



DSLR SENSOR CLEANING

Tripod Camera Club, November 12th 2013

DISCLAIMER

If you elect to clean your camera sensor yourself, you do so entirely at your own risk.

Sensor cleaning is usually straightforward and easy, but if done incorrectly there is a risk of permanent damage to your camera. If in any doubt, don't do it!



Symptoms of a dirty sensor:



Increasing the image contrast, clarity, or stretching the exposure histogram REALLY shows the dirt:



Another good example (thanks, Bill!):



Again, increasing the image contrast, clarity, or stretching the exposure histogram REALLY shows the dirt:

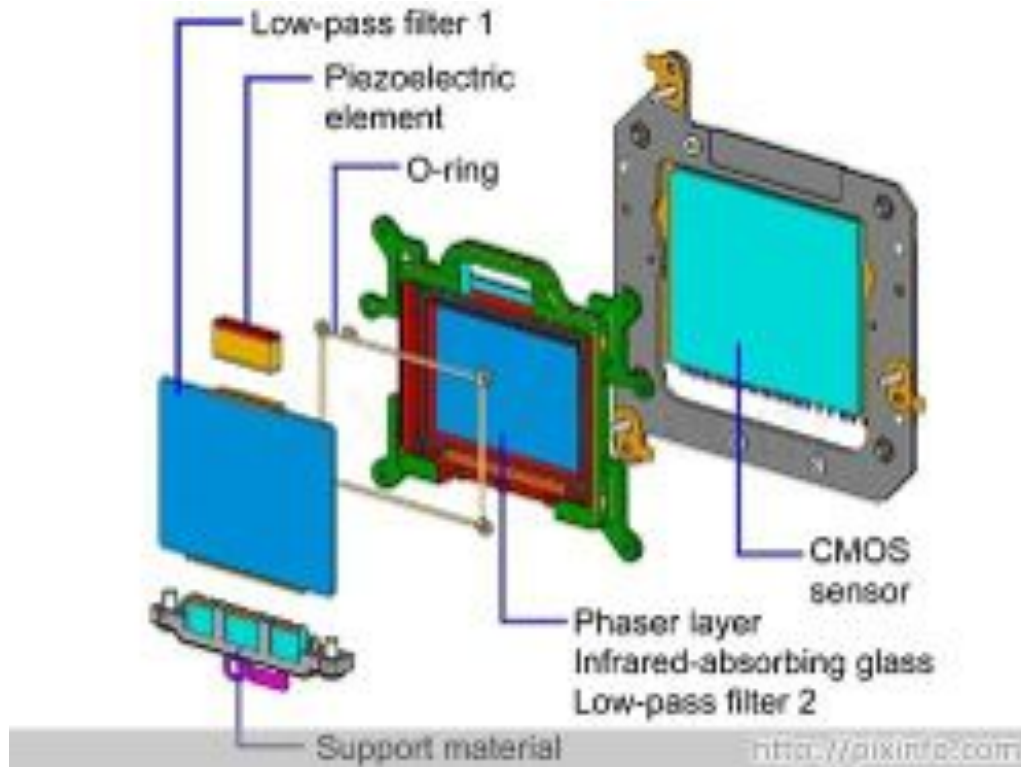


- Sensor contamination is usually more apparent with telephoto lenses and whenever any lens is stopped down far enough for aperture diffraction to become significant (e.g. f/16 for full frame sensors, f/11 for crop frame sensors, f/8 for 4/3 format sensors)
 - Adds spots and blemishes to ALL your images*
- Types of dust and grime
 - Particulates – common dust, skin cells, pollen, smoke, spores, mold
 - Vapors – oils, condensation, plasticizers from PVC and other plastics
- How does the dust and grime get inside a camera?
 - Changing lenses
 - Zooming
 - Focusing

* Don't forget to keep your lenses clean too! - Dust and finger prints reduce image contrast and sharpness

- Dust and grime eventually gets onto everything:
 - Front of lens
 - Back of lens
 - Inside the lens
 - Mirror
 - Focusing screen
 - Sensor
- Can't do much about the inside of a lens, but we can clean everything else
 - Send lens back to the manufacturer if the inside of a lens needs cleaning
 - Lens element centering is very important so don't try this at home!
 - We can clean the front and rear lens elements and the sensor.

- Modern cameras have ultrasonic dust removal systems to automatically clean the sensor
 - A piezoelectric cover immediately in front of the sensor is vibrated at ultrasonic frequencies to “shake off” any dust.
- Recommended that this feature is always enabled on your camera menu system.

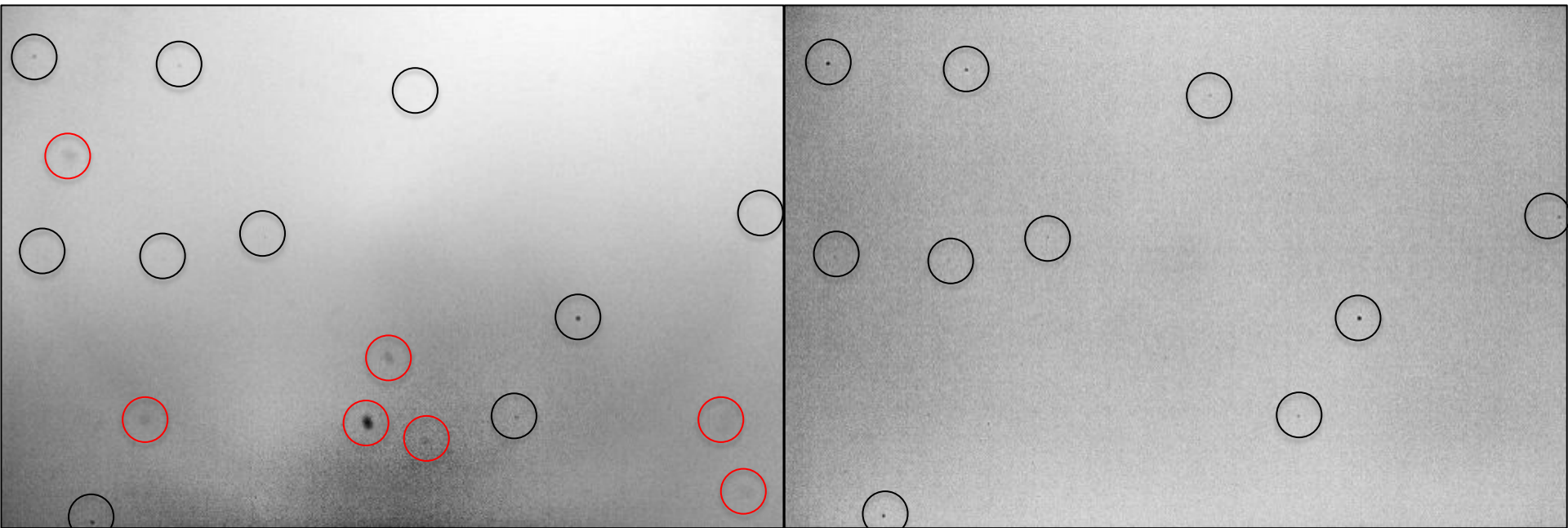


STEP 1 - “If it ain’t broke, don’t fix it”

- Decide if your sensor NEEDS cleaning - if it doesn’t, don't clean it!
- How to tell if you have a dirty sensor:
 1. It’s not always obvious, so fit a lens to your DSLR, **50mm or longer focal length**
 2. Select aperture priority, turn off the autofocus, manually **set the focus to infinity**
 3. **Stop the lens down as far as it will go (e.g. f/16, f/22, f/32)**
 4. Set the camera ISO to the slowest available (e.g. ISO 100)
 5. Take a picture of a blank pale color wall, white paper, a featureless sky, or place the camera lens close to a white computer page
 6. **Deliberately move the camera around during the exposure to blur out any image features (wall blemishes, child’s balloon in the sky.....)**
 7. Review the picture, preferably on your computer. Increasing the image contrast, clarity, or stretching the exposure histogram REALLY shows the dirt:

STEP 1 - "If it ain't broke, don't fix it"

- Why 50 mm or longer focal length?
 - To make sure the lens depth of field is sufficiently small to avoid imaging lens dust:



10 mm focal length

400 mm focal length

○ Sensor dust

○ Lens dust

STEP 2 – my sensor is dirty, now what?

- 4 options:
 1. Do nothing
 2. Try manually activating the in-camera sensor cleaning system
 3. Create an in-camera dust deletion data file
 4. Physically clean the sensor

STEP 2 – my sensor is dirty, now what?

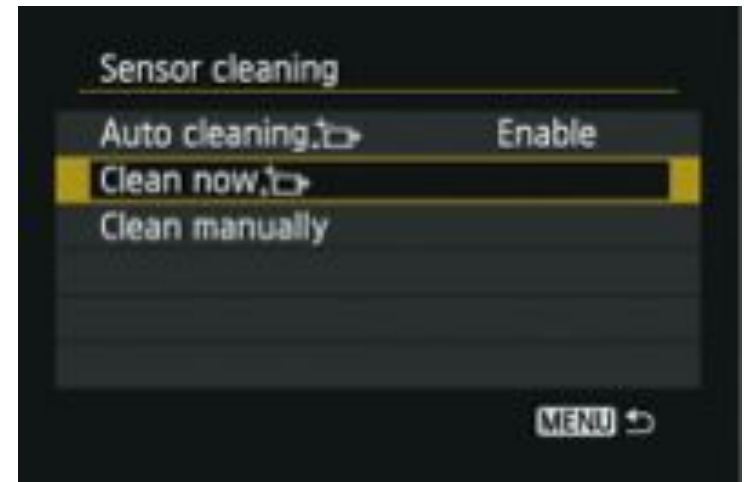
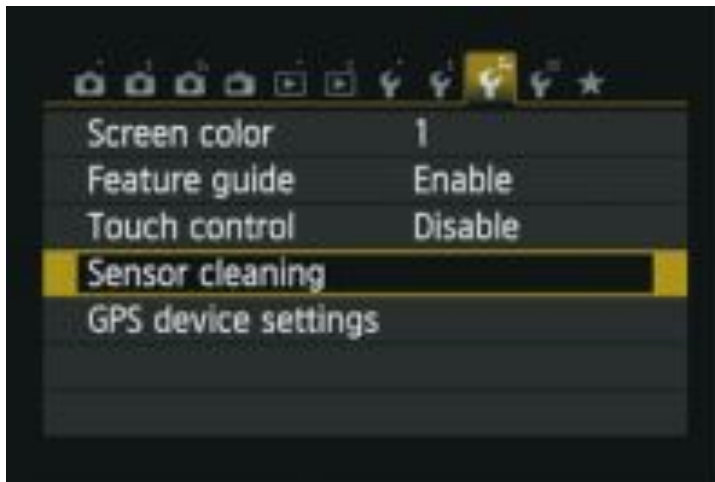
Option 1:

- Do nothing – if image blemishes ONLY show up when the lens is stopped right down, and if you practically never stop your lens right down, you can probably skip cleaning your sensor

STEP 2 – my sensor is dirty, now what?

Option 2:

- Try manually activating the in-camera sensor cleaning system. In most cameras, the manual activation is more vigorous than the routine start up/shut down automatic sensor cleaning



STEP 2 – my sensor is dirty, now what?

Option 3:

- Create an in-camera **dust delete data file**. This feature is really useful if you discover sensor dust while you are away from home.
- Your camera computer software is then used to “stamp” each image with dust correction data to remove the dust spots





STEP 2 – my sensor is dirty, now what?

Option 4:

- Physically clean the sensor

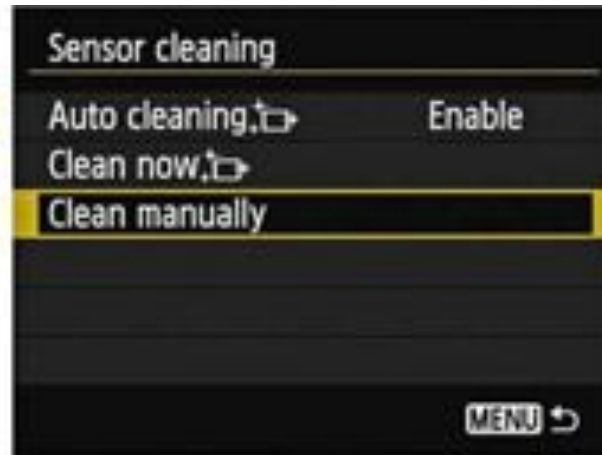


- MUST have a freshly charged battery or use a DC adapter! 
- DO NOT use “B” or “bulb” or long exposures to gain access to the sensor! 
 - Using anything other than the special manual cleaning setting in the camera menu will result in the sensor being energized. Cleaning the sensor this way can damage your camera and turn the sensor into a “dust vacuum”

Sensor Cleaning

Step 1

- Remove the camera lens
- Find somewhere with plenty of light and as dust free as possible
- Raise the mirror and open the shutter curtain using the camera's dedicated manual cleaning option



Sensor Cleaning

Step 2

- Use a blower to remove as much dust as possible
 - DO NOT USE CANNED AIR!
- Re-take a test image

Sensor Cleaning

Step 3

- Sensor wands (wet cleaning):



Sensor Cleaning

Step 3

- Never use paper or cotton products for sensor cleaning!



Sensor Cleaning

Step 3

- Sticky pads:



Sensor Cleaning

Step 3

- Sensor brushes:



Sensor Cleaning

Step 3

- Wet cleaning:



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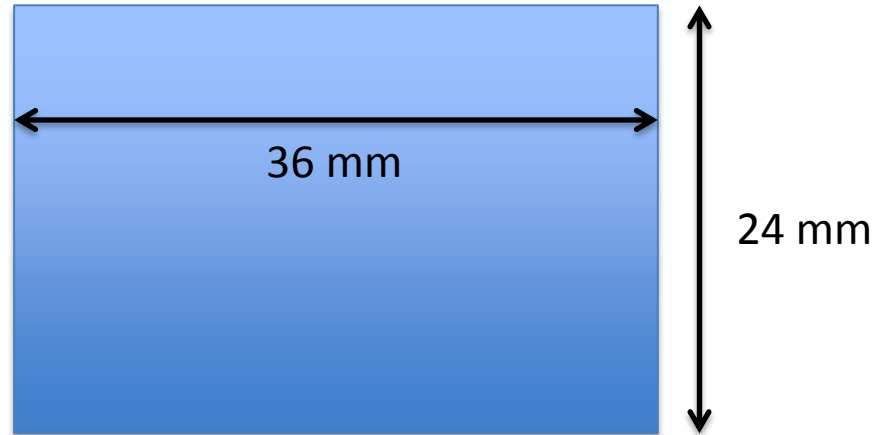
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Sensor Cleaning

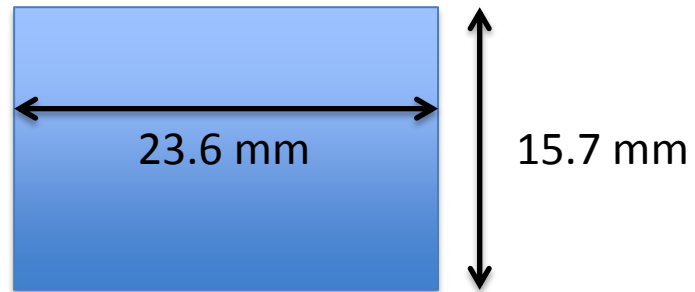
Step 3

- Common sensor sizes:

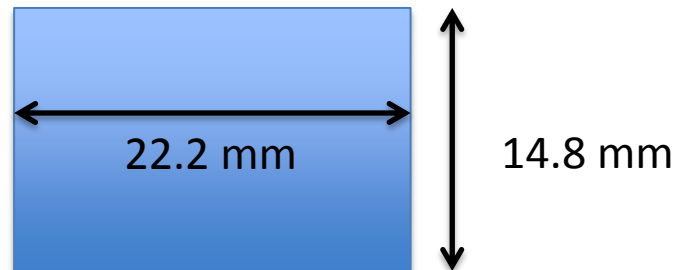
Full frame 35 mm



Nikon APS-C



Canon APS-C



Sensor Cleaning

Step 3

- Wet cleaning:



Sensor Cleaning

Step 3

- Wet cleaning:



Sensor Cleaning

Step 3

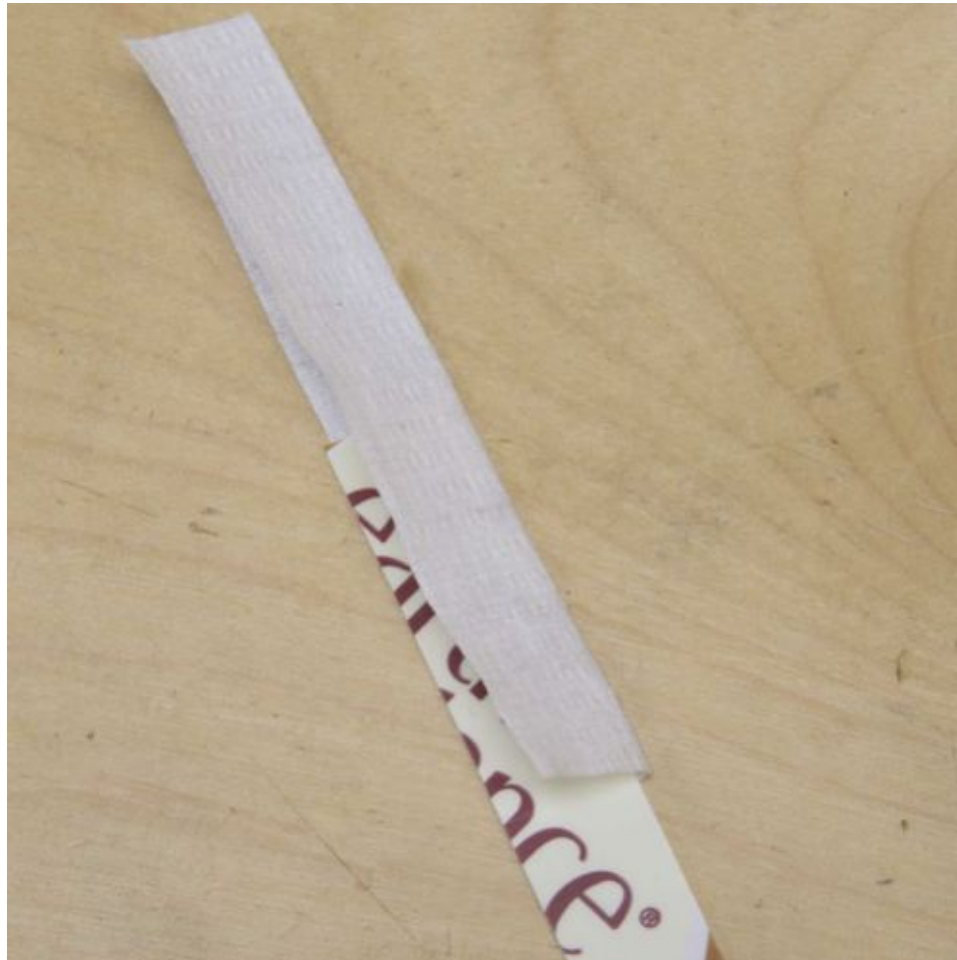
- Wet cleaning:



Sensor Cleaning

Step 3

- Wet cleaning:



Sensor Cleaning

Step 3

- Wet cleaning:



Sensor Cleaning

Step 3

- Wet cleaning:



Sensor Cleaning

Step 3

- Wet cleaning:



Sensor Cleaning

Step 3

- Wet cleaning:



Sensor Cleaning

Step 3

- Wet cleaning:



Sensor Cleaning

Step 3

- Wet cleaning:



Sensor Cleaning

Step 3

- Wet cleaning:



That's it!



Questions?