HIGH PRODUCTIVE / HIGH EFFICIENT SYSTEM AUTOMATION with
NIIGATA HORIZONTAL MACHINING CENTERS

NIIGATA MACHINE TECHNO CO., LTD
NIIGATA, JAPAN
Global Concerns / Issues

- ENVIRONMENTAL PROBLEM
- GAS PRICE
- WARMING
- AIR POLLUTION
- INFRASTRUCTURE IMPROVEMENT

NIIGATA’S MARKET FOCUS
As a world leader of horizontal machining center

- Developed first column traverse horizontal machining center in Japan

- Clear philosophy on product line
  - Heavy duty box way style HMC: Model: HN Series since 1979
  - High speed HMC: Model: SPN Series since 1994

- Developed first unmanned pallet system in Japan
  - APC System (Carousel Type): Over 300 units delivered
  - Linear Pallet Magazine (FMS/LPM Type): Over 150 units delivered

- Developed first cutting monitoring system in Japan
Multiple Pallet APC System (Carousel Type)

- Simple way to establish unmanned system
- Electrical power driven unit
- Pallet scheduling on NC display
- Safe work area Load/Unload Station
- Designed for the field retrofit after the machine installation

HN63D with 6 Pallets APC System

HN80D with 8 Pallets APC System
Linear Pallet Magazine System (LPM)

One High Pallet Stocker Type System

- Multiple pallet stockers with Automatic Guided Vehicle (AGV) (Custom-made layout available)
- System scheduling by Windows PC based Cell Controller
- Niigata ICC System Controller
- Safe Work Area Load / Un load station
- Flexible Design for Future expansion of the machine and pallet stockers
- Incremental Implementation
- Designed for the field retrofit after the machine installation

Stacker Crane Type System
APC System (Carousel Type)
Pallet Scheduling on NC Display

<table>
<thead>
<tr>
<th>(APC PROGRAM#)</th>
<th>(APC SEQUENCE#)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO  P25#</td>
<td>NO  S01#</td>
</tr>
<tr>
<td>01: 1031</td>
<td>01: 03</td>
</tr>
<tr>
<td>02: 0002</td>
<td>02: 04</td>
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<td>03: 0006</td>
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<td>06: 0006</td>
<td>06: 01</td>
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</tbody>
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- Assigning program # (4 digits - 8 digits optional) on each pallet #
- Set schedule (priority) of pallet order on NC display

Fanuc16iM Control

Fanuc30iM Control

Note: Above data include optional features.
**NIIGATA Linear Pallet Magazine System (LPM) with Intelligent Cell Controller (ICC) System**

**Hardware Features – Reliability & Ease of Maintainability**

- Normal PC based system controller
  - Ease of availability of the parts/component. Auxiliary electrical parts are also standard parts in the market.

- Redundant system back-up function
  - Inside mirroring disc system is equipped.

- The system controller is inside well protected cabinet.
  - Dust-proof, drip-proof cabinet with a cooler. Designed for industrial environment condition.
NIIGATA LPM system with ICC Controller

Software Features – Safety & Simple

- Pallet number based scheduling of the system operation (Establishing Pallet Master Data)
- Simple and easy of setting procedure on the screen
- Efficient system operation based upon workload and priority
- Check of NC programs and tools before start of the machining
- Simple Unattended Operation
- Displaying live system condition
- Tracking cutting time and machine run time
- Auto power shut-down after completion of the schedule
- Designed for energy saving
NIIGATA LPM system with ICC Controller

Highlights of Niigata ICC system

☑️ Installation Record:
35 sets linked with over 150 sets of Niigata HMC delivered worldwide.

☐ Customization:
The custom system layout can be created based upon the requirement from the customer.

☑️ Reliably simple operation in the industry:
Niigata ICC system has been highly reputed reliable and simply capable pallet automation system in the industry. The reliability and ease of the operation are key focus at Niigata factory to supply the automation to enhance the productivity at the customers.
NIIGATA ICC Controller Cabinet

Operation panel

Display

Keyboard mouse

PC

Control equipments

(Prepared by customer)
AC200V～AC220V, 1φ,1kVA

All control equipments are working based AC 100V
NIIGATA LPM system configuration (example)

- ICC controller
- 4 HN100Ds
- 15 Stockers
- 2 L/ULs
- Niigata RGV
NIIGATA LPM system Schematic

ICC system connection diagram

L/UL SW Panel
Operation Panel

PC
HUB
EtherNet
MC

Sequencer
Optical Transmission
Vehicle
Steps to initiate system operations

1. Make pallet master data
2. Register NC programs
3. Set production schedule
4. Press Cycle Start Button
NIIGATA ICC Controller System
Status Display (Main screen)

System condition
• Deployment and status of all units are displayed
• Pallet location and status is displayed.

Pallet
Icon represents each location and showing such state as empty, before cutting, after cutting, and before L/UL

MC
Color coded display for Power OFF, On/OFF line, Alarm

Stocker
Pallet status

RGV
Travel destination (From/To information)
NIIGATA ICC Controller Icons for Pallet and MC condition

- No schedule set up
- Empty pallet
- Before L/UL
- Before MC
- After MC
- Before WS
- Alarmed out
- Dummy pallet
- To be skipped

- Power OFF
- Off-line mode
- On-line mode
- Alarm pallet
Photo: HN100D with 6 pallets stockers / 2 Load/Unload stations (one high style)
NIIGATA ICC Controller Referenced Installation
NIIGATA ICC Controller  Referenced Installation

Photo: Automatic Guided Vehicle (one high style)
NIIGATA ICC Controller Referenced Installation

Photo: ICC controller and Load/ Unload stations.
NIIGATA LPM System  Referenced Installation

(20) pallets to interface with (4) Niigata 800mm size HMCs One high type system
NIIGATA LPM System Referenced Installation

(167) pallets to interface with (4) Niigata 800mm size HMCs Stacker Crane type system
NIIGATA LPM System Referenced Installation

(52) pallets to interface with (3) Niigata 1600mm size HMCs Stacker Crane type system
(6) pallets to interface with (1) Niigata 1300mm size HMC One high type system
NIIGATA LPM SYSTEM with ICC CELL CONTROLLER

THANK YOU

NIIGATA A World Leader of Horizontal Machining Center