World-Wide Technical Reference Guide

Specifications and Service Techniques









TABLE OF CONTENTS

REGULATION SPECIFICATION TABLE (NEW YORK, BOSTON, ESSEX)	3
REGULATION SPECIFICATION TABLE (HAMBURG, BOSTON, ESSEX)	4
STEEL WIRE SIZES FOR NEW YORK STEINWAY GRANDS AND VERTICALS	5
STEEL WIRE SIZES FOR HAMBURG STEINWAY GRANDS AND VERTICALS	6
STEEL WIRE SIZES FOR BOSTON AND ESSEX PIANOS	7
HAMBURG PEDAL AND LYRE SERVICE	8
HAMBURG KEYBLOCK PLATE SYSTEM	10
HAMBURG BACKCHECK REPLACEMENT PROCEDURES	12
NEW YORK STEINWAY LEG PLATES	15
SERVICING TEFLON BUSHINGS	17
STEINWAY "MODERN" GRANDS—SIZES AND PRODUCTION YEARS	19
WEIGHTS OF STEINWAY PIANOS	20
SIZES AND WEIGHTS OF BOSTON AND ESSEX PIANOS	21
YEAR OF MANUFACTURE FOR STEINWAY PIANOS	22
YEAR OF MANUFACTURE OF BOSTON AND ESSEX PIANOS	23
STEINWAY GRAND UNDERLEVER ASSEMBLY INSTALLATION PROCEDURE	24

Steinway, Boston, and Essex Regulating Specifications - New York Measurements

GRAND PIANOS

Model	Key Height	Blow Dis- tance	Let-off Bass	Let-off Mid-range	Let-off Treble	Hammer Drop	Key Dip	Hammer Checking	Down Weight - Bass	Down Weight - Tenor	Down Weight - Mid	Down Weight - Treble	Down Weight - High	Up Weight	After- touch
Steinway & Sons						from let-off	F		grams	grams	grams	grams	grams	grams	
D/C	2 19/32*	1 7/8"	1/16"	1/16"	1/16"	1/16"	.390420"	as high	51	50-49	48	47	46	19+	.031- .046"
A & B	2 19/32"	1 3/4"	1/16"	1/16"	1/16"	1/16"	.390420"	as possible	51	50-49	48	47	46	19+	.031- .046"
O&L	2 19/32"	1 3/4"	1/16"	1/16"	1/16"	1/16"	.390420"	(maximum	50	49	48	48	47	19+	.031- .046''
М	2 19/32"	1 3/4"	1/16"	1/16"	1/16"	1/16"	.390420"	5/8"	50	49	48	48	47	19+	.031- .046"
S	2 19/32"	1 3/4"	1/16"	1/16"	1/16"	1/16"	.390420"	from strings)	50	49	48	48	47	19+	.031- .046"
Boston	*Hamburg	sets the key	height on	models D an	d C at 67n	m or appro	oximately 2	21/32"							
GP-156	65 +/- 1	47 +/- 1	2	1.5	1	let off + 2	10 + .3	15 +	52	51	50	49	49	19+	.031- .046''
GP-163	65 +/- 1	47 +/- 1	2	1.5	ণ	let off + 2	10 + .3	15 +	52	51	50	49	49	19+	.031- .046''
GP-178	65 +/- 1	47 +/- 1	2	1.5	1	let off + 2	10 + .3	15 +	52	51	50	49	49	19+	.031- .046''
GP-193	65 +/- 1	47 +/- 1	2	1.5	1	let off + 2	10 + .3	15 +	52	51	50	49	49	19+	.031- .046"
GP-218 and 215	65 +/- 1	47 +/- 1	2	1.5	1	let off + 2	10 + .3	15 +	52	51	50	49	49	19+	.031- .046''
Essex	Measurem	ents in millir	neters												
EGP-155, 160, 161	65 +/- 1	45 +/- 1	2	1.5	1	2	10 +/3	15+	52	51	50	49	49	19+	.031- .046''
EGP-173,183	65 +/- 1	45 +/- 1	2	1.5	1	2	10 +/3	15+	52	51	50	49	49	19+	.031- .046''
	Measurem	ents in millir	neters												
UPRIGHT PIANOS															
Model	Key Height	Blow Dis- tance	Let-off Bass	Let-off Mid-range	Let-off Treble	Key Dip	Hammer checking	Down Weight - Bass	Down Weight - Tenor	Down Weight - Mid	Down Weight - Treble	Down Weight - High	Up Weight	After- touch	
Steinway & Sons								grams	grams	grams	grams	grams	grams		
1098	2 3/8"	1 3/4"	1/16"	1/16"	1/16"	.400"	1/2"	50 +/-3	50 +/-3	50 +/-3	50 +/-3	50 +/-3	19+	.031046"	
4510	2 3/8"	1 3/4"	1/16"	1/16"	1/16"	.400"	1/2"	50 +/-3	50 +/-3	50 +/-3	50 +/-3	50 +/-3	19+	.031046"	
R-52	27/10	1 3/4	1/10	1/10	1/10	.400	172	50 +7-5	50 +/-3	50 +1-5	50 +7-5	50 +1-5	19+	.031040	
<u>Boston</u>														1) 1)	
UP109	61	46	3	2.5	2	10.3	15	57	57	57	57	57	19+	.031046"	
UP-118	63	46	3	2.5	2	10.3	15	57	57	57	57	57	19+	.031046"	
UP-126 / UP-126	63	46	3	2.5	2	10.3	15	57	57	57	57	57	19+	.031046"	
UP-132	63	46	3	2.5	2	10.3	15	57	57	57	57	57	19+	.031046"	
Eccov	Measurem	ents in millir	neters												
EUP-107	61	43	3	2.5	2	10.7	15	50 +/-3	50 +/-3	50 +/-3	50 +/-3	50 +/-3	19+	031046"	
EUP-111 / 116	61	43	3	2.5	2	10.7	15	50 +/-3	50 +/-3	50 +/-3	50 +/-3	50 +/-3	19+	.031046"	
EUP-123	61	43	3	2.5	2	10.7	15	50 +/-3	50 +/-3	50 +/-3	50 +/-3	50 +/-3	19+	.031046"	
	Measurem	ents in millir	neters				•			•					

The measurements above are provided as general regulation guidelines. While regulating, slight variations may be needed to maximize the contro, repetition, and overall touch for the personalized requirements of each piano and pianist.

Steinway, Boston, and Essex Regulating Specifications - Hamburg Measurements

GRAND PIANOS	1	measurement	s in millimeters	1											
Model	Key Height	Blow Dis- tance	Let-off Bass	Let-off Mid- range	Let-off Treble	Hammer Drop	Key Dip	Hammer Checking	Down Weight - Bass	Down Weight - Tenor	Down Weight -Mid	Down Weight - Treble	Down Weight - High	Up Weight	After-touch
Steinway & Sons						from let-off			grams	grams	grams	grams	grams	grams	
D&C	65.0	47-49	1.5	1.0	1.0	2.0	9.9 - 10.6	as high	52	50-49	48	47	46	19+	.8 - 1.2
A & B	63	47-49	1.5	1.0	1.0	2.0	9.9 - 10.6	as possible	47	47	47	47	47	19+	.8 - 1.2
0 & L	63.0	47-49	1.5	1.0	1.0	2.0	9.9 - 10.6	(maximum	47	47	47	47	47	19+	.8 - 1.2
М	63	47-49	1.5	1.0	1.0	2.0	9.9 - 10.6	18 mm	47	47	47	47	47	19+	.8 - 1.2
S	63.0	47-49	1.5	1.0	1.0	2.0	9.9 - 10.6	from strings)	47	47	47	47	47	19+	.8 - 1.2
<u>Boston</u>															
GP-156	65 + /- 1	47 +/- 1	2	1.5	1	let off + 2	10 + .3	15 +	52	51	50	49	49	19+	.78 - 1.17
GP-163	65 +/- 1	47 +/- 1	2	1.5	1	let off + 2	10 + .3	15 +	52	51	50	49	49	19+	.78 - 1.17
GP-178	65 +/- 1	47 +/- 1	2	1.5	1	let off + 2	10 + .3	15 +	52	51	50	49	49	19+	.78 - 1.17
GP-193	65 +/ - 1	47 +/- 1	2	1.5	1	let off + 2	10 + .3	15 +	52	51	50	49	49	19+	.78 - 1.17
GP-218 and 215	65 +/- 1	47 +/- 1	2	1.5	1	let off + 2	10 + .3	15 +	52	51	50	49	49	19+	.78 - 1.17
Fsser															-
EGP-155, 160, 161	65 +/- 1	45 +/- 1	2	1.5	1	2	10 +/3	15+	52	51	50	49	49	19+	.78 - 1.17
EGP-173,183	65 +/- 1	45 +/- 1	2	1.5	1	2	10 +/3	15+	52	51	50	49	49	19+	.78 - 1.17
UPRIGHT PIANOS Model	Key Height	measurement Blow Dis- tance	s in millimeters Let-off Bass	Let-off Mid- range	Let-off Treble	Key Dip	Hammer checking	Down Weight - Bass	Down Weight - Tenor	Down Weight -Mid	Down Weight - Treble	Down Weight - High	Up Weight	After-touch	
Steinway & Sons								grams	grams	grams	grams	grams	grams		
1098	60.3	44.5	1.6	1.6	1.6	10.16	12.7	50 +/-3	50 +/-3	50 +/-3	50 +/-3	50 +/-3	19+	.78 - 1.17]
4510	60.3	44.5	1.6	1.6	1.6	10.16	12.7	50 +/-3	50 +/-3	50 +/-3	50 +/-3	50 +/-3	19+	.78 - 1.17	1
K-52	60.3	44.5	1.6	1.6	1.6	10.16	12.7	50 +/-3	50 +/-3	50 +/-3	50 +/-3	50 +/-3	19+	.78 - 1.17	1
Hamburg V	60.3	44.5	1.6	1.6	1.6	10.16	12.7	50 +/-3	50 +/-3	50 +/-3	50 +/-3	50 +/-3	19+	.78 - 1.17]
Boston															1
UP109	61	46	3	2.5	2	10.3	15	57	57	57	57	57	19+	.78 - 1.17	1
UP-118	63	46	3	2.5	2	10.3	15	57	57	57	57	57	19+	.78 - 1.17	1
UP-126 / UP-126	63	46	3	2.5	2	10.3	15	57	57	57	57	57	19+	.78 - 1.17	1
UP-132	63	46	3	2.5	2	10.3	15	57	57	57	57	57	19+	.78 - 1.17	1
Facey						•		•					•]
ESSEX	61	42	2	25	2	10.7	15	50.12	50 1/2	50.1/2	50.1/2	50.12	10.	70 447	4
EUF-107	61	43	2	2.5	2	10.7	15	50 +/-3	50 +/-3	50 +/-3	50 +/-3	50 +/-3	10+	79-117	-
EUP-117 110	61	43	3	2.5	2	10.7	15	50 +/-3	50 +/-3	50 +/-3	50 +/-3	50 +/-3	10+	78-117	1
LUF-120		40	5	2.0	2	10.7		30 77-3	00 -1-0	00 -1-0	30 +-3	JU +1-5	101	1.70-1.17	1

The measurements above are provided as general regulation guidelines. While regulating, slight variations may be needed to maximize the

contro, repetition, and overall touch for the personalized requirements of each piano and pianist.

				-														
Model	12	12 1/2	13	13 1/2	14	14 1/2	15	15 1/2	16	16 1/2	17	17 1/2	18	19	20	21	22	23
S		2	4	4	4	5	6	6	5	6	12		2	2				
M			6	4	4	5	6	6	5	6	12		2	4				
L ₁			6	4	4	5	6	6	5	6	12		8					
0			6	4	4	5	6	6	5	6	12		8					
85 Note A (Below 72000)			4	4	4	4	5	6	6	5	12		6					
A (Below 86000)			6	4	4	4	6	6	6	5	12		6					
A (Below 86000)			6	4	4	4	6	6	6	5	12		4	4	2			
B (Below 73226)			4	4	4	4	5	6	6	5	12		8	5	2			
B (Above 73226)			6	4	4	4	6	6	6	5	12		8	5	2			
C (Below 58952)			4	4	4	4	5	5	5	5	12		7	5	4			
C (Above 58952)				4	4	4	5	8	6	4	3	4	8	8	8	2		
D (Below 33000)			4	4	4	4	4	4	8	8	12		4	4	4	4	2	1
D (Below 51272)						4	4	4	9	6	8	6	8	8	4	4		
D (Above 51272)				4	4	4	5	8	6	6	8		6	7	6	4		
Verticals	12	12 1/2	13	13 1/2	14	14 1/2	15	15 1/2	16	16 1/2	17	17 1/2	18	19	20	21	22	23
F-40	2	4	4	4	4	4	4	4	4	6	6	4	2	2	2			
F-100	2	4	4	4	4	4	4	4	4	6	6	4	2	2	2			
45-1048		2	4	4	4	4	6	6	5	6	13		2	2				
I,M,R,S,T,FF,N			6	4	4	4	4	4	9	8	8		11					
O-85 Note			4	4	4	6	10	4	4	4	8		6			T I C		
FX			7	4	4	4	4	4	8	8	8		11		Note:	These fig	gures sho	ow gen-
G			6	4	4	4	5	6	4	8	12		6		table	will not fit	every pi	ano as
M			7	4	4	4	4	4	8	8	8		11		there	have be	en many	minor
F 11-85 Note			3	4	4	4	5	6	4	8	12		6		chang	es throug	ghout the	years.
E			3	4	4	4	4	4							and e	ormation	is fairly a	accurate
E-85 Note			4	4	4	4	4	4	8	8	8		6		ands	situa	tions.	most
v			6	4	4	4	4	4	9	8	8		9			0.140		
K (Vertigrand)			6	4	4	4	4	4	9	8	8		11					

Steel Wire Sizes for Most Steinway New York Grands & Verticals Number of Notes for Given Size

Model	12	12 1/2	13	13 1/2	14	14 1/2	15	15 1/2	16	16 1/2	17	17 1/2	18	18 1/2	19	20	21	22	23
S			6	4	4	3	8	6	5	6	12		2			2			
M			6	4	4	3	8	6	5	6	8	4	2			4			
0			6	4	4	3	8	6	5	6	12		8						
L			6	4	4	6	5	6	5	6	12		8						
A			6	4	4	4	6	6	6	5	12		4		4	2			
В			6	4	4	4	6	6	6	5	12		8		5	2			
С				4	4	4	5	8	6	4	3	4	8		8	8	2		
D				4	4	4	5	8	6	6	8		6		7	6	4		
Verticals	12	12 1/2	13	13 1/2	14	14 1/2	15	15 1/2	16	16 1/2	17	17 1/2	18		19	20	21	22	23
F		6		4	4	4	4		4		4		12		6	5			
Z			6	4	4	5	6	6	5	6	6	6	2		2				
V			6	4	4	4	4	4	4	13	8		9						
K alt (old)*			6	4	4	4	4	8	5	8	6		4	5					
K neu (new)*			6	4	4	4	4	4	4	13	8		11						
	* The that ti to det serial	Model I me, the ermine t number	K (nev "old so he cor availa	w Scale) l cale'' was rect scale ible wher	began s utiliz e for a n conta	producti ed. Cont given M acting ou	on apj act Ha odel I r offic	proximate amburg T X piano. 1 ce.	ely 19 'echni Please	85. Prior cal Servi have the	to ce					Note: 1 eral strin table wi there ha change This info rate and most sit	hese fig nging inf Il not fit ave beer s throug ormatior d should tuations.	ores sho formation every pia n many n hout the n is fairly be helpt	w gen- n. The ano as ninor years. accu- ful in

Treble Wire Sizes for Steinway Hamburg Grands & Verticals Number of Notes for Given Size

6

Steel Wire Sizes for Boston, Essex and Lang Lang Pianos

NUMBER OF NOTES FOR GIVEN WIRE SIZE

																1.12	1.15	1.17	1.20	1.22
	dia (mm)	0.775	0.800	0.825	0.850	0.875	0.900	0.925	0.950	0.975	1.000	1.025	1.050	1.075	1.100	5	0	5	0	5
	dia (.001 in)	31	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
BOSTON Models																				
(available worldwide):	applies to SN's																			
UP-109	all		4	4	6	4	6	6	4	4	4	6	4	4		2		2		
UP-118C/A/T/P	all		4	4	6	4	6	4	6	4	2	2	6	4		4		2		
UP-118S	all		4	4	6	4	6	4	6	4	2	2	6	4		4	5	2		
UP-118E	all		4	4	6	4	6	4	6	4	2	2	6	4		4		2		
UP-125E	all		4	4	6	4	4	6	6	4	10	2	4	2		2				
UP-126E/II	all	4	4	6	4	6	4	6	4	4	6	6	4							
UP-132E	before B140980		3	4	6	6	6	6	6	6	4	6	2	2		2				
UP-132E/II	after B140981		3	4	6	4	4	6	6	4	5	4	8	4						
	•						4)													
GP-156	all		4	4	6	4	6	4	6	4	2	2	6	8						
GP-163	all		4	4	6	4	6	4	6	4	2	2	6	4		6	2			
GP-178	all		4	4	6	4	6	4	6	4	6	4	4	6		2		2		
GP-193	all		5	4	6	4	4	6	4	4	4	6	0	8		4		2		
GP-215/III	all		5	4	4	4	6	8	4	10	4	8	2	2	2	.v	2		2	1
GP-218	all		5	4	6	6	4	6	4	4	6	6	0	5		4		4		4
ESSEX Models																				
(available worldwide):																				
EUP-107/108/111	all		4	4	6	4	6	6	4	4	4	6	4	4						
EUP-116	all		6	6	6	4	6	6	4	4	10	2	2	2						
EUP-123	all		5	6	6	6	6	4	5	4	6	4	2	4						
EGP-155	all			4	6	6	6	4	4	6	4	4	6	2	4					
EGP-160/161	all	7	6	4	5	6	4	4	6	8	6									
EGP-173	all			4	8	6	4	6	4	12	8	10				1				
EGP-183	all		4	4	6	4	6	4	6	6	6	4	6	6						
	•																			
LANG LANG Models																				
(available only in																				
<u>China):</u>									_											
LLU-123	all		5	6	6	6	6	4	5	4	6	4	2	4						
LLG-155	all			4	6	6	6	4	4	6	4	4	6	2	4		- 4			

Hamburg Lyre & Pedal Service

The Hamburg lyre was changed in 1994 to the current system. The reason for this change was the difficulty of proper service on the old pedal system and the uneven performance of all three pedals caused by mechanical disadvantages. The three pedals generally had different amounts of resistance and thus required different amounts of force from the player. With this change the performance of the pedals was greatly improved.

The new Hamburg pedals can be serviced as follows:

First the lyre needs to be taken off the piano. By means of an 8 mm Allen key the grand lyre top block connection to the keybed must be unscrewed. The lyre will come off as a unit together with the brass pedal rods. The loose wooden lyre sticks can be put aside.

As the next step, the three brass pedal rods must be taken off. They can either be pulled/forced out of the Teflon bushings at the rear end of the pedals—the ball end of the rods must be pulled out of the Teflon—or the Teflon bushings can be unscrewed on the bottom side of the pedals by loosening the small Phillips screws. (See photo to the right.)



Afterwards, the eight Phillips screws fixing the brass lyre bottom to the pedal box must be unscrewed in order to take out the whole pedal action.



With a 2.5 mm Allen key, the small fixing screw that secures the pedal tightly to the center pin must be taken out.



Now the center pin can be easily pushed out with an angular 3 mm Allen key for example. Now that the pedal is detached it can be pulled out of the system and service can be carried out to the center pin or Teflon bushings.

For lubrication a mixture of Vaseline with Teflon powder works very well. Teflon material would be most suitable for the Teflon bushings and the center pin; at least the lubricant should be fat-free in order to prevent long-term problems.

The Hamburg Service Department carries individual pedals or the complete mounted pedal system (to be installed into the pedal box) as spare parts.

Additionally we offer the center pins and their Teflon side-bushings, the lubricant, and single brass pedal rods with Teflon bushings as shown on the previous page. Of course, all tools are available for the complete service.





Hamburg Keyblock Plate System

To the present day, since their introduction by Steinway Patent No. 219,323 (2 September 1879), the keyblock plates have always been adjustable by simply taking out the keyblocks, loosening the fixing screws (which hold the plates), and moving the plates horizontally into the desired position. By doing this a better strikepoint position of the hammers can be determined, thus allowing for an improvement of tone.



The Hamburg keyblock plate system incorporates the possibility to adjust the treble keyblock plate from the outside without having to remove the keyblock. The horizontal shifting of the keyframe can therefore be done easily with the help of a simple 11 mm blade screwdriver. The brass screw must be turned, and it will move the keyblock plate within a range of approximately 6 mm back and forth. The keyframe will be repositioned accordingly and the strikepoint newly defined.

In addition to the aforementioned feature, a few years ago Hamburg developed a system that now offers the possibility to also adjust the pressure on the keyframe guide pins in the bass and treble. By use of this system the keyframe can be forced down onto the keybed in order to prevent knocking sounds, which can occur if the keyframe and keybed don't fit perfectly together.



The vertical adjustment of the keyblock plate is done by means of a long Allen key (see photo above), which is inserted into the hole in the front of the keyblock. The keyblock plate can be moved down carefully from the outside without taking the keyblock out. In some cases the vertical adjustment must be done with a 2 mm small-blade screwdriver instead of an Allen key, as the system incorporated a simple screw in the first series when it was first introduced.

However, this vertical adjustment is only a one-way possibility; the keyblock plate cannot be moved upwards right away because the system allows only for the increase of downward pressure on the keyframe. In order to move the keyblock plate back up and release the force, the keyblock must be taken out of the instrument and the two fixing screws (holding the keyblock plate) released slightly. Now the keyblock plate can be pushed upwards by hand and the screws retightened. The system is once again ready for downward adjustment from the outside!

While increasing the downward pressure on the pin, please ensure that the amount of force used is reasonable and not exaggerated! Too much pressure will prevent the keyframe from shifting when the left pedal is used. The keyframe must still be able to be pushed up with a thumb at the keyblocks. If this is not possible the reason will likely be the downward pressure from the keyblock plates.

Keyblock plates as spare parts and the necessary tools for the adjustment are available through our Service Department.

Hamburg Backcheck Replacement Procedure

The checking in grand pianos is a most critical and important aspect of the instrument's performance, as it greatly influences repetition! A high checking of the hammer 15 mm away from the strings would be perfect—the greater the checking distance, the less repetition can be expected. The Hamburg procedure to set the backcheck height ensures the capability to regulate the checking accordingly. A new set of backchecks with wires should be installed as follows:

The action must first be prepared by standard regulation with a 47 mm blow distance between the strings and the hammers at rest, 1 mm let-off from treble to bass, and approximately 2 mm drop after let-off.

The next step is the determination of the individual backcheck heights per section. Start with the bass section and take the first and last notes as samples. Put a ruler on top of the key end at the approximate position of the backcheck and move the key end upwards until reaching the let-off point, just prior to drop. (See photo.) Take the measurement (distance) to the lower edge of the hammer tail and reduce by 1 mm. This is the desired height of the backcheck now, to be installed with straight (not yet bent) wire.



For each section of the piano these sample heights must be determined first (the first and last notes in each section). Note the measured heights on the key ends with a pencil. Now the installation can begin. With special tools the backchecks can be pushed into the keys to the determined heights per each section. If the two sample keys show a big difference, the heights of the backchecks in between can be evened out accordingly. **Note:** Hamburg backchecks and wire have threads, so the height can as well be readjusted slightly after setting the backchecks into the keys by turning the backchecks on the wires.



When the backchecks are set, they must be bent for proper checking of the hammer tails. Use a bending tool (see top photo) and a model that shows the angle of 72° at the rear edge of the backcheck. (See middle photo.) The bending should be done at approximately 2/3 of the way up the length of the wire (see circled area on middle photo) or as high as the bending tool allows. With a firm, strong push down onto the work table, bend all wires into the same position. When finished, the actual resulting backcheck height should show a distance of approximately 2 mm between the backcheck top edge and the bottom edge of the hammer tail. (See bottom photo.)

It is advisable to use mainly the bending tool and only scarcely the fingers during final height regulation, because the tool will bend the wire more precisely at the desired spot (and not somewhere throughout the wire), and finger bending could rather loosen the wire in the hole at the key end.

All described standard regulation procedures for checking apply here as well and must be carried out in order to achieve a perfect result.

The description for determining the backcheck height applies as well in the case of inserting backchecks without wire! Tools shown in the photos are available through our Hamburg Service Department.







Leg Plate Technical Bulletin New York–Produced Steinway & Sons Grand Pianos

<u>Past Architecture</u>: Since the late 1870s, all New York–produced Steinway & Sons grand pianos have had the leg attachment plates depicted in the photo below. This system necessitated the use of a rubber or felt-covered mallet to install and remove the legs and lyre. Leg locking "toggles" or "buttons" were used on smaller grands (S, M, L, O, and A) and leg locking "blocks" or "wedges" were used on larger grands (B, C, and D) to lock and secure the legs and lyre.

discontinued New York Steinway leg plates



<u>New Architecture</u>: Depicted below is the newly designed leg-locking plate system introduced in 2007 for **all** New York–produced Steinway & Sons grand pianos. These plates will require the use of an 8 mm or 5/16" Allen key to lock the legs and lyre in place during installation, and for removal. This new system eliminates the use of a mallet for installation and removal and also eliminates the need for the locking "toggles" or "buttons" and "blocks" or "wedges" that eventually can become loose. This is a similar procedure used in the installation of legs and lyres on Hamburg-produced pianos.

leg plates for NY Steinways beginning in 2007



The 8 mm or 5/16" Allen key is located in a $2\frac{1}{2}$ " x 4" manila envelope taped inside the leg box inside the piano crate as shown in the photo to the right.







The parts depicted to the right ("toggles" or "buttons" and "blocks" or "wedges") will no longer be necessary for attaching the legs and lyre and will be noticeably absent from the underside of the piano.

SERVICING TEFLON BUSHINGS (PERMAFREE BUSHINGS)

Steinway & Sons introduced the Teflon bushing in 1962, and it was used in all NY grand actions until approximately 1982. This represents approximately 35,000 pianos. Many technicians will need to service these instruments. The following information and procedures will assist technicians in maintaining these instruments in top playing condition.

WHAT IS TEFLON BUSHING?

The Steinway & Sons "Permafree" (Teflon) Bushing (Patent 3,240,095) is a tiny cylindrical unit molded from inert Dupont Teflon. It consists of a straight, smooth tube accommodating a finished center pin. The exterior surface of the tube is serrated in order to grip the wood as the bushing is pressed into the flange hole. (This is NOT a screw style thread.) One end of the cylinder is enlarged, forming a collar or a built-in washer. This collar served as the traditional "bird's-eye" normally found on cloth-bushed action parts. There is no bird's-eye milled into action parts with Teflon bushings.

SERVICE PROCEDURES FOR PERMAFREE ACTION CENTERS

An essential feature of all piano action centers is that the center pin must always be firmly held by the **unbushed** hole of the center.

CLICKING NOISES

There are two main reasons for this to occur:

- incorrect reaming
- a faulty bushing

Before withdrawing the action, note which keys have clicks. (Using the sustain pedal will help to determine if the clicking is in the damper action or not.) Withdraw the action and test the hammer flanges by holding the hammer head between two fingers and making a slight sideways movement. A clicking bushing can be heard and felt. Clicks in the whippen and damper parts require removal and individual testing. Slight sideways movement of the center will indicate the pin moving in an oval bushing.

REMEDY: Re-pinning with a larger pin or re-bushing, as follows:

Extract the old pin and measure its size. Select the appropriate reamer and carefully ream BOTH sides of the bushing to uniformly fit the larger pin to be inserted. Try the new pin in each bushing to ensure equal friction on the pin. (Considerable practice is required to master the "feel" for the different centers.) **Do not lubricate Teflon bushings.**

Reassemble the center with the new pin and test for the freedom of the moving parts.

Replacing the defective bushing:

- To re-bush the center, remove the damaged bushing by pushing it out with an appropriate blunt punch. (A center-pin extractor tool pin can be used.) We strongly recommend replacing both bushings even though one may seem correct.
- Take a new bushing of correct size and place it on the inserter pin with the collar flat down on the tool surface. Press the bushing in place with finger pressure, the thumb supporting the wood on the opposite side. As it goes in, the serrations on its surface can be heard compressing against the wood. Be sure the collar is positioned on the inner surface to act as a washer.
- TOOLS: Reamers: The ideal reamers are the straight "spoon" or 4-fluted style reamers in eight sizes increasing in increments of .005" appropriate to the four sizes of pin. The common practice of taking a pointed center pin a half size smaller than the one to be inserted and, held in a pin vise, knurling it between two files, is acceptable. However, care and discretion is necessary in using this type of reamer. Under NO circumstances should the hexagonal tapered reamers or rat-tail files be used—these will ruin Teflon bushings.

FACTORY STANDARDS OF FRICTION FOR TEFLON BUSHINGS *

Remember, these are merely guidelines for the field technician. We advise strongly against rigid application of printed specifications. Use discretion and consideration of local conditions. The table below shows the gram weight necessary to move the action center with the appropriate freedom.

CENTER

ROTATING FRICTION

Hammershank	3 to 6 grams
Support (Whippen)	3 to 5 grams
Balancier (Whippen Lever)	3 to 5 grams
Fly (Jack)	1 to 3 grams
Underlever Flange	3 to 5 grams
Underlever Top Flange	1 to 3 grams
Tab	1 to 3 grams

- **NOTE:** No lubricants of any kind whatsoever are to be used on Steinway Permafree-I Teflon-bushed action parts.
- * See Grand Preparation, Chapter One (page 19) for cloth-bushed center friction standards

Steinway & Sons "Modern" Grands - Models / Sizes / Production Years

Model	Size	Year Introduced
S	5'1" / 155 cm	Introduced in 1936.
Μ	5'6"	Introduced in 1912.
Μ	5'6-3/4"	Introduced in 1914.
Μ	5'7" / 170 cm	Introduced in 1918.
L	5'10-1/2"	Introduced in New York, 1923. Discontinued from production in 2005.
0	5'10"	Introduced in 1902.
0	5'10-1/2″	Introduced in 1914. Discontinued in New York 1923, but
		continued in Hamburg.
0	5'10-3/4" / 180 cm	Reintroduced in New York in 2006
A I (Round Tail)	6'0"	Introduced in 1878. Discontinued in 1896.
A II (Square Tail)	6'2" / 188 cm	Introduced in 1896. Discontinued in New York 1914, but
		continued in Hamburg. Reintroduced in New York 2005.
AIII	6'4-1/2"	Introduced in 1913, discontinued in 1945.
Monitor Grand	6'8"	Introduced in 1872.
В	6'8"	Introduced in 1878.
В	6'10-1/2" / 211 cm	Introduced in 1884.
С	7'2"	Introduced in 1878.
С	7'5" / 227 cm	Introduced in 1886. Discontinued from regular production in
		New York 1913. Occasionally produced in New York through
		1936. Currently manufactured in Hamburg.
Centennial Grand	8'9"	Introduced in 1876.
D	8'10"	Introduced in 1884.
D	8'11-3/4" / 274 cm	Introduced in 1915.

Weights of Steinway & Sons Pianos

New York	Net		Boxec			
Grand Pianos	lb	kg	lb	kg		
S	540	245	750	340		
Μ	570	259	810	367		
L	610	277	860	390		
0	616	279	870	395		
А	695	315	945	429		
В	760	345	1025	465		
D	990	449	1365	619		
<u>Verticals</u>	lb	kg	lb	kg		
45 (1098/45-10)	480	218	560	254		
K-52	600	272	700	318		

Hamburg	Net	t	Boxee	d
Grand Pianos	kg	lb	kg	lb
S	252	556	337	743
Μ	275	606	360	794
0	280	617	365	805
А	315	694	400	882
В	345	761	440	970
С	400	882	500	1102
D	480	1058	580	1279
<u>Verticals</u>	kg	lb	kg	lb
V	267	589	307	677
К	305	672	345	761

Sizes and Weights of Boston and Essex Pianos

MODEL	-	<u>NET WE</u>	EIGHTS	<u>GROSS (E</u> <u>WEIG</u>	<u>30XED)</u> HTS
	Size (feet/ inches)	Kg	Lbs	Kg	Lbs
Boston					
GP-156	5' 1.5"	303	667	383	842
GP-163	5' 4''	285	627	377	829
GP-178	5' 10''	300	660	404	889
GP-193	6' 4''	345	759	463	1019
GP-215	7' 1"	390	858	536	1180
UP-118	46.5"	215	473	210	463
UP-126	49.5"	260	572	275	606
UP-132	52"	250	550	290	639
MODEL	_	NET WE	EIGHTS	GROSS (E	BOXED)
MODEL	- Size (feet/ inches)	<u>NET WE</u> Kg	<u>EIGHTS</u> Lbs	<u>GROSS (E</u> WEIG Kg	<u>BOXED)</u> HTS Lbs
MODEL Essex	- Size (feet/ inches)	<u>NET WE</u> Kg	<u>EIGHTS</u> Lbs	<u>GROSS (E</u> WEIG Kg	<u>BOXED)</u> HTS Lbs
MODEL Essex EGP-155	- Size (feet/ inches) 5' 1"	<u>NET WE</u> Kg 289	<u>EIGHTS</u> Lbs 636	<u>GROSS (E</u> <u>WEIG</u> Kg 341	<u>BOXED)</u> <u>HTS</u> Lbs 750
MODEL Essex EGP-155 EGP-161	- Size (feet/ inches) 5' 1" 5' 3"	<u>NET We</u> Kg 289 300	<u>EIGHTS</u> Lbs 636 660	<u>GROSS (E</u> <u>WEIG</u> Kg 341 325	<u>30XED)</u> <u>HTS</u> Lbs 750 715
MODEL Essex EGP-155 EGP-161 EGP-173	- Size (feet/ inches) 5' 1" 5' 3" 5' 8"	<u>NET We</u> Kg 289 300 309	<u>EIGHTS</u> Lbs 636 660 680	<u>GROSS (E</u> <u>WEIG</u> Kg 341 325 361	3 <u>0XED)</u> <u>HTS</u> Lbs 750 715 794
MODEL Essex EGP-155 EGP-161 EGP-173 EGP-183	- Size (feet/ inches) 5' 1" 5' 3" 5' 8" 6' 0"	<u>NET We</u> Kg 289 300 309 315	EIGHTS Lbs 636 660 680 693	<u>GROSS (E</u> <u>WEIG</u> Kg 341 325 361 410	30XED) HTS Lbs 750 715 794 902
<u>MODEL</u> Essex EGP-155 EGP-161 EGP-173 EGP-183 EUP-107/108	- Size (feet/ inches) 5' 1" 5' 3" 5' 8" 6' 0" 42"	<u>NET We</u> Kg 289 300 309 315 209	EIGHTS Lbs 636 660 680 693 460	<u>GROSS (E</u> <u>WEIG</u> Kg 341 325 361 410 250	30XED) HTS Lbs 750 715 794 902 550
MODEL Essex EGP-155 EGP-161 EGP-173 EGP-183 EUP-107/108 EUP-111	- Size (feet/ inches) 5' 1" 5' 3" 5' 8" 6' 0" 42" 44"	NET We Kg 289 300 309 315 209 227	EIGHTS Lbs 636 660 680 693 460 499	GROSS (E WEIG Kg 341 325 361 410 250 277	BOXED) HTS Lbs 750 715 794 902 550 609
MODEL Essex EGP-155 EGP-161 EGP-173 EGP-183 EUP-107/108 EUP-111 EUP-116	- Size (feet/ inches) 5' 1" 5' 3" 5' 8" 6' 0" 42" 44" 44"	NET WE Kg 289 300 309 315 209 227 236	EIGHTS Lbs 636 660 680 693 460 499 519	GROSS (E WEIG Kg 341 325 361 410 250 277 289	BOXED) HTS Lbs 750 715 794 902 550 609 636

Note: There may be slight variations from the above weights for different finish and case styles and for Hamburg and New York production.

Note: Serial numbers represent the approximate ending serial number for the year of production for New York and Hamburg pianos. Serial numbers for some early production may span more than one year.

1000 = 1856	175000 = 1916	370000 = 1961
2000 = 1858	185000 = 1917	375000 = 1962
3000 = 1860	190000 = 1918	380000 = 1963
5000 = 1861	195000 = 1919	385000 = 1964
7000 = 1863	200000 = 1920	390000 = 1965
9000 = 1864	205000 = 1921	395000 = 1966
11000 = 1865	210000 = 1922	400000 = 1967
13000 = 1866	220000 = 1923	405000 = 1968
15000 = 1867	225000 = 1924	412000 = 1969
17000 = 1868	235000 = 1925	418000 = 1970
19000 = 1869	240000 = 1926	423000 = 1971
21000 = 1870	255000 = 1927	426000 = 1972
23000 = 1871	260000 = 1928	431000 = 1973
25000 = 1872	265000 = 1929	436000 = 1974
27000 = 1873	270000 = 1930	439000 = 1975
29000 = 1874	271000 = 1931	445000 = 1976
31000 = 1875	274000 = 1932	450000 = 1977
33000 = 1876	276000 = 1933	455300 = 1978
35000 = 1877	278000 = 1934	463000 = 1979
40000 = 1878	279000 = 1935	468500 = 1980
45000 = 1881	284000 = 1936	473500 = 1981
50000 = 1883	289000 = 1937	478500 = 1982
55000 = 1886	290000 = 1938	483000 = 1983
60000 = 1887	294000 = 1939	488000 = 1984
65000 = 1889	300000 = 1940	493000 = 1985
70000 = 1891	305000 = 1941	498000 = 1986
75000 = 1893	310000 = 1942	503000 = 1987
80000 = 1894	314000 = 1943	507700 = 1988
85000 = 1896	316000 = 1944	512600 = 1989
90000 = 1898	317000 = 1945	516700 = 1990
95000 = 1900	319000 = 1946	521000 = 1991
100000 = 1901	322000 = 1947	523500 = 1992
105000 = 1902	324000 = 1948	527000 = 1993
110000 = 1904	328000 = 1949	530000 = 1994
115000 = 1905	331000 = 1950	533500 = 1995
120000 = 1906	334000 = 1951	537200 = 1996
125000 = 1907	337000 = 1952	540700 = 1997
130000 = 1908	340000 = 1953	545600 = 1998
135000 = 1909	343000 = 1954	549600 = 1999
140000 = 1910	346500 = 1955	554000 = 2000
150000 = 1911	350000 = 1956	558000 = 2001
155000 = 1912	355000 = 1957	562500 = 2002
160000 = 1913	358000 = 1958	567000 = 2003
165000 = 1914	362000 = 1959	571000 = 2004
170000 = 1915	366000 = 1960	574500 = 2005

	Boston		
Year	Serial Numbers		
1991	B103091	-	B103321
1992	B103322	-	B105311
1993	B105312	-	B107544
1994	B107545	-	B110170
1995	B110171	-	B112441
1996	B112442	-	B115757
1997	B115758	-	B120212
1998	B120213	-	B125536
1999	B125536	-	B132459
2000	B132460	-	B138889
2001	B138890	-	B141607
2002	B141608	-	B144962
2003	B144963	-	B148605
2004	B148606	-	B153097
2005	B153098	-	B157096
2006	B157097	-	B160534
	Essex		
Year Serial Numbers			
	2011		
2000	E100100	-	E100493
2001	E100494	-	E101382
2002	E101393	-	E101746
2003	E101747	-	E102249
2004	E102250	-	E102803
2005	E102804	-	E103529
2006	E103530	-	E106551

NY Steinway Grand Underlever Assembly Installation Procedure

Required tools and supplies: screwdrivers, wooden wedges, extra wooden pivot blocks, drill bit size no. 21 (for pivot pin holes), drill bits for screws, ³/₄" Forstner drill bit, mechanic's rule, travel paper, 6 small cardboard punchings, 2 small cloth punchings, key-dip block, lube (Vaseline & micro-fine Teflon powder).

Note: The Steinway Grand underlever assembly is available through the Steinway & Sons New York Parts Department in three different styles: Style S M O, Style A B, and Style C D. Style S M O is appropriate to use as well on the Model L.

Procedures and tips for New York Steinway Grand underlever assembly installation:

Preliminary Steps:

Note: Best results are obtained by also replacing the key end felts. Examine them to determine whether they should be replaced: If they are worn unevenly then the damper timing at the keys will be inconsistent from the damper lift at the pedal because the damper-tray felt on the new underlever assembly will be new and even.

Note: Keyframe must be bedded, keys must be squared and spaced, and key height and key dip must be established already in regulation. Hammer strikepoint should be set already at the keyblocks. Damper guide rails should be located already.

Note: The action stop block on the bass end of the keybed should already be planed or shimmed if necessary in the regulation.

Principles:

The **left/right** position should result with the underlevers centered on the key end felts midway between the keyboard rest and shift positions.

The **fore/aft** position should result with the underlever top-flange centers in vertical alignment with the damper guide rail holes, and the underlever assembly neither obstructed behind by the birch crossblock nor contacting the backcheck blocks on the keys, and with ample adjustment room for the sostenuto rod on the action frame in relation to the tabs on the underlever top flanges.

The **up/down** position should result with the contact point between the underlever and the key end felt intersecting a straight line between the underlever flange center and the key balance point midway through the damper stroke; and with the underlever assembly not any higher than necessary, but with ample clearance of the damper tray above the keybed dag blocks, **and parallel to the key ends across the scale**.

OBJECTIVE:

The standard objective is to locate the new underlever assembly as follows:

Left/right position of underlevers 3/32" from treble edges of key end felts.

Fore/aft position of underlevers 1/8" from edges of backcheck blocks.

Up/down position of underlever assembly pivot pin is 2¼" from keybed on the bass end, and parallel to key ends across the scale. (The treble-end pivot is set at the location that results in the underlever assembly being parallel to the key ends, therefore allowing for even damper timing across the scale. The treble pivot should be set at a determined location slightly higher than 2¼" due to crowning of the keybed.) Start with 3/16" higher for the treble pivot and sand the bottom of the treble pivot block until parallel is achieved.

AT THE BENCH:

Step 1. Alignment to keys.

Space the underlevers (left/right) to the key ends. On a workbench, simply lay the underlevers over the key ends, and then align them visually overall to the (treble) edges of the key ends. Look for any underlevers that need to be spaced accordingly. Loosen underlever flange screws and move flanges then retighten. Use travel paper if necessary. (Reason: Key ends vary in width because the key sets are cut by hand. Also, squaring and spacing of the keys in regulation causes key-end spacing to vary.)



Note: Scale variations found on some nineteenth-century grands might require plugging and relocation of flange screw holes in the damper tray or cutting damper tray to length.

AT THE PIANO:

Step 2. Locate bass pivot hole and block, and install bass pivot block.

Add 3 cardboard punchings (.010" or .012") and one cloth punching to both bass and treble pivot pins. (Reason: The cardboard punchings can be switched from bass to treble or vice versa if later on someone deems it necessary to plane or shim the action stop block on the bass end of the keybed.)





Install the underlever assembly provisionally with the use of dummy blocks locked in position with wooden wedges against the (upper) spruce crossblock. Assembly and blocks must be tight: no side clearance. Chalk may be used on the noses of the underlevers and allowed to transfer to the key end felts to determine the left/right position.



Determine the bass block pivot location by planing or shimming the dummy block as necessary.

Once the finish dimensions and pivot hole location have been determined on the dummy block, transfer these dimensions and hole location precisely to the finish block. Mark and drill the screw hole in the birch crossblock using the finish block, not the dummy block. Install the finished bass pivot block with a screw into the birch crossblock.

Step 3. Mark and drill hole for damper lift dowel.

Install underlever assembly provisionally with the use of a dummy pivot block for the treble end, and ensure that the assembly and blocks are tight (no side clearance). Place damper lift dowel in position, centered left/right in the keybed hole, and mark this position with a centerline on damper tray. Remove the underlever assembly and make a recessed hole in the underside of the damper tray for the damper lift dowel using a 34" Forstner drill bit. The center of this recessed hole should be 5%" from the edge of damper tray, thereby leaving a clearance of 14" between this hole and the damper tray edge.



Step 4. Locate treble pivot hole and block, and install treble pivot block.

Reinstall provisionally the underlever assembly, and install also the damper heads with felt and wires for notes #3 and #66. Set timing of test dampers using a key-dip block on these keys.

Test the damper lift using the damper tray (or damper pedal) and make adjustments to the dummy treble block pivot hole up/down location as necessary to achieve identical timing of damper lift from bass to treble.

Once the finish dimensions and pivot hole location have been determined on the dummy block, they can be transferred to the finish block. Mark and drill the screw hole in the birch crossblock using the finish block, not the dummy block. Don't forget to lube the two pivot pins and ensure that they are completely free of friction in the pivot blocks. Install the finished treble pivot block and underlever assembly with a screw into the birch crossblock. (And don't forget to remove the wooden wedges used in fitting.)

Additional Notes: New York Steinway Grands have 67 dampers, AAA–d^{#3}. Hamburg Steinway Grands have 68 dampers, AAA–e³. In current production, neither New York nor Hamburg Grands have underlever springs. New York underlever flanges are mounted on the damper tray with screws. Hamburg underlever flanges are glued onto the damper tray.

Historical Notes:

- 1875—Grand sostenuto (middle pedal) invented and patented by Albert Steinway.
- 1907—Pianofabrik begins to build pianos from scratch; 2 pedals standard for Hamburg.
- 1922—Grand underlevers equipped with flexible sostenuto tabs; fixed tabs discontinued (NY).
- 1930—New underlever leading; underlever springs discontinued (New York).
- 1945—Underlever springs reintroduced on Models B and D (New York).
- 1959—Underlever flanges attached with screws; glued-on flanges discontinued (New York).
- 1962—Beginning of Teflon bushing era, underlever springs discontinued (New York).
- 1975—Grand sostenuto installed on crossblock, 3 pedals standard (Hamburg).
- 1984—End of Teflon bushing era (New York).
- 1992—New York Improved action. New underlever flange profile for New York.