

# YAMAHA S90 ES



## What you need to know about the S90 ES and the new Piano feature innovations:

### Half Damper Function and Damper Resonance Effect

**Half Damper** function that lets you finely control the decay of the sound—and expressively recreate the complex characteristics of acoustic instruments, especially piano and stringed instruments.

When the Half Damper switch is turned ON, you can use the Half Damper function with an optional Foot Controller FC3 connected to the FOOT SWITCH SUSTAIN jack. The Half Damper function requires the optional FC3 pedal (sold separately). The FC3 sends sustain data values 0 **through** 127 for cc064, which is different from the FC4 or FC5. The FC4/5 are simply sending “On” or “Off” (0 **or** 127) values. But more than just the FC3 is required for a keyboard to respond to the half damper. In other words, plugging an FC3 into a keyboard does not necessarily give you half-damper response – the keyboard must be capable of the feature. Mo6/8, Motif and Motif ES, for example, do not have this functionality and cannot use the FC3 pedal at all for any sustain type function. P-series pianos (P60, P70, P90, P120, P140, P250) and PF-series pianos (PF500, PF1000) have this function.

#### **When the Half Damper function is set to ON (only FC3)**

By connecting an optional FC3 foot controller to the back panel SUSTAIN FOOT PEDAL jack, you can use the Half Damper feature. The Half Damper feature reproduces the fine control of an acoustic piano's damper pedal to control the sustain over time: pressing the pedal fully down makes the sound last longer, while letting up on the pedal part of the way slightly mutes the sustained sound. Effective use of the Half Damper feature lets you play piano sounds more expressively and realistically.

#### **When the Half Damper function is set to OFF (regular sustain)**

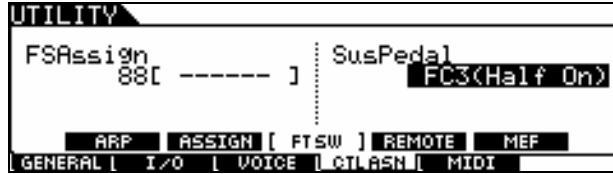
By pressing the footswitch (sustain) on/off, you can control whether the sound is cut off or continues playing, even when the keys are released. Keep in mind that some sounds may not be suitable for use in all situations with the Sustain footswitch. For example, for organ sounds that have no natural decay, the sound continues at the same level when holding down the Sustain footswitch. On the other hand, many sounds benefit from the use of Sustain, such as piano, which has a natural decay when a note is held. This is all dependent on the AEG (Amplitude Envelope Generator) for the Voice's Elements. If the envelope is programmed to return to 0 level it will eventually decay completely even with a sustain pedal.

You can switch the Half Damper function ON or OFF in the following parameters:

- Press [UTILITY]
- Press [F4] CTL ASN
- Press [SF3] FT SW
- Select “SusPedal” = FC3 (Half On)

**Settings:** FC3 (Half On), FC3 (Half Off), FC4/5

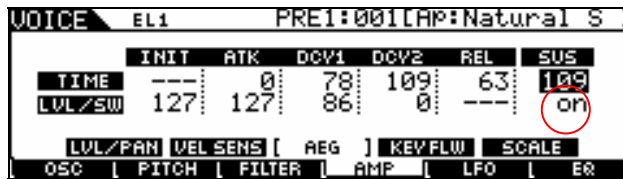
If you are using an FC4 or FC5 sustain pedal set this parameter to “FC4/5.” You cannot use the half damper function with the FC4 or FC5.



The "SusPedal" parameter selects the Foot Controller type connected to the FOOTSWITCH SUSTAIN jack.

Within in the VOICE data you can customize the Half-Damper response. From VOICE mode select the Voice you wish to program

- Press [EDIT]
- Press Track [1] to select Element parameters
- Press [F4] AMP
- Press [SF3] AEG
- Set Half Damper switch ON (red circle below)



From this display you can make all the time and level settings for the Amplitude EG, which determine how the volume of the sound changes over time. These can be used to control the change in volume from the moment a note is pressed on the keyboard to the moment the sound stops. The full names of the available parameters are shown in the chart below, as they appear in the display.

	INIT	ATK	DCY1	DCY2	REL	SUS
TIME	--	Attack time	Decay1 time	Decay2 time	Release time	Sustain time
LVL/SW	Initial level	Attack level	Decay1 level	Decay2 level	--	Half damper switch

**Settings:** SUS TIME: 0 ~ 127  
LVL/SW (Level/Half Damper Switch): ON/OFF

Unlike a conventional damper pedal control which simply turns sustain on and off, the Half Damper function lets you finely control the amount of sustain and natural decay—just as with a real acoustic piano—by using a continuous pedal controller. If, however, you are controlling the Half Damper function by Control Change messages from an external MIDI device, it is not necessary to change the "SusPedal" parameter.

**Important notes:**

- \_Keep in mind that two separate parameters must be set to ON in order to use the Half Damper function, as outlined above.
- \_The ON/OFF setting of the half-damper feature automatically affects the AEG (Amplitude Envelope Generator) settings.
- \_The default setting for the "SusPedal" parameter is "FC (Half On)." When using the FC4 or FC5, make sure to change this setting, depending on the particular footswitch you are using.
- \_You can also control the half damper function by using Control Change messages from an external device. In this case, you do not need to set the Sustain Pedal Select parameter.

**Using the FC3**

When using the half damper function, set this parameter to "FC3 (Half On)" and turn the half damper switch on (Voice Element Edit mode → [F4] AMP → [SF3] AEG display). If you are not going to be using the half damper function, this parameter can be set to "FC3 (Half Off)." Preset Piano Voices are setup to utilize the Half Damper function and are a great way to learn about its programming.

**When using a Footswitch connected to the FOOT SWITCH (SUSTAIN) jack**

**When the Half Damper function is set to OFF:**

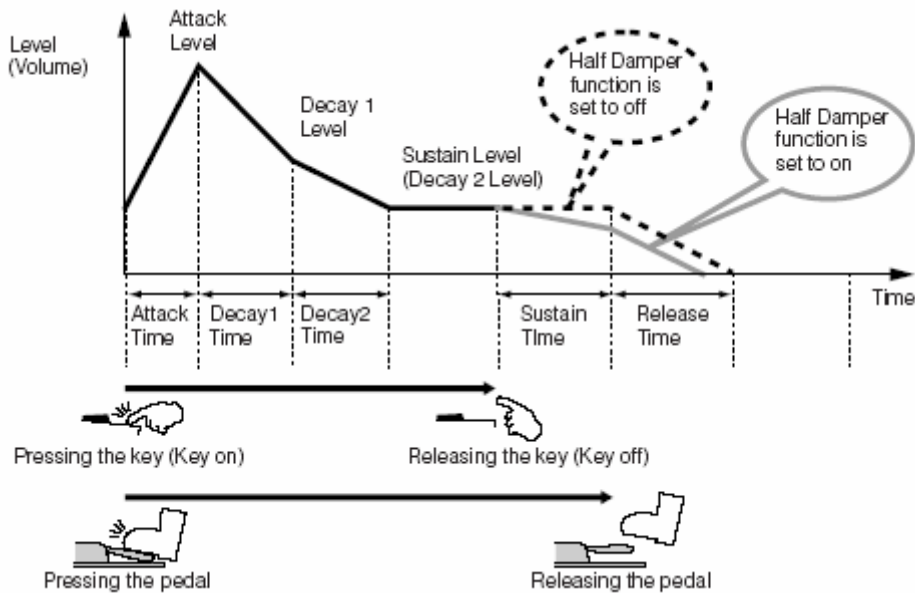
When you release the key while holding the Footswitch, the sound will stay at the Sustain Level (Decay 2 Level shown below. (For Voices having a Sustain Level of 0, the sound decays naturally to silence.)

When releasing the Footswitch, the operation is same as key off; the sound will start to decay, and finally decay to silence according to the Release Time.

**When the Half Damper function is set to ON (FC3 only)**

When you release a key while pressing the Footswitch fully down, the sound will decay to the Sustain Level (Decay 2 Level), according to the Sustain Time value.

In this case, you can control the decay time between the Sustain Time and Release Time by how far down you press the pedal. However, when you release the pedal after releasing the keys (key off event), the sound will decay according to the Release Time, as if the Half Damper function was set to off.

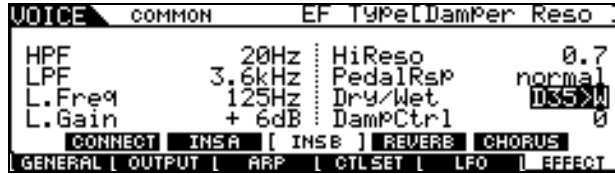


**When releasing the key before the sound reaches the Sustain Level**

When pressing the sustain pedal fully down, the sound will decay after reaching the Sustain Level (after the Decay 2 Time). When the Footswitch is not pressed fully down, the sound will decay immediately.

**Damper Resonance – Insertion Effect** – This is a new Insertion Effect algorithm that reproduces the rich harmonics and unique sound characteristics of an actual grand piano when using the damper pedal.

This new effect algorithm intended for use with acoustic piano samples, can be applied to any sound (with varying results). However, when used on the acoustic piano Voices you can add a very realistic soundboard simulation effect which is related to your use of the sustain pedal.



**Experiment:**  
 You can isolate the soundboard effect by making the DRY/WET value "D<W63", completely wet, then step on the sustain pedal while playing to bring in the soundboard. (In the screen shot above taken from the "Natural S" Preset 1: (A01) Voice, you can see the Dry/Wet parameter is highlighted.)

DAMPER RESONANCE				
No.	Parameter	Range	Value	Table No.
01	HPF Cutoff Frequency	20Hz – 8.0kHz	(0 – 52)	3
02	LPF Cutoff Frequency	1.0kHz – 20.0kHz	(34 – 60)	3
03	EQ Low Frequency	32Hz – 2.0kHz	(4 – 40)	3
04	EQ Low Gain	-12 – +12dB	(52 – 76)	
05	Hi Resonance	0.1 – 1.0	(1 – 10)	
06	Pedal Response	slow/normal/fast	(0 – 2)	
10	Dry/Wet Balance	D63>W – D=W – D<W63	(1 – 127)	
16	Damper Control	0 – 127	(0 – 27)	

By setting "D<W63" - This is like hearing *just* the soundboard resonance. You can hear how it is "biased" to the sustain pedal (Damper Control) – in other words, there will be no sound at all until the pedal is activated. Setting "Damper Control" to anything more than 0 makes the soundboard resonance less biased to the pedal's position. Using the FC3 to control this Damper Resonance you can control the amount continuously. The "Pedal Response" (PedalRsp) is the time it takes the soundboard's 'aura' to rise to full volume in response to the pedal going down.

Once again subtlety is important for realism. Soundboard resonance is best *felt* rather than *heard*.