Flexible Production Configuration

Each paint line has a distinct arrangement. Production volume, quantity of color, part size, booth size and paint used are the defining factors. The Cartridge Bell System flexible structure will adapt to many production setups. The following are examples of Cartridge Bell System configurations.

A Cartridge Bell System with dedicated cartridges will maximize paint savings in high volume production with limited number of colors and frequent color changes. In this example, the 48 dedicated cartridges will handle 24 colors while the 6 manual loading stations will allow for new paint introduction & testing.

A Cartridge Bell System based on a compact handler will make spray booth integration easier. This compact station consists of 2 flushable cartridges, 6 dedicated cartridges and 4 manual loading stations. The flushable cartridges will handle 16 colors; the dedicated cartridges will achieve a high level of paint saving for the most frequently used colors. The manual loading station will be used for special and new colors. This compact and flexible system will work best in high volume production with small batches and special colors.

If a production line is set up for frequent color changes, an unlimited number of special colors, a large number of standard colors, special fleet production, one time custom made colors, special series, backlog or random feed, it will require a flexible Cartridge Bell System. The 10 manual loading stations will be used for special colors. The 3 flushable cartridges and the 23 dedicated cartridges will work together to handle standard colors, special fleet & special series.

Legend

- General Loading Station
- Dedicated Cartridge
- Cartridge Flushing
- Spray Flushing
- Paint Eye Flushing
- Feed Eye Flushing
- Cartridge Flushing
- Spray Flushing

TECHNICAL DATA

Cartridge Bell System

The technology that really saves paint

Cartridge Flushing System

Made to handle standard colors, special series, batches or random production with small batches and special colors. The 3 flushable cartridges and the 23 dedicated feed, it will require a flexible Cartridge Bell System. The 10 manual loading stations will be used for special colors. The 3 flushable cartridges and the 23 dedicated cartridges will work together to handle standard colors, special fleet & special series.

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TECHNICAL DATA

Atmosphere

Stainless steel modular construction

Sensors on all moving parts

Custom size available

9 Standard sizes

1 Pneumatic up/down axis

2 axis servo controlled

Overall accuracy below 3%

Dosing liquid: low conductivity solvent

Servo motor displacement control

Volumetric displacement dosing

Cartridge holding by vacuum system

Capacity: 500cc or 800cc

Dedicated or Flushable Versions

Cartridges

Weight: 10.5 Kg (atomizer, cartridge & paint)

Bell cup size: 30, 50, or 70 mm

Atomizer

TECHNICAL DATA

4SP+ Controller

Designed Specifically for Paint Process

6 axis Drive

Fibre Based Processor

Synchronized Process and Path: 3D

Final Head Diagram

711800

Bell Cup Cleaning

Software

Paint speed 1600 mm/sec

Powerful Motion Control

Large Payload Capacity

IRB 5400 Robots

Common control robot and handler

Paint usage reporting

Full software status reporting

Hardware usage logging

Cartridge Bell System

The technology that really saves paint

Car Paint System Wins Prestigious Prize

An ABB cartridge painting system for cars, which has very low impact on the environment, has won the prestigious Toyota Technology Development award.

The prize was awarded to Toyota suppliers whose innovative technology has made a significant contribution to Toyota product quality or productivity. The 2005 awards were on environment, safety features, communications, weight savings and low cost production.

Isamu Suzuki, Vice President of ABB Japan, received the award from Toyota president Fujio Cho. At the ceremony, the system was praised for:

- a 27 per cent reduction in running costs for Toyota’s global production of five million vehicles
- a two per cent reduction in initial costs
- a 45 per cent reduction in volatile organic compound (VOC) emissions during painting
- improved productivity - the system can achieve smaller production runs with more colors possible, making painting more flexible.

ABB’s cartridge painting system was first installed at Toyota Auto Body Co’s plant in Japan.

The benefit of the system is that colors can be changed almost instantaneously; without the need to clean tanks, valves and lines - only the paint cartridge is washed. As a result, the system can operate continuously while cartridges are cleaned and filled. Thus downtime is vastly reduced, while small runs become much more feasible.
Software Features

The Cartridge Bell System software framework includes all commands, status, parameters and logging functions required to operate the system. All are presented in a user-friendly graphical interface (GUI).

Cleaning Devices

Some cartridges are loaded with paint many times per hour. Others are hardly used. In such cases, paint build-up may occur with time. To prevent this, the cartridge cleaning process is controlled by measuring the volume of dosing liquid ejected by the cartridge while in use. The remaining paint in the cartridge is pushed back into the paint circulating system.

Filling Station

Each cartridge is parked in a dedicated filling station when not in use. These stations are used to fill up and empty cartridges. The amount of paint loaded in the cartridge while in use is controlled by measuring the volume of dosing liquid ejected by the cartridge while in use. 

Mechanism

This simple feature prevents the accidental mix of cartridges and paint by creating a mechanism code for each color. Only cartridges and fill up and empty cartridges matching codes can work together.

Vacuum Holding

Cartridges delivered and loaded on the bell are held in place by vacuum. This system is lighter, more robust and needs less maintenance than any mechanical device.

Delivery Control Unit

Each cartridge has a piston with paint loaded on one side and dosing liquid pushing on the other side. During the color change cycle, the dosing cylinder is refilled with non color-specific paint. This prevents paint mixing during the color change cycle. During the color change cycle, the dosing cylinder is refilled with non color-specific paint.

Robots

The robot used in a Cartridge Bell System is the IRB 5400. This powerful workhorse can be a 6, 7 or 8 axis manipulator which brings speed, accuracy and reliability to the system.

Controller

The S4+F motion controller will handle up to 12 servo-controlled axes, conveyor tracking and multiple motion groups. The process is handled by the powerful IPS (Integrated Process Control). The IPS’ unique distributed time-synchronized network will bring perfect timing to all process related components. The powerful S4+F brings motion and process together providing our systems with unrivaled overall performance.

Handler

The Cartridge Bell Handler is available in different sizes to accommodate the various requirements of production lines. From a small 2-cartridge flashable station to a full dedicated station with 6 dedicated cartridges. The handler has two servo-controlled axes, a pneumatic up-down axis, four pneumatic grippers and a set of solvent-specific pneumatic valves to control each station’s valve operations. Station positions are all stored in one database file, so no position programming is required. All motion commands are automatically generated from built-in algorithms making motion-programming unnecessary. Some functions are built-in to control all processes.

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