

The Application of INVT CHV110 Energy Saving Cabinet in Injection Molding Machine

Overseas technical support department



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1、 Brief introduction

The CHV110 series high-performance vector energy-saving cabinet is the latest product, gathering the experience of many years of research and development, production and on-site transformation of injection molding machine energy saving cabinets. Mainly aimed at energy-saving transformation of the injection molding machine, it has introduced the superior performance of vector control technology to the injection molding machine energy-saving field, solved the previous problem that V/F control mode affects the production cycle, and increased the energy-saving rate. Energy-saving cabinet can also be applied to the energy saving of air compressor, central air-conditioning energy saving and automatic escalator energy saving and other energy saving applications.



2、 Technical features:

- Control mode: Without PG vector control (SVC)、 with PG vector control (VC)、 V/F control;
- Frequency setting mode: The signals comparison of pressure and flow channels;
- Signal conversion panel, using the Hoare module, changes the proportional valve of injection molding machine pressure and flow 0~1A signal into 0 ~ 10V signal to feedback the frequency inverter or directly connects to 0 ~ 10V signal;
- Big torque at low frequency: quick starting without affecting the production cycle;
- Good ability at overload: under the high pressure from plastic injecting and other conditions, it will not escape, so as to ensure the quality of the product;
- IP21 protection grade; fully enclosed design; dual-use of cabinet and wall hanging. Anti-Dust; anti-gas; anti-corrosion; environmental adaptability is good; the life of the equipment extends;
- 15KW~55KW full range of built-in DC reactor, effectively improves the power factor and improves the overall efficiency and stability, and effectively eliminates the impact from the high harmonics of the input side on the energy saving cabinet and reduces external interference;

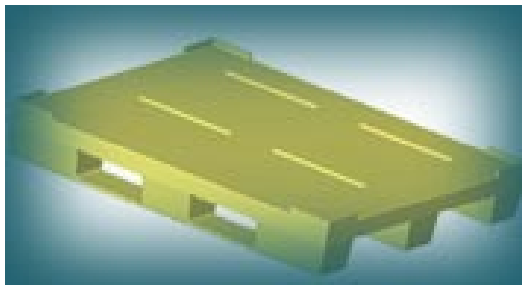
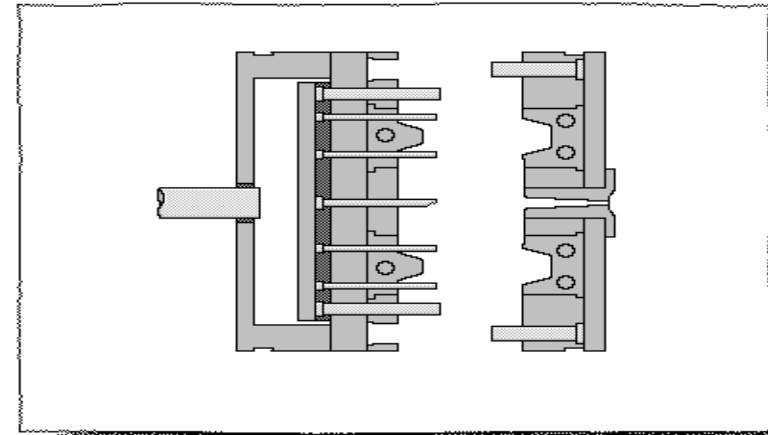
- Main supply / energy-saving dual-circuit security safety design ensuring the system is trouble-free and does not affect production;
- With the functions of automatic reset and power-off reset, to ensure continuous production and production efficiency;
- Good at anti-interference; input / output power cables are installed with filtering rings; the strong and weak electricity are separated, giving full consideration to safety requirements;
- With built-in PID controller, easily composing the closed-loop control system temperature, pressure, flow volume and other process parameters;
- Energy-saving is 5%~10% more than that of V/F control mode.

3、 Injection molding machine principle



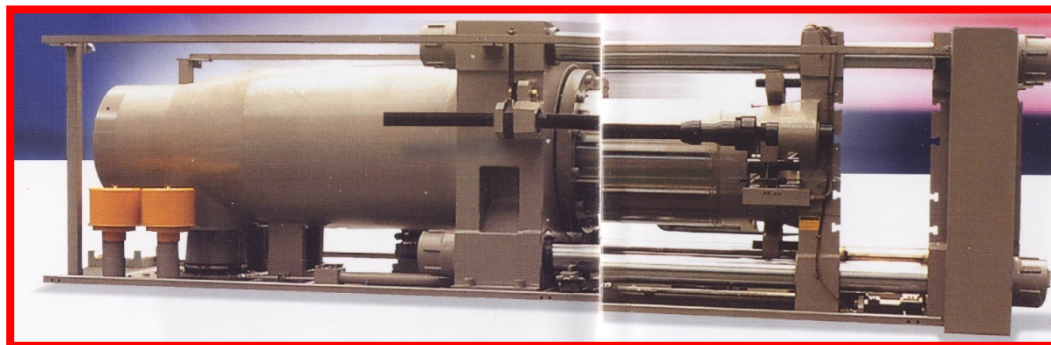
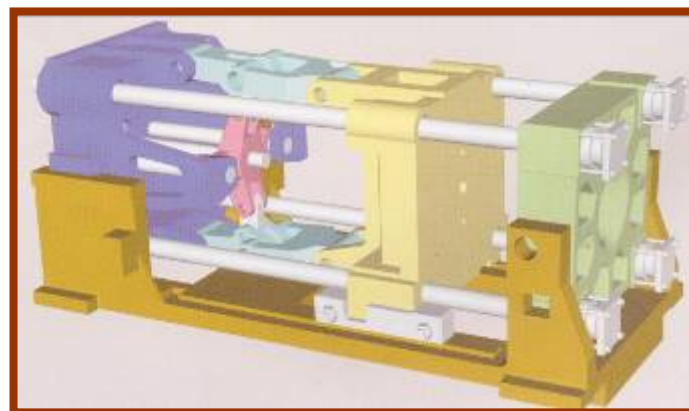
The injection molding define

- Adopting the injection molding method ;
- The main equipment used for injection molding is injection molding machine;
- The main auxiliary equipment is molds;

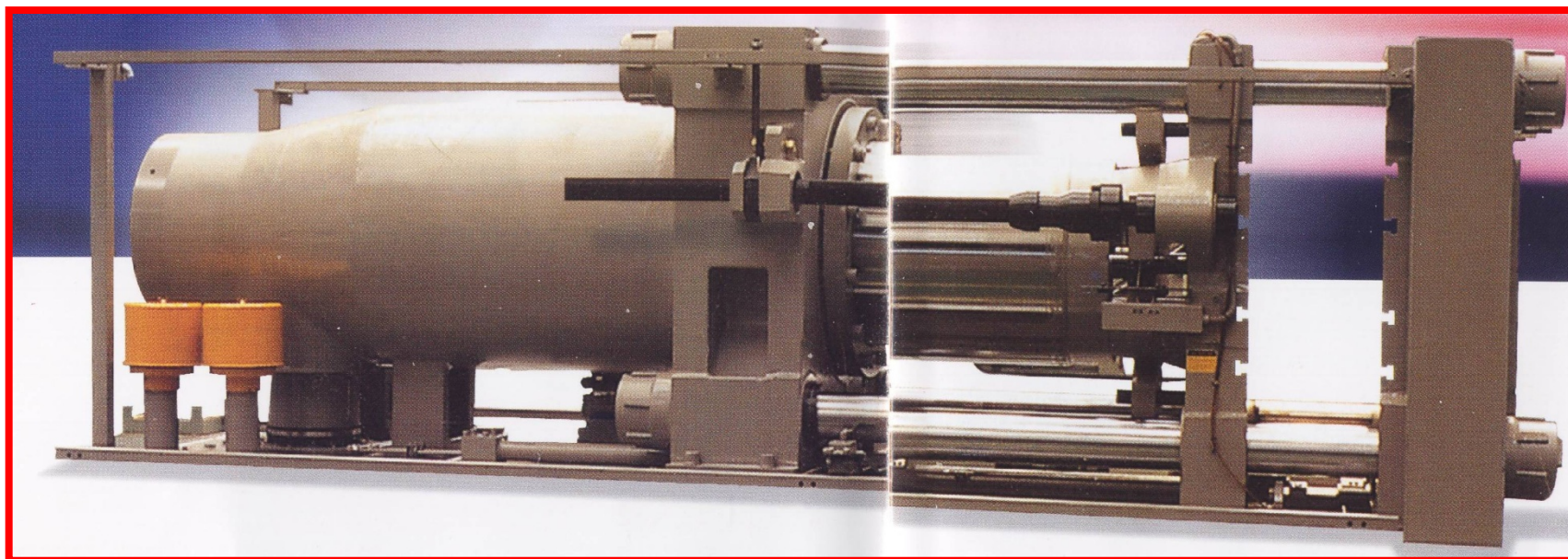


Injection molding machine classification

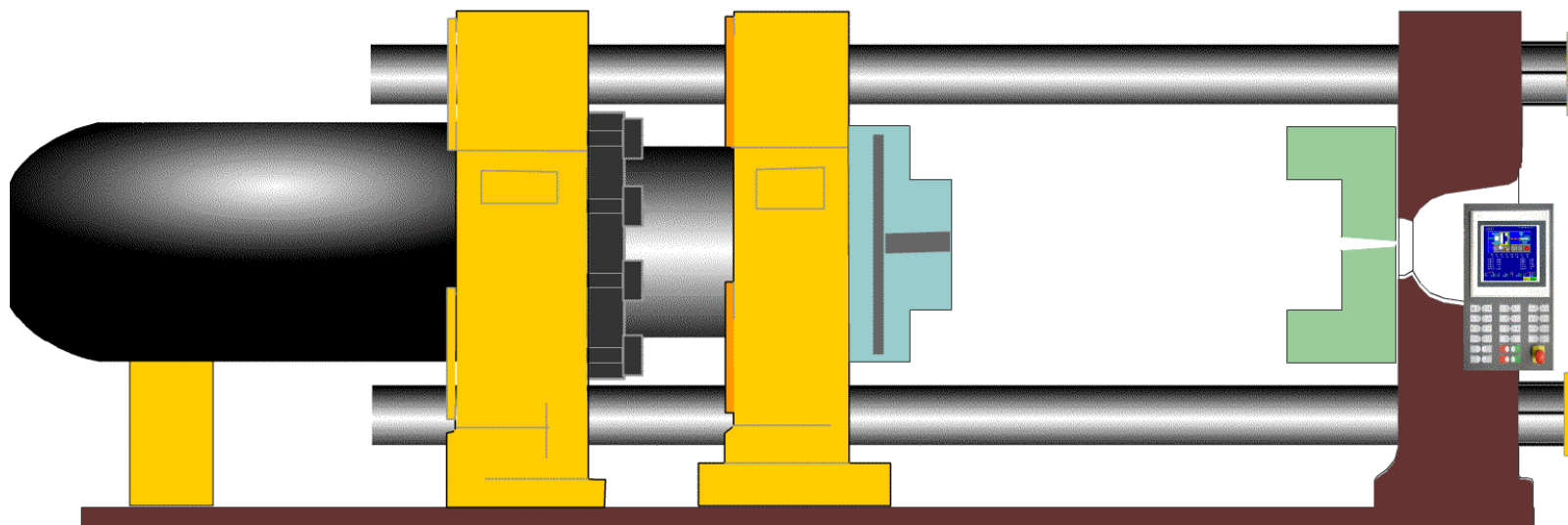
- According to the locking mode:
Machine hinge type、
direct pressure type and
two plate type injection
molding machine;



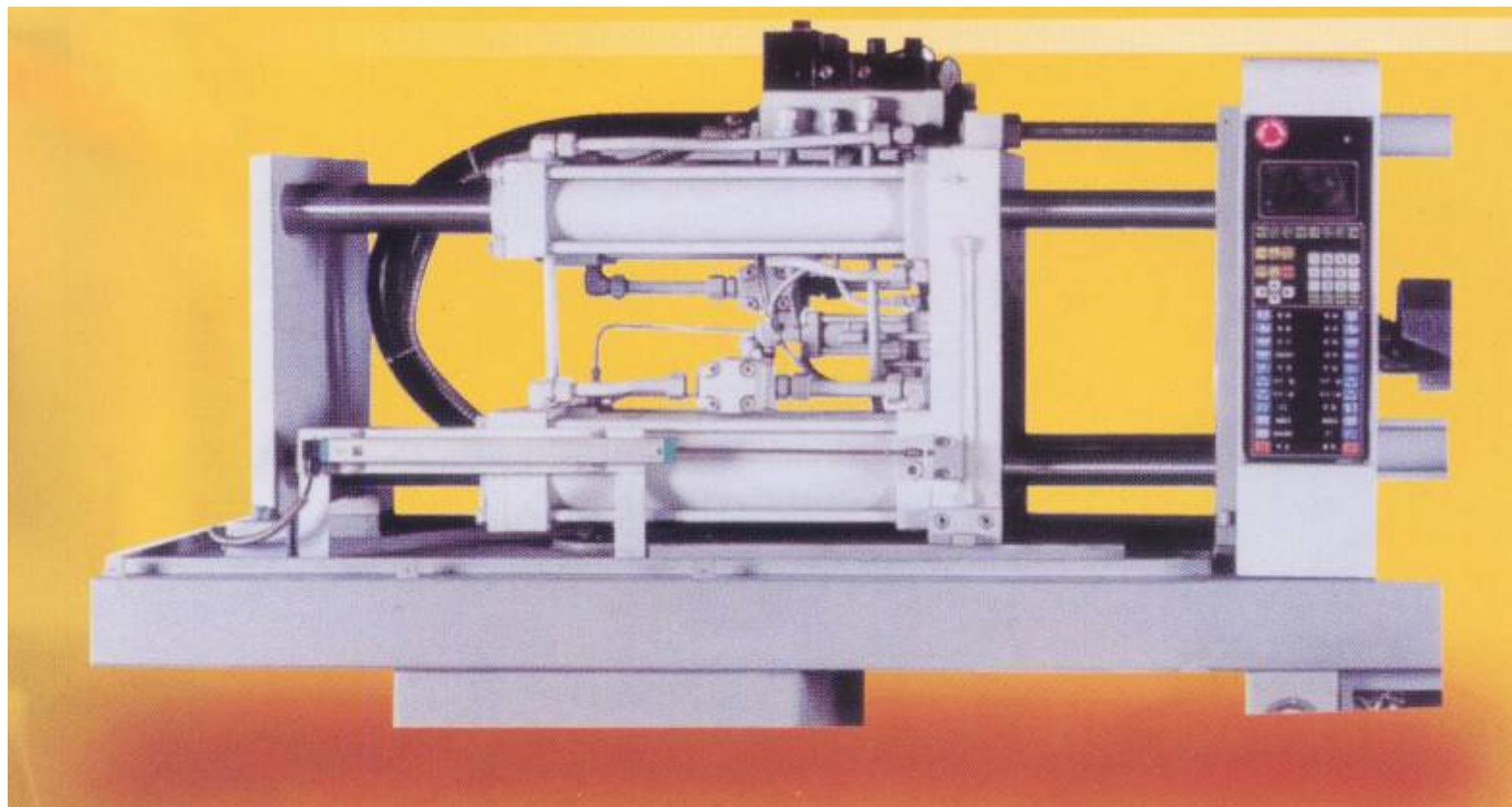
Direct pressure injection molding machine1



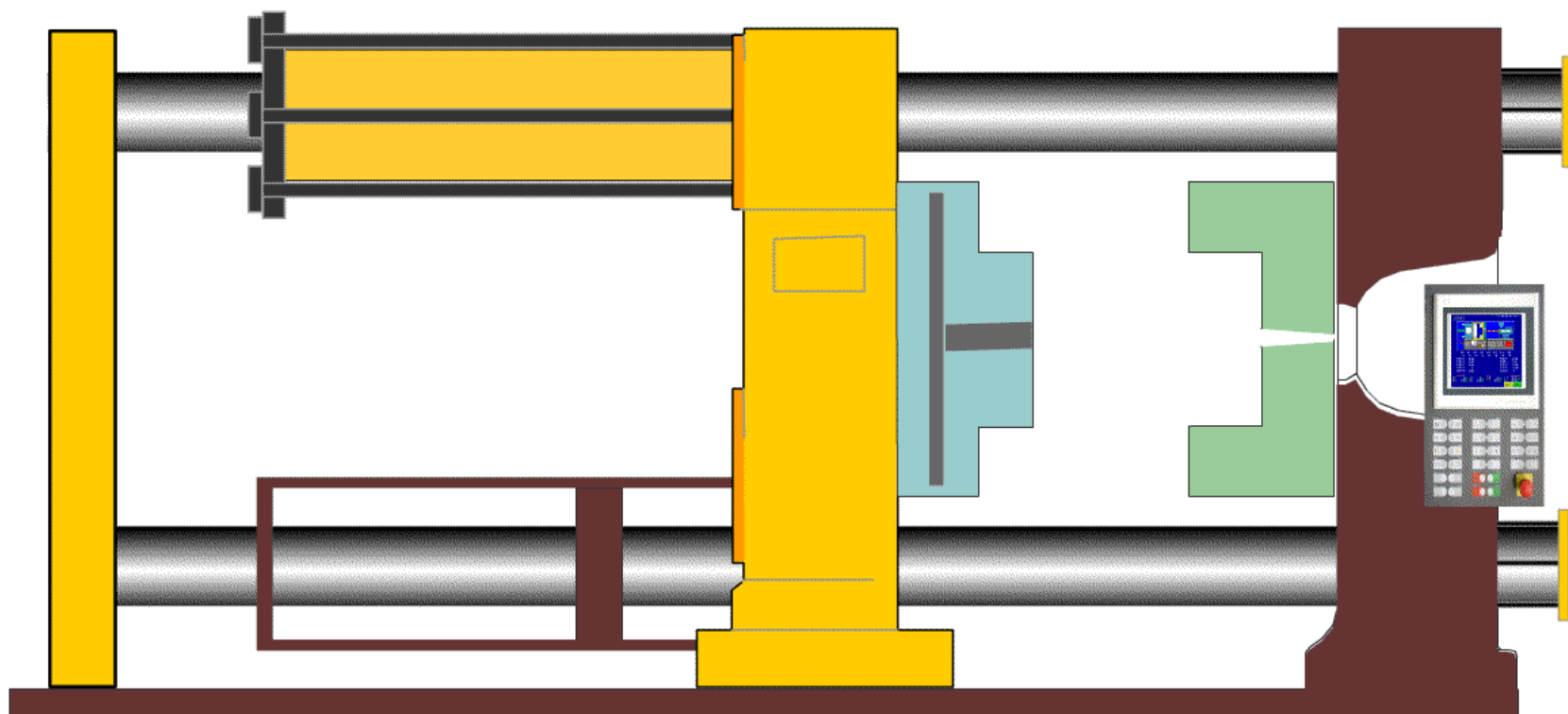
Direct pressure injection molding machine1



Direct pressure injection molding machine 2



Direct pressure injection molding machine 2



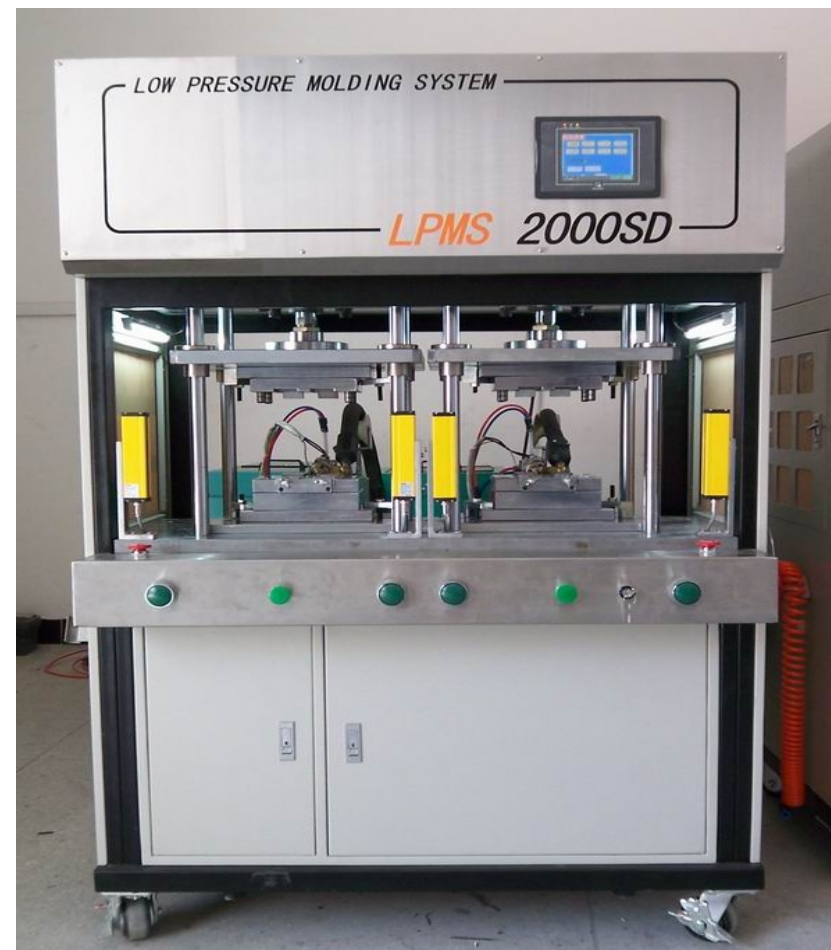
Various forms of injection molding machine



55T
85T
120T
150T

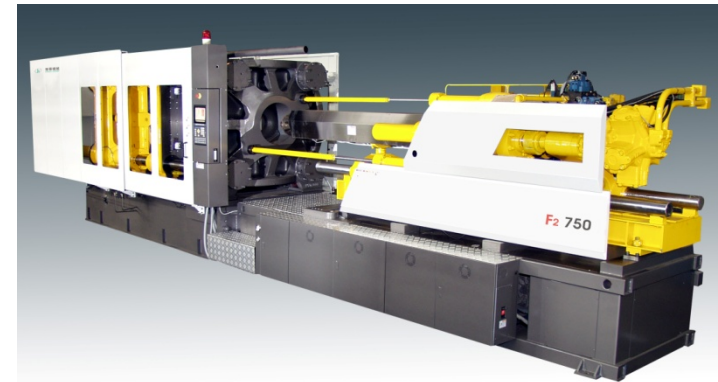


Various forms of injection molding machine



Injection molding machine classification

- According to the injection device mold-locking arrangement: Horizontal type、Vertical type and angle type injection molding machine;



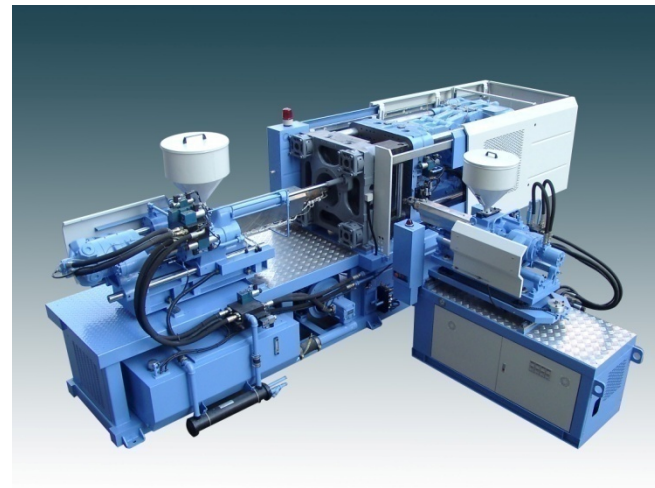
Injection molding machine classification

- According to driving mode: Hydraulic type、electric type and electric hydraulic combined type injection molding machine;

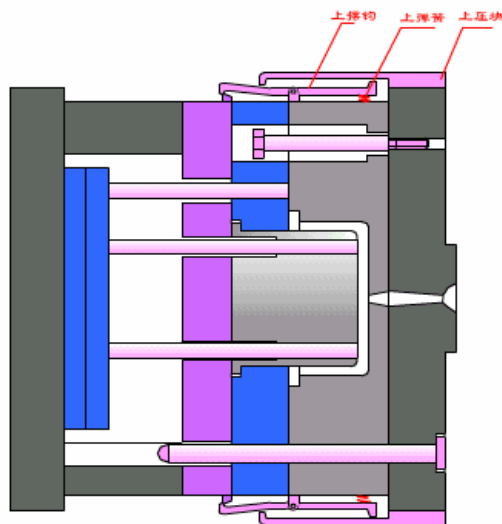


Injection molding machine classification

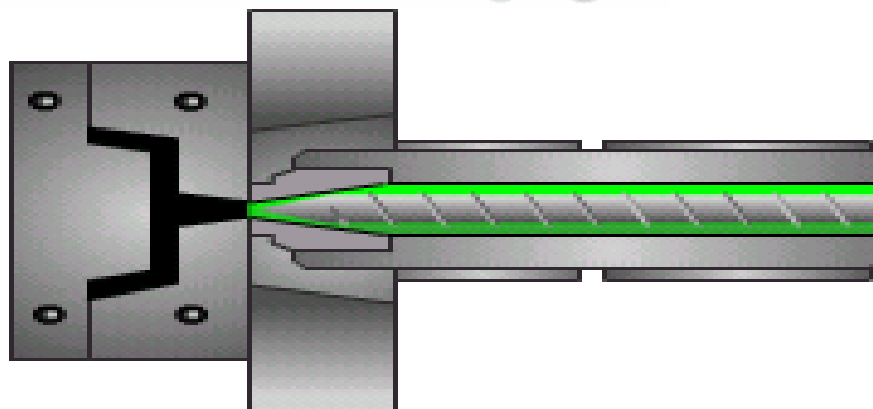
- According to injection device number:
The single material type and multi material type injection molding machine;



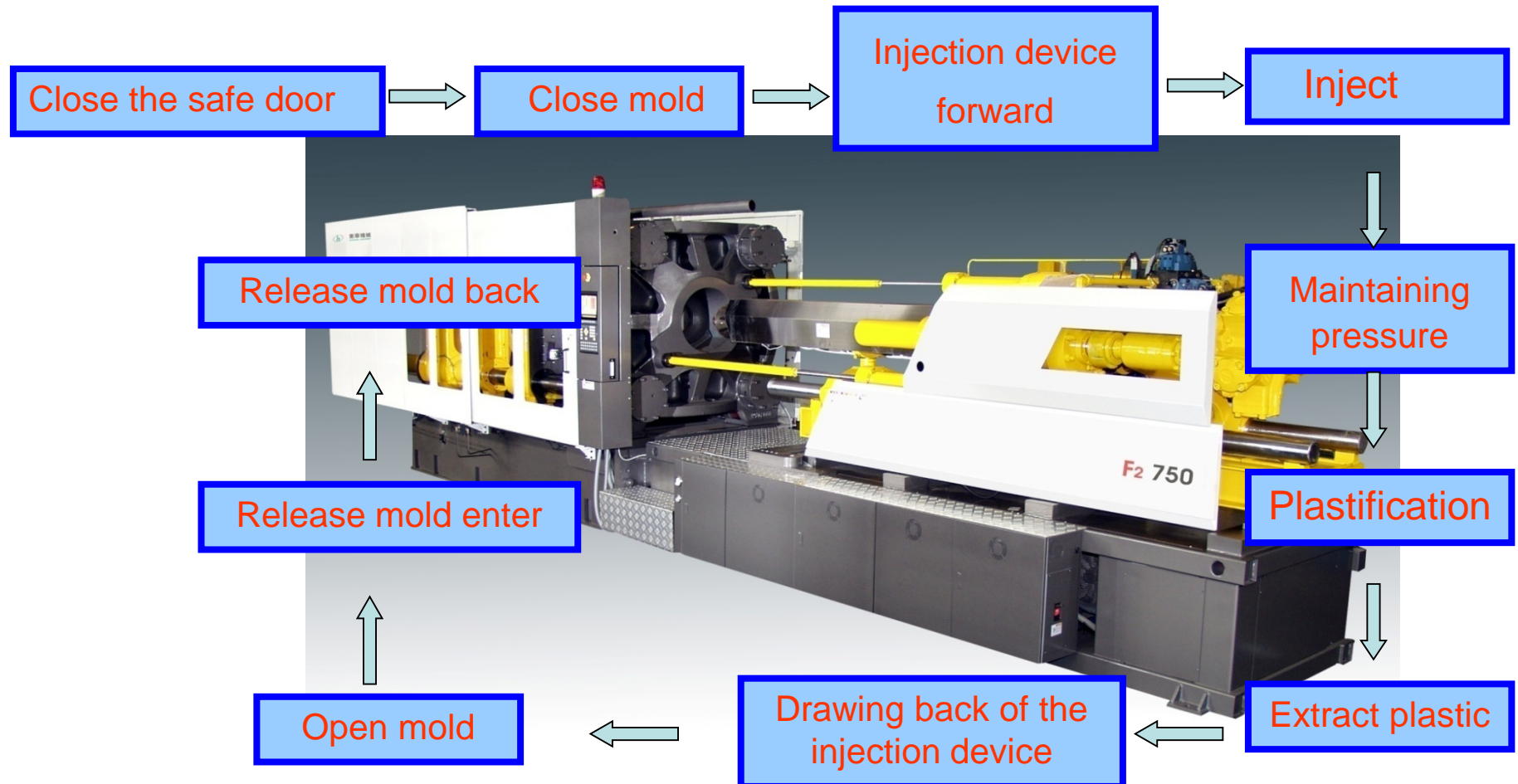
Injection molding machine schematic



摆钩分型螺钉定距双分型面注射模



Injection molding machine work flow

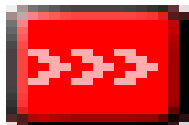


Injection molding machine structure principle

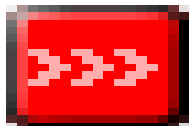
- Injection molding machine generally divided into four parts



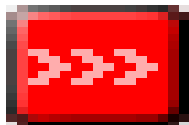
Lock mold part



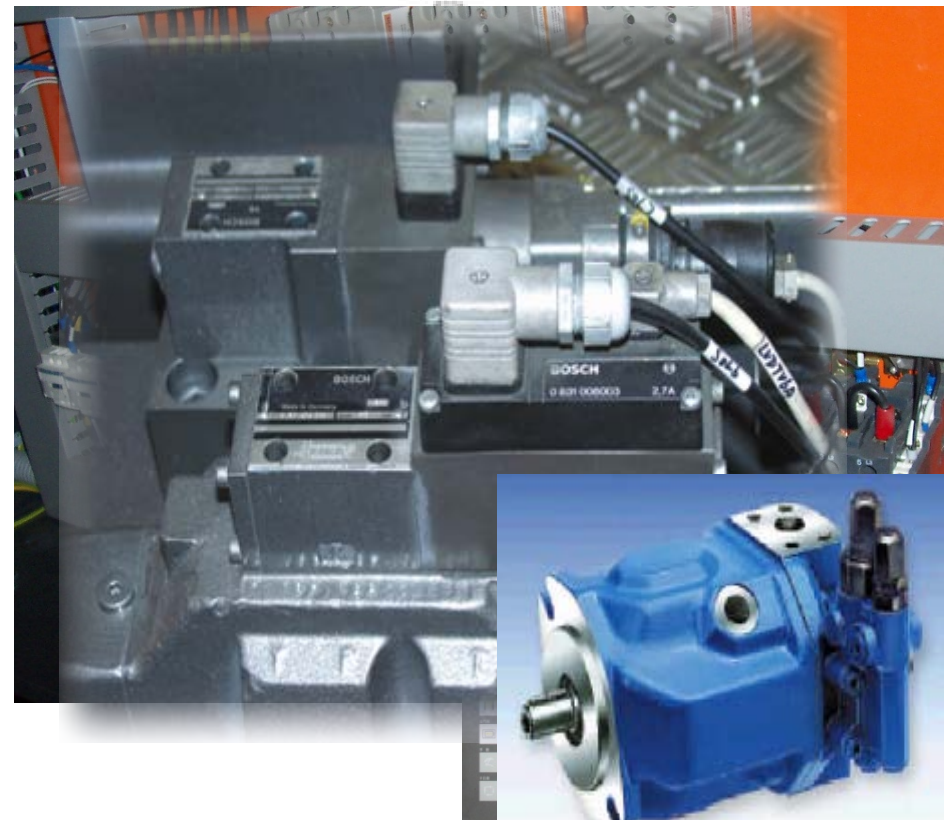
Inject part



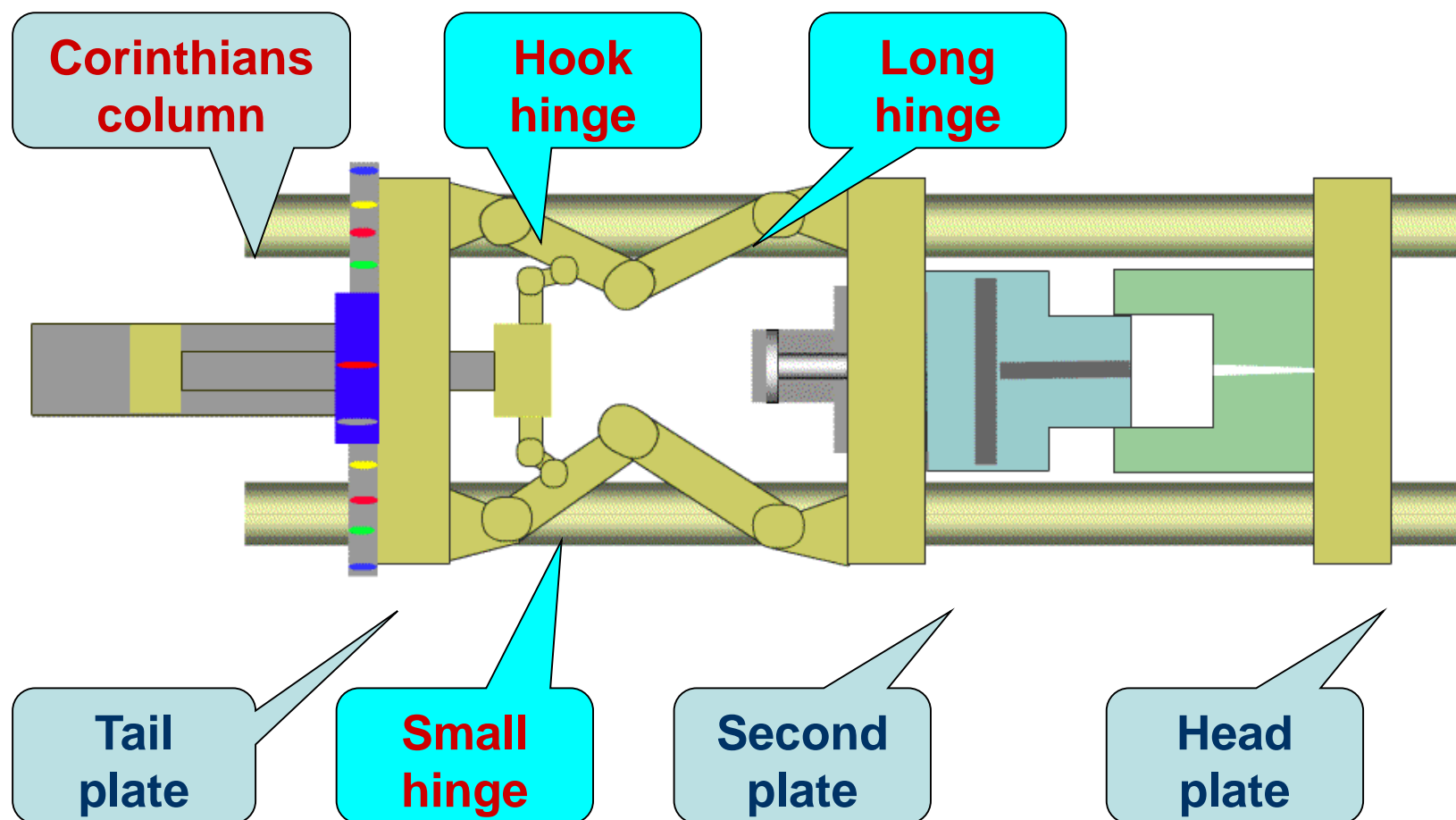
Electric part



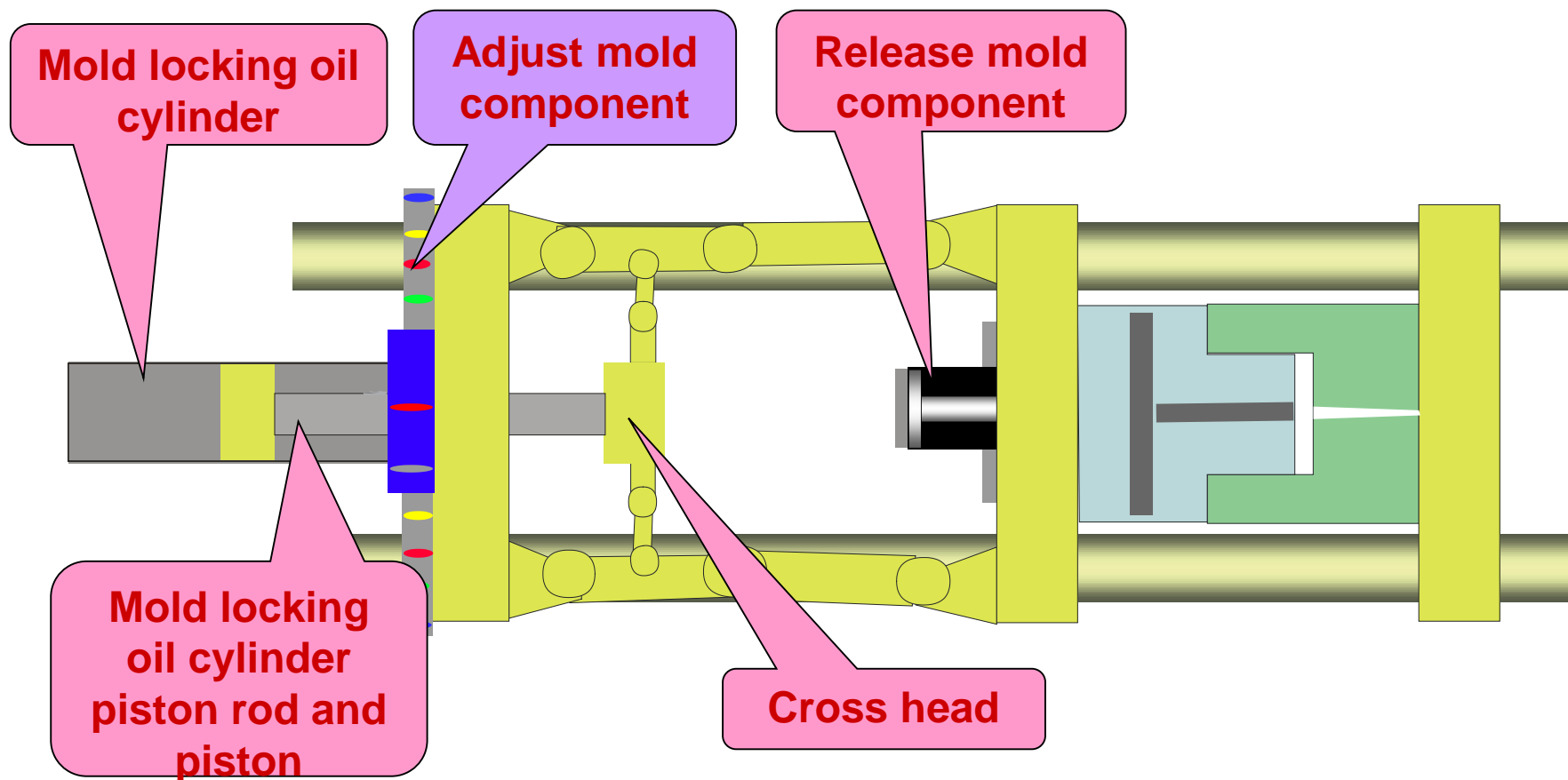
Hydraulic part



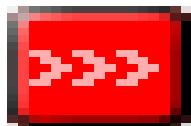
Injection molding machine hinge lock mold



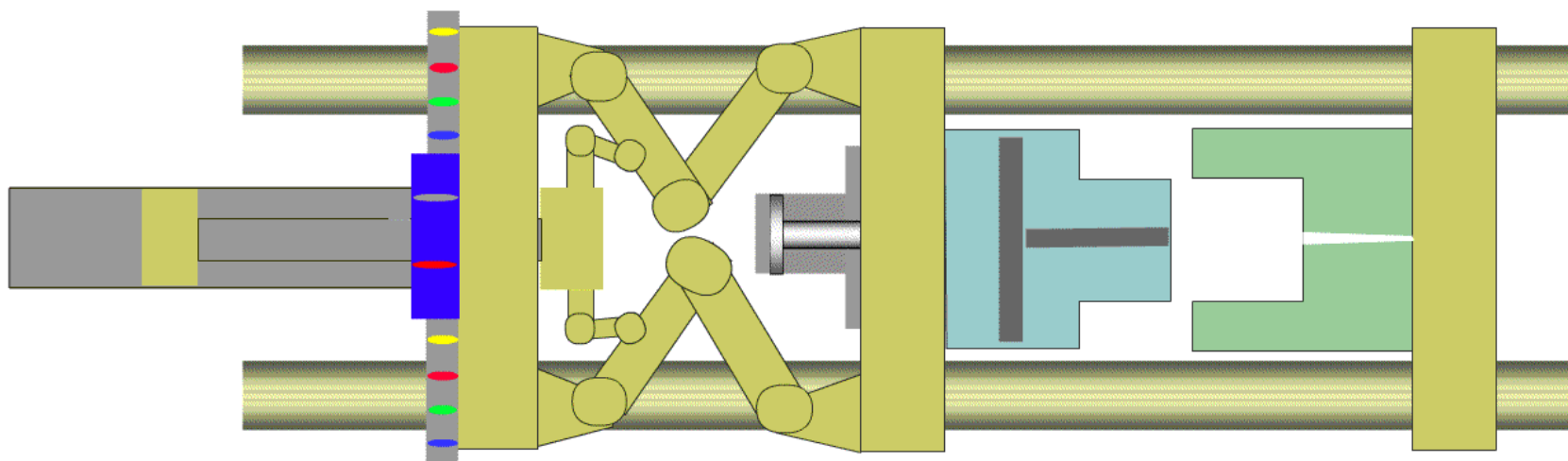
Injection molding machine hinge lock mold



Machine hinge machine adjust mold



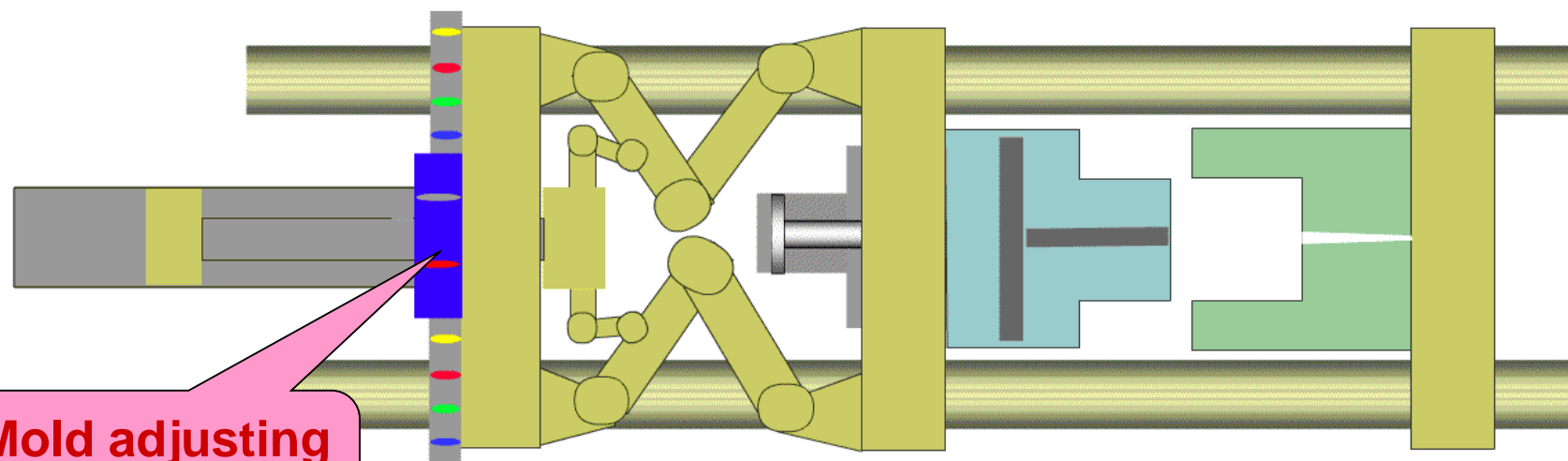
Mold too thick or thin



Machine hinge machine adjust mold

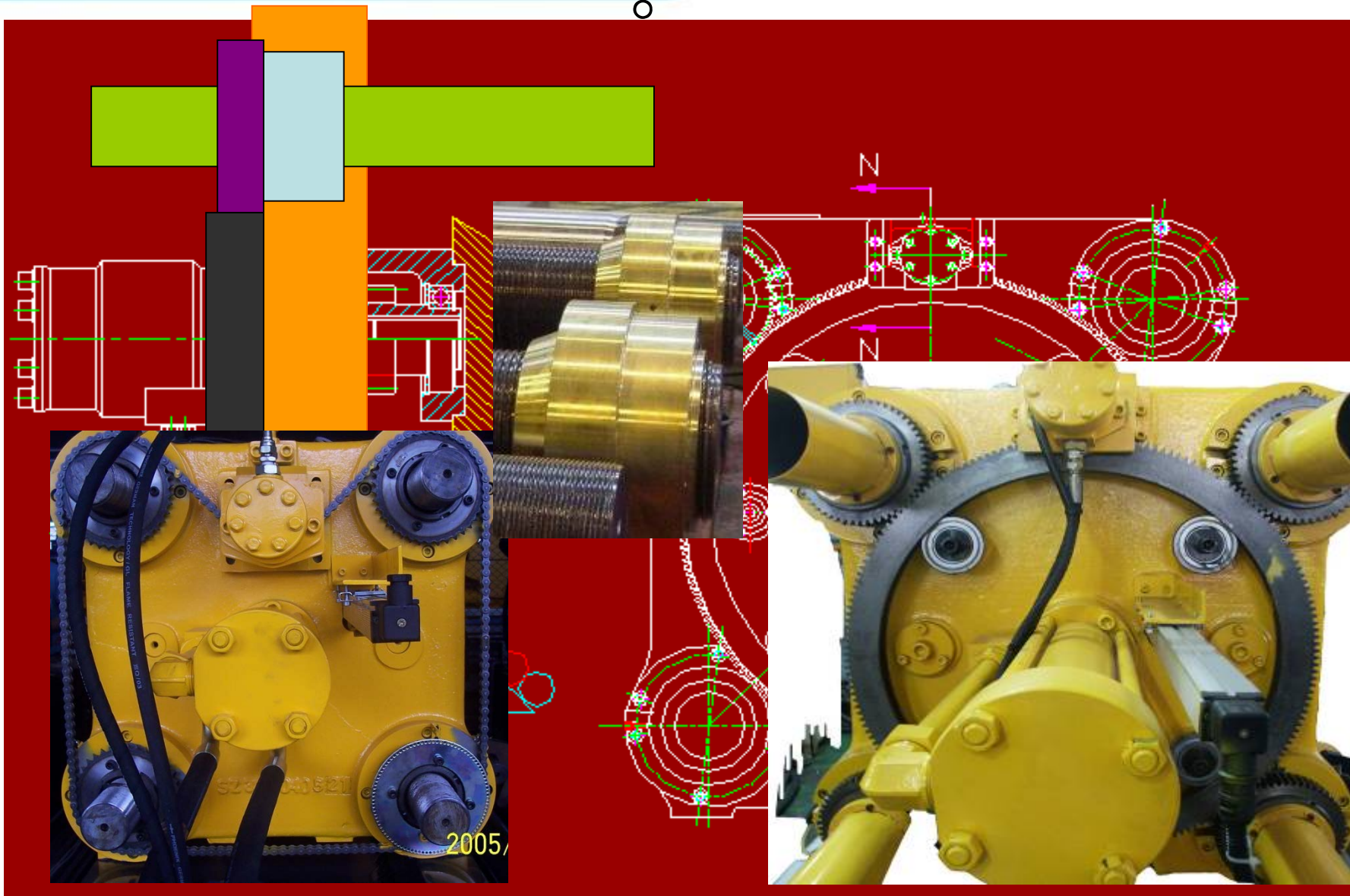


Adjust mold process

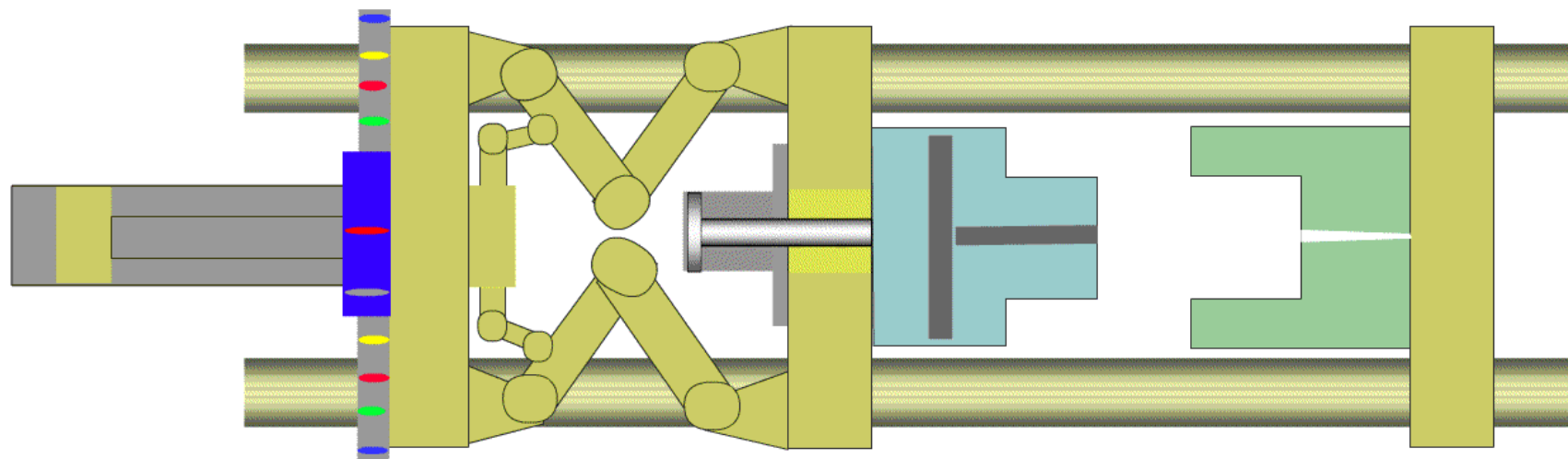


Mold adjusting gear

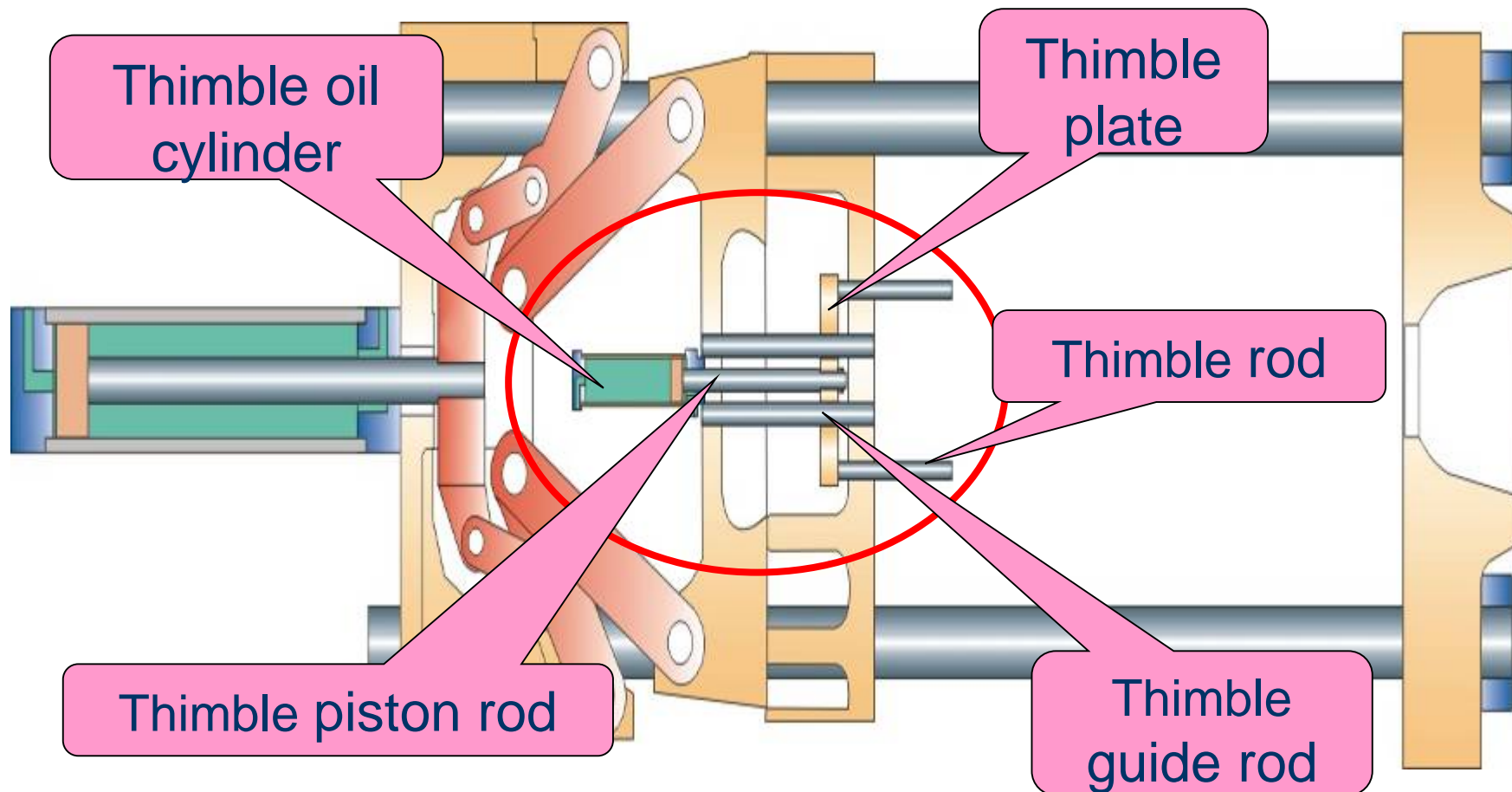
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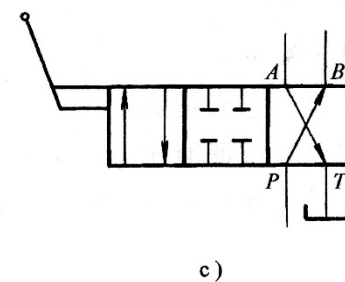
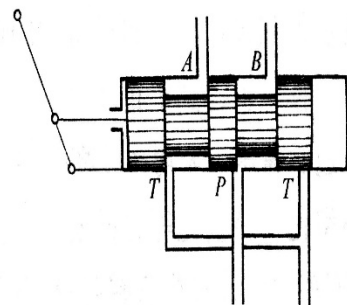
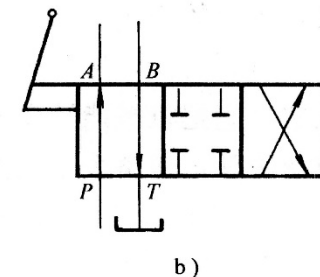
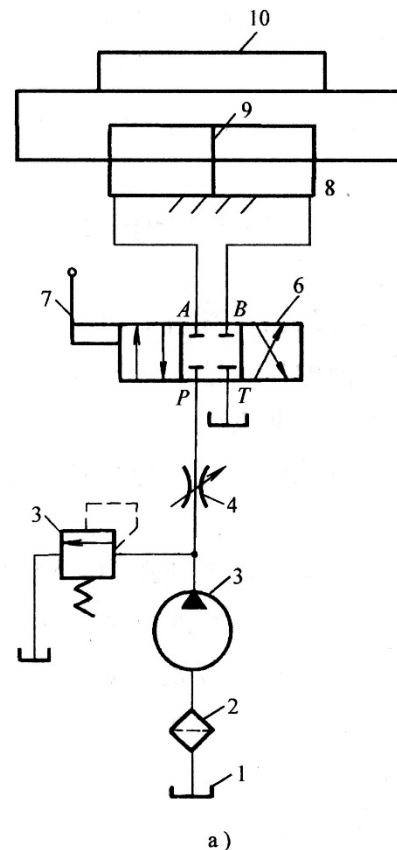
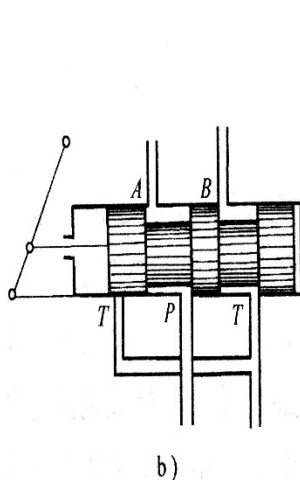
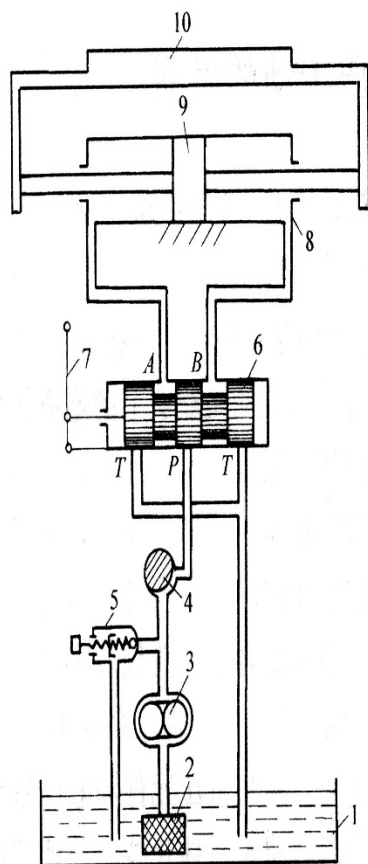
Injection molding machine release mold



Injection molding machine release mold component



Hydraulic pump, valve, hydraulic schematic symbols



4、 Installation and adjustment

The placement of the CHV110 in the injection molding machine:



The placement of the CHV110 in the injection molding machine



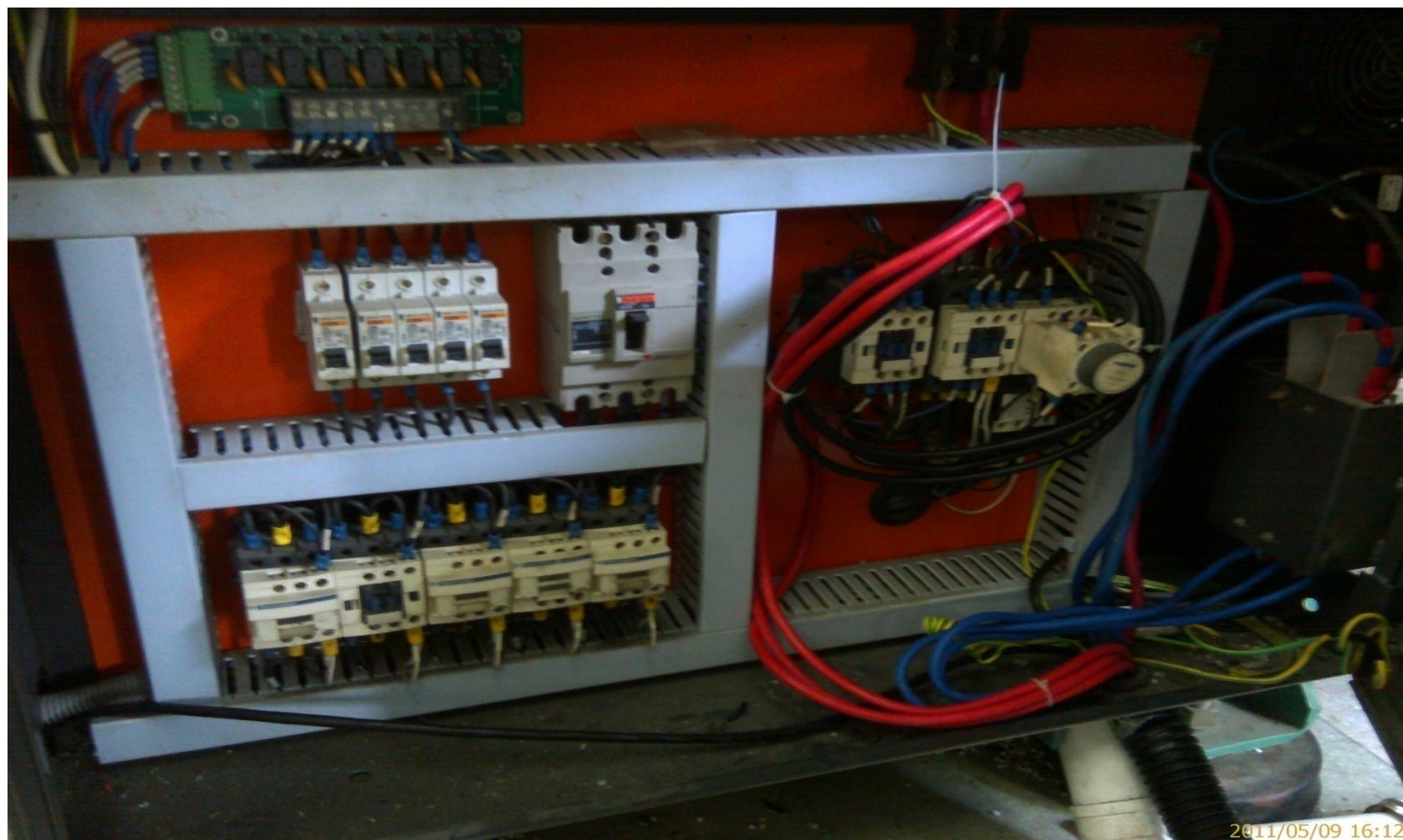
Main circuit wiring:

- Correctly find the main AC contact starting the motor; disconnect the three-phase AC wire between the air switch of the injection molding machine and the main contact;
- Note: if the main AC contact is connected to other power cables, shift them to the air switch;
- connect the <R, S, T> three-phase power cables of the energy saving cabinet to the air switch ;
- the <U, V, W> three-phase output cables to the main AC contact.

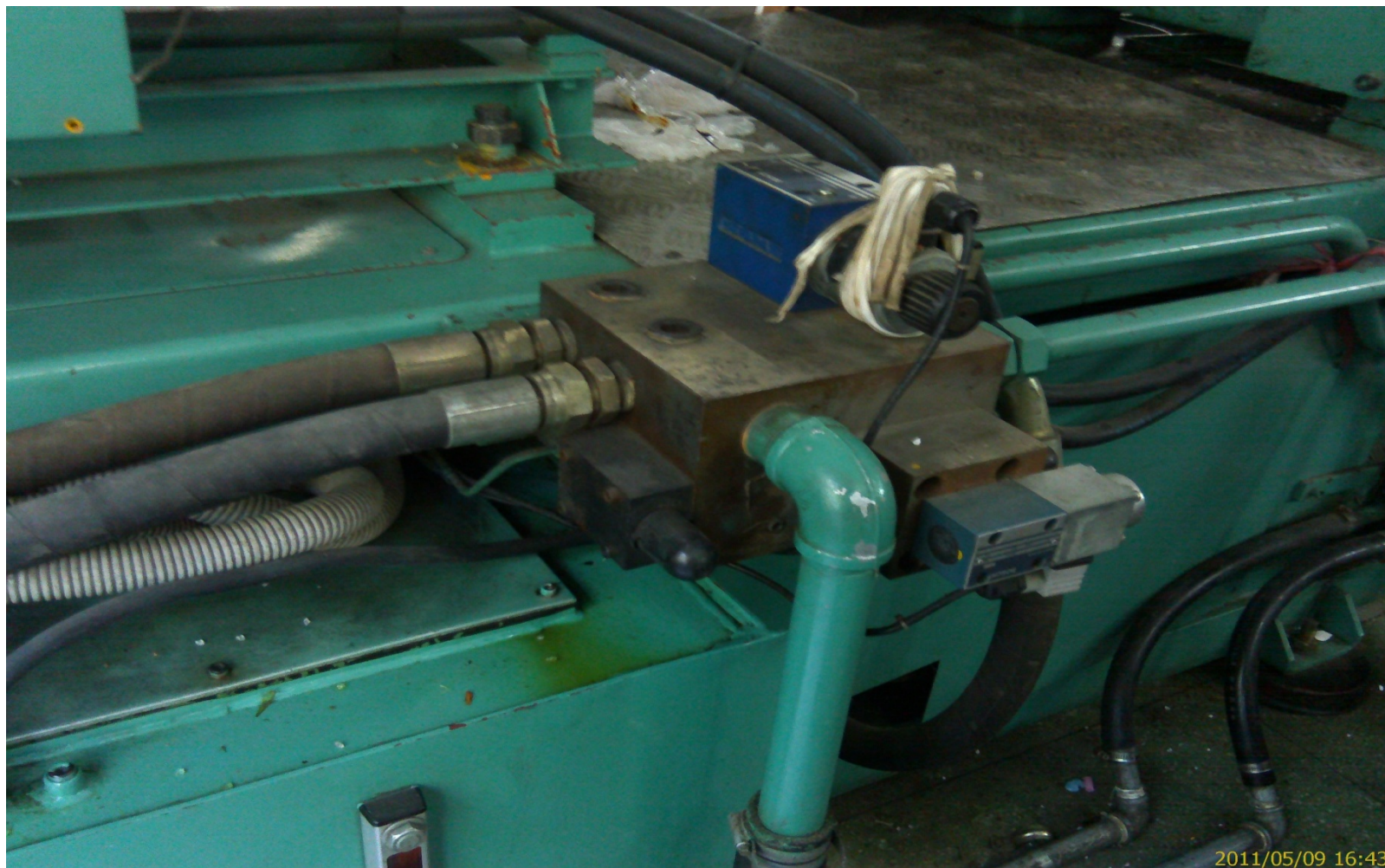
Main circuit wiring



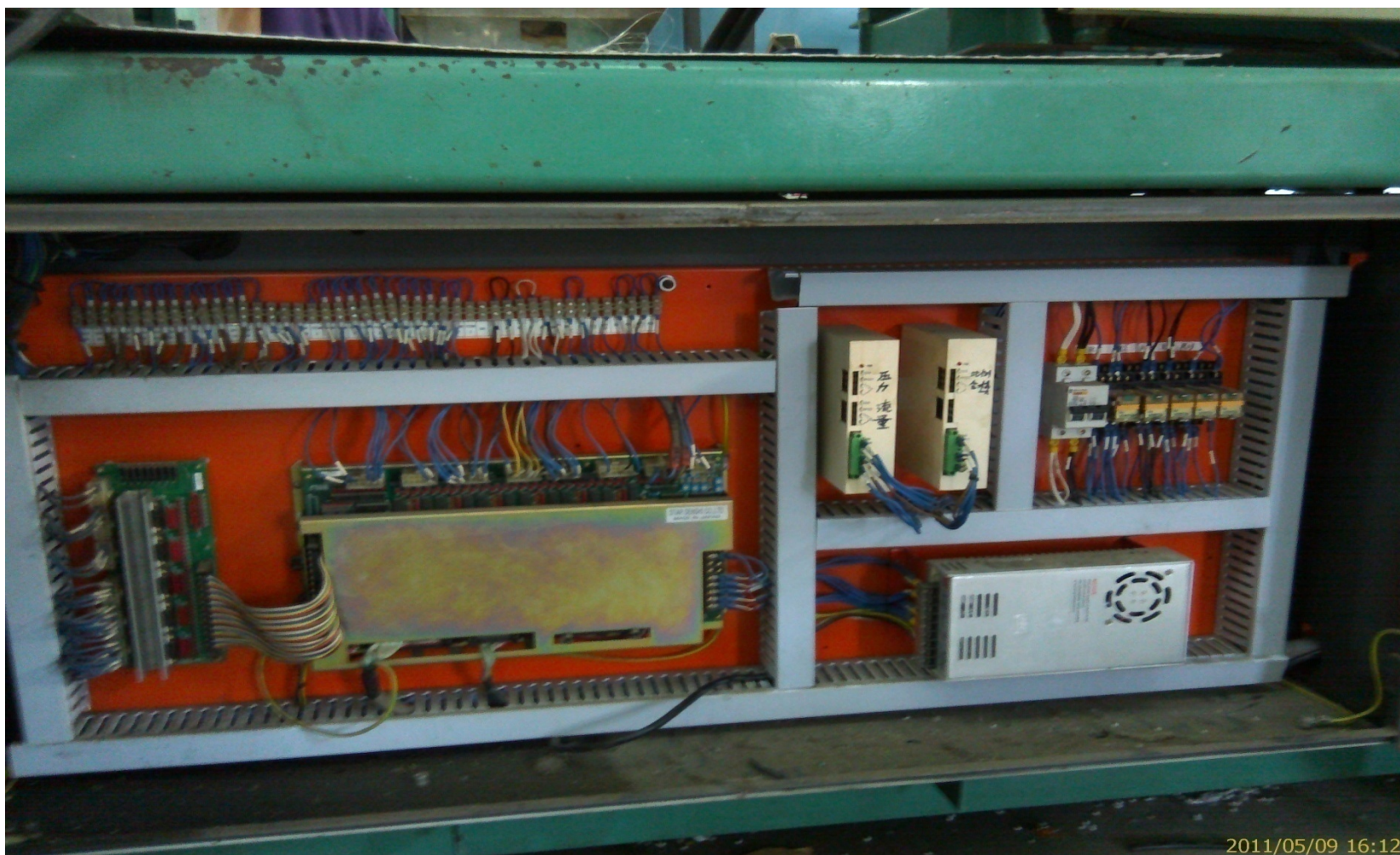
Main circuit wiring



Injection molding machine pressure, flow signals extraction



Injection molding machine pressure, flow signal selection



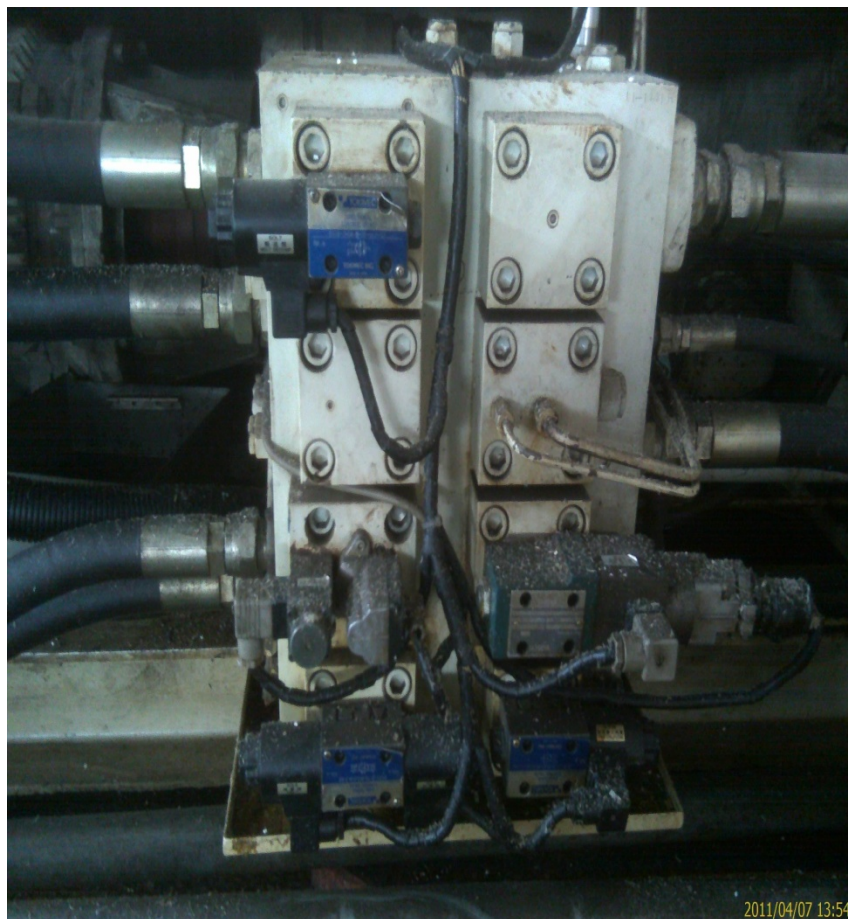
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Injection molding machine pressure, flow signal line connection

- correctly find the proportion flow signals and proportion pressure signals. When the signal is a current signal, on the signal acquisition card 1IA, 1IB are channel-one input terminals for current signal, the corresponding internal channel is AI3, its function code is P0.03 = 2, and the corresponding parameters are set to P5.25 - P5.29; 1IA is the positive input terminal of the differential current, whereas 1IB is the negative input terminal of the differential current;
- 2IA, 2IB are channel-two input terminals for the current signal; the corresponding internal channel is AI4: its function code is P0.04 = 1, and the corresponding parameters are set to P5.30 - P5.34; 2IA is the positive input terminal of the differential current, whereas 2IB is the negative input terminal of the differential current;

- The two signal channel combination pattern is set by the parameter P0.06;
- Pay attention to the current flow direction of the signal cable in connection;
- Some injection molding machine pressure signals and flow signals are closed loop control, take the input voltage signal, power saver injection molding machine card replacement for voltage type injection molding machine card.

Injection molding machine signal board extraction voltage signal



Parameter settings

- After all cables are connected, test the directions of the main supply、energy-saving and the motor running, motor reversing lead to injection molding machine all action is not moving, pressure is zero, because the pump reverse without hydraulic oil output;
- Perform auto-learning of the motor parameters, auto learning steps and notes are as follows: First, correctly enter the motor nameplate parameters, with the corresponding function code: P2.01-P2.05. First input P2.05(motor rated power) input P2.01(motor rated frequency)P2.02(motor rated rpm)P2.03(motor rated voltage) P2.04(motor rated current), change the following parameters: P0.01=0(keyboard control)P0.11=20(acceleration) P0.12=20(deceleration);
- Turn the energy saving cabinet to the state of energy-saving, and start the motor of the injection molding machine (keep the inverter output connected to the motor);

- Change P0.17 to 1. Finally, press the green button of operation, the frequency inverter will automatically perform autolearning. In the end it will display END;
- Press the operation key to test, to the rated motor frequency inverter output should be rated motor voltage, if the difference is more to adjust P2.08、P2.09, up output voltage to raise, small output voltage to reduce.
- Finally turn the energy saver switch to stop position, change P0.18 to 3 press ENT to complete the injection molding machine parameter setting.

Problems encountered in debugging and the solutions

- If the injection molding machine action slower than the original, change P5.27
、 P5.32 parameters small;
- If the injection molding machine doesn't work but the motor is still rotating, use the multi-meter DC file to test the voltage between the 1IA and 1IB, if the voltage is not zero, change P5.25. and use multimeter DC file to test the voltage between the 2IA and 2IB, if the voltage is not zero change P5.30;
- If the injection molding machine work without flow and pressure signals, can deal it with multiple speed
- If the energy saver has faults can't processed in time, first stop the injection molding machine motor, then switch to main supply electric operation.

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