JW Dual Head 8
Dual Head Jumper Wire Inserter
(6293C/6299C)

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JW DH 8
Dual Head Jumper Wire Inserter with Loader/Unloader
Model 6293C Servo Drive*
(Shown with Optional Internal Board Handling)
CE-Compliant

JW DH 8
Servo-Drive
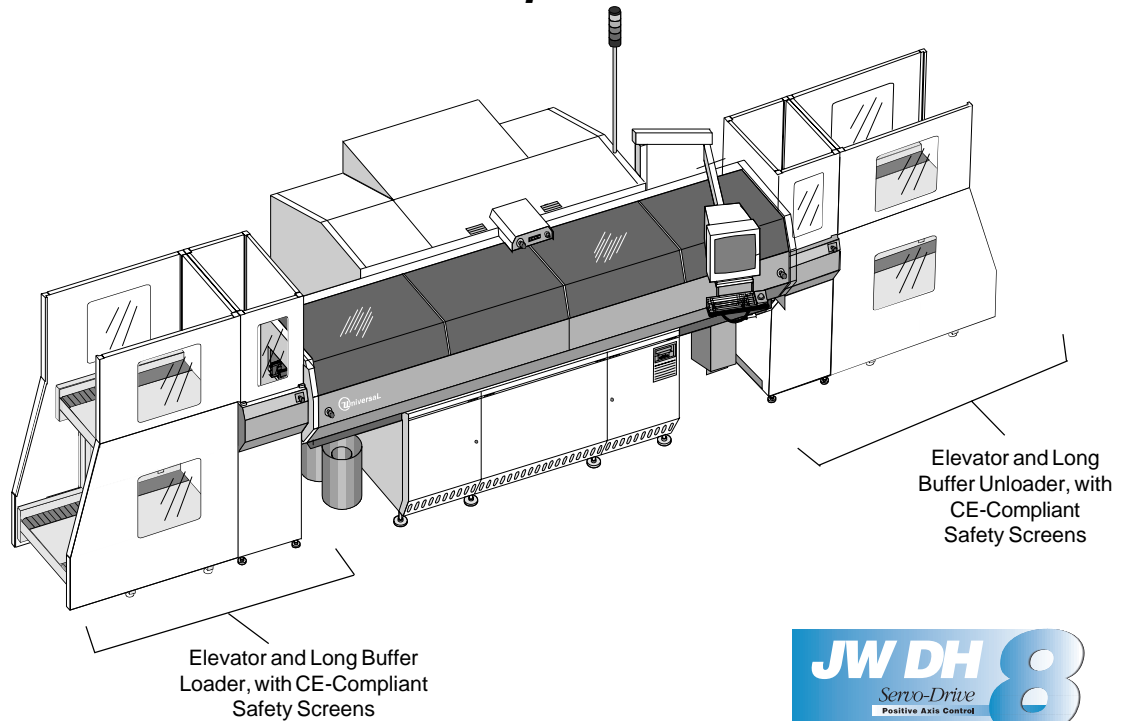**Positive Axis Control**
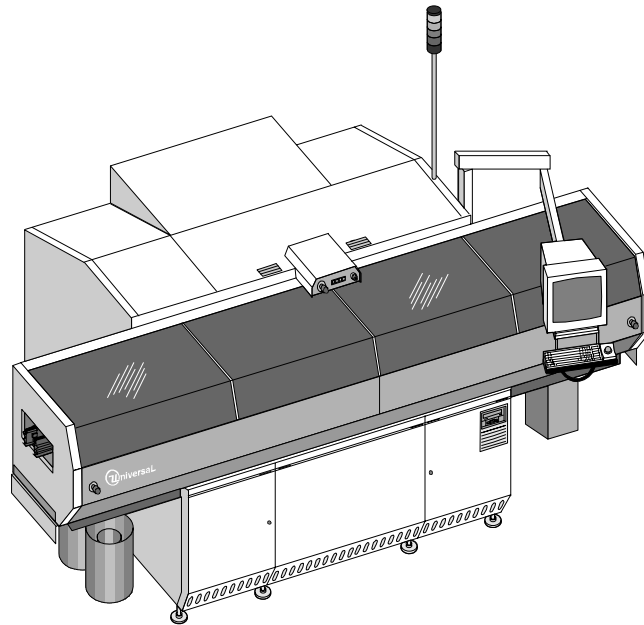
Jumper Wire Inserter Features

■ High-performance insertion machine with insertion rates up to 40,000 components per hour with both heads, and insertion PPM of 75 or better

■ Insertion span capabilities from 5mm (0.197") to 33.0mm (1.3")

■ VME-based control system with embedded P.C.

■ IM-Universal Platform Software with graphical user interface

■ Servo motor driven insertion heads, clinches, insertion span axes, and X-Y table axes

■ Uninterruptable Power Supply (UPS) included with each machine

* Patent Pending

JW DH 8
Dual Head Jumper Wire Inserter
*Model 6299C Servo Drive**
(Shown with Loader/Unloader: Magazine-to-Magazine)
CE-Compliant

Elevator and Long
Buffer Unloader, with
CE-Compliant
Safety Screens

Elevator and Long Buffer
Loader, with CE-Compliant
Safety Screens

JW DH 8
Servo-Drive
Positive Axis Control

Board Handling System Configurations

Same features as JW DH 8, Model 6293C, plus...

- Internal Board Handling System (BHS)
- Auto MisMark and Bad Board Reject Station
- Loader/Unloader: Magazine-to-Magazine, CE-compliant with Long Buffers only
- Loader/Unloader: Vacuum Bare Board-to-Magazine, not CE-compliant
- Loader/Unloader: Destacker on 29", 44", or 58" Conveyor-to-Magazine, CE-compliant with 44" or 58" Conveyor and Long Buffers only

* Patent Pending

Contents

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All specifications are subject to periodic review and may be changed without notice. Illustrations may not be drawn to scale.

Indicates a change from the previous edition of this document. Bar alongside text indicates entire section reflects change from the previous edition.

Glossary of Acronyms and Specialized Terms

Acronym/Term	Meaning
AC	Alternating Current: type of electrical power generation
APE	Advanced Product Editor (Universal brand name)
ASCII	American National Standard Code for Information Interchange
AWG	American Wire Gauge: wire size standard
BEC	Board Error Correction (Universal brand name)
BHS	Board Handling System: means of transporting PCBs
CAD	Computer-Aided Design
CD-ROM	Compact Disc-Read Only Memory
CE	Conformité Europeanne: European safety standard
CFM	Cubic Feet per Minute: measurement of air flow
CTA	Component Transfer Assembly
DC	Direct Current: type of electrical power generation
ERV	Expanded Range Component Verifier (Universal brand name)
GEM	Generic Equipment Model
GS	General Specification (Universal brand name)
GUI	Graphical User Interface
HSMS	High Speed SECS Message Service: implements SECS2 messaging over a network link
Hz	Hertz (cycles per second): measurement of electrical frequency
IM	Insertion Machine: equipment for through hole component insertion
IMC	Insertion Machine Components
IM-UPS	Insertion Machine-Universal Platform Software (Universal brand name): operating software for Universal Series 8 through hole equipment
I/O	Input/Output
IP	Index of Protection: resistance of machine to contamination by foreign objects
LED	Light Emitting Diode: electrical component
MIT	Machine Interface Translator (VME to I/O bus)
MMIT	Mini Machine Interface Translator (VME to I/O bus)
OS/2®	Operating System 2 (IBM Corp. brand name)
PAC	Positive Axis Control
P.C.	Personal Computer
PCB (or PC board)	Printed Circuit Board
PPM	Parts Per Million: measurement of machine performance
SCFM	Standard Cubic Feet per Minute: measurement of air flow
SECS	Semiconductor Equipment Communications Standard: interface between host computer and assembly machines
SEMI	Semiconductor Equipment & Materials International
SMC	Surface Mount Components
SMEMA	Surface Mount Equipment Manufacturers Association
TCP/IP	Transfer Control Protocol/Internet Protocol: network communication protocol
UCT	Universal Control Terminal (Universal brand name): personal computer for operating IM equipment
UICS	Universal Instruments Control Software (Universal brand name)
UPS	Uninterruptible Power Supply
VA	Volt-Amps: measurement of electrical power consumption
VAC	Volts Alternating Current
VCD	Variable Center Distance
VDC	Volts Direct Current
VGA	Video Graphics Array: type of CRT monitor standard
VME®	Versa Module Eurocard (Motorola brand name): industry standard for 32-bit computer bus

Introduction

Universal's high-speed jumper wire insertion machine, JW DH 8, features VME-based control with an embedded P.C. and IM-Universal Platform Software (IM-UPS), including a graphical user interface.

The product line comes in two models: 6293C, manual load, or with internal Board Handling System (BHS); and 6299C, with automatic board handling and loaders/unloaders. Dual indexing rotary tables, high-speed servo-driven insertion heads and cut and clinches are also featured.

Models 6293C and 6299C achieve insertion rates up to 40,000 cycles per hour: 20,000 CPH with each head.

In consideration of essential health and safety requirements, the JW DH 8, Models 6293C with BHS and 6299C, are CE-marked. The Vacuum Bare Board Loader-to-Magazine, Destacker on 29" Conveyor-to-Magazine, and stand-alone machine without board handling configurations, are not CE-marked.

Functional Description
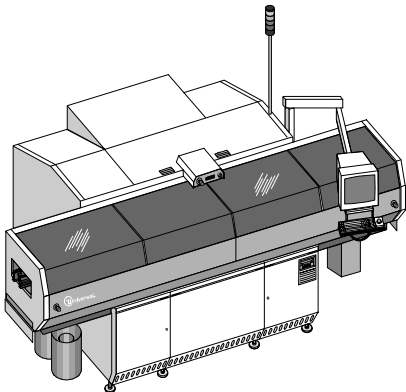
Models 6293C and 6299C automatically insert jumper wire from dual, bulk jumper wire reel input packages into printed circuit boards (PC boards). A product (pattern program) is created with information pertaining to the components, PC boards, and processing requirements. When this product is loaded, machine operation can be started.

When the machine is started, the PC boards can be located and clamped into the workboard holders. The product activates the X-Y positioning system and the component feed. The component feed transfers jumper wire to the insertion heads. The wire is straightened and the insertion tooling cuts the jumper wire to the required length determined by the product, and forms the wire for insertion.

After insertion through the PC board, the wire leads are cut and formed (clinched) to mechanically secure them to the board. The process continues until the product is completed and all required jumper wires are in place. When the product is complete, the PC board can be removed from the machine.

Standard Features

Control System

The JW DH 8 employs a control system, including input power/ distribution, VME bus, I/O, and servo system. Brief descriptions of major elements of this control system follow.

Power Input and Distribution

The input power to this machine is 230 VAC, single phase, 15 amps, 50 or 60 Hz. In combination with the supplied Uninterruptable Power Supply (UPS), the machine will accept a wider range of inputs (see "Service Requirements" section) and provide power to run the machine briefly in the event of a short power interruption. There are filters to prevent machine generated noise on the power lines as well as to prevent noise on the power lines from interfering with machine operation. The machine has a lockable disconnect switch for safety during service.

Internal to the machine, the 230 volts is directly used for amplifier power for the heads, clinches, and insertion span drives. There is a power conditioner transformer used for creating 120 VAC for the remainder of the machine functions. This includes the fan panels, the power chassis, the VME chassis, and the monitor. This transformer will also supply 120 VAC for the attached elevators and bare board loaders.

The power chassis, in turn, provides DC power for machine operation. This includes 56 VDC for Board Handling motors; +5 and ±15 VDC for the I/O box; and 12 VDC for general purpose use (valve solenoids, sensors, indicators, etc.). The 56 VDC is disconnected from the machine when interlocks are violated. The power chassis also provides 12 VAC for the worklight and 24 VAC for the machine status light and the interlock circuits.

Uninterruptable Power Supply (UPS)

An Uninterruptable Power Supply is standard with the JW DH 8 and external to the machine, providing continuous power at all times. The UPS will seamlessly transition to battery power in the event of an electric service interruption.

Battery capacity at full charge should allow full machine operation for up to 10 minutes after loss of input power. The machine should be brought to a controlled stop until electrical service is restored.

VME Chassis

The VME chassis is a state-of-the-art, multi-processor rack-mounted controller. It has an embedded Intel®-based P.C. which is used for the main operator interface. Attached to it are standard VGA monitor, keyboard, and pointing device. The main machine controller is a 680X0-based unit. This board handles all of the machine functions and timing. It does not directly handle the motor control, but does direct the motion controllers.

Two, four-axis motion controllers are used. These are 68000-based dedicated processors. The motion controllers provide speed and destination information to the servo amps, which drive the motors. Encoders, tachometers, and resolvers provide positional and velocity feedback to the motion controllers for precise position control. Three of these motion controllers are used with the Loader/Unloader configuration.

As an interface between the VME controller and the machine controls, there is a VME/Satellite interface board in the chassis. This connects to the I/O box using a Universal MIT cable.

Input/Output Box

The I/O box has a standard Universal MIT card in slot 1, which is the interface to the VME controller. The I/O box contains two Multi-Input cards, two 32 DC Output cards, a Board Error Correction card, and, for machines with board handling, two 32/16 I/O cards.

High Power Servo Chassis

The high power servo chassis contains the high voltage servo amps used for controlling the heads, clinches, and the insertion span axes. There are contactors in this chassis to disconnect power to the amps when interlocks are violated. The high power servo chassis has additional power line filtering for the 230 VAC used in the chassis. X and Y table servo amps are located external to the high power servo chassis.

Head Drive

The head drive is a servo-controlled axis for precise and rapid component insertions. The insertion depth is controlled by this servo. The servo motor contains an integral resolver used for position feedback. This signal is sent back to the high power servo chassis where it is converted to a quadrature line driver signal that is needed by the motion controllers in the VME chassis.

Insertion Span Axis

The insertion span axis is also a high voltage servo drive for rapid insertion span changes. There is a separate encoder on this axis for precise positioning of the heads and clinches.

Clinch Anvil Drive

The clinch anvil drive is a servo-controlled axis for precise and rapid anvil positioning. The anvil height is controlled by the servo. The servo motor employs an integral encoder used for position feedback.
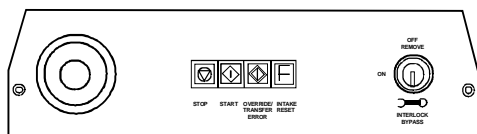
Push Button Panel

The PB panel includes the E-Stop switch, the Interlock Reset button, the Start and Stop buttons, the Override or Transfer Error button, and the Interlock Bypass Key Switch. All other machine functions are accessed through the graphical user interface via the keyboard, trackball, and monitor.

Board Error Correction (B.E.C.)

Board Error Correction allows the positioning system to compensate for lead hole location variations between printed circuit board lots. A light source and sensor are mounted relative to the insertion tooling centerline. On a maximum dimension PC board — 457.2mm x 457.2mm (18" x 18") — a small area cannot be sensed due to sensor offset. Detectable area is 457.2mm x 434.34mm (18" x 17.1"). See section in Technical Specifications on B.E.C. Detection Area.

B.E.C. uses a four quadrant sensor and amplitude controlled light source to find the center of holes in printed circuit boards. The signals are processed and provide the X and Y corrections to the motion controller via an analog signal. The motion controller then uses the full power of the control algorithms to find the center of the hole. Screens for B.E.C. setup are now integrated into machine diagnostics.

B.E.C. is also used in "Teach" to fit an insertion pattern to a PC board. This greatly improves pattern accuracy and reduces insertion PPM.
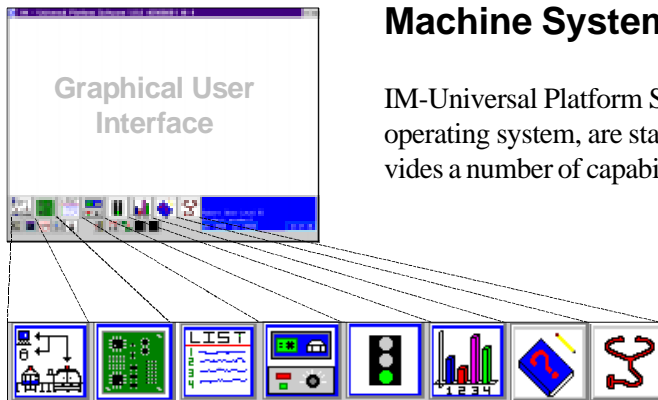
Machine System Software

IM-Universal Platform Software (IM-UPS), and an OS/2 WARP operating system, are standard. This graphical user interface provides a number of capabilities, including:

System Setup

- Machine Configuration — User configuration of machine options, such as board handling and tooling.
- Event Configuration — Configuration of events for display and control of machine status light.
- Security — Security based upon user/function.
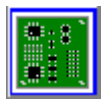
System Setup Icon

Advanced Product Editor (APE)

- Graphical Program Generation and Editing — Jumper wire location can be programmed/edited in either text or graphical format. Graphically displays all jumper wire insertions relative to PC board.
- Import of CAD Data for Program Generation (see following section).

Advanced Product Editor Icon

Product Changeover

- Load Product — User selection of previously stored product programs.

Product Changeover Icon

Production Control

- Counts — Allows setting inserter counts.
- Manual Control — Manually controls (zero, move) all axes of the machine.

Production Control Icon
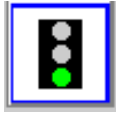
Machine Status Icon

Machine Status

- Current Messages — Displays current controller messages and events.
- Product Status — Displays status of running product.
- Analytical Information:
    - Discrete I/O — Ability to read each input and set each output individually.
    - Message History — Ability to view message log.
- Operations — Sets machine modes: Step, Single Cycle, Insert, Pattern.
- Error Recovery — Recovery processes for operational errors, i.e., mis-insertion.

Management Information Icon

Management Information

- Timers — Collection and display of machine timers.
- Counters — Count of machine events: insertions, insert errors, boards, Bad Board Reject, Board Error Correction, circuits.
- Component Data — Counts by component ID: placements, errors.

From these databases, a variety of reports can be created.

IM Diagnostics Icon

IM Diagnostics

- IM Diagnostics — Ability to exercise machine sub-systems on an individual or combined basis outside of machine control software.
- B.E.C. Set-Up/Analysis.
- Machine Set-Up Support.

On-Line Documentation Icon

On-Line Documentation

- IM-UPS documentation is available on-line.

CAD Data Requirements

ASCII File Format — Incoming CAD files must conform to the American National Standard Code for Information Interchange (ASCII). In order to accommodate a wide variety of CAD file formats, the APE uses either a generic columnar or separator data translation technique. All data contained in the CAD file is identified by a position in a definition created by the user.

CAD File Requirements
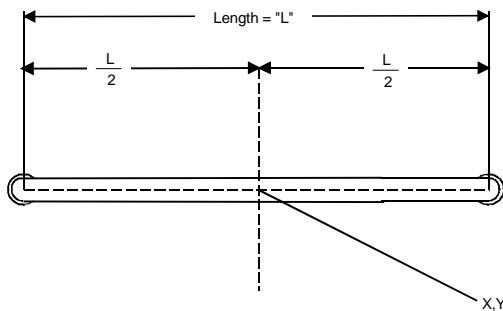
X Coordinate: The X centroid coordinate location on the board.

Y Coordinate: The Y centroid coordinate location of the component insertion.

Theta: The rotation of the jumper wire on the board.

Insertion Lead Span: The distance between the centerlines of the jumper wire.

Reference ID: The name assigned to the jumper wire insertion which makes it unique to all other jumper wire insertions in the product.

Component ID: The name of the jumper wire as it is found in the component database.

Alias ID: The name of a component in the database to which this jumper wire is aliased (optional).

Ignore: If the CAD file contains data that does not fit any of the fields, it should be identified with IGNORE.

A sample CAD file format is given with a brief explanation. This file format is provided for reference only and is an example of a typical CAD output.

Centroid (Top View)

This is a typical CAD file which may be output from a wide variety of different CAD systems.

This file includes SMC and IMC information, with component information stored for the IMC components. The component information for Surface Mount components will be obtained from the master .DEF files. IMC component information will be obtained from this file and placed into the Component Library.

Information in the CAD file:

A = REFERENCE DESIGNATOR
B = X COMPONENT CENTROID COORDINATE
C = Y COMPONENT CENTROID COORDINATE
D = ORIENTATION
E = PART NUMBER/COMP ID

F = SPAN
G = NUMBER OF LEADS
H = AXIAL BODY DIAMETER
I = MACHINE TYPE
J = DIP SOCKET
K = AXIAL LEAD DIAMETER

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**  ⇐ ⇐ ⇐ ⇐ ⇐ ⇐ ⇐ ⇐          NOTE 1          ⇒ ⇒ ⇒ ⇒ ⇒ ⇒ ⇒ ⇒ ⇒   **
**   Each line represents a placement/insertion on the board            **
****************************************************************************
   A        B        C     D          E          F    G    H    K          I    J
   |    |   NOTE 3   |   |  | |        |          | |  | |  || | |  | |      |  | | |
00000000001111111111222222222233333333334444444444555555555566666666667777777777
12345678901234567890123456789012345678901234567890123456789012345678901234567890123456789
****************************************************************************
C1       276      586   90    1206-CAP         NOTE 6                              *
IC1      5170     887   90    8-SOIC                                               *
C2       276     2288   90    1206-CAP                                             *
C3       276     2387   90    1206-CAP                                             *
C4       576      687   90    1206-CAP                                             *
IC2      1900    3200  270    DIP-300-16    300   16                      DIP      *
IC3      4000    7000   90    DIP-300-8     300    8                      DIP      *
T1       877     2789    0    SOT-89                                               *
C5       877     1987  180    805-CAP                                             *
C6       877     2087  180    805-CAP                                             *
J1       180     2250  180    TEKA-CONN                                            *
IC4      3000    1600    0    68PLCC                                               *
IC5      2000    5250    0    DIP-600-24    600   24                      DIP      *
XIC5     2000    5250    0    DIP-600-24-SOC 600  24                      DIP SOC  *
T2       877     2288   90    SOT-89                                               *
R1       3550    3200    0    RES-RAD-50    200    2                      RAD      *
IC6      877     2488  180    14-SOIC                                              *
IC7      1177    2488  180    14-SOIC                                              *
R3       7000    5000    0    RES-1/4W      500        095  025           AX       *
IC9      3520     950   90    8-SOIC                                               *
R4       5555    4444  180    RES-1/8W      300        080  020           AX       *
C7       3900    6690  270    CAP-RAD-25    100    2                      RAD      *
R5       9000    8000   90    RES-RAD-25    100    2                      RAD      *
CR1      3100    8500  270    DIODE-AX-2    600        100  025           AX       *
IC10     1177    2388   90    20-SOIC                                              *
```

Sample CAD File Format

Sample CAD File Format Notes

1. Maximum file width can not exceed 256 columns.

2. Headerlines, often output by the CAD system, may be used. The CAD Translator allows the user to define the quantity of lines containing the file header. This information is for operator use only and is not used by the CAD Translator.

3. **Format Type:** The format of file. This can be either Table or Separator format (Table is the default).

Table format uses predefined columns for each data type. For example, the reference ID column may be defined as 10 characters. The actual reference ID in the CAD file can contain up to 10 characters. It does not matter if there is data in every column.

Separator format uses a character (comma, space, dash, etc.) to separate data fields. Each line of data must contain the same data types in order for auto detect to work.

# of Fields: The number of fields in the file.

# of Lines: The total number of lines in the file.

4. The CAD file must be devoid of all special control characters such as Tabs. (Note that special characters shown are for illustration purposes only and cannot be contained in the actual CAD file. These characters include boxes, arrows.)

5. CAD data is limited to one component per data file line or row. Additional components are specified on additional lines of the CAD file. There must be no blank lines or rows between any rows of CAD data. Markers such as {EOF} must not be present at the end of the CAD file.

Additional APE Features

- Import of Existing UICS Patterns — UICS patterns are converted to IM-UPS products.

- Program Optimization — Optimization via "Nearest Neighbor" insertion path.

- Component Identifier and Reference Designator in Product Information — The addition of component identifier and reference designator in programs supports improved status message reporting and management data tracking by component identifier.

Off-Line Pattern Programming Specifications

The creation of a "product" (pattern program) can be completed on-line, utilizing the machine's embedded P.C., or off-line, using a suitable stand-alone P.C. loaded with IM-UPS software.

Universal recommends that pattern programming be generated off-line to eliminate production interruptions. The stand-alone P.C. for off-line pattern program generation is not a standard feature of the machine.

Note: IM-UPS software supplied with the machine is licensed only for use in the machine. Software for an off-line P.C. is available as an option at extra cost.

Minimum P.C. requirements for creating the product off-line (pattern programming) include:
- 486 processor
- 12 megabyte memory
- CD-ROM drive
- IBM OS/2 Warp 4.0
- 200 megabyte available disc space, on OS/2-compatible partition

For optimum performance in generating the pattern programming off-line, the following capabilities are recommended:
- Intel Pentium® processor
- 16 megabyte memory
- 500 megabyte available disc space, on OS/2-compatible partition

Note: Installation of OS/2 on an existing P.C. system may require partitioning of the hard drive.
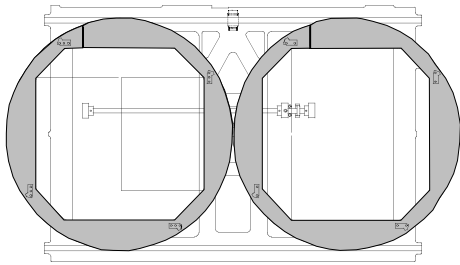
System Mechanics

X-Y Positioning System

The X-Y positioning system locates the printed circuit board under the insertion tooling and is equipped with dual rotary indexing tables that index in 90° increments, from 0° to 360° in a clockwise rotation. These rotary tables are air motor driven under pattern program control and require less than one second to execute each 90° rotation.

The X-Y positioning system employs high performance brushless motors. The system is controlled by the 680X0-based motion controllers. Automatic belt tensioning ensures that belts are properly adjusted.

Machine Console/Covers

The machine covers serve two primary purposes. The first is to provide safety by preventing access to dangerous mechanical and electrical hazards. The second is to further reduce the sound level of the operating machine. It is important that the machine covers remain in place and fully functional for operational safety.

On stand-alone machines (non board handling machines), the positioning system and work board holders are exposed to allow the operator to load and unload printed circuit boards. There is a hinged cover that protects the operator from the moving parts of the insertion heads. This cover is interlocked and will stop the machine if moved. Note: This configuration <u>does</u> <u>not</u> carry the CE mark. These covers <u>are not</u> made of an electrostatic dissipative material.

Board handling machine covers completely enclose the machine. The sliding covers on the front of the machine are secured with shot pins. The purpose of the shot pins is to prevent interlock conditions during machine operation. To gain access to the machine, the stop button on the Push Button Panel must be pressed. The machine will stop and the shot pins will be released from the covers, allowing them to be opened. Note: This configuration <u>does</u> carry the CE mark. These covers <u>are</u> <u>not</u> made of an electrostatic dissipative material.

Note: Covers that <u>are</u> made of an electrostatic dissipative material are available as an option, at extra cost, for both stand-alone and board handling machines.
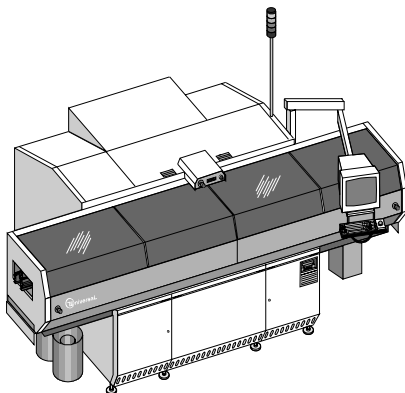
JW DH 8, with
Internal Board Handling
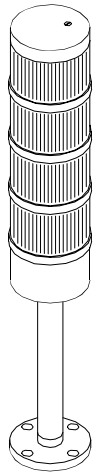
Machine Status Light

The machine status light indicates the status of machine operation. Each light is user configurable via the monitor/keyboard interface. Defaults are set as follows:

- Red - machine stop for any error.
- Yellow - normal operation, machine waiting.
- Green - normal operation, machine running.
- Blue - not configured for JW DH 8.

Specifications for Wire Input and Insertion Span

- **Insertion Hole Span** (hole center distance) — 5mm to 33mm (0.197" to 1.300").

- **Wire Diameter** — 0.6mm (0.024") solder coated copper is recommended. It is possible to insert other wire sizes with a reduction in insertion span range or increase in defect PPM. See table below:

Wire Specifications

Wire Diameter	Tensile Strength	Maximum Elongation	Insertion Hole Span	Comments
0.6mm	27-35 kg/mm²	4%	5mm-33mm	Recommended for optimal performance
0.5mm	27-35 kg/mm²	4%	5mm-20mm	Expect higher PPM when insertion span increases to 21mm-33mm range
0.45mm	22-30 kg/mm²	20%	5mm-20mm	Expect higher PPM when insertion span increases to 21mm-33mm range

- **Wire Usage** — The following formula may be used to approximate the amount of wire used per insertion for cost and material usage purposes:

Wire Consumed per Insertion = Insertion Hole Span + 15mm (0.60")
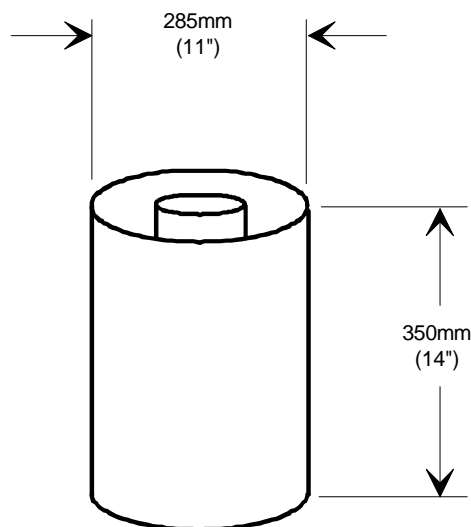
- **PCB Hole Diameter —** Minimum Printed Circuit Board Hole Diameter = wire diameter + 0.483mm (0.019") ±0.080mm (0.003") + 2 times printed circuit board hole location tolerance.

- **Wire Input** — Quality of jumper wire input is critical to reliable machine operation. The wire must be able to be drawn from its package without tangling and without excessive drag. The preferred package is a cardboard drum measuring 350mm (14") high by 285mm (11") diameter which may be placed on the floor next to the machine.

285mm (11")
350mm (14")

Wire is also available on reels, however, there are several potential issues when using reel type packaging:

- Universal does not provide a reel holder, so wire must be able to feed smoothly if the reel is placed directly on the floor.
- Smaller reel packages require more frequent changeover.
- Some types of reel packages will not feed properly and may not allow the machine to run at all.

The suggested source for wire imput is Hitachi Cable America Inc. (White Plains, NY; 1-800-394-0234). Specify part number "1TPA 0.60***5BP". This part number indicates 0.60mm diameter (0.024") solder coated copper wire in a 22 kilogram (approx. 48 pound) cardboard drum package.

The Hitachi wire is also available through Universal's Worldwide Parts Sales and Distribution Centers by ordering Universal part number 45126001.
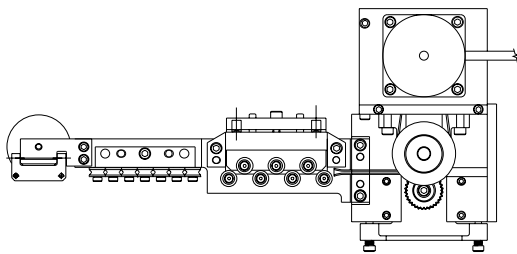
**Jumper Wire Feeder Assembly
(Top View)**

Wire Feeder

The wire feeder assembly consists of a drive mechanism and a straightener assembly. The drive assembly pulls wire from the input spools through the straightener assembly, and dispenses the straight wire to the insertion head tooling. It is controlled by a stepping drive mechanism with indexing capabilities and a matched stepper-drive motor. The drive mechanism automatically dispenses the required wire length depending upon the insertion span.

The straightener assembly consists of two sets of opposing rollers. The roller sets are mounted at right angles to remove wire bends in two planes. Adjusting knobs on each set of rollers provide control of the straightening pressure.

Jumper Wire Tensioner

(Into feed tubes)

From Wire Supply
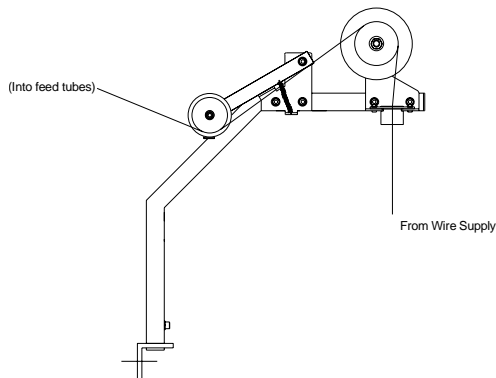
A wire tensioner to aid bulk jumper wire feeding is a standard feature. The tensioner prevents jumper wire snagging and pulling that may occur at sites using bulk jumper wire. The tensioner is specifically designed to aid feeding from large tubs or tapered spools of bulk jumper wire. The maximum height of the bulk container may be 762mm (30"). However, the tensioner is not recommended for small spools with large flanges.
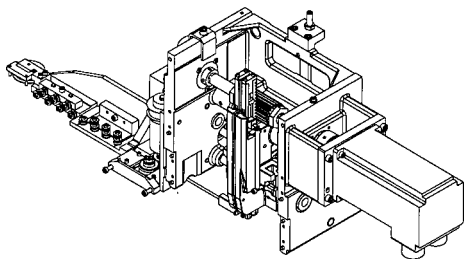
Insertion Head

A servo motor activates each insertion head through a rack and pinion drive, providing insertion rates up to 20,000 formed bare wires per hour. Close coupled software provides controlled acceleration/deceleration and velocity during the insertion process for increased reliability and reduced noise. Actual driver tip down position is controlled through the closed loop servo drive system.

Insertion Hole Span

The insertion hole span for component insertion is automatically calculated by the Advanced Product Editor and based on wire diameter and center-to-center hole spacing on the PC board. Insertion hole spans are variable under servo program control.

Insertion Tooling

The tooling has been designed for improved reliability and longer tooling life. This tooling incorporates generous amounts of carbide inserts and has increased cross-sections for greater robustness.

The standard insertion hole span is variable under program control from 5mm (0.197") to 33mm (1.300") in increments of 0.025mm (0.001"). The full range of insertion capabilities is accomplished with one style tooling.

Above board clearance beneath the retracted tooling is approximately 20mm (0.8"). See the illustration below for dimensions relating to the tooling footprint.

BOTTOM VIEW	SIDE VIEW	FRONT VIEW
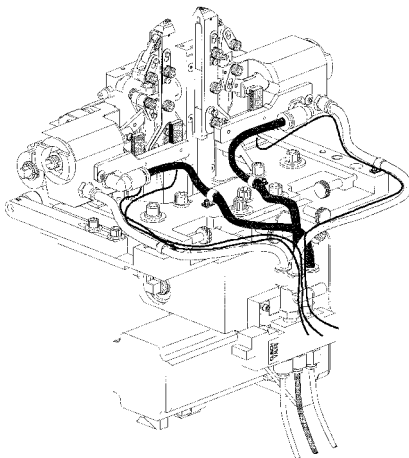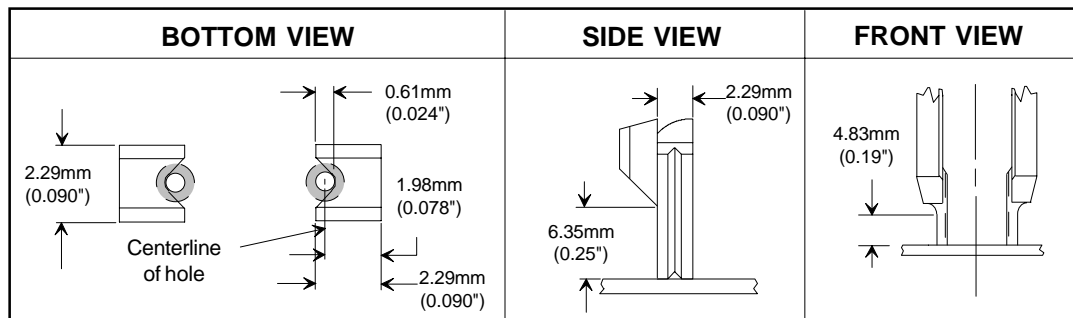
Cut and Clinch

The JW DH 8 cut and clinch contains a servo-driven rocker/slide up/down mechanism and provides PC board support during the insertion cycle, then trims and clinches the component leads to the underside of the PC board with a pneumatic actuated cutter.

Two-step operation allows the clinch to return to its lowest position during a table rotation and only half the distance during the insertion process, saving time and wear on mechanical parts. "Half-down" position clearance between the clinch and PCB is 7.62mm (0.300") and "full-down" clearance is 15.24mm (0.600").

Insertion span is servo controlled over the same span as the insertion head, and left and right anvils are coupled. Clinch angle is inward and may be adjusted over a range from 0º to 45º from the PC board bottomside.

Clinch lead length is adjustable from 1.28mm (0.050") to 1.8mm (0.071"). Lead length is measured from the center of the hole to the end of the lead. The tolerance on the lead length is ±0.29mm (0.011").

Clinch Pattern Options

Clinch
Length

Clinch
Length

0° Clinch   45° Clinch
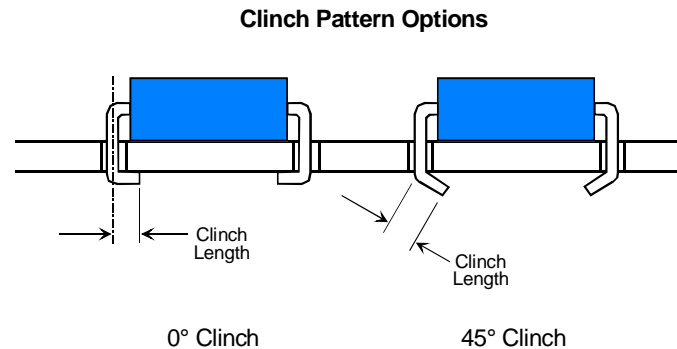
The JW DH 8 cut and clinch uses a dual lead continuity check to verify component insertion. The failure of either lead to pass through the PC board and be clinched will generate an insert error and cause the machine to stop.

Board Error Correction Alignment

The Board Error Correction Alignment template is required, one per customer location, for set-up of head to table alignment. The template must be mounted on the rotary table to align first Head 1 and then Head 2. This template is then used to calibrate B.E.C. (Board Error Correction) on Head 1. On pass through machines, the template is also used for tooling pin set-up.

The template has been redesigned to ease manufacturing set-up by removing variability from the process and providing consistent accuracy. On pass through machines, the template has been designed so removal of the front guide assembly is no longer required, saving time and simplifying the process. It also provides a 1.57mm (0.62") edge to simulate PC board thickness, aiding in setting correct tooling pin location. The template eliminates the need for the X-Y Table Setup tool and provides additional, tighter toleranced, tooling pin holes to check for skew and proper rotation about the rotary disc's center.

Optional Features
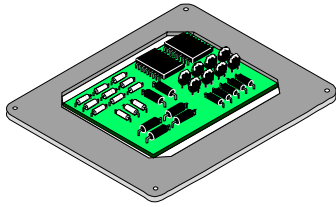
Workboard Holders

Workboard holders are required, but must be ordered as separate items. The workboard holders used with the model 6292C are the standard dual positioning Universal 457mm x 457mm (18" x 18") style. Workboard holder ordering information is contained in GS-134. Workboard holders are not required when ordering the Board Handling System, as they are included.

Automatic Board Handling Configurations

The JW DH 8 is available in several material handling configurations (left-to-right, or right-to-left):

■ Loader/Unloader: Magazine-to-Magazine with Short Buffer (not CE-compliant), or with Long Buffer with extra cost covers (CE-compliant).

■ Loader/Unloader: Vacuum Bare Board-to-Magazine with Short Buffer (not CE-compliant), or with Long Buffer (not CE-compliant).

■ Loader/Unloader: PCB Destacker-to-Magazine.

•   Destacker on 29" Conveyor with Short or Long Buffer (not CE-compliant).

•   Destacker on 44" Conveyor with Short Buffer (not CE-compliant).

•   Destacker on 44" Conveyor with Long Buffer with extra cost covers. Input PCBs, including any installed components, can not exceed 25.4mm (1") thickness (CE-compliant).

•   Destacker on 58" Conveyor with Long Buffer with extra cost covers (CE-compliant).

■ **In-Line Configuration:** Machines can be connected in-line using the internal Board Handling System (BHS) and interconnecting conveyors. The BHS transfers two PC boards at a time: unpopulated boards in, and populated boards out.

Board transfer from last insertion to first insertion on the next board occurs in 5.0 seconds. Transfer direction may be specified when ordering the machine, prior to manufacture, and quick and easy manual width adjustment handles a wide range of PC board sizes.

The front fixed rail is standard and all operator PC board changeover adjustments are readily accessible.

Network Kit

Package for connection includes Ethernet network card and IBM OS/2 TCP/IP client software. This provides high speed, reliable communications and data transfer to all computers connected to the network.

Host Computer Interface Kit

This kit is used to interface JW DH 8 with a Host computer using the SECS/GEM Standard. The Generic Equipment Model (GEM) Standard defines a standard implementation of the SECS II (Semi Equipment Communications Standard 2) communications interface for all semiconductor manufacturing equipment. See SEMI International Standards document E30-93 for details. Note: Requires customer's Host computer to be compliant with SECS/GEM standard SEMI E37, HSMS.

Remote P.C. Software/Off-Line Programming

Each base machine includes software licensed only to the machine. Universal recommends that "product" programs be created off-line to ensure maximum use of machine production time. This off-line software is licensed for use on a P.C. with a basic configuration as shown in the "Off-Line Pattern Programming Specifications" found on page 11 of this document.

Remote P.C.

The Universal Control Terminal (UCT), using optional IM-UPS software, allows a Universal approved personal computer to be used as an intelligent terminal. It is connected to the JW DH 8 via the optional Network Kit. This package includes a visual display terminal, keyboard, data storage unit, printer and stand, cable assembly, and manual. For additional information on this option, refer to GS-319. This can be used for off-line programming and machine data transfer.

Supporting Documents

GS-055	Indexing Rotary Tables
GS-134	Workboard Holders, Series 6810
GS-354-01	Through Hole Design Guidelines

Technical Specifications

Jumper Wire Length Considerations

Cut and Clinch Footprint
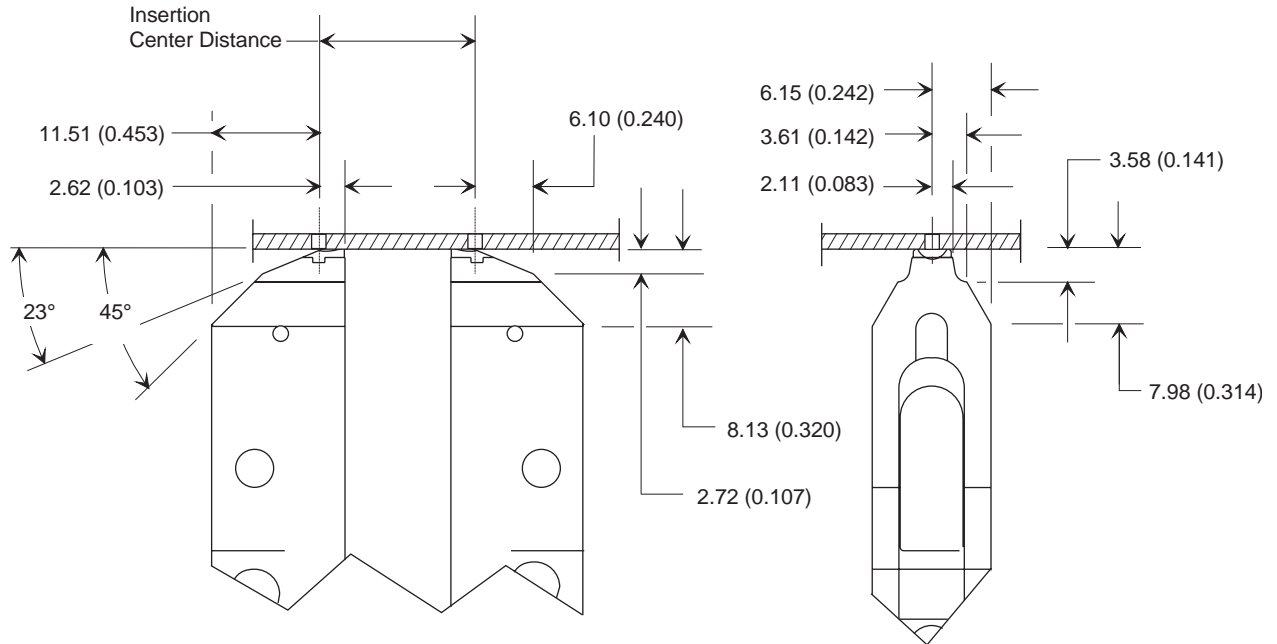
Component Clearances for Cut and Clinch Anvil Assemblies

Continuity Style Lead Sense

Dimensions are in millimeters;
inch equivalents are bracketed.

Side View

Jumper Wires
to previously inserted
axial leaded components.

2.54 (0.100)
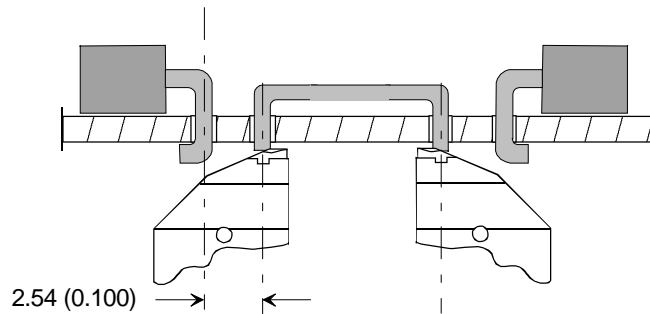
Side View

Jumper Wires
to previously inserted
DIP components, with both
outward and inward clinch.

Outward DIP   Inward DIP

2.79 (0.110) → ← → ← 2.54 (0.100)
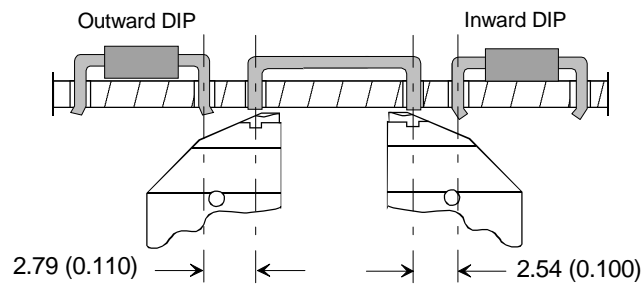
End View

Jumper Wires
to previously inserted
axial leaded and DIP
components shown with both
outward and inward clinch.

Outward DIP   Inward DIP

A → ← ← C

B → ←
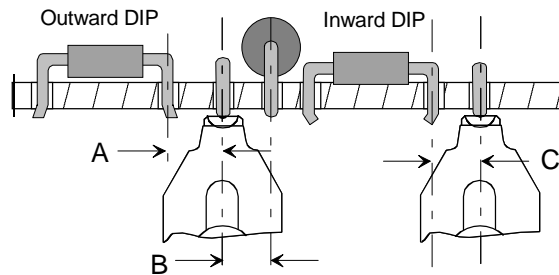
A	B	C
3.68mm	2.54mm	2.54mm
0.125"	0.100"	0.100"

Board Error Correction Detection Area

Due to the position of the Board Error Correction sensor relative
to the insertion point, there is an area which cannot be scanned
by the sensor. The non-scannable area is at the rear of the posi-
tioning system regardless of rotary table rotation.

Dimensions are in millimeters;
inch equivalents are bracketed.

22.86mm
(0.900")

The shaded area cannot be scanned
by Board Error Correction sensor.

457.2mm x 457.2mm (18" x 18")
insertable area
(less corners)

+Y

Insertion
centerline

+X

22.86mm
(0.900")

457.2mm
(18.000")

BEC sensor
offset

457.2mm
(18.000")

69.85mm
(2.75") TYP

Front of Machine
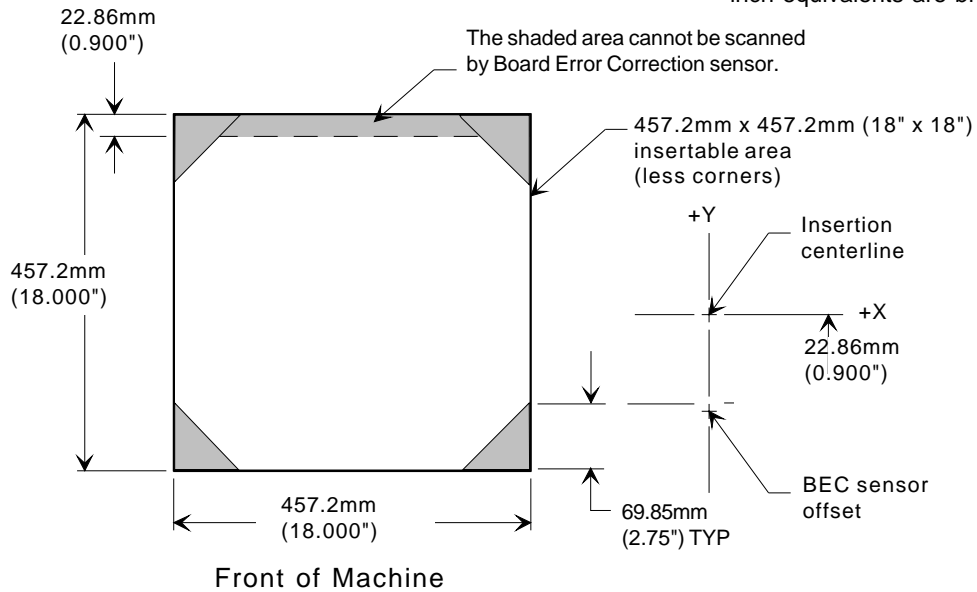
Auto MisMark

Due to the position of the Auto MisMark relative to the insertion
point, there is an area which cannot be marked by the marker.
The non-markable area is at the rear and right of the positioning
system, regardless of rotary table rotation.

38.1mm
(1.500")

8.89mm
(0.350")
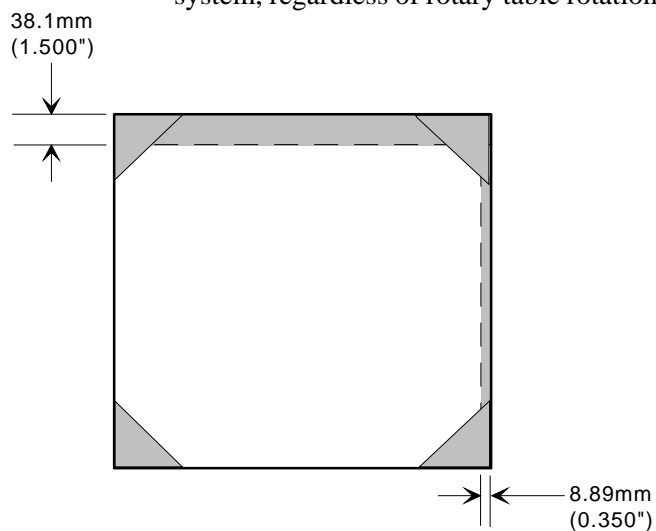
Insertion Rate Determination

To attain the maximum insertion rate, the X and Y axis move between consecutive pattern steps must be no more than 7.5mm (0.300"). An insertion span move greater than 2.54mm (0.100") will degrade speed.

Insertion Rate

Up to 40,000 insertions per hour. The insertion rate includes an insertion PPM of 75 or better.

Positioning System

Table Size	457mm x 457mm (18" x 18")
Insertable Area	457mm x 457mm (18" x 18"), less corners. See appendix for dual head board handling system details.
Accuracy	±0.05mm (±0.002")
Repeatability	±0.025mm (±0.001")
Table Capacity	22.7 kg (50 pounds) maximum, including workboard holder
Programming Capability	±0.01mm (metric dimensioning) ±0.001" (inch dimensioning)
Speed	368mm (14.5") per second 7.62mm (0.3") in 0.070 seconds

Insertable Area

Due to the shape of the rotary tables, the machine's insertable area is 457.2mm (18.00") square, minus the corners.
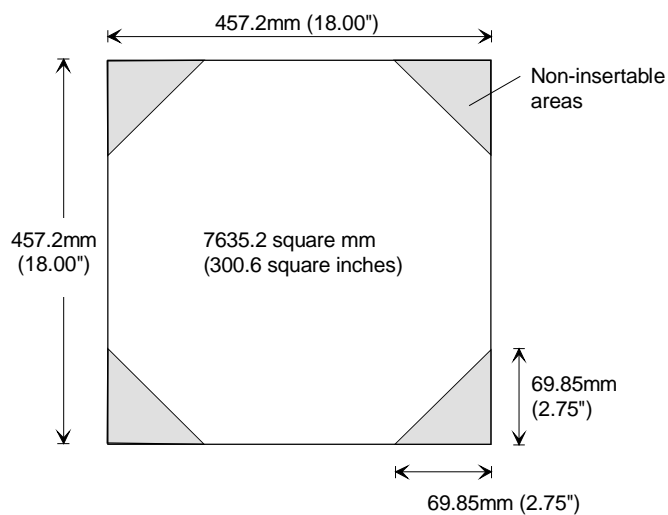
Stand-Alone Installation Considerations

Dimensions are in millimeters;
inch equivalents are bracketed.

Allow one meter
(three feet) around
entire machine
for work space.

381
(15)

483
(19)

P E

UPS   610
(24)

305
(12)

1549
(61)

2134 (84)

P Pneumatic connection

E Electrical connection

Operator
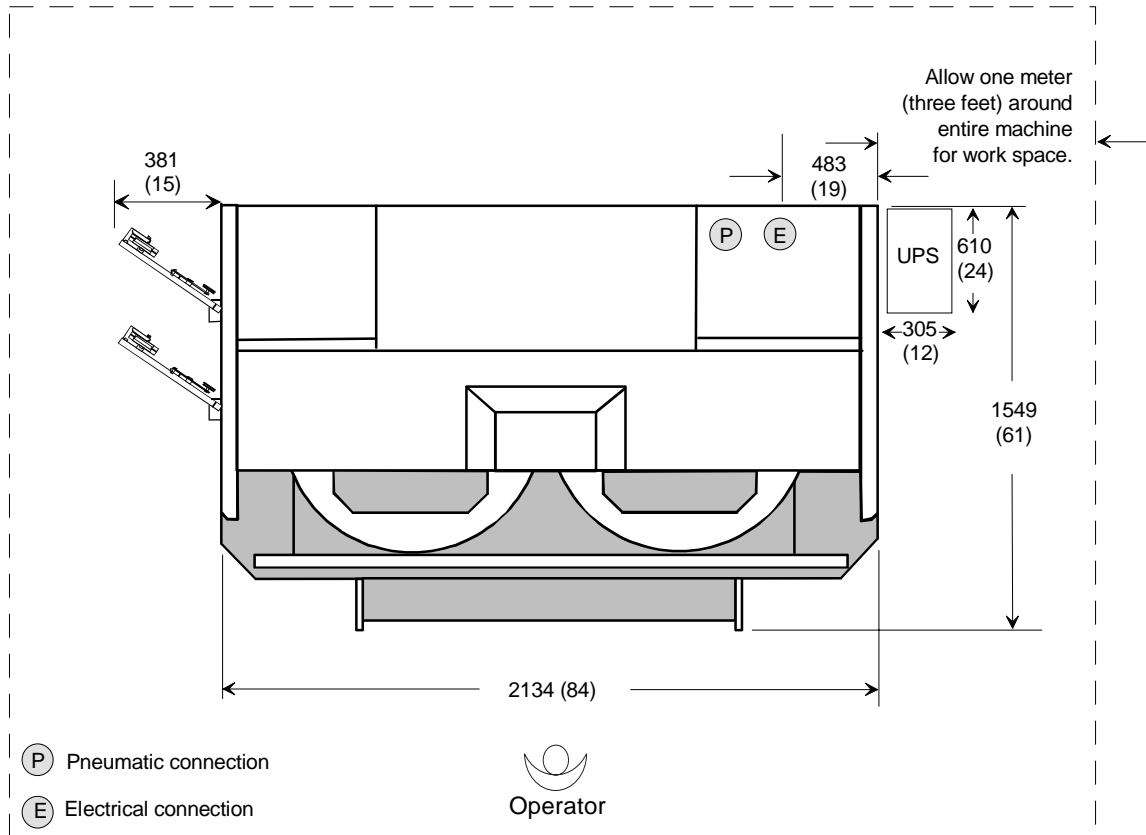
Machine Shipping Dimensions

	Length	Depth	Height	Weight
	2134mm (84")	1549mm (61")	1473mm (58")	1050.07kg (2315 lbs.)
Domestic Shipping	2591mm (102")	1829mm (72")	1549mm (61")	1334.02kg (2941 lbs.)
Air Freight	2616mm (103")	1854mm (73")	1676mm (66")	1324.49kg (2920 lbs.)
Sea Freight	2616mm (103")	1854mm (73")	1676mm (66")	1447.41kg (3191 lbs.)
Floor Space	A minimum clear area of one meter (three feet) around the machine perimeter is recommended for machine operation and servicing.			

Note: Jumper wire tensioner and feed tubes are removed for shipping.

JW DH 8, Non Pass Through:
Side View

Dimensions are in millimeters;
inch equivalents are bracketed.

1549.4
(61)

851.0
(33.5)

50.8
(2)

673.1
(26.5)

520.7
(19.5)

1028.7
(40.5)

1333.5
(52.5)

977.9
(38.5)

650.2
(25.5)

1371.6
(54.0)
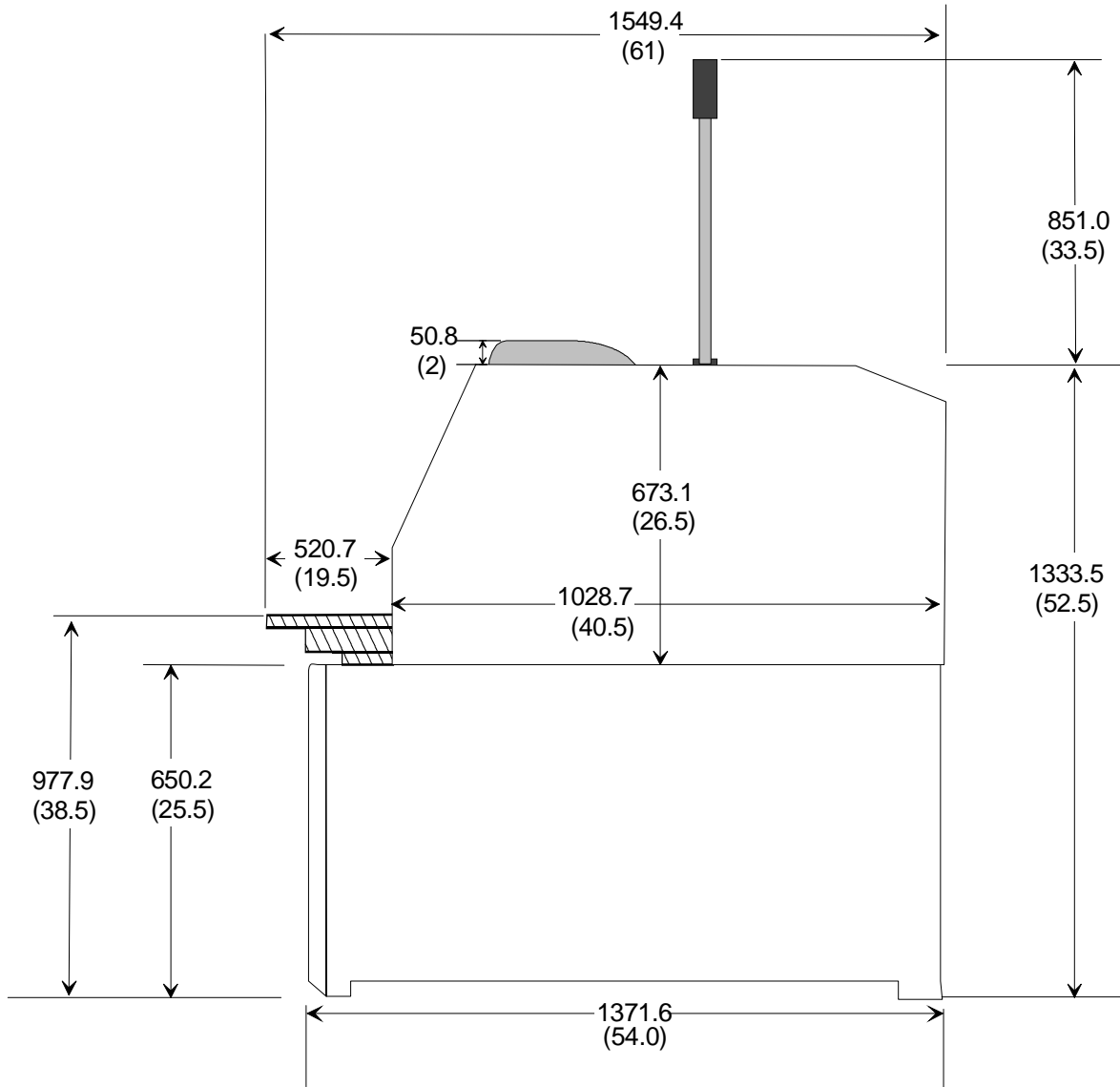
Service Requirements (including Uninterruptable Power Supply)

Electrical (base machine)

Electrical connection located in the back of the machine, 482.60mm (19") from the right side and 660.40mm (26") from the floor.

Machine is shipped with a power cord from machine to Uninterruptable Power Supply. A mating connector is supplied to attach the user provided power cord to the UPS.

The UPS has an external 5mm ground stud which must be permanently connected to earth/building ground with a 14 AWG or 2.5mm^2 wire that is appropriately protected from mechanical damage.

A circuit breaker is the overcurrent device for both the machine and the UPS. The machine breaker has a short circuit interrupting capacity of 10,000A, and the UPS breaker has a short circuit interrupting capacity of 1000A.

The branch circuit supplying the machine must be protected by an approved 15 amp circuit breaker with a delay suitable for "high inrush current" or "transformer loads."

Air Consumption   A quick disconnect with a male barbed fitting for 12.7mm (0.50") ID flexible hose is shipped with each machine.

Pneumatic connection located in the back of the machine, 482.60mm (19") from the right side and 660.40mm (26") from the floor.

Air Quality   Non-lubricated, dry air, maximum contamination particle size of 5.0 microns.

PNEUMATIC REQUIREMENTS (Base Machine)		ELECTRICAL REQUIREMENTS				
Minimum Air Flow Requirements	Air Consumption	Input Voltage	Input Frequency	Input Breaker	Actual Power Draw Without Loader/Unloader	Actual Power Draw With Loader/Unloader
1.4 CFM @ 90 PSI	8.7 SCFM	180 - 264 VAC	47 - 63 Hz	15A	1150 VA 5A @ 230 VAC	1610 VA 7A @ 230 VAC

Note:
- Without loader/unloader, for voltages other than 230 VAC, current is 1150 / (input voltage). Power factor may vary with input voltage.
- With loader/unloader, for voltages other than 230 VAC, current is 1610/(input voltage). Power factor may vary with input voltage.
- CFM (Cubic Feet per Minute): Volumetric flow rate at a specified pressure. This is used to describe the air flow requirement.
- SCFM (Standard Cubic Feet per Minute): Cubic foot of air at 20° C (68º F) at atmospheric pressure. This is used to describe average air consumption flow requirement.

Environmental Requirements

|	
Ambient Temperature	10° C. to 35° C. (50° F. to 95° F.)
Operating Humidity	10% to 90%, non-condensing
Contaminants	The machine, UPS included, carries an IP code rating of 20. IP 20 signifies that the equipment has limited protection against ingress of solid foreign objects and is not protected against the ingress of water. Consequently, the intended environment is that of manufacturing/office where the machine is not subject to such elements.
Transportation and Storage	-25° C to +55° C. (-13° F. to +131° F.); not exceeding 24 hours up to 70° C. (158° F.), 10% to 95%, non-condensing humidity. Universal provides suitable means to prevent damage from humidity, vibration, stress and shock during transport.
Noise Level, Pass Through Configuration	71 dbA in accordance with National Machine Toolbuilders Assoc. Noise Measurement Technique Standard — June 1986.
Noise Level, Non Pass Through Configuration	78.2 dbA in accordance with National Machine Toolbuilders Assoc. Noise Measurement Technique Standard — June 1986.

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Appendix: Automatic Board Handling Systems

Index

Introduction

The JW DH 8 (Model 6293C), is available either as stand-alone or with internal board handling only, for in-line configuration.
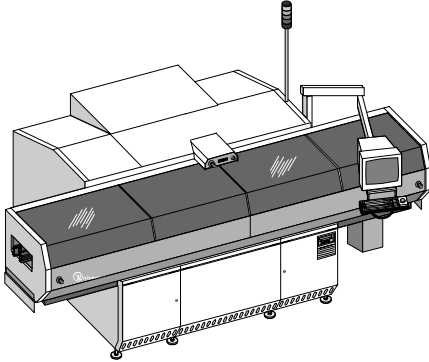
■ **In-Line Configuration:** Machines can be connected in-line using the internal Board Handling System (BHS) and interconnecting conveyors. The BHS transfers two PC boards at a time: unpopulated boards in, and populated boards out. All Board Handling Systems are factory configurable for either left-to-right or right-to-left direction. This configuration is CE-compliant.

Auto MisMark and a Bad Board Reject Station allow PC boards with misinserted components to be automatically marked at the time of misinsertion and stacked off-line for later repair.

The JW DH 8 (Model 6299C) is available in a number of automatic board handling configurations:
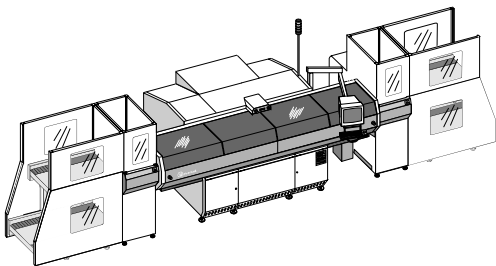
■ **Magazine-to-Magazine Configuration:** Magazines containing PC boards are placed on the input Elevator (Loader) and the PC boards are then automatically transferred into the machine for component insertion. Once completed, the boards are unloaded into an output magazine Elevator (Unloader). Each Elevator includes a magazine Buffer. Buffers are available in two sizes:

  • **Long Buffer:** 1270mm (50") for magazines up to 21" long (CE-compliant)

  • **Short Buffer:** 1016mm (40") for magazines up to 16" long (not CE-compliant)

■ **Vacuum Bare Board-to-Magazine Configuration:** Bare PC boards are placed in a Vacuum Bare Board Loader and the PC boards are then automatically transferred onto a 558mm (22") conveyor, which transports them into the machine for component insertion. Once completed, the boards are unloaded into an output magazine Elevator (Unloader). The output Elevator includes a Long or Short Buffer (as above); neither of these configurations is CE-compliant. **Note: This unit is best suited for PC boards with eyelets.**

■ **Destacker/Conveyor-to-Magazine Configuration:** Bare PC boards are placed in a Destack Loader and the PC boards are then automatically dropped onto a 736.6mm (29"), 1117.6mm (44"), or 1473.2mm (58") conveyor, which transports them into the machine for component insertion. Once completed, the boards are unloaded into an output magazine Elevator (Unloader). The output Elevator includes a Long or Short Buffer (as above);

only the systems incorporating the Destack Loader with the 1117.6mm (44") or 1473.2mm (58") conveyor, and Elevator with Long Buffer, are CE-compliant. **Note: This unit will not function properly when eyelets are present on the PC board.**

Board Handling Interface Standard

The board handling interface standard of the DH JW 8 is SMEMA, version 1.2.

Technical Specifications for Internal Board Handling System (BHS)

Board Handling System Specifications

	Minimum	Maximum
Transfer Height[1,2]	1001.5mm (39.43") to 1014.2mm (39.93")	
Board Changeover	Manual	
Direction	Select right-to-left or left-to-right.	
Edge Clearance	5mm (0.197") or 3mm (0.118") [3]	
Fixed Edge	Front	
Locator Pins	Front	
Transfer Time[4]	5.0 seconds, maximum for 1007.9mm (39.68") transfer height (upper level)	

Notes:
1. Transfer height can be configured, and alters transfer time. See transfer time specification.
2. Dual heads <u>are not</u> configurable to transfer at a lower level.
3. Set at factory to 5mm.
4. Time from last insertion to first insertion on next board. This number is based on 254mm (10") positioning system moves. Larger table moves increase transfer time.

Direction of Board Flow

Min. 80mm (3.1")
Max. 330mm (13")

Min.100mm (4")
Max. 457mm (18")

Operator
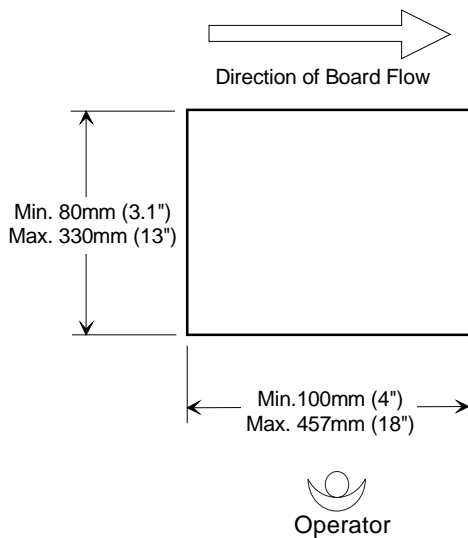
PC Board Specifications

	Minimum	Maximum
Length[1] x Width	100mm x 80mm (4" x 3.1") [2]	457mm x 330mm (18" x 13") [2, 3]
Length to Width Ratio	1 or greater: 1 is recommended	
Thickness	0.8mm (0.032")	2.36mm (0.093")
Warp	—	3.17mm (0.125")
Cutouts	Contiguous edges	
Datum Hole Diameter	3.17mm (0.125") [2]	6.35mm (0.25") [2]
Weight	2.27kg (5 lbs.), maximum	

Notes:
1. Length is in the direction of board flow.
2. Consult a Universal Sales Engineer for other than stated sizes.
3. Board widths larger than 297mm (11.70") require removal of 270° Rotary Table stop block.

Table Rotation (Dimensions shown are for standard tooling)

	0°	90°	180°	270°
A	5.99mm (0.236") [1]	7.59mm (0.299") [2]	9.27mm (0.365") [1]	7.59mm (0.299") [2]
B	7.09mm (0.279") [2]	5.49mm (0.216") [1]	7.09mm (0.279") [2]	5.49mm (0.216") [1]
C	7.09mm (0.279") [2]	8.76mm (0.345") [1]	7.09mm (0.279") [2]	8.76mm (0.345") [1]
D	7.09mm (0.279") [2]	5.49mm (0.216") [1]	7.09mm (0.279") [2]	5.49mm (0.216") [1]
E	7.09mm (0.279") [2]	8.76mm (0.345") [1]	7.09mm (0.279") [2]	8.76mm (0.345") [1]
F	5.33mm (0.210") [1,3]	5.38mm (0.212") [2,3]	5.33mm (0.210") [1,3]	5.38mm (0.212") [2,3]
G	5.33mm (0.210") [1,3]	5.38mm (0.212") [2,3]	5.33mm (0.210") [1,3]	5.38mm (0.212") [2,3]
H	3.17mm (0.125") minimum 6.35mm (0.250") recommended 7.62mm (0.300") maximum			
J	3.17mm (0.125") minimum 3.96mm (0.156") recommended 6.35mm (0.250") maximum			

1. Dimensions are to centerline of lead.

2. Dimensions are to the bottom of the 'V' groove in the former.

3. Dimension shown is for 3mm edge support. If using a 5mm edge support, add 2mm (0.079") to dimension shown.
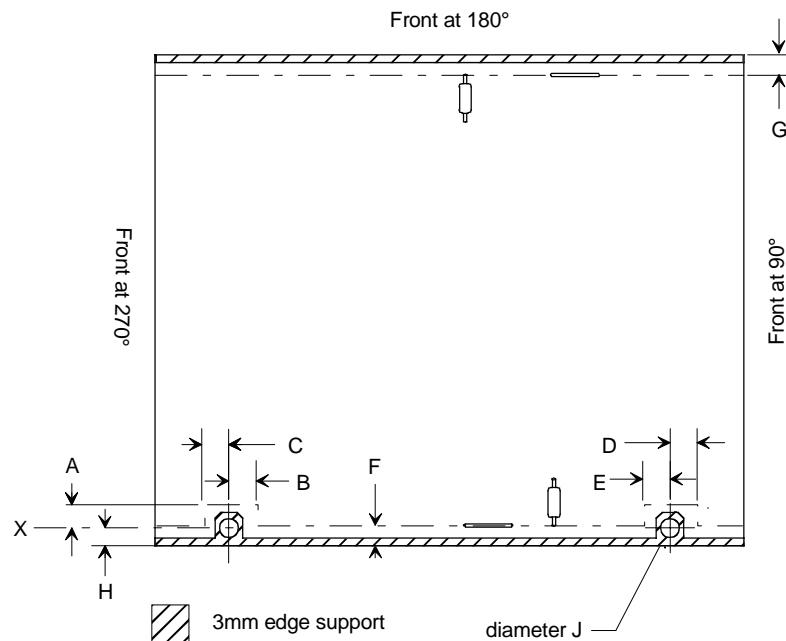
Dimensions shown are minimum distances from either the board edge or the tooling pin hole, to either the standard tooling or the clinch.

Machine Shipping Dimensions

	Length[1]	Depth	Height	Weight
	3820mm (151")	1549mm (61")	1473mm (58")	1288kg (2840 lbs.)
Domestic Shipping	4191mm (165")	1829mm (72")	1549mm (61")	1515kg (3340 lbs.)
Air Freight	4216mm (166")	1854mm (73")	1676mm (66")	1696.44kg (3740 lbs.)
Sea Freight	4216mm (166")	1854mm (73")	1676mm (66")	1809.83kg (3990 lbs.)
Floor Space	A minimum clear area of one meter (three feet) around the machine perimeter is recommended for machine operation and servicing.			

1. Length is in the direction of board flow.

Top View of JW DH 8 with Internal BHS only

Dimensions are in millimeters; inch equivalents are bracketed.
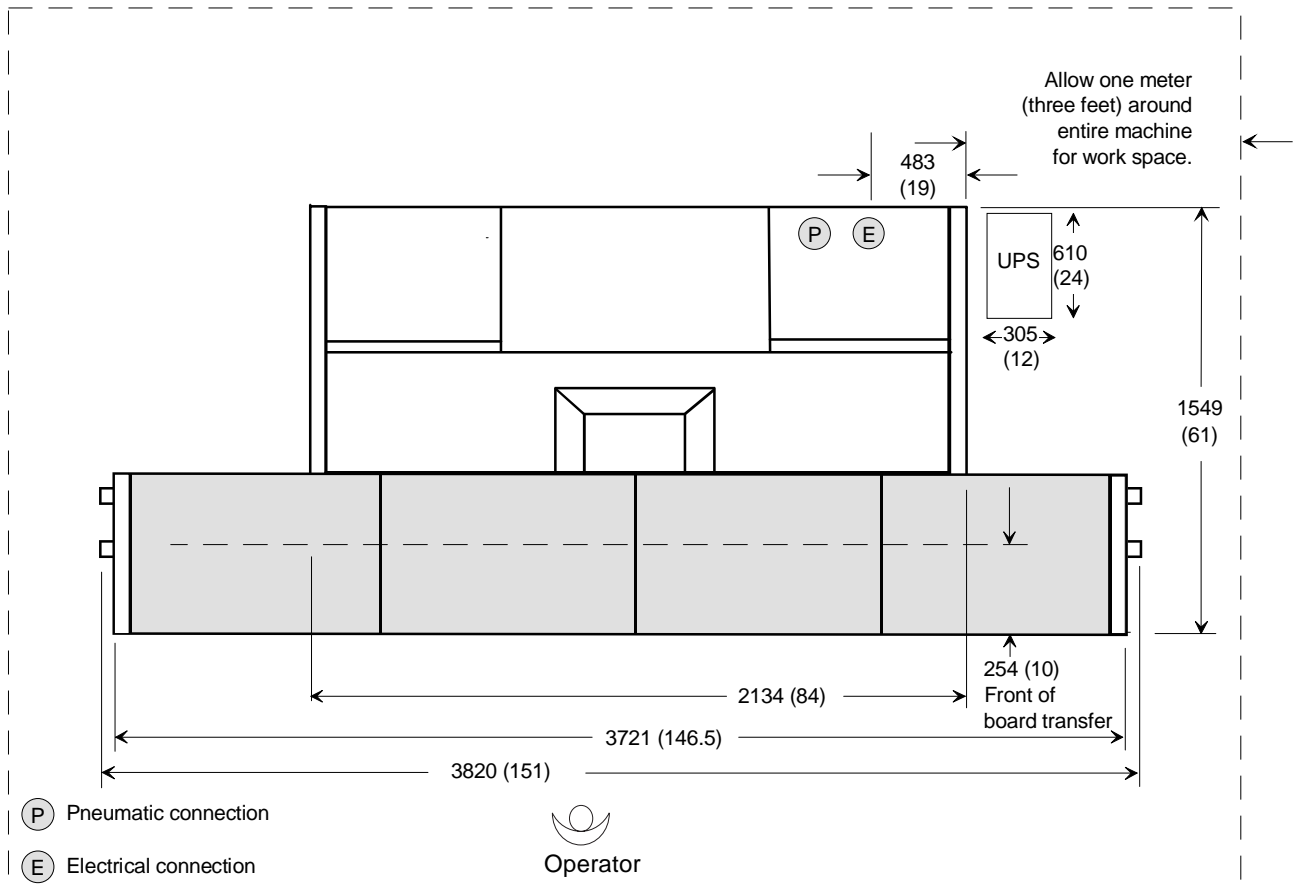
Allow one meter (three feet) around entire machine for work space.

483 (19)

UPS

610 (24)

305 (12)

1549 (61)

254 (10) Front of board transfer

2134 (84)

3721 (146.5)

3820 (151)

(P) Pneumatic connection

(E) Electrical connection

Operator

**JW DH 8, Pass Through:
Side View**

Dimensions are in millimeters;
inch equivalents are bracketed.

1549.4
(61)

851.0
(33.5)

50.8
(2)

184.15
(7.25)

434.875
(17.75)

171.5
(7)

647.7
(25)

673.1
(26.5)

208.25
(8.5)

263.75
(10.75)

18.75
(0.75)

1333.5
(52.5)

1295.4
(51.0)

685.8
(27)

863.8
(34)

650.2
(25.6)

1371.6
(54.0)

Long Buffer

Short Buffer
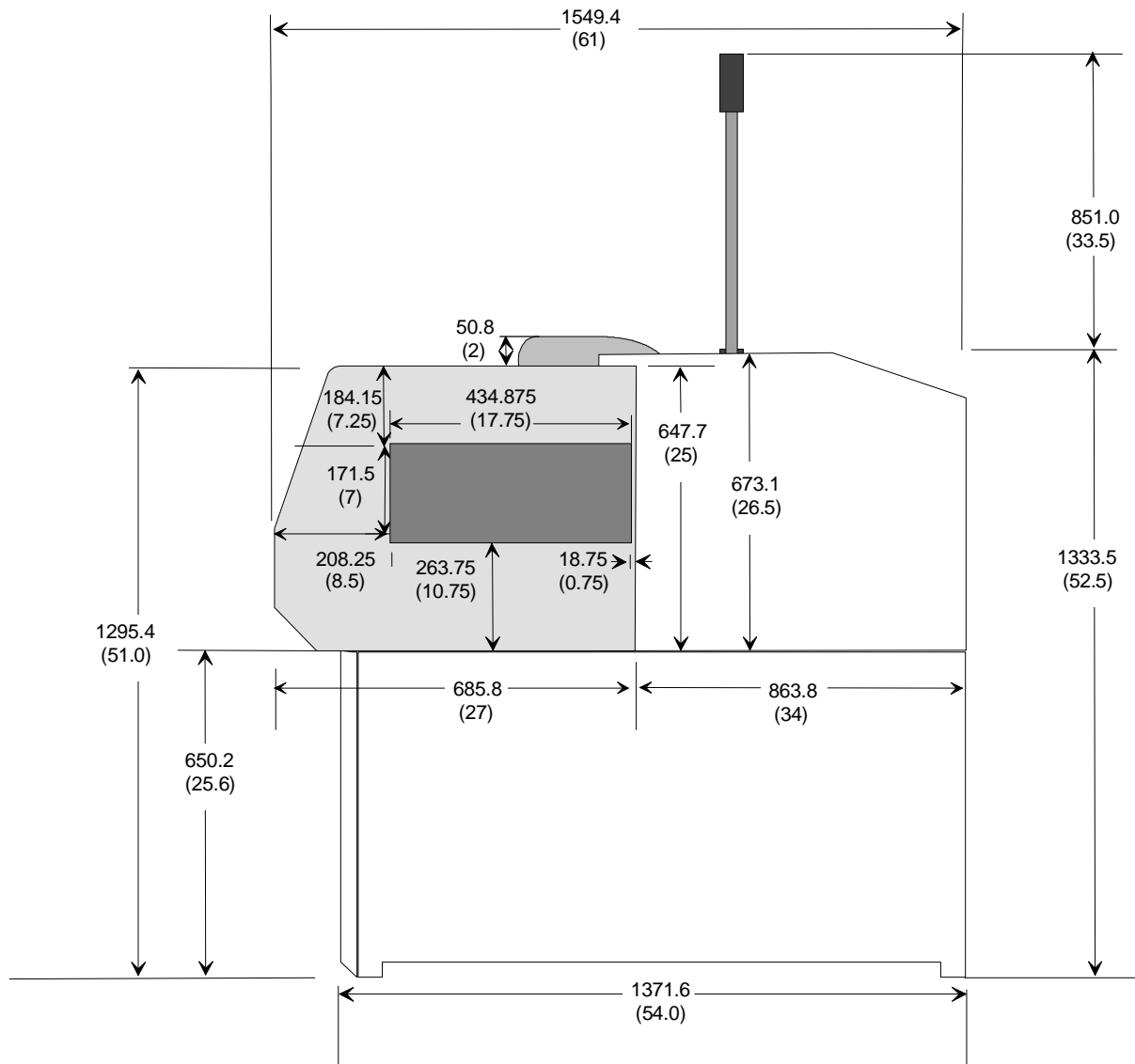
Technical Specifications for Loader/ Unloader: Elevator/Buffer Configuration

Changeover Time	Magazine, 20 seconds
PC Board	The insertion machine determines board size.

Magazine Elevators

Magazine Elevator	Controlled through insertion machine software. Power and air are supplied through the insertion machine. Elevators are equipped with emergency stops.		
Elevator Dimensions	**Length** 635mm (25")	**Depth** 838mm (33")	**Height** 1,835mm (72")

Magazine Input/Output Buffers

Long Buffer	The Long Buffer accomodates 2 magazines (in and out) that are up to 533mm (21") in length each.		
	Long Buffers are available either with CE-compliant Buffer covers or without the covers. Covers must be affixed to the Buffers in order for the Buffers to be CE-compliant.		
Long Buffer Dimensions With Full Covers (CE-compliant)	**Length** 1,270mm (50")	**Depth** 546mm (22")	**Height** 1,835mm (72")
Long Buffer Dimensions Without Covers (Not CE-compliant)	**Length** 1,270mm (50")	**Depth** 546mm (22")	**Height** 1,095mm (43")
Short Buffer	The Short Buffer accommodates 2 magazines (in and out) that are up to 406mm (16") in length each. (Short Buffers do not accommodate Universal magazines.)		
	Short Buffers are not CE-compliant.		
Short Buffer Dimensions	**Length** 1,016mm (40")	**Depth** 546mm (22")	**Height** 1,095mm (43")
Magazine Transfer Height	Upper level magazine transfer height for both Long and Short Buffers is 1,056mm (42"). Lower level Magazine transfer height for both Long and Short Buffers is 292mm (12").		
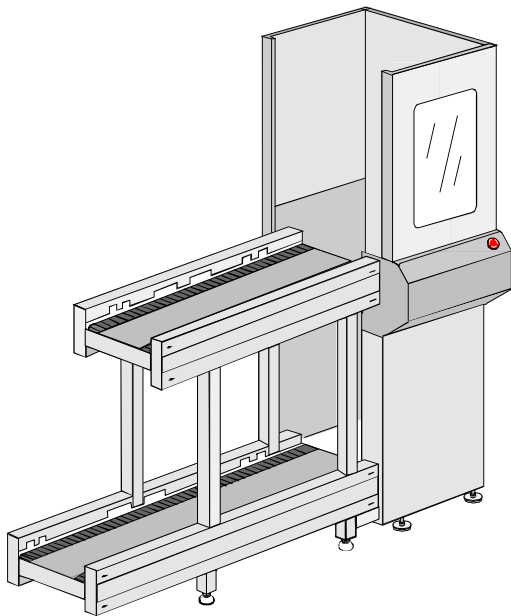
Magazines

Maximum Magazine Weight	45kg (100lbs) for PC boards plus magazines. Compatible with most commonly-used magazines. Consult a Universal Sales Engineer.			
Maximum Magazine Dimensions for Long Buffer	**Maximum Length**	**Maximum Width**	**Maximum Height**	**Maximum Weight (including PC boards)**
	533mm (21")	279mm (11")	606mm (24")	45kg (100lbs)
Maximum Magazine Dimensions for Short Buffer	**Maximum Length**	**Maximum Width**	**Maximum Height**	**Maximum Weight (including PC boards)**
	406mm (16")	279mm (11")	606mm (24")	45kg (100lbs)
Optional Magazine Gate Control	An optional magazine gate control is available for use with magazines that include a spring-loaded gate, used to keep PC boards retained within the magazine.			

Universal Magazine Specifications

Base Pan		PC Board Size Reference				PC Board Guides	
		Minimum	Maximum	Minimum	Maximum		
Width A	Length B	Width C		Length		Datum D	Pitch E
444.5mm 17.50"	476.3mm 18.75"	108mm 4.25"	406.4mm 16.00"	149.9mm 5.90"	457.2mm 18.00"	35.1mm 1.38"	10mm 0.394"
406.4mm 16.00"	476.3mm 18.75"	108mm 4.25"	368.3mm 14.50"	149.9mm 5.90"	457.2mm 18.00"	35.1mm 1.38"	10mm 0.394"
292.1mm 11.50"	476.3mm 18.75"	108mm 4.25"	254mm 10.01"	149.9mm 5.90"	457.2mm 18.00"	35.1mm 1.38"	10mm 0.394"

If Universal magazines are not purchased/used, user must provide magazine specifications or, preferably, a magazine to verify proper function with Universal loaders/unloaders. The maximum allowable dimensions for third-party magazines are: L 490mm (19.29") x D 460mm (18.11") x H 635mm (25.00").

Magazine Views
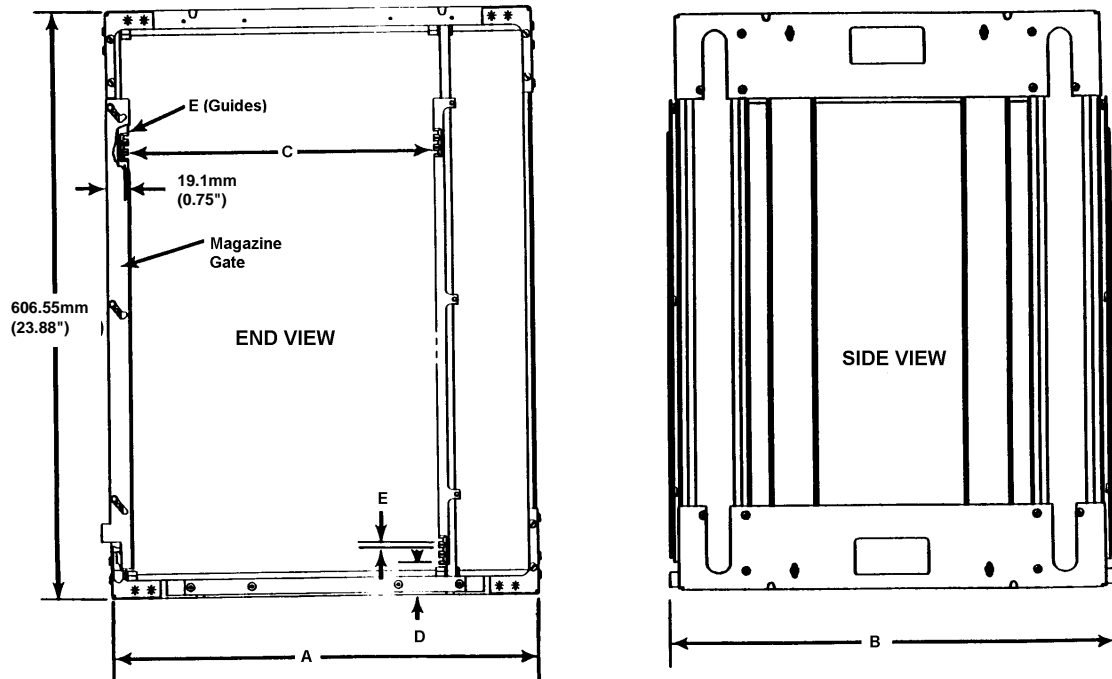
E Electrical Connection

P Pneumatic Connection

Dimensions are in millimeters; inch equivalents are bracketed.

Loader

Unloader

P E UPS

1539 (60.6)

838.2 (33)

546 (21.5)

Direction of Board Flow

635 (25)

1270 (50)

2134 (84)

1905 (75)

System shown in left-to-right board-flow configuration with fixed front rail.

3721 (146.5)

7531 (296.5)

Operator

JW DH 8, Magazine-to-Magazine Configuration, with Long Buffers

E Electrical connection

P Pneumatic connection

Dimensions are in millimeters;
inch equivalents are bracketed.

Loader

Unloader

P E UPS

1539
(60.6)

838.2
(33)

546
(21.5)

← 635 (25) → ← 1016 (40) →

Direction of Board Flow

2134 (84)

1651 (65)

System shown in left-to-right
board-flow configuration
with fixed front rail.

3721 (146.5)

7023 (276.5)

Operator
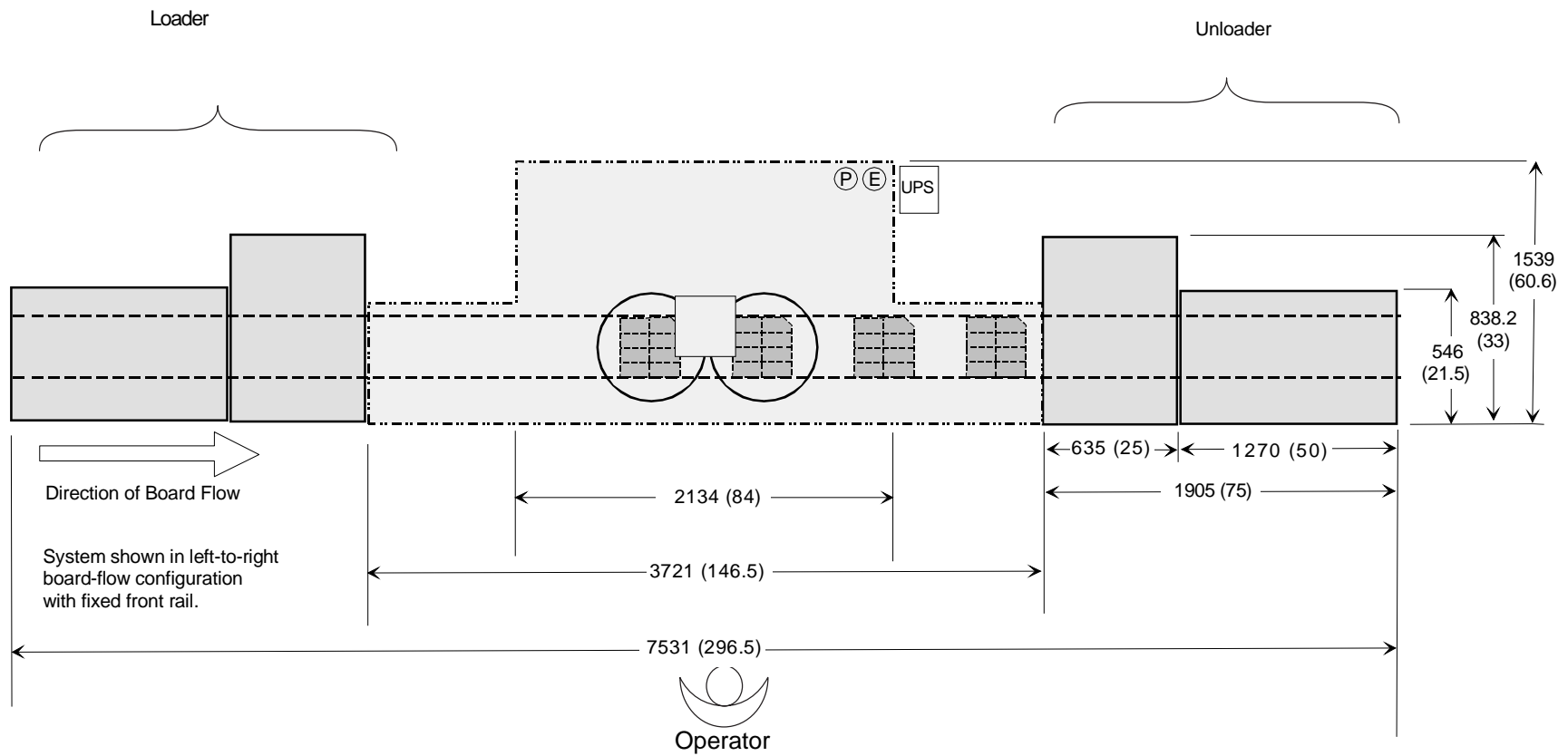
**JW DH 8, Magazine-to-Magazine Configuration
with Short Buffers**

Technical Specifications for Loader/ Unloader: Vacuum Bare Board-to-Magazine Configuration

Direction of Board Flow

Width
Min. 102mm (4")
Max. 406mm (16")

Length
Min.127mm (5")
Max. 457mm (18")

Operator

PC Board Specifications for Vacuum Bare Board Loader

	Minimum	Maximum
Length[1] x Width	127mm x 102mm (5" x 4") [2]	457mm x 406mm (18" x 16") [2]
Length to Width Ratio	$1:1 is recommended.	
Thickness	0.76mm (0.030")	2.36mm (0.093")
Warp	—	2.36mm (0.093")
Cutouts	Contiguous edges	
Stack, Maximum	250 boards at a nominal thickness of 1.57mm (0.062") is the maximum stack height of 394mm (15.5").	

Notes:

1. Length is in the direction of board flow.

2. The JW DH 8 determines board size. Consult a Universal Sales Engineer for boards larger than 356mm (14").

Vacuum Bare Board Dimensions	Length 751.1mm (29.57")	Depth 689.1mm (29.13")	Height 1574.8mm (62")

PC Board Specifications for Between Machines 22" Conveyor

	Minimum	Maximum
Length[1] x Width	76mm x 51mm (3" x 2") [2]	508mm x 457mm (20" x 18") [2]
Length to Width Ratio	$1:1 is recommended.	
Thickness	0.64mm (0.025")	3.18mm (0.125")
Warp	—	3.18mm (0.125")

Notes:

1. Length is in the direction of board flow.

2. The JW DH 8 determines board size. Consult a Universal Sales Engineer for boards larger than 356mm (14").

22" Conveyor Dimensions	Length 559mm (22")	Depth 802.6mm (31.6")	Height[1] 962.7mm (37.9")

Notes:

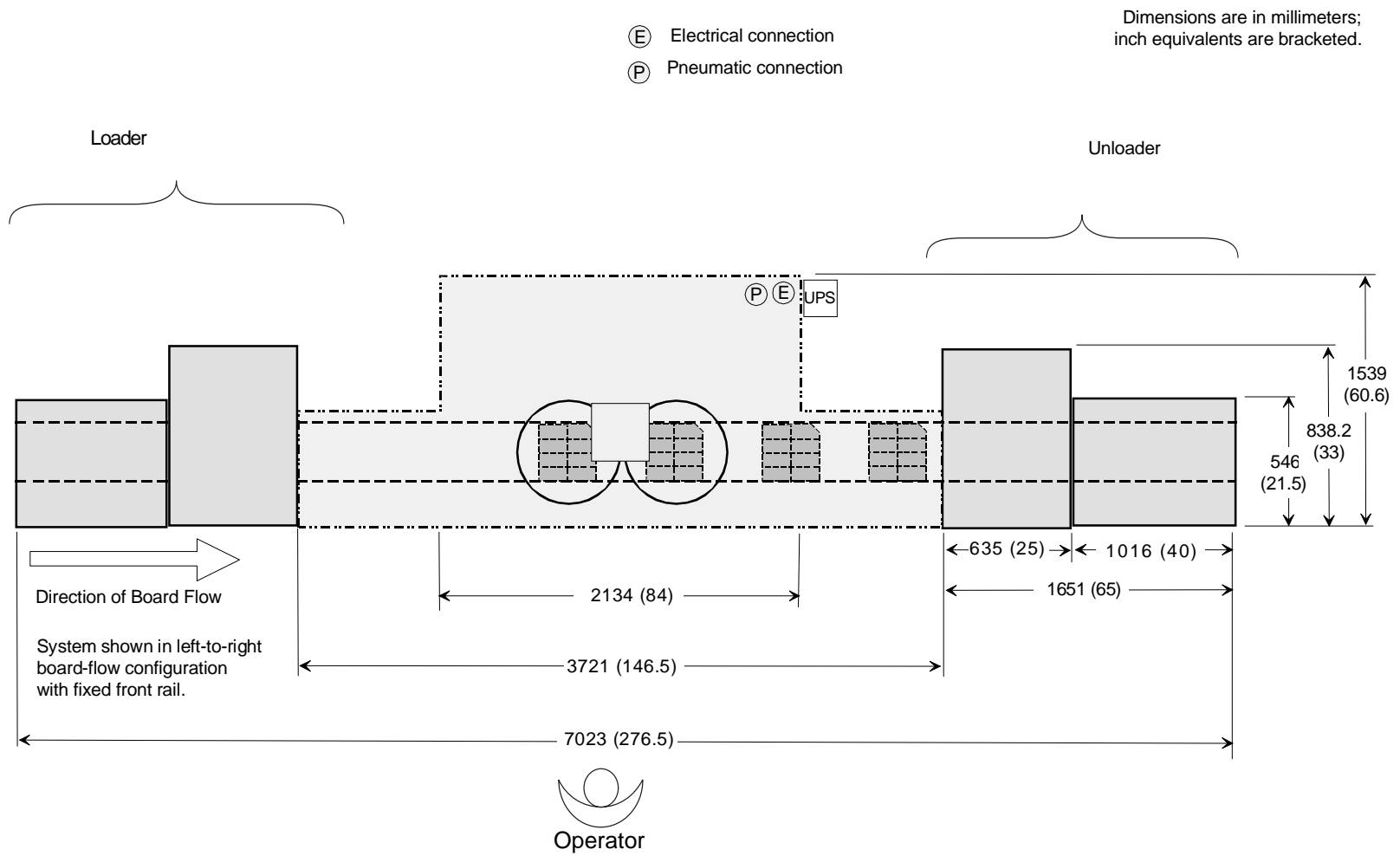1. Height represents pre-set transfer height of conveyor bed. Transfer height is adjustable from 812.8mm (32") to 1066.8mm (42").

Dimensions are in millimeters;
inch equivalents are bracketed.

(E) Electrical Connection

(P) Pneumatic Connection

Loader

Unloader

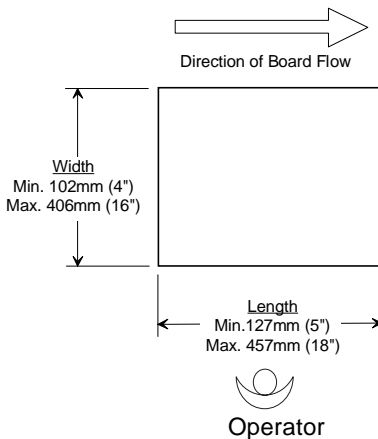Vacuum Bare
Board Loader

751.1
(29.57)

82.6
(3.25)

559
(22.0)

(P)(E) UPS

1539
(60.6)

838.2
(33)

689.1
(29.13)

802.6
(31.60)

546
(21.5)

635 (25)

1270 (50)

Direction of Board Flow

2134 (84)

1905 (75)

System shown in left-to-right
board-flow configuration
with fixed front rail.

3721 (146.5)

6936.1 (273.07)

Operator

**JW DH 8, Vacuum Bare Board-to-Magazine Configuration, with 22" Conveyor
and Long Buffer**

Dimensions are in millimeters;
inch equivalents are bracketed.

(E) Electrical Connection

(P) Pneumatic Connection

Loader

Unloader

Vacuum Bare
Board Loader

(P)(E) UPS

751.1
(29.57)

82.6
(3.25)

559
(22.0)

1539
(60.6)

689.1
(29.13)

838.2
(33)

802.6
(31.60)

546
(21.5)

635 (25)

1016 (40)

Direction of Board Flow

2134 (84)

1651 (65)

System shown in left-to-right
board-flow configuration
with fixed front rail.

3721 (146.5)

6682.1 (263.07)

Operator
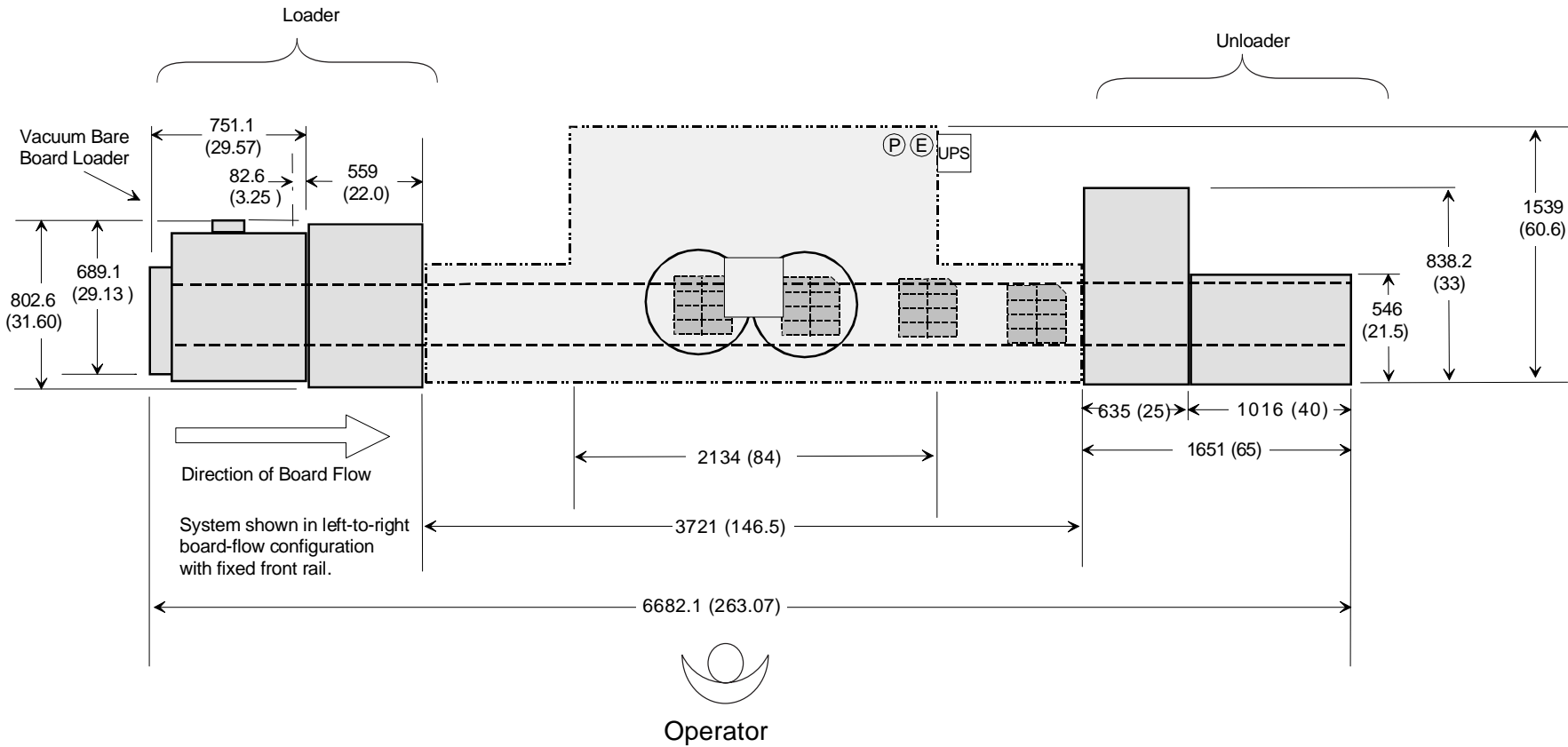
JW DH 8, Vacuum Bare Board-to-Magazine Configuration, with 22" Conveyor
and Short Buffer

Direction of Board Flow

Width
Min. 51mm (2")
Max. 457mm (18")

Length
Min.76mm (3")
Max. 508mm (20")

Operator
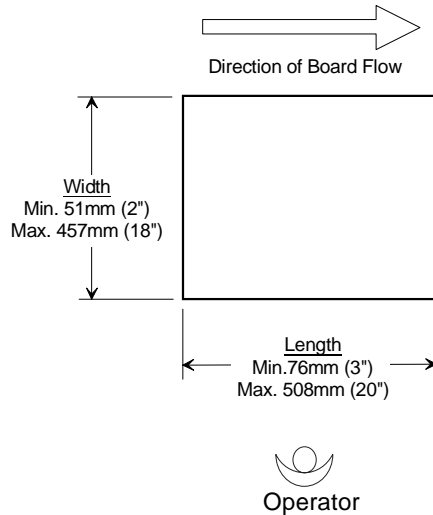
Technical Specifications for Loader/ Unloader: Destacker/Conveyor-to-Magazine Configuration

PC Board Specifications for Destacker/Conveyor Loader

	Minimum	Maximum
Length[1] x Width	76mm x 51mm (3" x 2")	508mm x 457mm (20" x 18")
Length to Width Ratio	$1:1 is recommended.	
Thickness	1.02mm (0.040")	3.18mm (0.125")
Warp	—	3.18mm (0.125")
Cutouts	Require Factory Review	
Stack, Maximum	190 boards at a nominal thickness of 1.6mm (0.063") is the maximum stack height of 304.8mm (12").	

Notes:
1. Length is in the direction of board flow.
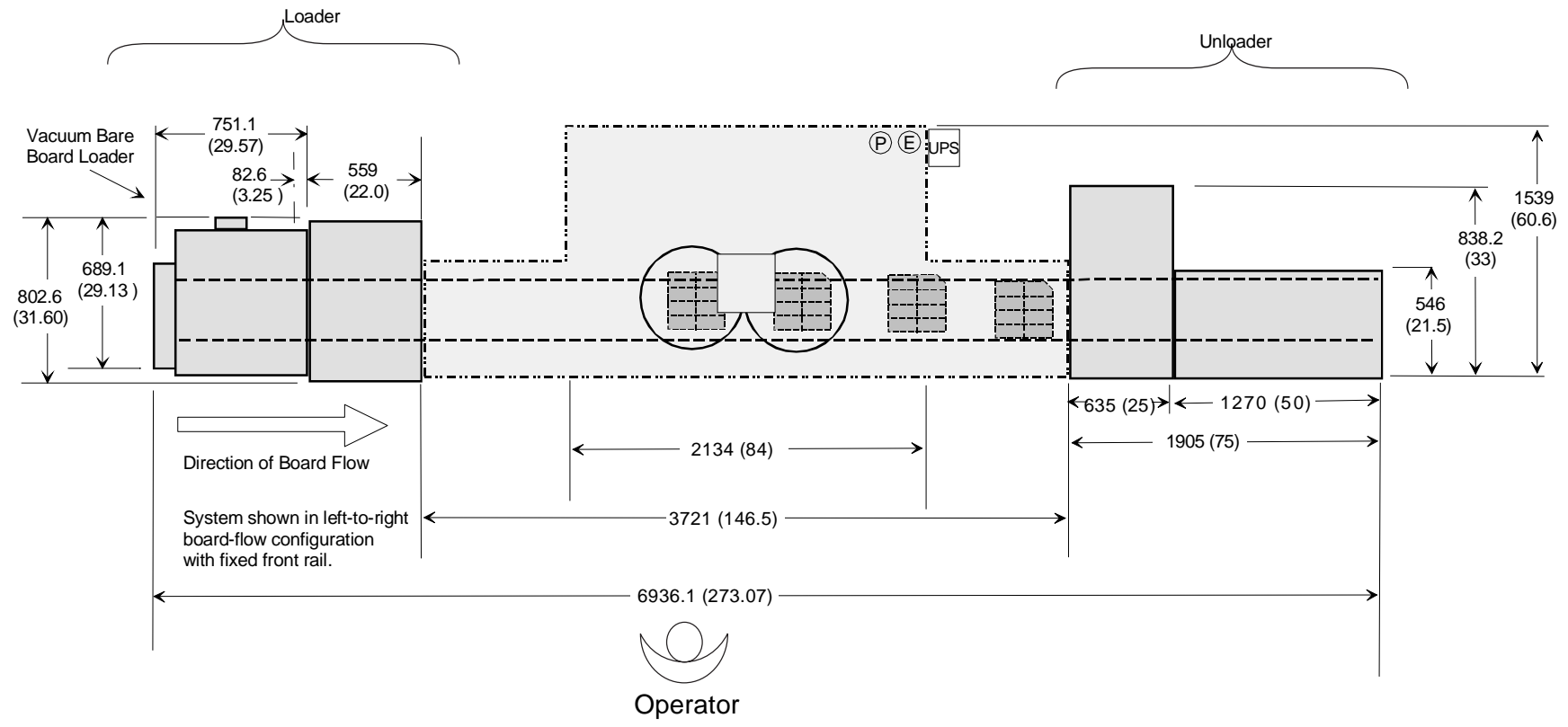2. The JW DH 8 determines board size. Consult a Universal Sales Engineer for boards larger than 356mm (14").

Destacker/Conveyor Specifications

Destacker on	Length	Depth	Height[3]
29" Conveyor[1]	736.6mm (29")	802.6mm (31.6")	962.7mm (37.9")
Destacker on 44" Conveyor[2]	1,117.6mm (44")	802.6mm (31.6")	962.7mm (37.9")
Destacker on 58" Conveyor[2]	1473.2mm (58")	802.6mm (31.6")	962.7mm (37.9")

Notes:
1. Not CE-compliant.
2. CE-compliant if configured with safety covers.
3. Height represents pre-set transfer height of conveyor bed. Transfer height is adjustable from 812.8mm (32") to 1066.8mm (42"). Add 383.5mm (15.1") to transfer height for total height of Destacker sitting atop Conveyor.

Dimensions are in millimeters;
inch equivalents are bracketed.

Ⓔ Electrical Connection

Ⓟ Pneumatic Connection

Loader

Unloader

Destacker/
Conveyor

Ⓟ Ⓔ UPS

802.64
(31.60)

1539
(60.6)

838.2
(33)

546
(21.5)

←736.6 (29.0)→

635
(25)

1270 (50)

2134 (84)

1117.6 (44.0)

3721 (146.5)

1905 (75)

1473.2 (58.0)

6362.6 (250.5)
with 29" conveyor

6743.6 (265.5)
with 44" conveyor

7099.2 (279.5)
with 58" conveyor

Direction of Board Flow

System shown in left-to-right
board-flow configuration
with fixed front rail.

Operator

**JW DH 8, Destacker/Conveyor-to-Magazine Configuration,
with Long Buffers**

Dimensions are in millimeters;
inch equivalents are bracketed.

(E) Electrical Connection

(P) Pneumatic Connection

Loader

Unloader

Destacker/
Conveyor

(P) (E) | UPS

802.64
(31.60)

1539
(60.6)

838.2
(33)

546
(21.5)

736.6 (29.0)

2134 (84)

635
(25)

1016 (40)

1117.6 (44.0)

1651 (65)

Direction of Board Flow

1473.2 (58.0)

3721 (146.5)

6108.6 (240.5)
with 29" conveyor

6489.6 (255.5)
with 44" conveyor

6845.2 (269.5)
with 58" conveyor

System shown in left-to-right
board-flow configuration
with fixed front rail.

Operator

**JW DH 8, Destacker/Conveyor-to-Magazine Configuration,
with Short Buffers**

Installation Considerations: Loader/ Unloader

Magazine-to-Magazine Configuration

Dimensions—Magazine Elevator Module (x2)

	Length [1]	Depth	Height	Weight
Shipping Dimensions	610mm (24")	1140mm (44.88")	1911mm (75.25")	159 kg (350 lbs.)

[1] Length is in the direction of board flow.

Dimensions—Long Buffer (x2)

	Length	Depth	Height	Weight
Shipping Dimensions Not CE-Compliant	1270mm (50")	546mm (21")	1095mm (43")	91 kg (200 lbs.)
Shipping Dimensions CE-Compliant	1270mm (50")	546mm (21")	1835mm (72")	118 kg (260 lbs.)

Dimensions—Short Buffer (x2)

	Length	Depth	Height	Weight
Shipping Dimensions	1016mm (40")	546mm (21")	1095mm (72")	82kg (180 lbs.)

Vacuum Bare Board-to-Magazine Configuration*

Dimensions—Vacuum Bare Board Unloader

	Length	Depth	Height	Weight
Shipping Dimensions	1194mm (47")	889mm (35")	1753mm (69")	288kg (635 lbs.)

Dimensions—22" Between Machine Conveyor

	Length	Depth	Height	Weight
Shipping Dimensions	965mm (38")	965mm (38")	1270mm (50")	98kg (216 lbs.)

Destacker/Conveyor-to-Magazine Configuration*

Dimensions—Destacker/Conveyor (29")

	Length	Depth	Height	Weight
Shipping Dimensions	736.60mm (29")	802.6mm (31.6")	1346.2mm (53")	136.2kg (300 lbs.)

Dimensions—Destacker/Conveyor (44")

	Length	Depth	Height	Weight
Shipping Dimensions	2540mm (44")	802.6mm (31.6")	1346.2mm (53")	136.2kg (300 lbs.)

Dimensions—Destacker/Conveyor (58")

	Length	Depth	Height	Weight
Shipping Dimensions	1473mm (58")	803mm (32")	1346mm (53")	170kg (375 lbs.)

* For installations, add size and weight dimensions for one magazine elevator module and one magazine buffer module, either Long or Short Buffer.

Service Requirements

Machine Description	Pneumatic Requirements		Electrical Requirements
	Minimum Air Flow Requirement	Air Consumption	Voltage
JW DH 8 with BHS	1.4 CFM @ 90 PSI	8.7 SCFM	230 VAC (50/60Hz) (180-264 VAC)
JW DH 8 with BHS and Loader/Unloader	1.6 CFM @ 90 PSI	9.8 SCFM	230 (50/60Hz) Loader/unloader supplied from core machine
IM Elevator (Loader or Unloader)	0.2 CFM @ 90 PSI	1.1 SCFM	120 VAC (50/60Hz) Supplied from core machine
Vacuum Bare Board Loader	1.5 CFM @ 90 PSI	9.3 SCFM	120 VAC (50/60Hz) Supplied from core machine
Destacker/ Conveyor Loader	0.4 CFM @ 90 PSI	1.4 SCFM	120 VAC (50/60Hz) Supplied from core machine
22" Conveyor	None required	None required	120 VAC (50/60Hz) Supplied from core machine
29" Conveyor	None required	None required	120 VAC (50/60Hz) Supplied from core machine
44" Conveyor	None required	None required	120 VAC (50/60Hz) Supplied from core machine
58" Conveyor	None required	None required	120 VAC (50/60Hz) Supplied from core machine

Note:

- CFM (Cubic Feet per Minute): Volumetric flow rate at a specified pressure. This is used to describe the air flow requirement.

- SCFM (Standard Cubic Feet per Minute): Cubic foot of air at 20°C (68° F) at atmospheric pressure. This is used to describe average air consumption flow requirement.