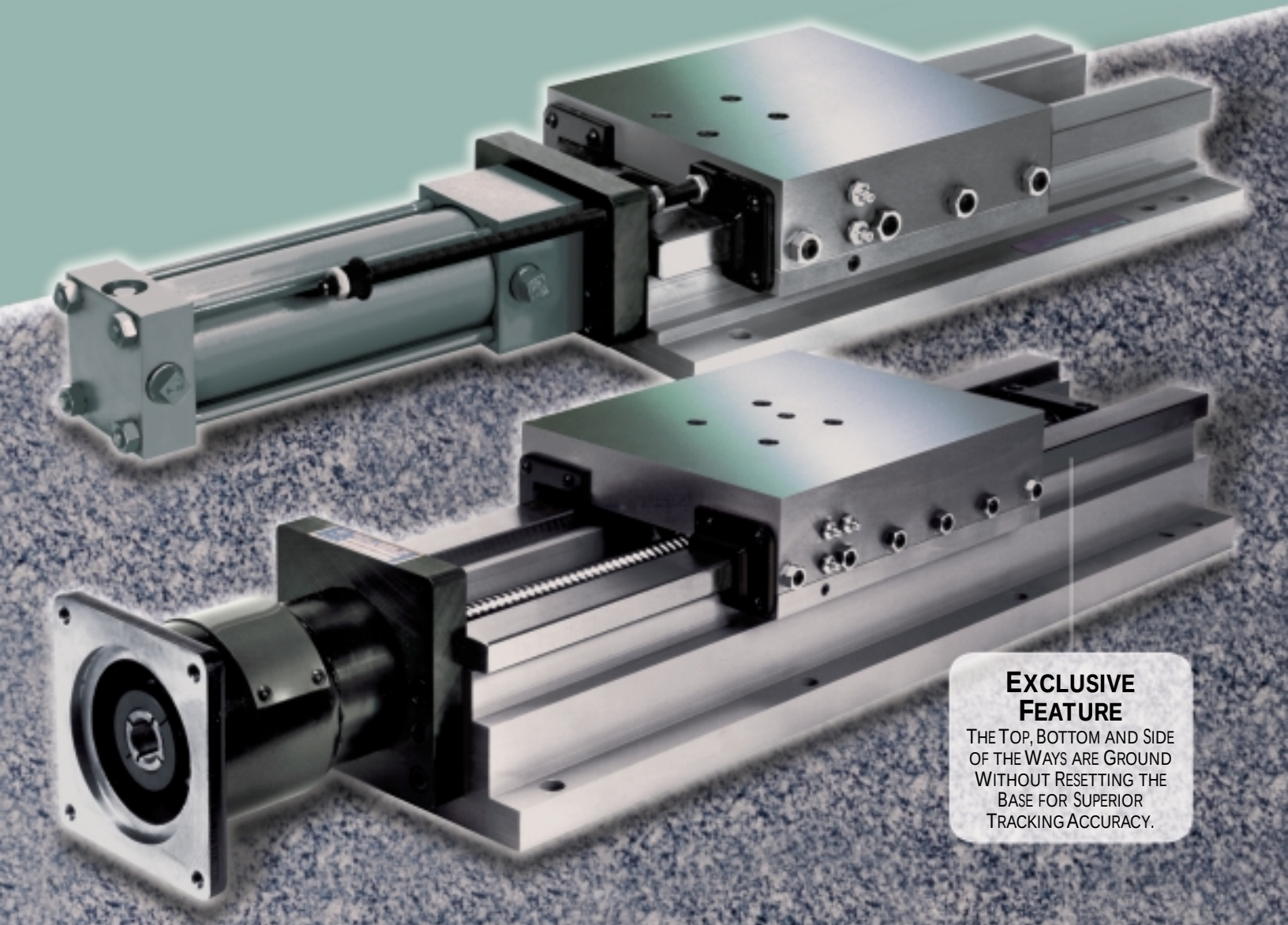
Catalog No. 707

Hardened Steel Way Slides

A Wide Range of Sizes for Processes Requiring Precision Linear Motion.

5" to 32" Standard Width Components in Stock



Exclusive Feature

The Top, Bottom and Side of the Ways are Ground Without Resetting the Base for Superior Tracking Accuracy.

Humston Machinery, Inc.
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Zionsville, IN 46077
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www.humstonmachinery.com

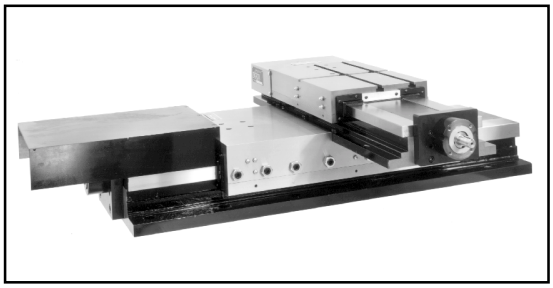
Russell T. Gilman
An SKF Company
Precision Machine Tool Components

Gilman
Hardened Steel Way Slides

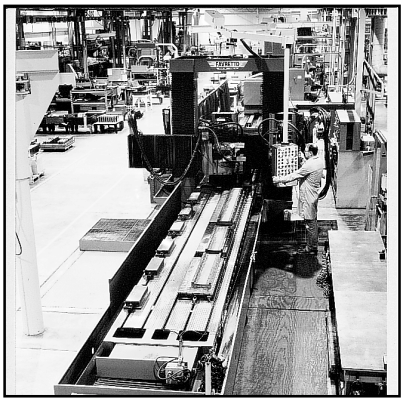
Gilman & SKF Deliver New, Quality Products and Services

Take advantage of exclusive SKF technologies and precision Gilman craftsmanship.

Whether your end application is a special machine or an OEM product line, Gilman's Grafton, WI plant – along with SKF facilities worldwide – assure you responsive engineering, precision manufacturing and prompt, efficient, after-sale service.



Gilman slide assemblies are designed and built for smooth, accurate, long-life operation. Both the base and saddle are made from close-grained cast iron of 40,000 psi minimum tensile and are properly normalized for maximum stability. Both parts are machined and ground parallel on top and bottom surfaces after assembly for a flat, accurate mounting surface. The saddle and base may be easily drilled, tapped or machined to accommodate specific mounting requirements. Saddle wear surfaces are lined with low-friction bearing material and are accurately ground and oil grooved to ensure adequate lubrication.



Gilman uses an ultra high-precision Favretto way grinder with a horizontal and universal grinding head capable of adjustment in one degree increments to maintain accurate tracking of hardened steel way slide assemblies. The top, bottom and side of the ways are ground without resetting the base; saddle mating surfaces are ground in a similar manner. Gilman can accurately grind ways up to 20 feet long.

Reduce your design and manufacturing time and costs.

Gilman standard slide assemblies give you substantial dollar savings wherever in-line precision movements are required in your special or standard mechanical equipment. Gilman slide modules can be easily assembled together or with other Gilman modular components to build special production machines quickly and efficiently. Slides are available in sizes from 5 inch to 32 inch widths, saddle lengths to 60 inches, and base lengths to 120 inches. **Longer lengths are available upon request.**

For prompt service please provide complete information with your order. You can readily build up the slide model number as you decide on the section, width, saddle length, base length, type of drive and travel. See model number code on Page 6.

Russell T. Gilman, Inc. has the facilities, equipment and application engineering assistance to help you solve your most challenging design problems with standard or custom precision slides. Our GMQ quality standards result in products that provide long life and meet exacting demands for accuracy, reliability and precision.

Table of Contents

The Engineering Department of Russell T. Gilman, Inc., reserves the right to change specifications without notice. Do not base final decisions on catalog drawings — ask for a certified print when you order a slide.

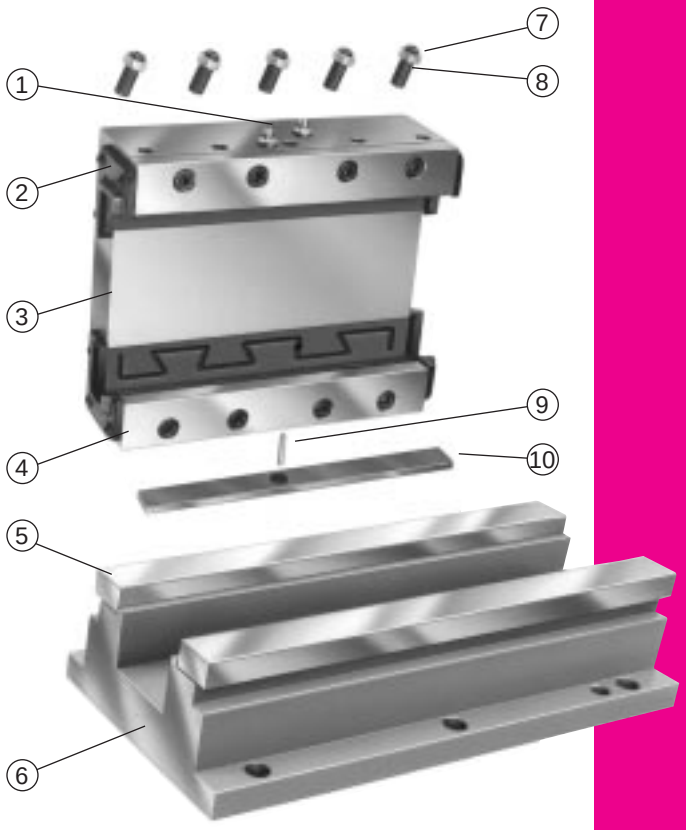
If servicing should be required on any Gilman slide, we suggest the unit be returned for factory service to assure optimum performance and life.

Ten Basic Parts

1. **Lubrication Fitting:** For pressure gun lubrication; can be removed for manual or automatic lubrication systems, see page 22. Lubricate with Mobil Vactra #2 oil or equivalent.
2. **Wiper:** Provide protection to way surfaces from chips, dirt and other contaminants. Made from molded neoprene with a steel retainer.
3. **Saddle*:** Moving member and female section. Manufactured from 40,000 psi close grain cast iron normalized for maximum stability. Wear surfaces are lined with low friction bearing material, accurately ground and oil grooved to ensure adequate lubrication.
4. **Retainer*:** Retains the saddle to the base. Made from finish ground low carbon steel with wear surfaces lined with low friction bearing material.
5. **Way:** Saddle tracking wear surface. Manufactured from high carbon steel and hardened. Bonded and fastened to base before finish grinding.
6. **Base:** Stationary member and male section. Made from 40,000 psi close grain cast iron normalized for maximum stability.
7. **Gib Screw Nut:** Locks the gib screw in place to maintain the adjustment on the gib.
8. **Gib Screw:** Special socket head screws properly spaced along one side of the saddle for adjusting the gib.
9. **Gib Positioning Pin:** For linear positioning of gib. Hollow pin mounted in lubrication hole.
10. **Gib*:** Adjustable member for setting side clearance between ways and saddle. Made from low carbon steel lined with low friction bearing material.

*Low friction bearing material has a coefficient of friction 1/3 that of cast iron on steel and similar dynamic and static coefficients which minimizes the stick-slip condition. Closer fits between the saddle and base can be obtained, which improves saddle tracking and positioning accuracy. Bearing material is standard on all HWS and HWL models. Slides without bearing material are available on request.

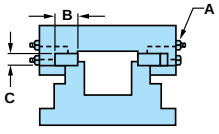
Caution: Low friction bearing material is not recommended in temperatures less than - 60°F or greater than + 150°F, and when fluorine base coolants or chlorinated cutting oils are used.



Lubrication

Mobil Vactra #2 oil or equivalent is recommended for lubricating slide ways. **DO NOT USE GREASE!**

Use these charts and formulas as a guide to determine the lube area or the amount of lubrication required for the slide. Lubrication requirements may vary depending on your application. Consult factory for further assistance.



SL	A
5-18	4
19-36	8
37-60	12

Model	B	C	D
HWS5	.88	.50	.11
HWL7, HWS7	1.19	.75	.16
HWL9, HWS9	1.38	.75	.17
HWL12, HWS12	2.12	1.12	.26
HWL15, HWS15	2.88	1.50	.35
HWL18, HWS18	3.25	1.75	.40
HWL24, HWS24	3.75	1.75	.44
HWS32	3.75	1.75	.44

SL = SADDLE LENGTH
T = TRAVEL
A = NO. OF LUBE POINTS
B = WAY WIDTH (in.)
C = WAY HEIGHT (in.)
D = LUBE FACTOR (cc/hr. per in. SL + T)
LB = LUBE AREA/LUBE POINT Top of Way ($in.^2$)
LC = LUBE AREA/LUBE POINT Side of Way ($in.^2$)
LD = LUBE REQ. (cc/hr.)

$$LB = \frac{(SL)(B)(4)}{A} \qquad LC = \frac{(SL)(C)(4)}{A} \qquad LD = (SL+T)(D)$$

Hardened Steel Way Slide Tolerances *

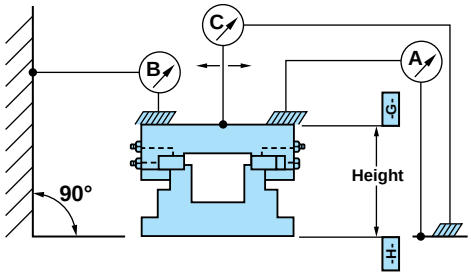
Over All Height ..... = ± .005 in.

Vertical Tracking: (A)
.....= .0005 in./3 ft.

Horizontal Tracking: (B)
..... = .0005 in./3 ft.

Parallelism: (C)
Saddle to Base ..... = .001 in./ft.

G	▱	.0005 in./ft.	H	▱	.0005 in./ft.

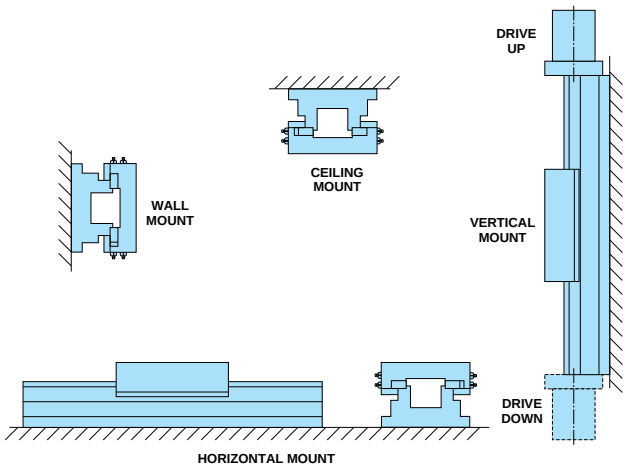


* Higher accuracies available upon request.

Gilman
Application Engineering Data

1 Slide Mounting

Drawings at the right show the most common mounting positions of hardened steel way slides. When slides are mounted other than horizontal, the load capacity changes and in some cases lubrication holes and grooves have to be altered. **Be sure and specify if mounting is other than horizontal when ordering.**



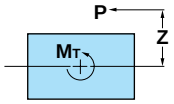
2 Slide Loading

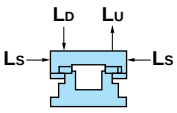
This data should be used as a guide to determine the size of a slide for a particular application. All values are for uniformally distributed loads and moments, and the saddle is assumed to be a rigid member. Some conditions may allow the use of higher load values (e.g. rough machining or positioning applications), while other conditions dictate the use of lower values (e.g. precision boring or grinding applications). For saddle lengths longer than two times the width, and if deflections are critical, please consult factory for load capacity.

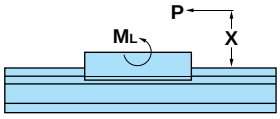
Model	Load Factors											
	D		U		S		W		T		L	
	Static	Dyn.	Static	Dyn.	Static	Dyn.	Static	Dyn.	Static	Dyn.	Static	Dyn.
HWS5	525	105	112	22	150	30	204	41	50	10	62	12
HWL7, HWS7	712	142	187	37	225	45	480	96	75	15	99	20
HWL9, HWS9	825	165	225	45	225	45	759	152	75	15	118	23
HWL12, HWS12	1275	255	300	60	337	67	1350	270	112	22	162	32
HWL15, HWS15	1725	345	450	90	450	90	2531	506	150	30	238	47
HWL18, HWS18	1950	390	525	105	525	105	3543	708	175	35	276	55
HWL24, HWS24	2250	450	600	120	525	105	5400	1080	175	35	316	63
HWS32	2250	450	600	120	525	105	7200	1440	175	35	316	63

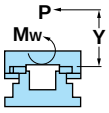
Maximum Load & Moment Calculations

Maximum Loads:	Maximum Moments:
L_D max.= D x SL (lb.)	M_W max. = W x SL (in. lb.)
L_U max. = U x SL (lb.)	M_T max. = T x $(SL)^2$ (in. lb.)
L_S max. = S x SL (lb.)	M_L max. = L x $(SL)^2$ (in. lb.)









Definitions

2 Slide Loading

A = Slide Width (inches)

D = Down Load Factor

L_D = Vertical Load Down (lb.)

L_S = Horizontal Load Side (lb.)

L_U = Vertical Load Up (lb.)

L = Length Moment Load Factor

M_L = Moment About Saddle Length (in. lb.)

M_T = Moment About Plane of Saddle Top (in. lb.)

M_W = Moment About Saddle Width (in. lb.)

P = Load Producing Moment (lb.)

S = Side Load Factor

T = Top Moment Load Factor

U = Up Load Factor

W = Width Moment Load Factor

X = Distance from Load P to Slide Way (inches)

Y = Distance from Load P to Slide Way (inches)

Z = Distance from Load P to Center Line of Slide (inches)

SL = Saddle Length Engaged on Base (inches)

MORE

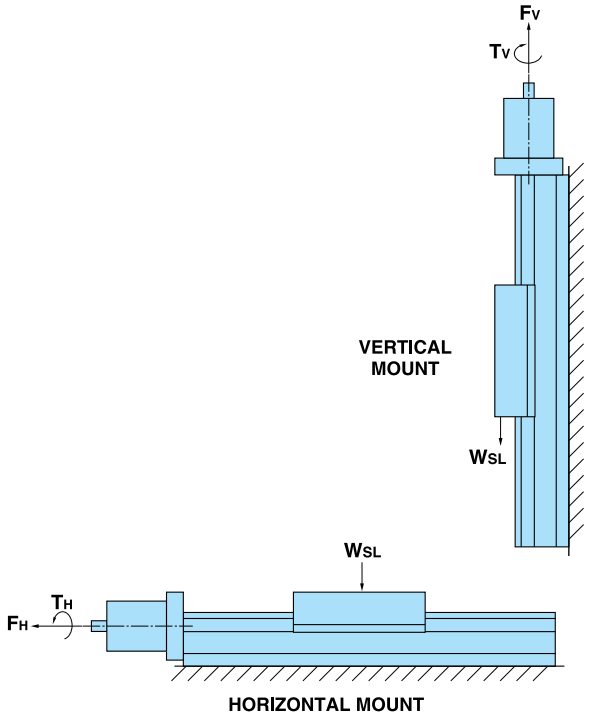
3 Slide Thrust and Torque

The force required to power the slide assembly (F_H and F_V), includes the force to overcome all external loads as shown under "slide loading," plus the force required to power the saddle assembly times a factor of safety. The factor of safety is applied to ensure sufficient power to accelerate the load and overcome friction due to variables such as lubrication, machining tolerances, finish, etc.

Depending on the type of drive used, see FS under Definitions below.

The torque required to accelerate or decelerate the slide is dependent upon the moving weight, screw size, the force applied to the slide and the rate of acceleration or deceleration. Please consult the motor manufacturer you selected for this analysis.

The thrust values obtained from the calculation must be checked against the maximum thrust capacities (pages 8 thru 19), for the drive model being used. If acceleration time is critical or speeds above 350 ipm are required, please consult factory for power requirements.



Thrust and Torque Calculations

Thrust Calculations ± :

$F_H = (F_D + F_{SLH} + F_L + F_{ML} + F_{MW} + F_{MT})FS$

$F_V = (F_D + F_{SLV} + F_L + F_{ML} + F_{MW} + F_{MT})FS$

$F_{SLH} = (\mu)(W_{SL})(SL)$

$F_{SLV} = (W_{SL})(SL)$

$F_L = (\mu)(L_D + L_U + L_S)$

$F_{ML} = (3\mu)(\frac{M_L}{SL}) + P$

$F_{MW} = (2\mu)(\frac{M_W}{E}) + (\mu)\ (P)$

$F_{MT} = (3\mu)(\frac{M_T}{SL}) + P$

Torque Calculations:

$T_H = T_D + (K)(F_H)(L)$

$T_V = T_D + (K)(F_V)(L)$

± All forces, loads and moments must be added using correct signs positive or negative

Model	T_D (in. lb.)		
	Acme Screw	Ball Screw Non-Preloaded Nut	Ball Screw Preloaded Nut
HWS5, HWL7	8	5	—
HWL9	11	5	10
HWS7, HWL12	16	10	15
HWS9, HWL15	18	12	17
HWS12, HWL18	19	12	17
HWS15, HWS18, HWL24	21	15	20
HWS24, HWS32	26	20	25

Definitions

3 Slide Thrust and Torque

F_H = Force required to power slide horizontally (lb.)

F_V = Force required to power slide vertically (lb.)

F_D = Force required to overcome saddle drag (lb.)
10 lb. — 100 lb.
Drag force is affected by several factors including gib adjustment, way wipers, way covers, lubrication and slide size. Use lower values for smaller slides and higher values for larger slides.

F_{SLH} = Force required to power saddle weight horizontally (lb.)

F_{SLV} = Force required to power saddle weight vertically (lb.)

F_L = Force required to overcome loads L_D, L_U, L_S (lb.)

F_{ML} = Force required to overcome moment M_L, and load P (lb.)

F_{MW} = Force required to overcome moment M_W, and load P (lb.)

F_{MT} = Force required to overcome moment M_T, and load P (lb.)

FS = Factor of Safety
Manual Drives = 1.5
Lead Screw Drives = 2
Hydraulic Cylinder Drives = 2.5
Air Cylinder Drives = 3

μ = Coefficient of Friction with Lubrication
.25 cast iron on hardened steel
.08 low friction bearing material

SL = Saddle Length (in.)

W_{SL} = Weight of Saddle (lb./in.)

E = Distance Across Ways (in.)
See page 7 or 14 for E dimension

T_H = Torque required to power slide horizontally (in. lb.)

T_V = Torque required to power slide vertically (in. lb.)

T_D = Torque required to overcome drag of screw assembly See chart. (in. lb.)

K = Screw Constant
.64 Acme Screw
.20 Ball Screw

L = Lead of Screw (ipr)
See pages 8, 9, 16 or 17.

Gilman
Ordering Instructions

SKF's Global Network Stands Behind Your Gilman Machine Tool Components

If you want to get the most out of your manufacturing process concept, make Gilman and SKF your process/product partners.

Our decades of manufacturing engineering experience — combined with our global network of research, design support and service facilities — give you access to detailed process/environment application knowledge in addition to a comprehensive line of SKF precision bearings, spindles, roller screws, rails, slides and modules.

Strategically located to provide parts, service and support anywhere in the world, SKF's global network facilities are dedicated to delivering the highest value to our manufacturing partners.

SKF Bearing Technology

Belt-Driven and Integrally Motorized Spindles

Steel, Ceramic, Air and Magnetic Bearing Spindles

Ball and Roller Screws

Dovetail, Hardened Way and Roller Bearing Rails

Slides and Drives

ORDERING INSTRUCTIONS FOR HWS AND HWL SECTION SLIDES

HWS9-12-24-H5-9 With Side Porting

MODEL NUMBER CODE

Slide Section And Width														
HWS5	HWL7	HWS7	HWL9	HWS9	HWL12	HWS12	HWL15	HWS15	HWL18	HWS18	HWL24	HWS24	HWS32	Description	Code
														Saddle Length	
•	•	•	•	•	•	•	•	•	•	•	•	•	•	See catalog for min. & max. lengths	‡
														Base Length	
•	•	•	•	•	•	•	•	•	•	•	•	•	•	See catalog for min. & max. lengths	‡
														Slide Drive Type	
•	•	•	•	•	•	•	•	•	•	•	•			Acme screw in-line handwheel	A1
•	•	•	•	•	•	•	•	•	•	•	•	•		Acme screw right angle handwheel	E1
•	•	•	•	•	•	•	•	•	•	•	•	•	•	Rolled ball screw non preloaded nut	D1▲
	•	•	•	•	•	•	•	•	•	•	•	•	•	Ground ball screw preloaded nut (inch)	D2▲
	•	•	•	•	•	•	•	•	•	•	•	•	•	Ground ball screw preloaded nut (metric)	D3▲
•	•	•	•	•	•	•	•	•	•	•	•	•	•	Hydraulic cylinder stop rod	H2
	•		•		•		•		•		•			Hydraulic cylinder adjustable end stops	H3
		•		•		•		•		•		•		Hydraulic cylinder internal	H4
		•		•		•		•		•		•		Hydraulic cylinder internal adjustable end stops	H5
		•		•		•		•		•		•		Hydraulic cylinder partially internal	H6
		•		•		•		•		•		•		Hydraulic cylinder partially internal adjustable end stops	H7
•	•	•	•	•	•	•	•	•						Air cylinder stop rod	P2
•	•	•	•	•	•	•	•	•						Air cylinder stop rod parallel hydraulic check	P4
		•	•	•	•	•	•	•						Air cylinder stop rod in-line hydraulic check	P5
														Travel	
•	•	•	•	•	•	•	•	•	•	•	•	•	•	See catalog for min. & max. lengths	‡

Accessories

Accessories must be specified when ordering. Be sure to include any additional information required when ordering accessories. See pages 11, 22 and 23 for accessories.

‡ Specify saddle length, base length and travel in inches.

▲ Specify maximum traverse rate for ball screw slides. (saddle in ipm or ball screw rpm)

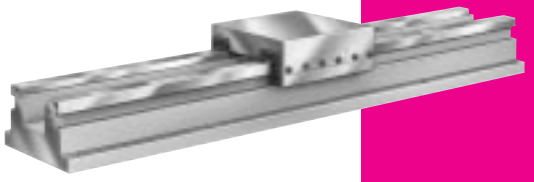
Gilman
HWS Section Basic

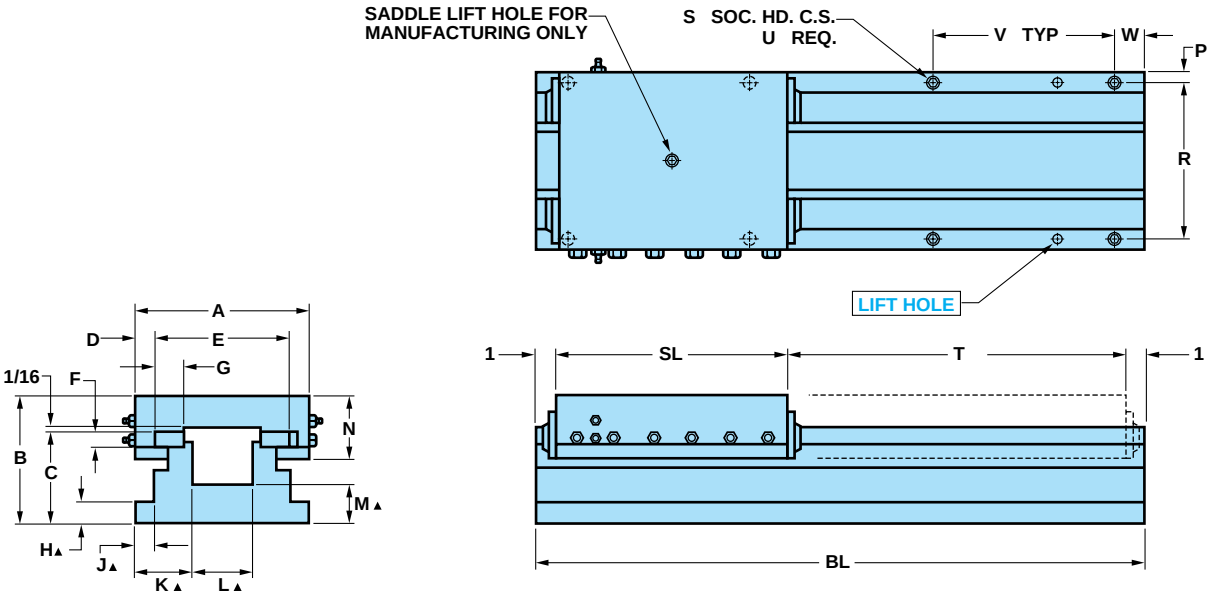
HWS basic hardened steel way slide assemblies are offered in eight sizes as shown in the chart below. Consult the factory for larger sizes.

Saddle lengths are available in one-inch increments up to 60 inches. Base lengths in three-inch increments from 9 to 30; six-inch increments from 30 to 60; and 12-inch increments from 60 to 120. Base lengths greater than 120 inches are available in 12-inch increments up to 240 inches maximum. This enables the designer to achieve an economical, compact machine package. The saddle is generally shorter than the base. Saddle length plus two inches for way wipers, plus the travel, equals the base length, BL=SL+T+2. If the base does not calculate to a standard length, adjust the saddle length or travel to suit a standard base length. Base lengths other than shown are available. The saddle, retainer and gib wear surfaces are lined with low friction bearing material to reduce sliding friction.

A cavity is machined in the center of the base to provide space for a drive mechanism such as a lead screw or cylinder. HWS5 through HWS32 slides with drives are shown on page 8 through 13. Consult factory for other special drives to suit your particular applications. Prints will be furnished on request.

For accessories, see pages 22 and 23.



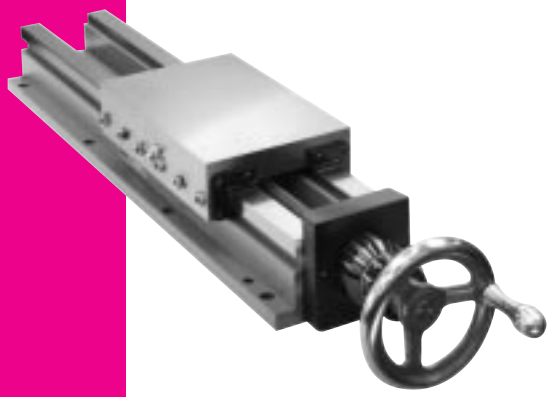


▲ Cast surface on HWS18, HWS24 and HWS32

MODEL	SL 1 Inch Increments		BL*		Dimensions (inches)															Approx. Weight lb./in. Lg.	
	Min.	Max.	Min.	Max.	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	SL	BL
HWS 5	5	21	9	24	5	3½	2½	11/16	3⅝	½	⅞	⅝	11/16	1 11/16	1⅝	15/16	1⅞	⅜	4¼	5/16	1⅝	1¾
HWS 7	7	36	12	72	7	5	3⅝	15/16	5⅛	¾	1 3/16	¾	⅞	2⅜	2¼	1½	2⅝	½	6	⅜	3¼	3⅞
HWS 9	9	60	12	84	9	6⅜	4⅝	1⅛	6¾	¾	1⅜	1	1	2⅞	3¼	2	3⅛	½	8	⅜	5	6½
HWS 12	12	60	15	96	12	7½	5½	1½	9	1⅛	2⅛	1¼	1⅛	4⅛	3¾	2¼	4	⅝	10¾	½	8⅛	10½
HWS 15	15	60	18	96	15	8½	6¼	1⅞	11¼	1½	2⅞	1½	1⅜	5¼	4½	2⅜	4¾	¾	13½	⅝	11¾	15
HWS 18	18	60	21	120	18	10½	7¾	2¼	13½	1¾	3¼	1⅞	3⅛	6⅜	5¼	2⅝	5¾	1⅝	14¾	¾	17	19¾
HWS 24	24	60	27	120	24	12	8½	3	18	1¾	3¾	2⅛	4	8½	7	2½	6⅞	2¼	19½	¾	29⅛	28¼
HWS 32	32	60	36	120	32	12½	8½	4	24	1¾	3¾	2⅛	5	10	12	3	7⅜	2¼	27½	¾	41¼	36¼

*Base Lengths and Mounting Hole Locations Dimensions (inches)																			
BL	9	12	15	18	21	24	27	30	36	42	48	54	60	72	84	96	108	120	132 through 240
U	4	4	6	6	6	8	8	8	8	8	10	10	10	10	12	12	12	14	Available in 12 inch increments. Consult factory for mounting locations.
V	6	9	6	7½	9	7	8	9	11	13	11	12½	14	17	16	18	20	19	
W	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	2	2	2	2	2	3	4	3	

Gilman
HWS Section
Acme Lead Screw
(A1, E1)



Lead screw drives for hardened steel way slides are available in three different drive configurations.

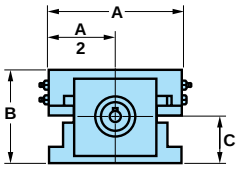
A1 and E1 drives are used primarily for hand positioning and can be furnished with either an in-line drive or a 2:1 reduction right angle drive which can be positioned eight ways as shown below. Please specify position number when ordering. Manual drives are furnished with a balanced hand wheel, micrometer dial, needle bearing thrust assembly, an acme lead screw (X_1), and bronze nut. Acme adjustable nuts for reducing backlash (.001 in. minimum), or hexagon end shaft extensions for wrench adjustments are available on request.

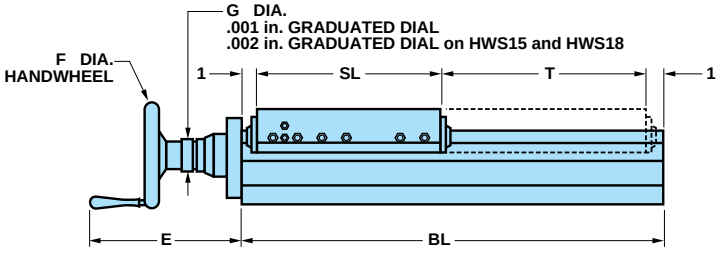
The base length is calculated as follows: BL=SL+T+2. If the base does not calculate out to a standard length, adjust the saddle length or travel to suit a standard base length.

For accessories, see pages 22 and 23.

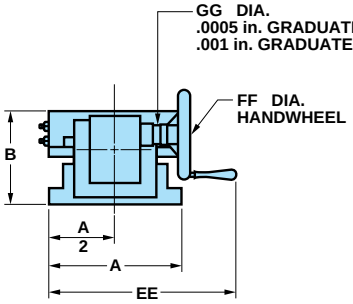
FOR DIMENSIONS NOT SHOWN SEE BASIC ASSEMBLY PAGE 7

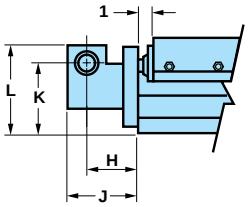
A1

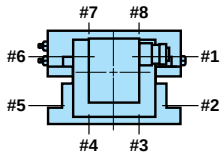




E1







DRIVE POSITION #1 STANDARD.
POSITION #2 THRU #8 OPTIONAL.
SPECIFY WHEN ORDERING

X_1- ACME LEAD SCREW L.H. THREAD
MAXIMUM LEAD ERROR .003 in./ft.
MAXIMUM NUT BACKLASH .005 in.
STANDARD ON A1 and E1 DRIVES

MODEL	Thrust † Capacity (lb.)	X_1	
		Dia. (inches)	Lead (ipr)
HWS 5	850	5/8	.100
HWS 7	1000	1	.100
HWS 9	1115	1 1/4	.100
HWS 12	1475	1 1/2	.100
HWS 15	1025	2	.200
HWS 18▲	1205	2	.200
HWS 24 ‡	4525	2 1/2	.250

† Based on 25 lb. pull on handwheel (A1 Drive).

▲ .250 lead Acme and 5:1 reduction furnished with E1 Drive.

‡ Not available in A1 Drive; 5:1 reduction furnished with E1 Drive.

MODEL	1 Inch Increments SL		T		BL*		DIMENSIONS (inches)													
	Min.	Max.	Min.	Max.•	Min.	Max.	A	B	C	D	E	EE	F	FF	G	GG	H	J	K	L
HWS 5	5	21	1	17	9	24	5	3 1/2	1 13/16	1 13/16	6 5/8	8 3/16	5	4	1 5/8	1	2 5/32	3	2 15/16	3 13/16
HWS 7	7	36	1	63	12	72	7	5	2 19/32	2 5/8	8 7/8	10 1/8	6	5	2 1/4	1 5/8	3 3/8	4 9/16	4 3/32	5 3/8
HWS 9	9	60	1	73	12	84	9	6 3/8	3 7/16	3 3/8	9 1/8	13	7	6	2 1/4	1 5/8	3 3/8	4 9/16	4 15/16	6 7/32
HWS 12	12	60	1	81	15	96	12	7 1/2	4 3/8	4 1/16	11 1/4	16 7/16	9	7	3	2 1/4	4 3/32	5 7/8	6 5/8	8 1/4
HWS 15	15	60	1	79	18	96	15	8 1/2	4 3/4	4 3/8	12 3/8	18 15/16	12	9	3	2 1/4	4 27/32	6 5/8	7	8 5/8
HWS 18	18	60	1	100	21	120	18	10 1/2	6 1/4	5 7/8	14 1/8	21 3/8	14	12	4	3	7 1/8	9 5/16	9 1/4	10 7/8
HWS 24‡	24	60	1	94	27	120	24	12	—	6	—	27 1/8	—	12	—	3	7 1/8	9 5/16	9	10 5/8
HWS 32	32	60	1	86	36	120	32	12 1/2	—	6	—	—	—	—	—	—	—	—	—	—

• Maximum travel based on 350 ipm saddle traverse.
* See page 7 for base lengths and mounting hole locations.

Gilman
HWS Section
Ball Lead Screw
(D1, D2, D3)

The D1, D2, and D3 drives are used for powered applications where the purchaser provides and mounts the driving source to the keyed shaft and piloted mounting face. These slides are equipped with a ball lead screw. Each slide has a thrust assembly which utilizes a pair of preloaded ball bearings. D1 features a rolled ball screw with nonpreloaded ball nut. D2 inch or D3 metric features a precision ground ball screw with preloaded ball nut. Preselected ball nuts with .005 in. maximum backlash are available on request for the D1 drive assembly. It is highly recommended that all ball screws are protected from contaminants or accidental damage from tools or work pieces.

Total lost motion of slide drive assembly includes backlash in nut, backlash in thrust assembly, and deflection in the system due to load. Please consult the factory in applications where positioning is critical.

For accessories, see pages 22 and 23.

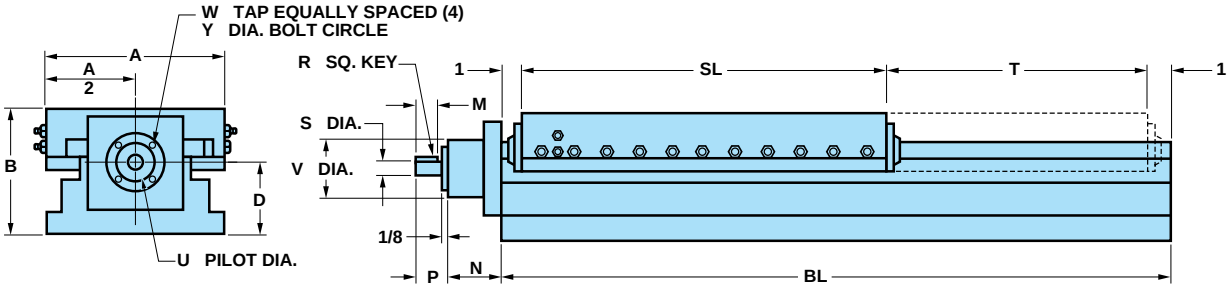
Please specify maximum traverse rate when ordering. (Saddle in ipm or ball screw rpm)

FOR DIMENSIONS NOT SHOWN SEE BASIC ASSEMBLY PAGE 7

D1- ROLLED BALL LEAD SCREW R.H. THREAD
MAXIMUM LEAD ERROR .009 in./ft.
MAXIMUM NUT BACKLASH .010 –.015 in.
DEPENDING ON SCREW SIZE.

D2- GROUND BALL LEAD SCREW R.H. THREAD
MAXIMUM LEAD ERROR .0005 in./ft.
ZERO NUT BACKLASH.

D3- GROUND METRIC BALL LEAD SCREW
R.H. THREAD
MAXIMUM LEAD ERROR .04mm/m (.0005 in./ft.)
ZERO NUT BACKLASH.

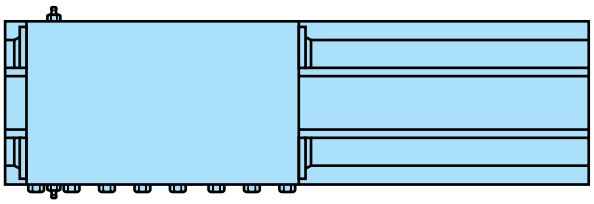


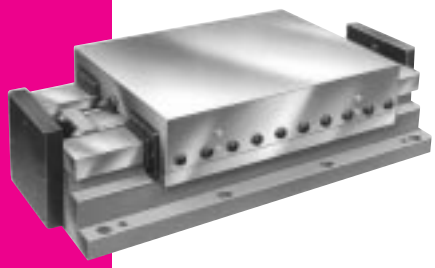
MODEL	D1			D2			D3		
	Thrust Capacity (lb.)	Dia. (inches)	Lead (ipr)	Thrust Capacity (lb.)	Dia. (inches)	Lead (ipr)	Thrust Capacity (lb.)	Dia. (mm)	Lead (mm/r)
HWS 5	950	¾	.200	—	—	—	—	—	—
HWS 7	3400	1	.250	2200	⅞	.250	2200	25	5
HWS 9	4500	1½	.250	2800	1¼	.250	2700	32	5
HWS 12	4500	1½	.250	3200	1½	.250	3200	40	5
HWS 15	14000	2	.500	8300	2	.500	12800	50	10
HWS 18	14000	2	.500	8300	2	.500	12800	50	10
HWS 24	21100	2½	.500	15200	2½	.500	15400	63	10
HWS 32	21100	2½	.500	15200	2½	.500	15400	63	10

DIMENSIONS (inches)									Approximate Weight (lb)					MODEL
									Per Inch Length		Drives			
M	N	P	R	S	U	V	W	Y	SL	BL	T	A1 D1 D2 D3	E1	
¾	2⅛	1 3/16	⅛	½	1⅝	2⅝	¼-20	2⅛	1⅝	1¾	⅛	7	7¼	**HWS 5**
1	2⅝	1⅜	3/16	⅝	1⅞	2⅞	¼-20	2⅜	3¼	3⅞	3/16	10	19	**HWS 7**
1¼	3	1⅞	3/16	⅞	2⅝	3⅞	5/16-18	3¼	5	6½	5/16	20	27	**HWS 9**
1¼	3¼	1⅞	3/16	⅞	2⅝	3⅞	5/16-18	3¼	8⅛	10½	⅝	38	55	**HWS 12**
2	3¾	2⅞	5/16	1⅜	3⅞	5⅜	⅜-16	4⅝	11¾	15	13/16	45	68	**HWS 15**
2	4	2⅞	5/16	1⅜	3⅞	5⅜	⅜-16	4⅝	17	19¾	1 5/16	102	128	**HWS 18**
2¾	4 5/16	3 9/16	⅜	1¾	5	6½	⅜-16	5¾	29⅛	28¼	1¾	125	150	**HWS 24‡**
2¾	4 13/16	3 9/16	⅜	1¾	5	6½	⅜-16	5¾	41¼	36¼	1¾	125	—	**HWS 32**

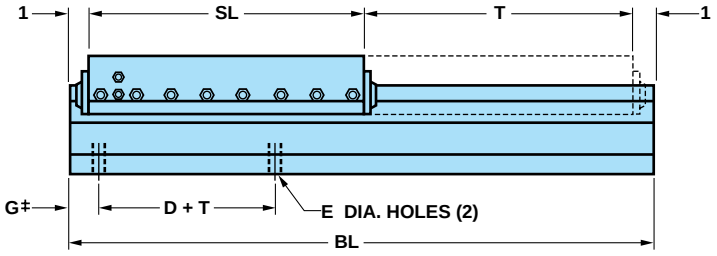
Gilman

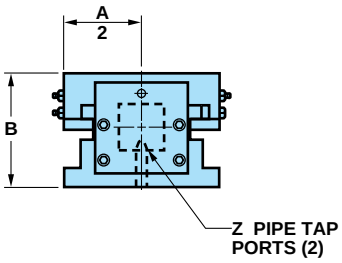
HWS Section
Hydraulic Cylinder-
Internal (H4, H5, H6, H7)



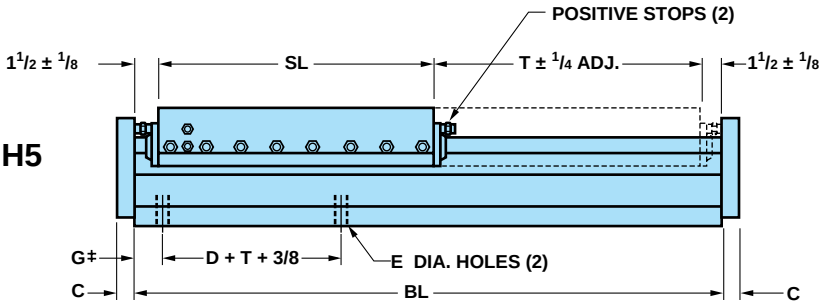


H4



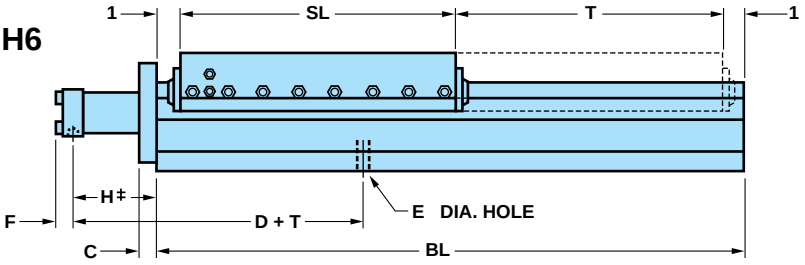


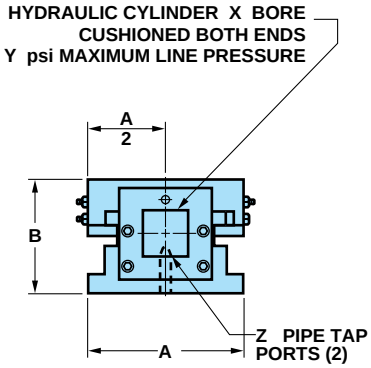
H5



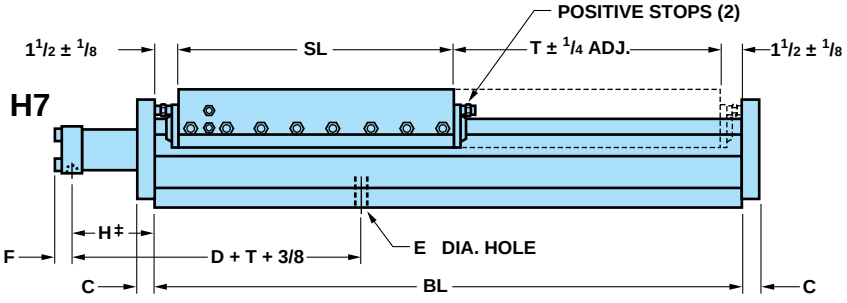
FOR DIMENSIONS NOT SHOWN
SEE BASIC ASSEMBLY PAGE 7

H6





H7



MODEL	1 Inch Increments				BL*		DIMENSIONS (inches)									Approximate Weight (lb.)				
	SL		T													Per Inch Length			Cyl. Drive	Stops
	Min.	Max.	Min.	Max.	Min.	Max.	A	B	C	D	E	F	X	Y	Z	SL	BL	T		
HWS 7	7	36	2	24	12	72	7	5	1	2 1/4	7/8	13/16	1 1/2	750	3/8-18	3 1/4	3 7/8	3/8	12	5
HWS 9	9	60	2	45	15	84	9	6 3/8	1	2 1/4	7/8	7/8	2	750	3/8-18	5	6 1/2	5/8	19	7
HWS 12	12	60	2	50	18	96	12	7 1/2	1 1/4	2 3/8	7/8	7/8	2 1/2	750	3/8-18	8 1/8	10 1/2	7/8	33	13
HWS 15	15	60	2	55	21	96	15	8 1/2	1 1/4	2 5/8	1	1 1/16	3 1/4	750	1/2-14	11 3/4	15	1	50	17
HWS 18	18	60	2	60	24	120	18	10 1/2	3 1/2	3 19/32	1 1/4	1 9/16	3 1/4	1250	3/4-14	17	19 3/4	2	92	31
HWS 24	24	60	2	70	30	120	24	12	4	3 7/8	1 1/4	1 9/16	4	1250	3/4-14	29 1/8	28 1/4	2 3/4	124	38

*See page 7 for base lengths and mounting hole locations.

MORE

Gilman
HWS Section
Hydraulic Cylinder-Internal (H4, H5, H6, H7)

Slides with hydraulic cylinder drives mounted internal or partially internal, H6 and H7, are more compact than end mounted drives shown on page 12. These slides can be used whenever the cylinder size provides sufficient thrust. On H4 and H5 drives both cylinder ports are accessible through the slide base. On H6 and H7 drives the front port is accessible through the slide base and the rear port is external to the slide base.

H5 and H7 drives are furnished with an adjustable end stop. The travel can be adjusted ±1/8 inch on each end.

The hydraulic cylinder is cushioned on both ends for a smooth stop. Cylinders are of the standard, square-head medium pressure type on HWS7 through HWS15 slides and high pressure type on HWS18 and HWS24 slides.

To select the drive that suits your requirements, follow the procedure listed below:

A) Select the slide width, A dimension.

B) Check thrust requirements (see page 4, section 3), against the thrust capacity of slide selected using X bore and line pressure. Do not exceed the maximum line pressure Y.

C) Determine your needs, adjustable end stop drives, H5 and H7, or drive without stops, H4 and H6.

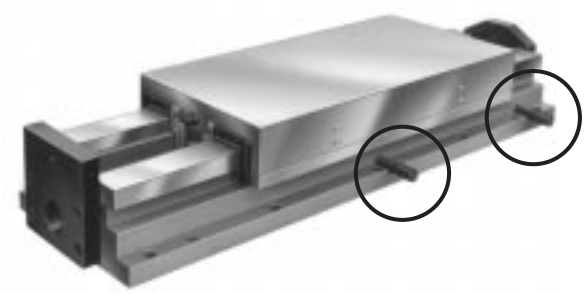
D) Determine saddle length, SL; travel, T; and the base length, BL=SL+T+2 for drives H4 and H6 or BL=SL+T+3 for drives H5 and H7. If the base does not calculate to a standard length, adjust the saddle length or travel to suit a standard base length.

E) Now follow through the six-step procedure listed under Drive Selection chart shown below. It may not be necessary to complete all six steps. Proceed until the formulated requirements are met. (Internal cylinder port locations are determined by the G dimension, step 1; partially internal cylinder port locations by the H dimension, step 4).

For accessories, see pages 11, 22 and 23.

Micrometer Stop Accessory

For convenience in adjusting the end stops, a micrometer dial graduated in .001 inch increments is available on H5 and H7 models. The total adjustment is ±1/8 inch on each end. ***(Must be specified when ordering.)***



Side Porting Accessory

When cylinder ports are not accessible through the bottom of the base, or for ease of piping, hydraulic cylinder slides can be furnished with the ports piped out either side of the base.
(Must be specified when ordering.)
NOTE: G or H dimension may vary with side and bottom porting.

DRIVE SELECTION ‡

G MIN.	H MIN.	K H4 H6	K H5 H7	MODEL
2	2	7	6 11/16	**HWS 7**
2	2	8	7 11/16	**HWS 9**
2	2	9	8 11/16	**HWS 12**
2	2	10	9 11/16	**HWS 15**
3	3	12	11 11/16	**HWS 18**
3	3	14	13 11/16	**HWS 24**

1) G = SL – T– K (H4 or H5)
2) G ≥ G min., use G calc. in step 1
3) G < G min., calculate H
4) H• =T + K – SL (H6 or H7)
5) H ≥ H min., use H calc. in step 4
6) H < H min., use H min.

• H > 2/3T Cylinder furnished with cap end foot mount; customer to provide support.

Gilman
HWS Section
Hydraulic Cylinder-
Stop Rod (H2)

These slides are used where an even feed rate is required and end limits of travel have to be accurate.

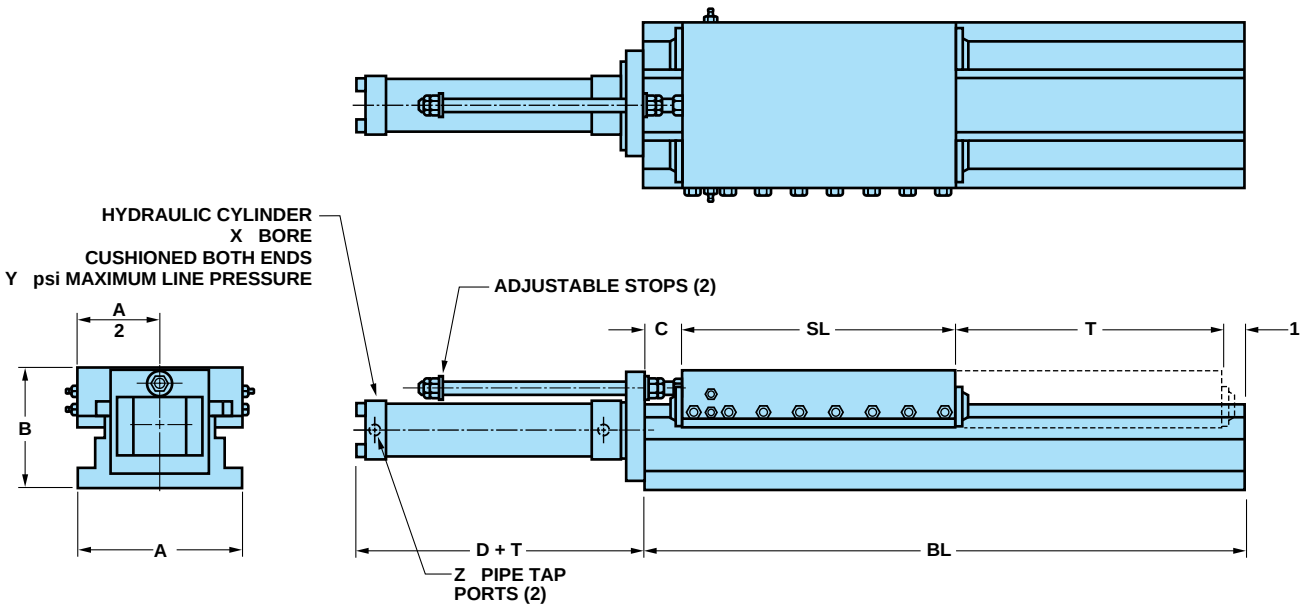
The hydraulic cylinder is cushioned on both ends for a smooth stop. Cylinders are of the standard, rectangular flange mount, medium pressure type on HWS5 through HWS15 slides and high pressure type on HWS18 through HWS32 slides.

Stops are provided to regulate the length of travel and may be adjusted easily to accommodate different requirements. This feature, when used with a controlled dwell, ensures depth accuracy.

The base length is calculated as follows: BL=C+SL+T+1. If the base does not calculate out to a standard length, adjust the saddle length to suit a standard base length.

For accessories, see pages 22 and 23.

FOR DIMENSIONS NOT SHOWN
SEE BASIC ASSEMBLY PAGE 7



MODEL	1 Inch Increments				BL*		DIMENSIONS (inches)							Approximate Weight (lb.)			
	SL		T											Per Inch Length			Cyl. Drive
	Min.	Max.	Min.	Max.	Min.	Max.	A	B	C	D	X	Y	Z	SL	BL	T	
HWS 5	5	21	2	16	12	24	5	3½	2	5	1½	750	⅜-18	1⅝	1¾	⅜	9
HWS 7	7	36	2	30	12	72	7	5	2	5 7/16	2	750	⅜-18	3¼	3⅞	⅝	15
HWS 9	9	60	2	30	15	84	9	6⅜	2	5 9/16	2½	750	⅜-18	5	6½	¾	22
HWS 12	12	60	2	30	18	96	12	7½	2	6⅝	3¼	750	½-14	8⅛	10½	⅞	41
HWS 15	15	60	2	36	21	96	15	8½	3	6⅝	4	750	½-14	11¾	15	1¼	60
HWS 18	18	60	2	36	24	120	18	10½	3	8⅝	4	1250	¾-14	17	19¾	2⅞	108
HWS 24	24	60	2	36	36	120	24	12	4	9⅝	5	1250	¾-14	29⅛	28¼	4½	158
HWS 32	32	60	2	36	42	120	32	12½	4	10⅛	5	1250	¾-14	41¼	36¼	4½	158

*See page 7 for base lengths and mounting hole locations.

Gilman

HWS Section
Air Cylinder Stop Rod (P2), and Air Cylinder Hydraulic-Check Stop Rod (P4, P5)

Air cylinder drive slides are commonly used for light to moderate loads and where end limits of travel have to be accurate.

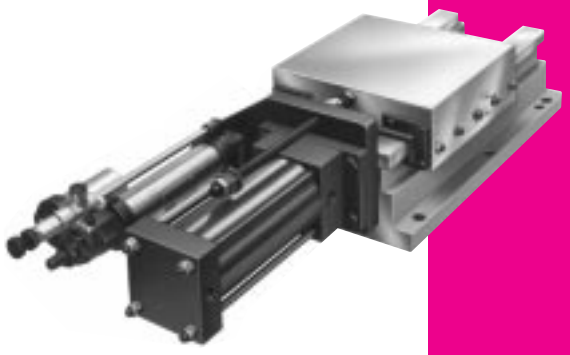
P2 drives are used for two-position applications that do not require an even feed rate. P4 parallel mount and P5 in-line mount drives use a hydraulic check with the cylinder to provide a smooth, adjustable rate of feed. P5 not available on HWS5 model.

Forward acting hydraulic checks with a feed rate control of 4 to 300 ipm are standard. Reverse acting, double acting, skip, stop or precision (feed rate 1 to 50 ipm) hydraulic checks are available on request.

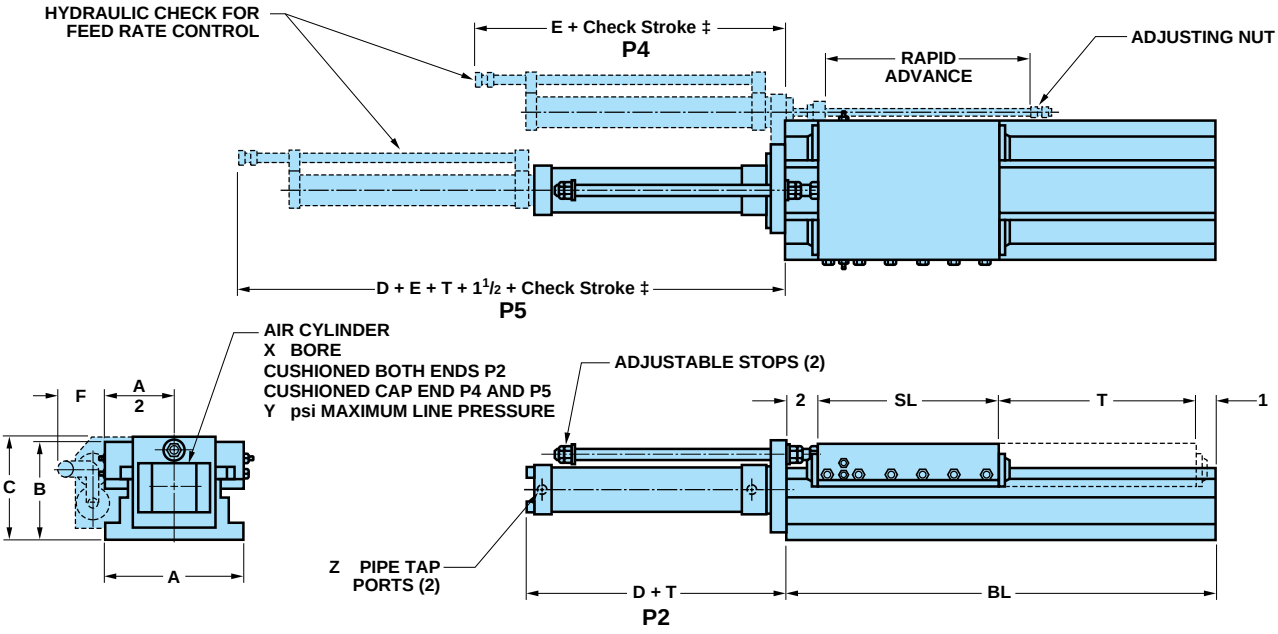
Adjustable stops are provided to regulate the length of travel. This feature, when used with a controlled dwell, ensures depth accuracy.

The base length is calculated as follows: BL=SL+T+3. If the base does not calculate out to a standard length, adjust the saddle length or travel to suit a standard base.

For accessories, see pages 22 and 23.



FOR DIMENSIONS NOT SHOWN SEE BASIC ASSEMBLY PAGE 7



MODEL	1 Inch Increments						BL*		DIMENSIONS (inches)									Approx. Weight (lb.)			
	SL		T															Per Inch Length			Cyl. Drive
	Min.	Max.	Min.	Max. P2	Max. P4	Max. P5	Min.	Max.	A	B	C	D	E	F	X	Y	Z	SL	BL	T	
HWS 5	5	21	2	16	16	—	12	24	5	3½	3 7/16	4 15/16	9	4 1/16	2	250	⅜-18	1⅝	1¾	¾	17
HWS 7	7	24	2	30	18	9	12	60	7	5	5	5 7/16	9	4 1/16	2½	250	⅜-18	3¼	3⅞	1	27
HWS 9	9	24	2	30	18	9	15	60	9	6⅜	6⅜	6¼	9	4 1/16	3¼	250	½-14	5	6½	1¼	39
HWS 12	12	30	2	30	18	9	18	72	12	7½	7½	6½	9	4 1/16	4	200	½-14	8⅛	10½	1½	61
HWS 15	15	30	2	36	18	9	21	72	15	8½	8⅝	6 13/16	9	4 1/16	5	150	½-14	11¾	15	2	89

*See page 7 for base lengths and mounting hole locations.

‡ Hydraulic check strokes available in 2, 4, 6, 9, 12, 15, and 18 inches. Check supplied with stroke equal to or greater than travel.

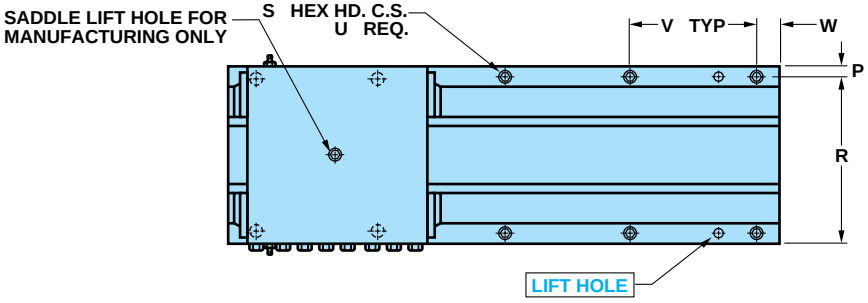
Gilman
HWL Section
Basic

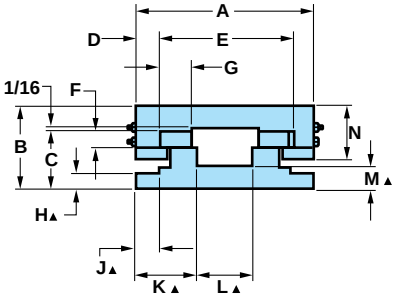
HWL basic hardened steel way slide assemblies have a lower profile than the HWS slide assemblies, and are used in applications where space is limited or multiple axis compounds are required. HWL slides reduce the centerline height of spindles and holding fixtures mounted to the saddle which reduces the moment due to the thrust load.

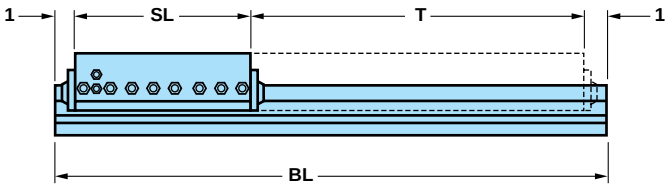
Saddle lengths are available in 1 inch increments up to 60 inches. Base lengths in 3 inch increments from 12 to 30; 6 inch increments from 30 to 60; and 12 inch increments from 60 to 120. Base lengths greater than 120 inches are available in 12 inch increments up to 144 inches maximum. This enables the designer to meet specific travel length requirements which often means savings in cost and space. The saddle is generally shorter than the base, saddle length plus 2 inches for way wipers, plus the travel, equals the base length, BL=SL+T+2. If the base does not calculate to a standard length, adjust the saddle length to suit a standard base length. Base lengths other than shown are available. The saddle, retainer and gib wear surfaces are lined with low friction bearing material to reduce sliding friction.

A cavity is machined in the center of the base to provide space for drive mechanism such as a lead screw or cylinder. HWL7 through HWL24 slides with drives are shown on pages 15 through 19. Consult factory for other special drives to suit your particular applications.

For accessories, see page 22 and 23.







▲ Cast surface on HWS18 and HWS24

MODEL	SL 1 Inch Increments		BL*		Dimensions (inches)																Approx. Weight lb./in. Lg.	
	Min.	Max.	Min.	Max.	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	SL	BL
HWL 7	7	36	12	60	7	3½	2½	15⁄16	5⅛	¾	13⁄16	½	1	2½	2	1	2¼	½	6	⅜	2½	2⅞
HWL 9	9	60	12	72	9	4⅜	3⅛	1⅛	6¾	¾	1⅜	¾	1	3⅜	2¼	15⁄16	2⅝	½	8	⅜	3⅞	4½
HWL12	12	60	15	84	12	5½	3 15⁄16	1½	9	1⅛	2⅛	⅞	15⁄16	4 1⁄16	2⅝	11 3⁄16	3 9⁄16	⅝	10¾	½	6¾	7¾
HWL 15	15	60	18	96	15	6¾	4 13⁄16	1⅞	11¼	1½	2⅞	1	1 9⁄16	5⅞	3¼	2 3⁄16	4 7⁄16	¾	13½	⅝	10½	12
HWL 18	18	60	21	120	18	8	5¾	2¼	13½	1¾	3¼	1¼	3 3⁄16	6 13⁄16	4⅜	2 1⁄16	5¼	1⅝	14¾	¾	14¾	16⅜
HWL 24	24	60	27	120	24	10½	7½	3	18	1¾	3¾	2⅛	4	8½	7	2½	6⅜	2¼	19½	¾	26	27

*Base Lengths and Mounting Hole Locations Dimensions (inches)																			
BL	12	15	18	21	24	27	30	36	42	48	54	60	72	84	96	108	120	132	144
U	4	6	6	6	8	8	8	8	8	10	10	10	10	12	12	12	14	16	18
V	9	6	7½	9	7	8	9	11	13	11	12½	14	17	16	18	20	19	18	17
W	1½	1½	1½	1½	1½	1½	1½	1½	1½	2	2	2	2	2	3	4	3	3	4

Gilman
HWL Section Hydraulic Cylinder-Stop Rod (H2)

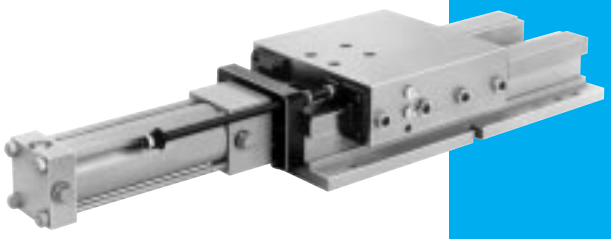
These slides are used where an even feed rate is required and end limits of travel have to be accurate.

The hydraulic cylinder is cushioned on both ends for a smooth stop. Cylinders are of the standard, medium pressure type on HWL7 through HWL18 slides and high pressure type on HWL24 slide.

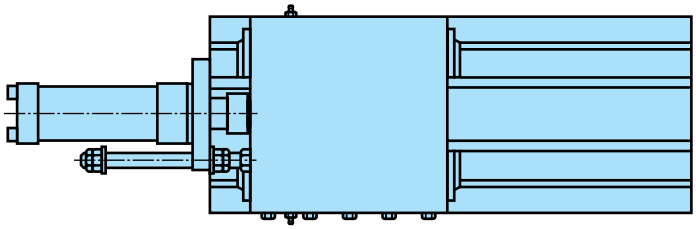
Stops are provided to regulate the length of travel and may be adjusted easily to accommodate different requirements. This feature, when used with a controlled dwell, ensures depth accuracy.

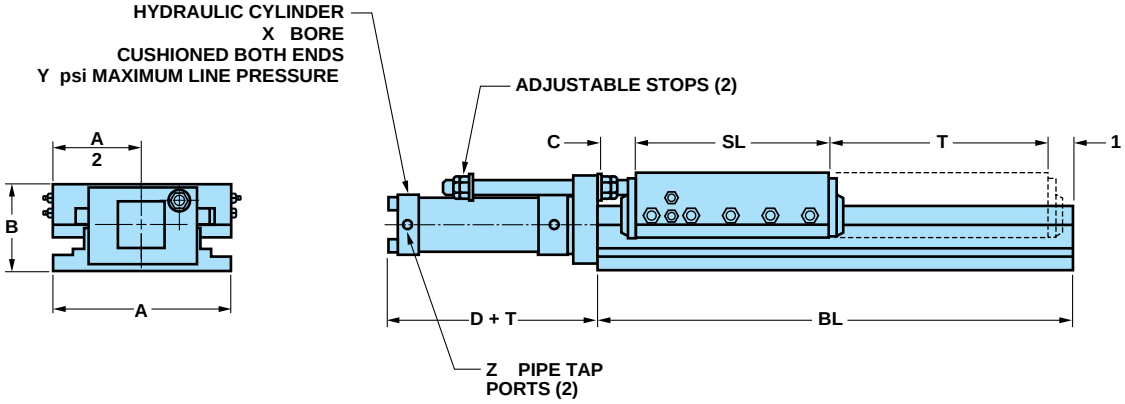
The base length is calculated as follows: BL=C+SL+T+1. If the base does not calculate out to a standard length, adjust the saddle length to suit a standard base length.

For accessories, see pages 22 and 23.



FOR DIMENSIONS NOT SHOWN
SEE BASIC ASSEMBLY PAGE 14

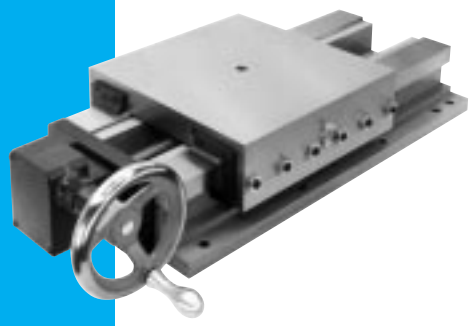




MODEL	1 Inch Increments				BL*		DIMENSIONS (inches)							Approximate Weight (lb.)			
	SL		T											Per Inch Length			Cyl. Drive
	Min.	Max.	Min.	Max.	Min.	Max.	A	B	C	D	X	Y	Z	SL	BL	T	
HWL 7	7	36	2	24	12	60	7	3½	2	5⅛	1½	750	⅜-18	2½	2⅞	⅜	9
HWL 9	9	60	2	30	15	72	9	4⅜	2	5 7/16	2	750	⅜-18	3⅞	4½	⅝	15
HWL 12	12	60	2	30	18	84	12	5½	2	5 9/16	2½	750	⅜-18	6¾	7¾	¾	22
HWL 15	15	60	2	30	21	96	15	6¾	2	6⅝	3¼	750	½-14	10½	12	⅞	41
HWL 18	18	60	2	36	24	120	18	8	3	6⅝	4	750	½-14	14¾	16⅜	1¼	60
HWL 24	24	60	2	36	30	120	24	10½	3	8⅞	4	1250	¾-14	26	27	2⅞	108

*See page 14 for base lengths and mounting hole locations.

Gilman
HWL Section
Acme Lead Screw
(A1, E1)



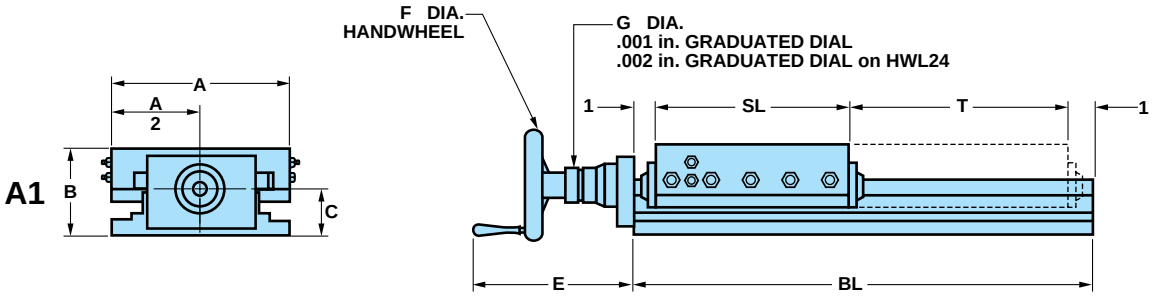
Lead screw drives for hardened steel way slides are available in three different drive configurations.

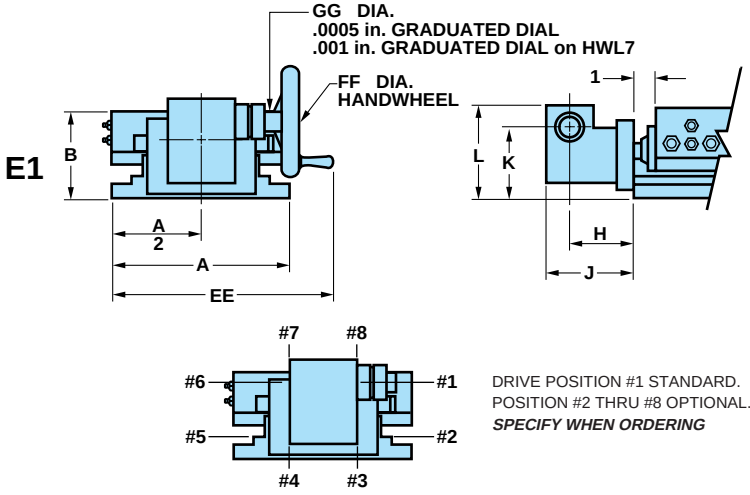
A1 and E1 drives are used primarily for hand positioning and can be furnished with either an in-line drive or a 2:1 reduction right angle drive which can be positioned eight ways as shown below. Please specify position number when ordering. Manual drives are furnished with a balanced hand wheel, micrometer dial, needle bearing thrust assembly, an acme lead screw (X_1), and bronze nut. Acme adjustable nuts for reducing backlash (.001 in. minimum), or hexagon end shaft extensions for wrench adjustments are available on request.

The base length is calculated as follows: BL=SL+T+2. If the base does not calculate out to a standard length, adjust the saddle length or travel to suit a standard base length.

For accessories, see pages 22 and 23.

FOR DIMENSIONS NOT SHOWN SEE BASIC ASSEMBLY PAGE 14





DRIVE POSITION #1 STANDARD.
POSITION #2 THRU #8 OPTIONAL.
SPECIFY WHEN ORDERING

X_1- ACME LEAD SCREW L.H. THREAD
MAXIMUM LEAD ERROR .003 in./ft.
MAXIMUM NUT BACKLASH .005 in.
STANDARD ON A1 and E1 DRIVES

MODEL	Thrust † Capacity (lb.)	X_1	
		Dia. (inches)	Lead (ipr)
HWL 7	850	5/8	.100
HWL 9	1000	3/4	.100
HWL 12	925	1	.100
HWL 15	1085	1 1/4	.100
HWL 18	2045	1 1/2	.100
HWL 24 ‡	1200	2	.200

† Based on 25 lb. pull on handwheel (LA Drive).
‡ .250 lead Acme and 5:1 reduction furnished with E1 drives.

MODEL	1 Inch Increments SL		T		BL*		DIMENSIONS (inches)													
	Min.	Max.	Min.	Max.•	Min.	Max.	A	B	C	D	E	EE	F	FF	G	GG	H	J	K	L
HWL 7	7	36	1	33	12	60	7	3 1/2	1 29/32	1 13/16	6 3/4	9 3/16	5	4	1 5/8	1	2 9/32	3 1/8	3 1/32	3 29/32
HWL 9	9	60	1	34	12	72	9	4 3/8	2 3/8	2 9/32	8 7/8	11 1/8	6	5	2 1/4	1 5/8	3 3/8	4 9/16	3 7/8	5 3/32
HWL 12	12	60	1	40	15	84	12	5 1/2	2 29/32	2 15/16	8 7/8	12 5/8	6	5	2 1/4	1 5/8	3 3/8	4 9/16	4 13/32	5 9/16
HWL 15	15	60	1	52	18	96	15	6 3/4	3 5/8	3 9/16	9 3/8	15 11/16	7	6	2 1/4	1 5/8	3 5/8	4 13/16	5 1/8	6 9/32
HWL 18	18	60	1	59	21	120	18	8	4 5/8	4 5/16	12 3/8	20 7/16	12	9	3	2 1/4	4 27/32	6 5/8	6 7/8	8 1/2
HWL 24‡	24	60	1	99	27	120	24	10 1/2	6	5 5/8	14 1/8	24 3/8	14	12	4	3	7 1/8	9 5/16	9	10 5/8

• Max. travel based on 350 ipm saddle traverse.
* See page 14 for base lengths and mounting hole locations.

Gilman
HWL Section
Ball Lead Screw
(D1, D2, D3)

The D1, D2, and D3 drives are used for powered applications where the purchaser provides and mounts the driving source to the keyed shaft and piloted mounting face. These slides are equipped with a ball lead screw. Each slide has a thrust assembly which utilizes a pair of preloaded ball bearings. D1 features a rolled ball screw with nonpreloaded ball nut. D2 inch or D3 metric features a precision ground ball screw with preloaded ball nut. Preselected ball nuts with .005 in. maximum backlash are available on request for the D1 drive assembly. It is highly recommended that all ball screws are protected from contaminants or accidental damage from tools or work pieces.

Total lost motion of slide drive assembly includes backlash in nut, backlash in thrust assembly and deflection in the system due to load. Please consult the factory in applications where positioning is critical.

For accessories, see pages 22 and 23.

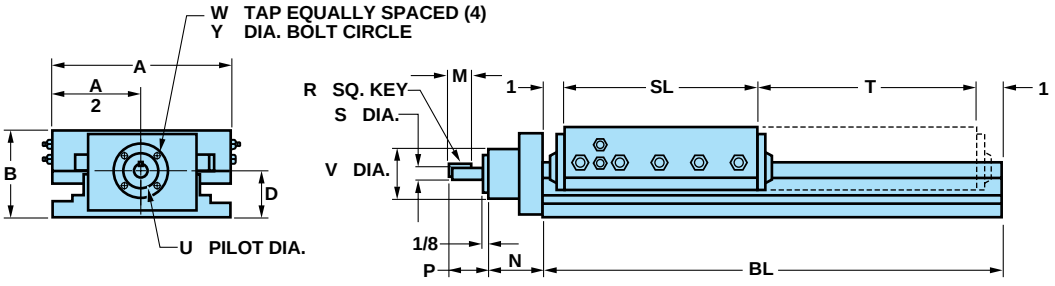
Please specify maximum traverse rate when ordering. (Saddle in ipm or ball screw rpm)

FOR DIMENSIONS NOT SHOWN SEE BASIC ASSEMBLY PAGE 14

D1- ROLLED BALL LEAD SCREW R.H. THREAD
MAXIMUM LEAD ERROR .009 in./ft.
MAXIMUM NUT BACKLASH .010 –.015 in. DEPENDING ON SCREW SIZE.

D2- GROUND BALL LEAD SCREW R.H. THREAD
MAXIMUM LEAD ERROR .0005 in./ft.
ZERO NUT BACKLASH.

D3- GROUND METRIC BALL LEAD SCREW R.H. THREAD
MAXIMUM LEAD ERROR .04mm/m (.0005 in./ft.)
ZERO NUT BACKLASH.



MODEL	D1			D2			D3		
	Thrust Capacity (lb.)	Dia. (inches)	Lead (ipr)	Thrust Capacity (lb.)	Dia. (inches)	Lead (ipr)	Thrust Capacity (lb.)	Dia. (mm)	Lead (mm/r)
HWL 7	950	¾	.200	—	—	—	—	—	—
HWL 9	950	¾	.200	1400	¾	.200	1400	20	5
HWL 12	3400	1	.250	2200	⅞	.250	2200	25	5
HWL 15	4500	1½	.250	2800	1¼	.250	2700	32	5
HWL 18	4500	1½	.250	3200	1½	.250	3200	40	5
HWL 24	14000	2	.500	8300	2	.500	12800	50	10

DIMENSIONS (inches)									Approximate Weight (lb)					MODEL
									Per Inch Length			Drives		
M	N	P	R	S	U	V	W	Y	SL	BL	T	A1 D2 D1 D3	E1	
¾	2¼	1 3/16	⅛	½	1⅝	2⅝	¼-20	2⅛	2½	2⅞	⅛	7	7¼	**HWL 7**
¾	2½	1 3/16	⅛	½	1⅝	2⅝	¼-20	2⅛	3⅞	4½	3/16	10	19	**HWL 9**
1	2⅝	1⅜	3/16	⅝	1⅞	2⅞	¼-20	2⅜	6¾	7¾	5/16	10	19	**HWL 12**
1¼	3¼	1⅞	3/16	⅞	2⅝	3⅞	5/16-18	3¼	10½	12	⅝	20	27	**HWL 15**
1¼	3¼	1⅞	3/16	⅞	2⅝	3⅞	5/16-18	3¼	14¾	16⅜	13/16	45	68	**HWL 18**
2	4	2⅞	5/16	1⅜	3⅞	5⅜	⅜-16	4⅝	26	27	1 5/16	102	128	**HWL 24‡**

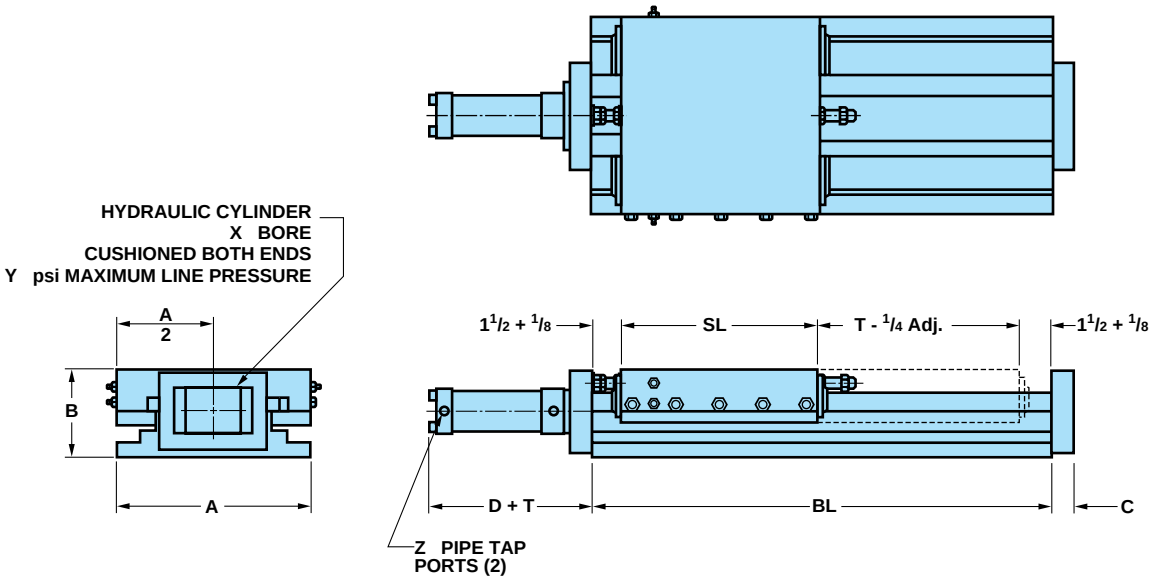
Gilman
HWL Section
Hydraulic Cylinder-
Adjustable End Stops (H3)

These slides have hydraulic cylinder drives end mounted. The hydraulic cylinder is cushioned on both ends for a smooth stop. Cylinders are of the standard rectangular flange mount medium pressure type on HWL7 through HWL18 slides and high pressure type on HWL24 slide. An adjustable positive stop is furnished at each end of saddle that can be adjusted + 1/8 inch on each end to regulate the length of travel.

The base length is calculated as follows: BL=SL +T+3. If the base does not calculate out to a standard length, adjust the saddle length or travel to suit a standard base.

For accessories, see pages 22 and 23.

FOR DIMENSIONS NOT SHOWN
SEE BASIC ASSEMBLY PAGE 14



MODEL	1 Inch Increments				BL*		DIMENSIONS (inches)							Approx. Weight (lb.)			
	SL		T											Per Inch Length			Cyl. Drive
	Min.	Max.	Min.	Max.	Min.	Max.	A	B	C	D	X	Y	Z	SL	BL	T	
HWL 7	7	36	2	24	12	60	7	3½	¾	5⅛	1½	750	⅜-18	2½	2⅞	⅜	9
HWL 9	9	60	2	30	15	72	9	4⅜	1	5 7/16	2	750	⅜-18	3⅞	4½	⅝	15
HWL 12	12	60	2	30	18	84	12	5½	1	5 9/16	2½	750	⅜-18	6¾	7¾	¾	22
HWL 15	15	60	2	30	21	96	15	6¾	1¼	6⅝	3¼	750	½-14	10½	12	⅞	41
HWL 18	18	60	2	36	24	120	18	8	1¼	6⅝	4	750	½-14	14¾	16⅜	1¼	60
HWL 24	24	60	2	36	36	120	24	10½	3½	8⅛	4	1200	½-14	26	27	2⅛	108

*See page 14 for base lengths and mounting hole locations.

Gilman

HWL Section
Air Cylinder Stop Rod (P2), and Air Cylinder Hydraulic-Check Stop Rod (P4, P5)

Air cylinder drive slides are commonly used for light to moderate loads and where end limits of travel have to be accurate.

P2 drives are used for two-position applications that do not require an even feed rate. P4 parallel mount and P5 in-line mount drives use a hydraulic check with the cylinder to provide a smooth, adjustable rate of feed. P5 not available on HWL7 model.

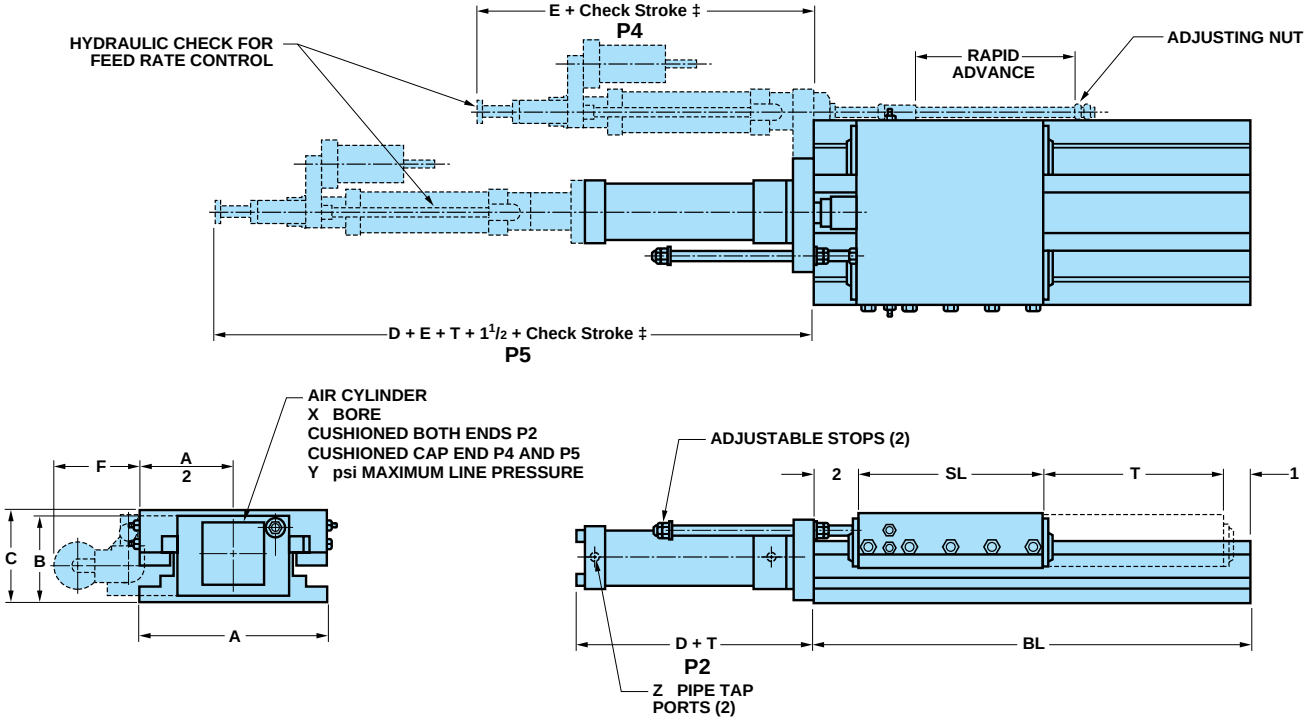
Forward acting hydraulic checks with a feed rate control of 4 to 300 ipm are standard. Reverse acting, double acting, skip, stop or precision (feed rate 1 to 50 ipm) hydraulic checks are available on request.

Adjustable stops are provided to regulate the length of travel. This feature, when used with a controlled dwell, ensures depth accuracy.

The base length is calculated as follows: BL=SL+T+3. If the base does not calculate out to a standard length, adjust the saddle length or travel to suit a standard base.

For accessories, see pages 22 and 23.

FOR DIMENSIONS NOT SHOWN
SEE BASIC ASSEMBLY PAGE 14



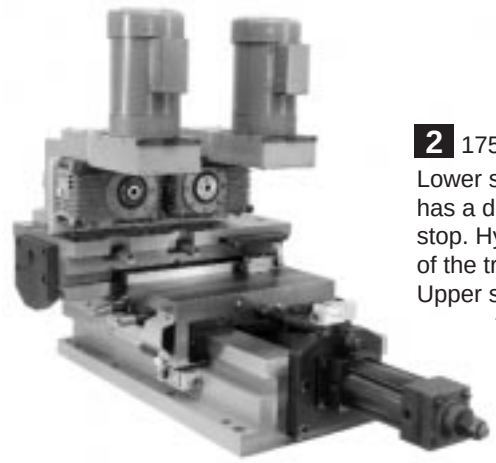
MODEL	1 Inch Increments						BL*		DIMENSIONS (inches)									Approx. Weight (lb.)			
	SL		T															Per Inch Length			Cyl. Drive
	Min.	Max.	Min.	Max. P2	Max. P4	Max. P5	Min.	Max.	A	B	C	D	E	F	X	Y	Z	SL	BL	T	
HWL 7	7	24	2	24	18	—	12	60	7	3½	3⅞	4 15/16	9	4 1/16	2	250	⅜-18	2½	2⅞	¾	17
HWL 9	9	24	2	30	18	9	15	72	9	4⅜	4⅜	5 7/16	9	4 1/16	2½	250	⅜-18	3⅞	4½	1	27
HWL 12	12	30	2	30	18	9	18	84	12	5½	5½	6¼	9	4 1/16	3¼	250	½-14	6¾	7¾	1¼	39
HWL 15	15	30	2	30	18	9	21	96	15	6¾	6¾	6½	9	4 1/16	4	200	½-14	10½	12	1½	61

*See page 14 for base lengths and mounting hole locations.
‡ Hydraulic check strokes available in 2, 4, 6, 9, 12, 15, and 18 inches. Check supplied with stroke equal to or greater than travel.

Gilman Special
Hardened Steel Way Slide Modules

1 18054 **3500/HWL7/HWS7/HWL12 Special Compound Slide and Spindle Module**

Hydraulic driven slides for three axis of motion. Travels X-Axis-3", Y-Axis-4", Z-Axis-6".
Application: Plunge mill two pads on an aluminum part.

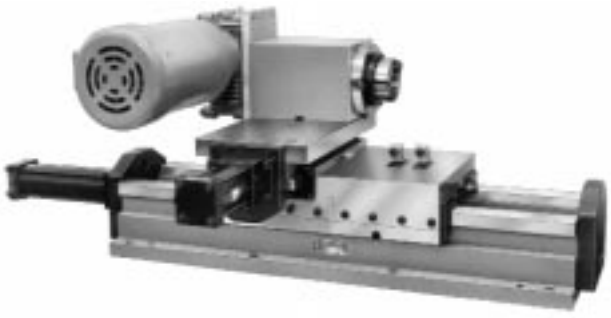


2 17526 **Special Compound Slide and Spindle Module**

Lower slide is a three-position type. End mounted hydraulic cylinder has a double rod, with one end used as an in-line adjustable positive stop. Hydraulic cylinder mounted under the saddle extends the balance of the travel, using the stop rod assembly for positive depth control. Upper slide has an internal mounted cylinder assembly. Mounted on the saddle are two 4000 belt gear driven spindle assemblies.
Application: Advance lower slide to center position, cross feed upper slide to mill face of two parts. Feed lower slide to hollow mill same two parts. Retract lower slide to starting position, retract cross feed slide and index parts.

3 17590 **HWL9/HWL15 Special Compound Slide Module**

Lower slide assembly is designed to accept a ball screw and nut assembly. Upper slide assembly is designed for a hydraulic cylinder with adjustable forward stop. On this module the customer will furnish the power drive assemblies.
Application: Facing and boring.



4 17576 **HWS15 Special Compound Slide Module**

Both axes are supplied with ground ball screw and nut assemblies to be motorized. Lower axis used for positioning. Upper axis has a R.H. and L.H. ground ball screw so the saddles can be moved toward and away from each other.
Application: Compound slide assembly for special lathe.

5 17572 **HWS9/HWS12 Special Compound Slide and Spindle Module**

Both slide axes are hydraulic cylinder powered. Lower axis used for three positions. Upper slide rapid traverse feed, to a depth stop and retract. Spindle is a 4000 series special gear drive.
Application: Three position slot milling.

MORE

Gilman Special
Hardened Steel Way Slide Modules

6 17644 **HWS7/4000 Special Slide and Spindle Module**

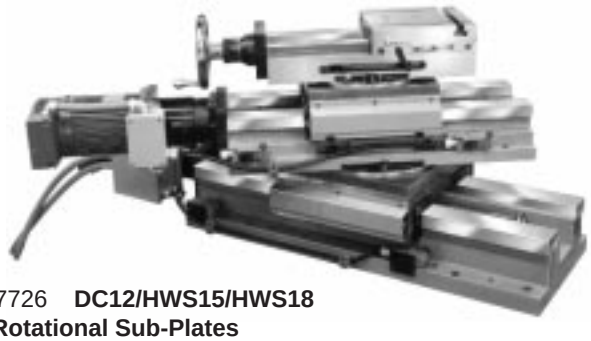
Slide has DC motorized belt driven ball screw assembly. Spindle nose end designed for special boring tool holder. Spindle belt driven with AC motor and electronic variable speed controls. Slide is supplied with accordion way covers, multiple limit switch assembly and a welded steel angle bracket.
Application: Precision boring of parts on dial boring machine.

7 17559 **HWL15/HWS24 Compound Slide Module**

Lower slide is equipped with ball screw and nut assemblies to be motorized and programmed for three stops. The saddle has hydraulic retainer locks to secure the positions. Three HWL15 slides are machined in the saddle, two of which are supplied with ball screw and nut assemblies, the other to be lead screw powered and gear driven from customers tapping head.
Application: Drilling, chamfering, and tapping of stationary part.

8 18055 **HWV24 Special V-Type Hardened Steel Way Slide**

Ideally suited for your precision boring applications. Available in sizes 7" to 24".



9 17726 **DC12/HWS15/HWS18 with Rotational Sub-Plates**

Special three-axis assembly, complete with programmable controller capable of two axis simultaneous operation. Travels, HWS18 Axis-28", HWS15 Axis-19", DC12 Axis-12", with precision ground ball screws and preloaded nuts in both hardened way axes.
Application: Special lathe compound for turbine machining.

10 17728 **8000C-X3M-50-G-D3 Special Motorized Vertical Travel Spindle Mounted to HWS32/HWS32**

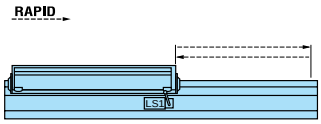
Travels in Z-Axis-20", X-Axis-12", Y-Axis-28". Precision ground screws and preloaded nuts — all axes. 15 H.P. spindle drive with two-speed manual transmission.
Application: Three-axis machining with customer engineered and assembled CNC control.

11 17632 **HWS24/HWL20/4000 Special Slide and Spindle Module**

Lower axis slide has internal mounted hydraulic cylinder assembly. Top slide is a low profile base with ball screw assembly and hydraulic drive motor. Four spindles are in a cluster, each pair driven by an electric gear motor.
Application: Milling four separate surfaces of a piece part at one time.

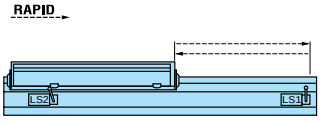
Gilman
Accessories

1 Limit Switch–Side Mounted: Heavy duty oil tight plug-in limit switches are offered in four commonly used arrangements and are available on all model slides. Other types of switch arrangements can be supplied depending on your control requirements. Switch mounting configurations are shown for models HWS and HWL slides.



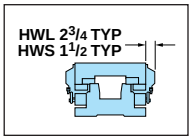
SL ≥ T + 2 "

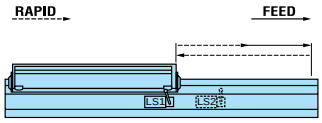
SA1 - One neutral position switch for signal at each end of travel. Saddle lengths greater or equal to the travel plus 2 inches.



SL < T + 2 "

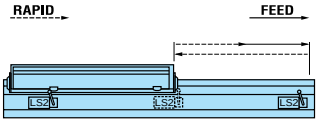
SA2 - Two standard switches for signal at each end of travel. Saddle lengths less than the travel plus 2 inches.





SL ≥ T + 2 "

SA3 - One neutral position switch for signal at each end of travel and one standard switch to signal a portion of travel in feed **(specify feed length)**. Saddle lengths greater or equal to the travel plus 2 inches.



SL < T + 2 "

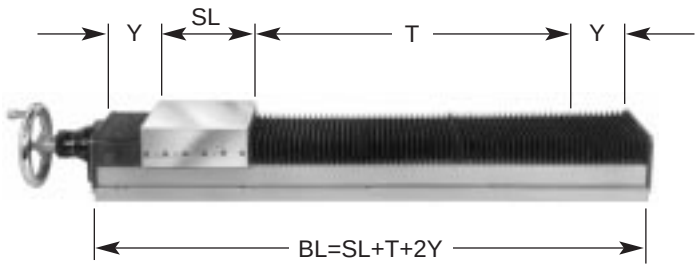
SA4 - Three standard switches. Two used for signal at each end of travel and one used to signal a portion of travel in feed **(specify feed length)**. Saddle lengths less than the travel plus 2 inches.

2 Limit Switch–Side Mounted Multiple: Precision multiple limit switches are more compact in design and combine from two to six switches in one housing. They are most beneficial when space is limited or for numerous switching positions. Available on all model slides.

3 Limit Switch–Stop Rod: A heavy duty oil tight plug-in neutral position switch gives a signal at each end of the travel and does not require resetting when the travel limits are adjusted. Available on all stop rod model slides.

4 Lubrication System–Manual or Automatic: Either system provides a convenient method of supplying a metered quantity of oil to the slide assembly with the inherent advantages of safety, cleanliness and savings both in time and lubricant. The manual system uses a pull handle pump lubricator, while the automatic system uses an electric pump that can be set to provide proper lubrication. For automatic systems **please specify** 115V or 230V. Either lubrication system can be supplied with nylon tubing, steel tubing or an internal manifold in the saddle (**please specify**). The lubricator will be supplied unmounted with six feet of nylon tubing.

MORE

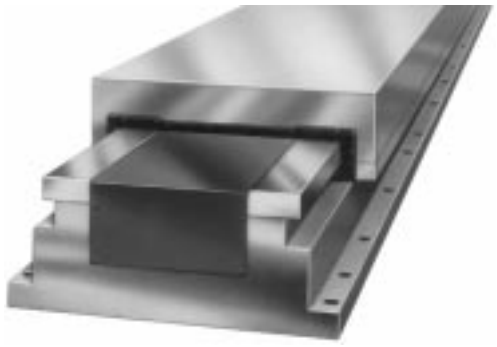


Slide Width	Dimensions (in.)	
	T Max.	Y*
5	15	.130T + .36
7	20	.098T + .36
9	25	.098T + .36
12	30	.079T + .36
15	40	.098T + .36
18	50	.044T + .36
24	70	.044T + .36
32	70	.044T + .36

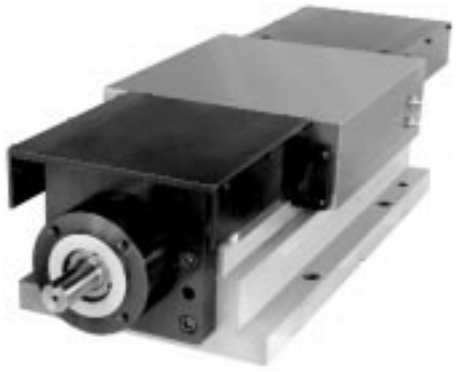
*Round up to 1/2" increment, Y min. = 1".

5 Way Covers–Accordion: When way wipers are not adequate, coated fabric covers are recommended in applications where there are chips, dirt or dust that might harm the way surface or drive mechanism in the base cavity. **These covers are not available on end stop models or cylinder end of stop rod models.**

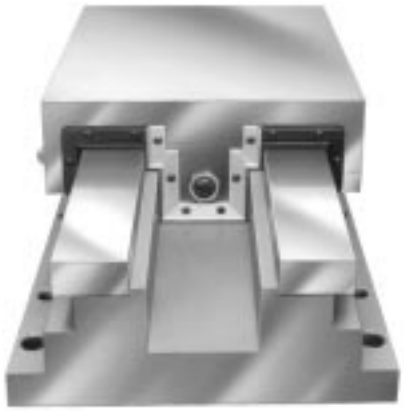
6 Way Covers–Telescoping: Collapsible metal covers with durable wipers and guides protect the ways and drive mechanism from contaminants such as chips and dirt. These covers also prevent accidental damage from tools or work pieces. The covers are fixed to the saddle and base support bracket. They are available on all model slides except drive end on models A1 and E1. Consult factory for specific dimensions.



7 Cavity Cover–Fixed: A metal cover mounted between the ways and fixed to the base, with a durable wiper mounted to the saddle protects the drive mechanism against chips, dirt, dust or accidental damage from tools or work pieces. These covers are generally used for short travel slides, and their use depends on the saddle length and travel. Available on all slides. Consult factory if applicable to your particular slide configuration.



8 Way Covers–Fixed: A metal cover with two side plates fixed to the saddle provides protection to the ways and base cavity from contaminants such as chips, dirt or accidental damage from tools or workpieces. These covers are generally used for short travel slides. Available on all slides except drive end on models A1, E1, P4 and P5.



9 Cavity Wiper: A durable wiper mounted to the saddle (opposite the drive end) wipes away chips, dirt and other contaminants from the base cavity. Base or end plate holes may be necessary for chip removal. Cavity wipers are available on all model slides with drives that do not extend beyond the front end of the saddle.

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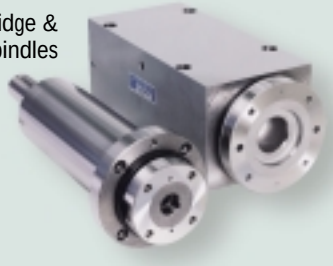
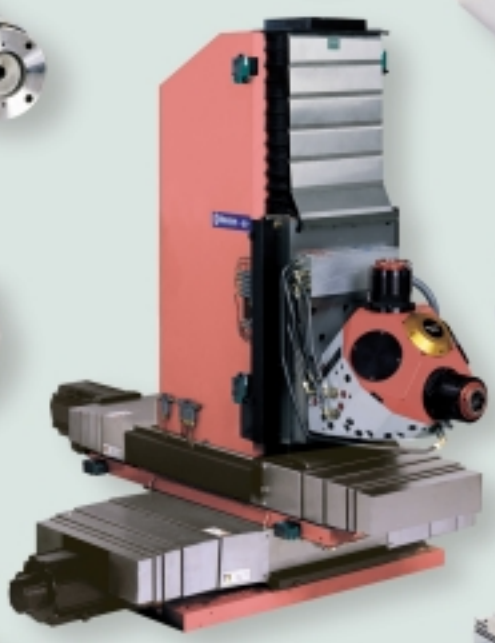
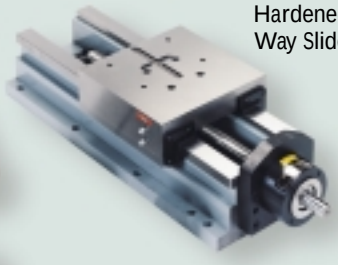


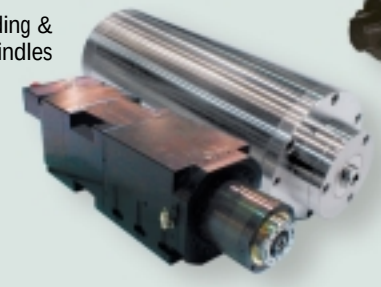
Cartridge & Block Spindles



Multi-Axis Modules



Hardened Steel Way Slides



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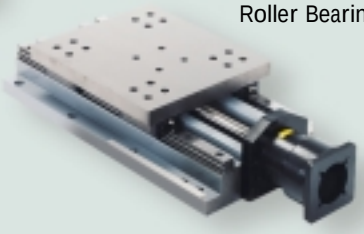

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