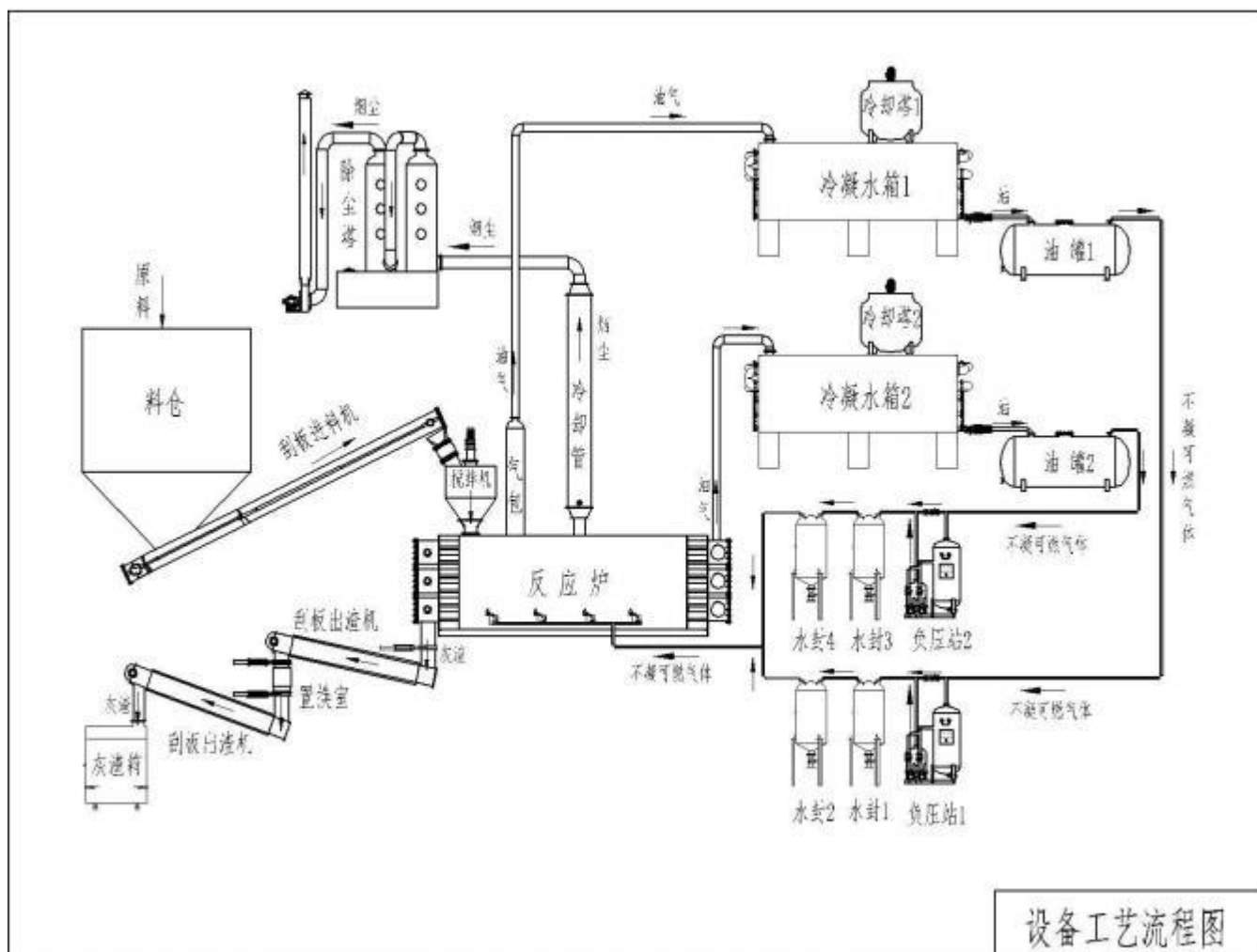


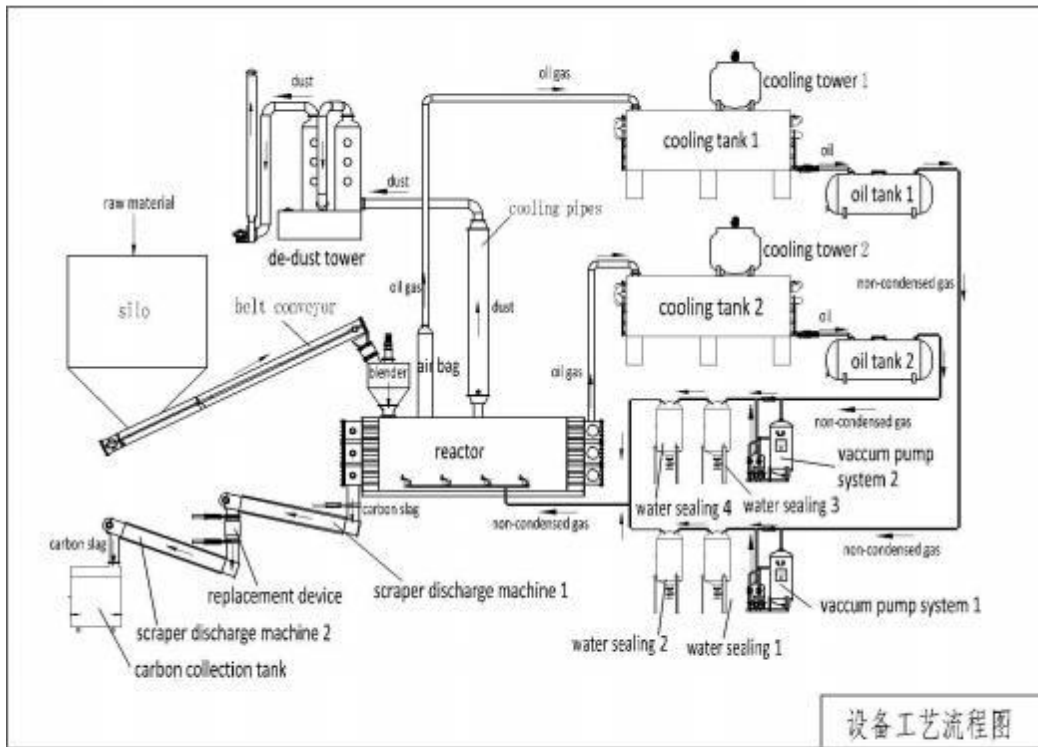
连续裂解设备使用说明书

Instruciton manual for fully continuous pyrolysis plant

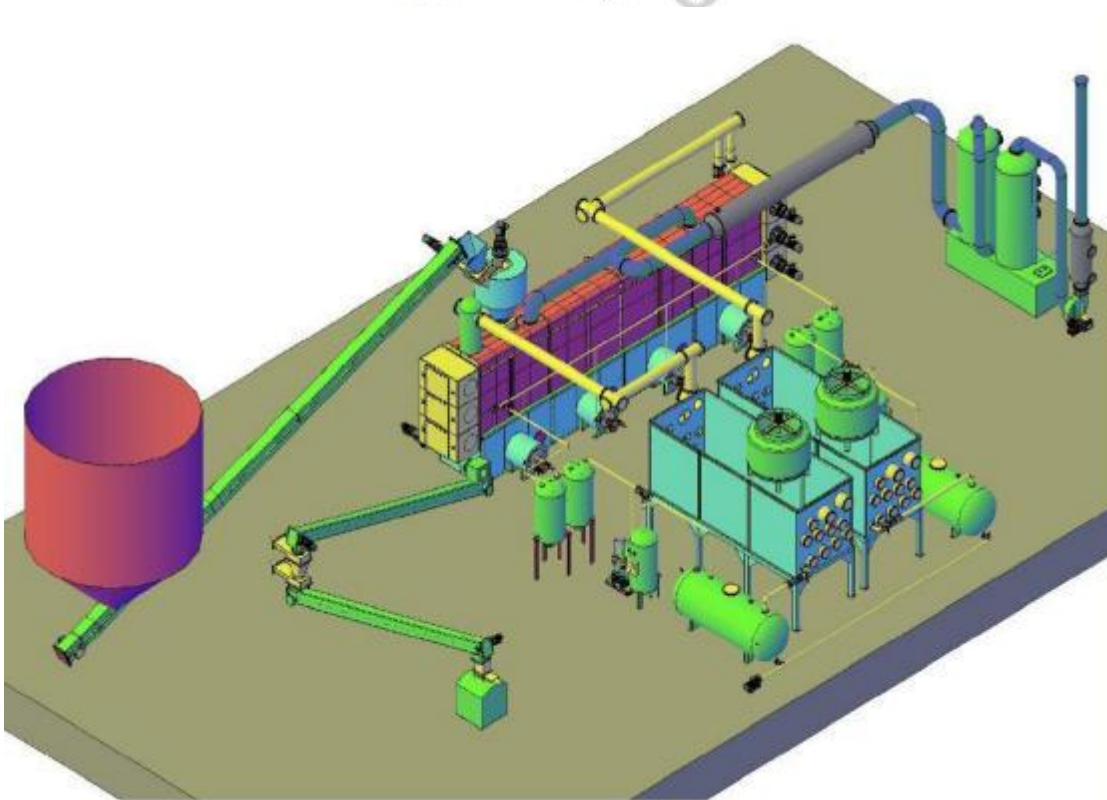
一、 工艺流程

Flow chart

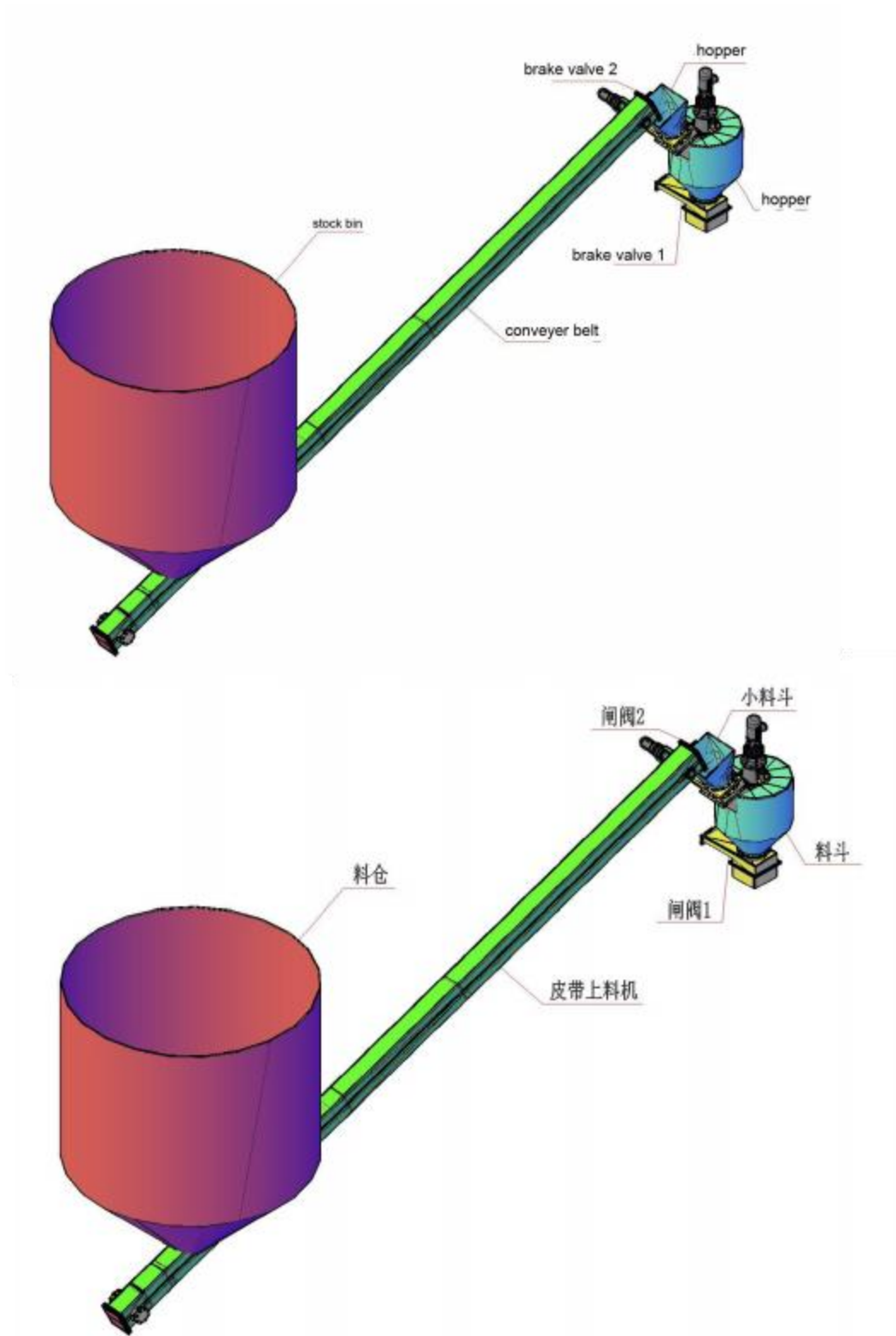




二、设备结构 Structure



1.1 进料系统 feeding system



A. 进料方式

Feeding way

本设备进料要做到原料可以连续进同时空气不能进入。由于原料不同，有固态，液态和半液态。而固态又因比重不同进料方式也不一样。比重轻的像泡沫塑料必须经过挤压处理，不然进料很困难。

The continuous pyrolysis plant requires raw material should be continuously fed in meanwhile air can not feed in.

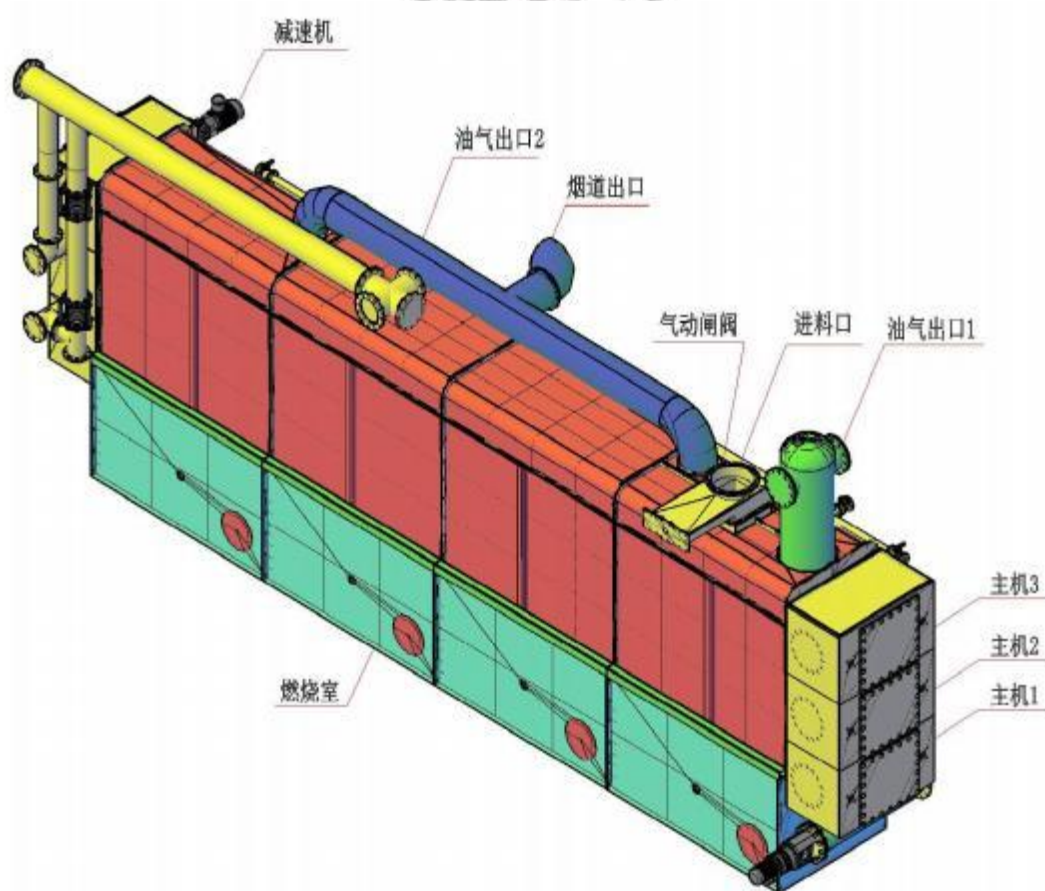
There are many kinds of raw material some are liquid some solid, some semi-liquid. The feeding ways are different because of the different density of solid material. For small density material such as plastic, it must be pressed before feeding, other wise difficult to feed in.

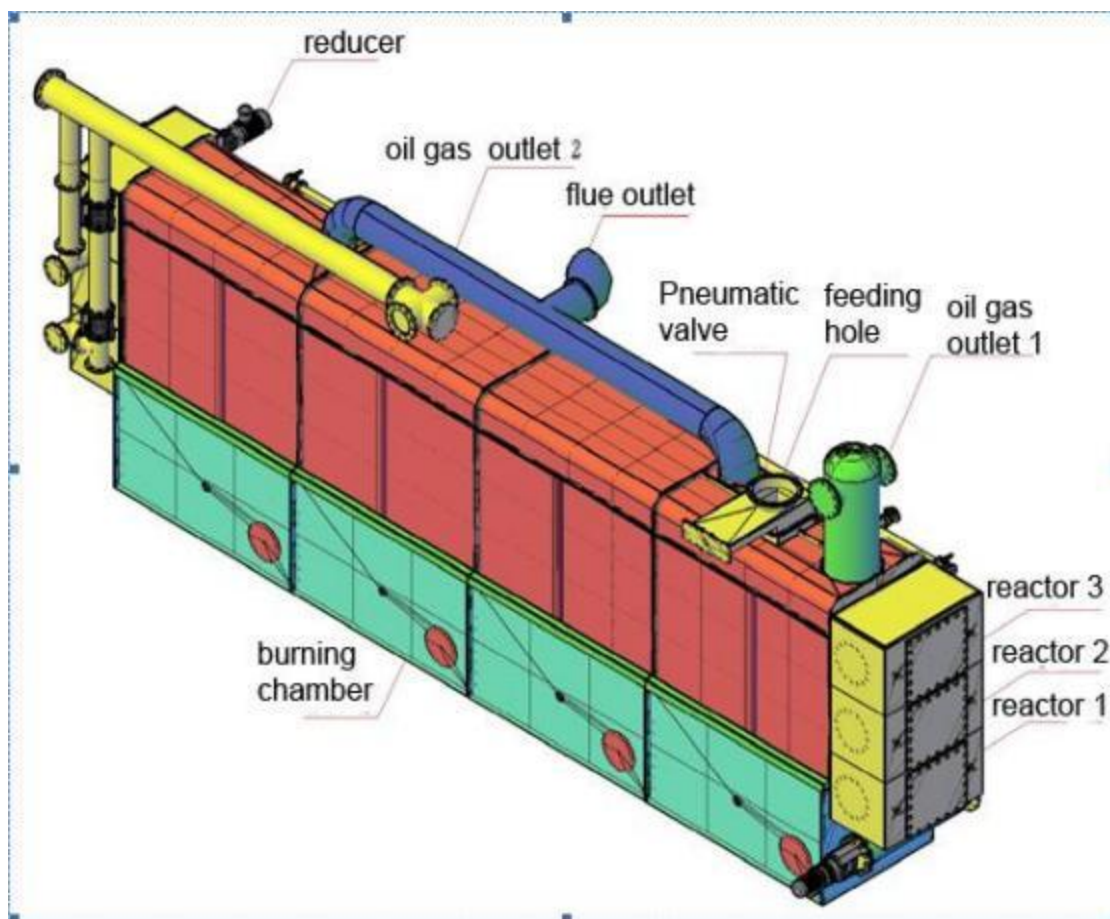
B. 输送方式

Transportation way

1.2 干馏、裂解系统

1.2 pyrolysis system





该裂解系统是刮板复链式。其独特之一是克服一些物料在高温干馏，热裂解时有粘壁，结块，导致热传递差。

The system is scraper chain type .one of big characters is solving the problem of coking and sticking during high temperature cracking which lead to slow heat conduction.

A. 有三个温区低温区 20~150 度，中温区 150~250 度，高温区 250~500 度。

There are 3 temperature areas

Low temperature area 20-150 °C, middle temperature area 150-250 °C,

High temperature area 250~500 °C .

B. 有三个主传动

电机 7.5 千瓦，摆线针两极电机，输出最高转速 3 转/分。变频无级调速。

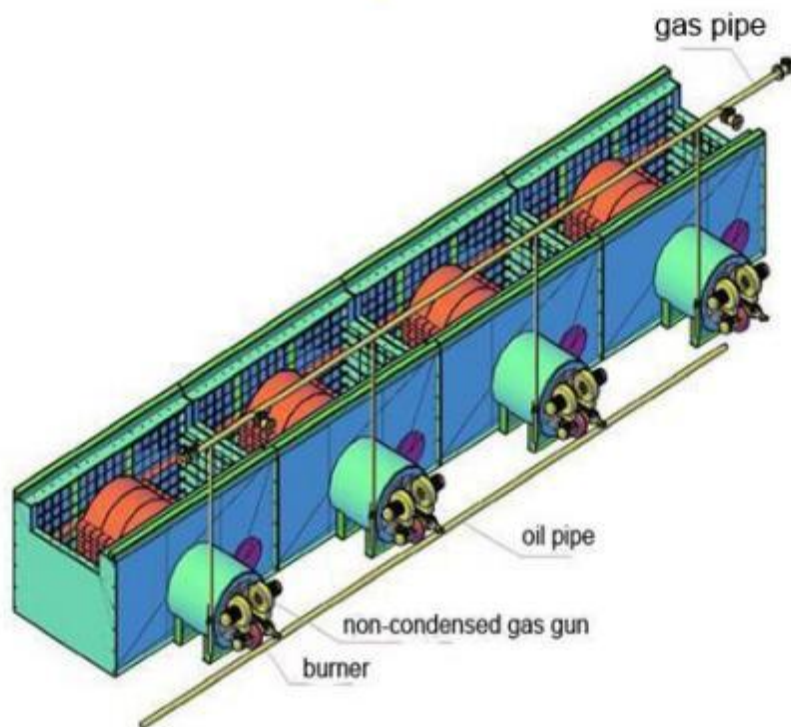
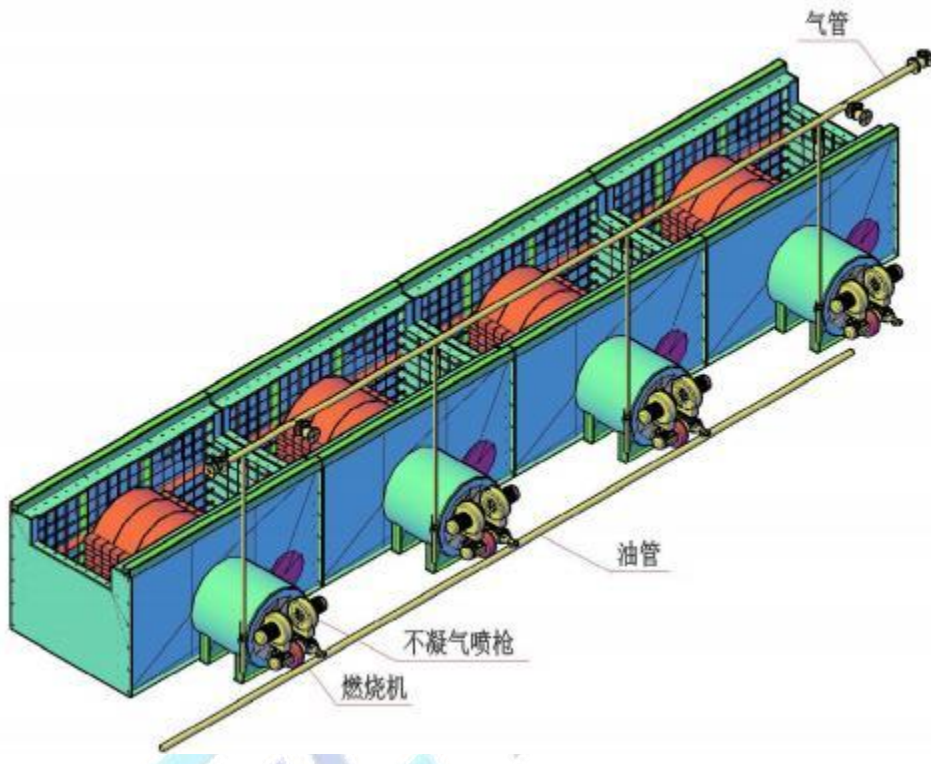
There are 3 main drives.

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7.5 kw motor , cycloidal pin Bipolar speed reducer ,the max output speed is 3 rpm.
Frequency conversion stepless

C. 链板有三条往复闭循环链板链条，
chain belt has 3 reciprocating close loop chain plates

D. 燃烧室
burning chamber



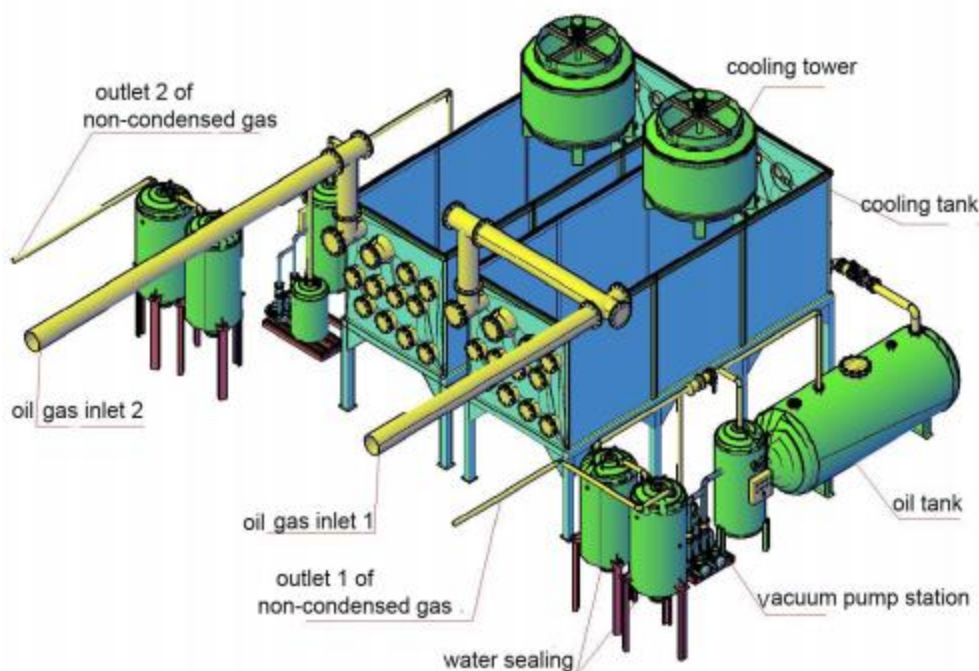
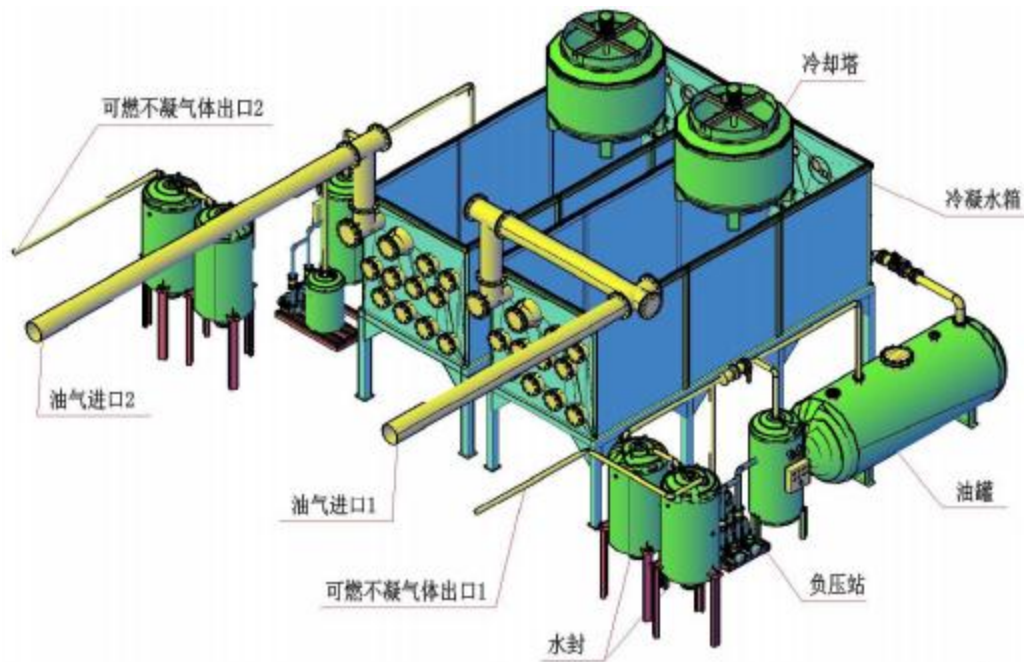
本机设有四个燃烧室。特点是主机受热匀称，克服老式通用燃烧有局部高温现象。可比传统加热方式延长主机使用寿命。

There are four designed burning chamber.the feature of it is heating reactor uniformly over come the problem of uneven heating and high temperature partly.

It can prolong machine work life comparing to traditional reactor.

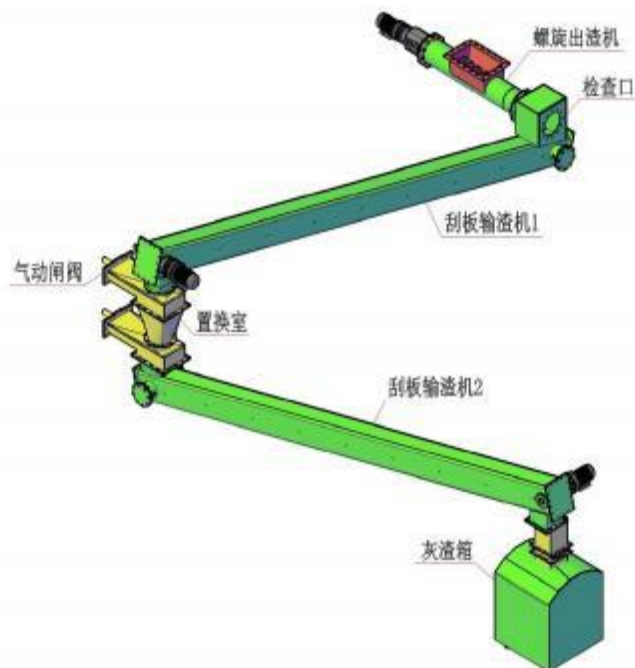
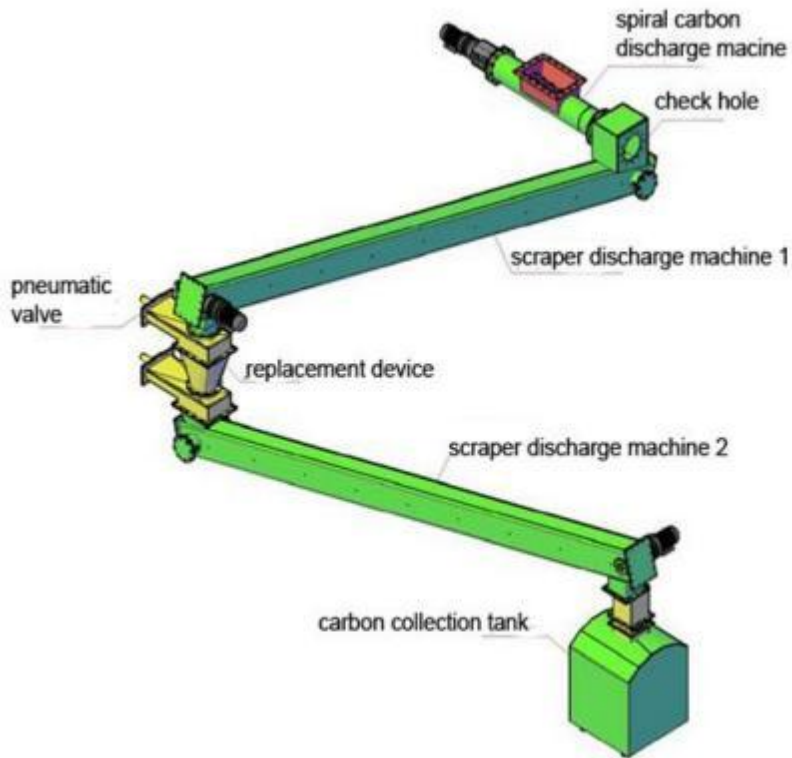
1.3 油、汽收集冷却系统

oil and gas collection system



- A. 催化 catalyst
- B. 降尘阻尼 dust damp
- C. 冷却 cooling
- D. 气体收集回用 gas collect and reuse
- E. 负压站 negative pressure

1.4 出渣系统 slag discharge system



A. 出渣方式

slag discharge way

一级出渣选用罗旋机料封形式。目的是渣正常通过同时切断油气外流。

First class discharge is in the way of spiral material seal, in this way to prevent oil gas going out meanwhile let slag come out .

三级出渣是刮板外夹套水冷输送。同时二三级出渣连接处设有气动闸阀置换机构，防止内外气体对流。

Second class and third class discharge are scraper conveyers with water cooling jacket. And at the connection between second class discharge and third discharge there is air valve of replacement device for fear convection of internal air and external air .

B. 渣输送 slag transportation

一级罗旋机输送，二级三级刮板机输送。

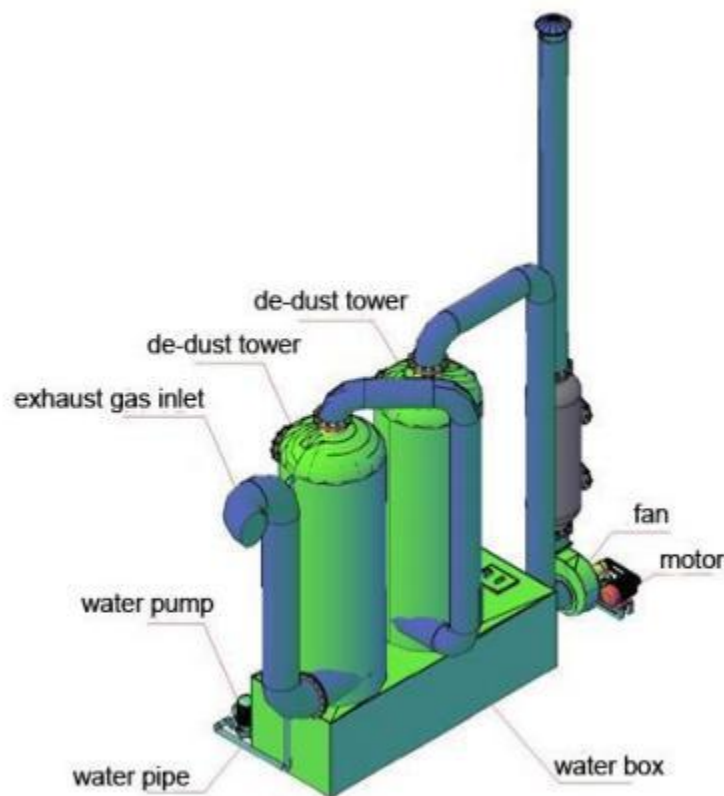
First class slag is transported by screw conveyor , second class slag transported by scraper conveyor .

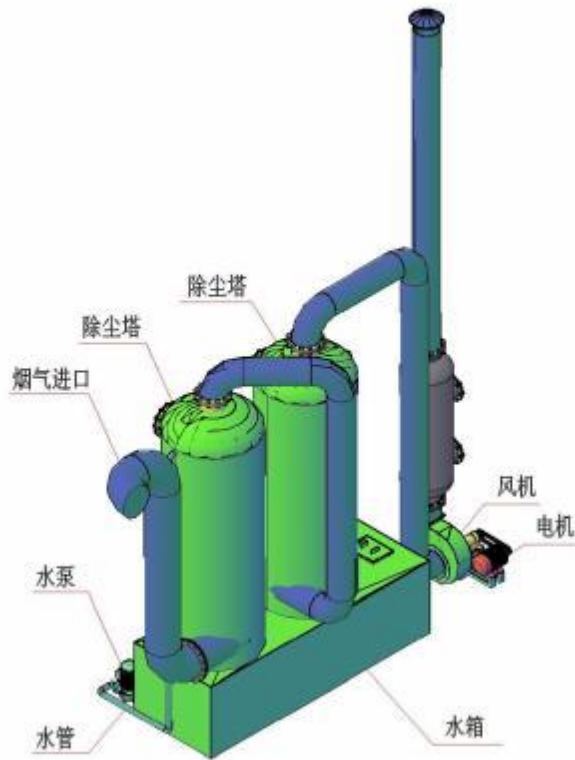
C. 渣收集 slag collection

渣收集有渣仓周转箱，定时定量更换外运另行包装处理。

Collect slag by collection tanks and pack it periodically and quantificationally .

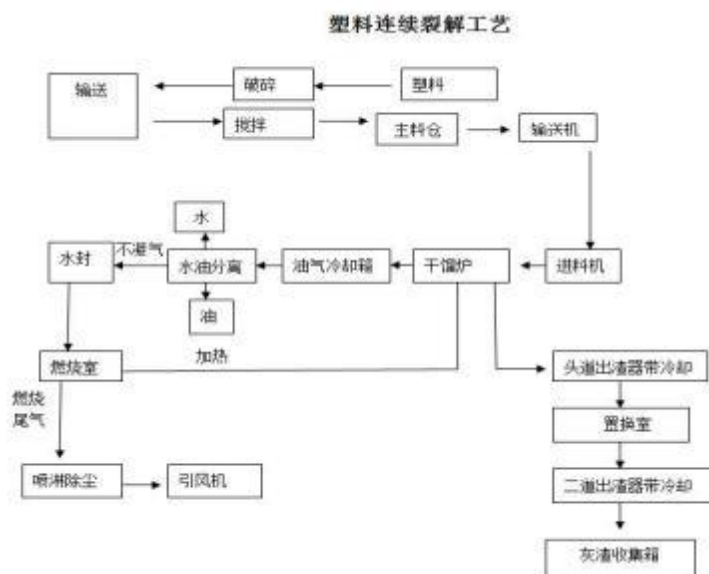
1.5 烟气脱硫除尘 desulfur system

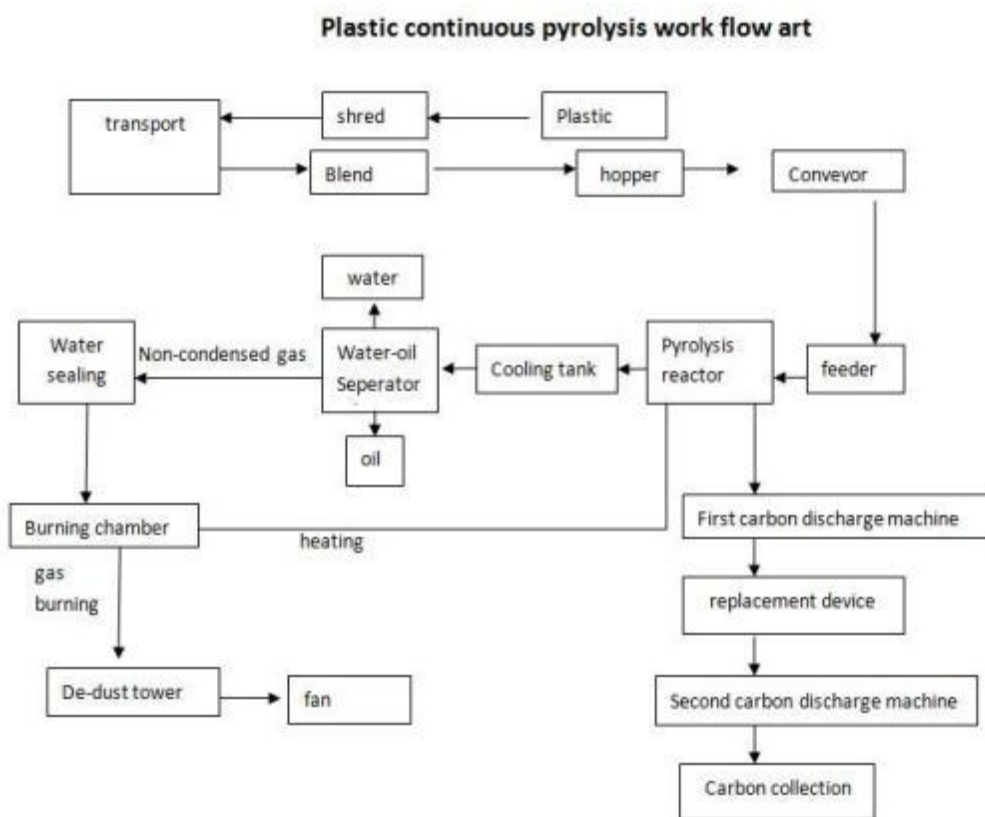




- A. 烟气输送
Flue gas transportation
- B. 烟气冷却 fule gas cooling
- C. 除尘塔 dedust tower
- D. 吸附塔 adsorption tower
- E. 引风机 fan

三、工作原理 working principle





四、设备安装 installation

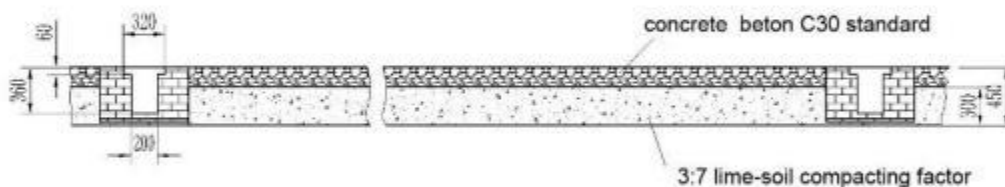
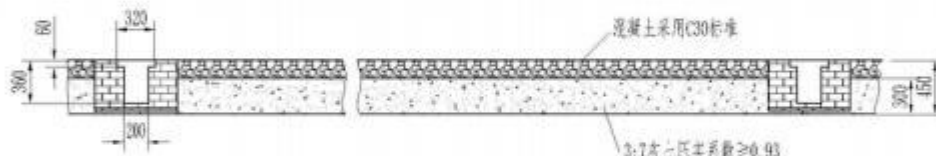
4.1 场地要求 site requirement

混凝土硬化地面，单位面积能承受 5000 kg/米。
Cement harden ground, bear 5000kg/m.

A. 地面要求 site requirement

整体平整，中高四周低，并有排水沟。如图

Overall flat, middle higher, four sides lower, has drainage ditch.



B. 厂房要求 workrequirements

钢架结构或砖混结构，

Steel structure or brick-concrete structure

跨度≥16米，长度20米。单套。

span≥16m, long 20m, single set.

房顶高度≥10米，坡度5%。

Roof high ≥10m, gradient 5%.,

抗雪压80kg/米。

Snow-crushing resistance 80kg/m

抗风七级。

Wind resistance 7 grade

抗震六级。

Anti-seismic 6 grade

房顶设有通气楼，排气量 ≥ 16 立方米/分

Ventilation floor on the roof, gas displacement $\geq 16M^3$

4.2 电力要求 power supply

输入电源电压 $>380V$ ，承载量 200 千瓦/小时。电频 50~60

Input power voltage $>380V$, load 200kw /hour ,power frequency 50~60HZ

4.3 水源要求 Water requirements

厂区有储水池 ≥ 200 立方米。水源有自来水，河水，井水。水质中性。

Factory has water pool more than 200CBM .Water source can be tap water ,river ,well etc.

Neutral water.

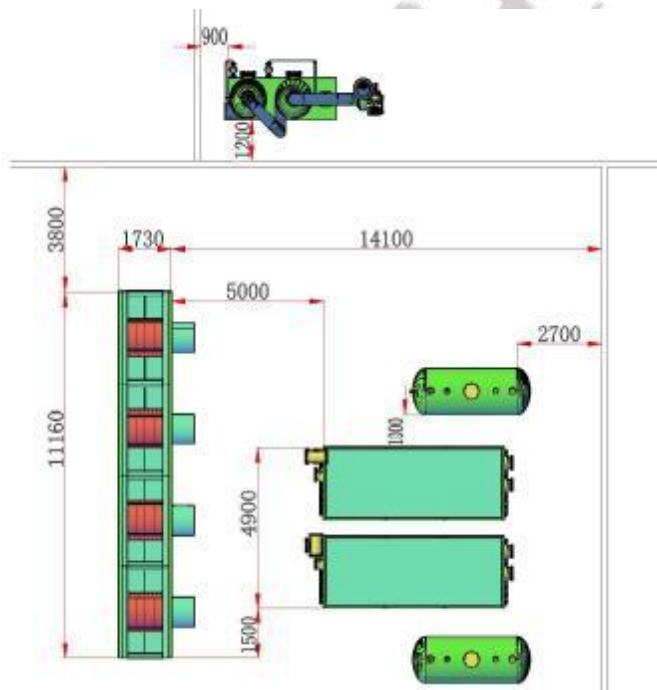
4.4 消防管线 Fire line

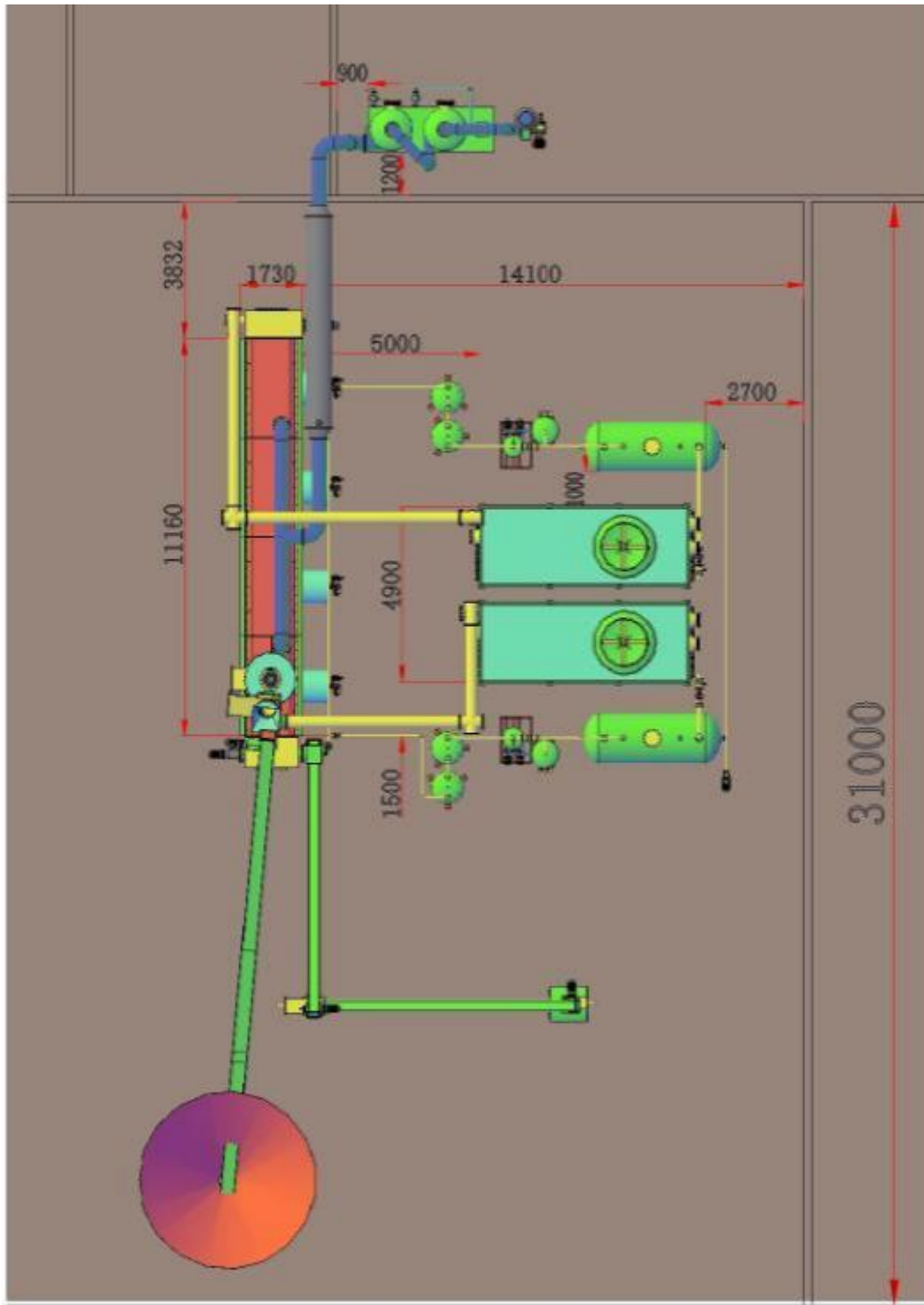
按当地要求布局装配。

According to local standards!

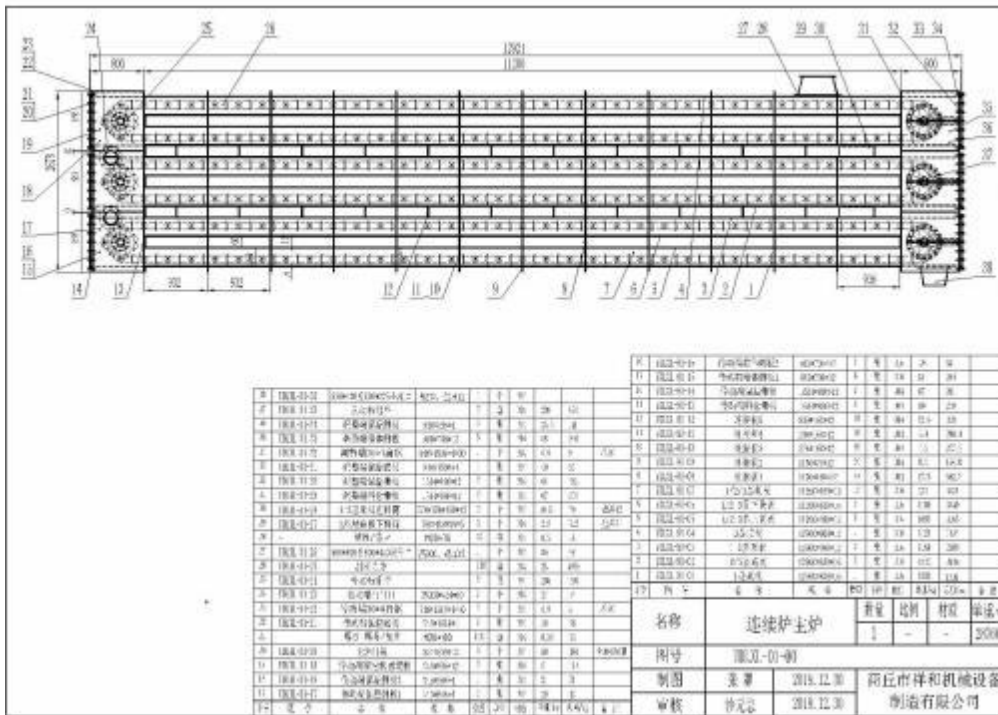
4.5 主机定位 Main machine location

A. 主机底座装配 basement of reactor installation

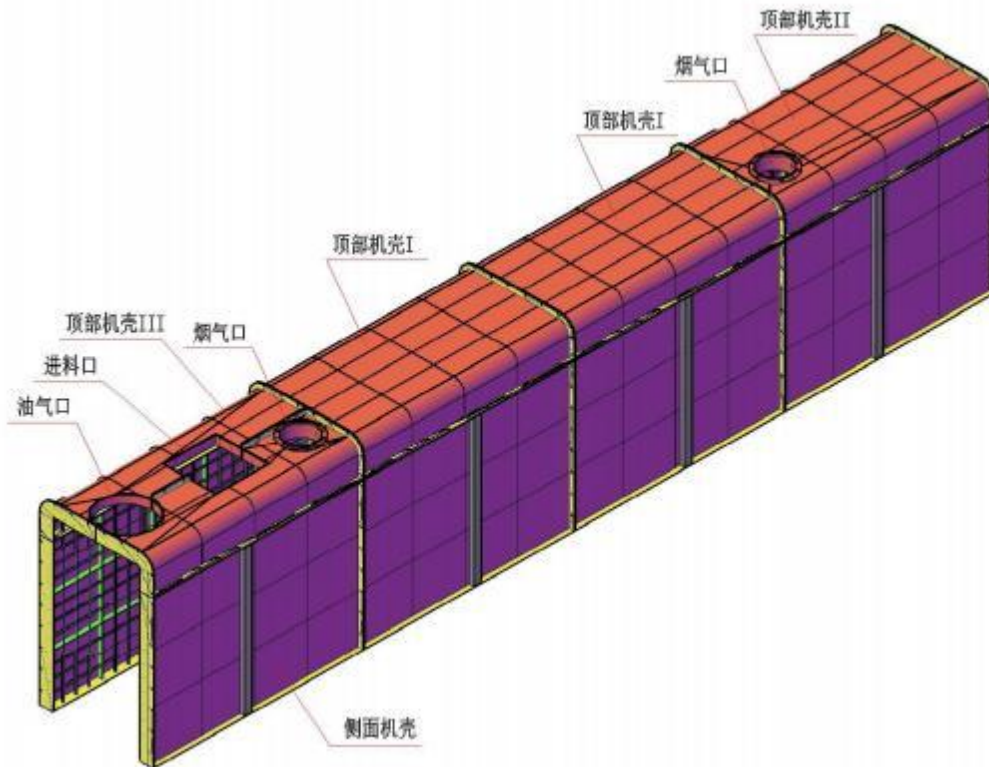


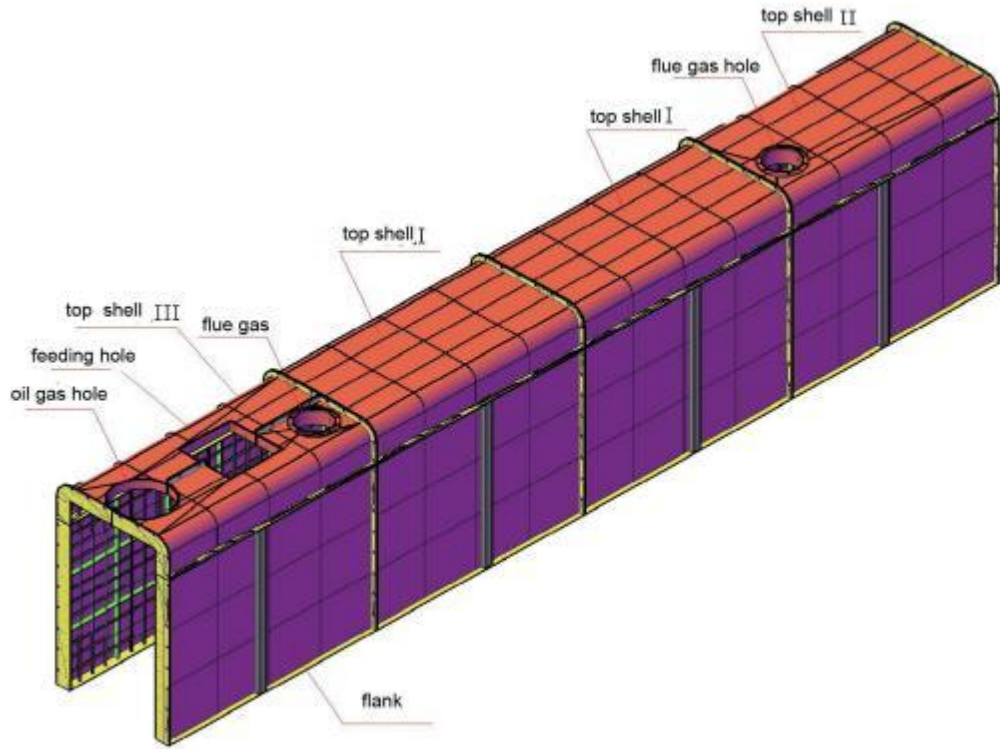


B.主机安装 reactor installation

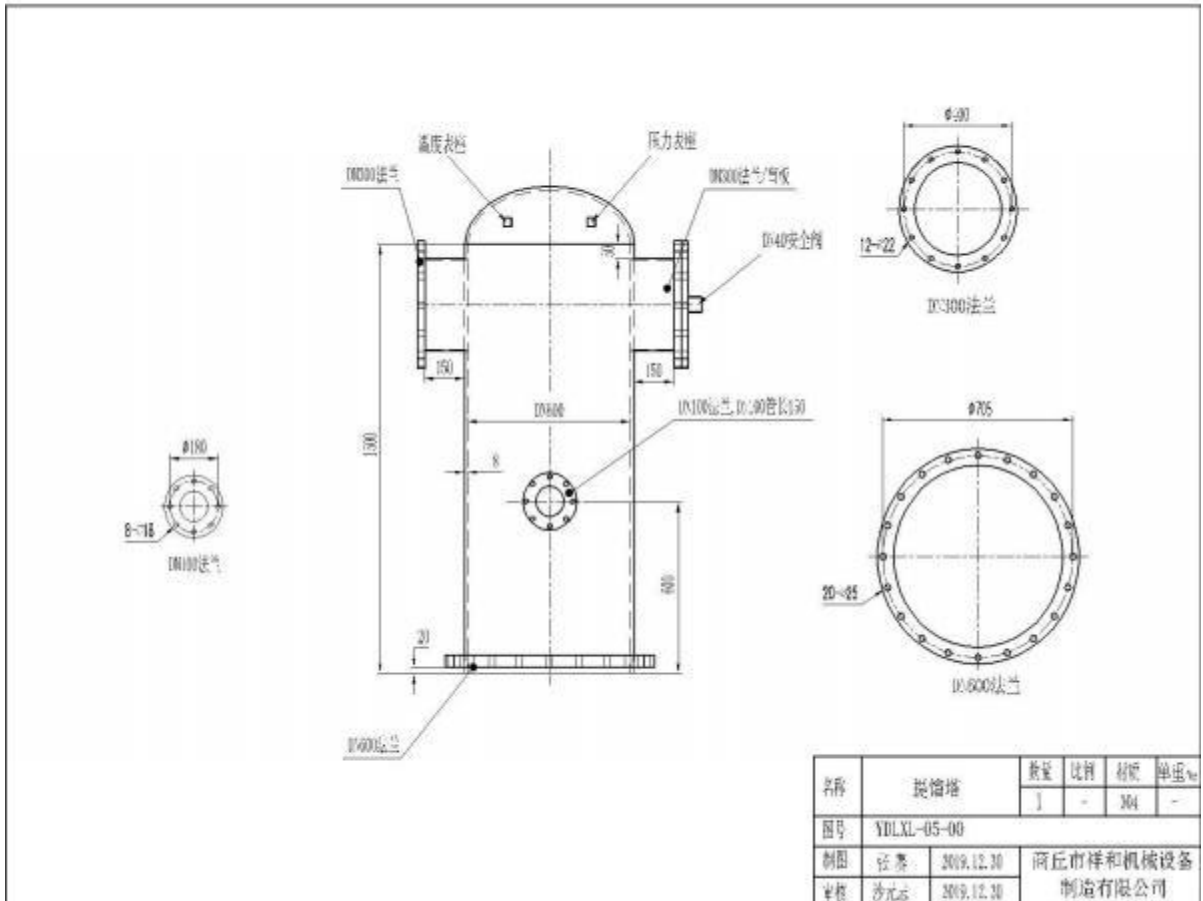


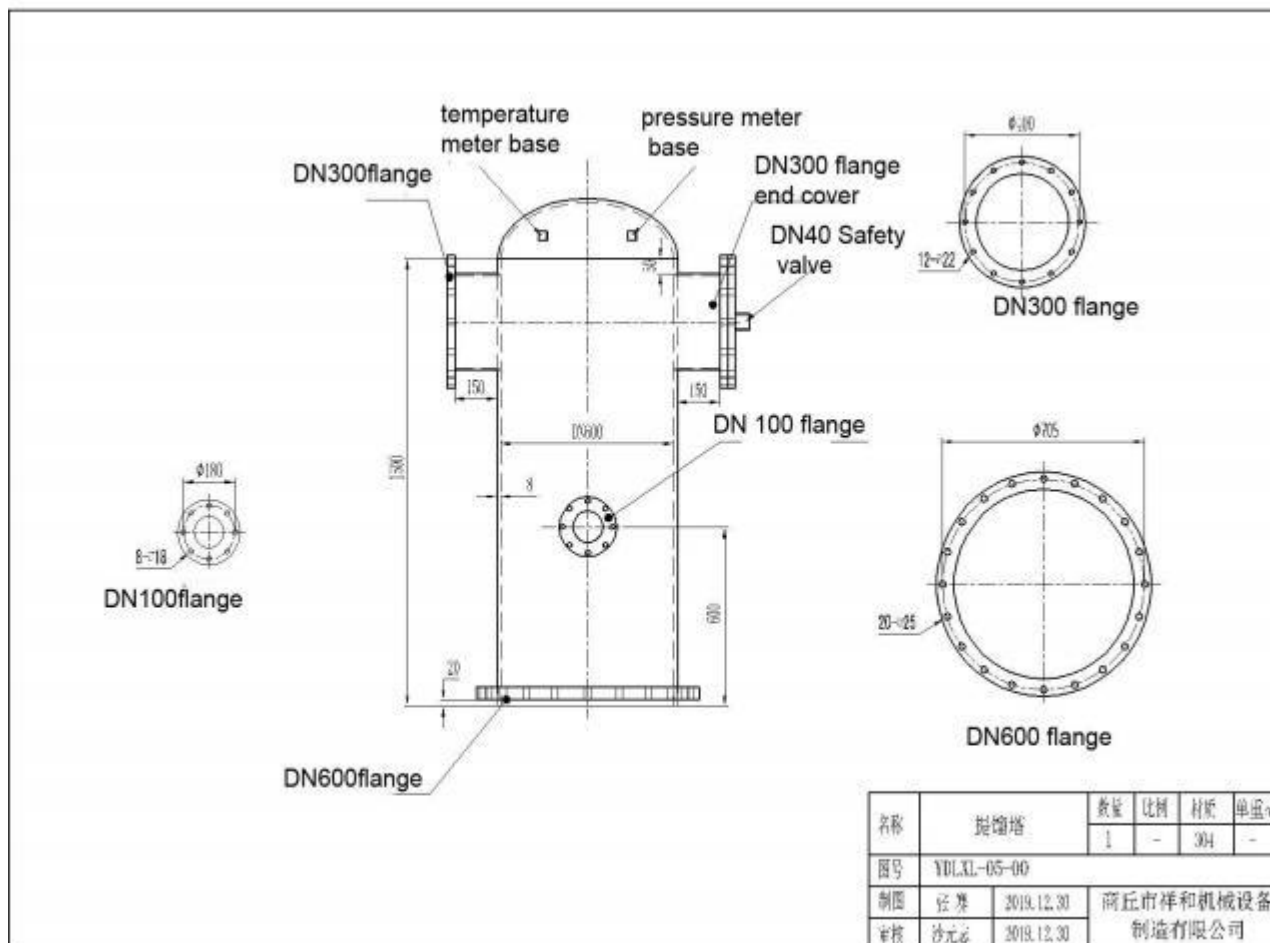
C. 主机外壳装配 cover installation





D. 进料口、气包装配
Feeding hole and air bag installation

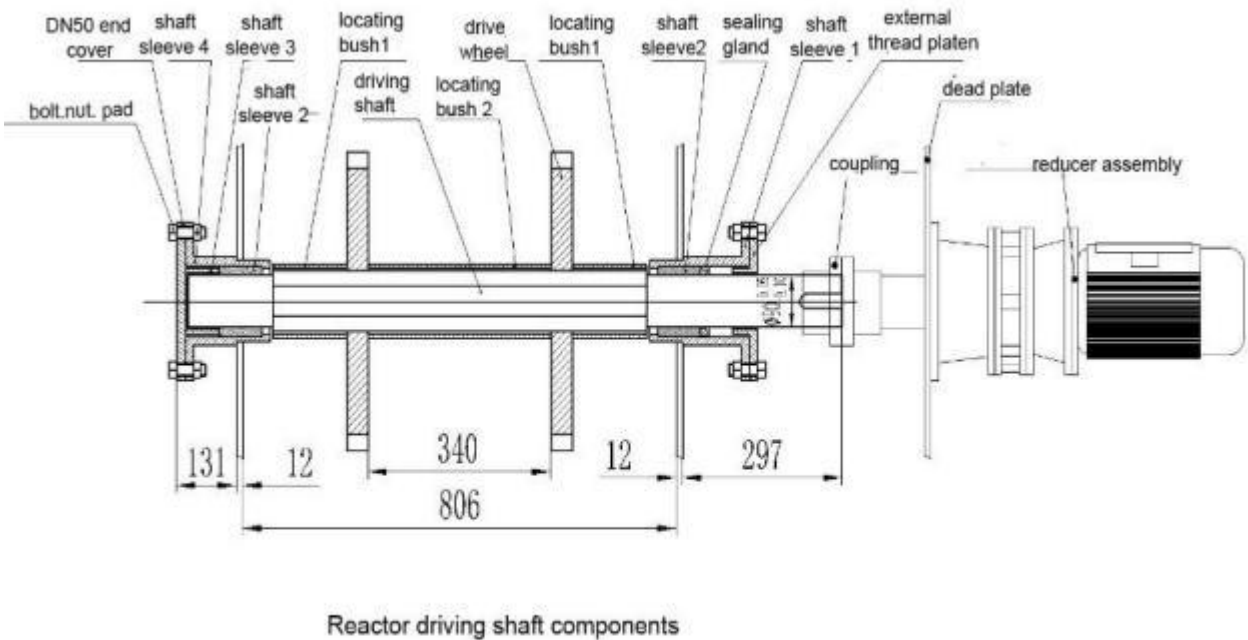
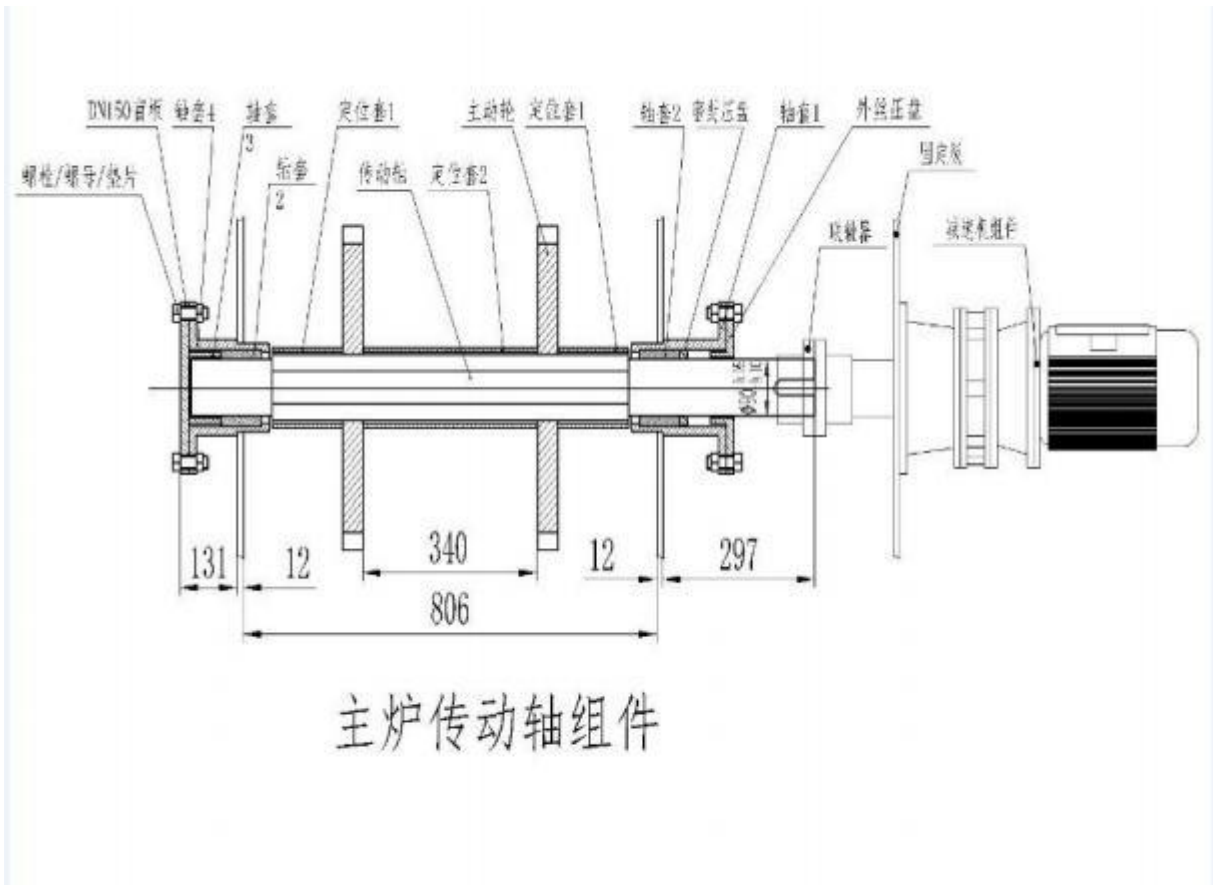




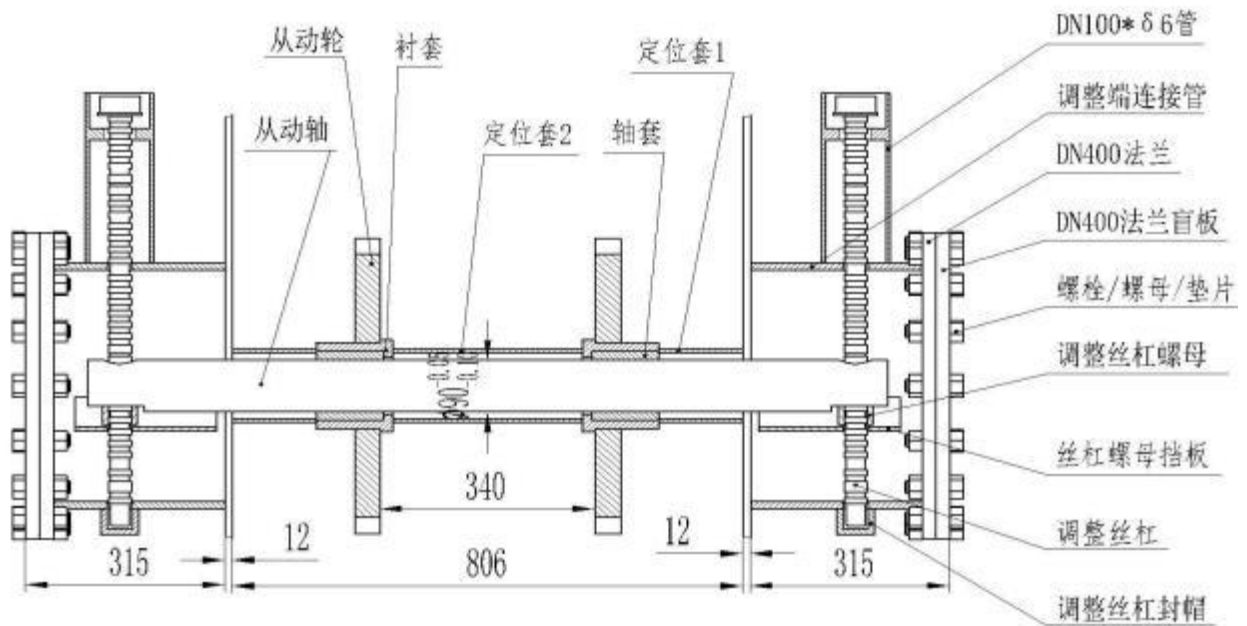
4.6 上料系统装配 feeding system installation

- A. 气动闸阀装配 pneumatic valve installation
- B. 料仓装配 stock bin installation
- C. 上料机装配 feeder installation
- D. 制氮机装配 nitrogen making machine installation
- E. 氮气管线连接图 nitrogen gas connection pipe line
- F. 原料仓定位 raw material warehouse location

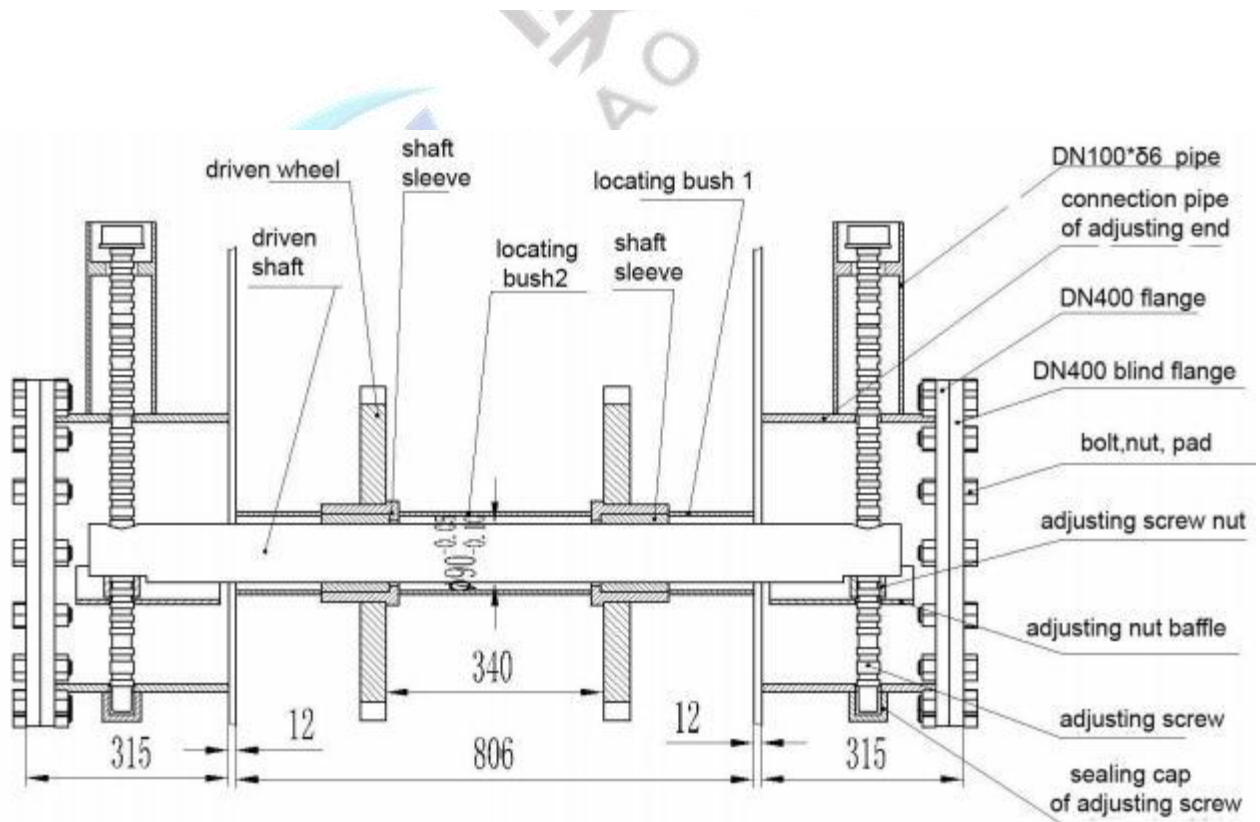
4.7 主机主转动装配 Main machine Principal rotation installation



4.8 主机从动装配 Main machine driven assembly

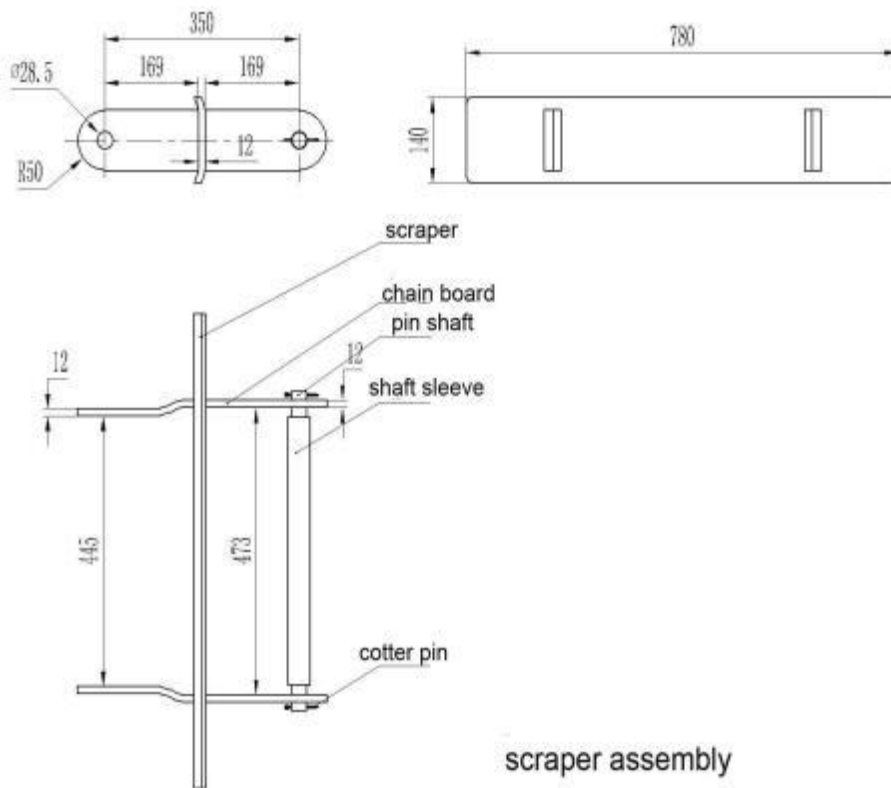
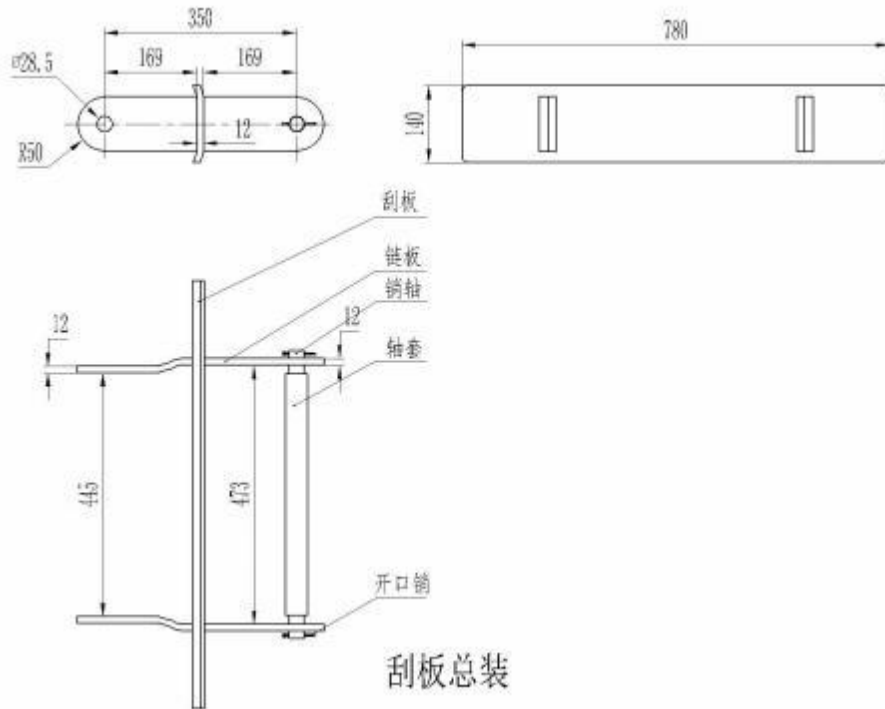


主炉从动轴组件

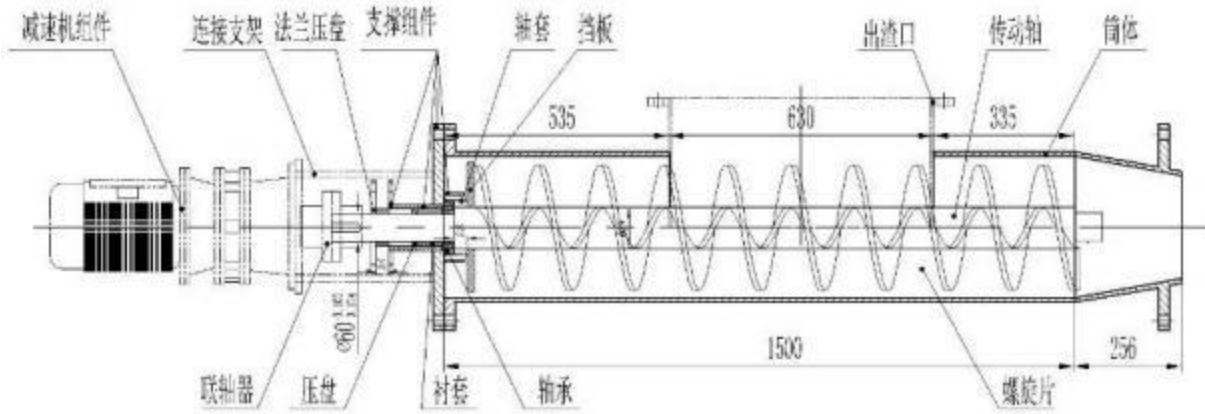


driven shaft components of reactor

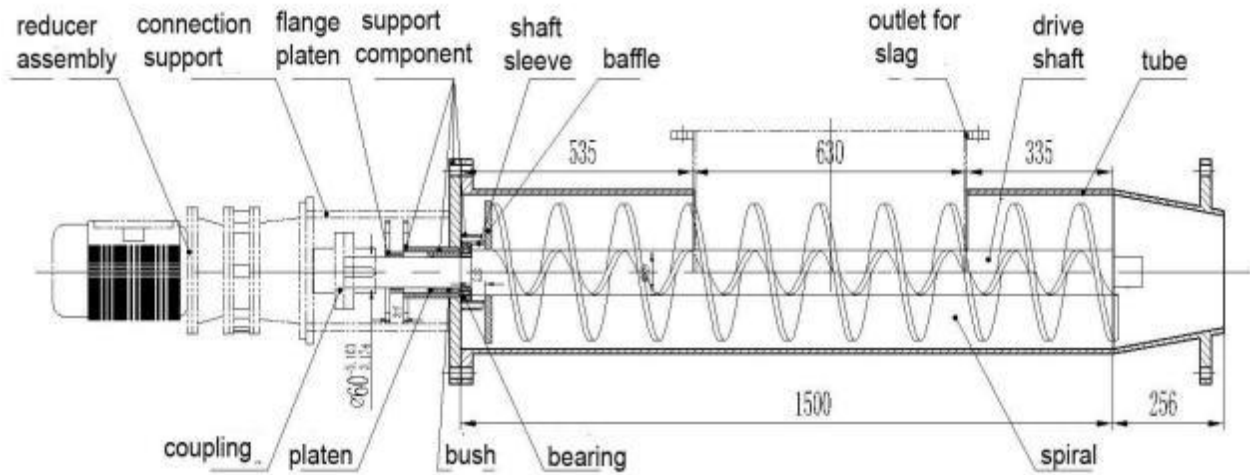
4.9 主机刮板链装配 maine machine scraper chain assembly



4.10 出渣螺旋机装配 spiral carbon discharge machine



出渣机



carbon discharge machine

4.11 出渣一、出渣二过渡箱装配

Assembly of transition box between first carbon discharge machine and second carbon discharge machine

4.12 水冷出渣机装配

Water-cooled carbon discharge machine assembly

4.13 置换室、气动阀装配

Assembly of replacement and air valve

- A. 气动闸阀管线连接
Pneumatic valve pipe line connection
- B. 气泵、电控箱定位
Location of air pump and control board

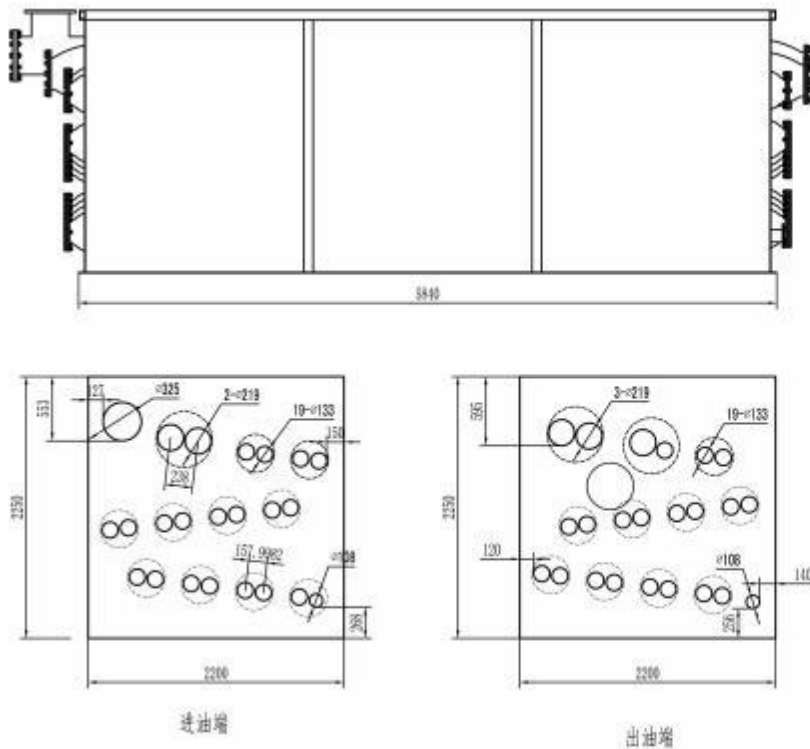
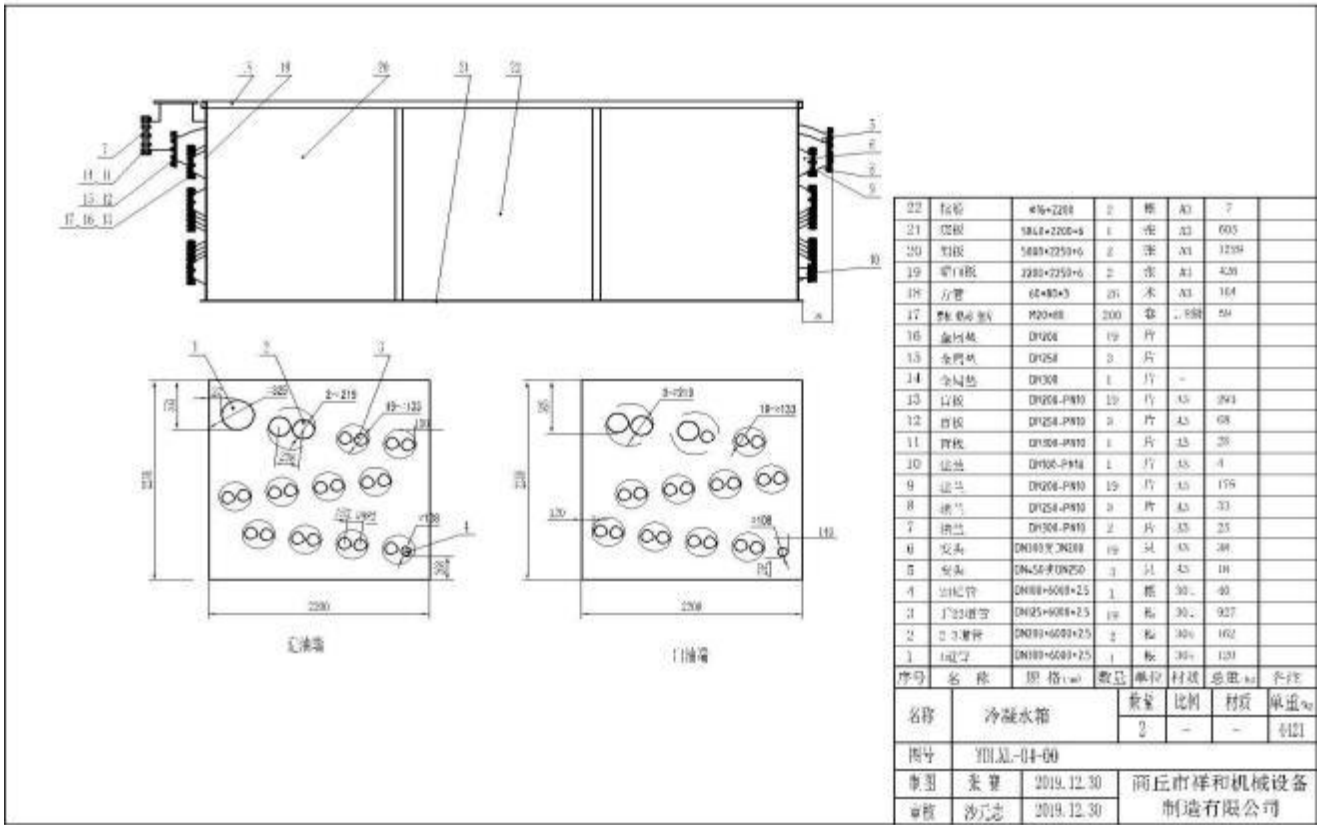
4.14 出渣三装配

Installation of 3rd carbon discharge machine

4.15 燃烧机装配 Installation of burner

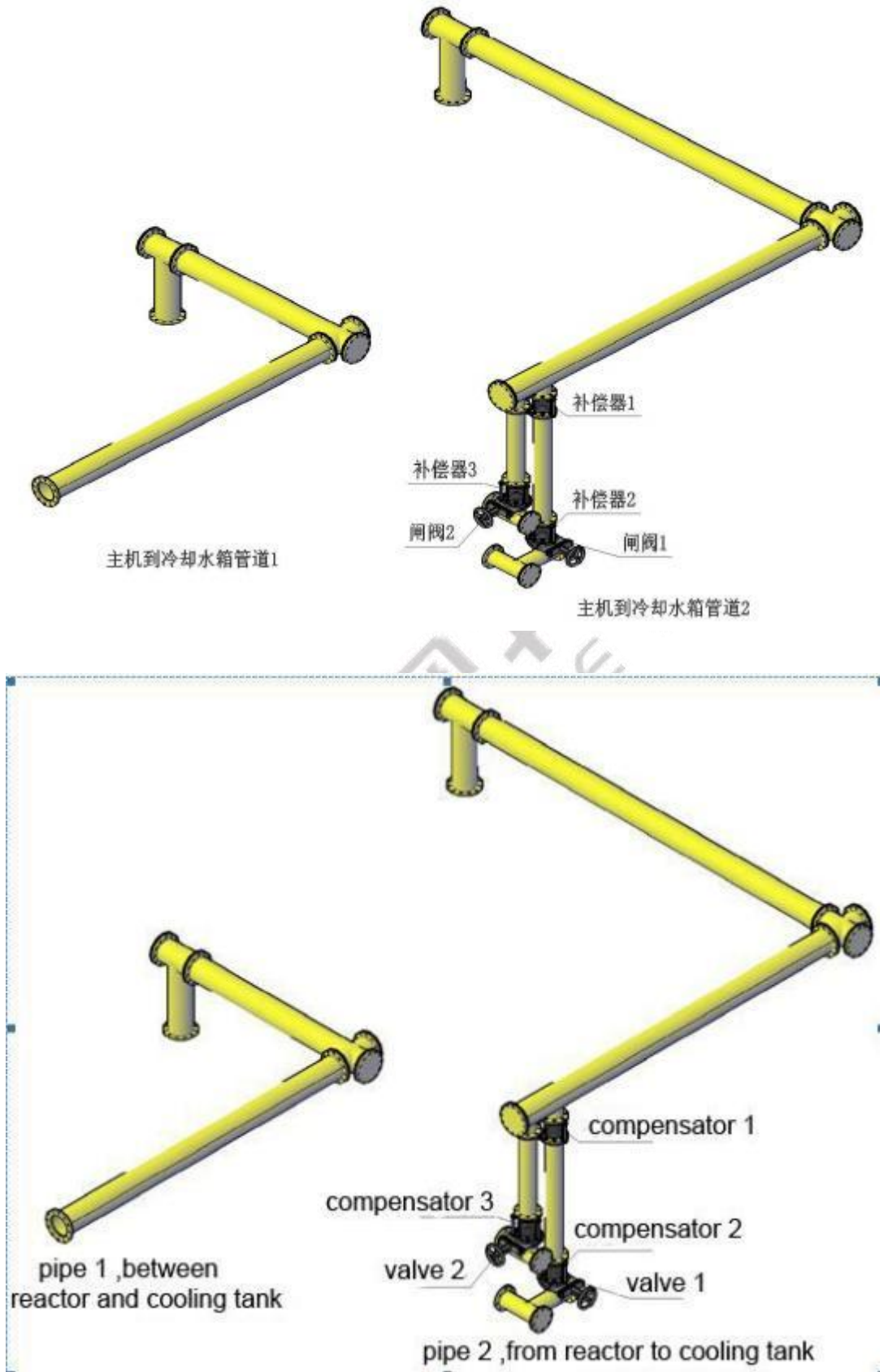
- A. 燃烧机定位 burner positioning
- B. 油管连接 oil pipe connection
- C. 气管连接 gas pipe connection
- D. 电路连接 Circuit connection

4.16 冷却系统装配 Installation of cooling system

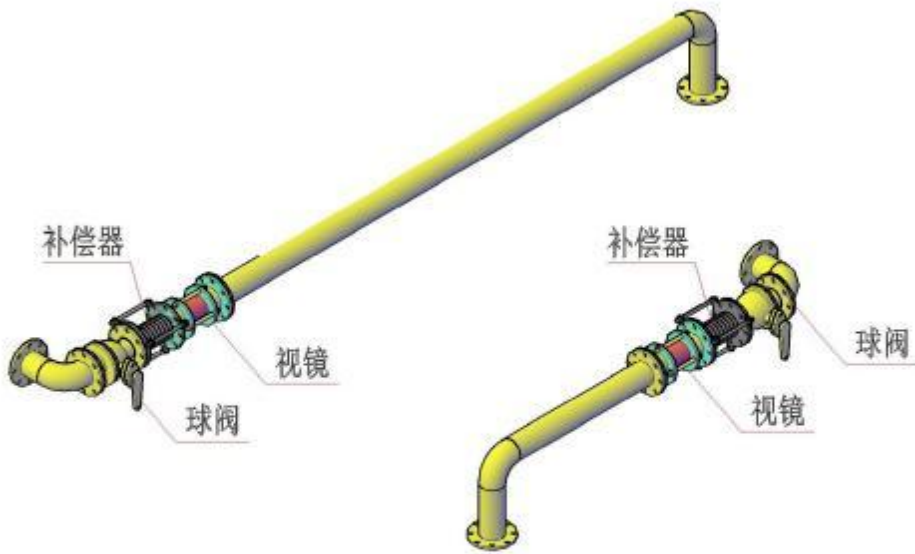


A. 冷却水箱定位 cooling tank positioning

B. 主机到冷却箱管道连接 connection between cooling tank and reactor

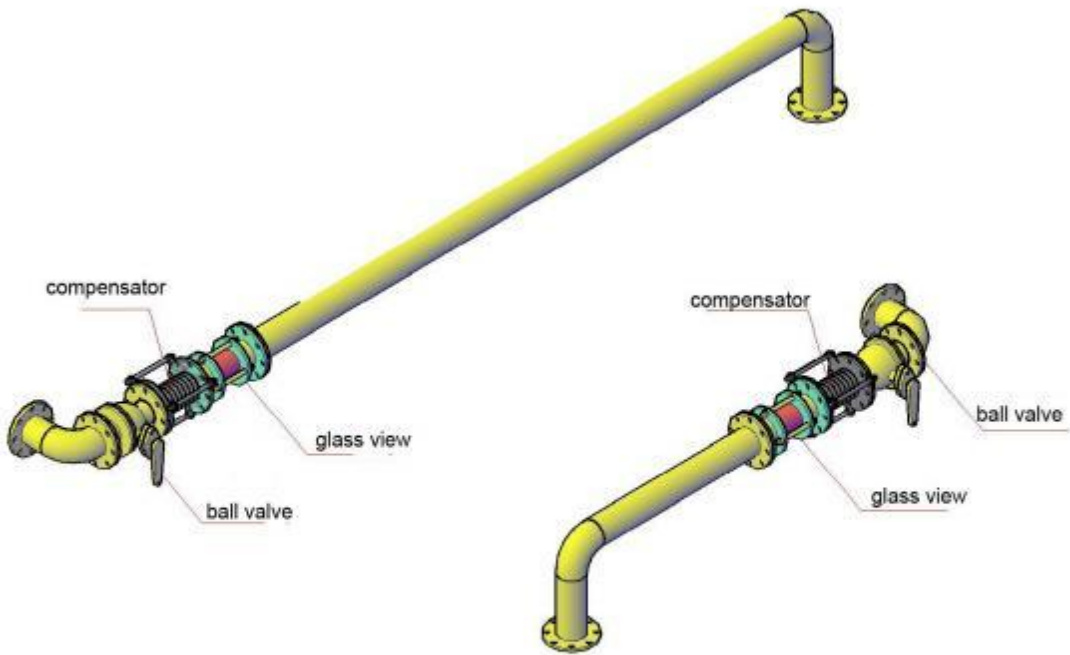


C. 冷却箱到油罐连接 connection between oil tank and cooling tank



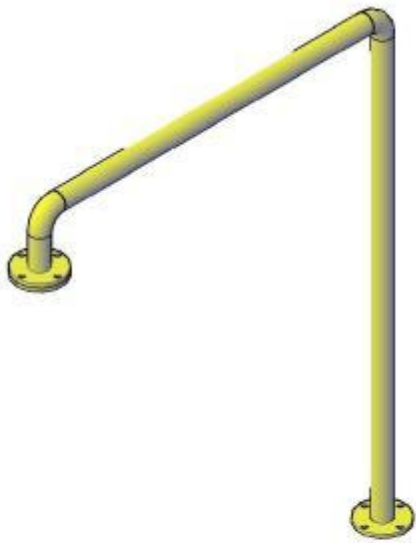
冷却水箱到油罐连接2

冷却水箱到油罐连接1

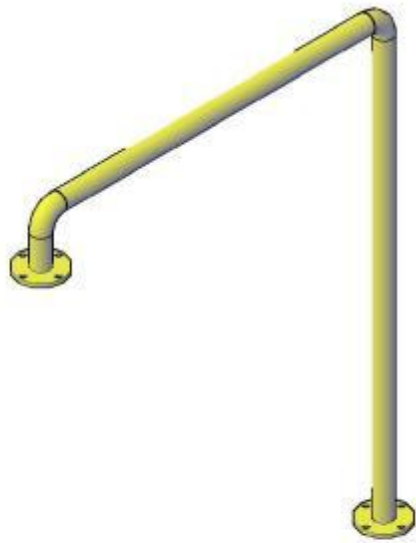


cooling tank to oil tank connection 2

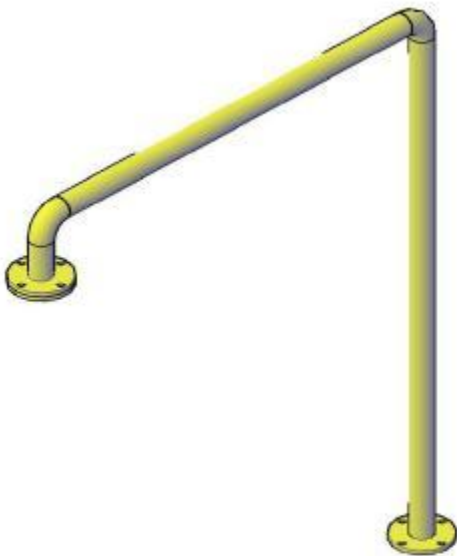
cooling tank to oil tank connection 1



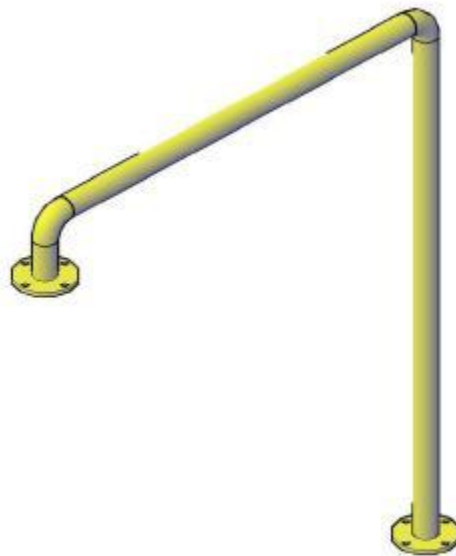
油罐到水封管道连接1



油罐到水封管道连接2



oil tank to water sealing connection 1

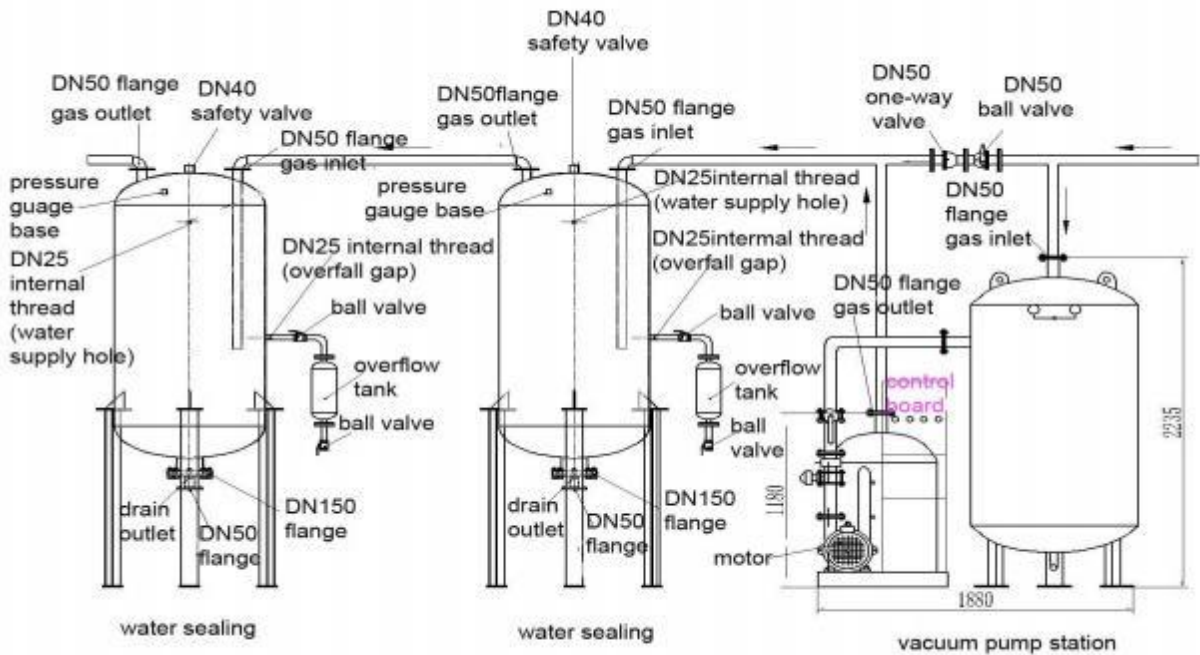
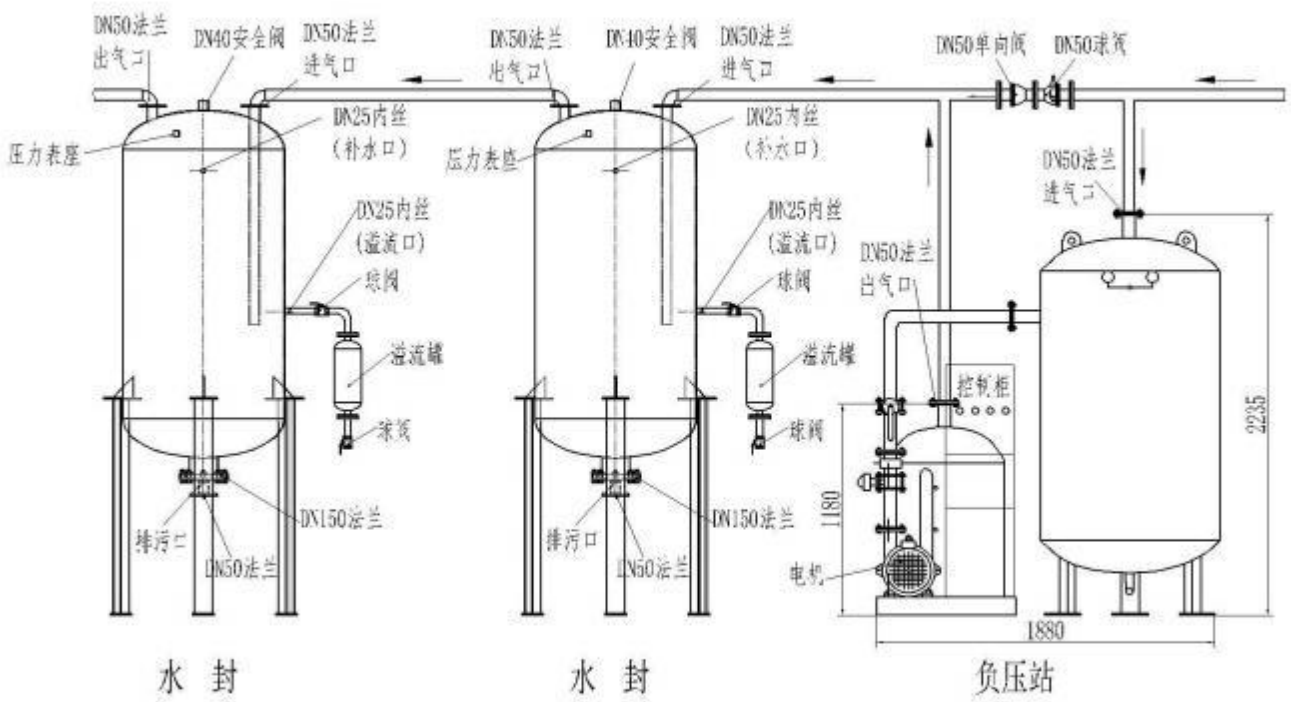


oil tank to water sealing connection 2

D. 水封、负压站定位 positioning for water sealing and negative pressure station

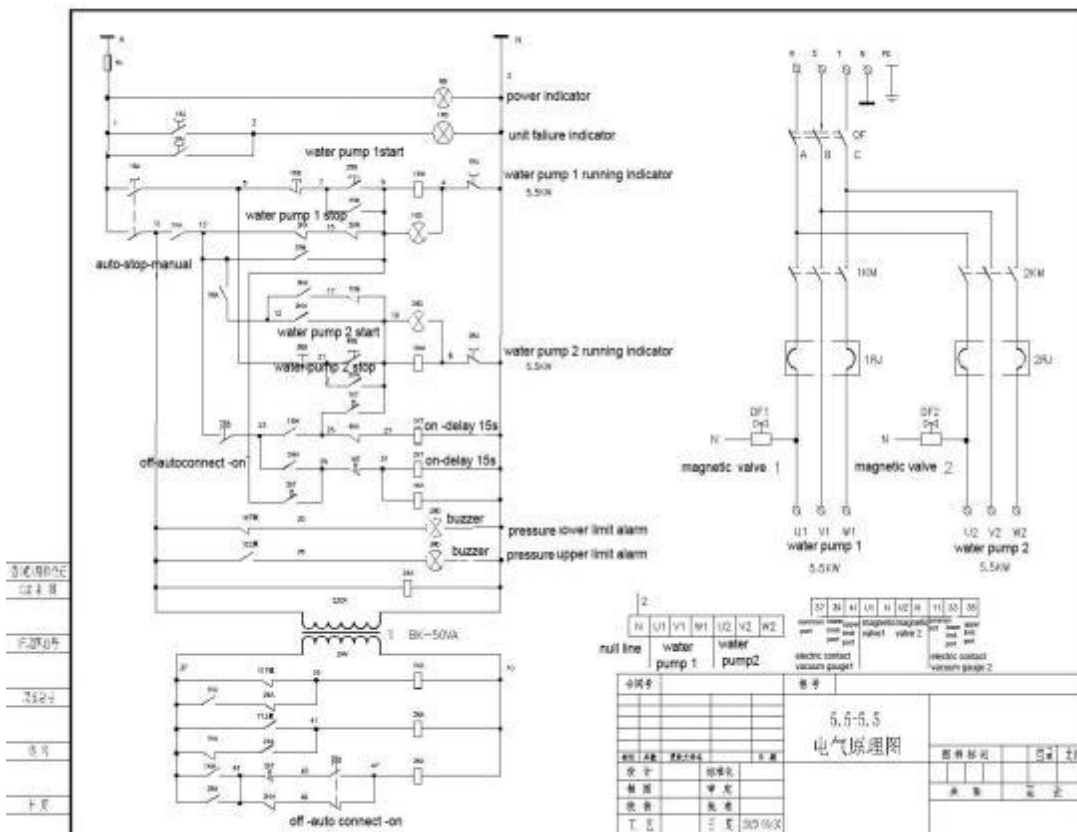
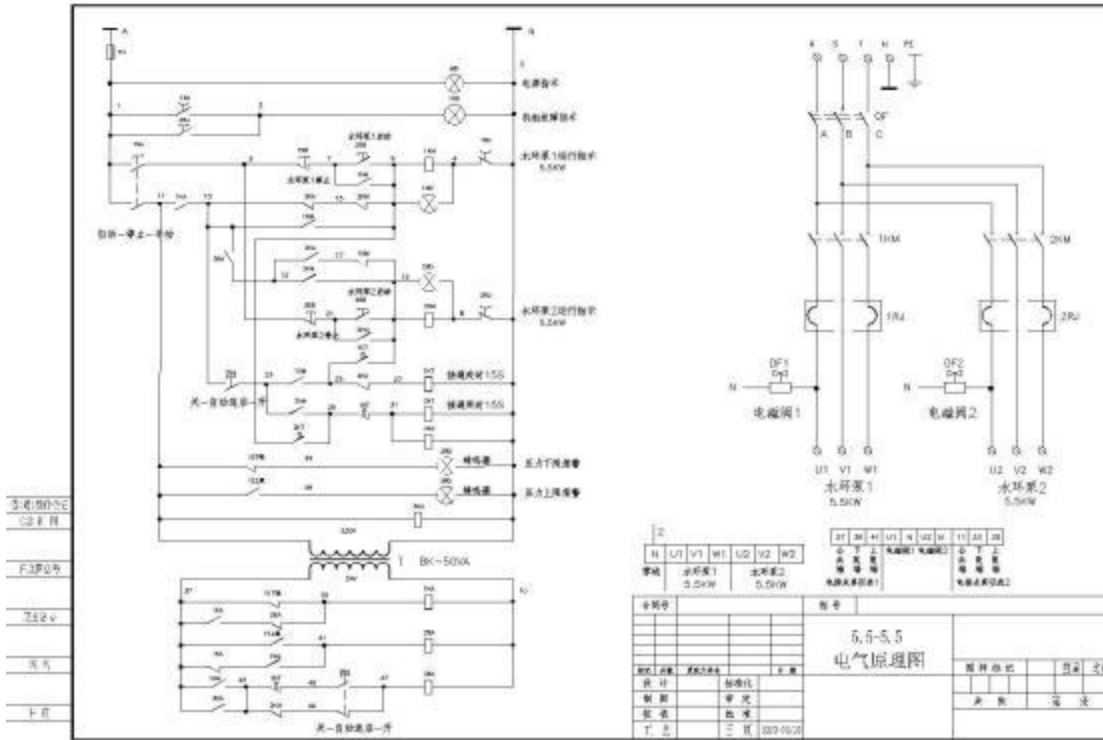
E. 水封、负压站管线连接

Pipe connection for water sealing and negative pressure station



F. 负压站电控说明

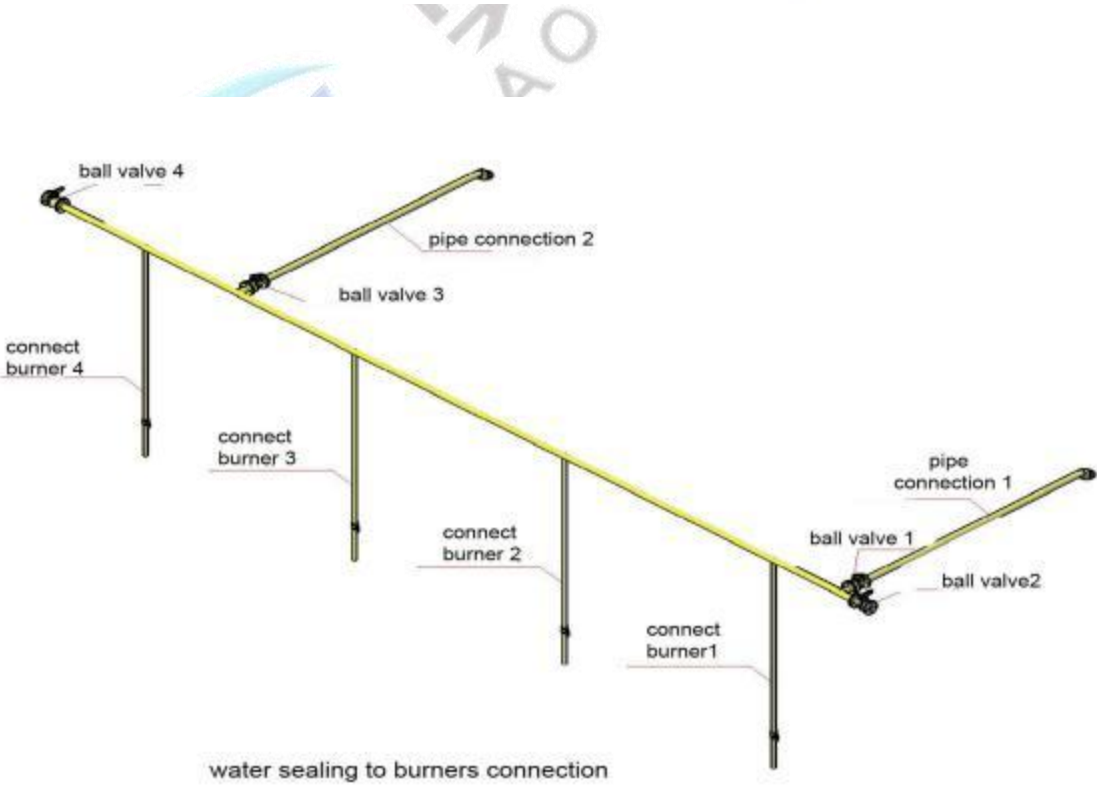
商丘奥特威环保设备有限公司



G. 水封到燃烧机管线连接 Connection between water sealing and burners



水封到燃烧机管道连接



water sealing to burners connection

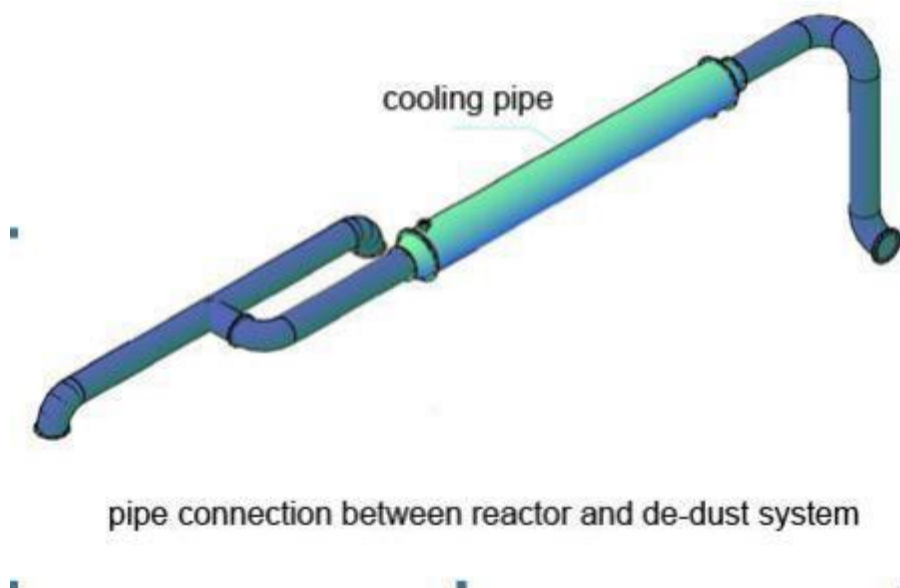
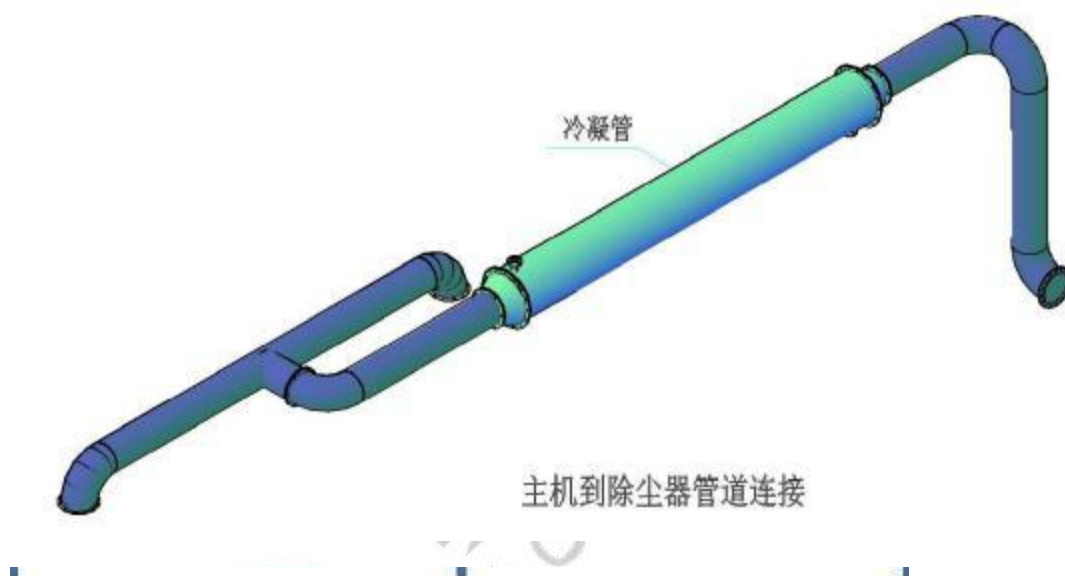
H. 主机、油罐、水封连接

Connection between reactor and oil tank and water sealing

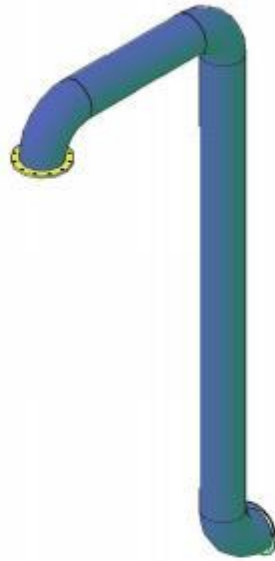
4.17 除尘系统装配 Installation for dedust system

A. 除尘器定位 De-dust tower positioning

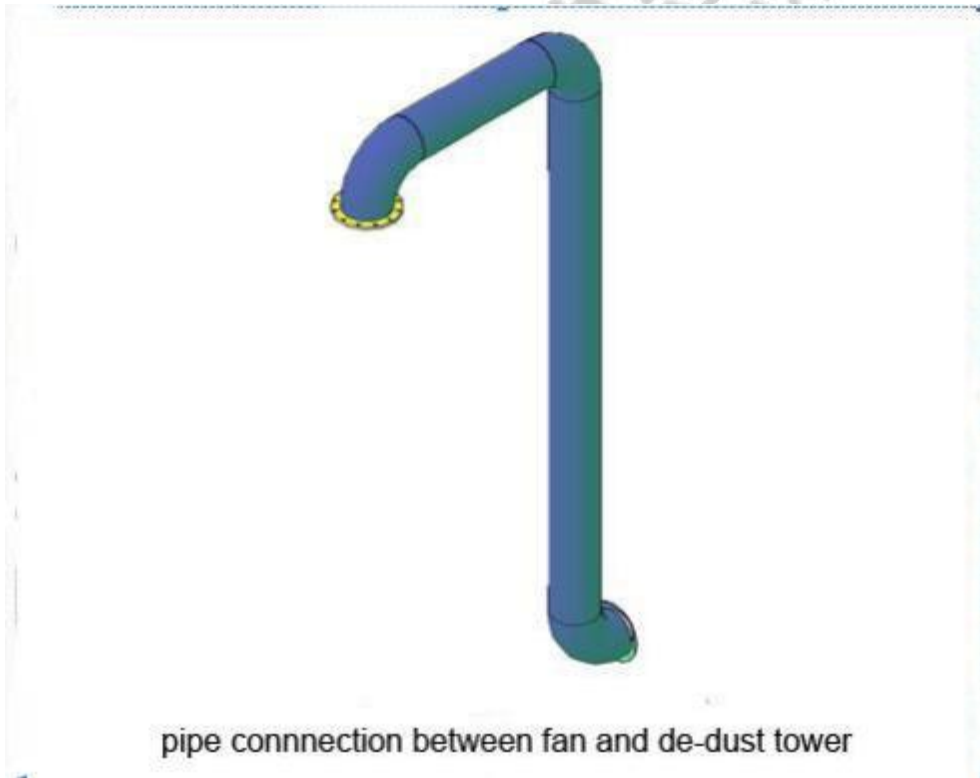
B. 主机到除尘器管线连接 pipe connection between de-dust tower and reactor



D. 除尘器到风机连接 Connection between dedust tower and fan

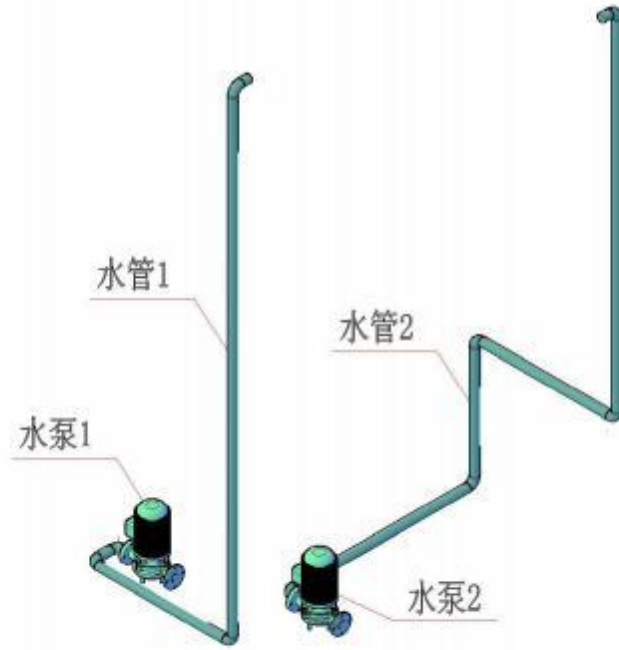


除尘器到风机管道连接

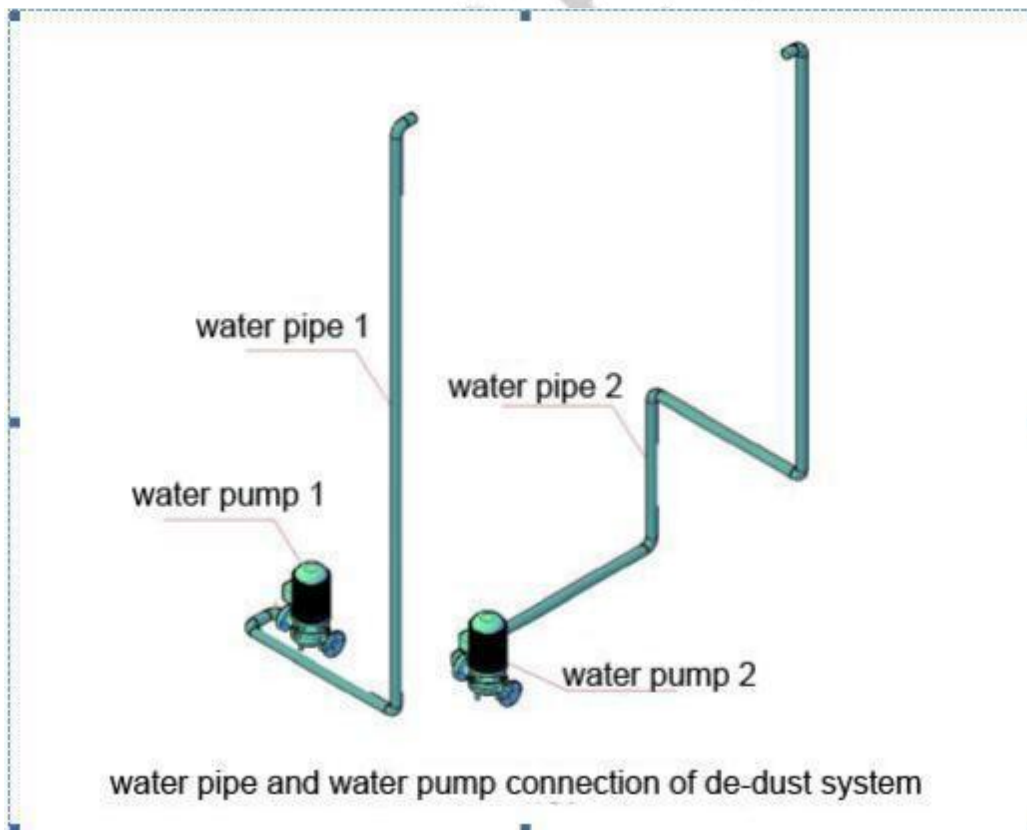


pipe connection between fan and de-dust tower

E. 喷淋塔水泵，管线连接 Pipe connection of water pump



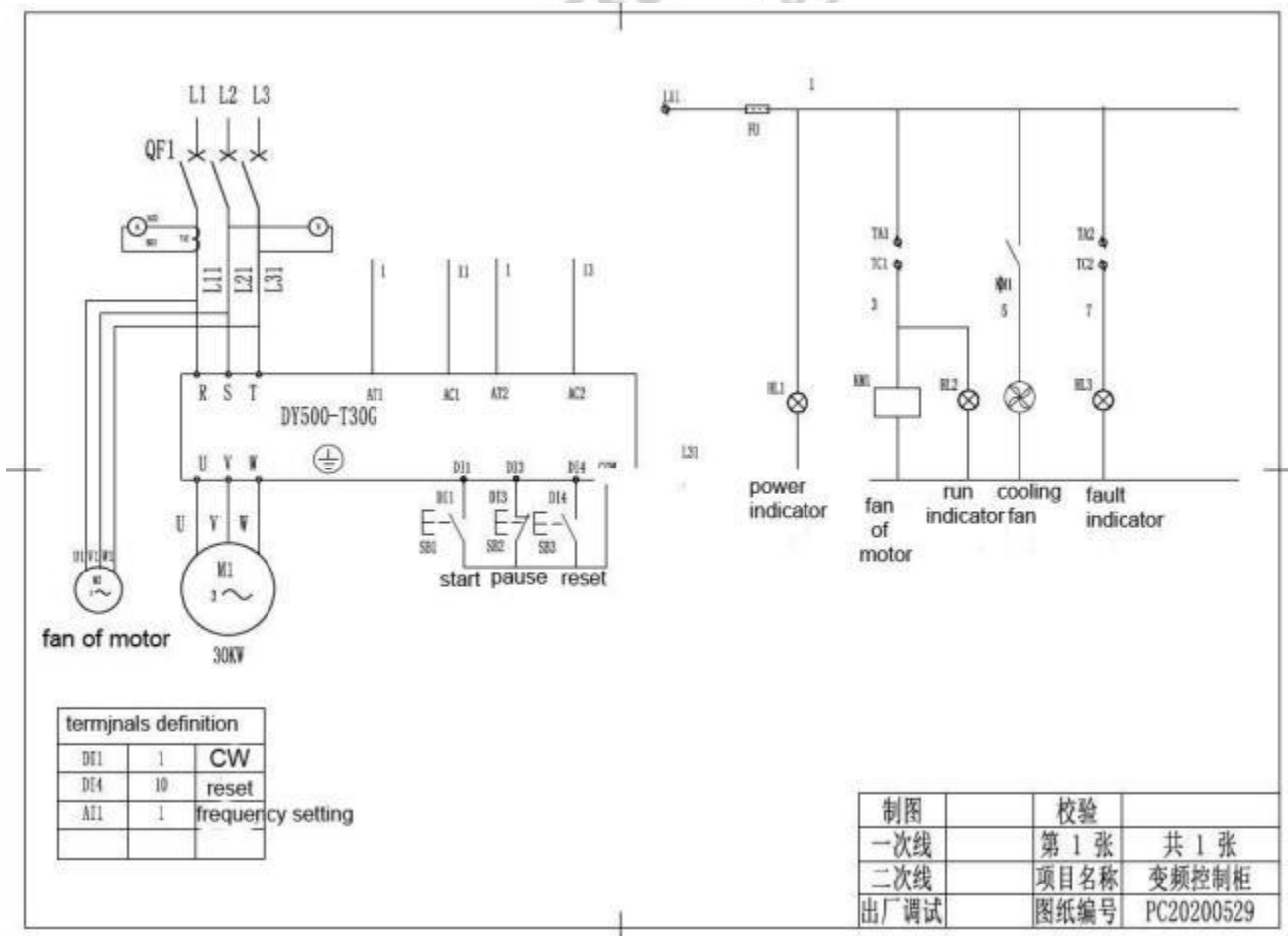
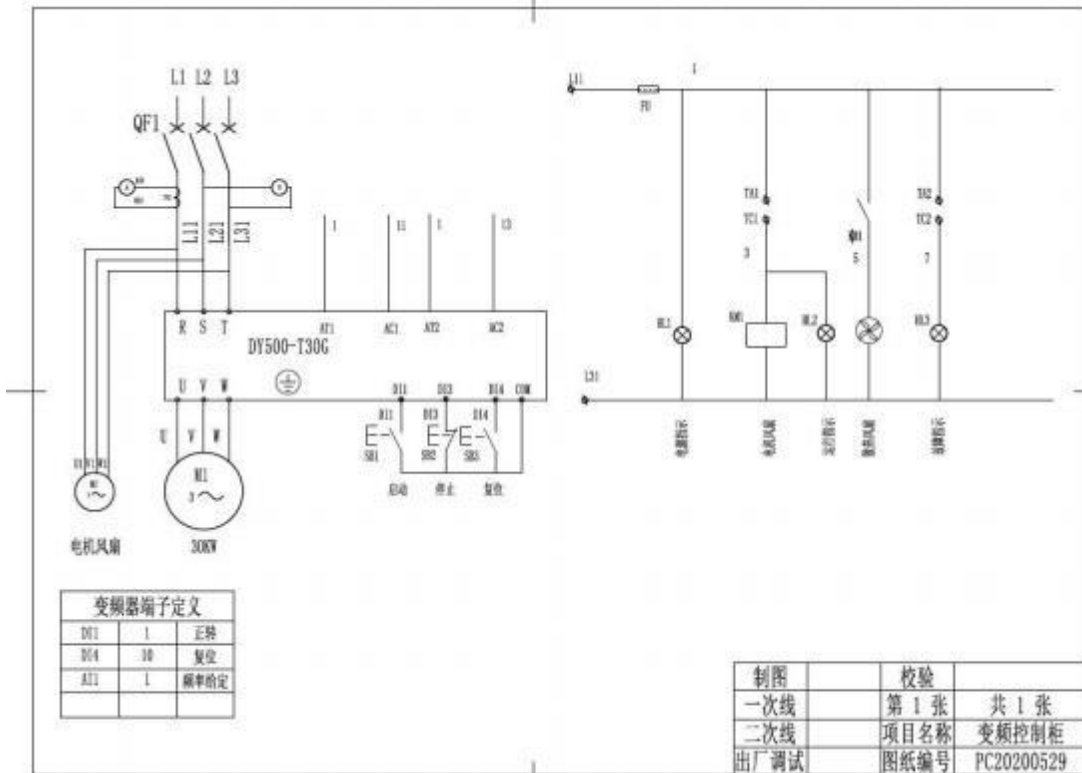
喷淋塔水泵管道连接



water pipe and water pump connection of de-dust system

- E. 喷淋塔填料装配 Material filling for dedust tower
- F. 引风机装配 Fan installation

G.风机电控说明, Control board of fan



五、配件，易损件明细

List of component and consumable parts

5.1 主动轴 Driving Shaft

5.2 从动轴 Driven shaft

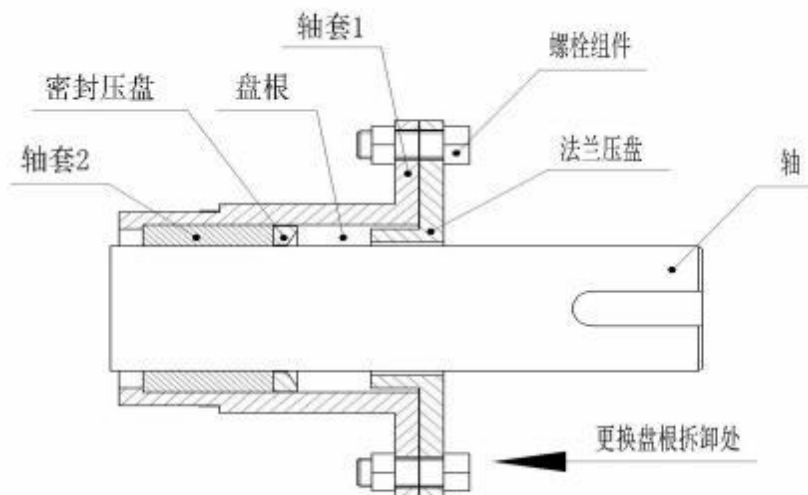
5.3 轴套 Axle sleeve

5.4 密封材料 Sealing material

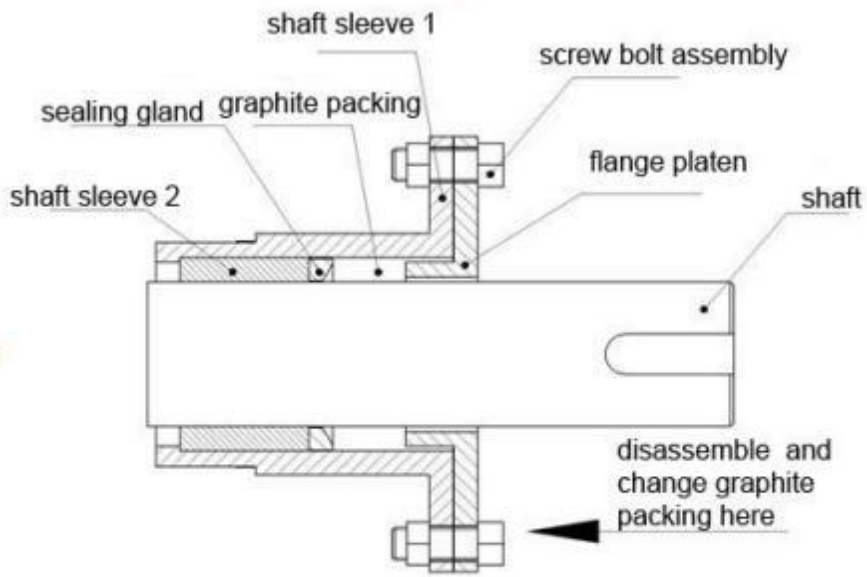
A. 盘根规格 specificaiton of graphite packing

盘 根	
序号	规 格 (mm)
1	16*16
2	12*12
3	10*10
4	10*50
5	32*32

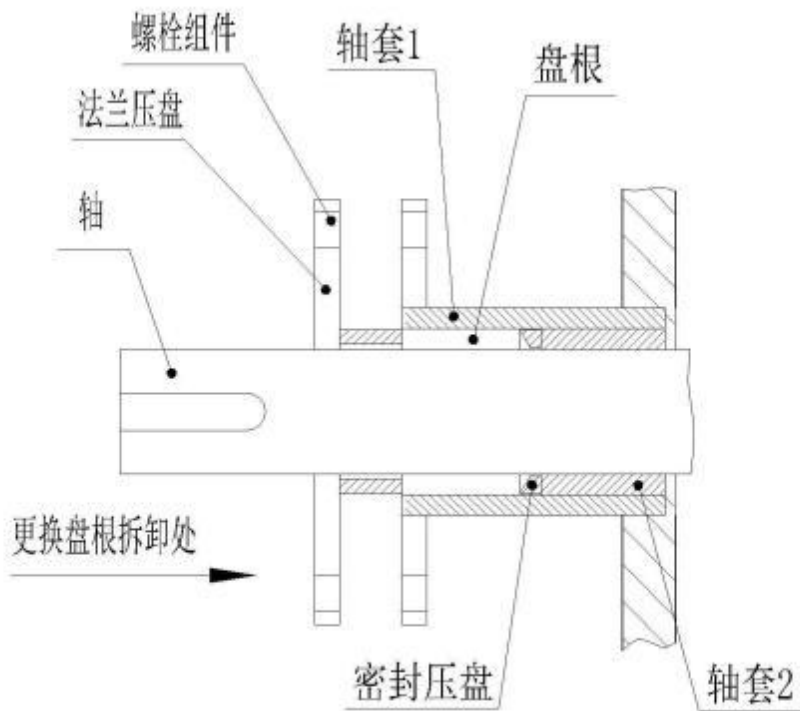
B. 更换方法 The way of change
 松掉螺栓组件，拿掉法兰压盘进行更换盘根；如图箭头所指方向：
 Loose the screws and nuts, take off flange platen change the packing,
 following the arrow direction.



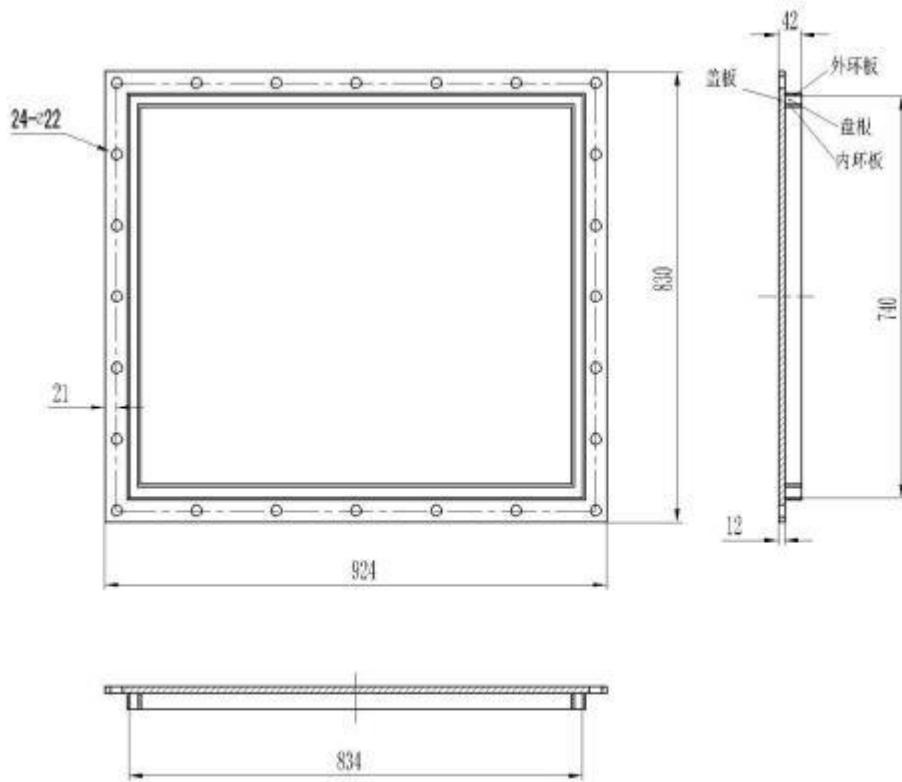
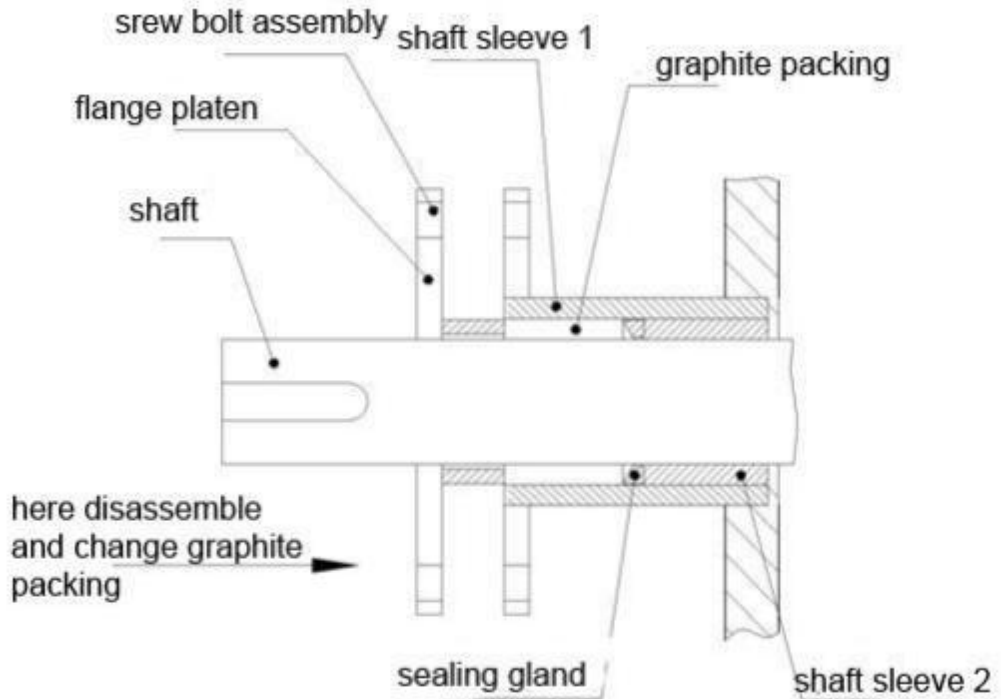
主炉主动轴密封示意图



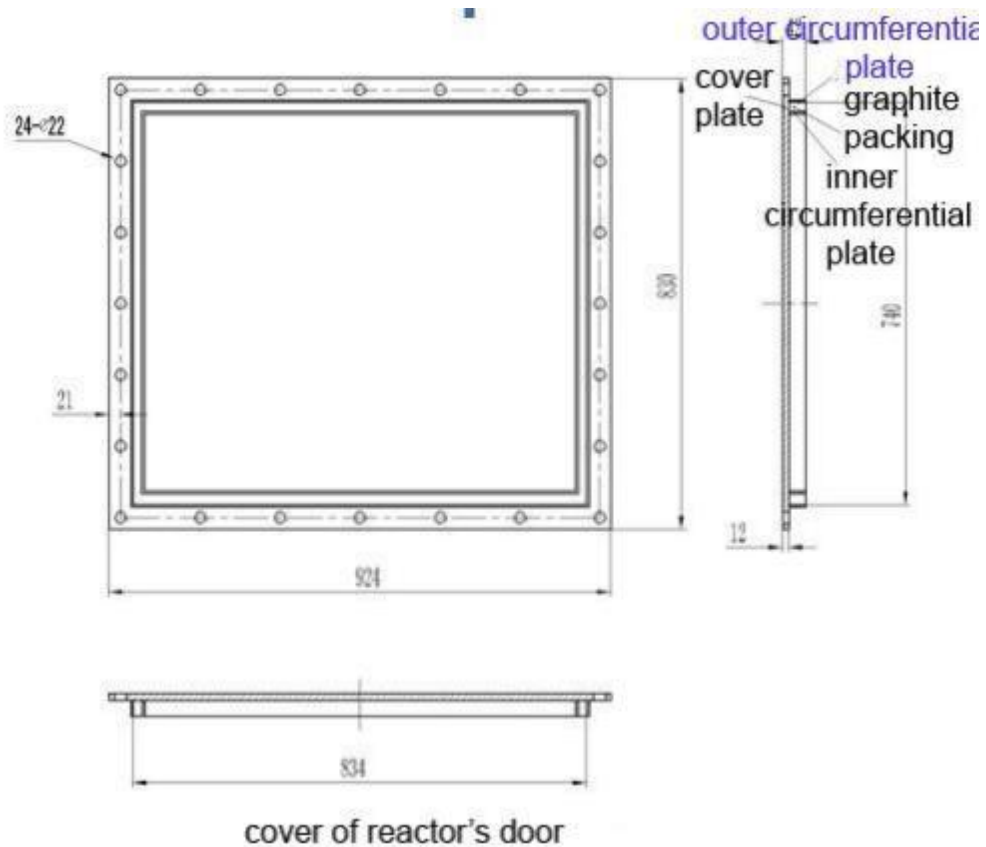
reactor's driving shaft sealing drawing



出渣机密封示意图



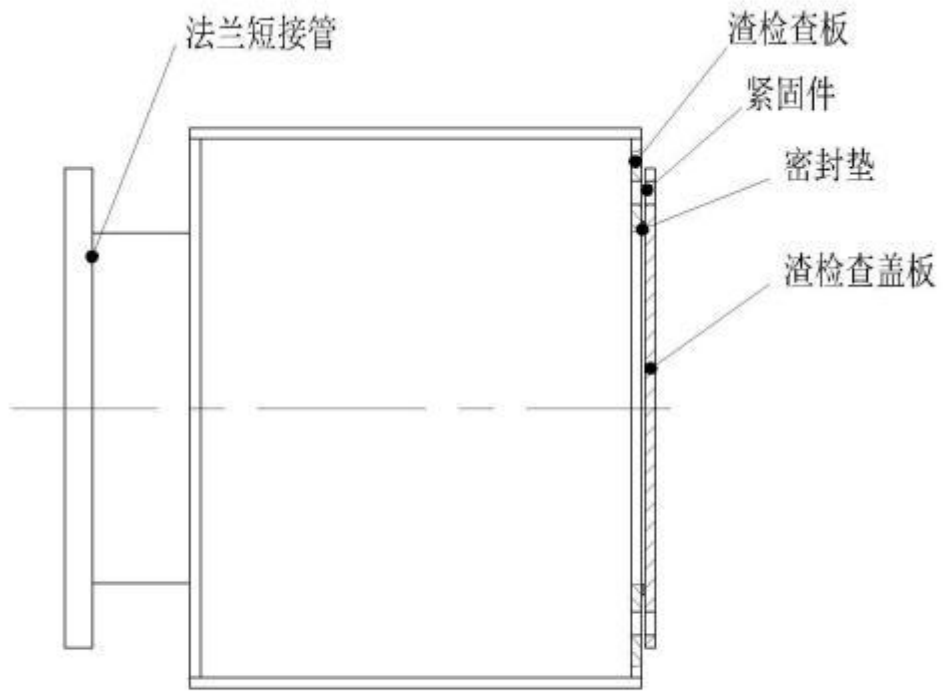
主炉门盖



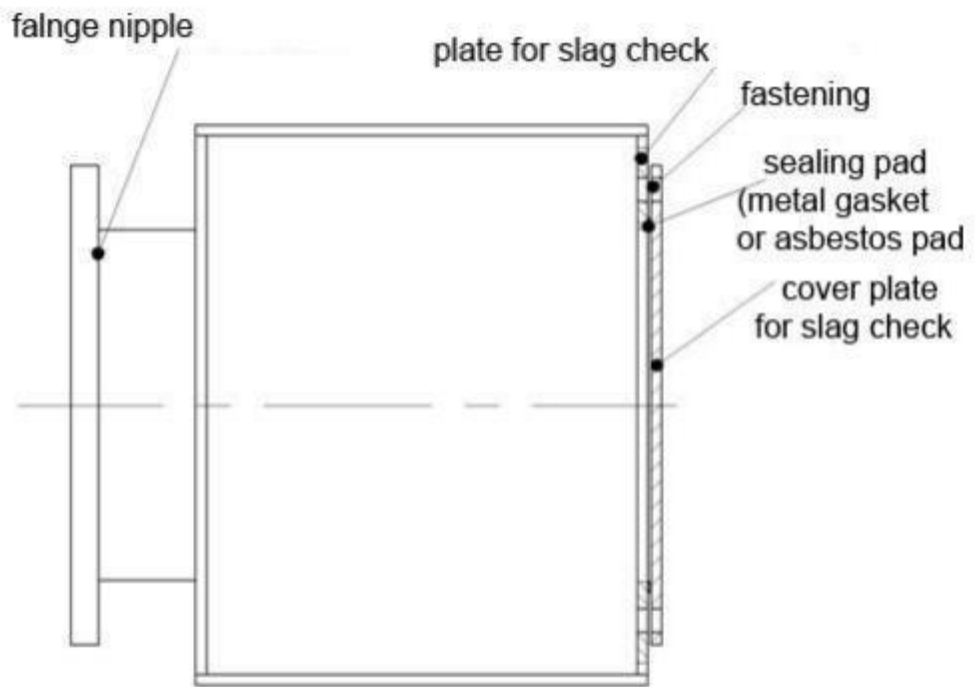
B.石棉垫，金属垫 Asbestos pad, metal gasket

金属垫	
序号	规格 (mm)
1	DN500
2	DN300
3	DN250
3	DN200
4	DN100
5	DN80
6	DN50

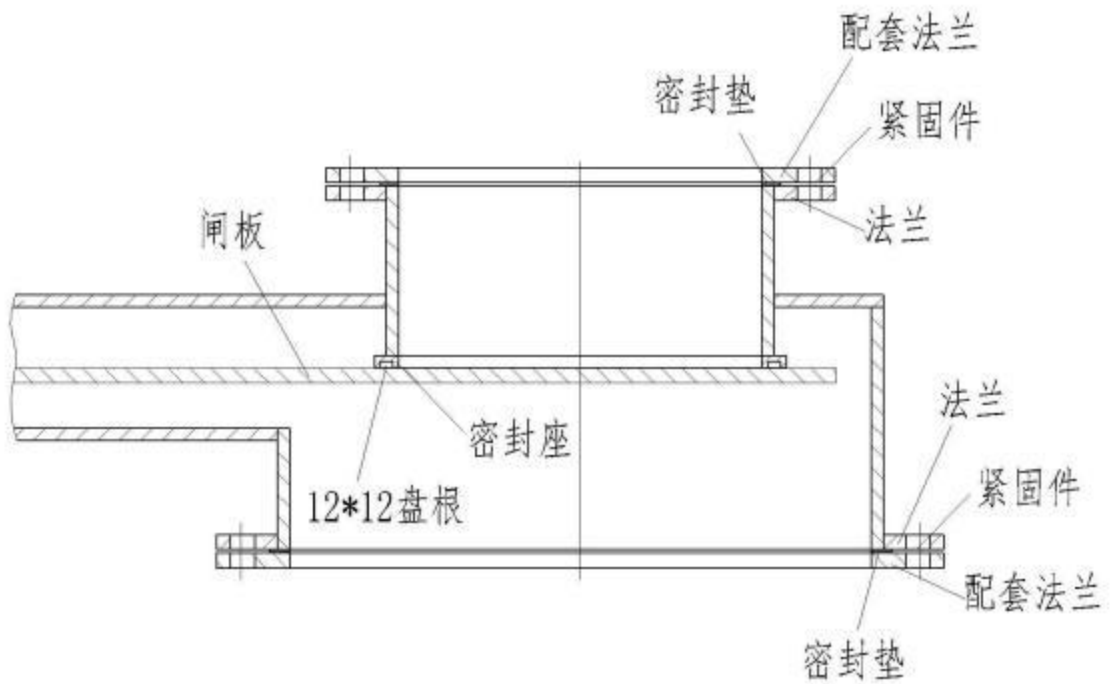
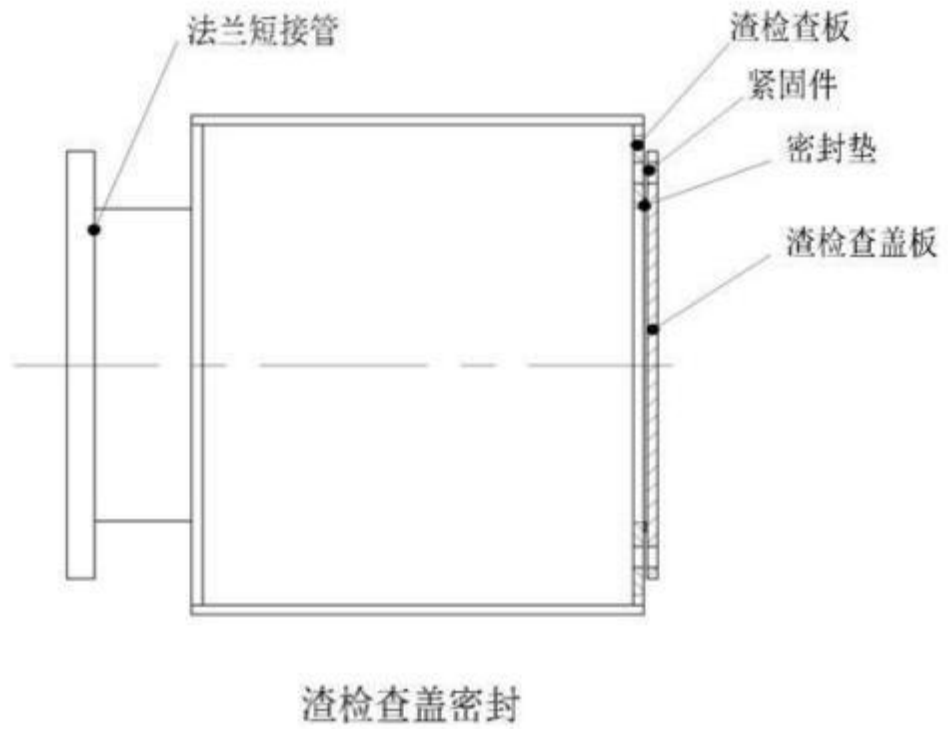
Metal gasket	
NO	Spc (mm)
1	DN500
2	DN300
3	DN250
3	DN200
4	DN100
5	DN80
6	DN50

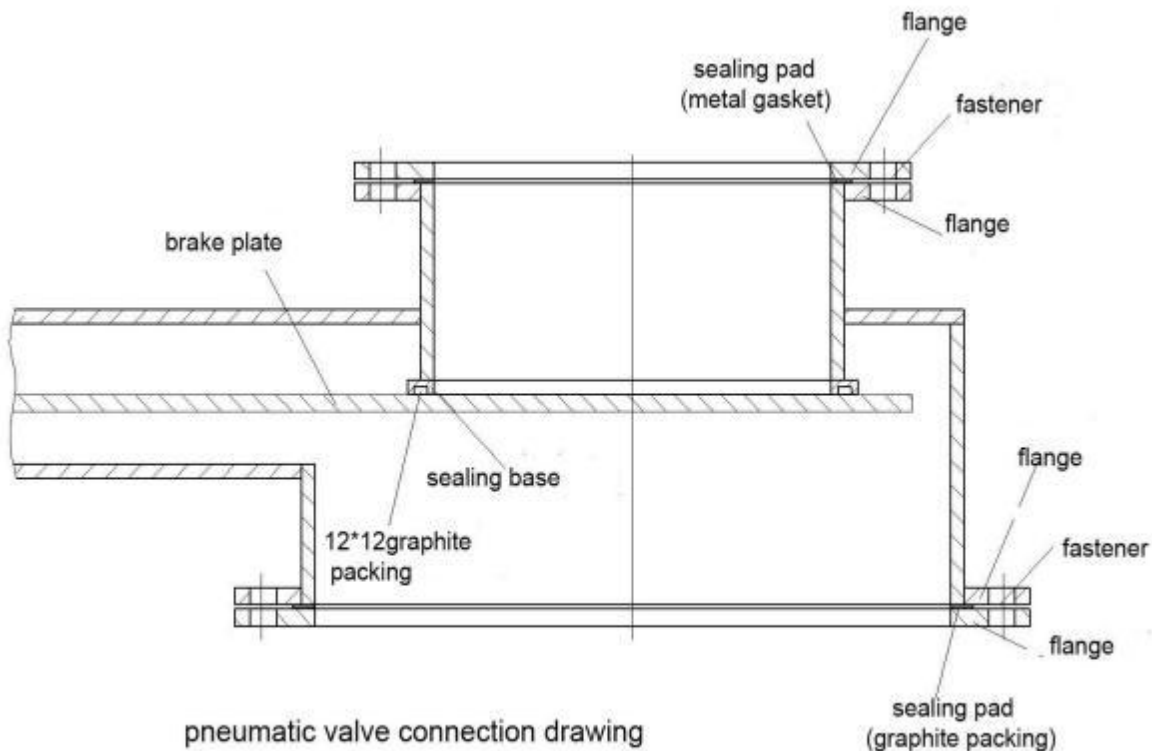


渣检查盖密封



sealing of cover plate for slag check





5.6. 仪表 Meters

六、安全操作规程 Safety operation procedures

6.1 试车 Trial run

A. 空运行各转动 Empty loading run

各减速机加油（10#齿轮油）。

Refuel the reducer with 10# gear oil

加至油镜 2/3 处为准。如有说明书按说明书操作。电机单机启动。确认正反转和工作旋转方向并标注箭头指示以便工作巡查。

Add oil to 2/3 line. Please follow the manual if there is .

Start single moter, make sure the negative direction and positive direction, and mark them with arrow indication for next time checking.

B. 冷压气密试车 Cold pressure air tight test run

因该设备工艺是在高温无氧条件下把原料裂解产出燃料油。

The machine working principle is that pyrolysis fuel oil at high temperature without oxygen.

在开机生产过程中，不能让里面气体流出，也不让外边空气进入。

When machine start and run , can not let oil gas come out neigher let air come in machine.

在装配完毕后要先进行冷压检测。检测压力 0.05~0.09Mp。正常工作压力为正 20Kpa~到-20 Kpa。

Make a cold pressure test after completement of assembly .Testing pressure should be 0.05~0.09Mp ,normal working pressure should be 20Kpa~ -20 Kpa。

C. 热试 Test by hot water

主机第三高温区加水 150 kg ~ 200 kg 。启动燃烧机加温热试。有蒸气源的可通入蒸气热试。压力 0.05~0.09Mp。有漏点处理。

Fill 150 kg~200 kg water in third temperature area of reactor .

Start the burner and heat reactor .(Also can test by water vapour if there is).Pressure shoulbe be 0.05~0.09Mp.If there is leak point ,then handle it .

6.2 开机前检查，准备

Checking and preparation before start to run machine

各润滑油液位，冷却水液位。

Check the liquid level of lub oil and cooling water

各电机、电器箱接线。Check line connection of the motors ,electronical box

各防护装置。Check all safety protective devices.

各阀门应处于开、闭位置是否正确。Check valves ,make sure them in the correct on-off station .

各紧固罗栓是否松动。Check the screws bolts see if they are loose.

消防设施是否完好无损。Check fire-fighting equipment, make sure no damage.

工作人员防护用具齐全。Workers'safety protective device should be full equipped .

工作人员全部就位，并明确自己工位范围和责任。

Make sure all statf take their places,and they know well their working range and responsibility.

现场通道无障碍物。

No obstacles in the way.

各仪表、电器、照明、密封体检查。

Check all gauges ,electric appliance ,lighting , and sealing parts

6.3 运行开机步骤 Steps to start machine

A. 启动电源通电，Start elcetric power

B. 启动引风机。Start fan

C. 接通燃烧机油路。 Connect fuel line of oil burners

D. 点燃燃烧机。（首次开机升温要慢，每小时升温 30 度，炉膛 200 度时保温 10 小时后再升至 400 度保温 6 小时。然后再升温到工作温度。）升温要求，每小时升温 50 度。燃烧机操作参考燃烧机说明书。

Fire the oil burners.

First time running , temperature should be rised slowly,every half hour

rise 30 degree. When burning chamber's temperature reaches to 200degree ,keep 10 hours, then heat it to 400 degree, keep 6 hours.

Then slowly rise temperature .The heating requires: rise 50 degree per hour. Refer the manual of oil burner.

E. 主机启动 start reactor

当第三段温度（底部温度）350 度时，启动主机。

When the third layer of reactor reaches 350 degree, start the reactor .

先启动三（底层）电机，然后启动（中间）电机，最后启动（上层）电机。

When the temperature of botom layer of reactor reaches to 350 degree,
Start the reactor .Firstly start the bottom layer's motor, then start the middle layer 's
motor.Finally the upper layer's motor .

F. 打开进料阀门一（料仓进料口 DN400 气动闸阀）。同时开启制氮机，打开氮气阀门。启动上料机（皮带输送机），料仓加满关闭阀门一，同时关闭氮气阀。

Open the first feeding valve (DN400 pneumatic valve of feeding hole)

Meanwhile start the Nitrogen making machine,open nitrogen valve.

Start the conveyor (belt conveyor),when the stock bin is full, close the first valve at the same time turn off the nigrogen valve .

G. 打开进料阀门二（料仓下部），同时启动料仓搅拌器，转速适当调整。先慢运行，后进入正常速度。

Open the second feeding valve (bottom of silo) at the same time start the silo
blender ,adjust the rotate speed porperly ,in the beginning slowly run then run at normal
speed.

H. 进料开始，启动冷却系统负压装置，压力调整上限正 15kp~到-10Kp。并打开不凝气阀门。

Start to feed material,start cooling system and negative pressure system,
Adjust the pressure between 15Kp and -10 Kp,open the non-condensed gas valve.

L. 进料 40 分种开启出渣系统

出渣机开启三后端，置换，二（中部），一（主机下部）

After 40 minutes of feeding, start the three sections of carbon discharge system: firstly
replacement device then middle section finally the third section which is under the reactor .

6.4 运行主事项 Precautions in the operation

A. 引风机、输送机、搅拌器、电机、负压站、油罐液位、各控制议表、置换往复运动、操作盘温度、压力指示、润滑液位等等，定时检查。

A.

Regularly check fan, conveyor ,blender ,motors,negative pressure station, liquid level of oil
tank, control device, reciprocating motions of replacement device,operating board
temperature ,pressure indication,
lub liquid level etc.

B. 动静密封部位检查，冷却温度调整，主机压力控制调整，进料量随温度调整，搅拌器随进料速度调整。

Check the dynamic and static sealing area ,adjust the cooling temperature , adjust reactor
pressure , adjust material feeding quantily accroding to temperature,adjust blender
accroding to feeding speed.

C. 燃烧机大、中、小火随温度调整，不凝气燃烧随压力和温度调整，当不凝气压力升高而主机温度又高，打开外面无效燃烧室

Adjust oil burner in big fire, middle fire, small fire .adjust non-condensed gas based on the burning pressure and temperature .when non-codensed gas pressure goes up and the reactor temperature is high, open outside burning chamber.

D. 观察出渣情况对进料量调整、主机刮板速度调整，观察主机温度对燃烧机大小火调整。

Adjust feeding quantity accroding to carbon discharge situation ,adjust reactor scraper speed.

6.5 运行停机步骤 Machine stop steps

A. 停止上料 Atop feeding

开闭上料机。Turn off the feeder

开闭搅拌器。Turn off blender

开闭进料阀门二（料仓下部）turn off second feeding valve (under the silo)

B. 关闭燃烧机及不凝气燃烧机（这时无效热水气燃烧机开完）。若气压还高要打开应急排空。
Turn off the oil burner and non-condensed gas burner (turn on the burner outside for Invalid combustion),if the pressure still high, open emergency hole to release pressure.

C. 运行四十分分钟停主机一（上层），二（中层），三（下层）。

After reactor runing 40 minutes, stop reactor .

Fristly stop upper layer, then middle layer, finally bottom layer.

D. 出渣机一（主机下部）关闭。

Turn off the first carbon discharge machine (udner the reactor)

D. 出渣二关闭。

Turn off the second carbon discharge machine

E, 置换关闭。

Turn of replacement device

F, 出渣三关闭。

Turn of the third carbon discharge machine

G, 观察冷却箱后视镜无液体流动，关闭负压系统，同时打开负压管线傍路直通阀。

Check the glass view of cooling system, if no liquid flows ,close the negative pressure system, open the straight through valve of negative pressure pipeline bypass.

6.7 应急停机 The emergency stop

在正常生产中，难免会发生一些意外突发故障，现场能解决的，尽量不停机。局部需要停机的，就不全停。现介绍几种故障停机方式。

During the normal production, sudden failer will be happen inevitably ,

If the problem can be solved at sight, try not to stop machine as possible .If partly stop is available please don't to stop the whole machine.Hereby we introduce some ways of facility breakdown.

A. 进料系统 Feeding system

无料或上料机、搅拌机及供氮气阀门出现故障，这时燃烧机调到中火或小火，保持主机温度，排除故障后再复回。

If there is no material or there are problems of blender or conveyor or nitrogen maker ,please adjust fire to middle or small ,keep reactor's temperature, After problems being solved, then go ahead.

B. 主机传动故障 Reactor transmission fault

主机在运行中，出现电机电流过高或刮板有杂音，说明原料有杂物混进。这时要停止进料，关闭阀门二（料仓下部）、搅拌器和上料机。若是一段（上层有问题仅停上层，并反方向转动，但时间不能很长，

When reactor is running, if the motor's electric current too high or there is noise from scraper ,it means there is dopant mixed in the raw material.At this moment, need to stop feeding, turn off the second valve(under the stock bin) and blender and conveyer.If only first layer has problem,only need to stop first layer,and run reactor/scraper in negative direcation but not run too long time

运行两转反回转动，排除故障后回复正常运行；若二层有问题，停进料和一层；三层有问题，停进料、一层和二层。

After two rotation and removal of fault , return to normal operation,if the second layer has problem ,stop feeding and stop first layer , if the third layer problem, stop feeding and stop first layer and second layer.

C. 出渣系统故障 Discharge system fault

一般出渣故障有两点

Normally there are two kinds of faults for carbon discharge system

1) 机械故障

2)

A. Mechanical failure

2.)减速机缺油和电机超载。

Reducer out of oil and overloading of motor

排除故障时，停止进料，主机一，二，三停止。排除故障后回复运行。

When there is malfunction, stop feeding, stop first layer ,second layer and third layer,after clear the fault , start to run machine .

C. 加热温度不稳定或进料量过大，渣不干堵寒。

Slag blocking caused by uneven heating or too much feeding.

排除故障前停止进料，并关闭主机一，二，三运行。排除后回复运行。若不能排除，要停机降温后排除。停机步骤按正常运行停机操作。

Stop feeding ,close first layer ,second layer and third layer of the reactor,after clear the fault run the machine,if can not fix a breakdown, Should stop machine and after the temperature come down then solve the problem.The stop step is according to normal stop process.

6.8 紧急停机 Emergency stop

紧急停机有以下几种

There are several kinds situation of emergency stop

A. 主机运行故障，出渣运行故障，冷却管堵塞故障，燃烧机故障，如出现这几种故障，按应急停机操作。

A. Reactor failer, carbon discharge failer ,cooling pipe block, burner problem, if above problems happen, make emergency stop.

B. 停电应急操作

Sudden power cut

这时主机、燃烧机、负压站、氮气机都停运，这时需要人工打开紧急排空阀和水封傍路直通阀。打开燃烧防爆口。关闭不凝气燃烧机进气阀门。

In such a situation, should stop reactor, burner, vaccum pump station, and nitrogen maker,the worker should open the emergency hole and straight valve beside the water sealing. open the explosion-proof combustion port,close the inlet valve of non-condensed oil gas.

