

BLINE AUTOMATION SUITE 4.0

IT-OT CONVERGENCE PLATFORM

The Central Brain for Smart Manufacturing

INDUSTRY 4.0 READY

WHAT IS IT-OT CONVERGENCE?

IT (Information Technology)

- Enterprise Systems (ERP, QMS)
- Business Intelligence & Analytics
- Cloud Computing & Data Storage
- Office Networks & Communication
- Digital Business Operations

OT (Operational Technology)

- PLCs, SCADA, DCS Systems
- Sensors & IoT Devices
- Manufacturing Equipment
- Robots & Automation Systems
- Real-time Process Control

BLINE AUTOMATION SUITE = IT + OT UNIFIED

- ✓ Real-time data flow from shop floor to management
- ✓ Single platform for business + manufacturing operations
- ✓ No middleware, no third-party integrations needed
- ✓ Complete traceability & compliance automation

PLATFORM ARCHITECTURE

LAYER 1: ENTERPRISE LAYER (IT)

BLine Pharma Suite • ERP • QMS • LIMS • WMS • Batch Control • Compliance

LAYER 2: INTEGRATION LAYER

REST APIs • MQTT Broker • OPC-UA Server • Time-Series Database • Audit Trail

LAYER 3: AUTOMATION BRAIN (Central Intelligence)

Industrial Protocols: EtherNet/IP • Modbus TCP/RTU • OPC-UA • MQTT • Robot IQ

LAYER 4: EDGE & IoT LAYER

IoT Gateways • Edge Devices • Jetson AGX • PLC/SCADA • Industrial PCs

LAYER 5: OPERATIONAL TECHNOLOGY (OT)

PLCs: Allen-Bradley • Siemens • Mitsubishi • Schneider • Omron • ABB • Beckhoff

Sensors: 100+ sensors per line • Temperature • Pressure • Flow • Vision • Proximity

Machines: Blenders • Compressors • Coaters • Packaging • Robots • Vision Systems • Production Line

CORE PLATFORM COMPONENTS

1

B-Line Core Library

Pharma-compliant software framework with built-in GMP, audit trails, e-signatures

2

Time-Series Database

Industrial-grade TSDB for high-frequency sensor data (1000+ tags/sec)

3

Protocol Stack

Native support: EtherNet/IP, Modbus TCP/RTU, OPC-UA, MQTT, REST APIs

4

PLC Drivers

Pre-built drivers for 7 major PLC brands - no custom coding needed

5

OPC Server/Client

Built-in OPC-UA server for third-party SCADA/HMI integration

6

Industrial Alerts

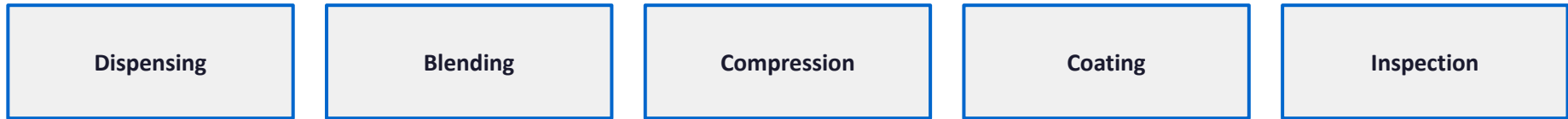
Multi-channel alerts: Email, SMS, physical alarms, mobile push notifications

AUTOMATION WORKFLOW

From Recipe to Production - Fully Automated



BLINE AUTOMATION SUITE - CENTRAL BRAIN



REAL-TIME MONITORING & CONTROL

- ✓ Live machine status
- ✓ Sensor data streaming
- ✓ Auto parameter control
- ✓ Alarm management
- ✓ Complete audit trail

MACHINE AUTOMATION EXAMPLE

Tablet Compression Machine - Complete Automation

SENSORS DEPLOYED

- ✓ Turret speed encoder
- ✓ Tablet counting sensor
- ✓ Compression force sensor
- ✓ Fill depth sensor
- ✓ Weight check load cell
- ✓ Metal detector integration
- ✓ Vibration sensor (health)
- ✓ Temperature sensor (motor)

AUTOMATION LOGIC

1. VFD controls turret speed
2. Auto tablet counting & batching
3. Weight verification → Accept/Reject
4. Metal detection → Auto STOP
5. Recipe-based compression force
6. Predictive maintenance alerts

DATA COLLECTED & LOGGED

- Production count (real-time)
- Weight variance (%)
- Rejection rate & reasons
- OEE metrics
- Operator actions (audit trail)
- Compression force (per tablet)
- Turret RPM history
- Downtime & stoppages
- Energy consumption
- Equipment health score

SENSOR DEPLOYMENT SCALE

Typical Pharmaceutical Production + Packaging Line

100+

Total Sensors

Per production line

31-33

Safety Sensors

E-stops, light curtains

12

Machines

Fully automated

1000+

Data Tags/Sec

Real-time streaming

Sensor Categories Deployed:

Level & Liquid: 8-10 sensors

Temperature: 12-15 sensors

Pressure: 10-12 sensors

Flow: 6-8 sensors

Vision: 4-8 cameras

Proximity: 15-20 sensors

Vibration: 8-10 sensors

Weight/Load: 6-8 sensors

All sensor data stored with millisecond timestamps • Complete audit trail • 99.99% uptime

INDUSTRIAL PROTOCOL SUPPORT

Native Protocol Stack - No Third-Party Dependencies

EtherNet/IP

Allen-Bradley, Rockwell automation. Real-time deterministic communication

Use Case: Primary protocol for AB PLCs

Modbus TCP/RTU

Universal industrial standard. Serial & Ethernet variants supported

Use Case: Legacy equipment, sensors

OPC-UA

Platform-independent M2M communication. Secure, scalable architecture

Use Case: Multi-vendor integration

MQTT

Lightweight IoT protocol. Pub-sub messaging for distributed systems

Use Case: IoT devices, cloud sync

REST APIs

HTTP-based web services. JSON/XML data exchange

Use Case: ERP integration, mobile apps

Robot IQ

Proprietary protocol for AGV/AMR control. Custom implementation

Use Case: Robotic fleet management

GLOBAL REGULATORY COMPLIANCE

Audit-Ready Automation System

✓ WHO - World Health Organization

✓ USFDA - 21 CFR Part 11

✓ EMA - European Medicines Agency

✓ TGA - Therapeutic Goods (Australia)

✓ MHRA - UK Regulatory Agency

✓ CDSCO - India

✓ SFDA - Saudi Arabia

✓ MoHAP - UAE

✓ MOPH - Qatar

✓ SAHPRA - South Africa

✓ ANVISA - Brazil

✓ COFEPRIS - Mexico

✓ ANMAT - Argentina

✓ AEMPS - Spain

✓ NDA - Uganda

✓ EDA - Egypt

✓ MoH - Russia

Built-in Compliance Features:

- ✓ Electronic signatures (21 CFR Part 11)
- ✓ Complete audit trails (ALCOA+)
- ✓ Data integrity enforcement
- ✓ Role-based access control
- ✓ Validation support (IQ, OQ, PQ)
- ✓ Secure document lifecycle

AUTOMATION SOLUTIONS



Production Line Automation

End-to-end manufacturing process control



Packing Line Automation

Counting, filling, labeling, serialization



Equipment Health Monitor

Predictive maintenance, vibration analysis



Maintenance Automation

Scheduled PM, work order management



Machine Control

Recipe-based automated operations



Performance Monitoring

OEE, downtime, yield analytics



Cleaning Automation

CIP/SIP integration, cleaning validation



Factory Automation

Plant-wide SCADA and control system

PHARMA VALIDATION SUPPORT

Complete Validation Documentation & Support

DQ

Design Qualification

- URS (User Requirement Specification)
- FDS (Functional Design Specification)
- Risk Assessment Documentation
- Traceability Matrix

IQ

Installation Qualification

- Hardware Installation Verification
- Software Installation & Configuration
- Network & Communication Testing
- Environmental Conditions Check

OQ

Operational Qualification

- Functional Testing (All Features)
- Alarm & Alert Verification
- Security & Access Control Testing
- Backup & Recovery Procedures

PQ

Performance Qualification

- Real Production Environment Testing
- Extended Duration Testing
- Concurrent User Load Testing
- Final Acceptance Criteria

BUSINESS BENEFITS



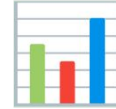
60-75%

Reduction in manual data entry



40-50%

Faster batch release time



99.9%

Data accuracy & integrity



30-40%

Lower compliance costs



100%

Audit trail coverage



Real-time

Production visibility

Single platform • Zero middleware • Always audit-ready • Future-proof architecture

LET'S AUTOMATE YOUR FACTORY



**Address: 111, B.C. Chambers, Jaora Compound, Opp. MY Hospital Indore -
452001, Madhya Pradesh, India**



Phone: +91 9755695811 | +91 9977975607 | 0731 3152421



Email: info@blinesolution.com



Website: www.blinesolution.com