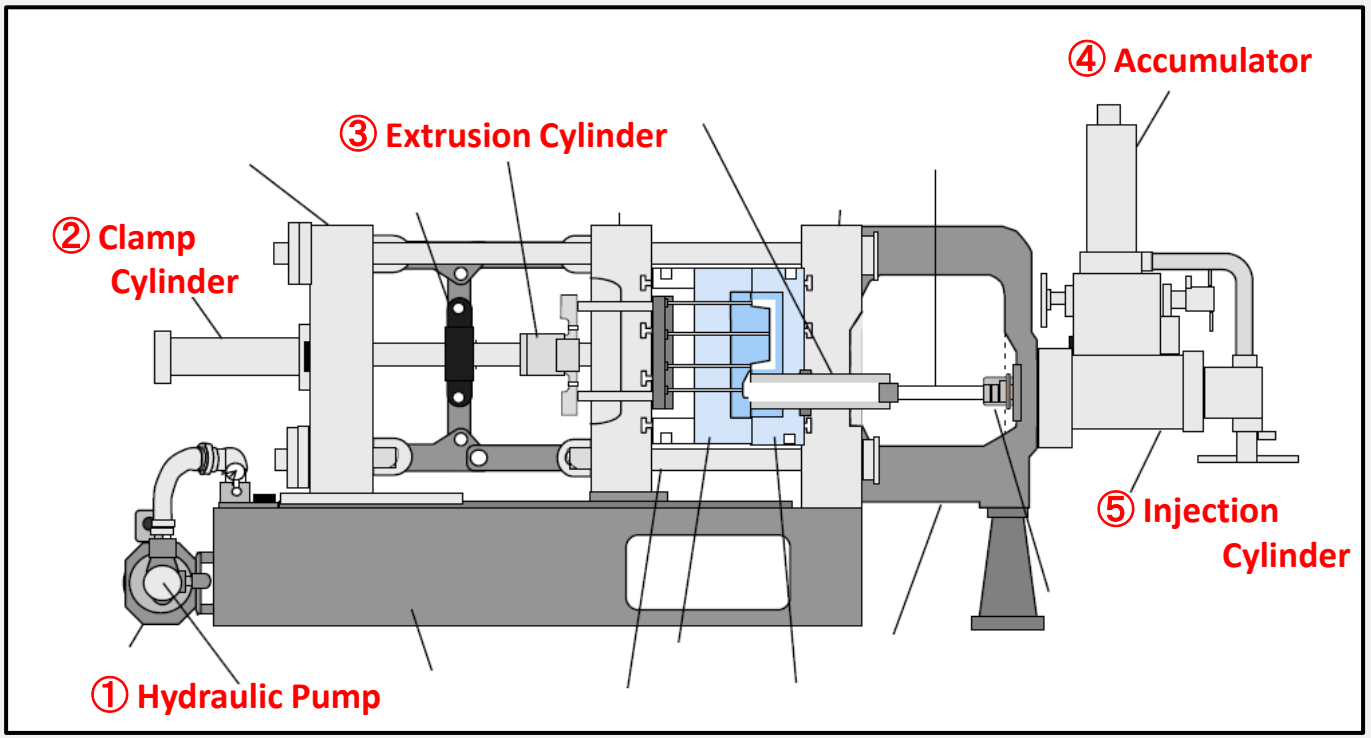


Hydraulic Oil Tank
Hydraulic Oil Pump

Hydraulic / Lubricant oil related part

① Hydraulic oil tank ② Gear Box ③ Clutch/ Brake
④ Bearings ⑤ Oil Pump ⑥ Cylinder
⑦ Solenoid-controlled valve etc.

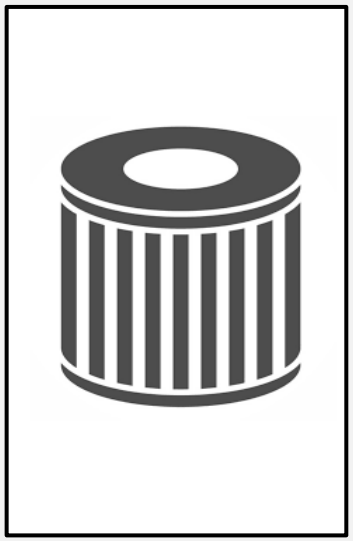
For Die-Cast Machine (Part requires **CLEAN** oil for operation)



① Hydraulic Pump : Apply high pressure to power the hydraulic oil
② Clamp Cylinder : Press the two molds together
③ Extrusion Cylinder : Remove the cooled and solidified aluminum part from the mold
④ Accumulator : Hold pushing pressure
⑤ Injection Cylinder : Pushing molten aluminum into a mold
⑥ Solenoid valve : Controls the direction and amount of hydraulic fluid flow
(Not shown in the above picture)

Press Machine - Case Study 1

Power Shovel Plant



Only Line filter is used

Installed in 1000t press

Installed in 300t press

Issue

High cost was required
- **-for defection on expensive servo press units**
- **-for exchanging tons of oil annually to maintain clean oil**

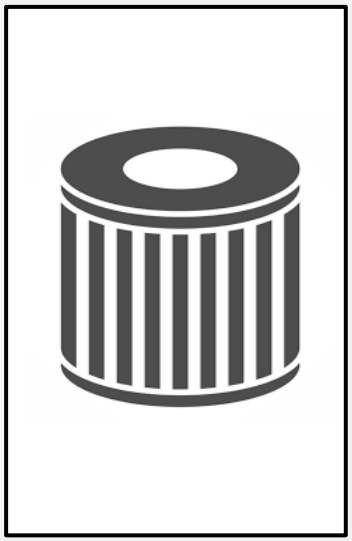
Result

1) Oil exchanging cost was reduced.
2) Oil leakage from Cylinder / Pump has stopped. (=protect Cylinder)
3) Sound from press machine became light and operating smoothly
4) Smooth operation leads to low electric consumption
5) Oil is maintained at 0.38mg/100ml which is better than new oil

Press Machine - Case Study 2

Produce sensor for LEXUS

Installed in KOMATSU L2C250



Only Line filter is used

SRC-811-8V was installed

Issue

1) Lube-oil of sliding part catches bonderize sludge etc. and gets dirty
2) Dirty oil caused noise sound & defection on clutch and bearing
3) It's been difficult for them to stop production line for frequent oil exchange.

Result

1) **Machine defection & repair cost were reduced**
   Ex: Clutch Overhaul With MB = 7years/time Without MB = 1~2years/ time
2) **Production line does not stopps**
3) **Product quality has been increased**

Mold Injection Machine - Case Study 1

Car-Parts production plant in USA

TOSHIBA Injection Molding Unit (Tank capacity 2000-3000L)

↑ Installation is possible in a small space

MB SRC-812-6V is installed

Issue

1) Oil and machine maintenance was headache
2) Quality requirements from customer are getting higher and it requires the molding machines to run in 100% good condition

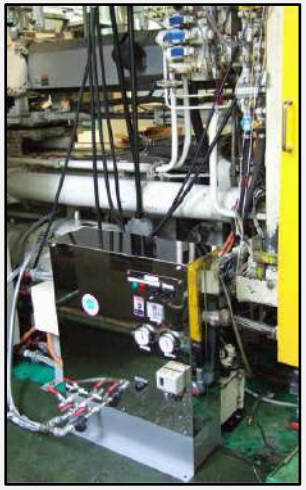
Result

1)Works very smooth
2)Operating sound is very quiet.
3)The injection molding machine does not get hot in summer
4)Improved molding quality

Mold Injection Machine - Case Study 2

Car-Parts production plant in JAPAN

TOSHIBA Injection Molding 450～1600T Unit (Tank capacity 1,600～4,000L)



MB SRC-812-6V& SRC-814-15V are installed

↑ Existing RRR & Toshiba original line filters are no longer required & closed.

Issue

1) **Failure of hydraulic parts could not be reduced even if the oil system is maintained at a high cost**

Result

1) Since installation in 2017, the acid value has been maintained 0.1-0.2mgKOH/g and the viscosity does not change. New oil level at 1.0mg/100ml pollution degree.
2) Oil supplier stop recommending oil replacement for our 7 molding machines with MB.
3) 200,000L of oil has been saved and its CO2 reduction amount is about 500ton
4) Also, there have been no hydraulic troubles since installation (Reduced USD 5,000 to 15,000 costs for solenoid valve and hydraulic)

Solution for maintain clean oil

Issue

Sludge　Oxide　Moisture

Removing these matters are difficult by standard oil filtration equipment.

Solution

Install Miracle Boy

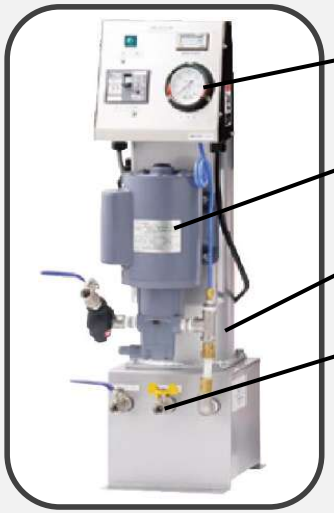
RESULT

- Oil stays clean as brand-new oil.
- Machine runs in high efficiency without defects and stop.
- Parts exchanging / Overhauling are minimized.
  (Free from oil & machine maintenance work)
- Product quality & Production efficiency are improved.

What is Miracle Boy? - “Main Unit"

Simple Structure & Setting

Simple structure with 4 main parts.



SRC-411-12V

① Control Panel

② Gear Pump

③ Filter Casing

④ IN/OUT valves

Size : 300W x 265L x 423H
Power : 75W

SRC-816-22V

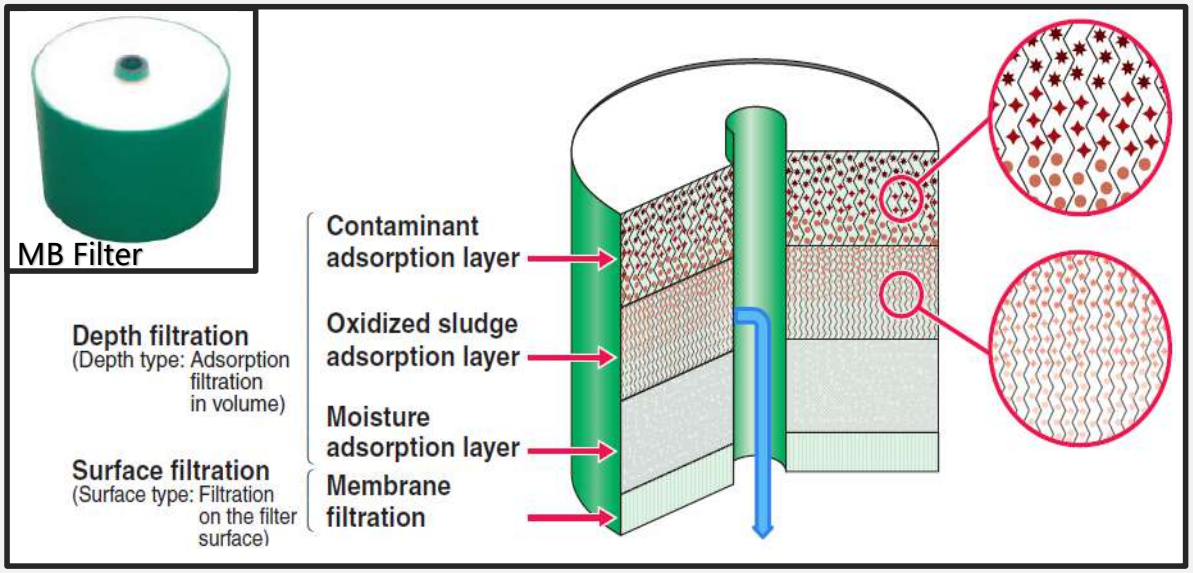
SRC-814-C

Basic structure is same with other MB series

- Easy to install & maintain
- Strong & Long life & Compact
- Low power consumption
- Various optional function available

What is Miracle Boy? - “Filters"

MB uses Surface & Depth filters which has great capacity and long filter life



Miracle Boy Filter Technology

- 4 layers of MB filter absorbs Sludge / Oxide / Moisture
- Large capacity = Filter exchange is required only once a year
- Easy to replace / Trash as combustible waste

Sample Results of MB Filtration

Hydraulic oil for the hydraulic Injection molding machine (850 t)

SRC-811-8V

[The automotive large parts molding plant]

	Unit	Before filtration	After filtration
Kinematic viscosity (40°C)	mm²/s	44.78	44.87
Moisture (KF Method)	ppm	1225	67
Total acid value	mgKOH/g	0.29	0.22
Contamination level (Mass Method)	mg/100ml	6.9	0.1

* Malfunctions of hydraulic control valves are eliminated and molding accuracy is increased.
* There is no need to replace oil; oil costs, the number of times of replacing solenoid valves and hydraulic pumps and personnel costs are significantly reduced; there is no waste oil emission.

Lubricating oil (1,000 L) for the reducer

SRC-812-6V

[Plate manufacturing department in the metal processing factory]

	Unit	Before filtration	After filtration
Kinematic viscosity (40°C)	mm²/s	137	136.7
Moisture (KF Method)	ppm	163	146
Total acid value	mgKOH/g	0.98	0.89
Contamination level (Mass Method)	mg/100ml	51.84	0.56

* Oil used to be replaced every six months due to significant contamination. At present there is no need to replace oil; metallic wear has dramatically decreased, thus increasing the operation rate.
* No oil replacement leads to drastic reduction of oil costs, machinery maintenance costs and personnel costs; there is no waste oil emission.

Hydraulic oil for the hydraulic equipment (800 L tank)

SRC-811-8V

[The hydraulic equipment in the electric wire plant]

	Unit	Before filtration	After filtration
Kinematic viscosity (40°C)	mm²/s	30.71	30.73
Moisture (KF Method)	ppm	11254	33
Total acid value	mgKOH/g	0.39	0.30
Contamination level (Mass Method)	mg/100ml	122	0.1

* Oil used to be replaced frequently due to significant contamination. At present, however, there is no need to replace oil. Machinery failures have decreased drastically, thus reducing maintenance personnel costs.
* No oil replacement leads to drastic reduction of oil costs, the number of r eplacement of solenoid valves and hydraulic parts and personnel costs; there is no waste oil emission.

Lubricating oil (12,000 L) for the paper-making machine bearing

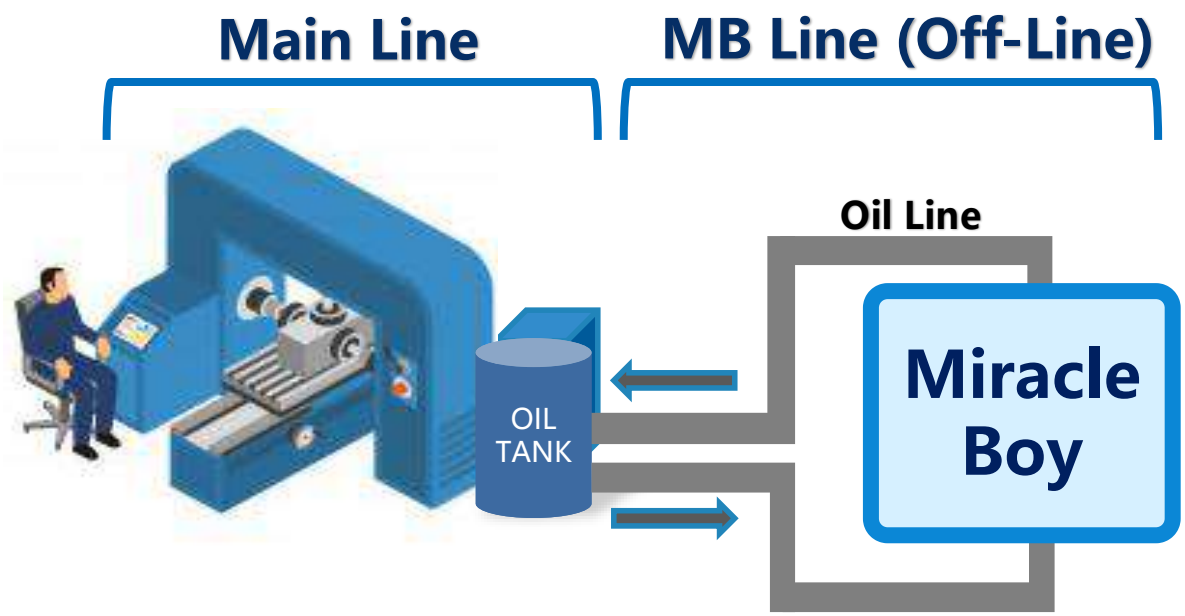
SRC-8124-224V

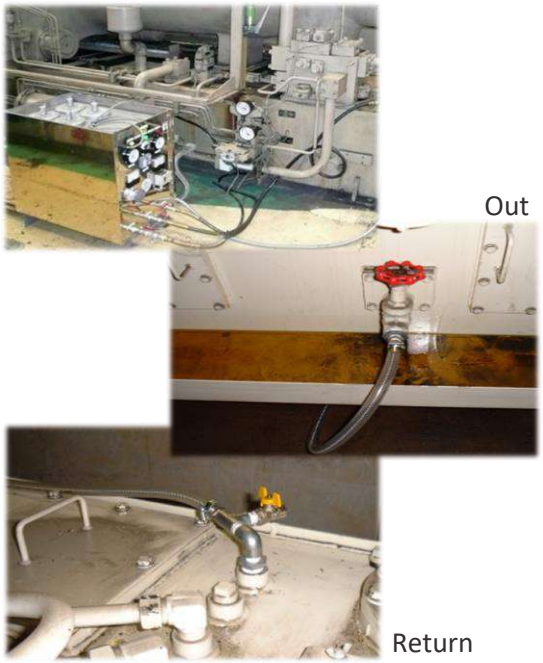
[Lubricating oil for the dryer bearing/gear in the paper factory]

	Unit	Before filtration	After filtration
Kinematic viscosity (40°C)	mm²/s	224.9	222.1
Moisture (KF Method)	ppm	3000	59
Total acid value	mgKOH/g	0.35	0.34
Contamination level (Mass Method)	mg/100ml	12.2	0.3

* Metallic abrasion powder collected in the tank was eliminated with time. There is no need to replace oil.
* There is no failure occurring. Personnel costs are reduced and waste oil emissions are eliminated.

Easy installation & OFF-LINE(Oil line) connection





Easy Installation

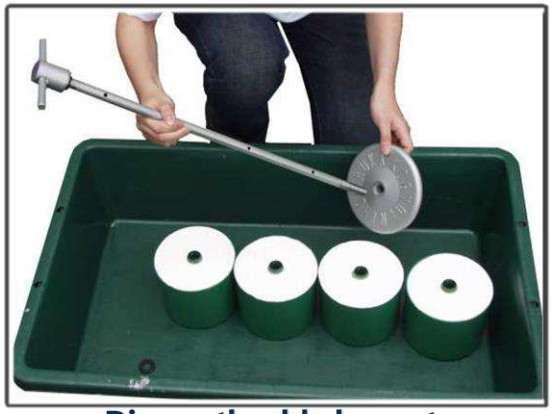
Just connect IN & OUT oil hose to the main oil tank.
(Using tank's drain valve & free port or hatch)

OFF-LINE Connection

MB is connected as OFF-LINE, so installation / filtration / maintenance process does not require production stop.

Replacing Filter Element

Pull out filters



Dismantle old elements

New elements & Seals

Exchange seals

Insert new elements

Put it back to casing

Turn it on

(Above is for 4 filter elements type)

Easy Filter Replacement

Exchanging work is simple by replacing new elements and packing.

Advantages from Installing MB

MAIN ADVANTAGES

- Free from oil maintenance work & costs
- Reduce production stop from machine troubles
- Reduce machine overhauling work & costs
- Improve production quality

Additional Merits

- CO_2 reduction / Good for SDGs
  (Burning Oil 1,000L = CO_2 emissions 2,500kg)
- Smooth machine operation reduces electricity charges

etc.

Various Application & Widely Accepted Performance

Lubricating oil for the 150 kw screw compressor (SRC-814-C)

Refinery turbine lubricating oil (SRC-814-15V; explosion proof)

Turbine engine oil for the natural gas carrier (SRC-8112-70V)

Paper machine lubricating hydraulic oil (SRC-816-22V)

Lubricating oil for the auto parts manufacturing process (SRC-814-15V)

Lubricating oil for the 75 kw screw compressor (SRC-813-C)

Supply Record

TOYOTA
TESLA MOTORS
HONDA
BRIDGESTONE
KOMATSU
KUBOTA
YAMAHA
LNG vessel
Thermal power plant
.
.
and more

Since 1970s, Miracle Boy has been installed globally.

Required Information for Installing MB

For providing the most suitable MB type, please fill out our survey sheet provided after this session.

- **Detail of Target Machine**
- **Oil Type (Brand / Model No.)**
- **Oil Temperature**
- **Volume of Oil**
- **Improvement Target** (Oxide etc.)

Thank you.