PLC Application
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1. Introduction

- Building air conditioning system application using PMU-600 and iH
  1) Installation: 2002/02
  2) Field: HVAC (building air-conditioning)
  3) Type: PMU-600, iH

2. System configuration

3. Main functions

1) Inverter operation parameter control using RS-485 communication of PMU-600
2) Building air conditioning by controlling inverter frequency and its operation
Assembly line control system

1. Introduction

- Assembly line control of automobile’s air conditioner using Profibus-DP
  1) Field: Electronic & Electric device (HVAC)
  2) Type: K200S, Profibus-DP (G6L-PUEA), Cnet, PMU330

2. System configuration

- System configuration diagram:
  - PLC(K200S)
  - Touch Panel (PMU330)
  - Automatic bolt/screw tightening machine
  - ID40

3. Main functions

1) K200S communicates with ID40 (data gathering device: Bosch) installed in the assembly line (T2: Bosch) using Profibus-DP master module (G6L-PUEA) so that it can control the assembly line system.

2) Profibus-DP configuration using Sycon (configuration software) adding ID40 gsd file.

3) When ID40 senses a pallet, the bolt/screw tightening machine starts working and after its job finished, DR6 robot changes A/C position so that other nuts can be tightened.

4) PMU-330 monitors the whole system (its process status and assembly information, etc) via Cnet module of K200S.

5) Automobile's air conditioning system (HVAC)
  - System to control air conditioning (cooling/heating) using generated heat from automobile, and to ventilate air.
Guest room control system

1. Introduction

- Guest room control system with smart I/Os
  1) Field: BAS (Building Automation System)
  2) Type: GM4, Rnet, HMI (PMU), Smart I/Os

2. System configuration

3. Main function

1) Guest room control
   Power on/off and air-conditioning control according to the presence of guest(s) with the signals from proximity sensors and wireless receiver through SMART I/Os

2) Ventilation and Pump control
   Ventilation and pump control by inverter through RS-485

3) Hot water and air temperature control
   Hot water and air temperature control by PID module

4) Control condition setup and control status monitoring by PMU
   Convenient Maintenance of system by PMU to set up control condition and monitor its status.

4. Others

1) Heating and air-conditioning functions are not operated when a guest room is not occupied, which saves energy.

2) By applying a VFD (inverter) to control ventilation fans and heating/cooling pumps, much energy is saved.

3) Comfortableness of a guest and the energy saving of room/building management are served.
1. Introduction
- Central monitoring and controlling the humidity of 10 mushroom-culture rooms by installing PLCs in an existing humidifier
  1) Field: BAS (Building HVAC / Communication)
  2) Type: K120S, K200S, MODBUS

2. Process
K7M-DRT20U
RS-485
steam
Relay output
Transistor output

3. Main functions
  1) Relay output: on/off control of FAN
  2) Tr. output: Controlling the humidifier controller with PWM output (High/Medium/Low)
  3) Receiving operation pattern from HMI through RS-485 (RTC control at every hour, time ratio control of High/Medium/Low/Stop time)
  4) Transmitting the operation status to HMI through RS-485

4. System configuration

4. Others
  1) With the built-in RS-485 port, 20 PLCs (K120S) in each culture room needs no communication module (cost saving)
  2) High process speed (0.1 ms/basic instruction) and high on/off response speed of Tr. output
1. Introduction

- Air conditioning system using K200S and inverter (iS5)
  1) Installation: 2002/04
  2) Field: BAS (air conditioning)
  3) Type: K200S (DA), iS5

2. System configuration

3. Main functions

1) The number of rooms where power is on is transferred to K200S (sensor detects whether or not the power is on)
2) Current from DA module changes according to the number of sensors attached to each room so that it changed the inverter frequency
3) As inverter frequency changes, the RPM of blowers changes
Hospital power supply/distribution monitoring system

1. Introduction
- Power supply/distribution monitoring system application using GLOFA GM2 analog I/O function
  1) Installation: 2001/9
  2) Field: Power supply/distribution
  3) Type: GM2 (AI)

2. System configuration

3. Main functions
1) Analog input -> input value output -> analog input digital display
2) Power status (each phase current, voltage and power) of power supply panel is inputted through analog input module, which is output through analog output module
3) If the analog input value is different from setup value, the buzzer sounds
Automatic toilet control and remote monitoring system

1. Introduction
- Remote monitoring control using GLOFA GM4 and Ethernet (ADSL)
  1) Installation: 2002/04
  2) Field: Others (communication)
  3) Type: GM4 (DI/DO, AI/AO, Enet), CIMON
  4) Others: Ethernet (ADSL) network

2. System configuration

3. Main functions
1) Detecting/paying back coins
2) Automatic door opening/closing
3) Audio guide
4) Air conditioning & ventilation control
5) Toilet sheet rotation
6) Washing and drying of toilet bowl and floor
7) Lighting control
8) Remote status monitoring using ADSL network

4. Others
1) Configuration: ADSL connection using Ethernet module

2) Basic Ethernet parameter
   - Fixed IP address in PLC
     (Not support Enet module DHCP or flexible IP)
   - TTL (time to live): set over 32
   - Media: 10BaseT
1. Introduction

- Data gathering system to receive data from flow meters located in regions using IGS (serial to Ethernet)

1) Field: PA
2) Type: IGS-100

2. System configuration

HMI

- Data gathering system to receive data from flow meters located in regions using IGS (serial to Ethernet)

1) Field: PA
2) Type: IGS-100

3. Main functions

- Connecting to Ethernet network by IGS-500, each flow meter communicates with RS-485. HMI software in PC gathers and monitors each data.

1) Flow meter supports RS-485 only
2) IGS-100 converts RS-485 (flow meter) to Ethernet
3) HMI connected to IGS through Ethernet gathers data

4. Others

- ISG-100 converts RS-485 (flow meter supports RS-485 only) to Ethernet using protocol editing function of it, and HMI gathers and monitors data from flow meters.
Remote program monitoring and controlling system

1. Introduction

System to control/modify/manage PLC program in a remote area using serial to Ethernet converting function of IGS.

1) Field: Electronic & Electric device, semi-conductor
2) Type: GM4, IGS-50

2. System configuration

3. Main functions

- After having access to PLC in China through Internet, uploading/downloading/monitoring program in Korea.

1) IGS-50 in Korea: converting serial (loader protocol) to Ethernet
2) IGS-50 in China: converting Ethernet (loader protocol) to serial (RS-232C) which is available to connect to CPU
3) GM4: program running according to remote control

4. Others

- Having access to CPU through Internet, changing and monitoring a program in a remote area is available so that in case of emergency, the system of factory can be managed in a short time in office.
Network integration among Pressers

1. Introduction
- Integrated system using serial to serial converting function (IGS) among other PLCs (with different protocols) to control/monitor/share data.
  1) Field: Automobile
  2) Type: IGS-200, HMI

2. System configuration

3. Main functions
- Networking different PLCs via RS-485, IGS-200 gathers data from each PLC while HMI controls/monitors each PLC's data through Ethernet.
  1) Each PLC communicates with IGS via RS-485
  2) IGS communicates with different PLCs by protocol editing
  3) HMI controls and monitors each PLC via IGS through Ethernet

4. Others
- After protocol editing, IGS-200 enables different PLCs to share data in the network. HMI controls PLCs via IGS.
1. Introduction

- This is a system which cuts attached part of packing paper after coating process, which uses speed synchronization to control speed of a subordinate motor in proportion to that of a main motor.

1) Field: Individual machine
2) Type: K200S, G6F-PP1D (1-axis positioning module)

2. System configuration

3. Main functions

1) Equipment usage
   After coating a sheet of paper with pressing and heating process, it is cut by the same length.

2) Positioning module: G6F-PP1D
   - It controls a cutter attached to the cutter to make the coated paper the same length
   - The cutter should control a main drum to control a coating film at a constant ratio so the cutting operation is done the same time as coating process
   - Main function: speed synchronization by an external encoder, JOG, External Stop

4. Others

1) Application for speed synchronization operation
   - The speed ratio between a motor (main axis) controlling the speed of a moving object and a motor (dependent axis) controlling a process part can be set, which applies to a system operating more than 1 motor.
   - control system which adjusts speed synchronization between a main and dependent axis.

2) Applicable equipment
   - This function is applicable to the field of assembling or cutting parts in the move: cutting and packaging machine

- PG: Pulse Generator
- SM: Synchronous Motor → servo motor
- IM: Induction Motor → general electric motor
1. Introduction
- Heat treatment with frequency, enhancing durability of automobile elements, which uses "continuous" method of operation patterns.
  1) Field: Individual machine
  2) Type: K300S, G4F-PP1D

2. System configuration

3. Main functions
1) Equipment usage
- This system operates the heat treatment with high frequency on metal products in variable length, which has different time for heating process at a regular length.

2) Positioning module: G4F-PP1D
- It controls a servo motor installed vertically. For heating process, it changes the speed per section without pause.

3) Analog I/O modules: G4F-AD3A / G4F-DA3I
- These modules are to adjust output intensity and a user could recognize any problem of it thanks to the output feedback.

4) PMU
- Metal type and processing time can be set up in the PMU screen which controls the system and monitors its status.

4. Others
1) Application for continuous operation pattern
- A system which can change the speed of object without pause by the same length.

2) Applicable equipment
- It is applicable to a system which controls the operation speed by the manufacturing part such as heat treatment equipment, pressing machine, extruding machine, and shaping machine.
1. Introduction

- Ice cream packaging equipment communicating with a temperature controller via DeviceNet

1) Field: Individual machine (Packing)
2) Type: K300S (DeviceNet), iS5

2. System configuration

3. Main functions

1) Inverter (iS5) controls the operation speed of a conveyer.
2) SOL operates with a delay time after the proximity sensor is turned on.
3) Setup time of a timer is determined by the input period of two proximity sensors.
4) With a delayed time after the proximity sensor signal is on, SOL presses the packaging film (TMON) and cut it.
5) The temperature controller controls the temperature of ice cream material and that of packaged product and communicates with K300S through DeviceNet (Data: Input 92bytes, Output: 72bytes)
1. Introduction

- Making internal hole of iron and iron bar

1) Field: Individual machine
2) Type: GM4, HMI (PMU)

2. Process

1. Position teaching
2. Speed teaching
3. Torque teaching
4. Data management

3. System configuration

4. Main functions

1) The position and speed of an object is controlled by reciprocation on X axis.
2) The internal part of a hole is roughly manufactured by forward/reverse rotation of Y axis.
3) The internal part is accurately processed by forward/reverse rotation and torque teaching of Z axis

※ The high-speed reciprocation of each axis, position and speed control, torque control by analog output, and simultaneous control of each axis help a user achieve a high degree of accuracy.
1. **Introduction**

- Equipment to manufacture and unload shuttles for embroidering machine
  1) Field: Individual machine (Textile machinery)
  2) Type: K300S

2. **Process**

   - **X-axis**: LOADING
   - **Y-axis**: STEP moving
   - **Z-axis**: UNLOADING
   - **Grinding operation**

3. **System configuration**

   - GM4-PA2A
   - K4P-15AS
   - G4Q-RY2A
   - G4F-PP3O
   - G4I-D22A
   - Key point: 3-axis repeated operation, position and speed control

4. **Main functions**

   1) Shuttles of JIG on X axis is loaded in position.
   2) Shuttles on Y axis is moved in step.
   3) Unloading shuttles grinded on Z axis to embroidering machine
   ※ Key point: 3-axis repeated operation, position and speed control
Press Shuttle Robot

1. Introduction
- The system transfers material for a presser.
  1) Field: Individual machine
  2) Type: G4F-PP2D (2-axis positioning module)

2. Process

1) Material is transferred to the vertical and horizontal plane by a servo motor of a shuttle robot installed in the presser.

2) Procedure:
- After X and Y axis return to the origin, they are in ready position.
- The material is transferred according to order (from 1 to 3) linked with the presser operations.

3. System configuration

1) Control with HMI, PLC, and servo driver
- This equipment adopts HMI which controls and sets up the position of a motor to stop and its speed, and to monitor its operation status.

4. Main functions

1) Control using 2 axes
- X axis is to move a shuttle robot horizontally and Y axis vertically using position and speed teaching functions.
- According to its process, it transfers material horizontally, vertically, or simultaneously.

2) Characteristics
- The speed of each axis movement (horizontal/vertical) should be fast and this is a key factor in this system.
- Line drive type is used to fast control in transferring material.
Endurance testing system of ABS Pedal

1. Introduction

- Test equipment to qualify ABS pedal endurance at high & low temperature, which is available to test pedals at the same time.

1) Field: Automobile
2) Type: MK300S, HMI

2. Process

3. System configuration

Machine specifications
1. Size: 950 * 1000 * 829 (H)
2. Weight: About 300 kg
3. Test Speed: Max. 500mm/sec
4. Test Load: Max. 60Kg.f
5. Independent Control Rack Type
6. Servo Motor: HC-SF73 (Mitsubishi)
 Ball Screw: GY2525 (KURODA)
 Load Cell: CDES50 (BONGSHIN)

4. Main functions

1) The system consists of 3 axes, but each servo repeats rotary motion separately.

2) Speed control is more important than position control.

3) Teaching value varies by a pedal model.

4) Teaching value is made by HMI.

5) Parameter setting change during operation (JOG speed change).
Winding machine controller

1. Introduction
- Winding machine controller
  1) Field: Individual machine
  2) Type: G4F-PP2D (2-axis positioning module)

2. Process
- Starting after setting a pitch of thread and its winding number, two motors do straight-line and rotary motion, respectively, and operate synchronously to make thread alignment for equal diameter. After its winding, two axes stop at the same time.

3. System configuration
- GM4 (G4F-PP2D) + Servo + Touch Screen (PMU)
- PMU changes operation speed and rotation number of each axis and monitors system status.

4. Main functions
1) 2-axis control: rectilineal and rotative motion
   - The ratio between the speed of winding axis and the traveler speed should be constant.

2) Characteristics
   - Maintaining a pitch of thread
   - Fast changing speed to a designated position
   - Accuracy of pulse output when speed changes
Automatic powder tamping system

1. Introduction

-Automatic powder tamping system, used for construction/public works tamps gunpowder automatically within a margin of error.

1) Field: Individual machine
2) Type: K300S, HMI (PMU)

2. Process

1) After rolling a paper for a container, it tamps powder automatically in it.

2) The weight of 12 powder boxes is estimated by indicator, and the data are transmitted to K300S through RS-422.

3) Products within a margin of error proceed to the next stage, otherwise, sorted out as inferior goods.

4) The amount of powder plays an important role in the quality of product because it is closely related with the explosion power.

5) Product is packaged in a bundle.

6) HMI is used for controlling data input and receiving them through RS-422.

3. System configuration

4. Main functions

1) Quality control through the communication with scales estimating the weight of powder.

2) Communication with 12 scales via RS-422 with one Cnet module
**Manual TAB sticker (TFT LCD)**

**1. Introduction**
- System to stick TAB to LCD screen
- For fast, accurate interpolation, positioning module and servo motor are used.
  1) Field: Electronic & Electric device (LCD)
  2) Type: GM4-CPUC, PMU-830 (12.1”)

**2. System configuration**

- PG: Pulse Generator
- SM: Synchronous Motor

**3. Main functions**

1) **Equipment usage**
   - After attaching TFT LCD glass under 54 inches to a moving flat and fixing it, transferring where TAB is sticked by straight-line control (2 axes) and rotary motion (1 axis), this system binds TAB to glass with set time and pressure.

2) **Positioning module: G4F-PP2D / G4F-PP1O**
   - Positioning control of TAB bounded on Glass
   - 3 axes used for forward/backward, left/right, rotation motion.
   - Main functions: 2-axis line interpolation, separate operation, direct operation, position/speed teaching and JOG

3) **Communication module: G4L-CUEA, HMI (PMU-830)**
   - HMI controls and monitors a binding position, operation conditions such as operation status setting, pressure, temperature, etc.
   - Main functions: keypad (Ten Key), screen change, internal calculation, graph, alarming list
   - Communication: RS-232C

4) **Others**
   - Retain area setting to maintain all the information concerning operation conditions of LCD devices.

**4. Others**

1) **Application of interpolation function**
   - Motor system having 2 axes or more of which distances are different but same starting/ending points.

2) **Applicable equipment**
   - Conveyer, feeder with more than 1 axis.
1. Introduction
- Remote monitoring system for shipyard sewage treatment status using Ethernet
  1) Installation: 2002/03
  2) Field: PA (water treatment)
  3) Type: GM4, Enet
  4) HMI: Fix

2. System configuration

3. Main functions
1) Tank level monitoring
   - 4-step level detection (High-High, High, Low, Low-Low) by digital input from level sensors (4 points) and monitoring by HMI with Ethernet
2) Pump status monitoring
   - pump status (run/stop/fault) detection by digital input and monitoring by HMI with Ethernet
3) Ethernet communication
   - among GM4 PLCs in the same Subnet: High-speed link service
   - between GM4 (Master) and GM4 (each Subnet): FB (Function Block) service
   - between HMI and GM4 (Master): dedicated protocol service

4. Others
1) FB communication is used because the subnet between PLCs is divided by media change (UTP/optical) and various routing equipment application such as switching HUB.
2) Master PLC collects data and HMI communicates with Master PLC.
## 1. Introduction

- PID control applied to chlorine gas control facility in kiln bypass system
  1) Installation: 2002/1
  2) Field: PA (cement)
  3) Type: GM3 (AI/AO/PID/CNET)

## 2. System configuration

![System configuration diagram]

- Temperature control by setup temperature to control inverter RPM at each process step
- Temperature is sent to the analog input module through temperature transducer
- PID output is transferred to INV through the analog output module (4-20mA) for RPM control.
- P value should be set below 1 for PID control because temperature changes abruptly
- Temperature decreases as steam is emitted
- GM3 Monitoring through Cnet module

## 3. Main functions

1) Temperature control by setup temperature to control inverter RPM at each process step
2) Temperature is sent to the analog input module through temperature transducer
3) PID output is transferred to INV through the analog output module (4-20mA) for RPM control.
4) P value should be set below 1 for PID control because temperature changes abruptly
5) Temperature decreases as steam is emitted
6) GM3 Monitoring through Cnet module
**Unmanned water treatment system**

**1. Introduction**
- Unmanned system for water collection and water purification using Cnet and Enet of GMR series.
  1) Installation: 2002/03
  2) Field: PA (water treatment)
  3) Type: GMR (DI/DO, Cnet, Enet)

**2. System configuration**

**3. Main functions**
1) Wireless modem communication for unmanned water collection and purification systems
2) System control and monitoring (MMI) using wireless communication between water collection/purification systems
3) Cnet configuration: A (master), B (slave)

**4. Others**
1) Remote control using wireless modems (TM/TC)
2) System stability and control guaranteed by unmanned redundancy equipments
3) The system configuration of B Water Purification system is the same as that of A Water Purification system
1. Introduction
- Pump control (on/off) in water reservoir with HMI through Ethernet using modems between GLOFA GM3 and GM6s
  1) Installation: 2001/12
  2) Field: PA (water treatment)
  3) Type: GM3 (Ethernet, Cnet), GM6 (Cnet), Touch Screen
  4) Others: dedicated communication with dedicated modems

2. System configuration

3. Main functions

1) For On/Off control of 6 pumps of water reservoir,
   - the upper MMI controls GM3
   - GM3 and GM6s are connected by dedicated modems through Ethernet
2) The upper MMI sends data to GM6s by modems
3) The operation state of GM6s is sent to GM3 by modem, and transfers to MMI through Ethernet.
Wastewater treatment system

1. Introduction
- Wastewater treatment control using Modbus communication between GLOFA GMR (Cnet) and ViMac/ViPam
  1) Installation: 2002/03
  2) Field: PA (water treatment)
  3) Type: GMR/GM4 (DI/DO, AI/AO, Enet, Cnet), CIMON

2. Process

3. System configuration

4. Main functions
1) CPU and communication (Ethernet) redundancy
2) Analog input processing (4~20mA): level, flow rate, water quality (pH), etc.
3) Pump and valve control
   - DO: pump run/stop and valve on/off
   - AO: analog valve control
4) TM/TC and monitoring
   - PLC → HMI PC: pump status, valve status, tank level, flow rate, water quality
   - HMI PC → PLC: operation mode setup (automatic/manual), pump run/stop, monitoring level change (HH,H,L,LL)
5) Modbus communication
   - Current/voltage/power/frequency input from ViMac/ViPam
Advanced water treatment system

1. Introduction
- Filtering system controlled by redundant PLC.
  1) Field: PA
  2) Type: GMR (redundant PLC)

2. Process
Conventional water treatment process

Advanced water treatment process

3. System configuration

4. Main functions
1) Redundant communication between PLC and PC (control room) using Fast Ethernet.
2) MODBUS communication with measuring devices and PID control using analog modules which control measuring data
3) Valve control using I/O modules
4) Automation in filtration, reverse osmosis, air flushing using GMR which control numerous valves, VFDs for hydraulic pressure, analog modules and PID operation.
Hammer heat treatment system

1. Introduction

- Heat treatment system for a hammer of an excavator using GM4.

1) Field: Heat treatment system
2) Type: GM6

2. Process

1) Automatic hammer needs hardness and strength. For this reason, some hammers are cast-ironed and treated by heat.

2) Heat treatment at 600 to apply nitrogen, ethanol and some gases such as LPG and cooling process are the know-how of this system.

3) PLC controls temperature in a heating furnace, injection of gases, cooling process, and material supply.

4) The previous equipment was manually controlled while this system adopted GM6 to enhance productivity.

3. System configuration

4. Main functions

1) Dedicated communication (GM_RD) among PLCs (GM6) makes the heating/cooling system connected to operate

2) After TC module measures the temperature of a heating furnace, built-in PID function maintains temperature constantly.

3) Digital modules are used to control gas injection and VFDs.
Automobile body line system

1. Introduction
- Front Longi welding line application in automobile line
  1) Installation: 2001/12
  2) Field: Automobile
  3) Type: GM1/GM2 (DI/DO, Enet)

2. Process

3. System configuration

4. Main functions

  1) Automobile type grading
   - Manual input for grading data (automotive type, steering wheel, domestic/foreign demand, etc)
   - Shift table operation
  2) Robot control and interlock
   - Work complete detection and robot operation
   - Welding condition detection
  3) Main/sub operation panel control (total/each process)
   - Line operation mode setup (manual/automatic)
   - Utility status lamp (power, air, cooling water, etc)
   - Error status display (robot, pneumatic, valve, etc)
   - Emergency stop
  4) Line status/automobile type display (TR output)
   - Production state display (production/inferior goods number, cycle time)
   - Present/next automobile type display
1. Introduction

- Process control and total monitoring system for Zeolite production process
  1) Installation: 2002/02
  2) Field: PA (water treatment)
  3) Type: GM4 (DI/DO, AI/AO, Enet, Fnet), IS5, IH5, CIMON
  4) Others

2. Process

3. Main functions

1) Various measuring data detection (analog input: 4~20mA)
   - temperature/pressure/flow rate/tank level/weight
2) Valve control
   - on/off valve (digital output)
   - analog valve (analog output: 4~20mA)
3) System integration and HMI monitoring using Ethernet.
   - monitoring (PLC -> HMI): Temperature, pressure, flow rate, weight, level, etc.
   - control (HMI -> PLC): Valve On/Off, analog value setting, PID setup value change
4) Measuring data sharing between PLCs and Interlock control using Fnet
5) Inverter (IS5) frequency control using Fnet
6) Drier control using PID function (2nd filtration & drying)
   - setup value (SV) = Temperature in the drier
     - when the temperature is low -> Increase liquid input volume
     - when the temperature is high -> Decrease liquid input volume
1. Introduction

- Annealing line and temperature control application using AI/AO and Fnet of GM2/GM3/GM4
  1) Installation: 2000/04
  2) Field: PA (iron manufacture)
  3) Type: GM2, GM3, GM4 (DI/DO, AI/AO, Fnet), PMU-600

2. Main functions

1) Line and temperature control of SUS annealing line using Fnet
2) Furnace temperature monitoring and value setup through PMU-600
**Wastewater treatment aeration tank**

### 1. Introduction

- Wastewater treatment aeration tank using GM3 analog input module and inverter
  1) Installation: 2001/10
  2) Field: Individual machine
  3) Type: GM3 (AD, DA, Ethernet), iS5, MMI
  4) Others: MMI equipment is connected with GM3 by Ethernet.

### 2. System configuration

![Diagram of aeration tank system]

- Frequency control by voltage input
- Pollution sensor
- Blower
- Aeration tank

### 3. Main functions

1) Electric signal of pollution input sensor is sent by G3F-AD4A.
2) The analog input value is displayed on screen by upper MMI and Ethernet.
3) The input analog value is used as analog output for inverter input for speed control.

### 4. Others

Pollution level is measured by analog input, and the inverter operation speed is controlled by the pollution level using analog output so that air supply to the aeration tank is controlled.
**1. Introduction**

- Electronic components examination system using positioning module of K200S
  1) Installation: 2002/01
  2) Field: Individual machine
  3) Type: K200S (G6F-POPA)

**2. System configuration**

Component quality is classified by detecting its height using pressure sensor

**3. Main functions**

1) If a component is transferred to the examination position, a plate axis equipped with several pressure sensors moves toward the component
2) The height of each component is determined by pressure sensors and one with different height is classified as inferior one
3) Positioning module is used to move the plate upward/downward
Winder machine system

1. Introduction
- INV and servo control application using GM4 Fnet and Cnet
  1) Installation: 2001/03
  2) Field: Individual machine (textile)
  3) Type: GM4 (DI/DO, Cnet, Fnet), iS5, iG5, PMU-600

2. System configuration

3. Main functions
1) Precise control of INV (0.01Hz scale) using dedicated Fnet communication between PLC and INV
2) Servo control by RS-422 multi communication
3) Inverter frequency and motor rpm setup by PMU-600
Fiber coating system

1. Introduction
- Coating system which controls fiber cloth rail connected to inverter (iS5) through Fnet, and monitors using upper HMI linked to GLOFA GM6 by Cnet
1) Installation: 2001/07
2) Field: Individual machine (textile)
3) Type: GM6 (Cnet, Fnet), iS5, Touch screen

2. System configuration

3. Main functions
1) Upper MMI controls GM6 through Cnet (RS-422)
2) Data from the upper MMI is sent to INV (0~10) through Fnet communication
3) INV controls each motor connected to fiber cloth rail for controlling tension and speed of the fiber cloth
4) Operation status of each INV is monitored by MMI connected to CPU module

4. Others
- The conventional analog-type interlock coating machine can be controlled more precisely thanks to communication functions
1. Introduction

- Ice cream packaging system using contact input and timer of K80S
  1) Installation: 2001/4
  2) Field: Individual machine (packaging)
  3) Type: K80S, iG5 inverter

2. System configuration

3. Main functions

1) The conveyor controls operation speed using inverter (iG5)
2) SOL operates with a time delay when the proximity sensor is turned on.
3) Setup time of the timer is determined by input period of proximity sensors.
4) With a time delay after the proximity sensor signal is on, SOL presses the packaging material for 150ms (TMON) and cut it.
Chewing gum transferring system

1. Introduction
- Gum transferring system using GM4 and inverter
  1) Installation: 2001/10
  2) Field: Individual machine
  3) Type: GM4, iS3

2. System configuration

3. Main functions
1) If a worker transfers the gum plate at the end of conveyor belt, the conveyor is driven by a signal detected by sensors and the damper descends so that the next gum plate is transferred
2) If the sensor detects the transferred gum plate, the damper rises to prevent the next gum plate from transferring, and after 2 seconds, the conveyor stops.
Nut tightening system

1. Introduction
- Nut tightening system using APM (1-axis)
  1) Installation: 2002/02
  2) Field: Individual machine
  3) Type: K300S (G4F-PP1O), HMI

2. Process
- The object is detected by optical sensor and moved to joining position by pneumatic finger
- Nut joining header
- The motor speed is controlled by header pressure of load cell in the nut joining part
- The object is put in position using pneumatic finger after insulation test signal is detected
- Lock sensor (joined status)
- Lock sensor (before joining)
- Servo motor
- Ball screw
- Conveyor (before joining)
- Insulation tester (moving up/down)

3. System configuration
- Pressure controller
  1) Input: pressure signal (contact)
  2) Input: Z-phase signal (contact), Output: pulse chain (forward and reverse pulse chain)
  3) CPU communication port of K3P-07AS/T Touch screen (TOP 5.5”)
  4) Pressure-reach/joining-completion signal processing

4. Main functions
- 1) When startup signal is input, the motor is descended (fast)
- 2) Motor speed is reduced, if it encounters sensor during descending (intermediate)
- 3) 2-stage reduction of motor speed by load cell input signal (1st pressure detection) (slow)
- 4) Motor stops by load cell input signal (2nd pressure detection)
- 5) Motor is ascended slowly by load cell input signal (3rd pressure detection)
- 6) Motor stops by load cell input signal (4th pressure detection)
- 7) Motor is ascended at high speed by joining completion signal
- 8) Motor is stopped by upper proximity sensor signal
- 9) Restarts after time delay
- 10) The joined object is moved to insulation tester by Servo for final test

PW K300S G4F-PP1O
DI DO Servo drive (Omron)
1. Introduction

- Post office tray conveyor controlling and monitoring system
  1) Installation: 2002/02
  2) Field: Transport
  3) Type: GM2/GM7, Fnet, Enet

2. Process

2.1 Tray conveyor control system in post office

- MIMIC control PC
- Central control PLC (GM2)
- Data management server (MDAC #1 & #2)
- Ethernet (TCP/IP)

3. System configuration

4. Main functions

4.1 Tray conveyor control
4.2 Interlocking among conveyors
4.3 Fnet/Ethernet communication

3-1) GM7 → GM2 → CCR
- Conveyor operation status (run/stop) transfer
- Error and status data transfer
- Loading condition (box loading condition of each conveyor) and box number data transfer
- Tracking data transfer

3-2) CCR → GM2 → GM7
- Conveyor run/stop/emergency stop
Museum show window control system

1. Introduction
- Museum show window control system using high-speed counter of K80S.
  1) Installation: 2002/01
  2) Field: Others (Museum exhibition hall)
  3) Type: K80S

2. System configuration

3. Main functions
1) Manual
- The show window moves left/right according to the duration time an operator pushes left/right button.
2) Automatic
- Pushes moving direction and Open/Close button.
- If an operator pushes the Left button, the show window opens to the left side and is stopped by limit sensor.
- Then, if he pushes the Left Close button, the show window is closed and stopped at the original position by limit sensor.

4. Others
- It’s convenient to exchange exhibition in the museum.