HollySys

HOLLiAS BATCH CONTROL SYSTEM

HollySys

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**Intelligence
For Excellence**

www.hollysys.com

Profile

Founded in 1993, HollySys is a leading supplier of intelligence solutions with more than 4,700 employees and operates in both China and abroad. HollySys is headquartered in Beijing with R&D, production, and service bases in Beijing, Hangzhou, Xi'an, Singapore, and local branches in major cities in China, as well as offices in India, Malaysia and Indonesia, establishing a comprehensive service network across the world.

HollySys business consists of industrial intelligence, transportation intelligence, and food and pharmaceutical intelligence, covering the main industries for the national economy and the people's livelihood. With years of technological accumulation in various fields and continuous capacity building, we can provide customers with customized integrated solutions, stable and reliable products, and full lifecycle services, helping them improve market competitiveness. Over the past three decades, we have served more than 35,000 clients, successfully completed more than 45,000 projects, and gained more than 1,000 new clients each year, making HollySys a world-renowned brand in automation and intelligence filed.

The HOLLiAS industrial control platform of HollySys features a series of advanced, practical and reliable industrial automation systems and HollySys automation instrumentations products. The system products include MACS-K, MACS-S industrial control system DCS, professional control systems such as DEH, ETS and SIS, and whole-process information-based software for manufacturing enterprises. Instrumentation products include isolated safety barriers, signal isolators, surge protectors, power transmitters, pressure transmitters, electromagnetic flowmeters, metal tube float meters, magnetic level gauges, radar level gauges, throttling elements, thermal elements, and pressure gauges.

The company's products have been successfully applied to major projects and key equipment, including 1000MW ultra-supercritical thermal power units, 1.2 million tons of urea and 5 million tons of oil refining main units, earning a good reputation in the industry.

Specializing in HollySys Instrumentation and control system engineering and integration, the company can provide both new and brown field projects of enterprises with HollySys proprietary products, as well as comprehensive engineering services such as customized design and construction & commissioning.

HollySys has always pursued continuous innovation and R&D while sticking to its vision "create the most valuable intelligent company through stable and sustainable development" to provide more reliable, secure, and intelligent technology and products for our customers.
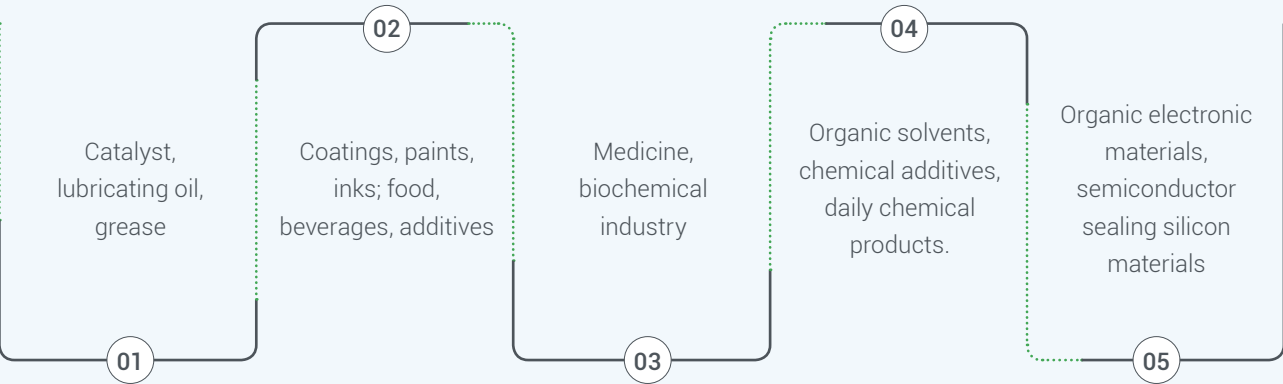
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Overview

In this era of transition from the www to the Internet of Things, the industrial focus has also undergone a rapid and fundamental shift. Before Industry 4.0, all innovations were aimed at reducing costs through economies of scale and increased productivity. In the future, the secret of industrial success lies in how to improve productivity while shortening the cycle of products from "design" to "marketing", and how to meet more complex and personalized product requirements. So as to complete the transition from "product manufacturing" to "intelligent manufacturing", for example: production equipment interconnection, transparent and visual control process, flexible and changeable process, rapid switching of new products, multi-product recipe management, product quality traceability, planned production scheduling, etc.

HollySys developed the HOLLiAS Batch software based on above requirements to provide an integrated and intelligent solution for intermittent production process.

The HOLLiAS Batch software combines the characteristics of batch production to model, standardize and simplify the complex process.

Batch control system is primarily implemented in industries with intermittent and batch process:

01 Catalyst, lubricating oil, grease

02 Coatings, paints, inks; food, beverages, additives

03 Medicine, biochemical industry

04 Organic solvents, chemical additives, daily chemical products.

05 Organic electronic materials, semiconductor sealing silicon materials

System Advantage

The HOLLiAS Batch control system brings the following advantages to customers:

Product Quality Improvement

Implement of standard recipes reduces human error

Guarantee Production Safety

Complete unit supervision, automatic fault interlock and confirmation process ensures production safety

Batch Process Traceability

Real-time monitoring of production process and batch report realizes process traceability

Industry 4.0

Docking ERP/MES materials, recipes, plans and other instructions to improve industry 4.0 level

Production Efficiency Improvement

The system automatically arbitrates unit occupies conflicts, improves resource utilization, and reduces process waiting

Simple and Flexible Operation

Online recipe modification (parameter value, interpolating step, skipping step) adapts to changeable site conditions

Material Preparation Improvement

Automatically generates material preparation lists based on recipes to enhance material preparation efficiency and quality

Visible Production Process

The equipment for each production work order and batch operation, execution sequence and current operating parameters are all on the screen for easy monitoring
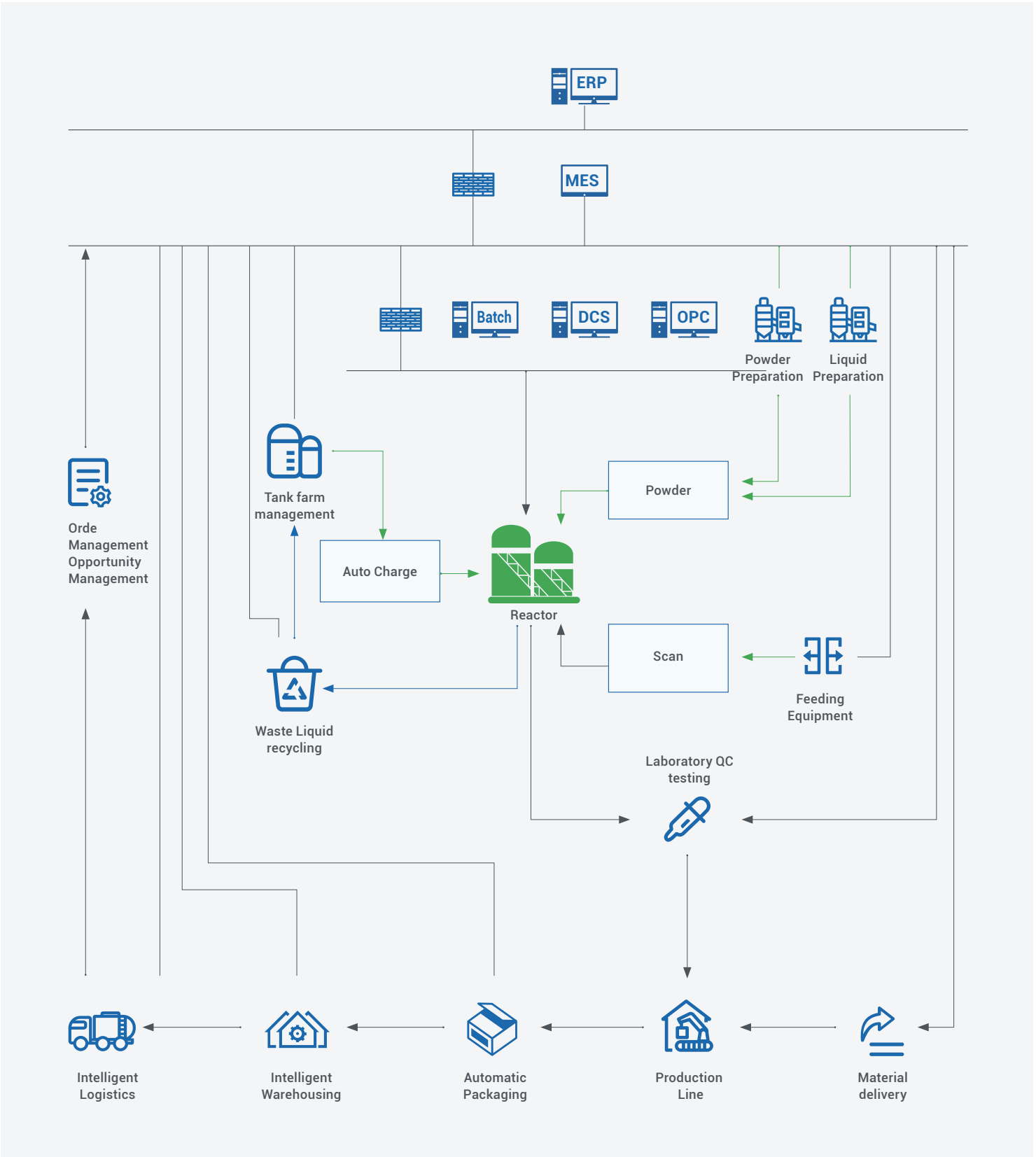
Core Competence

With the increasingly fierce global competition and the challenges, HOLLiAS Batch provides an optimal information flow to standardize production process, and reduce the risks of errors and omissions in paperwork transmission.

Design Compliant with International Standards

· ISA S88 standard defined model (physical model, program model, control activity model)
· FDA21 CFR PART11 standard: electronic records and electronic signatures functions

Flexible and Stable Database

· General MS-SQL relational database
· Flexible data storage and query
· Powerful batch report

Powerful Recipe Management

· For different production scenarios, the same master recipe can have multiple parameter schemes
· Up to 200 control recipes running at the same time
· Maximum 50 clients online at the same time

Friendly Human-machine Interface

· Graphical program configuration and display function (CFC)
· Modular software design
· Classic WINDOWS navigation interface style
· Simple guided installation and setup
· Rich online help and guidance

Practical Advanced Analysis and Query.

· Parameter comparison and process analysis between batches or within batches
· Data query such as operation log, alarm information and historical recipe

Reliable, Flexible and Open Platform

· Advanced management functions, such as planning, scheduling, comparison and analysis
· Centralized library management functions (material library, operation library) to improve reusability
· Secure data interchange
· Abundant system alarms and powerful diagnosis
· Open external communication interface
· Reliable manual charge check (bar code scanning, electronic label)
· Complete batch reports and statistical reports
· Flexible production line equipment selection
· Standard user authorization management
· Orderly batch priority management

System Architecture

Production Efficiency Improvement

The visual-based drag-and-drop engineering interface and modular process make everything simple and efficient, from recipe assignment, scheduling to equipment control, from physical model configuration to recipe configuration. HOLLiAS Batch software provides a comprehensive operation management solution and workflow optimization for intermittent production enterprises.
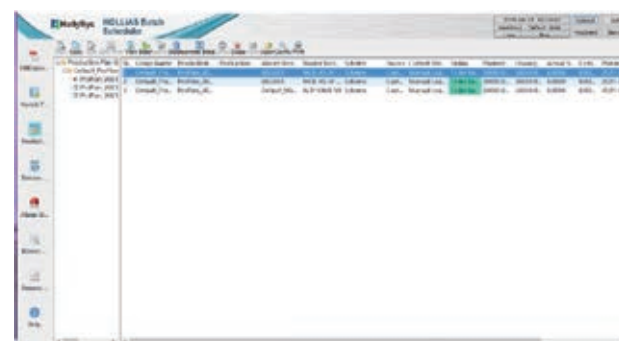
Planning and Scheduling

· The orders are broken down production task orders and scheduled to each production line, so that production is more orderly and predictable
· Modify production plan and scheduling information online so that we can quickly and flexibly respond to production line requirements
· Supports third-party systems to release production plans

Flexible Batch Control

· Equipped with factory intelligent production planning mode to meet the requirements of on-site fully automatic production
· Supports semi-automatic and semi-manual production planning mode, which meets the requirements of complex production conditions on site
· Multiple batches are running at the same time, and the system will automatically run the next batch if any equipment on idle to reduce equipment waiting time
· Intelligent judgment of multi-to-multi device path realizes self-optimization of paths to reduce errors and increase productivity
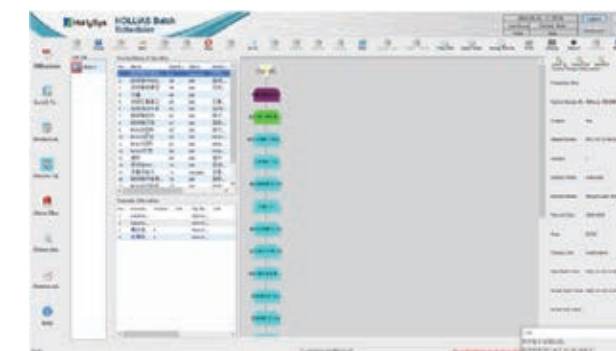
Production Plan Classification Management

· The production plan creates folders based on process recipes for classified management for easy traceability
· The status of each production plan is clear and orderly, which is c

Product Quality Improvement

· HOLLiAS Batch monitors the production process in real time, and all batches running process are plainly visible.
· Multi-colors indicate different states of recipe program operation, and on-site monitoring and operation are clear at a glance
· The system defines simply process operations such as pause, skip, abandon, interpolate, modifying parameters and other one-key operations

Flexible Control Mode

· Three Batch control modes: automatic, semi-automatic and manual, in line with on-site operation habits
· The Batch control mode can be used independently or in combination to meet the requirements of the Batch control process
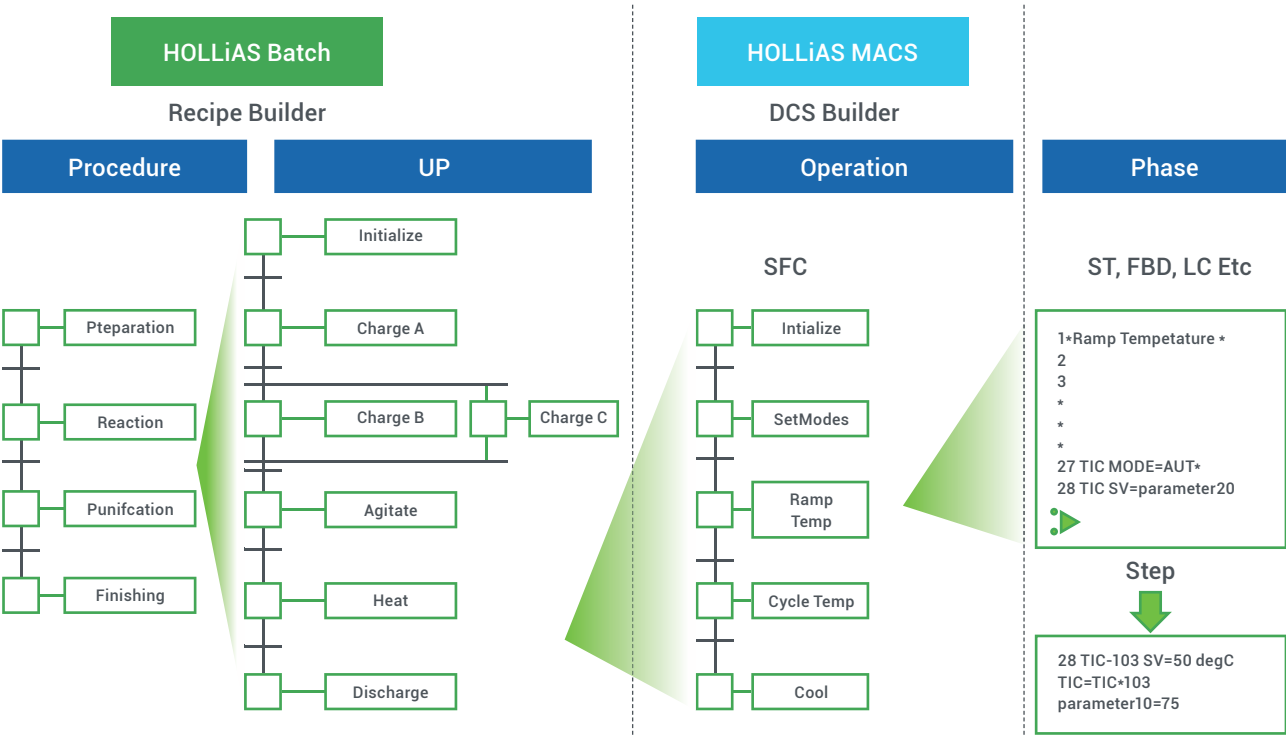
Rich Process Information

· Batch control generates a wealth of process information, which provides an important basis for production operations and decision-making
· The detailed and orderly human-machine interface information and simply production operation reduce labor intensity
· The historical batch process data after operation facilitates the traceability and optimization of the production process

Intelligent Resource Strategy

· Multiple batches are alternately proceeded in an orderly manner according to priority, reducing equipment idleness and increasing equipment utilization
· For multi-to-one production process, intelligent resource strategy reduces resource occupation and improves production efficiency
· For multi-to-multi production process, self-optimized path strategy reduces resource conflicts and shortens the production cycle
· The equipment is optional to be exclusively occupied or shared to realize efficient, flexible and simple production and operation
· Manual intervention provides expedient for emergencies to ensure safe and stable production

⇨ Refined Control

- The control models are divided into batch level, unit level and operation level to cover whole process
- The control range is refined level by level, and the different operation instructions are levered to achieve precise control
- Strict operation and monitoring authority management ensures the safety of the production process and the non-disclosure of recipe data
- Step-by-step modularization and refined management improves production management level and product quality

HOLLiAS Batch

Recipe Builder

Procedure	UP

- Initialize
- Pteparation — Charge A
- Reaction — Charge B — Charge C
- Punifcation — Agitate
- Finishing — Heat
- Discharge

HOLLiAS MACS

DCS Builder

Operation	Phase

SFC

- Intialize
- SetModes
- Ramp Temp
- Cycle Temp
- Cool

ST, FBD, LC Etc

1*Ramp Tempetature *
2
3
*
*
*
27 TIC MODE=AUT*
28 TIC SV=parameter20
▷

Step

28 TIC-103 SV=50 degC
TIC=TIC*103
parameter10=75

⇨ Instant Online Modification

- Online modification allows fast and timely modification to recipe and other parameters
- All online modification in the batch process will take effect immediately and will not affect existing production process.
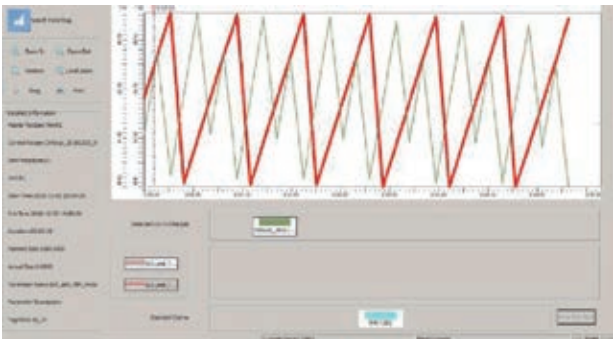

Process Optimization

The process analysis of the HOLLiAS Batch software is of great help in optimizing the production process and operation.

⇨ Graphical Display Interface

- Simultaneous comparison of multiple related parameters quickly analyzes the process parameter differences causing quality fluctuation
- Out-of-tolerance alarm reminder help retaining product quality uniformity
- Query of the optimal quality process parameters helps optimizing the control process and parameters to improve quality and efficiency
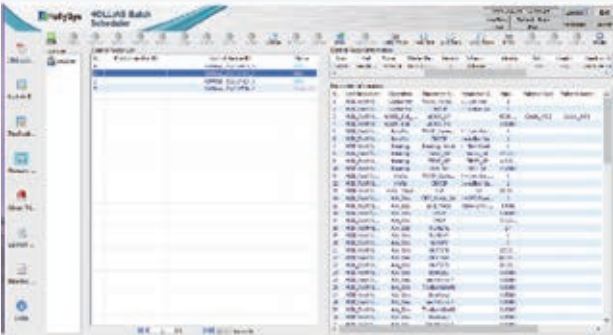
⇨ Add Trend Points Online

Online add parameters for comparison. Easy to use and convenient.

Manufacturing Process Traceability

HOLLiAS Batch software automatically records all online operation information and batch running status.
HOLLiAS Batch provides reports complaint with the characteristics of intermittent industry:

- Adopts MS Excel configuration for easy use
- Supports flexible customized report function
- Online report query and printing function
- Automatically generates reports, which are unchangeable and independent stored

⇨ Operation Log

· Records operation information such as online modification of orders and recipes to ensure production process traceability
· Records all online operation instructions following FDA electronic record requirements to ensure safe and compliant production
· The detailed operation log provides a basis for the assessment and evaluation of production operators

⇨ System Alarm

The online alarm of HOLLiAS Batch software includes real-time graphical display, customizing alarm level and multi-function alarm query, etc.

· Important events or abnormalities in the production process will trigger an alarm and corresponding interlock to guarantee production safety
· The record of problem, identification, time, level and type of the alarm facilitates fast locating the fault source
· The alarm information system also provides methods and guidelines for troubleshooting, reducing the system maintenance workload

⇨ Alarm setting

· Supports alarm printing, offline storage, convenient for important information archiving and traceability
· Flexible setting of alarm priority adapts the requirements of production process and on-site operation
· Alarm filtering and confirmation functions realize fast production problems querying and handling

⇨ Batch Reports

· Whole process and results reports provides data support for process optimization and product traceability
· Automatic generation of reports without manual recording
· Customized batch report templates meets production process requirements
· Reliable and unchangeable data complies with FDA electronic signature requirements
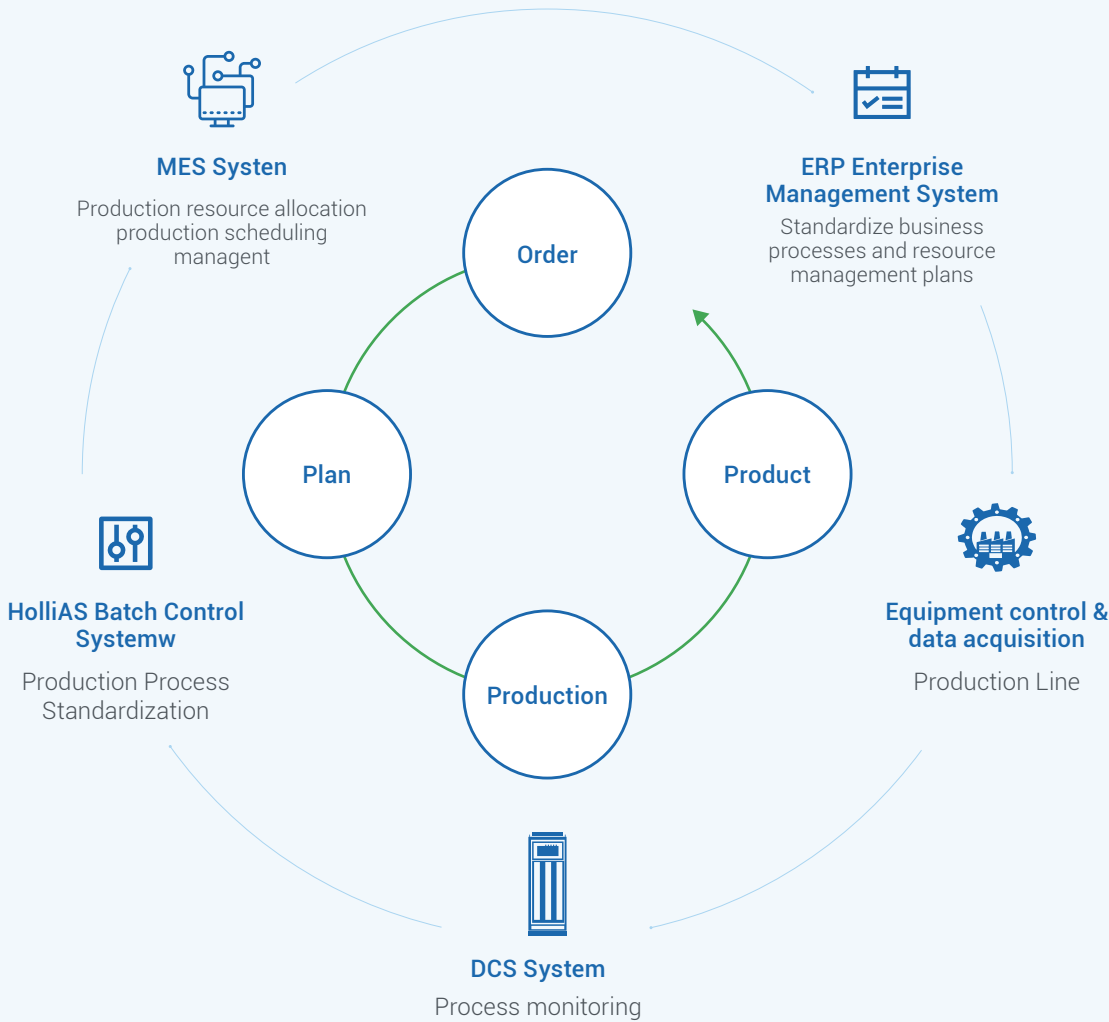
⇨ Statistical Reports

· Daily, weekly and monthly reports provide a basis for raw material and energy consumption analysis
· Analysis of peaks and valleys of various raw materials based on historical data of the statistical reports for process optimization

Operation & Management Integration

The warehouse management function provides accurate and abundant material information for production.
Flexible building of a warehouse management model realizes efficient and convenient management of material warehousing and batch operations.
Real-time connection with third-party warehouse management systems such as ERP/MES, and timely update of material inventory and other information.

· **Material and batch query.**
· **Barcode for scan verification, code printing and query.**
· **Material preparation management.**

MES Systen
Production resource allocation production scheduling managent

ERP Enterprise Management System
Standardize business processes and resource management plans

HolliAS Batch Control Systemw
Production Process Standardization

Equipment control & data acquisition
Production Line

DCS System
Process monitoring

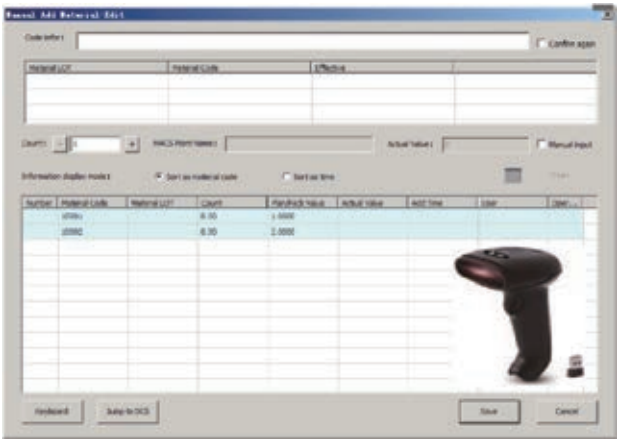Order

Plan

Product

Production

⭲ Warehouse Management

· The outbound and inbound operation seamlessly integrates with batch production process, making the batch charge process more efficient
· Automatically generates picking lists, only need simple operations to complete material library management and update
· Powerful warehouse management function facilitates daily material management and cost accounting
· Optional barcode scanning or third-party release of material information avoids the inefficiency and high error rate of manual input

⭲ Material Preparation Management

· Material preparation management prepares manual raw materials in advance and generates barcodes based on batch numbers and recipes
· Timely update of the actual material inventory ensures that meets the production requirements
· The auto generated material preparation list saves preparation time and improves preparation efficiency

⭲ Barcode Management

· Material barcode scanning and verification prevents omission, mistaken charge and overcharge
· Barcode scanning to check the equipment, step sequence, material code, charge amount and other information ensures the accuracy of the material
· For online manual charge, it supports both manual input and scanning of barcode, which are easy to operate
· The barcode format can be configured or from a third part

Major References

Pharmacy(Chinese/Western Medicine)		Pesticide		Lubricant/Grease	
Product/ Equipment	Typical References	Product/ Equipment	Typical References	Product/ Equipment	Typical References
Chinese medicine extraction	E-fong Pharmeceutical Guangdong	Pesticide formulations	BASF Plant protection agent	Lubricant	Sinopec Lubricant Branch
	E-fong Pharmeceutical Longxi		Shanghai Xianglin Mefront		PetroChina Lubricant Branch
	Chia Tai Youth Bao		Shenzhen Noposion		Shanghai Naco Synthetics
Original drug synthesis	Kanglong Chemical	Pesticide Intermediate	Guangzhou Greatchem		Shandong Fangyu
Medicinal preparations	Liaoning Cynda		Tomie Benzene Satoshi	Grease	Sinopec Lubricant East China
Pharmaceutical intermediates	Suzhou Fujilai		Limin Chemical BM		Sinopec Lubricants Wuxi
Organic electronic materials silicon materials		**Resin**		**Catalyst/polyether/surfactant**	
Product/ Equipment	Typical References	Product/ Equipment	Typical References	Product/ Equipment	Typical References
Cathode material	Guangzhou BYD	Acrylic	Hubei Huyi Chemical	Exhaust gas catalyst	BASF Catalyst Jinqiao
	HEC Lithium Iron Phosphate		Shanghai Baolijia	PGM	BASF PGM
Lithium battery materials	Ningde Kaixin Battery Materials	Furan resin	Suzhou Xingye	Microspheres/ Molecular Sieve	PetroChina Changting Catalyst
liquid crystal Isoelectronic materials	Zhejiang Yongtaitech Chemical	Phenolic Resin	Shandong Shengquan	Polyether	Hangjin Technology Polyether
Silicone materials	Wynca Chemical	Unsaturated resin	Jiangsu New Solar		Sanjiang Chemical Surfactant
Fluorosilicon material	Shandong Dongyuechem		Changzhou Tianma Ruisheng	Surfactant	Zhuhai Solvay
		PU/PE Resin polyester	Shanghai Huide		Yangzhou Sixin Chemical
Daily chemical		**Paint/Coating**		**Paint/ink**	
Product/ Equipment	Typical References	Product/ Equipment	Typical References	Product/ Equipment	Typical References
Laundry detergent	Bluemoon Guangzhou	Architectural paint	Shandong Puntium Paint	Wood paint	Nippon LRF
	Bluemoon Kunshan		Zhiqiang Paint	Anticorrosive paint	Qingdao Haiyangchem
Essence	Hangzhou Grascent		Shanghai Bauhinia	Varnish/tablet/ gravure	Hangzhou Hhink
Spices	Hangzhou Youbang Spices	Real stone paint/ imperial paint/latex paint for exterior wall	Shanghai Asia-paint	Flat ink	Tongxiang Bauhinia Ink