Panasonic

LUMIX

S1H ı S1R ı S1 ı S5
BS1H ı BGH1
GH5M2 ı GH5 ı GH5S ı G9

Video AF Guidebook

INDEX

LUMIX

Wide Range of Possibilities

Check Out the Tutorial Videos

General Filming

https://youtu.be/ubC9bD0P6UQ

Filming People

https://youtu.be/vSWh2N6Xp-o

Filming Groups

https://youtu.be/hp6vsU_9yhk

Vlogging

https://youtu.be/cjOXP2jEJkw

Remote Filming and Gimbal

https://youtu.be/CAPWbAtm7n8

Filming with Manual Focus

https://youtu.be/dKIaUrU4_zU

[1] Continuous AF

MODE 1

The camera automatically keeps focusing on subjects during recording.

Applicable Situations :

The first position is fixed in the scenario etc., such as when shooting a take of a movie scene, and it is a situation where it starts moving as soon as shooting starts.

MODE 2

The camera automatically keeps focusing on subjects during recording standby and during recording.

Applicable Situations :

A situation where it is better to stay in focus when the subject is constantly moving such as during live streams, etc.
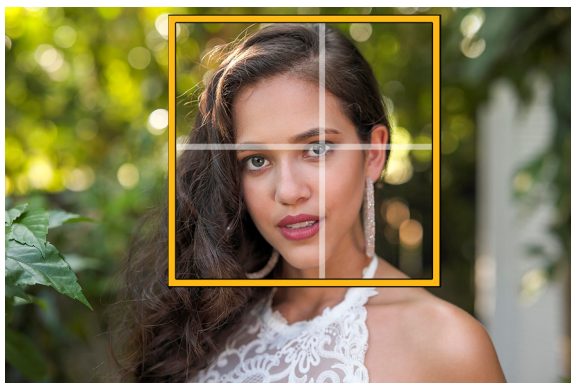
OFF

The camera maintains the focus point at the start of recording.

Applicable Situations :

A situation where the subject is not moving or where you don't want to move the focus when shooting still life images.

[2] Auto Focus Mode 1

Face/Eye/Body/Animal Detection AF

Face/Eye Detection

The camera recognizes the person's face and eyes, and chooses the optimal focus and exposure.

Applicable Situations :

The camera automatically focuses on the pupil to provide sharp and clear portraits. It automatically adjusts the focus on the eye closer to the camera.

Select the person to focus on and whether to focus on the right or left pupil. Human heads are recognized even if the subject's face is turned sideways.*

* LUMIX GH5 does not support head recognition.

Human Body Detection*

The camera recognizes the person's whole body or upper torso and selects the optimal focus.

Applicable Situations :

The human body recognition network incorporating deep learning technology enables the detection of a subject even if the person's back is facing toward the camera.

It offers high recognition performance even when shooting football games, fencing and other sports scenes where players or athletes wear protective gear on their faces as well as wedding scenes with the bride wearing a veil.

* LUMIX GH5 does not support human body detection.
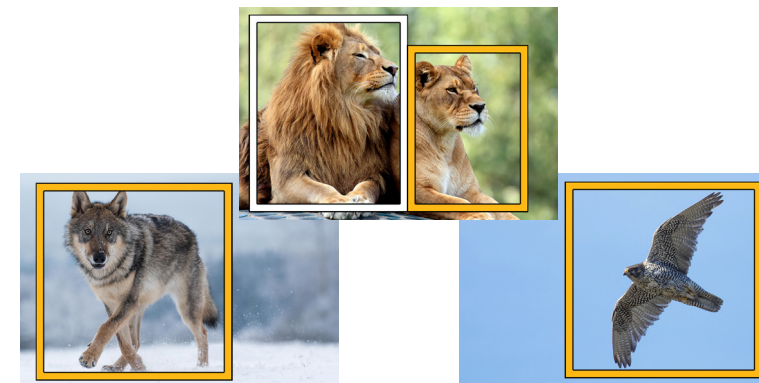
Animal Detection (Canidae, Felidae, Birds)*

The camera can recognize birds and animals, such as Canidae (including wolves and others) and Felidae (including lions and others), and selects the optimal focus.

Applicable Situations :

The animal recognition network incorporating deep learning technology enables the detection of animals regardless of their positions. The camera offers stable tracking performance and accurate focusing even when shooting difficult-to-photograph wild animals.

* LUMIX GH5 does not support animal detection.

[2] Auto Focus Mode 2

Tracking AF

The camera locks on and "tracks" the subject as it moves, continuously adjusting the focus.

Applicable Situations :

- Tracking AF is activated by half-pressing the shutter button.*

- In addition to Tracking AF using live view images, Panasonic's original DFD and Motion Vector technologies enable tracking of even fast-moving subjects.

* In the case of LUMIX BS1H/BGH1, half-press the Fn1 button to activate.
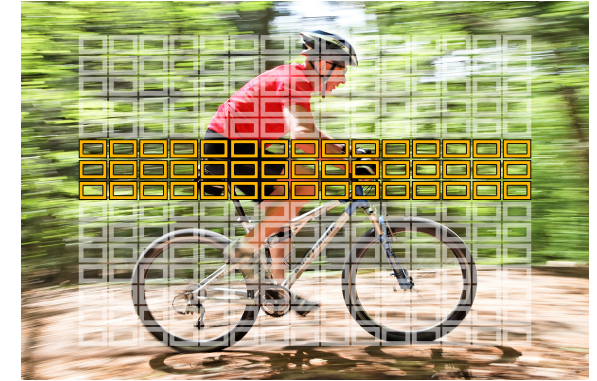
225-Area

Up to 225 areas for each AF area can be focused.

Applicable Situations :

The camera's analytical technology makes it possible to flexibly focus on the main subject. Even when it is difficult to predict the subject's motion and maintain framing, the main subject can be found in the frame and brought into focus.

Zone AF

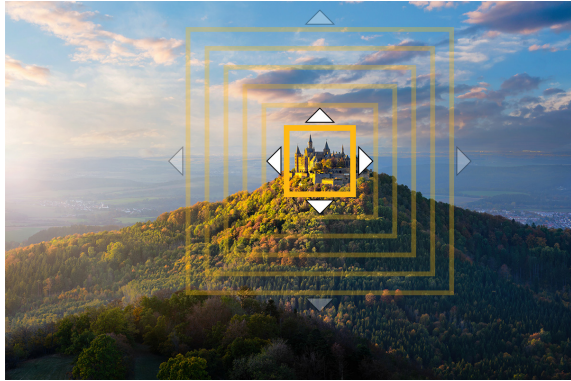You can freely select the AF-area group for the subject among 225 AF-areas.

Applicable Situations :

- Three default settings: Vertical/Horizontal, Square, Oval*

- Up to 3 settings can be registered by custom. Areas can be intuitively selected by touch and joystick.

* Oval only in the case of LUMIX BS1H/BGH1.

[2] Auto Focus Mode 3

1-Area AF

Focusing is possible in any part of the screen.

Applicable Situations :

- This mode is recommended when the situation allows you to frame your shots as you desire. A single target can be accurately selected from subtle differences in depth of field for accurate focusing.

- The size of the AF area can be freely set to match the subject's size and motion.

- Human/Animal recognition can be set ON or OFF.*

1-Area+ AF

The camera adjusts the focus using the 1-Area AF and an auxiliary AF area with twice the size of the AF area.**

Applicable Situations :

- This is recommended when you focus on a moving subject. You can first focus using the 1-Area AF, and if the subject moves out of that AF area, the focus is readjusted using the auxiliary AF area.

- The size of the AF area can be freely set to match the subject's size and motion.

- Human/Animal recognition can be set ON or OFF.*

Custom1-3

You can select desired areas from the 225-Area and register them.

Applicable Situations :

Up to 3 settings can be registered by custom.
Areas can be intuitively selected by touch and joystick.

* Firmware must be updated to version 2.2 or later (S1H) / version 1.6 or later (S1/S1R) / version 2.0 or later (S5/GH5S) / version 2.4 or later (G9). LUMIX BGH1/GH5 does not support this function.
** LUMIX BS1H/BGH1/GH5/GH5S/G9 does not support 1-Area+ AF.

[3] AF Custom Setting 1 : AF Speed

With this setting item, AF speed can be changed during video shooting. Since actual effect varies depending on the mounted lens and subject conditions, it is recommended to conduct test recording with the setting at [0] and then adjust the setting toward the positive (+) or the negative (-) side.

AF Custom Setting(Video)

| AF Speed | ±0 |
| AF Sensitivity | ±0 |

Slow   Fast
-5 -4 -3 -2 -1   0 +1 +2 +3 +4 +5

◁ Set
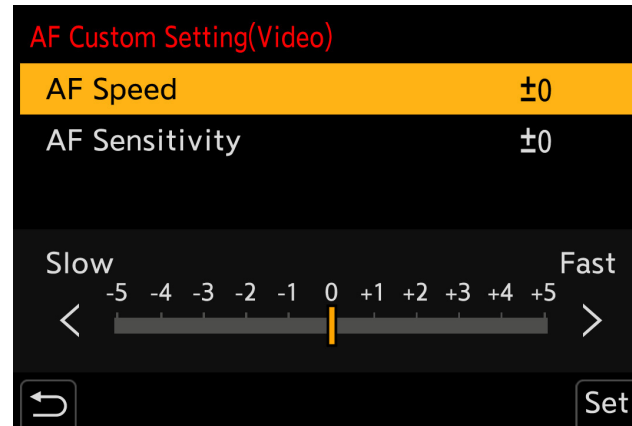
– Slow

When set to [-5], AF performs focusing at least 0.4 times faster than when set to [0].

AF performs focusing slowly and smoothly during video shooting. This setting is useful in shooting a scene with minimum changes in the subject or focus, such as when shooting a distant scenery using a wide-angle lens.

If the focusing speed is too fast and results in poor images when tested with the setting at [0], adjust the setting toward the negative (-) side.

0

AF operates at a standard speed.

The AF operates at standard speed to achieve good balance between smoothness and quickness.

The [0] setting provides good AF results in many situations.

+ Fast

When set to [+5], AF performs focusing up to 3 times faster than when set to [0].

This setting performs focusing quickly during video shooting. This setting is useful in shooting a scene with large changes in the subject or focus, such as when shooting a sports scene using a telephoto lens.

If the AF is too slow and results in continuously blurry images when tested with the setting at [0], adjust the setting toward the positive (+) side.

[3] AF Custom Setting 2 : AF Sensitivity

With this setting item, AF tracking sensitivity can be changed during video shooting. Since actual effect varies depending on subject conditions, it is recommended to conduct test recording with the setting at [0] and then adjust the setting toward the positive (+) or the negative (-) side.

AF Custom Setting(Video)

AF Speed	±0
AF Sensitivity	±0

Locked On   Responsive

-3   -2   -1   0   +1   +2   +3

Set
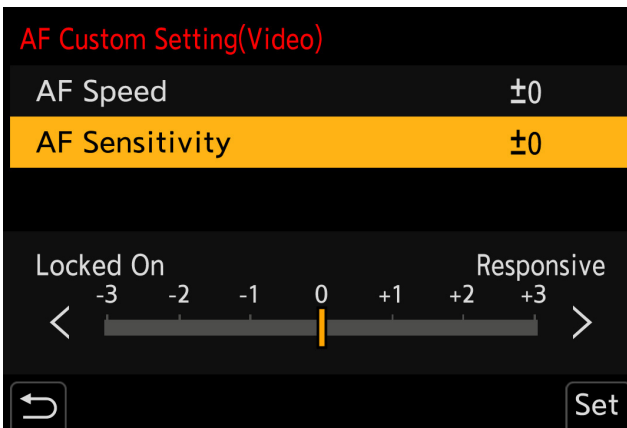
- Locked On

When set to [-3], AF refocuses after about 1-second delay to compensate for about twice larger changes in the subject as compared to when set to [0].

Since the AF operates less frequently, the AF responds with reduced sensitivity. This setting is useful in shooting a scene without frequently changing the focus, such as when recording a scene with infrequent appearances of obstructive objects using a tripod.

If the AF operates unnecessarily when tested with the setting at [0], adjust the setting toward the negative (-) side.

0

AF refocuses from its in-focus condition to compensate for normative changes in the subject.

The AF achieves well-balanced focusing when normative changes occur in the subject.

The [0] setting provides good AF results in many situations.

+ Responsive

When set to [+3], AF refocuses to compensate for about 0.4 times larger changes in the subject as compared to when set to [0].

Since the AF operates frequently, AF response delay time becomes short. This setting is useful in shooting a scene with frequent shifting of focus from one subject to another, such as when shooting a sports scene with fast-moving athletes.

If the AF response is slow and results in blurry images when tested with the setting at [0], adjust the setting toward the positive (+) side.

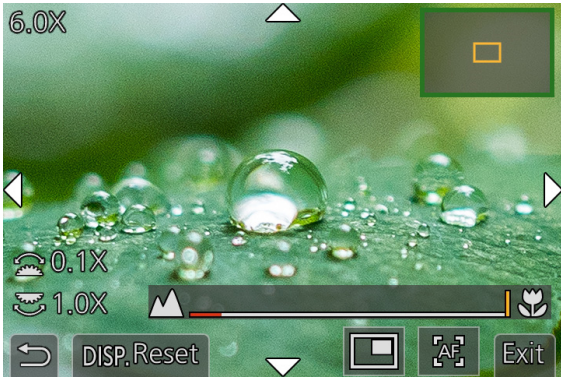# [4] Focus Assist Functions 1

MF Guide

The distance indicator enables you to check the area that can be focused and the present focusing position.
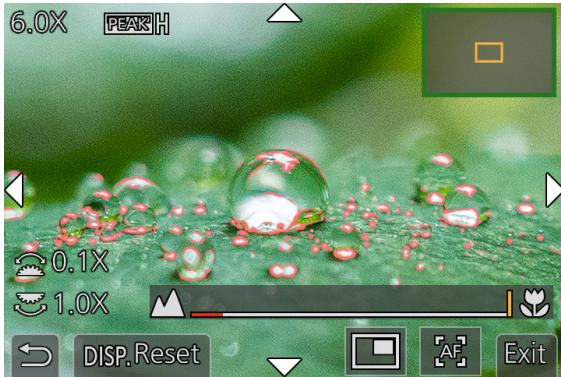
MF Assist

A part of the image can be enlarged up to 6 times in a windowed screen display mode (PIP (Picture-In-Picture)).

A part of the image can be enlarged up to 20 times in a full screen display mode (FULL).

Peaking

This shows the peak of the focus .

Sensitivity can be adjusted in
5 steps (S1H/S1R/S1/S5/BS1H/BGH1/GH5M2) /
3 steps (GH5/GH5S/G9).

[4] Focus Assist Functions 2

AF-ON One-shot AF

MF

▼

AF

Focus with AF before fine tuning with MF.

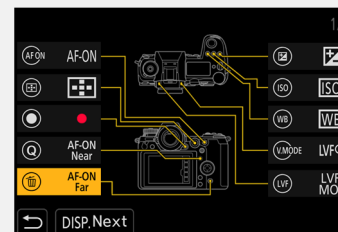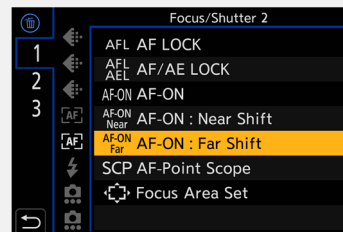### Near Shift / Far Shift

For subjects or shooting conditions that are difficult to bring into focus, the auto focus direction can be adjusted.

Near Shift

Put the priority on a near subject.
Nearby subjects can be focused on.

Far Shift

Put the priority on a far subject.
Convenient for shooting through fences or nets.

AFL AF LOCK
AFL AEL AF/AE LOCK
AF-ON AF-ON
AF-ON Near AF-ON : Near Shift
AF-ON Far AF-ON : Far Shift
SCP AF-Point Scope
Focus Area Set

By assigning this function to an Fn button, you can use it to re-apply AF
to a subject that is nearer to or farther from the camera's present AF position.

# [4] Focus Assist Functions 3

AF+MF

AF

MF

Focus with AF, then fine tune with MF after AF locking.
Confirmation is possible while enlarging with MF Assist.

Can be used during video shooting. When you turn the focus ring, it will set to the MF mode.
When you stop the focus ring, it will set to the AF mode.*

* LUMIX S Series only.
Firmware must be updated to version 1.6 or later (LUMIX S1/S1R) / version 2.0 or later (LUMIX S5).

## Focus Transition (S1H/BS1H/BGH1/GH5M2/GH5/GH5S)
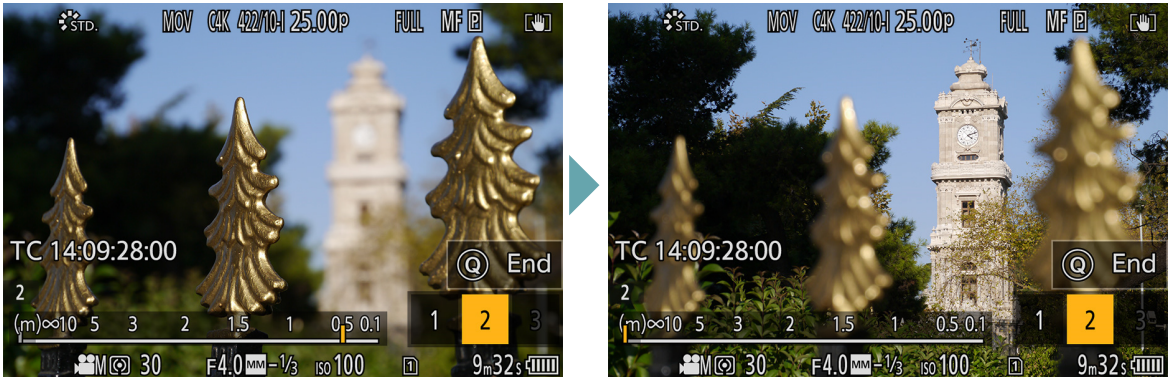
The Focus Transition function automatically shifts the focus point
at a constant speed for precise in-focus to out-focus points
to give you an impressive 'rack focus' motion picture effect.

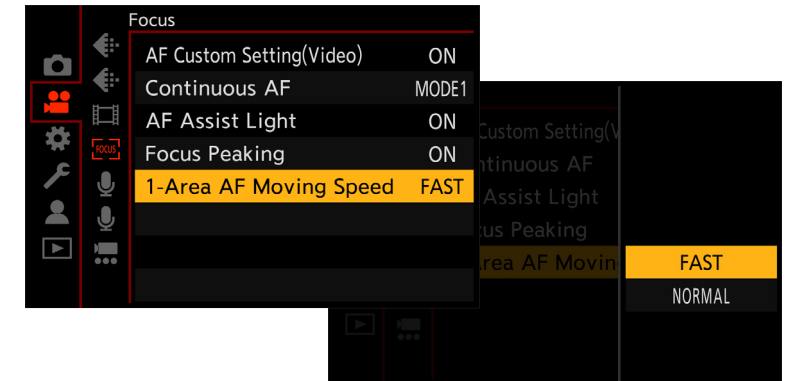| Focus Arrival Position	Up to 3
Transition Speed	SH / H / M / L / SL
Transition Waiting Time	10 sec / 5 sec / OFF

[5] Intuitive Control 1

External Buttons

The external levers, buttons, and joystick controller can be used to intuitively control the focus while watching the viewfinder.
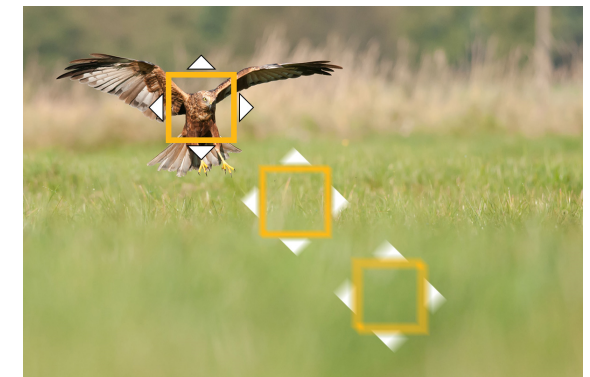
Focus Mode Lever

AF-ON Button

AF Mode Button
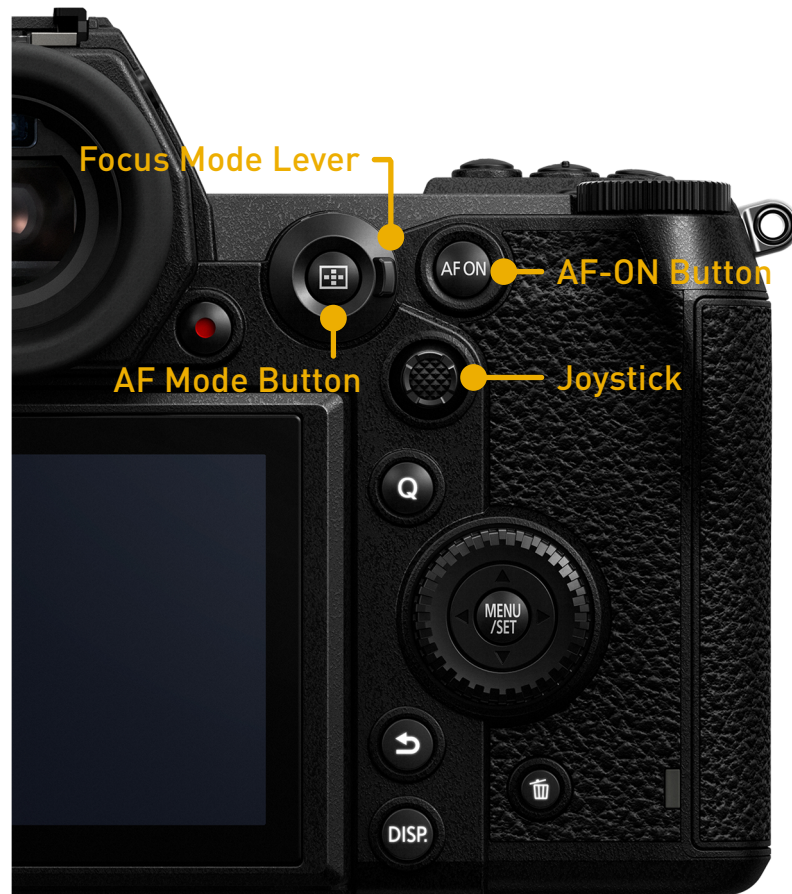
Joystick

Joystick Controller

The joystick allows 8-direction control and push operation. It lets you set the focus area quickly with your thumb.

Focus
AF Custom Setting(Video)   ON
Continuous AF   MODE1
AF Assist Light   ON
Focus Peaking   ON
1-Area AF Moving Speed   FAST

FAST
NORMAL

The moving speed of the 1-Area AF frame can be selected.

8-direction joystick control + 1-Area AF Moving Speed selection
⇒ The frame can be moved quickly even in a diagonal direction.
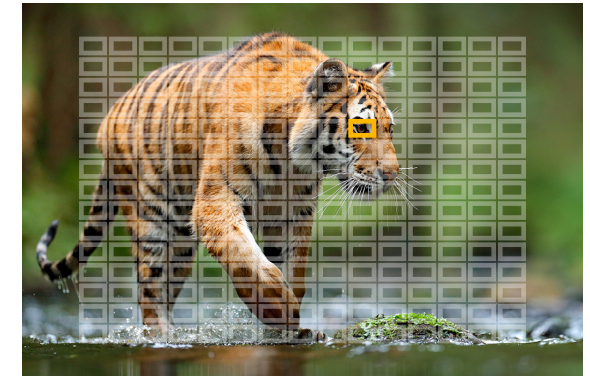
[5] Intuitive Control 1

External Buttons

The external levers, buttons, and joystick controller can be used to intuitively control the focus while watching the viewfinder.

Focus Switch

AF/AE Lock Button

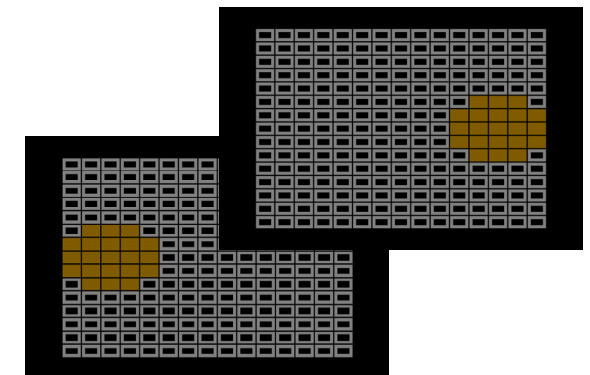**AF Mode Button**

Joystick

Joystick Controller

The joystick allows 4-direction control and push operation.

The joystick controller allows you to smoothly select focus areas from 225 areas.

The AF area can be moved from the end of the screen to the opposite end.

[5] Intuitive Control 2

Joystick Controller

The joystick allows easy camera operation. It lets you quickly shift the focus from one subject to another without taking your eyes off the viewfinder.
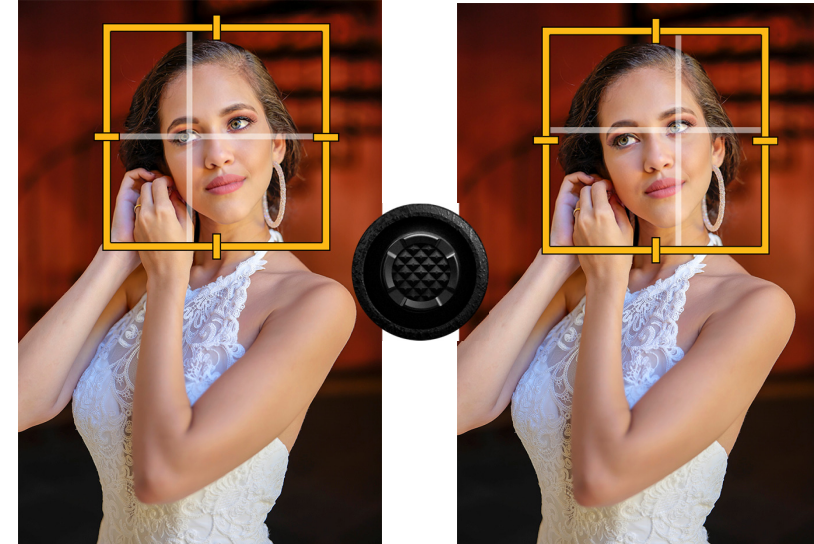
Face Detection / Human Body Detection / Animal Detection

Pressing the joystick moves the main AF area toward the right.
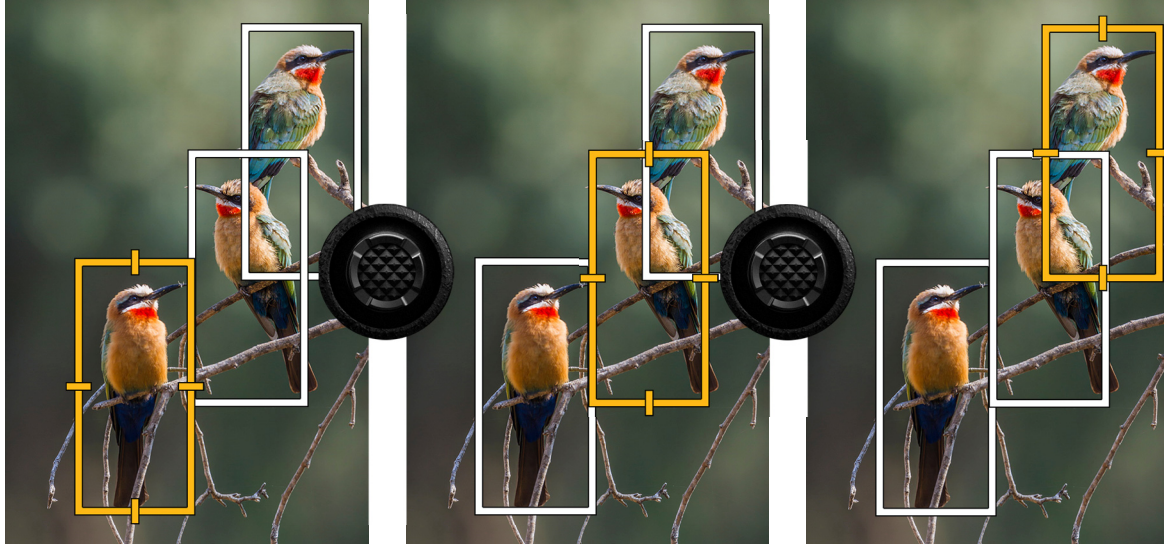
Face/Eye Detection

Pressing the joystick switches the focus point between the left eye and right eye.
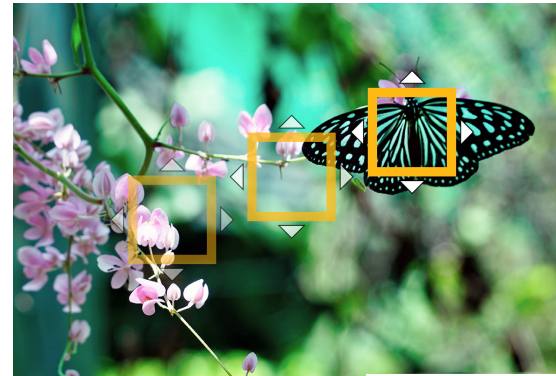
[5] Intuitive Control 3

Touch AF

Use intuitive touch operation (Pinch In/Out) just like you do with a smartphone. You can seamlessly change the size of the AF area, and focus over the entire screen.
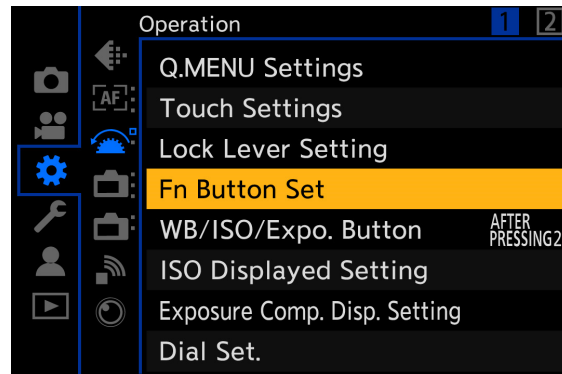
Touch Pad AF

The Touch Pad function enables you to use both the LVF and monitor simultaneously for more flexible focusing.
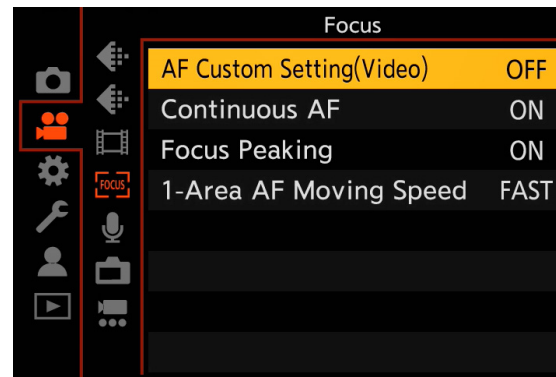
[6] Logical, Speedy Menu System

Custom Menu

Focus/Shutter 1 2 3

Focus/Shutter Priority
Focus Switching for Vert / Hor   OFF
AF/AE Lock Hold   OFF
AF+MF   ON
MF Assist
MF Guide   m
Focus Ring Lock   ON
Show/Hide AF Mode

Operation 1 2

Q.MENU Settings
Touch Settings
Lock Lever Setting
Fn Button Set
WB/ISO/Expo. Button   AFTER PRESSING2
ISO Displayed Setting
Exposure Comp. Disp. Setting
Dial Set.

Custom Menu can be used to preset the functions suitable for a specific project in advance.

Video/Photo Menu

Focus

AF Custom Setting(Video)   OFF
Continuous AF   ON
Focus Peaking   ON
1-Area AF Moving Speed   FAST

Focus

AF Custom Setting(Photo)   SET1
AF Assist Light   ON
Focus Peaking   ON
1-Area AF Moving Speed   FAST

Settings that may be frequently changed during shooting are included in Photo/Video Menu.

My Menu

Page 1

AF Custom Setting(Video)   ON
Focus Peaking   ON
MF Assist
Focus Ring Lock   ON
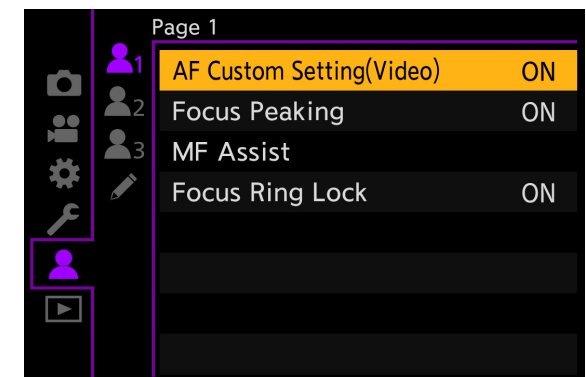
The functions you frequently use and want to access immediately can be registered in My Menu.

* The displayed menu item varies depending on the product.

[7] Custom Settings 1

Camera Fn Buttons

You can allocate various functions to the Fn buttons for quick recall.
This enables you to customize your camera.

	Number of Fn Buttons			
	Fn Buttons	Fn Touch Buttons	Battery Grip*	
S1H	2	5	1	
S1R	2	5	1	
S1	2	5	1	
S5	2	5	1	
BS1H	5	-	-	It is possible to assign to different buttons.
BGH1	4	-	-	
GH5M2	2	5	1	
GH5	5	6	1	
GH5S	5	6	1	
G9	5	5	1	

* Sold separately.

There's almost no limit to customizing!

Fn Lever (G9)

Pinpoint setting can be instantly changed.

Shooting functions that you can allocate.	
AF Mode	Quality
Photo Style	Long Shtr NR
Stabilizer	6K/4K PHOTO (Pre-Burst)
Self Timer	Silent Mode
Shutter Type	Bracket
Touch Screen	Touch Pad AF
Auto Review (Photo)	Peaking
Night Mode	Front/Rear/Control
Dial Lock	Off

For example, if you have set Face/Eye Detection in AF mode,
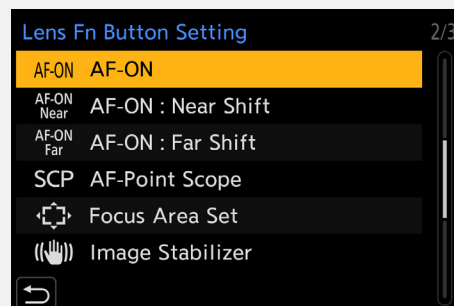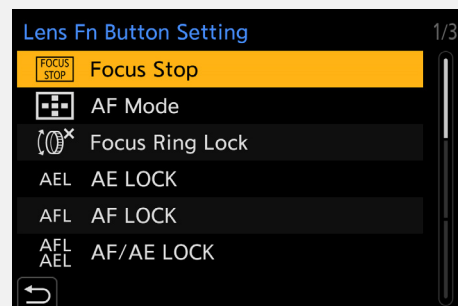you can temporarily switch to 1-Area AF and shoot while effectively focusing on the bouquet.

[7] Custom Settings 2

Lens Fn Button (LUMIX S Lens S-E70200)

Setting Method

- Allocate on the camera for the following settings.
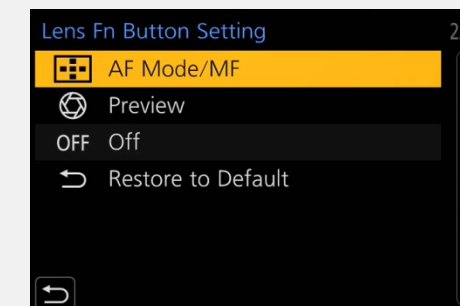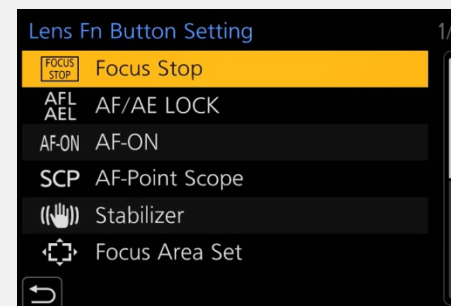- All three buttons have the same function.

Lens Fn Button Setting	1/3
FOCUS STOP Focus Stop	
AF Mode	
Focus Ring Lock	
AEL AE LOCK	
AFL AF LOCK	
AFL AEL AF/AE LOCK	

Lens Fn Button Setting	2/3
AF-ON AF-ON	
AF-ON Near AF-ON : Near Shift	
AF-ON Far AF-ON : Far Shift	
SCP AF-Point Scope	
Focus Area Set	
Image Stabilizer	

Lens Fn Button (LUMIX G Lens H-ES200)

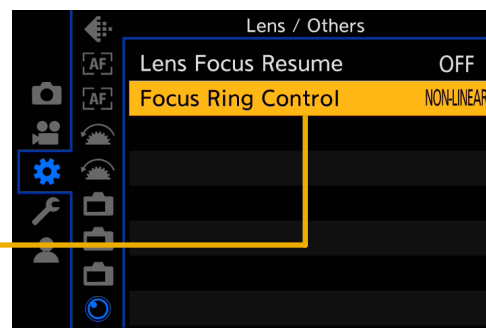A function can be allocated to the Fn button of the lens.

Setting Method

1. Allocate on the camera for the following settings.
2. Set switch ❶ to [Fn], then press button ❷ to recall the allocated function.

Lens Fn Button Setting	1/2
FOCUS STOP Focus Stop	
AFL AEL AF/AE LOCK	
AF-ON AF-ON	
SCP AF-Point Scope	
Stabilizer	
Focus Area Set	

Lens Fn Button Setting	2/2
AF Mode/MF	
Preview	
OFF Off	
Restore to Default	

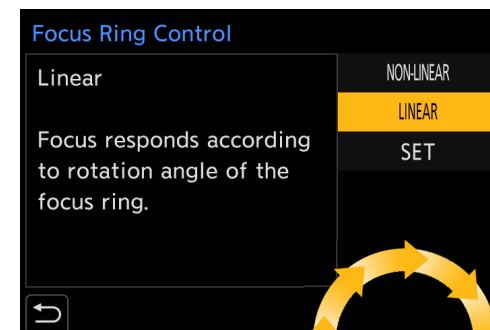# [7] Custom Settings 3

Focus Ring Control

You can set the coordination between the focus ring operation and the amount of focus movement when using supported lenses.
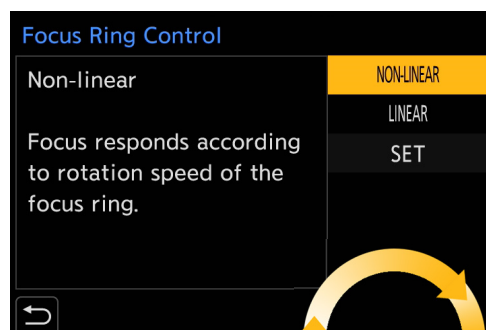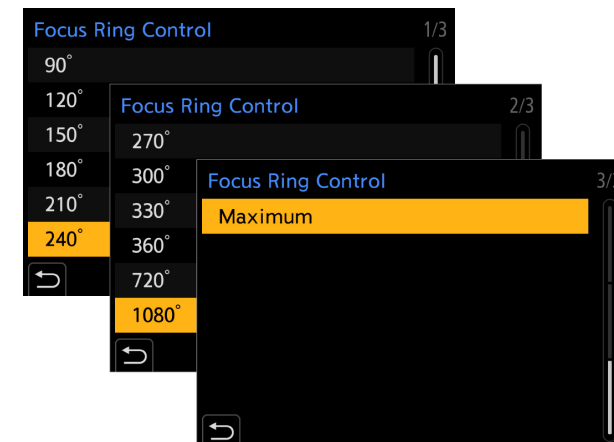
Nonlinear

This setting accelerates the focus movement in accordance with the speed of the focus ring rotation.

Linear

This setting moves the focus at a constant speed in accordance with the rotating angle of the focus ring.

Set

You can set the focus ring rotating angle when [Linear] is selected.

* LUMIX S1H/S1R/S1/S5 does not support 720° and 1080°.

[8] LUMIX Tether for Multicam

Focus control is possible with the remote using
the PC software "LUMIX Tether for Multicam".

1	Focusing is possible by clicking on the screen	
2	Focus Mode	AF
		MF
3	AF Mode	Auto Detection
		Tracking
		225-Area
		Zone (Oval)
		1-Area
4	1 Shot AF	
5	Zoom In Scale	
6	MF Adjust	

LUMIX Tether for Multicam Download ▶▶▶
https://av.jpn.support.panasonic.com/support/global/cs/soft/download/d_lumixtether_multicam.html

Operating Environment (as of December 2021)
* OS: Windows 10 (64bit), Mac macOS 10.13, 10.14, 10.15.3-10.15.7, 11.0-11.4
* CPU: Intel CPU of 1 GHz or higher
* Installed RAM: 2GB or more
* Display: 1024 x 768 or more
* Hard disk: Free space of 200 MB or more for installation
* Interface: USB 3.0/3.1 *Operation is not guaranteed with a connection via a USB extension cable. Wired LAN / Wireless LAN (Wi-Fi).

https://youtu.be/bo6vDTIsu40
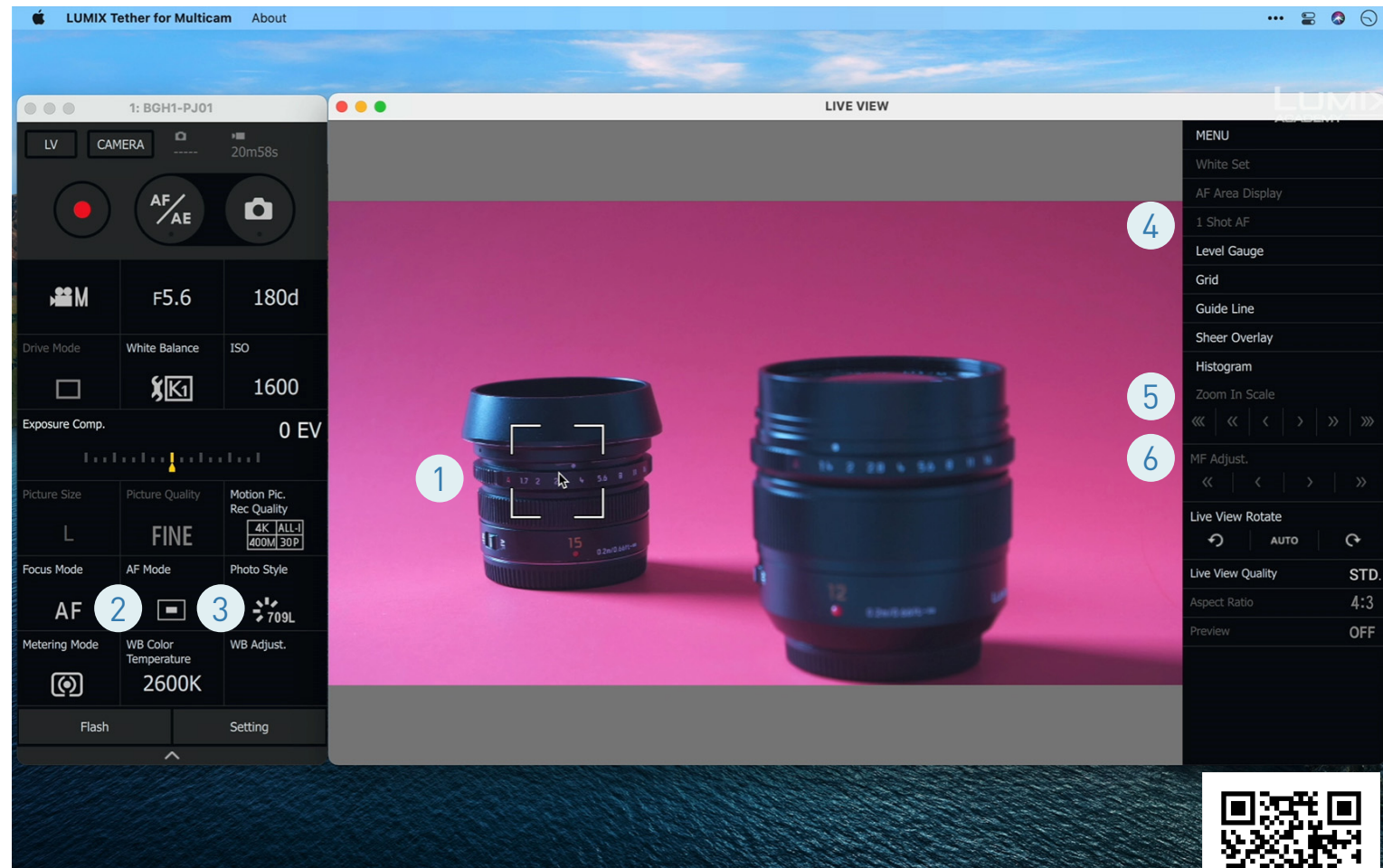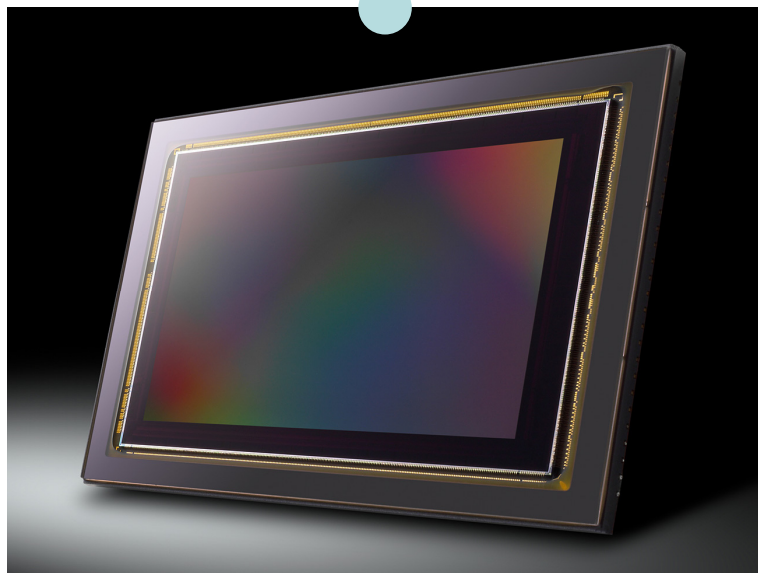
Introduction to LUMIX AF Technologies

Overall LUMIX System Advantages

The AF technology accumulated by LUMIX provides optimal control of the three main devices
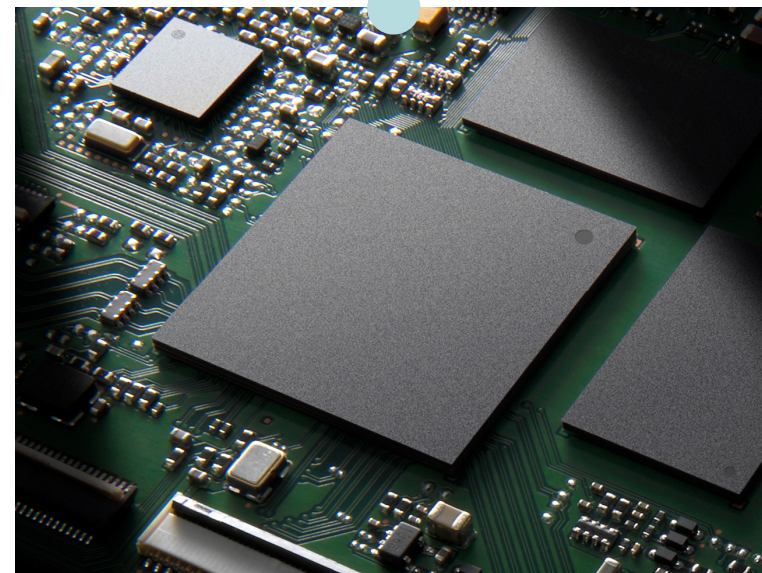

LENS

- Inner focus drive system
- Real-time feedback control
- Silent, high-precision operation

SENSOR

- High sensitivity and low noise
- High-speed read out

ENGINE

- Optimized lens control system
- High-speed, high-precision contrast AF
- DFD technology
- Human / Animal recognizing technology*
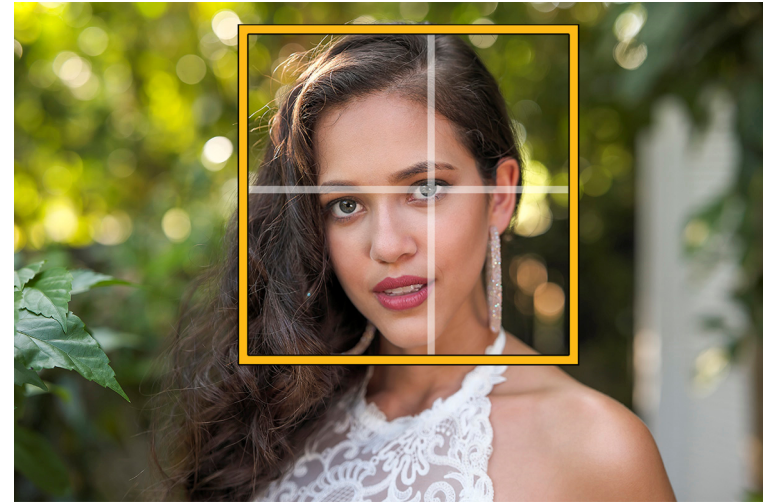
* LUMIX GH5 does not support animal detection.

Recognition Technology

Cutting-edge recognition technology that only Panasonic can achieve

Instantaneous Calculation of Spatial Information
Depth from Defocus

Real-Time Detection of Subject
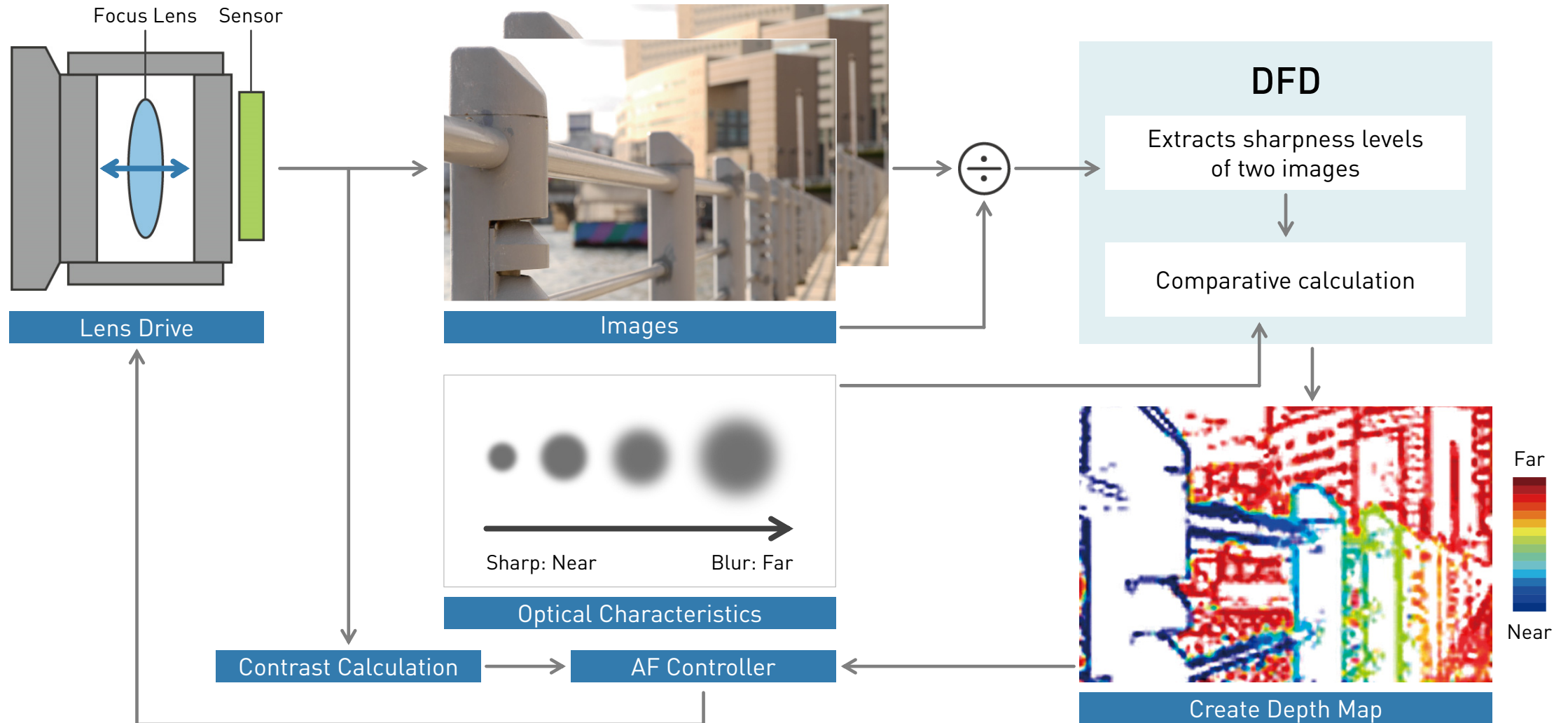## Face/Eye/Head/Body Recognition*

* LUMIX GH5 does not support head recognition and human body detection.

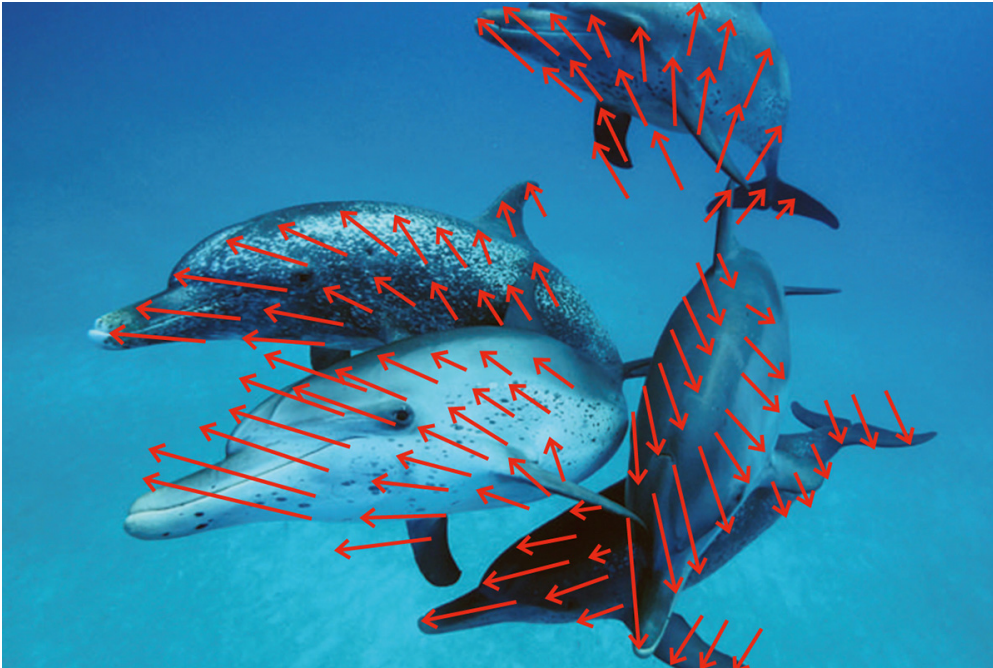**Cutting-edge recognition technology makes it possible to accurately capture subjects**

DFD Technology (Depth From Defocus)

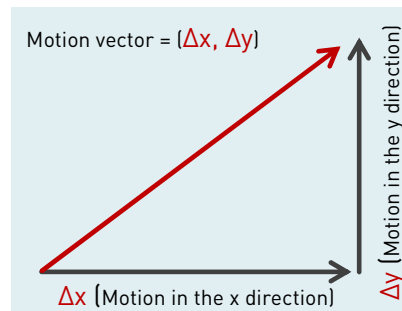**LUMIX knows... Subject distance in whole area, instantaneously.**

Motion Vector

LUMIX knows... Subject X-Y motion in whole area, precisely.

How motion vectors are detected

Present Frame

Past Frame

Y

X

Time

Motion detection blocks

Search for blocks with images of the highest similarity to the motion detection blocks of the past frame.
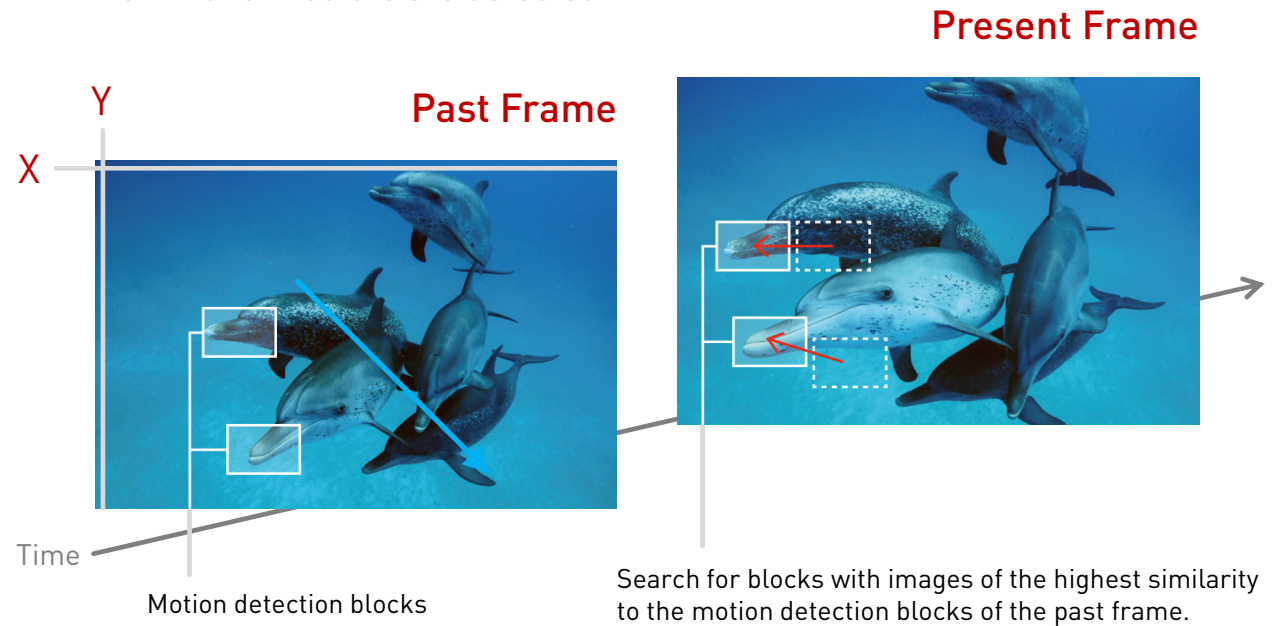
Motion Vector is a method for digitizing the amount of a subject's motion. It is calculated for each frame across the entire screen.

Adaption
• Auto focus
• Auto exposure
• Video codec
• Video noise reduction

Motion vector = (Δx, Δy)

Δy (Motion in the y direction)

Δx (Motion in the x direction)

* Firmware must be updated to the latest version.

Recognition Function with Deep Learning Technology

Human Recognition and Animal Recognition

Deep Learning technology creates a human recognition / animal recognition AI to accurately recognize a person and animal. A human recognition / animal recognition AI acquired from a huge number of images is processed by the camera's Venus Engine.

Panasonic's advanced technology will continue to expand the range of application for deep learning.

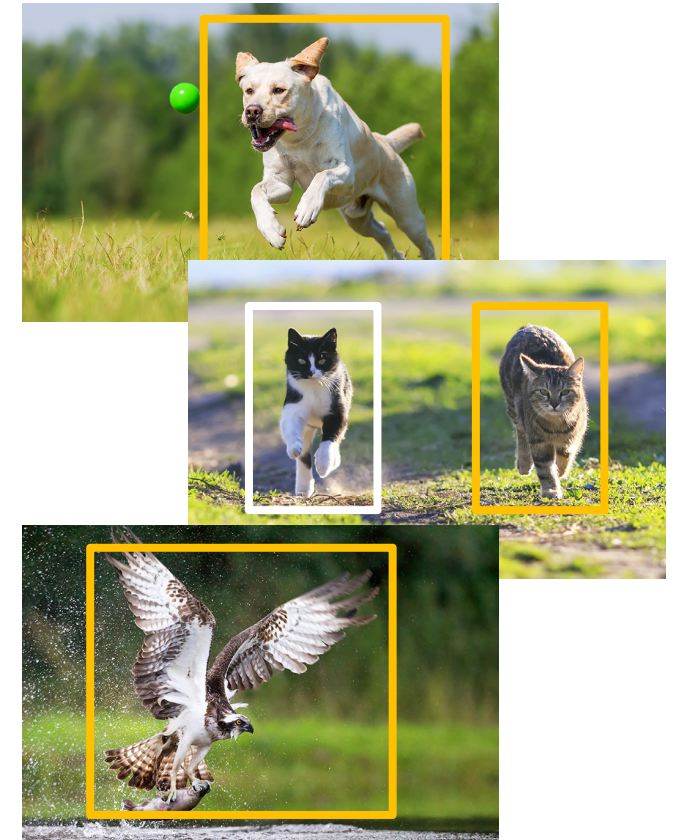### Human (Bodies and Heads)

Focuses on human bodies, even if the subject faces the other way.

Focuses on human heads, even if the subject's face is turned sideways.

Animal (Canidae, Felidae, Birds)

Allows the photographer to concentrate on the picture composition in difficult animal photography.

Appendices

Compatible Lenses

The operable focus settings vary depending on the lenses.
Check the latest information on our customer support page on our website.

LUMIX S1H	https://av.jpn.support.panasonic.com/support/global/cs/dsc/connect/s1_s1r.html
LUMIX S1R	https://av.jpn.support.panasonic.com/support/global/cs/dsc/connect/s1_s1r.html
LUMIX S1	https://av.jpn.support.panasonic.com/support/global/cs/dsc/connect/s1_s1r.html
LUMIX S5	https://av.jpn.support.panasonic.com/support/global/cs/dsc/connect/s5.html
LUMIX BS1H	https://av.jpn.support.panasonic.com/support/global/cs/dsc/connect/s1_s1r.html
LUMIX BGH1	https://av.jpn.support.panasonic.com/support/global/cs/dsc/connect/bgh1.html
LUMIX GH5M2	https://av.jpn.support.panasonic.com/support/global/cs/dsc/connect/gh5m2.html
LUMIX GH5	https://av.jpn.support.panasonic.com/support/global/cs/dsc/connect/gh5.html
LUMIX GH5S	https://av.jpn.support.panasonic.com/support/global/cs/dsc/connect/gh5s.html
LUMIX G9	https://av.jpn.support.panasonic.com/support/global/cs/dsc/connect/g9.html

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