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Attention:

Subject: Komatsu Model H2F 400B Two Point Straight Side Servo Press

Thank you for your interest in Komatsu. We are pleased to present our proposal KCQ Proposal No. XXX for the above referenced press. Komatsu Presses contain many outstanding proprietary features and are designed and constructed to provide your company with many years of unsurpassed performance and reliability. Komatsu maintains a nationwide staff of factory trained service engineers. Although we offer a strong warranty and Service support team we feel that the best warranty is one that you don't have to use.

If you want to be, " Well Protected," Komatsu's warranty that runs 24/7/365 is the way to go. Look at the features. Look at the, " Low Maintenance," design. Then go Komatsu, the leader in proven advanced design for maximum productivity.

- Patented Closed Loop AC Servo Drive System
- Slide Position Accuracy and Repeatability of 0.0004mm (0.00001")
- Die Height Maintained to 0.01mm (0.0004")
- Large Tolerance for Off-Center Loading
- Motorized Slide Adjustment with Hydraulic Lock
- Plunger Guided Slide for True Vertical Slide Motion
- Precision Machining of Slide and Bolster
- Hydraulic Overload
- Pneumatic Slide Counterbalance

Thank you for considering Komatsu, the leader in proven advanced design for maximum productivity.

Sincerely,

KOMATSU AMERICA INDUSTRIES LLC
Press Technology Division

KOMATSU Model H2F 400B
2 point Straight Side Servo Press

SPECIFICATIONS:

CAPACITY

Tonnage -----	440 U.S. ton
Rating point, above BDC-----	.51" (13mm)
Net Die Height over bolster, SDAU-----	36.2" (920mm)
Speed -----	40 SPM
Counterbalance, at 71 PSI line pressure-lbs-----	11600 (5.3 m.ton)

SLIDE

Machining per drawing-----	Standard
Stroke max-----	11.8" (300mm)
Adjustment-----	12.2" (310mm)
Increments of Adjustment-----	0.001mm
Area, Right to Left-----	144" (3660mm)
Front to Back-----	61" (1550mm)

GUIDES

Gibs, Type – Square -----	8 Point
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BOLSTER

Machining per drawing-----	Standard
Area, Right to Left-----	144" (3660mm)
Front to Back-----	61" (1550mm)
Thickness -----	7.8" (200mm)
Material -----	Steel

FRAME

Overall height above floor, w/o railings, w/ mounts-----	6900mm (272")
Overall height above floor w/railings, w/mounts-----	7705mm (304")
Window openings in uprights	
Side opening -----	63" (1600mm)
Front opening -----	148" (3760mm)

ELECTRICAL

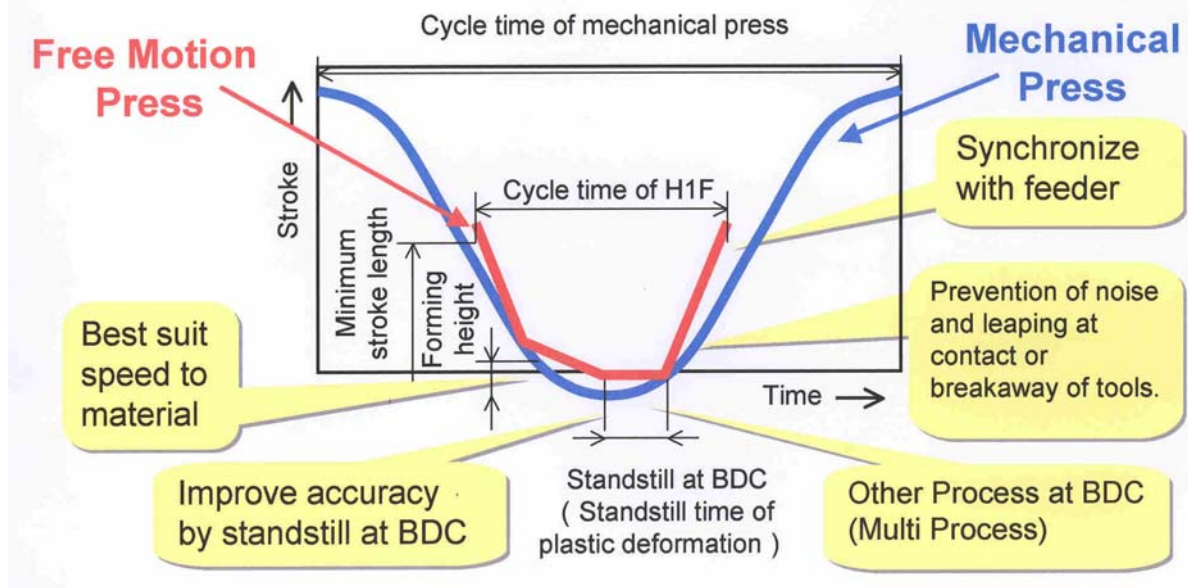
Main Motors -----	100kW (2)
Power supply requirement, SINGLE VOLTAGE -----	460 V, 3Ph, 60Hz
Air supply requirement, PSI -----	71

WEIGHT

Approximate -----	80 metric ton (176000 lbs)
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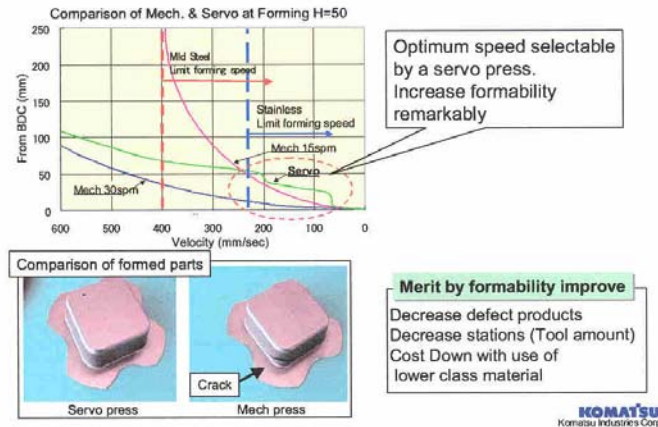
What is Free Motion?

“Free motion” is ability to modify the slide’s motion path to suit any or all of the following: tooling, material, or process.



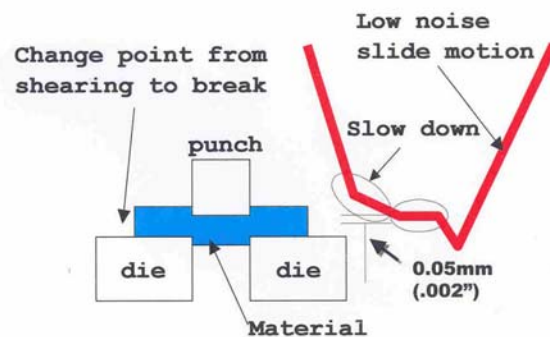
ADVANTAGE OF SETTABLE VELOCITY

- Unlike “Link” Motion Profile with Fixed, Mechanically Adjusted Slide Velocity, Komatsu’s Servo-Press allows for Programming Velocity to Suit controlled Movement of Metal



Blanking--Reduction of Snap-through

- ❖ Reduction of punch “shock” by controlled slide motion.
- ❖ Precision motion of slide stroke by the CNC control.



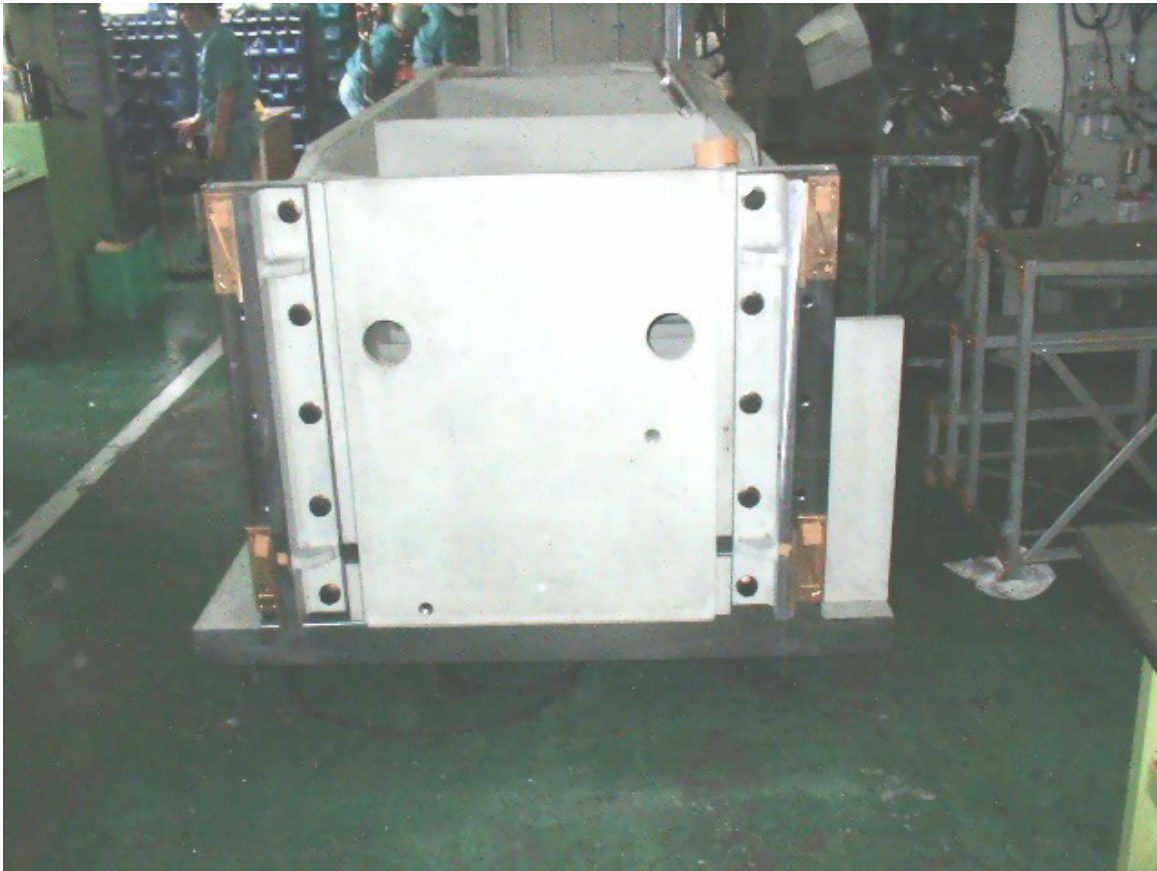
FRAME

Four piece, **full tie rod construction** with bed deflection not to exceed **.0015" per foot** of span between the columns, with full press capacity load distributed over the center 2/3 of the bed area. The uprights, bed, and slide are fabricated / welded construction.



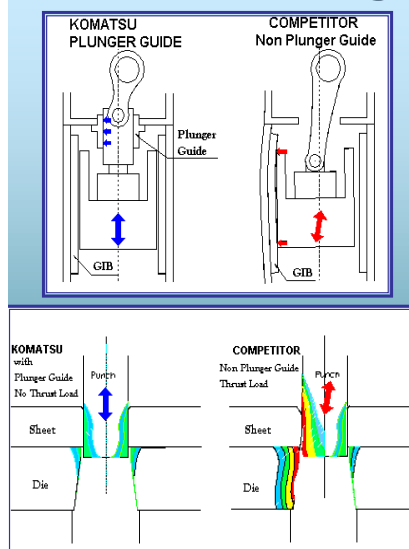
SLIDE

True box-type construction using fabricated steel for maximum rigidity.

GUIDING

Komatsu's **plunger guide system** and 8 point gibbing, **which employs forced oil lubrication** rather than grease combine for optimum close gib tolerance settings. **Gib life is increased 200 times** longer than non-plunger guided systems. Better lubrication means **less maintenance and tighter gib tolerances mean less die wear and higher part accuracy**, translating into improved profits for you.

Plunger Guide



The true benefits of the plunger guide is the elimination of thrust load on the DIE, not amount of thrust load on connection rod.

Since our plunger guide absorbs 100% thrust load in the crown of the press, no thrust load is transferred to the die and possibly the part.

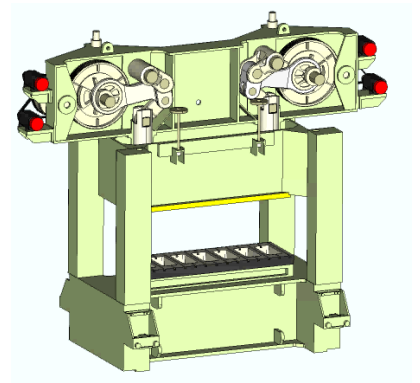
A non-plunger guided system creates thrust through its natural eccentric motion and is not designed to absorb thrust load. It is normally considered that the die-to-punch clearance is 5% of the stock material thickness. Because non-plunger guided presses require more gib clearance, they can easily exceed the recommended die clearance therefore, effectively eliminating the clearance required to assure and maintain accurate part quality. As the punch and material touch each other while piercing, bending or drawing, the load acts on the punch and material directly and it causes early wear of punches and other die components

PRECISION AC SERVO DRIVE

The two-point drive transmits maximum torque from the AC Servo motors via the main gears to the eccentric shafts (grease lubrication), through the knuckle linkage (forced oil lubrication), to the plunger guide (oil bath). Energy from the servo-motors is "on demand" and full tonnage is available in any stroke length near the bottom of the knuckle stroke; so using either a 2" stroke or 9" stroke full tonnage is still kept at .51" BDC. The stroke length is changed simply by setting the "top stop" and "bottom stop" positions of the gear.

DIE HEIGHT and SLIDE ACCURACY

The servomotors controlling each connection point are "masters" allowing independent motion control. Sensors on the slide and frame detect both the out-of-balance condition caused by off-center loads and frame elongation caused by heat and automatically corrects the slide position. Die height accuracy is kept at 0.01mm (0.0004"). Slide position and repeatability is in the micron range at 0.0004mm (display is 0.0001"). Operated by pushbuttons from the operator "T" stand, the **motorized slide adjustment is automatically locked into position** by hydraulic pressure on the locking nut.



Two linear position scales, one for each independent servo drive system, monitor measure slide stroke position from top of the bolster/bed, isolated from any effects of Column and Crown deflection

SLIDE POSITION ACCURACY 20 um

HYDRAULIC OVERLOAD

Should press capacity be exceeded, the overload will trip and immediately stop the press. The overload is a **simple air over hydraulic system**. When the overload trips, a small amount of oil is evacuated from the cavity under the screw, causing the slide to "move up". The combination of the air counterbalance cylinders and collapse of the overload pocket causes the rising of the slide

AIR COUNTERBALANCE

Extends the operating life of both press and die.

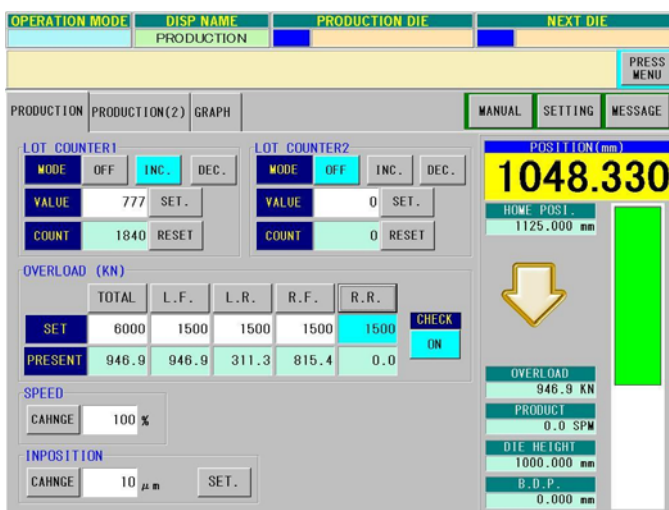
DIE AREA LIGHTS

Illuminates die space for the operator.

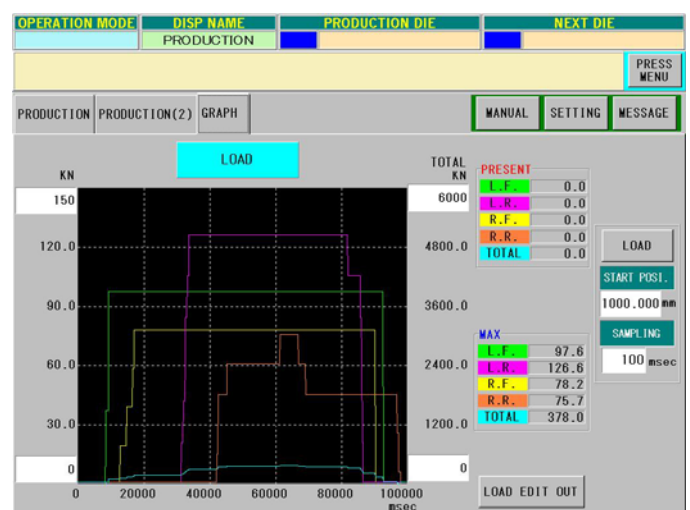
STANDARD CONTROL FEATURES:

PRESS ELECTRONIC CONTROL

Incorporating all the latest thinking in closed loop AC Servo control and press control design, Komatsu's own press control system is designed with **user-friendly controls**, a plain language "touch screen" color display, and intuitive features **including one-hundred (100) job memory**, four (4) programmable cams, one (1) programmable air ejector (cam angle), production counter, pre-set counter, LCD panel with continuous display of press speed/ all counters/stopping time/actual tonnage, **"plain language" diagnostic errors** and operation status messages. The control features either pull down or pop-up menus for each parameter. Available options include: (4) die protection (misfeed) inputs, (4) extra programmable cams, (3) air ejectors (cam or timer), additional I/O boards for coil line, QDC, or robot interface, air automation control, external press control signals.



Main Screen

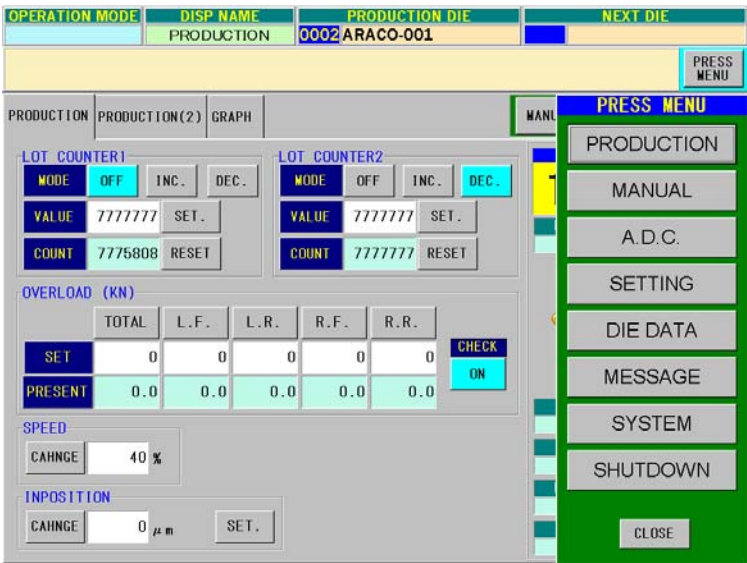


Load Monitor Screen

SET UP CONTROLS

All press functions are set on the color touch screen display, which is mounted either on a pendant or on a remote console. The main screen template includes operation status, set up mode, die number (both “current” and “next”), production counters, load monitor, current slide position in 0.000mm and slide travel direction.

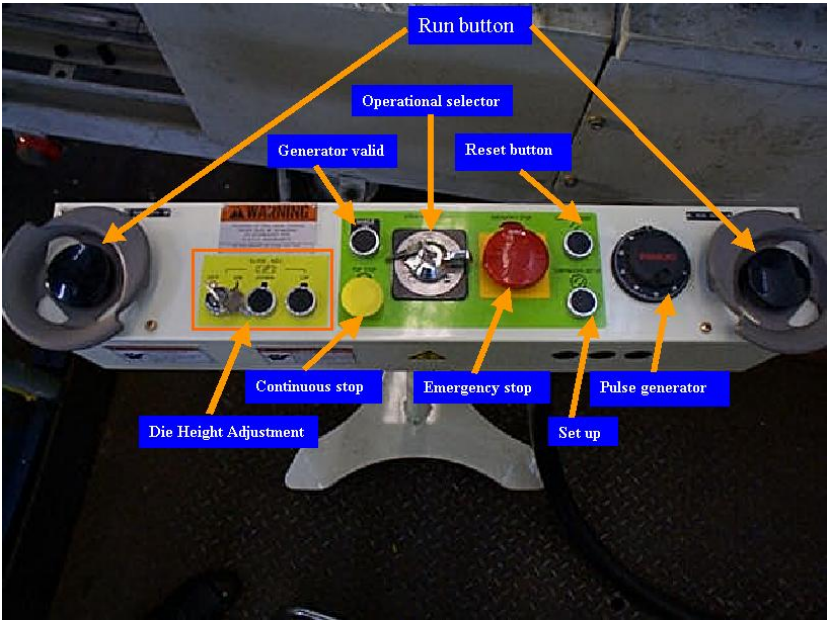
The “Press Menu” key brings a pop up “sub-menu” for various operational parameter settings such as Production, Manual, ADC (Auto Die Change) and Die Data.



OPERATOR CONTROLS

The following controls are mounted on the portable "T" stand:

- Run (2) palm buttons
- Slide Adjustment buttons/switch
- Pulse Generator Valid button
- Continuous set up button
- Top stop button
- Cycle selector key switch
- Emergency Stop Button
- Reset and Set-up Button
- Pulse Generator Dial



INVESTMENT, H2F 400B, 144" x 61" ----- \$ 780.000.00

OPTIONS, as required:

1. One set of press mounts ----- \$ 12,800.00

Start Up: Komatsu America Industries LLC (KAIC) will send (1) service engineer to supervise the installation of the press and provide maintenance and operator training (2 engineers for presses over 600 tons). The time allowed for this service is a maximum of 15 days, 5 to 6 days per week, not including holiday work. Should additional time be required for this start up service, additional charges may apply and must be mutually agreed upon between KAIC and the customer before completion of start up. Assistance from the customer is required during the start up of the press. Customer assistance will consist of full availability of 2-millwright grade personnel as well as a forklift and/or high lift. Uncrating, rigging, removing all protective coatings from bolster/slide face and other areas, as well as the disposal of all packaging materials, is the responsibility of the customer, unless ordered from KAIC. Supply and connection of all utilities (including all required lubricants) is the sole responsibility of the customer. Overtime will not be allowed unless authorized by KAIC.

I have read the above start up policy and agree to the terms specified.

Signature: _____

Name: _____ Title: _____

Please specify the contact person at the installation site who will coordinate with KAIC service personnel for this start up:

Name: _____ Title: _____

Phone: _____

NOTE: QUOTATION VALID FOR THIRTY (30) DAYS