

Comparison Sato CL 412/612 series - CHESS/64-0x series

Overview

The CL series consists of two basic printer widths each with 8 and 12 dot/mm print heads. Both the CL 408 and CL 412 have a 104mm (4.1") head in 8 and 12 dots/mm respectively. The CL 608 has a 152 mm (6") head @ 8 dot/mm and the CL 612 has a 165 mm (6.5") head @ 12 dot/mm. No print head widths of 5" or 8" are available.

The comparison refers to the 2 units with 12 dot/mm resolution. The CL 412 runs at a maximum print speed of 150 mm/sec (6 ips) and the CL 612 at 200 mm/sec (8 ips).

The CL 612 was the actual printer tested and compared to the CHESS/64-0x.

Available standard features are: Tear off edge, reflective sensor, serial/parallel interface Optional interfaces are: Twinax/Coax and Ethernet

Optional finishing devices are: Flat blade knife, external rewinder, dispenser, PCMCIA slot, real time clock.

No ribbon saver system available.

All drives for the printer are served by one stepper motor. The dispenser, knife and rewinder include extra drives.

Short summary: Very simply designed printer. Lacking in value added details. Suitability for industrial applications seems to be more towards low to medium output.

Specification Comparison

Reviewing specifications, this printer is very comparable to the CHESS/64-0x in many respects. But after a detailed evaluation clear differences appear with reference to:

- Matching high volume applications
- Durability/functionality of all components
- General engineering
- Ribbon saver
- Speed of first Label

Speed of First Label

Printing using printer resident fonts and barcodes or huge graphics or multiple labels across the web, from small to big labels—the CHESS/64-0x printers are up to 200% faster!

Print Speed

At 150 mm/sec for the CL 412 versus 300 mm/sec for the CHESS/64-0x the CL 412 can't compete.

The print speed difference is less (but still significant) between the CL 612 and CHESS/64-0x (200 mm/sec vs. 300 mm/sec). Plus the CHESS/64-0x can print at its maximum speed in a wider variety of applications. With a lower print speed and slower speed of first label, combined with a smaller ribbon capacity (see below) the CL 612 is no competition either.

Media Size Range

The CHESS/64-0x class with 4 machines covers all widths from 25.4 mm to 254 mm with the same 300 dpi resolution. The label length ranges from 5 mm up to 2 m independent of the finishing device. And even 15 m with an optional card is possible!

With the SATO CL class there are also 4 machines but only two basic print widths (4 and 6/6.5 inches) with two print head resolutions. Given the two different resolutions, output compatibility will be an issue for some applications.

The minimum label width for the CL 412 is similar to the CHESS/64-0x (22 mm versus 25.4 mm). But the minimum label width for the CL 612 is significantly larger than the CHESS/64-0x (50mm vs. 30 mm) making the CHESS/64-0x more versatile.

The CL series label length ranges from 20 to 178 mm, beyond that an optional card is needed. Finishing devices increase the minimum length of the label and none imprintable area in 1:1 mode considerably.

Ribbon

The larger ribbon capacity of the CHESS/64-0x (600 m vs. 410 m) means less down time and operator monitoring even at the higher print speeds.

The minimum ribbon width is not specified for the CL 612 but given the design it is assumed to be 50 mm. The 30 mm minimum width for the CHESS/64-0x means lower operating costs for some applications.

The ribbon saver is standard for CHESS/64-0x class but not available for the CL Class.

Print Head Check

The CHESS/64-0x will soon have a print head check feature available. It will monitor the head elements and, if a problem develops, try to automatically shift the format image so the bad element corresponds to a non-print position. If this is not possible the printer will stop and alert the operator. The check can be performed at the start and end of each job as well as at operator specified intervals. This will provide improved security for print quality and potentially extend print head life.

This feature is not offered for the CL series.

Connectivity

Centronics, RS 232/485 are standard for both printers. The CHESS/64-0x class runs a serial transmission speed of 115.2 KBAud for modern industrial requirements. The CL class is limited to 19.2 KBAud only.

Options

Rotary knife, rewinder, dispenser, external signal inputs and memory expansion cards (PCMCIA) are available for both printers. For the CHESS/64-0x the PCMCIA interface is standard but it is an additional cost for the CL series. Also, for the CL series the media handling options increase the minimum length requirements but for the CHESS/64-0x this has no impact.

CHESS/64-0x class can be equipped as well with a scanner, an applicator and a front infeed module. Plus 2 output signals for integration and synchronization with other systems.

Physical Construction

Externally both brands have a steel case and a rugged construction design. For the CL series the internal design is not as rugged. The CHESS/64-0x class uses bearings instead of bushings, there are aluminum ribbon mandrels instead of plastic, large motors and gears and drive belts instead of less rugged devices, high precision parts instead of low cost items all leading to differences in terms of durability for high volume industrial applications.

Dimensions

No real differences given.

Design

The CL class is a basic cube design, i.e. hard and straight edges, plus a visible big hinge on top.

The CHESS/64-0x class has nice contours with curves, smooth edges, inclined surfaces and more attention to design details—a much more attractive piece of equipment, industrial isn't necessarily boring.

User Friendliness

The procedures to operate the unit including insertion of media, operation of keys, readability of display and adjustment of parameters are much easier on the CHESS/64-0x class. This is the result of more attention to detail, which is not part of the CL class design. Also, automated routines instead of manual steps and structured menus with simplified key selections make for easy adjustments and set-up of all operating parameters on the CHESS/64-0x class.

Price and Maintenance Costs

On a total cost of ownership basis the CHESS/64-0x is expected to provide a better value. The higher print speed and supplies capacity, with no sacrifice in durability, should provide higher productivity and throughput.

Detail Comparison

Print Quality at High Speed

Where the CL 412 runs at a maximum print speed of 6 ips and the CL 612 at a max. 8 ips, the CHESS 04/64-04 and Chess 06/64-06 run at 12 ips. Obviously the CL 412 is not even a consideration for high speed printing.

One of the most relevant factors effecting print quality and print speed is media density (or thickness); the thicker the media, the worse the quality and the higher the abrasion with flat heads due to bending of the media underneath the head. The Sato CL series appears to have specs indicating it is both a tag and label printer. It can handle a material thickness up to a 0.25 mm for the 4" head and 0.20 mm for the 6.5" head. However, the long-term effects of printing at maximum speed on maximum thickness materials are a potential issue. The stresses on the mechanism are more severe; the axles don't even have ball bearings at the outer side.

The CHESS/64-0x can also handle 20% thicker (denser) material. But even with the same materials the CHESS/64-0x, with its Near Edge print head and straight paper path, can run at maximum print speed with higher print quality in a wider variety of applications.

Both sides of the CHESS/64-0x print head mechanism are rigidly supported in ball bearing mounts, which gives added stability and optimum alignment under all operating conditions. Also the CHESS/64-0x print heads require less head pressure. This means reduced print head abrasion and less wear and tear on the mechanism. The end results are improved reliability, longer head life and better print quality.

Media Insertion, Width Adjustments and Media/Ribbon Transport Performance

For insertion of paper/ribbon the print engine of the CL series can be opened from the side by means of a lever. Adjustments for width are combined with general pressure adjustments in 3 steps like the CHESS/64-0x series.

For the CHESS/64-0x, the opening and closing of the head is done automatically as part of the basic operating modes. Plus the media can be conveniently fed through or removed from the print engine by pressing 2 keys on the operator's panel.

There are 4 advantages provided by this concept:

- No risk of forgetting to set the head offset adjustment for different paper widths and creating badly imprinted labels.
- No risk of prematurely worn down print heads due to wrong paper width adjustment.
- No risk of a flat spot on the print roller from leaving the head closed for a long period of time.
- No need to open/close the head mechanism by means of a lever i.e. one less operation and the printer is always ready.

The standard label roll core diameter is 3" for the CL 612—the CHESS/64-0x handles 1.5", 3" and 4" cores to match a broader range of requirements.

The CL series does not have a dancer arm to help accelerate the label roll and take up slack in the web. The CL 412 running up to 6 ips with no dancer may be okay, but the CL 612 running up to 8 ips with a 178 mm maximum media width can experience problems. The CHESS/64-0x printers have a long traveling dancer providing high registration accuracy at any speed condition even with slippery label liner material.

Lateral media guidance on the CL series is less accurate as it is quite distant from the head (150 mm) and has a very short guide length. With the CHESS/64-0x the guides are long and close to the head. A high registration accuracy of +/- 0.5 mm is guaranteed.

The standard gap sensor for the CL 612 is in a fixed position. CHESS/64-0x series have a 15mm adjustment range for transmissive and reflective sensors, and a sensor adjustable over the full width is available as an option.

The CL series ribbon drive system has a steel core with plastic sleeves, a spring-loaded backfeed function and a felt brake that are claimed to meet industrial requirements. Running a full and wide roll of ribbon driven at the higher speeds may lead to some reliability problems. The spring loaded backfeed for the ribbon (needed for on demand printing, i.e. backfeed of label from tear off point to print line) has its performance limits in terms of speed and roll weight. Ribbon slack can develop leading to unintended gray marks at the beginning of the ribbon or ribbon breakage due to a jam under the head. Furthermore, this limits the user to one unwind direction only. If the wrong unwind direction is used the ribbon backfeed operation may suffer or damage may occur. An untrained operator may cause some problems or even expensive repairs.

The CHESS/64-0x uses a stepper motor supported, maintenance free system that doesn't have these kinds of limitations and provides enhanced reliability. There are no limits for the unwind direction -either

ribbon ink side in or out can be used. Also, the extra ribbon transport shaft between the head and ribbon rewinder provides consistent separation of the ribbon from the media resulting in excellent print quality and reliable operation and prevention of ribbon wrinkles.

Surprisingly, the CL 612 doesn't have a ribbon saver, either as a standard feature or an option.

The CHESS/64-0x ribbon saver design uses a dual roller media feed system—one roller feeds material, the other is in use during the print process only. During ribbon save the head is lifted so there are no problems with ribbon wrinkles or head wear.

The CL 412 has a factory adjusted, fixed ribbon torque system so using thin and/or narrow ribbon with large print areas may lead to ribbon breakage as the torque can't be lowered. The CL 412 also only has a ribbon capacity of only 450 m.

The CHESS/64-0x printers have adjustable ribbon unwind and rewind torque. This allows a minimum width of 30 mm, or less if the torque is readjusted. The ribbon capacity is also significantly larger with a 90 mm roll diameter providing a 600 m length.

Fonts

The CL series and the CHESS/64-0x series offer both a rich library of fixed size and scalable fonts.

The CHESS/64-0x series allows font rotation in steps of 1 degree. Additionally the ability to download True Type Font typefaces by the user will be implemented soon. Given the large internal memory in the CHESS/64-0x, downloading fonts may not require an extra memory card like the CL series.

Display, Menu and Operator Control

With the CL series, the operator panel consists of 2 keys, 5 LEDs showing status, 4 potentiometers, 3 dip switches and a 2 line/16 character display to adjust parameters. A lot of clutter for a couple of parameters. And the display is oriented vertically, which is not easily viewable in many circumstances.

The CHESS/64-0x series has a 2 line 16 character display and 4 keys with symbols angled for optimum viewing. The rich menu of parameters makes the Chess/64-0x more versatile and easier to operate. It requires less operator training and adjustments can be made more quickly. There are also 3 access levels that can be set to protect critical settings. Additionally features like the automatic gap initializing with manual mode allows adjusts for multicolored preprinted labels which convinces even some Sato dealers to sell CHESS/64 0x printers in special applications.

The CHESS/64-0x printer's comprehensive list of error messages helps the operator with set-up and basic machine functions and allows the supporter to analyze problems via the phone, saving both time and money.

And the choice of format and/or manual control of the menu parameters is appreciated by everyone.

Media Specifications

Thickness: For the CL series the thickness or weight of paper is dependent on the width. The maximum thickness that can be handled is about 20% less the CHESS/64-0x series (which is rated at 240g/m²). In special applications the CHESS/64-0x can handle up to 300 g/m² at widths of 4 inches.

Length: The minimum label length for the CL 412 is 6 mm; the CL 612 needs 20 mm. The impact of finishing devices like a cutter or dispenser, in terms of raising the minimum length, are not known but the design indicates it may be an issue.

CHESS/64-0x printers offer a standard minimum length of 5 mm and this can be lowered if required. The minimum length is independent of what finishing device is attached. Neither cutter, dispenser nor tear off edge will raise this value due to its highly functional backfeed system.

Standard max length for the CHESS/64-0x exceeds 2 meters, which is more than adequate for most any application. No memory extension is normally required. The CL 612 max standard label length is only 178 mm so memory expansion options will be required frequently.

Printing banners i.e. extra long labels (maybe your next new sales opportunity) the CHESS/64-0x printers can be equipped with up to 32MB. Labels of up to 15 meters at 4 inch width can be printed in short time.

Connectivity

Both printers have both a parallel and serial interface as standard. CHESS/64-0x printers have a serial interface with 115.2 Kbaud max speed where the CL series ends up with 19.2 Kbaud.

The optional/external COAX/TWINAX interface for the CL series is expensive and other external units can be sourced from hardware suppliers for a much lower cost.

Ethernet is optional for both printers (will be internal in a later release of the CHESS/64-0x).

Power Supply

The CL 612 needs the fuse exchanged when changing from 110V to 230V and vice versa.

The CHESS/64-0x series switches automatically.

Maintenance

Print Head - Replacing the print head on the CL series requires tools and the operation is challenging due to poor connector access.

For the CHESS/64-0x the heads are easily replaced with no tools. The mount is pre-adjusted with high precision and does not need realignment. But if required the position can be readjusted for special applications. Also worth mentioning is that the Near Edge head on the CHESS/64-0x has a "self cleaning" characteristic. This provides better uptime and more consistent, high quality print even after long-term use. And don't forget the longer head life, which results in lower operating costs.

Gap Sensor

The media sensor is nearly maintenance free on the CL 612 due to a transparent shield above the sensors. This however leads to a larger distance between the sensors and media, which reduces registration accuracy and may affect the ability to sense certain materials.

Options

Knife: No details available for the CL 612 knife.

The CHESS/64-0x has a fast and powerful modular knife and is only 20 mm from the print line. The backfeed system is very accurate and allows a fully imprintable label in 1:1 demand mode. The knife is capable of cutting media up to 0.25 mm thick and 4 inches wide making it appropriate even for tags. An average life of more than 1.5 million cuts even on critical TYVEK material can be expected.

Rewinder: No details available for the CL 612 rewinder.

The CHESS/64-0x rewinder module is:

- mounted externally for easy access and rewinds up to a diameter of 210 mm. This saves operator time or the need for an additional separate rewinder,
- available in different core sizes so it matches the next step of the application,
- self-adjusting to print speed so no loose rolls or other mismatches.

Dispenser: No details available for the CL 612 dispenser.

For the CHESS/64-0x a separate feed roller/pressure roller combination pulls the backing paper around the dispense edge. This provides consistent performance for dispensing and excellent registration accuracy on most any label material.

Simply try to dispense a thin plastic label on a heavy backing paper and the difference will show up clearly. Or even more often, the die cut at the label isn't perfect. Even in these cases your customer will see a reliability of performance probably never experienced before.

The dispenser of the CHESS/64-0x printers can be combined with our applicator unit. This isn't available on the Sato products, which can only be interfaced to apply through a third party device.

Memory Cards: For the CHESS/64-0x the new ATA card slot is standard and provides options up to 48MB of additional memory. This allows an incredible expansion of functions like selectable "auto-start" files, look up tables, an enormous quantity of additional fonts and

graphics and an extremely large image buffer for extremely large labels.

For the CL series the PCMCIA card is a costly option. And then it only offers 2 slots with 2MB each vs. the 48MB on the CHESS/64-0x printers.

What CL Series Don't Have Compared to CHESS/64-0x Printers?

- Automatic print head dot check that can shift the image in case a dot fails. Provides more security for bar code readability, extends print head life and increases uptime.
- Rotation of scalable fonts in steps of 1 degree
- Good print quality at higher speeds
- Heavy duty bearings throughout the printer
- Heavy duty drivers for the stepper motors that have reserve capacity even at the highest speeds
- High capacity power supply for high density printing even at 12 ips
- Modular boards for peripheral devices
- Ribbon Saver
- Made in Germany and not in Malaysia

What CHESS/64-0x Printers Don't Have Compared to CL Series?

- Automatic interface detection for the serial/parallel ports
- Covered gap sensor