



DENIM ANYWEAR

By Apparel Online

FFT DENIM DIRECTIONS



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AUTOMATING JEANS SEWING OPERATIONS

FOCUS ON
MANPOWER
UTILIZATION

Global competition has ensured that apparel manufacturers strive to enhance productivity and quality, forcing manufacturers to focus on machine automates that offer improved productivity while adhering to stringent quality standards. Factories manufacturing specialized products (like denim jeans) cater to bulk quantities where mechanization becomes an important criterion in equipment selection. One of the biggest impediments till date in automating sewing operation is the difficulty it entails in handling the fabric component. All sewing operations can be broken up into three steps – Loading, Sewing and Unloading. Most of the sewing automats follow manual loading by operator, and sewing and unloading steps are completely automated requiring no human intervention. Interestingly, it is observed that manufacturers are inclined to exploit the productivity element of these automats, while potential for improvement in manpower utilization is not fully explored. This article highlights important automats used in jeans sewing operation with view to explore their potential for improving manpower utilization.

Automats for four operations in jeans sewing – Back Pocket Setting, J-Stitch, Back Pocket Hemming and Decorative Stitching – are analyzed to explore the scope of improving manpower utilization in terms of man to machine ratio, wherein 1:1 refers to single operator per machine and 1:2 refers to 2 work stations manned by single operator.

Back Pocket Setting Machine: In automatic Back Pocket Setting Machine (creasing + sewing automat for pre-hemmed and pre-decorative stitched pocket piece), the operator's task is limited to:

- Loading trouser panel
- Loading pocket piece (pre hemmed, pre decorative stitched)
- Actuating the machine

Analysis of operation shows that in 1:1 man to machine configuration, operator remains idle for 42% of cycle time (6 seconds idle for 14 seconds of cycle time) waiting for machine cycle to complete. This idleness of the operator often goes unnoticed. Similarly, in a 1:2 man-machine configuration, the operator is fully utilized but machine idle time is of 14% of cycle time (2 seconds idle for 14 seconds of cycle time is observed). 1:1 and 1:2 man-machine configurations give production rate of 2057 and 3600 pieces, respectively per shift (Ref. Exhibit 1.1). Thus, if the production level permits, operator utilization can be improved from 2074 to 3600 pieces by utilizing 1:2 man-machine configurations. However,



Vibemac 4650 EV9R Auto Belt Loop Setter



Vibemac 2516 V2 Auto Pocket Setter Unit



Vibemac V701 Auto Back Pocket Hemmer

Exhibit 1.1 – Production level for different automats at different man-machine configuration

Automat	Operation Description	Production in 1:1 Man-Machine Ratio	Operators Idle Time in 1:2 Man-Machine Ratio	Production in 1:2 Man-Machine Ratio	Operators Idle Time in 1:2 Man-Machine Ratio
Back pocket attach	Creasing + Attaching (Pre-hemmed + Pre-decorative stitched) pocket to the panel	2057	6 sec	3600	-
Belt loop attach	Belt loop attach (Pre-marked panel)	1147	0 sec	NA	-
J-Stitch	J-Stitch on fly	1585	0 sec	NA	-
Automatic pocket hemmer	Hemming (Pre-cut back pocket panels)	14400	0 sec	NA	-
Automatic pocket hemming for 4 hours and Decorative stitching for 4 hrs	Hemming (Pre-cut back pocket panels) for 4 hours + Decorative stitching on back pocket for 4 hours	7200	0 sec	1400	-
Back pocket decorative stitching	Back pocket decorative stitching	2820	5 Sec	5640	-

(Source: Timings are calculated from machine video available on YouTube and/or company website)

it should be noted that when two automats are manned by single operator, there is a small production loss of 514 pieces compared to when two automats are manned by two operators independently (2057 X 2).

Belt Loop: The operator is required to manipulate the trouser panel throughout the loop setting cycle, thus the 1:1 configuration does not show any operator idle time and efforts should be concentrated in exploiting the full productivity potential of the machine in this scenario.

J-Stitch Machine: On an automatic J Stitch machine, in 1:1 configuration, the operator performs following three tasks:

- Loading the panels on the clamps
- Aligning and straightening the fly
- Actuating the clamp

Analysis of 1:1 configuration reveals that operator remains occupied in panel manipulation and alignment while the machine completes the stitching cycle. The configuration does not offer any operator idle time for further improving machine allocation. As said earlier, efforts should be directed in fully exploiting productivity potential, rather than improving manpower allocation in this scenario.

Back Pocket Hemming: In 1:1 man-machine configuration, the continuous operation of hemmer requires continuous loading of conveyor. The automat does not provide any operator idle time. However, operator on auto back pocket hemming operation can be utilized in tandem for sewing decorative stitches on back pocket panels, provided production level and style permit the same. He can work on both machines in tandem, first on hemming then on decorative stitching. Production level when working in 1:1 configuration and 1:2 (hemming & decorative stitching) configurations are indicated in Exhibit 1.1.

Decorative Stitching: Analysis of decorative stitch operation on automat with 1:1 configuration shows that Operator's task is restricted to loading the pocket panel on the clamps, while the machines complete the stitching and stacking function. In 1:1 man-machine configuration, operator's idle time is 50%; that means the same operator can be effectively used for manning two machines (1:2

configuration) giving production of 5640 stitched pockets, while in 1:1 configuration single operator can give production of 2820 stitched pockets.

Following are important machine manufacturers providing automats for jeans sewing operations:

BELT LOOP ATTACH AUTOMAT

A. JUKI

- Automatic 2-Needle Lockstitch Belt Loop Attaching Machine MOL-254:** Capable of delivering belt loops of finished length 48-78 mm, the machine promises increased productivity with a machine time of 1.2 seconds per belt-loop. The feed mechanism incorporates a computer-controlled X-Y method to allow the operator to change the number of stitches and sewing sizes.
- Automatic Single Needle Lockstitch Belt-Loop Attaching Machine AB-1351:** Among the pioneers of multiple belt loop sewing patterns, AB-1351 has a maximum sewing speed of 2500 stitches per minute and can store up to 200 bar tacking patterns. Automating not only the belt loop attaching process but the belt loop cutting as well, the machine gives improved savings of time and labour. The productivity for this machine can be improved further when one operator attends to two AB-1351 units.

B. VIBEMAC

4650 EV9R: Equipped with a 7" coloured touch screen panel, 4650 EV9R is a two needle lockstitch belt loop setter with a sewing speed of 2800 SPM and loop width of 8 mm to 25 mm (30 mm also available optionally). The machine also has a thread aligner to avoid the mispositioning of loop on the fabric and a sewing area of 15 mm X 23 mm.

J-STITCH AUTOMAT

Vibemac – 1010V4F1: The "J" seam unit 1010V4F1 (Double Colour Technology), comes with a Mitsubishi direct-drive PLK-G, 2 needle lockstitch(V4F1 model)/1 needle lockstitch (V4F1M model), shuttle hook and thread trimmer promising a high production rate. The machine also accommodates a loader, stacker and one of the widest sewing areas



NEO DENIM

TRULY DEEP DARK BLUE DENIMS, WHICH WASH DOWN GRADUALLY AND OFFER GREAT CONTRAST AT EVERY LEVEL, MAKING THE JEANS LOOK SUPER RICH.

BOOMERANG

IT COMES BACK TO YOU!
 HIGH RECOVERY / EXTRA SOFT / BOUNCE BACK

CORD DENIM

COROUROY DENIM THAT FADES AS YOU WEAR AND WASHES DOWN WITH EVERY WASH. IT'S COROUROY AND IT'S DENIM.

MUTANT JEANS

DENIM EFFECT USING DOBBY STRUCTURES FOR ULTRA COMFORT

Arvind

Arvind Denim Lab : Naroda Road, Ahmedabad-380 025, India.

(245 x 145 mm) in the market. New designs can be developed within a day through the company's assistance over email and uploaded to the machine instantaneously using USB. 1010V4F1 can be used for operations such as back pocket embroidery, making darts and pleats, run flap stitch with minor adjustments to the machine.

POCKET SETTER

A. VIBEMAC

- a. **2516V4 DCT:** 2516V4 DCT is a double needle lockstitch machine equipped with a shuttle hook and thread trimmer and can sew any kind of pre-pressed patch pockets on jeans. The operator's job is restricted to loading the trouser panel and the pre-pressed pocket onto the machine clamp, after which the machine works on its own. The output rate is very high up to 2400 pieces per 8 hours. In 1:2 man to machine configuration manpower utilization can be improved.
- b. **Vibemac 2516V2 + 005V + C005V:** Vibemac's 2516V2 + 005V + C005V, automates the process of automatic pocket setting from creasing to pocket attach. Here operator's task is limited to the loading of trouser panel, tab (e.g. red tab of Levi's) and pocket patch (pre-hemmed and pre-decorative stitched) and pressing the actuator. The machine claims a high output rate of 2400 pieces per 8 hours.

B. **Duerkopp Adler 906-01 Classic:** CNC controlled machine for attaching pre-creased pockets: The machine has a heavy sewing head that facilitates sewing medium weight fabrics like jeans, workwear and sportswear, with a thread size up to a thickness of Nm 15/3. The maximum sewing field is 210 X 210 cm. The loading area is easily accessible with 15 degree inclined table top. Machine provides a high production rate of around 1800 pockets per shift (with double seam and bar tack). The machine offers quick and easy change of pockets shapes (<3 minutes). The machine is claimed to give high performance with max sewing speed of 3000 stitches/min. Use of XXL hook ensure higher bobbin capacity and hence less frequent bobbin changes. The machine is equipped with thread breakage identification device and sewing thread consumption monitoring system. Electromagnetic thread clamping device ensures neat seam beginning.

C. **Typical - C764:** Mainly used in jeans and shirt pocket stitching, the machine uses Typical's GC6720 single-needle direct-drive sewing head, high capacity rotary hook, automatic thread trimming device, coupled with automatic folding, automatic feeding, sewing and stacking device. This machine can produce 1100 trousers per 8 hour shift (2200 pockets). With the help of replaced fixtures, the machine can sew pockets of different dimensions.

D. **JUKI - AP-876:** The machine is able to fold a subsequent pocket and place it on a garment body while the machine is still engaged in the sewing of the current pocket giving higher productivity per machine. Capable of sewing 4000 stitches per minute and storing 999 patterns, the high-speed, 1-needle lockstitch zigzag stitch machine with an automatic thread trimmer, AP-876 reduces the cycle time by 5% as compared to JUKI's previous model, AVP-875.

4650 EV9 R
AUTOMATIC BELT LOOP SETTING UNIT



V300
AUTOMATIC WAISTBAND UNIT



**VI.BE.MAC'S
KEY UNITS**

V100EA
DOUBLE HEAD POCKET CREASING UNIT



High performance units

Top quality output !!



2516 V4 DCT
AUTOMATIC BACK POCKET SETTER

BACK POCKET
STATION



V800 AS
AUTOMATIC SIDE SEAM SERGING MACHINE



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