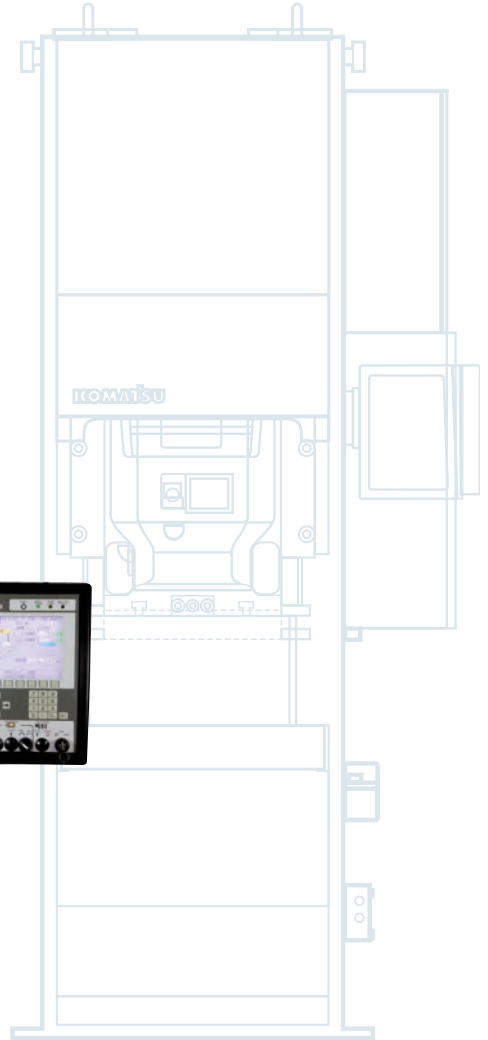


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KOMATSU
HIGH PERFORMANCE SHOULD NOT BE OPTIONAL

Komatsu: A Heritage of Innovation

Technological innovations that increase capacity, productivity and performance have been the hallmarks of Komatsu Press Division since its inception more than 75 years ago. Over the years, Komatsu has demonstrated a commitment to respond to customer demands and originate technologies and systems to meet the needs of a global marketplace. Today, Komatsu continues to build on its tradition of engineering excellence to create equipment that satisfies the complex demands of a competitive, highly technical and complex metal stamping industry.

1924

Komatsu leverages its technologically-innovative capabilities for heavy equipment in the mining

industry to create the Komatsu Press Division and introduces its first low-maintenance stamping press, featuring the durable clutch-brake unit.

Komatsu perfects its proprietary plunger guide system, which produces 30 percent longer die life and improved part quality. The plunger guide eliminates virtually all lateral movement, allowing tighter gib tolerances and precision slide movement. This technology quickly becomes an industry standard.

Komatsu Press Division wins the Deming Prize for engineering excellence, the first Japanese press manufacturer to receive this coveted engineering award. This acknowledgment strengthens Komatsu Press Division's position as worldwide industry leader.

Komatsu's Super-series of single point gap frame presses brings product standardization to the industry with standard models, features and specifications for added value and performance.



In response to needs in the U.S. auto manufacturing market, Komatsu develops fully-automatic transfer presses that deliver high-productivity features, such as fully-automated die change and the first servo-controlled transfer feeder.

High-strength, low-alloy carbon steel and other high-strength metals replace traditional metals in production of common stamped parts. Realizing the limitations of traditional flywheel-driven powered presses in forming these materials, Komatsu launches a comprehensive development process to bring modern CNC servo technology into the stamping arena. Komatsu engineers build on years of experience in servo drive systems.

1998

Komatsu introduces the world's first standard hybrid AC servo press. Brilliantly combining the toggle link drive of

forging press models with that of modern and efficient AC servo drive systems, the new "Free Motion" of the slide motion path brings together the productivity of a mechanical press with the motion control of a hydraulic press.

Komatsu demonstrates continued engineering excellence with a series of single-point servo presses in standard models ranging from 35 to 200 metric tons as well as standard models in two-point and four-point straightside frames up to 2,500 tons—offering size and capacity that no one else can deliver. As a result of the worldwide acceptance of Komatsu AC servo presses, the company further expands its servo technology division.

Komatsu produces the world's first modular, servo-controlled, multi-slide transfer press rated at 4,200 metric tons. The press features independent slide motion control for each of the seven slides.

Komatsu creates its Automation Technology Division to develop new peripheral automation devices that enhance the technology and productivity advances of its AC servo presses. The division quickly brings new linear motor-controlled transfer feeders, high-speed tandem-line loader/unloader (H*TL) and fully programmable AC servo die cushion automation to market, making Komatsu the first to offer a fully-integrated AC servo technology system in support of customer needs.

Today

Komatsu has delivered over 4,000 AC servo presses into the global market, proof of the worldwide acceptance for the company's innovative technologies and products.



H1F
35-80

Komatsu H1F Hybrid AC Servo Presses



The H1F Servo-driven Press: Designed for Superior Flexibility and Accuracy

- Ideal for progressive, transfer or manual die operations
- Incorporates modern, state of the art A.C. servo technology into mechanical stamping press designs
- Ability to control slide velocity throughout the stamping work being done—optimal slide motion can be set for any application
- Maintains constant working energy throughout stroke regardless of slide velocity
- Provides ability to dwell at position to allow timing of secondary work within the press cycle time
- Improved part quality
- Increased die life
- Ability to program multiple motion paths before returning to top dead center
- Automatically maintain and adjust slide position to assure consistent die height
- Elimination of high maintenance mechanical components like the clutch-brake unit
- Reduces importance of die or part lubrication
- Reduces die tryout time and expense
- Saves energy cost by reducing electricity consumption

A Higher Level of Standard Equipment for Increased Performance

- U.S. standard bolster and slide machining
- Heavy plate, rigid frame construction
- Available in optional solid side-frame design on 45-ton models and above
- Pre-machined, heavy-duty cast slide with adapter plates on 80-ton models and above
- Precision plunger guide design
- Precision oil-lubricated long 6-point gibs
- Automatic lubrication of main drive components
- Quick-responding, dependable hydraulic overload protector
- Shock-resistant, pendant-mounted control
- T-stand for easy set-up and operation
- Job storage memory
- Safety block with interlock
- Air counter-balance system

The Komatsu Warranty

When a press is designed as a system, it should be expected to perform as a system without routine tear downs for wear items (the conventional “weak link” in our competitors’ presses.) That’s why every Komatsu H1F press comes with a Two Year Unconditional Warranty on anything that rolls, slides or glows—parts and labor. Unlike other manufacturers, there is no hourly limit—your press is guaranteed to perform 3 shifts a day, 7 days a week, 365 days a year. With Komatsu systems engineering it’s possible to extract the full potential from your press, and the full revenue potential from every job.

Main Drive

Effective and efficient combination of mechanical and state-of-the-art AC Servo technology

Accuracy

Position and repeatability of slide held within microns

Reliability

Redundant, three-way slide position and monitoring circuit

Programmability

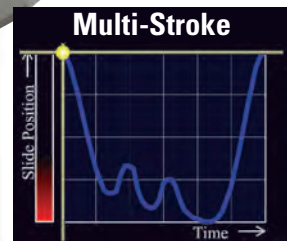
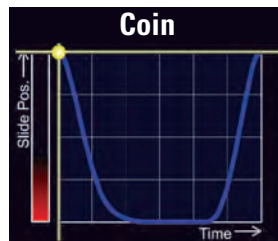
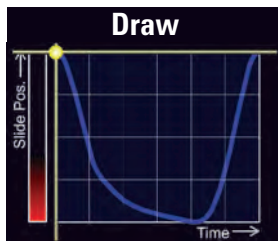
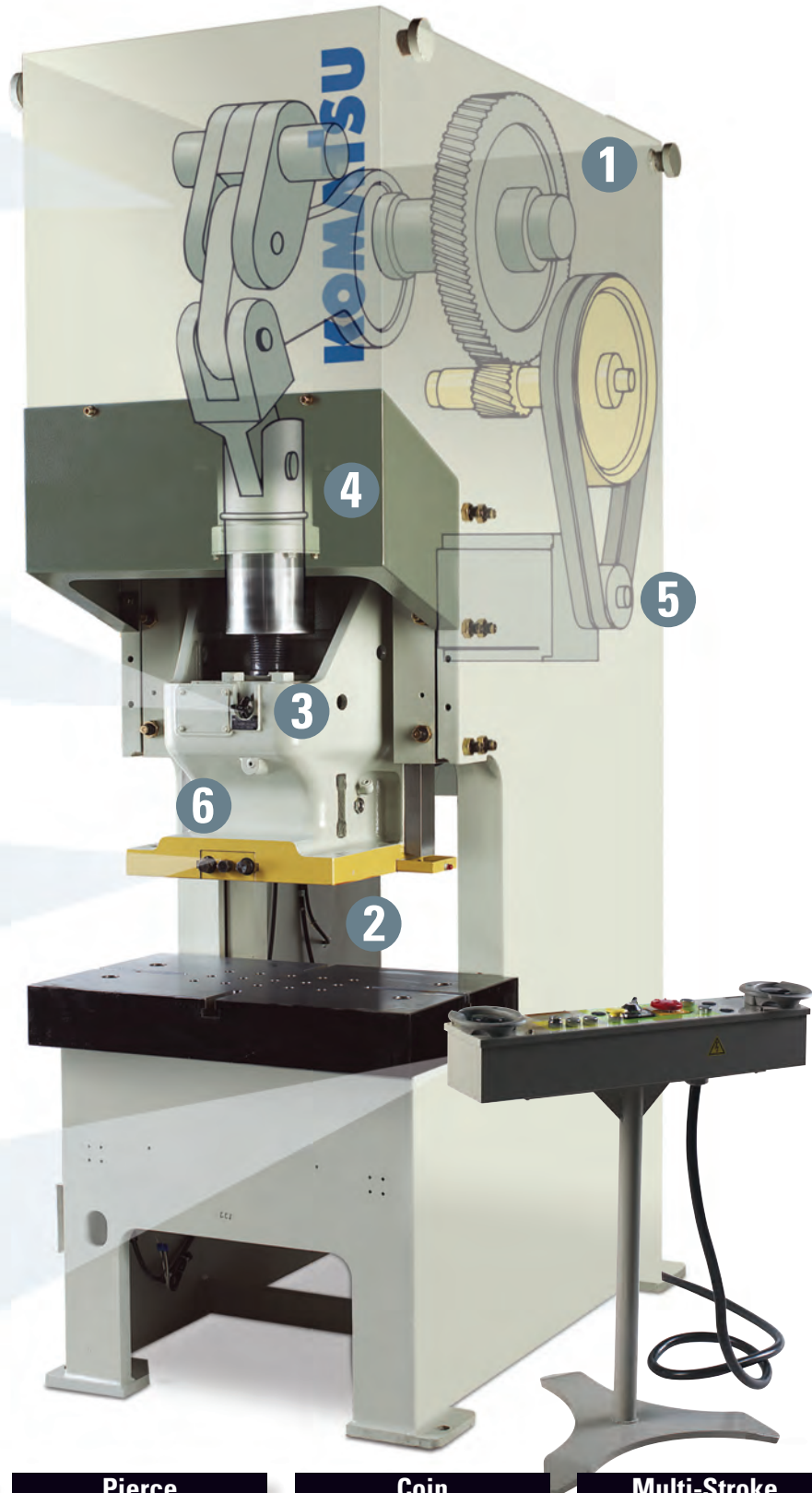
The best motion path can be selected for each stamping operation

KOMATSU

HIGH PERFORMANCE SHOULD NOT BE OPTIONAL

H1F
35-80

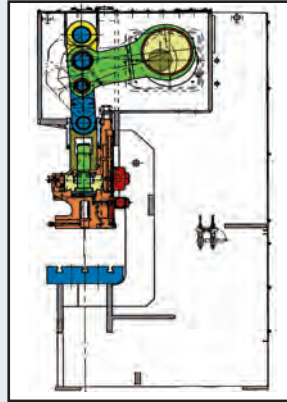
Komatsu H1F Hybrid AC Servo Presses



Standard Features

1 Drive Layout

Komatsu engineering has combined today's modern A.C. servo technology with its proven and very rigid toggle linkage from our forging presses to provide a versatile, efficient and reliable solution to the changing demands of today's pressroom. Incorporating a series of mechanical ratios allows for a standard motor size from a proven motor and control system—no proprietary motors or motor controller are used.



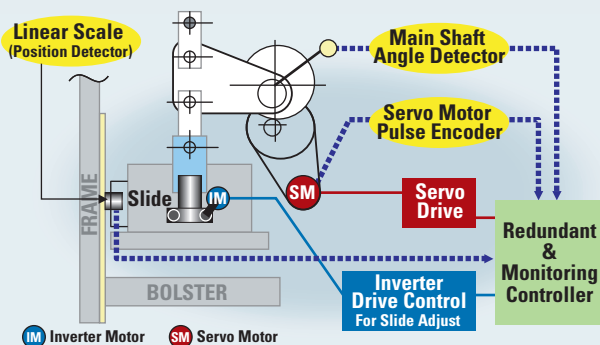
2 Accuracy within microns

A Linear Scale is mounted to the frame of the press and monitors the the slide position to assure repeatable die height consistency at the bottom of the stroke where the work is being done. The linear scale is mounted to a sub-frame, fixed at the bottom to assure slide position accuracy and allowed to "float" at the top while the press frame is under load.



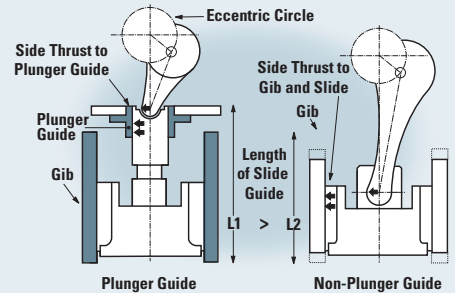
3 Auto Die Height Adjustment

The press control continuously monitors the slide position to assure consistent part quality. Die height adjustments are automatically made during continuous operation of the press. System reliability is assured by constant position monitoring of the main shaft angle detector, motor encoder and actual slide position by the linear scale.



4 Plunger Guide System

Designed for high precision and less die wear. Thrust load from eccentric motion is absorbed by the plunger guide system. The plunger guide is the primary guiding force, preventing side load on the gibs. A size-specific plunger guide is engineered for each different press model, providing maximum performance for each unit. Komatsu also employs full-length gibs that capture the entire length of the slide guide. Gib tolerances are set to Komatsu's tolerances of 0.0015" nom. per gib with oil (not grease) lubrication, allowing them to last up to 200 times



longer than conventional gibs. Together, the plunger guide and gib surface area of the Komatsu H1F add up to 4-5 times the guiding surface area of our nearest competitors. Less routine gib maintenance, less die wear and higher part accuracy are the positive end result, which can translate into improved profits for you.

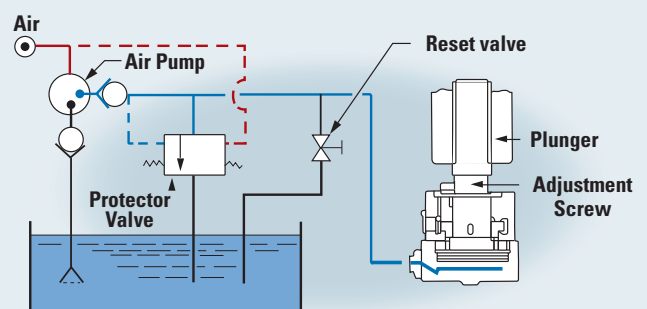
5 Drive system and control

Komatsu's unique combination of toggle-linkage and standard AC servo technology allows for a compact and efficient motor size. The dual timing belts are constantly monitored electronically for motion and breakage, isolating the servomotor from direct load and shock inherent to stamping operations.



6 Hydraulic Overload Protector

Helps prevent damage to the press and dies. All Komatsu presses are equipped with a hydraulic overload protector, a standard feature that has been standard for decades helping to protect against damage to the press or die sets. If the rated load is exceeded, the press stops automatically. Since the hydraulic pressure can be released easily, operations can be resumed smoothly even if jamming occurs.



SIT IV® - System Integrated Terminal

Advanced electronics technology provides user-friendly operation and outstanding reliability. The SIT IV electronic press control unit is designed to provide the fastest, easiest, and most reliable control available for all press functions. Included as standard equipment on the Komatsu H1F press, SIT IV incorporates all the latest thinking in press control unit design.

- All information necessary for press set-up, start-up, operation and diagnostics is available in one display, at the touch of a button.
- Language terminology and graphics are user-friendly, easily understood by the press operator in plain view in one central location on the digital display. Display also includes plain language description of fault messages.
- SIT IV has the ability to integrate with current press room equipment, such as electronic coil feeds.
- Operator "T-stand" control interface houses all switches and push-buttons required for ordinary press set-up and operation, including Push Buttons for slide adjustment.
- Die Data Recording function can store and retrieve data, including cam and fault detection angle as well as production performance. Also includes digital display of "stored" press speed and actual press speed, plus crank angle.
- Alpha-numeric entry of die name and memo data for easy cataloging and referencing.
- 8.4" Color Screen
- Built in Comm. Port for optional V-I-S
- Digital Total Counters
 - 1-production, re-settable
 - 1-lot (pre-set), re-settable
- 4 - Electronic rotary cams
- 1- Pneumatic air ejector with cam
- Mode Selections:
 - (1) Off, (2) Inch, (3) Single Stroke,
 - (4) Continuous
- Optional Modes:
 - (1) Automatic Single Stroke, (2) Automatic Continuous



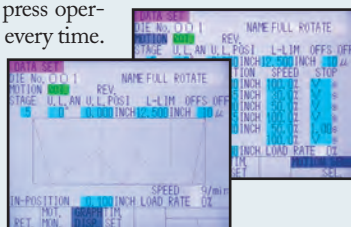
Simple guidance. SIT IV displays operational procedure guidance for select press functions. Intuitive, user-friendly prompts guide press operators in a logical series of steps, for faster, more reliable press set up and operation. The SIT IV pendant is also used for all motion programming. Slide velocity is adjusted in percentage values. When a velocity change is desired, the exact position where this change occurs can be set by actual slide position or in degrees of operation. The slide motion can be programmed to multiple stages before a complete return to Cycle Start Position (CPS) must occur.

Extensive use of electronics gives outstanding reliability.

- Solid-state control
- Integrated Circuits are used for all control circuits
- Increased safety, longer operation life and high reliability

Digital display for improved operation performance. Digital display of the crank angle and electronic angle detectors provide increased accuracy for press operations. Automatic operation setting and die set-up functions are easier and faster for press operators, with precise, reliable settings every time.

To protect the integrity of all electronic systems and provide additional safety, monitor lamps indicate defects in circuits of all electronic systems, and faults are detected instantly.



Optional Features

Electronic Load Monitor (2-channel) Load monitors are available to continuously monitor loads in all press operations, including blanking, bending, drawing, etc. The monitor also detects die overloads and underloads during operation. In addition, balanced die load is achieved by measuring the off-center-load, thus extending press and die life. (Note: required for VIS)

Increased Job Storage Memory

Emergency Stop Receptacle

Slide Knockout (mechanical)

Pulsar Wheel (jog mode)

Photoelectric Safety Equipment

Additional set of 4 Electronic Rotary Cams

Graphic Load Monitor with Reverse Load

Quick Die Equipment

Hydraulic die clamps available in either lever or cylinder type.

Hydraulic die lifters.

Mechanical draw out rails.

(note: re-machining of "T" slots may be required)

Vibration Isolating Pad

Pneumatic Die Cushions

Air Ejector with Cam

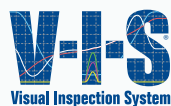
Coil Line Interface

Quick Die Change Interface

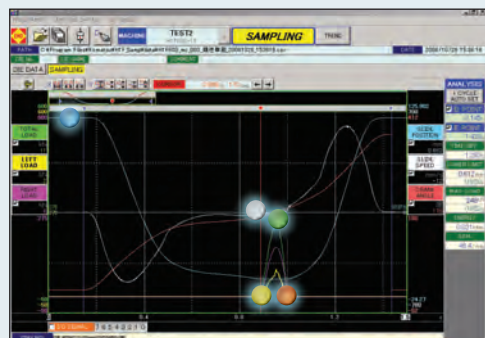
Warning - For protection of the operator, point of use guards should be used at all times. The H1F press does not include O.S.H.A. required point of protection guards.

Note - Immediate Stopping Performance monitor and control reliability. This control meets the current requirements of O.S.H.A. Standards Section 1910.217 and ANSI B11.1.

Automation Complete turn-key Komatsu designed press systems including coil lines, die carting and systems engineering tailored to your specific application.



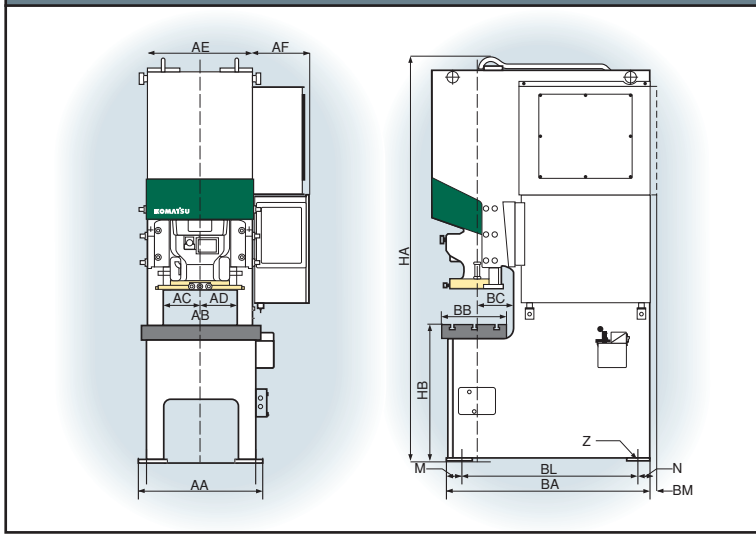
Monitor slide motion and velocity, make adjustments—right from your Ethernet (LAN)-equipped laptop or PC!



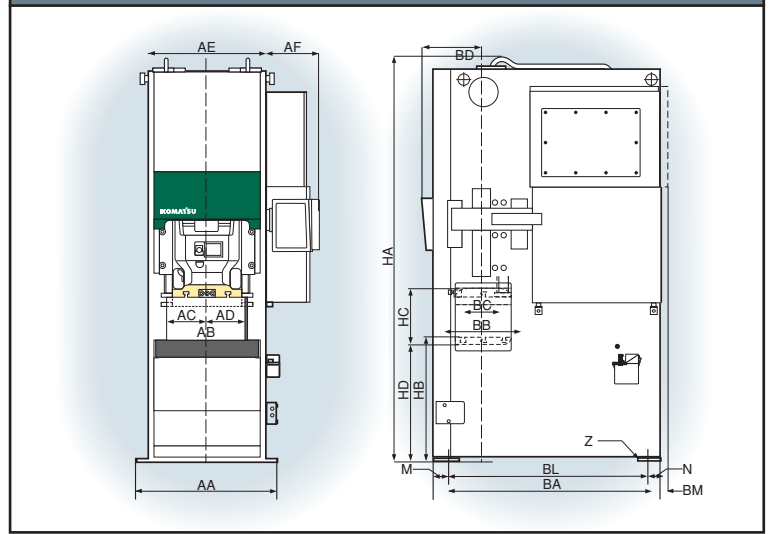
- Slide motion (from actual operation)
- Touch speed
- Maximum loading point
- Monitors precise touch points
- End of forming process



General View ("C" Frame)



General View ("O" Frame)



Specifications (inches)		("C" Frame)				("O" Frame)			
	H1F 35	H1F 45	H1F 60	H1F 80	H1F 45	H1F 60	H1F 80		
AA	29.9	31.9	37.8	39.4	33.6	39.8	45.9	AA	
AB	27.6	31.5	35.4	39.4	23.6	29.5	31.6	AB	
AC	8.7	9.6	11.8	12.6	9.6	11.8	13.6	AC	
AD	7.8	8.7	10.9	11.7	8.7	10.9	12.7	AD	
AE	24.4	26.4	32.3	33.9	28.1	34.3	40.6	AE	
AF	13.0	13.0	14.4	14.4	15.3	15.0	15.0	AF	
BA	47.3	49.9	59.6	60.2	55.7	65.4	69.7	BA	
BB	15.7	17.7	21.7	23.6	17.7	21.7	23.6	BB	
BC	8.3	9.4	15.2	12.6	15.7	15.7	17.7	BC	
BL	40.4	44.3	53.1	52.6	50.0	58.9	62.0	BL	
BM	0.0	0.0	0.0	2.2	0.0	0.0	2.2	BM	
HA	94.5	100.8	116.1	125.0	100.8	116.1	125.0	HA	
HB	31.5	31.5	35.4	35.4	31.5	35.4	35.4	HB	
HC	—	—	—	—	13.8	15.7	16.5	HC	
HD	—	—	—	—	29.5	33.5	33.5	HD	
M	3.6	4.0	3.0	3.9	4.0	3.0	3.9	M	
N	3.3	1.6	3.9	3.7	1.6	3.5	3.7	N	
Z	1.3	1.3	1.3	1.3	1.3	1.3	1.3	Z	

MODEL		H1F35		H1F45			H1F60			H1F80			
		CS	CH	CS	CH	OH	CS	CH	OH	CS	CH	OS	OH
Cap. Ton	(US)	38.5		49.5			66			88			
Rating Point (BDC)	(in.)	0.18	0.12	.22	0.12		.24	0.14		0.20		0.20	
Stroke (Max)	(in.)	3.15	1.57	3.94	1.97		4.72	2.36		5.12	3.94	5.12	3.94
SPM (Max)	(in.)	120	240	100	200		85	150		75	110	75	110
Shutheight (Max)	(in.)	8.27		9.84			11.81			12.60			
Slide Adjust	(in.)	2.17		2.36			2.56			3.15			
Slide Dim. (L/R, F/B)	(in.)	13.8 x 11.8		15.75 x 13.8			19.7 x 15.75			21.65 x 17.7			
Shank Hole (Dia.)	(in.)	1.5		2.0			2.0			2.0			
Bolster Dim. (L/R, F/B)	(in.)	27.6 x 15.7		31.5 x 17.7		23.6 x 17.7	35.4 x 21.7		29.6 x 21.7	39.4 x 23.6		31.50 x 23.6	
Bolster Thickness	(in.)	3.4		4.33			5.12			5.51			
Motor (KW)	(kw)	5	7	7			7	11		15	22	15	22

Specifications subject to change without notice