HollySys

HOLLiAS MACS DCS

Building Intelligent, Efficient, and Green Plants

Contents

About HOLLiAS MACS DCS

HollySys has developed multiple generations of control systems, continually advancing technological innovation. With over 30 years of industry experience, we offer users simpler, more integrated, and more economic solutions of industrial intelligence. HOLLiAS MACS DCS is a future-proof industrial automation control system designed to support flexible plant architectures. Its exceptional performance has earned the trust of users, with over 20,000 successful installations spanning more than 60 countries worldwide.

High Stability
High system reliability with full redundancy configuration, minimizing unplanned downtime

High Flexibility
Suitable for various types of projects, enhancing application flexibility

High Precision
Highly accurate data collection, control, and analysis

Superior Quality
Design and manufacturing compliant with international standards

HOLLiAS MACS DCS is built with a clear purpose: simple configuration to handle your unique control applications - no matter their sizes - and ease of expansion to cover additional personnel and assets, or even integrate entire business operations. HollySys enhances enterprise adaptability and competitiveness by utilizing advanced DCS capabilities. Full lifecycle services cover every stage from design through operation to maintenance, providing users with extensive technical support and assurance, reducing operational costs, and enhancing system availability and maintainability.

Lower Cost

Unified platform with customized industry-specific function blocks and libraries for lower cost and higher efficiency

User-Friendly Operation

Unified project management tools and advanced, user-friendly HMI interfaces for lower maintenance cost

Shorter Lead Time

Seamless data integration from process design to plant engineering

Enhanced Network Security

Equipped with built-in security components and external secure communication devices to ensure system integrity

System Features

Safety and Reliability are the Core Fundamentals of Production

HOLLiAS MACS DCS is comprised of two primary parts - hardware and software. It stands out with its reliable and safe hardware, user-friendly interface, unbeatable cost effectiveness, and robust durability. Packed with best-in-class features, it's the essential solution for enhancing productivity and achieving superior economic performance in today's highly competitive landscape. We ensure every bit of software and hardware maintains a high availability service record. In addition, the system has passed multiple functional safety certifications, including CE, Achilles, G3 Anti-Corrosion, and TÜV, and met the requirements of CCS.

Guaranteeing the Highest Availability and Reliability

No Single Point of Failure

Our system ensures no single point of failure with fully redundant controllers, power supply modules, I/O modules, network, IO-Bus, and historian stations. Active and stand-by processor controllers work in synchronization. If a failure occurs, the control switches over seamlessly to the stand-by controller. Failed modules can be replaced online, ensuring that failure will not interfere with the process control.

Comprehensive Diagnostics

Complete self-diagnostics are conducted by the controller and I/O modules all the time. All types of faults, such as communication failure, open wire, short circuit and over range, can be detected and reported to the operator in a timely manner.

Advanced Isolation Technology

Reliability is improved through optoelectronic isolation between the system bus and modules, isolating power supplies for system and field power, and fault isolation between module channels.

Robust Cybersecurity

Real-time Ethernet, firewall-integrated switches, and industrial-grade PowerPC architecture CPUs with built-in network storm protection ensure the operation with robust cybersecurity.

Unique Safety and Security Features

Safety System Design Philosophy

Numerous safety design principles, such as signal quality assessment and fail-safe mechanisms, are adopted to enhance system reliability.

Fail-Safe Technology

A safety design philosophy is adhered across the entire system, while signal quality between logical computations is validated to ensures safety. In case of a fault, outputs can automatically switch to pre-defined safe values and execute ECC memory error detection.

Cybersecurity Protection

Robust cybersecurity is provided through industrial security gateway, industrial firewall, intrusion detection system, security audit system, log audit system, whitelisting software, host hardening system, and security management platform.

Achilles	CE	G3 Anti-Corrosion	CCS

Ensuring Seamless Connection through Excellent Openness

Seamlessly Integrated Solutions

HOLLiAS AMS (Asset Management System), Batch, APC (Advanced Process Control), MES (Manufacturing Execution System), OTS (Operator Training System), SIS (Safety Instrumented System), DEH (Digital Electro-Hydraulic), PLC (Programmable Logic Controller), etc. can seamlessly integrate with other HollySys products as well as third-party devices, to realize unified management and coordination. This integration enables production data and information to flow seamlessly between different systems, facilitating collaboration across all levels. It provides users with comprehensive solutions to optimize enterprise processes and further reduce operational costs.
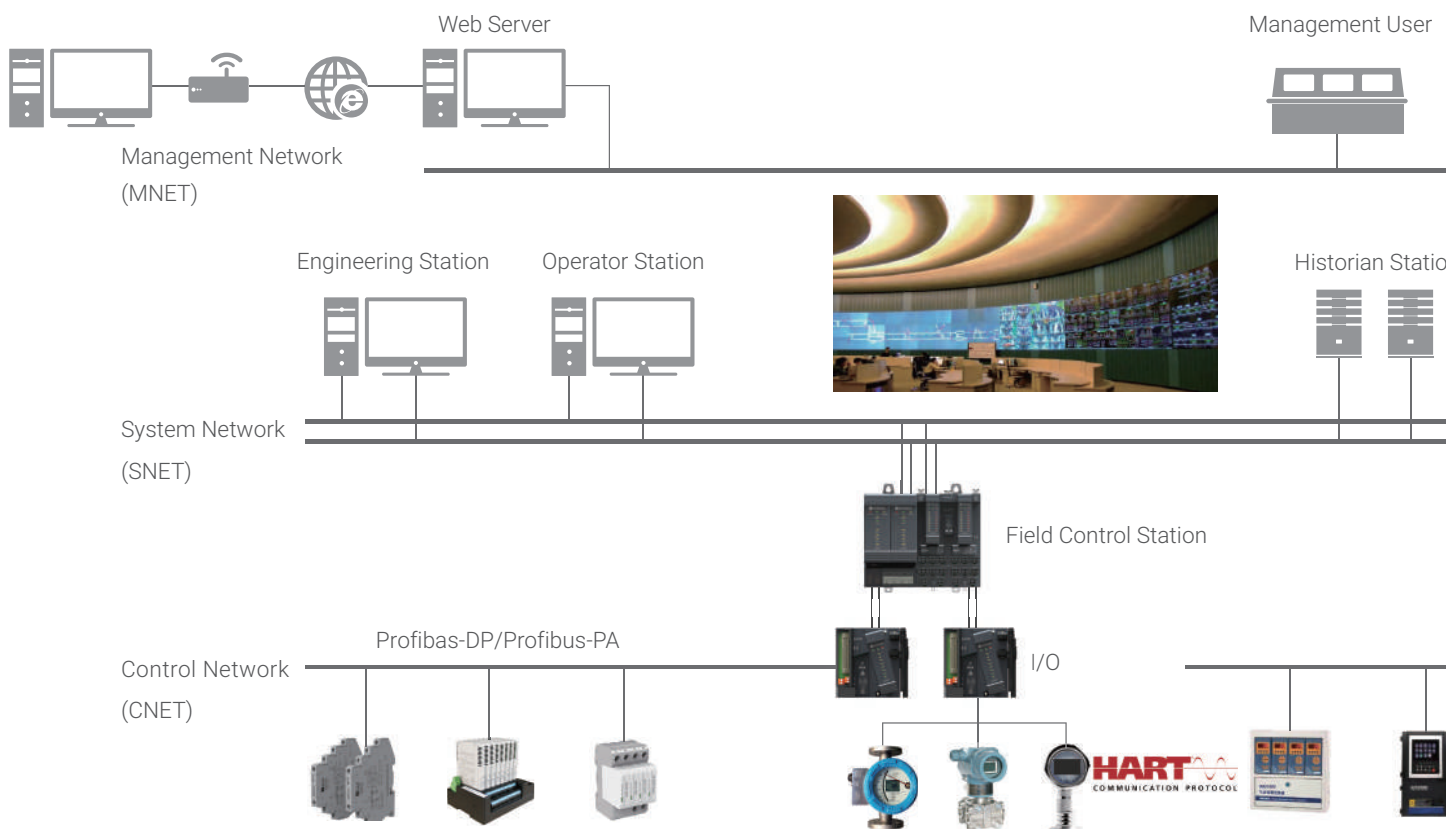
Production Management Optimization		MES
Control Optimization		APC
Operation Optimization		OTS
Asset Management Optimization		AMS
Highly Reliable Control Systems	DCS/DEH	OCS	SIS	PLC

Protocol Support and Interface Options

Compatible with Profibus-DP/PA, ProfiNet, TCP/IP, OPC/ODBC, ModBus, and other communication protocols, the system utilizes RS232/RS422/RS485, Ethernet, and other interfaces. This enables one-way or two-way information exchange with other systems via communication stations or switches. The system seamlessly integrates with other HollySys products as well as third-party systems.
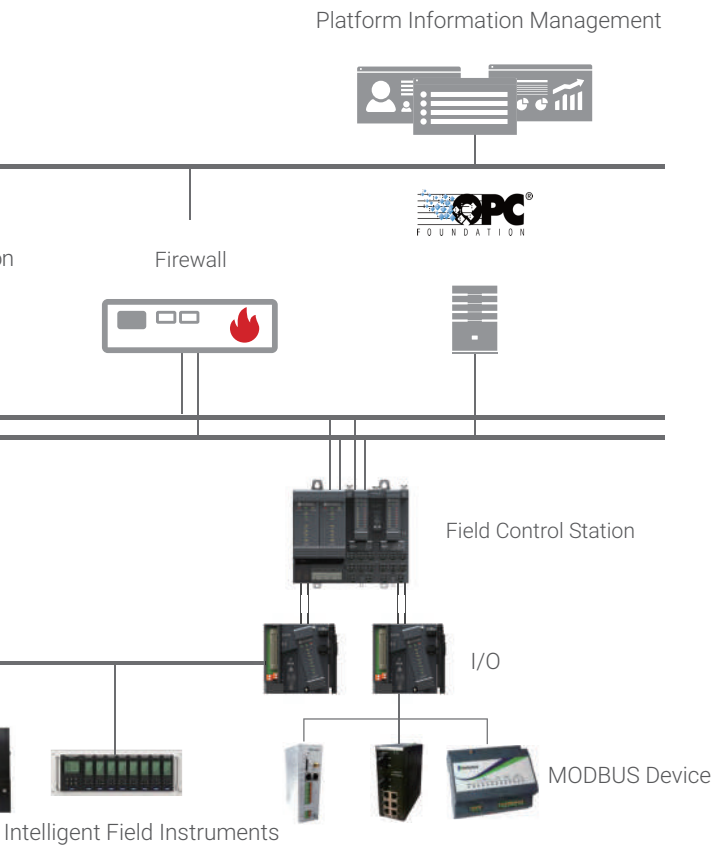
PROFIBUS · Modbus · PROFINET · HART COMMUNICATION PROTOCOL · OPC FOUNDATION · IEC · ODBC

System Architecture

The Simple Architecture Ensures Flexibility and Scalability

Web Server

Management User

Management Network
(MNET)

Engineering Station   Operator Station

Historian Station

System Network
(SNET)

Field Control Station

Profibas-DP/Profibus-PA

Control Network
(CNET)

I/O

HART COMMUNICATION PROTOCOL

Technical Data

Basic Environmental Index	
Operating environment temperature	-20 to 60°C
Operating environment relative humidity	Relative humidity of 5% to 95%, without condensation
Storage environment temperature	-40 to -80°C
Storage environment relative humidity	Relative humidity of 5% to 95%, non-condensing
Vibration	Acceleration of 0.5 g, vibration frequency of 10 Hz ≤ f ≤ 60 Hz, 1 octave/min (10%)
Environment adaptability	Compliant with ANSI/ISA-71.04-2013 G3
Electromagnetic Compatibility Requirements	
Electrostatic discharge immunity	Compliant with IEC61000-4-2, Class A
RF collision field radiation immunity	Compliant with IEC61000-4-3, Class A
Electrical fast transient immunity	Compliant with IEC61000-4-4, Class A
Surge (impact) immunity	Compliant with IEC61000-4-5, Class A
Rf field inductive conduction disturbance immunity	Compliant with IEC61000-4-6, Class A
Power frequency magnetic field immunity	Compliant with IEC61000-4-8, Class A
Voltage dips and short-time interruption immunity	Compliant with IEC61000-4-11, Class A
Radiation emission & conducted emission	Compliant with IEC61000-6-4, Class A

Platform Information Management

Firewall

Field Control Station

I/O

MODBUS Device

Intelligent Field Instruments

Flexible Architecture

Flexible network topology is supported, including P-to-P (Peer to Peer), C/S (Client/Server) structures, and hybrid structure, greatly enhancing system flexibility.

Strong Compatibility

The SNET system utilizes real-time Ethernet with firewall-equipped switches and internal controller configurations to prevent network storms, ensuring stable network communication. Moreover, it is equipped with and adapts to various communication devices, interfaces, and protocols, seamlessly integrating with different devices and systems to enhance overall compatibility and flexibility.

High Scalability

The system offers high scalability, allowing flexible adjustments and expansions based on specific needs. We provide comprehensive and efficient solutions for small, medium, and large-scale systems, catering to diverse application requirements and adapting to future developments and changes.

System Specifications			
Max. no. of domains	64		
Max. no. of operator stations per domain	64		
Max. no. of field control stations per domain	64		
Real-Time Response Capability			
SOE resolution	1 ms		
Data refresh time of operator station	<1s		
Command delivery time of operator station	<1s		
Controller			
Model	K-CU11	K-CU02	K-CU03
CPU	32-bit PowerPC architecture processor	32-bit PowerPC architecture processor	32-bit dual-core PowerPC architecture processor
Dominant frequency	400 MHz	400 MHz	800 MHz
Internal memory	128 MB	128 MB	512 MB
I/O module	100	65	200
I/O point	3,200	1,040	4,800
PID loop	300	300	300

HOLLiAS MACS-K Hardware

Core Advantages of Stability, Safety, Sustainability, and Cost-Effectiveness

Controller

I/O Module

VIO Module

Commu...
Mo...

Non-Redundant
Terminal Board

Red...
Modu...

Non-Redundant
DB37 Base

iDTU (Industrial Intelligent Data Transmission Unit)

Compact
16-Channel iDTU

16-Channel iDTU

Power Supply
Module

Redundant
Module Bases

48-Channel iDTU

HOLLiAS MACS-K controller boasts outstanding processing power and ample application storage capacity, while inheriting the high quality and stability of past generations of DCS. Leveraging the latest advancements in field digital technology and continuously optimized, this new generation hardware product significantly enhances plant operational efficiency and stability.

Robust Hardware Configuration

- PowerPC architecture industrial-grade microchip with built-in anti-network storm component are adopted.
- Single CPU mounting and fanless design are adopted.
- Hot-swapping is supported.

Full Redundancy Configuration

All system components, including network, IO-Bus, controllers, power modules, I/O modules, and historian stations, can be redundantly configured to ensure no single-point failure.

Multiple Isolation Protections

- Optical isolation between the system bus and module effectively isolates high voltage, high current, and noise interference, reducing fault occurrence.
- The system power supply is isolated from the field power supply to reduce electromagnetic interference.
- Fault isolation between module channels prevents fault diffusion and ensures stable system running.

Comprehensive Intelligent Diagnosis

The controller and I/O modules are equipped with intelligent diagnostic units, which can provide self-diagnosis and reporting of board failure, communication status, signal disconnection, short circuit, overrange, etc., reducing maintenance costs and downtime.

Excellent Environmental Adaptability

The system is designed for harsh industrial environments and compliant with EMC design specifications, meeting international standard IEC61000. Its electromagnetic interference resistance meets IEC61000 requirements, with corrosion resistance meeting ANSI/ISA-71.04-2013 standards.

HOLLiAS MACS Operator Software

Making Intelligent Decisions Quicker and Better

HOLLiAS MACS operator software simplifies plant operations by providing the information needed to make timely decisions without cluttering the view. Its intuitive interface promotes a thorough understanding of situations and facilitates appropriate actions. The system allows operators to quickly find positive solutions, reducing pressure from tight deadlines, while its predictive intelligence ensures safety during potentially hazardous situations.

User-Friendly HMI Interface

The user-friendly interface is designed for simplicity and ease of use. Enjoy a variety of clear display styles and attractive designs with just one click to navigate and operate effortlessly. The UI is visually appealing and practical, supporting wide-screen and multi-screen displays, facilitating efficient navigation.

One-Click Navigation

Each device or point comes with its own sleek faceplate, granting seamless access to all associated operations such as alarms and trends, and detailed information with just a single click. Empower operators with intuitive simplicity, mastering complexity with elegance.

Trend & Alarm Management

- Operations become simpler with effortless alarm management, organizing according to zone, group, and type. Disruptions are minimized and efficiency is enhanced through customized alerts featuring a range of icons and colors.
- Trend tracking helps users understand how system performance changes over time in advance to gain valuable operational experience and make informed decisions, while ensuring efficiency and precision to help users meet operational challenges.

History Playback

The history playback feature allows for effortless analysis of production incidents. Reviewing past data playback enables thorough incident assessments and provides valuable insights to enhance operational efficiency. Our intuitive history playback function can help simplify your production process.

Seamless Online Changes without Stopping Production

Through seamless dynamic configuration changes, we maximize productivity and flexibility, ensuring uninterrupted production. Our software enables modifications, debugging, and testing during operations without downtime. By employing incremental compilation and installation to minimize disruptions, we achieve smooth transitions, enhance production efficiency, and maintain peak performance and responsiveness.
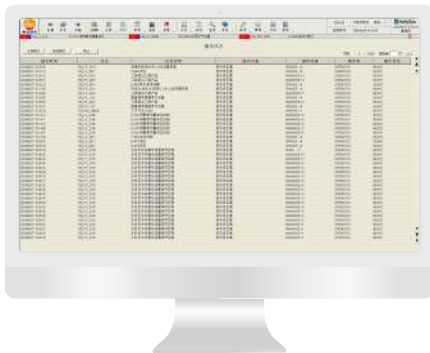
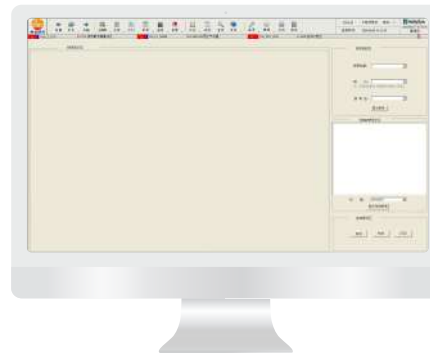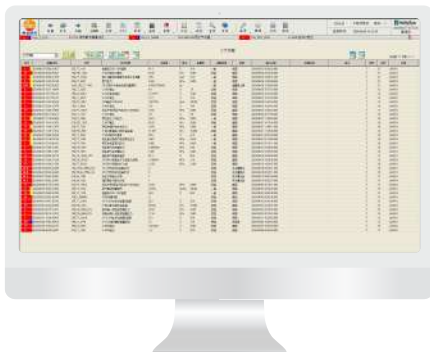**Main Operator
Station Interface**
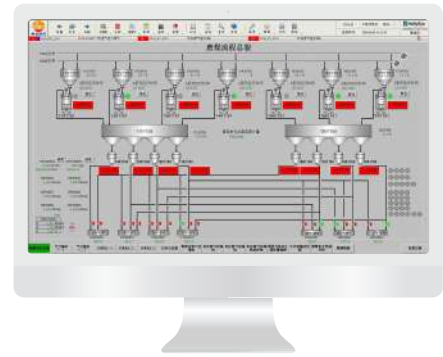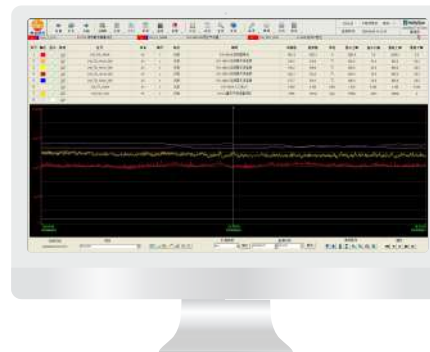
Flow Chart

Log Function

Report Function

Alarm Function

Trend Analysis

HOLLiAS MACS Engineering Software
Maximizing Efficiency with Less Engineering Time

HOLLiAS MACS engineering software streamlines configuration through easy drag-and-drop, professional algorithm libraries, global databases, and other features, helping users reduce initial system configuration time. Additionally, it offers common sequential and batch control logic programs. The software includes control panel templates, batch processing editing functions, automatic coordination loops, online debugging of control logic, and industry-specific HMI graphic templates. All engineering configuration tasks are completed within a unified project center, making configuration from process graphics to field devices simple and intuitive.

Unified Data and Configuration Management

The engineering software utilizes centralized data management, which is ideal for large-scale projects with extensive points. Integrated controller algorithm editing, management, simulation, online debugging, and hardware configuration functions are managed through a single platform, providing unparalleled convenience. This unified solution facilitates seamless operation and efficiency improvement.

Standard Logic Language & Flexible Programming Methods

The engineering software supports IEC 61131-3 standard languages such as CFC, ST, LD, SFC, applicable across industries. Users can easily create control logic using existing algorithm libraries and user-friendly programming languages. For specific applications, users can utilize custom algorithm libraries for specialized algorithm research, tailored to meet personalized control requirements.

Rich HMI Libraries

Featuring new visual effects, sleek and refined graphics, and a comprehensive library of industry-specific images, the software includes graphical tools to easily generate online operation flow charts and interface templates. An extensive symbol library aids users in creating various graphical interfaces and data display charts. Customizable symbol libraries support diversity and convenience.

Efficient Collaborative Configuration

The engineering software supports the collaborative configuration of multiple engineering stations, and application modifications can be achieved without interrupting the operation of the existing system. It is very suitable for shortening the project schedule, especially in medium and large projects. Experience project management is streamlined and users see results faster with our advanced collaborative provisioning capabilities.

Offline Simulation and Debugging

The software provides offline simulation capabilities, enabling real-time system testing and control strategy validation, assisting in optimizing configuration control effectiveness, achieving efficient debugging, reducing production risks, and helping users shorten plant acceptance testing and field debugging time.
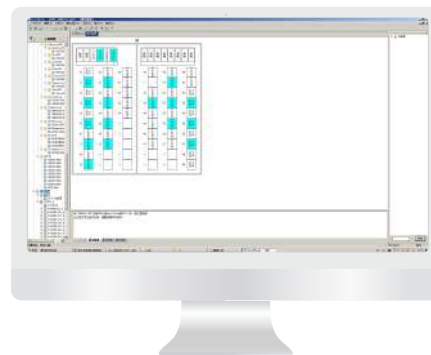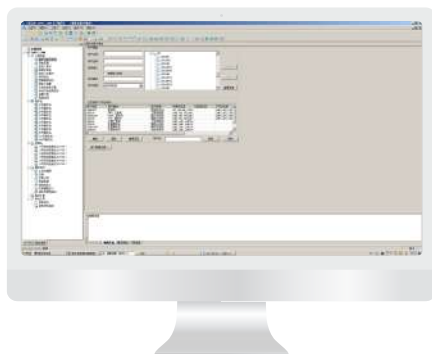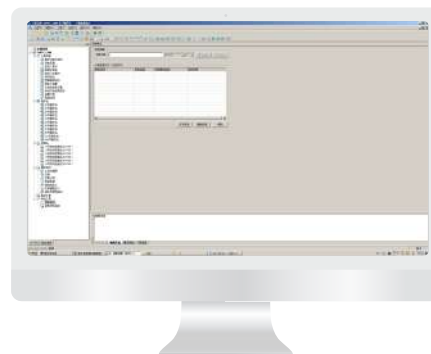
Graphic Configuration
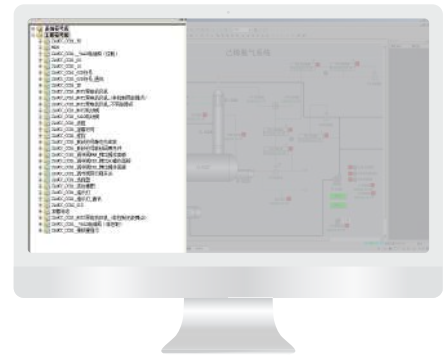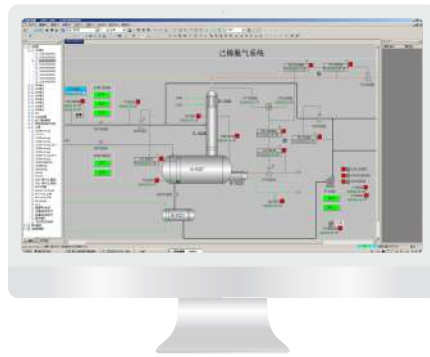
Logic Configuration
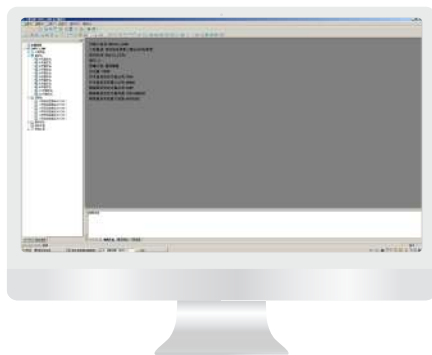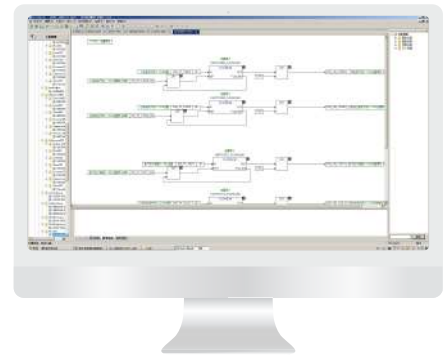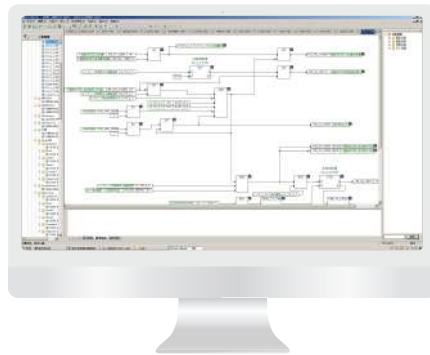
Project Center

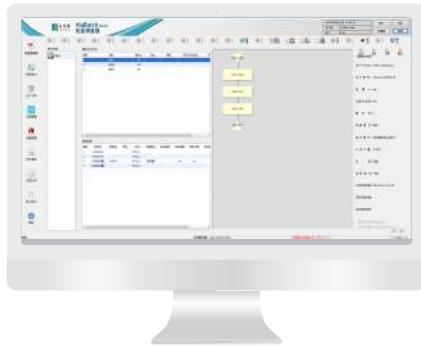**Hardware Configuration**

User Configuration

Report Configuration

Industrial Software

Making Industrial Production & Operations Simple and Efficient

Batch Control System HiaBatch

HiaBatch Batch Control System is designed for industrial manufacturing enterprises with a modular software structure that can be flexibly configured according to user needs. It ensures industrial process standardization while addressing network security and data reliability concerns.

Simulation and Training System HiaSim

With rigorous mathematical models and virtual controller software as the core, HiaSim supports operational training, incident drills, instrument control training, control optimization, operational efficiency, and process learning. It ensures safe production operations for enterprises.

Instrumentation and Device Management Platform HiaPlant IDM

HiaPlant IDM is a unified management platform for maintenance, calibration, and fault diagnosis of intelligent devices such as field instruments and control valves. It serves as a crucial component of the comprehensive intelligent instrument maintenance and fault diagnosis system throughout the plant.
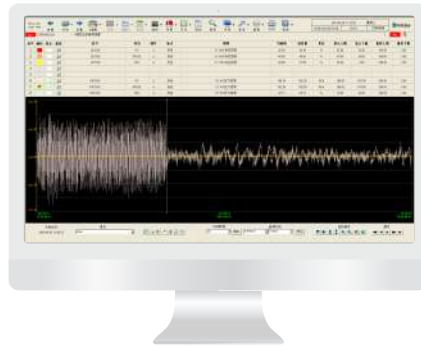
Advanced Process Control HiaAPC

HiaAPC Advanced Process Control significantly enhances industrial production process stability, improves dynamic performance, reduces operational fluctuations of key variables, ensures product quality consistency, increases target product yields, and enhances production unit processing capabilities.

Supervisory Control and Data Acquisition System HiaPlantSCADA

HiaPlantSCADA Supervisory Control and Data Acquisition System combines traditional control technologies with new technologies such as Internet, information security, and big data storage. It enables centralized control of multiple dispersed sites, significantly reducing the need for field personnel and enhancing labor efficiency.
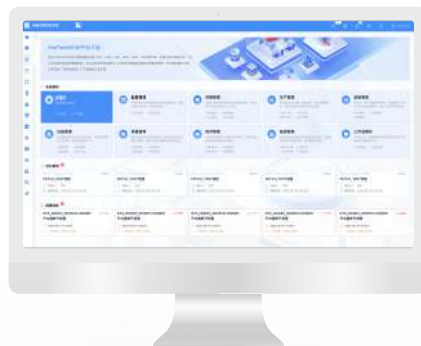
Manufacturing Operation Management System HiaPlantMOM

HiaPlantMOM Manufacturing Operation Management System utilizes digital means to standardize existing business management processes, achieving data visualization, process control, and traceability. This enhances enterprise production management efficiency.

Services

Towards Service Excellence

Based on extensive technical expertise and industrial domain knowledge, HollySys, as your partner, provides comprehensive services and support to ensure reliable project operations, empowering you towards a successful digital future. Our services not only enhance the profitability and efficiency of your system equipment and plant throughout their lifecycle but also reduce total operational costs.

Project Services

With rich project experience, a professional team, robust project management processes, and a unified platform, we guarantee efficient, high-quality, and timely project delivery. Our end-to-end services cover project design, engineering construction, commissioning, and operational management, etc.

Full Lifecycle Services

Our full lifecycle services offer integrated, efficient, and reliable solutions. Maintenance services minimize downtime with annual warranties, regular onsite support, and spare parts management. Upgrade and migration services ensure system updates to meet rapid technological advancements and changes.

Value-Added Services

We provide system optimization, energy management, and data analysis services to boost operational efficiency. Our cybersecurity measures, remote diagnostics, and maintenance services safeguard your systems from network threats, adding value to your entire plant.

Training Services

With well-equipped training centers and experienced instructors, HollySys enhances learning effectiveness through hands-on system practice. Tailored training solutions address specific operational needs and cater to diverse product lines and trainee knowledge structures.

Consulting Services

With leading-edge thinking, extensive experience, and advanced technology, we help foresee the value of innovative technologies and accelerate the realization of sustainable competitive advantages. Our consulting services focus on digital and intelligent manufacturing diagnosis, consulting, planning, and project management, facilitating smooth transitions from traditional to digital and intelligent enterprises.
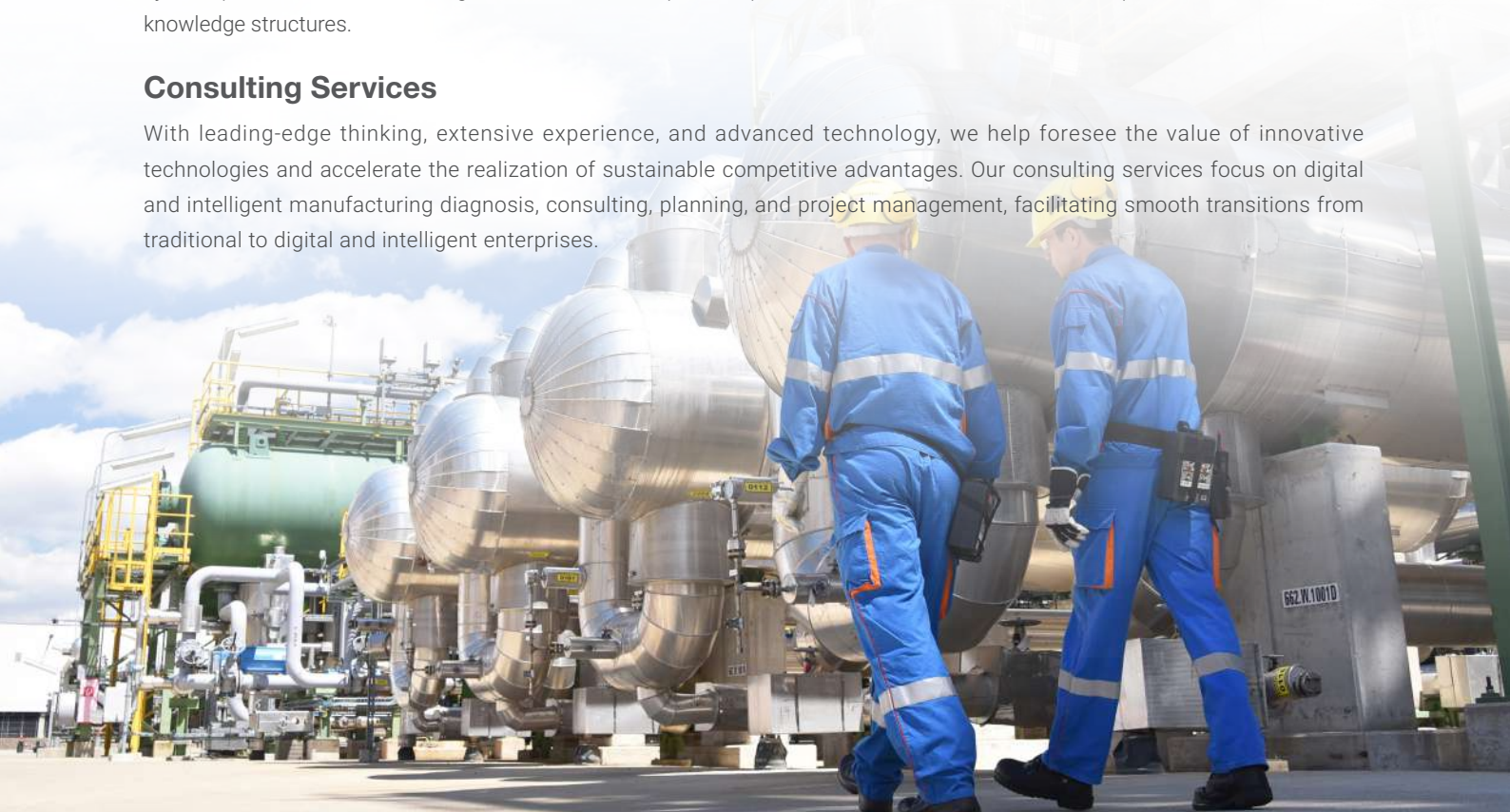
Typical Cases

Petrochemical

Sinopec Tianjin Nan'gang 1.2 MTA Ethylene & Downstream High-End New Materials Industrial Cluster Project

- Project Scale: DCS: 100,000+ I/O points, SIS: 20,000+ I/O points

- Project Highlights: It's Sinopec's first large-scale refining and chemical project focusing on high-end new materials, utilizing HollySys' OCS (Industrial Optical-Bus Control System), achieving ethylene engineering industrial application and development research.

Sinopec Hainan PX Polyester Raw Material Project

- Project Scale: 35,000 I/O points, 26,800 communication points

- Project Highlights: The project is of large system structure and complex process. Through this project, HollySys has become one of the few DCS suppliers with extensive performance in large-scale xylene control systems.

Chemical

Zhong'an United Coal Chemical (ZAUCC) 1.7 MTA Coal to Methanol and Olefin Conversion Project

- Project Scale: 80,000 I/O points

- Project Hights: It is a large-scale modern coal chemical project. HollySys participated in the project construction with MAV mode, and realized the upgrading and transformation of major industrial control equipment.

BASF Environmental CCE3.0 Project

- Project Scale: Nine coating lines and slurry production lines are constructed with an annual output of 18 million tons. HollySys provided DCS, Batch, and full life cycle services for the project.

- Project Highlights: The project achieved over 30% reduction in on-site personnel, increased production efficiency by over 15%, improved equipment utilization by over 10%, and increased product qualification rate by over 5%.
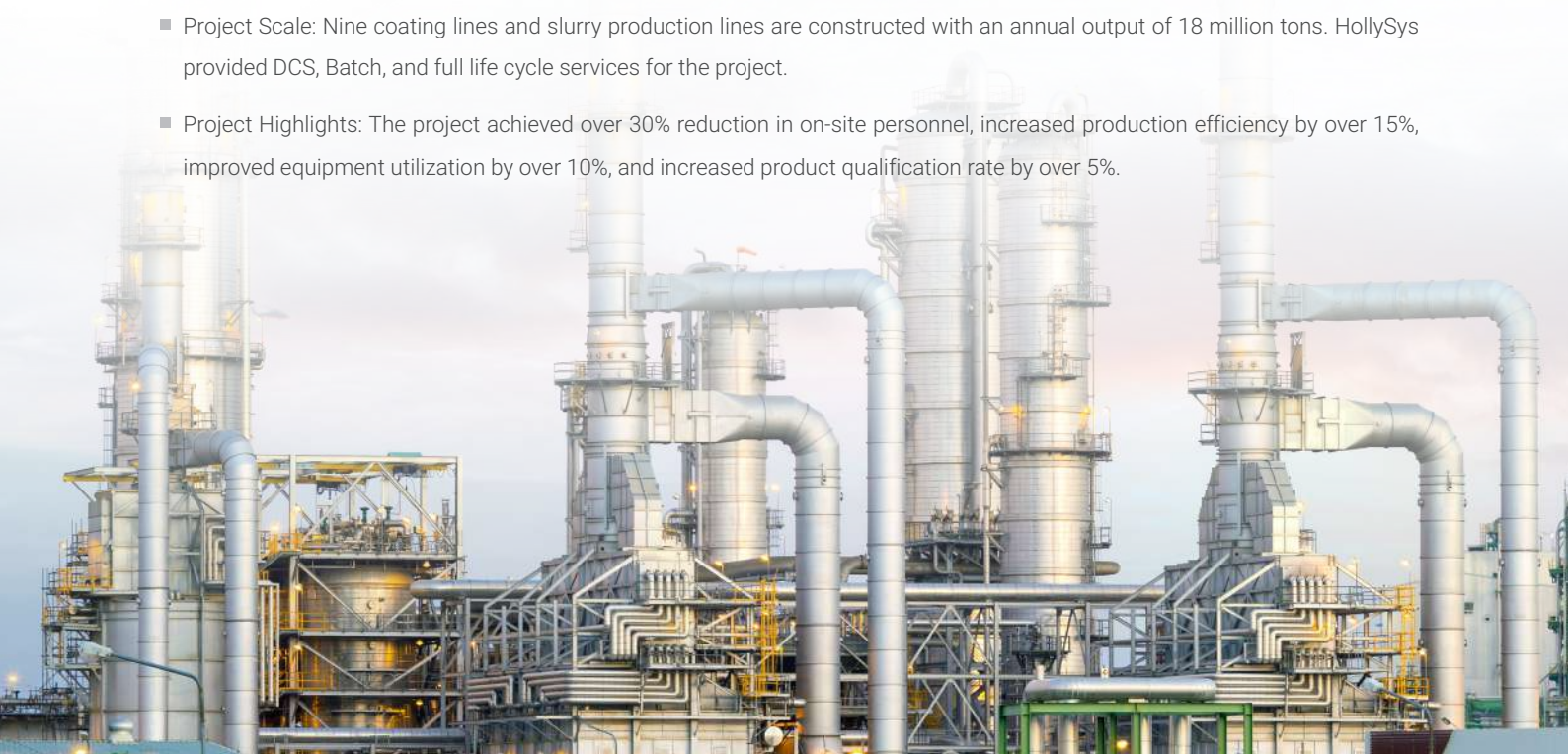
Power

Datang Dongying 1,000 MW Ultra-Supercritical Secondary Reheat Thermal Power Project

- Project Scale: 40,000+ physical I/O points

- Project Highlights: The project achieved 65%+ field bus control rate, 100% self-control rate, and the goal of one-click start-stop for units.

Xinjiang Zhundong Wucaiwai North III Power Plant 2 × 660 MW Unit "Full Process Intelligent Collaboration Center Construction Project"

- Project Scale: 40,000+ physical I/O points

- Project Highlights: It is the inaugural fully digital smart power plant, utilizing exclusively high-sodium coal, pioneering zero-discharge wastewater technology in thermal power, and leading in the complete implementation of field bus technology.

Oil & Gas

PipeChina South China Branch Product Oil Pipeline SCADA System Retrofitting Project

- Project Scale: 300 KTA download capacity at Zhuhai pumping station, 360 KTA for Zhongshan pumping station

- Project Highlights: The project adopted HollySys' SCADA. Two scientific research achievements of the project, "Development and Application of SCADA System Based on Advanced Chips and Operating Systems in Product Oil Pipeline" and "Key Technologies and Applications of Intelligent Monitoring and Early Warning for Natural Gas Pipeline Safe Operation" both promoted the advancement of the petroleum and chemical intelligence.

CNOOC Tianjin Branch Kenli 6-1 Oilfield Group Development Project

- Project Scale: 15,000+ physical I/O points, 35,000 communication points

- Project Highlights: This oilfield is the first 100-million-ton level oilfield in the northern area of Laizhou Bay, Bohai Sea, China. HollySys provided DCS, ESD, FGS, SIS, AMS, network security equipment and remote control equipment for 7 platforms to cope with the complex working conditions of offshore platforms.

New Energy

Sinopec Xinxing Xinjiang Kuche Green Hydrogen Demonstration Project

- Project Scale: The project involves the construction of a 300 MW photovoltaic power station with an annual electricity generation capacity of 6,180 MWh, and a hydrogen production plant capable of producing 20,000 tons of hydrogen per year. It includes hydrogen storage tanks with a capacity of approximately 210,000 Nm^3, hydrogen transmission pipelines with a capacity of 28,000 Nm^3/h, and supporting power transmission and transformation facilities.

- Project Highlights: This project is a megaton-level photovoltaic hydrogen production initiative and the largest-scale photovoltaic green hydrogen project globally. It is expected to reduce CO_2 emissions by nearly 480,000 tons annually.

SOFAR Gansu Dunhuang Tower-Type Solar Thermal Power Generation with Heat Storage Project

- Project Scale: 19,440 physical I/O points, 5,600 communication points

- Project Highlights: It's the largest single-unit solar thermal power station in Asia with the world's largest concentrated solar area per unit, tallest absorption tower, and largest molten salt thermal storage tank.

Metallurgy

China Nonferrous Nickel Iron Project in Dagon, Myanmar

- Project Scale: 16,000 physical I/O points, 20 control rooms, 46 operator stations

- Project Highlights: Invested and constructed by China Nonferrous Metal Mining Group, this project represents the largest cooperation in the mining sector between China and Myanmar. It has an annual processing capacity of 1.32 million tons of dry ore, helping customers achieve international advanced levels in ore beneficiation and metallurgical processes.

Jiujiang Wire 2 × 2.4 MTA Chain Circulating Pellet Project

- Project Scale: 12,000 physical I/O points, 16 engineering stations and operator stations

- Project Highlights: Invested and constructed by Jiujiang Wire Group, the project has an annual output of 4.8 million tons of pellet ore. The project achieved comprehensive upgrading and retrofitting of the control system, promoted the digitalization of engineering equipment, established a basic information platform for intelligent plant construction, and laid a solid foundation for intelligent pellet production.

Food & Pharmaceutical

Hubei CAHIC (China Animal Husbandry Industry) Animal Medicine R&D and Production Base Project

- Project Background: 260 million RMB was invested to construct the animal medicine R&D and production base. The HOLLiAS® pharmaceutical integrated solution assists in achieving production automation and integrated management.

- Project Highlights: The project has promoted the integrated development of informatization and industrialization in the pharmaceutical industry.

New Era Pharmaceuticals' Orlistat Active Pharmaceutical Ingredient (API) Instrumentation and Control EPC Project

- Project Background: Orlistat products as a new era pharmaceutical industry 1 billion level single product, urgent need to expand production capacity.

- Project Highlights: The project has achieved centralized workshop control, increased production capacity by nearly 5 times, reduced operating personnel by more than 30%, and significantly improved the first-pass qualification rate.

Building Materials & Papermaking

Hubei Five Continents Special Paper Co., Ltd. PM15 Production Line Project

- Project Background: HollySys provided an integrated solution for the PM15 production line, including pulp making, papermaking DCS, and paper machine MCS. This achieved high-precision control and adjustment with a reel width of 8,660 mm and operating speed of 1,300 m/min.

- Project Highlights: The project not only enhanced production efficiency and product quality but also represented a significant domestic practice in replacing imported automation control systems.

Hubei Century Xinfeng Leishan Cement Co., Ltd. 6,500 t/d New Dry Process Cement Production Line Project

- Project Background: The plant has been in operation for nearly 20 years with low automation levels and a variety of brands for on-site control electrical components, lacking unified protocols.

- Project Highlights: HollySys' retrofitting solution achieved equipment networking throughout the entire plant, centralized management and control, automatic equipment warning, and operation maintenance. The project achieved coal savings of 2% to 3%, electricity savings of 3% to 5%, and an overall cost reduction of 1.3%.

Key Accounts

BASF — We create chemistry

Worley — energy | chemicals | resources

ENTER ENGINEERING

PLN

PETRONAS

VEOLIA WATER

TOTAL

NTPC

SINOPEC

中国石油

CNOOC

WISON

EVONIK INDUSTRIES degussa.

FLUOR

Johnson Controls

国家管网 PipeChina

中国国电 CHINA GUODIAN

大唐集团公司 CHINA DATANG

DEC 中国东方电气集团有限公司 DONGFANG ELECTRIC CORPORATION

上海电气 SHANGHAI ELECTRIC

sinoma

HTC

APP sinarmas

Apical

UZBEKNEFTEGAZ

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10, Mahmoud Tarabi Street, Tashkent, Uzbekistan