Elevator operation energy consumption problem

When the elevator heavy load down or light load up, the extra mechanical energy (including bits Energy and kinetic energy), the traction motor will generate electricity when it is led for operation, these electricity is wasted by resistor, this is not only the generated electricity waste, but also need air conditioner to reduce the power room temperature, so both the generated electricity and the cooling system power is wasted.

The advantage for elevator power feedback system:
1. Recycle the generated electricity
2. Reduce the motor room cooling system energy cost
3. Avoid the system crack down or parts destroy, reduce system maintenance cost

Elevator energy saving effect:
1. The higher the elevator is the greater the energy saving.
2. Newly installed elevator, the more Mechanical inertia, the greater the energy saving.
3. The faster the elevator, the greater the energy saving.
4. The more frequently the elevator used, the greater energy saving.
The total energy saving can be up to 15% to 45%, such as hotel, office building, hospital and so on.
Brief Introduction for elevator energy saving Unit

The elevator energy saving unit is designed by Canada technology, great performance, have Flexible dual PWM and LCL filter technology; the flexible dual PWM technology significantly reduce machine running noise and temperature rise, output waveform is better; LCL filtering techniques suppress the harmonic and electromagnetic interference effectively, so that the feedback power is in full compliance with the national grid, the grid THDI <5%, and will not cause pollution on the grid. Energy feedback "Zero current" processing technology can improve the feedback current quality, improve light load stability and improve power factor.

The products are widely used in more than thirty kinds the different brands elevators, such as Mitsubishi, Hitachi, Otis, ThyssenKrupp and so on.

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Elevator saving principle of operation

From National Grid
- transformer
- mother ammeter
- local grid
- other device

- Elevator Frequency conversion Control system
- BPF Energy feedback
- Elevator motor
- LCL Filtering
- Inverter module
- Flexible Dual PWM

(same phase/ frequency/ amplitude)

Note: Red arrow for power Consume; Green arrow for power feedback.
Elevator energy saving device Picture
Elevator energy saving

Inner part picture

Holzer current transformer

Electrolytic capacitor (under)

Electric Fan

Inverter module (IGBT) (Under)

Backflow preventing diode

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1. First rate software technology

Use military industry DSP to control the system, make the feedback unit operate fast and exactly, stable and reliable.
2. Feedback harmonic coefficient is low

Flexible dual PWM and the LCL filter technology; significantly reduce machine running noise and temperature rise, the output waveform is more perfect; effectively suppress harmonics and electromagnetic interference, the feedback voltage THD <3%

LCL Filter technology

Feedback current and grid voltage waveform

3. Elevator feedback energy saving technology Features

(1) High efficiency and energy saving

Elevator brake energy recovery more than 97% of the conversion rate, the saving rate of 15% to 45%, frequent braking, high floors, speed elevator energy saving effect is more pronounced up to about 45%.

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(2) Multi-function

◆ Digital panel Display;
◆ Have self-diagnostic fault protection features;
◆ Automatic voltage tracking function to ensure accurate output voltage phase;
◆ To prevent the current loopback function, never affect the inverter;
◆ Terminals and voltage dual control system, more adapted to some special occasions, such as Static voltage is high.

(2) Plug and Play, easy installation

Simply connect the feedback device DC (+) ”, the" DC (-) to the inverter DC positive and negative terminals correctly, www.elevatorenergysaving.com
Connect the feedback device AC output "A", "B", "C" to the inverter input AC power correctly is ok.

(3) Much more advanced than the traditional simulation feedback unit

- Use the advanced TMS320F28 series DSP chip as control processor, ensure the feedback unit operation speed and reliability to be the best.

- To meet customer requirement, based on special software algorithm design, operation is very quiet.

- Internal digital filtering, more accurate, reliable signal processing; with special zero current processing technology, can improve the quality of the feedback current, improve the stability and power factor.

- With bus voltage, three-phase input voltage, internal temperature, feedback operation voltage, feedback time operation monitoring function, provide easy user parameter settings.

- Three digital input ports and two digital output port is released to customer, support MODBUS protocol, convenient and reliable information communication with control systems, real-time monitoring and control, can supply
custom-made programme.

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Reference

Elevator saving effect case

A business office in Shenzhen 8pcs 26KW Mitsubishi Elevator, elevator speed 2.5M / S, load 1.5 tons, the 30-floor, Room air conditioning 3P × 2. Normal use of a fitted energy feedback device, 36H, test as follows:

The meter display in KWH: 39 KWH; total power consumption: 72 KWM. Elevator actual power consumption is 42 +71 = 111 KWH

1, directly saving rate = 39/111 = 35.13%

2, the annual electricity savings

(1) The average of each elevator monthly saving power: 39/36 hours × 24 hours × 30 days = 779 KWH
(2) Air Conditioning monthly electricity savings: (assuming the air conditioning to run daily for 12 hours, running 8 months a year)

Control cabinet temperature detection analysis: now less of an air conditioner; then
3 x 0.75 / P × 12 × 30 = 810 KWH

(3) An annual electricity savings: 779 KWH × 12 × 8 + 810 KWH × 8 = 81 264 KWH

3 years consolidated power consumption

111 KWH/ 36 hours × 24 hours × 365 days × 8 pcs + 6 × 0.75 / P × 12 hours × 240 days (8 months)

= 229,039.99 KWH

The consolidated power consumption of the annual energy-saving rate = annual electricity savings / year

= 81 264 KWH / KWH 229,039.99 × 100% = 35.48%

Shenzhen Airlines International Hotel

Hitachi NPH elevator, a 30-story, elevator power 30KW. After testing, the use of the IPC the elevator energy saving cabinet, each lift daily average power saving of 25 degrees, the direct saving of 32.5%. Coupled with the use of the IPC the elevator energy saving cabinet, elevator room air conditioning costs savings, the total integrated power saving Rate was 34.3%

Traditional Chinese Medicine Hospital
HITACHI PFE elevator, after install the feedback of energy-saving devices, elevator average daily power consumption of 56 degrees, Elevator daily average power saving of 21 degrees, its saving rate of 37.5%.

Shenzhen International Business Center

After testing, when install the elevator energy saving cabinet, each elevator daily average power saving of 31.3 degrees, the direct saving of 39.8%. Combined air conditioning savings Costs, the total saving rate is up to 41.7% .

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