



CCTV MOTORIZED ZOOM LENS

**Y35Z10RH Y36Z15RH Y36Z20RH
Y55Z16RH Y64Z16RH Y66Z15RH
Y66Z31RH Series**

Instruction Manual

株式会社 ヴィ・エス・テクノロジー

VS Technology Corporation

Thank you for choosing VS Technology Security Zoom Lens for your system.

Before handling, connection, and operation, please read this instruction manual carefully, especially to avoid any accident or damage.



WARNING

If the instructions below are not followed, it may cause death or serious injury.

- **Don't disassemble or modify the lens.**
 - ✧ It could damage lens circuit board and cause a fire or electrical leakage.
 - ✧ Optical performance may drop.

- **Don't let lens get wet.**
 - ✧ It may cause a fire, electrical leakage and electrical shock.
If the incident occurs, turn off the power supplied to the lens immediately.

- **Don't damage cable or wires.**
 - ✧ It could cause electrical short which may cause a fire.

- **Fix the lens to housing of Pan and Tilt System firmly.**
 - ✧ If the lens isn't fixed firmly, it may drop from housing from high-place, which causes severe accidents.

- **Don't look at the Sun or strong light source directly through lens with eyes.**
 - ✧ It could damage your eyes and you lose eyesight.



CAUTION

If the instructions below are not followed, it may cause injury or substantial damage.

- **Make sure to turn off when making switch setting.**
 - ✧ IC may get damaged if any switch on a lens is switched while the power is on.

- **Make sure to confirm that all the switch settings are correct before turn on the power.**
 - ✧ Circuit boards may get damaged if the power is turned on with a wrong switch setting.

- **Handle the lens with care. / Don't give a shock to the lens.**
 - ✧ The lens is assembled with sensitive alignment on many parts inside. If shock is given to the lens, optical performance may drop.

- **Don't drop the lens.**
 - ✧ If the lens is dropped, it may cause injury.
 - ✧ If the lens is dropped, it may cause damage or malfunction on lens. Also, optical performance may drop.

*Specifications and appearance are subject to change without notice

- **Hold the lens by hands when it's attached or removed from housing.**
 - ✧ If camera is hold instead of the lens, lens' C mount may get damaged or removed from the lens and the lens may drop.
- **Don't supply the power to the lens before or during wire connection.**
 - ✧ It may cause electrical leakage or electrical short, which may cause a fire.
- **Don't pull cables or wires.**
 - ✧ It may damage them and cause contact failure.
- **Don't hold wires by edge of fingernail or something sharp such as tweezers.**
 - ✧ It may damage or cut wires.
- **Make sure all the wires are connected correctly and properly.**
 - ✧ Miswiring may cause damage on circuit boards of the lens or may cause a fire.
 - ✧ Poor terminal connection assembly may cause contact failure.
- **Make sure all the input voltage to the lens is correct.**
 - ✧ Excess voltage will damage a circuit board.
- **Read instruction manual of other equipment.**
 - ✧ To connect or attach the lens properly with other equipment such as camera, controller and housing, read and follow the instruction manuals of those equipment as well as this lens' instruction manual.
- **Don't fix lens and camera separately on two separate bases or plates.**
 - ✧ When the system is given strong shock, lens C mount may get damaged. Lens and camera must be fixed onto one base or plate using both lens's tripod screw and camera tripod screw.
- **Fix the lens using tripod screws.**
 - ✧ Since the lens is heavy, make sure the lens' tripod screws are used to be fixed.



RECOMMENDED

- ✧ Using IR corrected zoom lens, it is highly recommended to make anti-reflection coating on both sides of window glass of housing to avoid light reflection inside the housing and the lens.

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1. General Features

- **Optical Near Infrared Corrected (True NIR)**

Focus positions between visible light and near infrared light are almost the same position and no refocusing is needed when using NIR illuminator at night. Super Low Dispersion Glasses are used.

- **Visible Light Cut Filter (VC filter /Haze Cut filter)**

By using the VC filter, the object hidden by haze can be seen.

- **Thermal Compensation System (TCS) (For the lens with TCS only)**

TCS automatically adjust back focus in correct position every 2 °C by monitoring lens body temperature with thermal sensor every 3 minutes. By using TCS, it is free from re-setting of preset positions when temperature changes widely through the year. It also enables auto focus to keep in good performance no matter what temperature is.

- **Auto Focus (AF) (For the lens with AF only)**

Yamano AF has two modes. One is "Quick Scan AF" and the other is "Full Scan AF" By pushing AF button less than 1sec., Quick Scan AF will activate and focus on the object in the distance between 100m and infinity. By pushing AF button more than 1sec., Full Scan AF will activate and searching focus on the object in the distance between 25m and infinity.

2. Environmental Conditions in Use

Yamano zoom lenses are guaranteed for proper operation under the following conditions.

- Temperature : -10°C ~ +50°C (Subject to no dew condensation)
- Humidity : 30% ~ 70% (Subject to no dew condensation)

3. Important Notice before Installation

- Make sure all DIP switches of a lens are set correctly before the power is turned on.
- Make sure all switches of camera, controller, and lens are turned off before connection.
- Do not touch the surface of lens. When the surface of lens gets soiled, wipe it with clean cloth soaked with lens cleaner liquid or cleaning paper.
- Before connecting wires, confirm the input voltage indicated in the electrical specification in this manual.
- For longer life, it is recommended to move the zoom and focus functions daily to prevent the grease

from evaporating earlier.

- As the zoom lens, especially optical system is assembled by delicate adjustments to maintain optical performance, please handle a lens very carefully to prevent it from strong shock by dropping or hitting hard which may affect the optical performance.
- Do not pull wires hard, which may cause malfunctions of connections.
- Zoom lens is heavy. When fixing a lens to a housing, please make sure the lens tripod screws are used to fix the lens firmly onto a base plate. Also use camera tripod screw to fix the camera onto the same base plate firmly to prevent lens' C mount from getting damaged by shock and vibration during transportation.

4. Lens Mounting to a Camera

Before mounting a lens to a camera, please check a mount type of camera (C or CS). When C mount zoom lens is mounted to a CS mount camera, CS mount adaptor ring (t=5mm) has to be attached between the camera and the lens to obtain nearly correct back focus length.

To adjust camera position:

Refer to item "10.2".

5. Selection of Control circuit

Select either “CVS circuit” or “DVS circuit” for the zoom and focus circuit with DIP switches. The differences between CVS circuit and DVS circuit are as follows.

CVS circuit is a circuit that keeps the voltage applied to the motor below a certain voltage to protect the motors (zoom/focus motors rated voltage 6V, iris motor rated voltage 3V). Therefore, it is not possible to change the operating speed by changing input voltage to zoom & focus motors from the external controller.

Be sure to select CVS circuit when using autofocus function or serial communication control function.

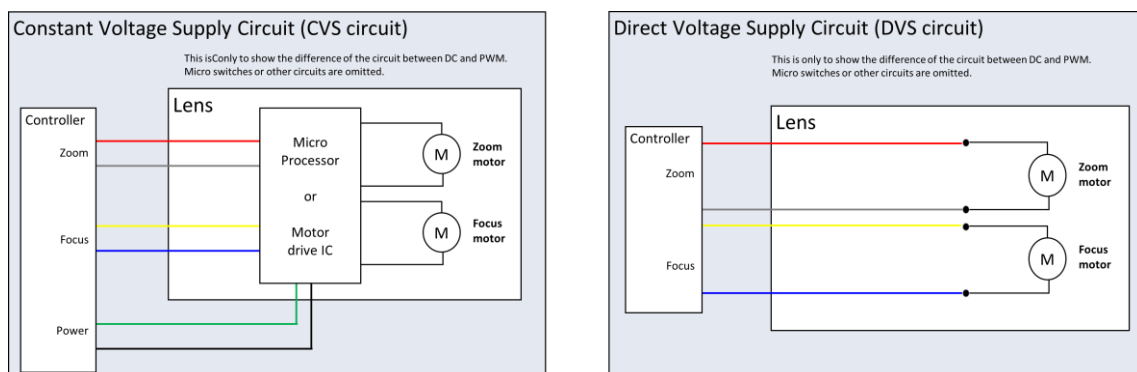
【DVS Circuit】 (Newly added control circuit)

DVS circuit is a circuit that controls zoom motor and focus motor by applying a voltage directly from an external controller to each motor without going through any circuit. Therefore, it is possible to change the operating speed to any speed by changing the voltage applied from the external controller to the motor.

However, because there is no circuit to protect zoom motor and focus motor, care must be taken not to apply a voltage higher than the rated voltage of the motors.

Also, when selecting DVS circuit, both focus circuit and zoom circuit will become DVS circuit. Refer to the next section “【Switch setting method】” to set the switches.

Main application: For PWM control of focus motor to fine-tune focus, etc.

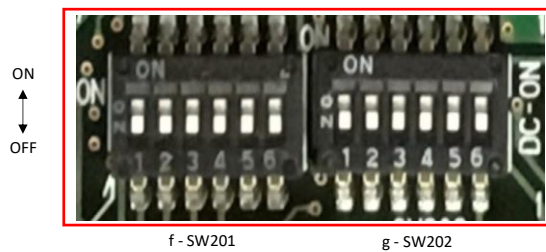


【Switch setting method】

If the two DIP switches are set as shown in the table below with the power turned off, both the zoom and focus circuits will switch to either CVS circuit or DVS circuit at the same time.

Caution: Turning on the power with the wrong SW setting will damage circuit boards.

	SW201	SW202
DVS circuit	ALL ON	ALL OFF
CVS circuit(Default)	ALL OFF	ALL ON

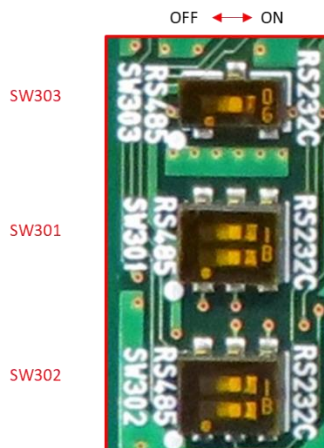


The picture left shows a example of wrong setting.
(All switches are set "OFF".)

If all the switches are set "ON", PCB will get damaged.

6. Selection of Serial control function

(1) Select either RS-232C or RS-485 with the DIP switches below.



	SW303	SW301	SW302
RS-232C	ON	全て ON	全て ON
RS-485	OFF	全て OFF	全て OFF

Caution: Turning on the power with the wrong SW setting will damage circuit boards.

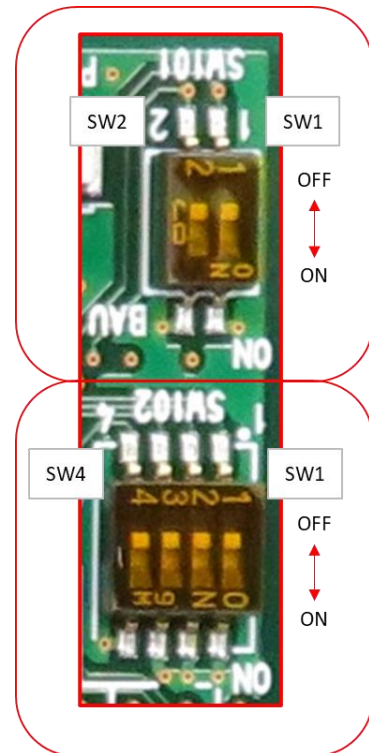
(2) Baud Rate Setting

Set Baud Rate according to the table below.

(Factory setting: 9600bps)

Baud Rate : SW101

Baud Rate	SW1	SW2
4800 bps	OFF	OFF
9600 bps	ON	OFF
19200 bps	OFF	ON
38400 bps	ON	ON



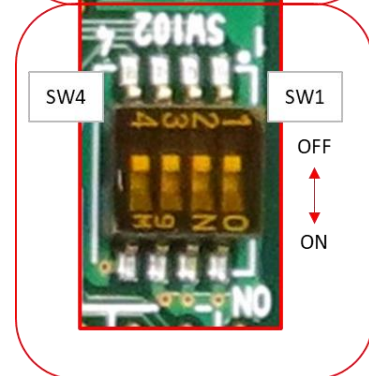
(3) Lens address setting

Set Lens address according to the table below.

(Factory setting: Address=1)

Lens Address : SW102

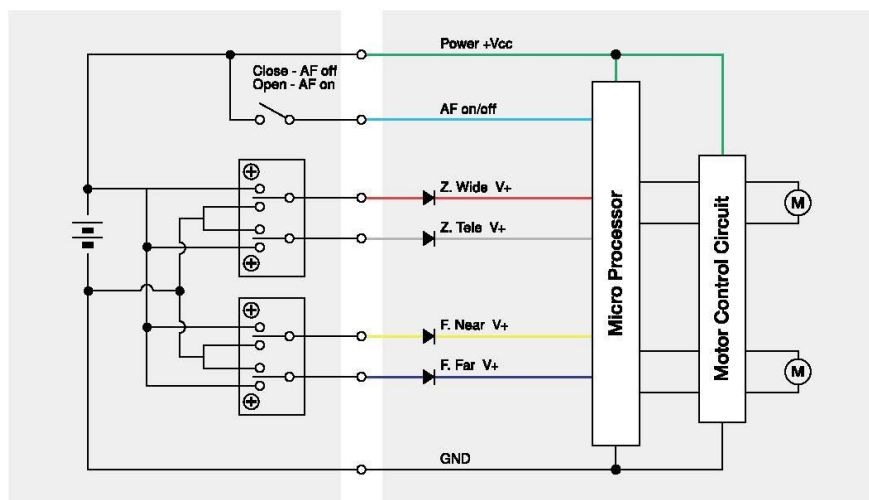
Address	SW1	SW2	SW3	SW4
1	OFF	OFF	OFF	ON
2	OFF	OFF	ON	OFF
3	OFF	OFF	ON	ON
4	OFF	ON	OFF	OFF
5	OFF	ON	OFF	ON
6	OFF	ON	ON	OFF
7	OFF	ON	ON	ON
8	ON	OFF	OFF	OFF
9	ON	OFF	OFF	ON
10	ON	OFF	ON	OFF
11	ON	OFF	ON	ON
12	ON	ON	OFF	OFF
13	ON	ON	OFF	ON
14	ON	ON	ON	OFF
15	ON	ON	ON	ON



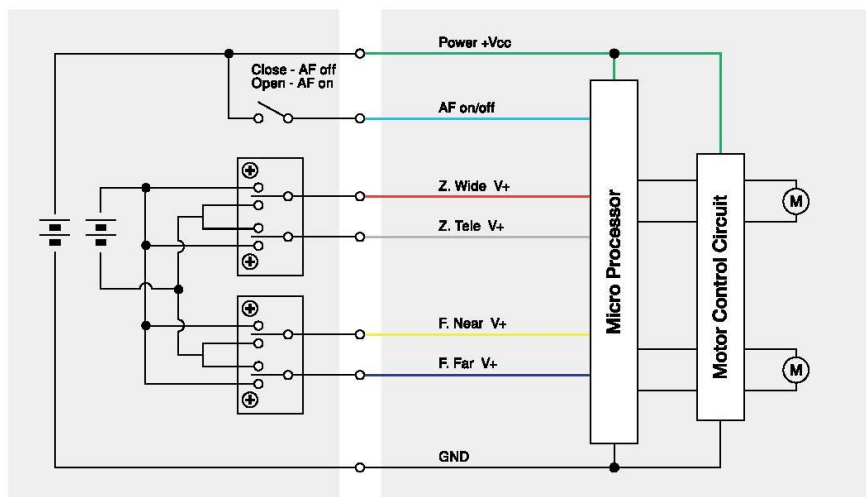
7. Circuit Diagram of Controller for Auto Focus

Yamano New AF Zoom Lens requires the following control circuit. A conventional zoom lens controller can be used as well as a special AF zoom lens controller which our current users of our products have been using to make an operation. Either Controller No. 1 or Controller No. 2 can be used.

(1) Controller No.1 : Common Ground Type

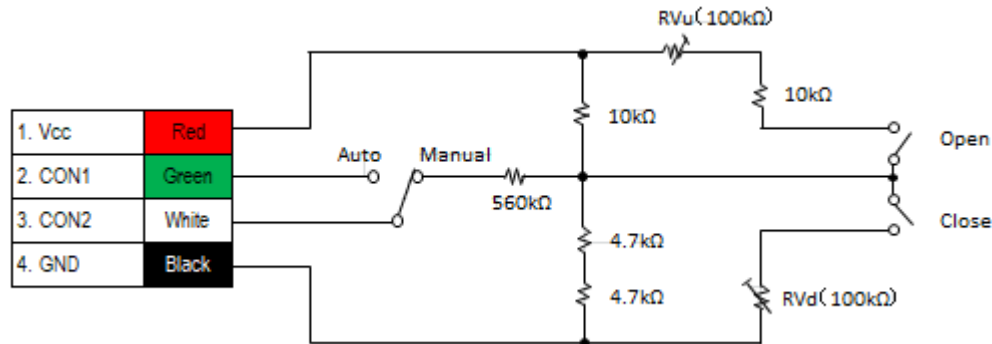


(2) Controller No.2 : Independent Ground Type (Conventional zoom lens controller)



8. Circuit Diagram for Iris Manual Override (M/O) (only for Video AI)

With Iris manual override, the iris can be switched from auto iris to manual iris. The iris manual override is an option for the lens of Video Iris type only. To control the M/O, the following control circuit is prepared by users.

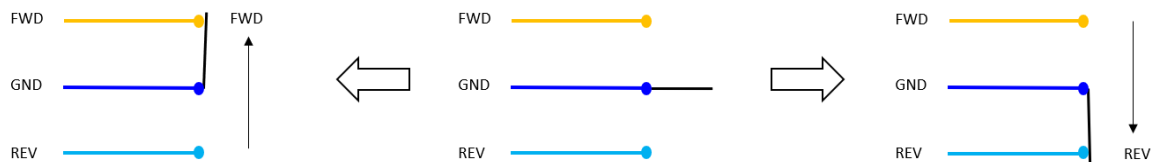


* RVu = 100kΩ By making the volume of resistance lower, can get faster speed of iris opening.

* RVd = 100kΩ By making the volume of resistance lower, can get faster speed of iris closing.

9. How to control for Turret Filter (only for the Turret filter Option)

【Analogue Control】



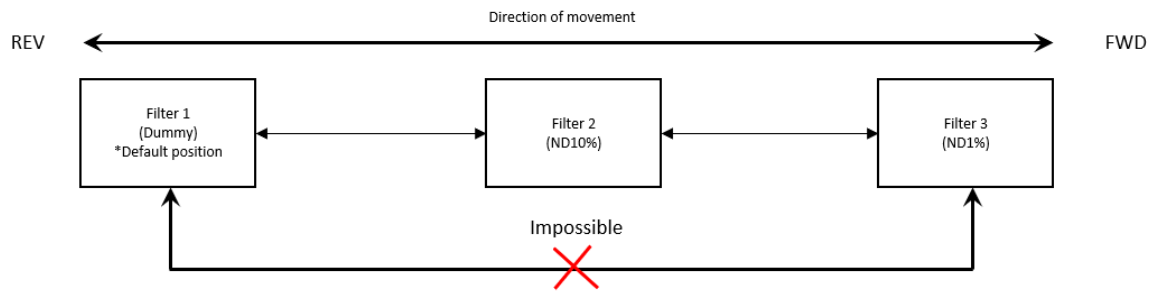
*It is programmed to automatically move to a next filter when either "FWD" or "REV" circuit is closed once to the GND ($\geq 100\text{ms}$).

*If "REV" circuit is closed once when Filter 1 is selected, it will automatically move to Filter 3 passing through Filter 2.

*If "FWD" circuit is closed once when Filter 3 is selected, it will automatically move to Filter 1 passing through Filter 2.

EX: To change position from Filter 1 to Filter 3, there are two ways.

- 1) Close "FWD" circuit twice
- 2) Close "REV" circuit once

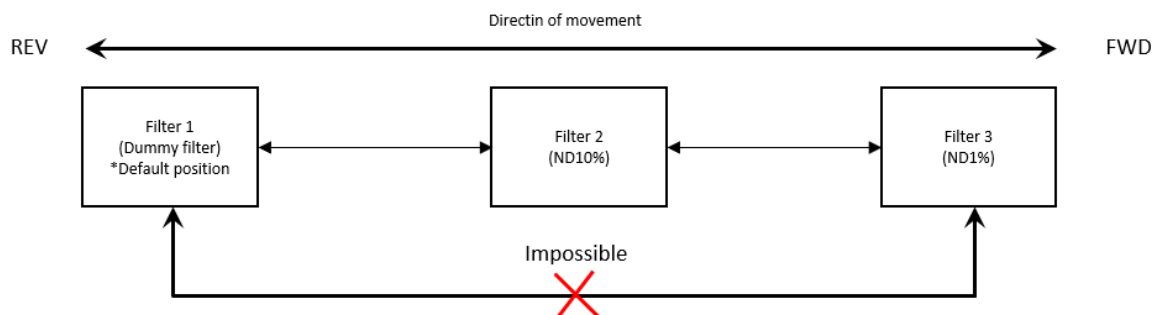


【Serial Communication Control】

For serial communication control, dedicated commands are assigned from Filter 1 to Filter 3.

Therefore, just by sending the command of each Filter, it will automatically move to the specified filter.

If the command of Filter 3 is sent when Filter 1 is selected, or if the command of Filter 1 is sent when Filter 3 is selected, it moves to the specified filter via Filter 2.



10. Adjustment

10.1. Back Focus

After a lens is mounted to a camera, back-focus needs to be adjusted correctly to get a sharp focus.

Adjust back focus with either the back focus adjustment mechanism of a lens or auto back focus (ABF) function of a camera.

If the camera has ABF function, use it to adjust back focus. Back focus adjustment mechanism is used when a camera doesn't have ABF function.

- (1) Prepare a proper object of shooting to adjust the back-focus easily. The recommended conditions of the object are
 - in a distance as far as possible (recommended over 1km)
 - flat surface at right angle to the optical axis of a lens
 - having a good contrast

(2) Open the iris fully.

For DC auto iris :

Use the automatic back-focus (ABF) function on the camera and it opens the iris automatically and fully.

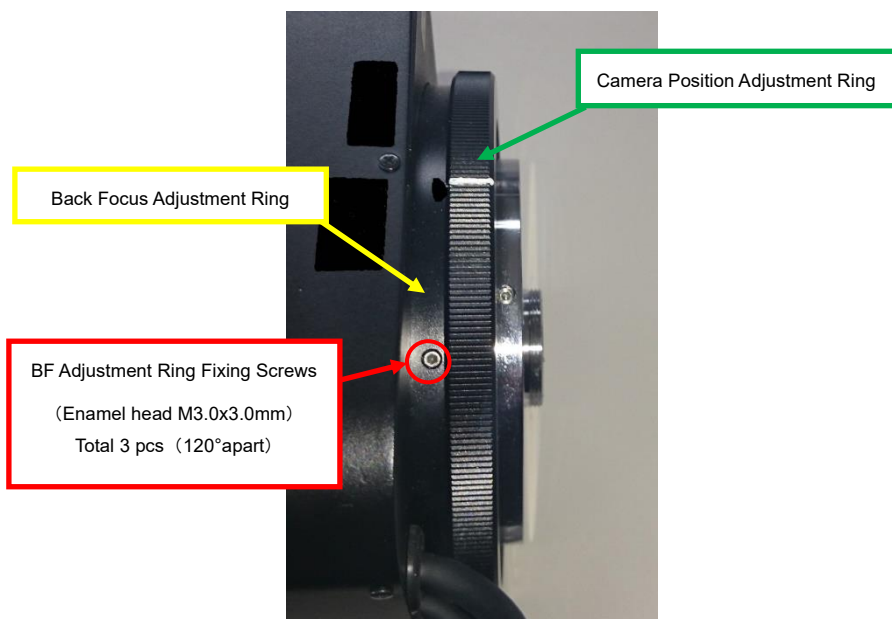
* If iris doesn't fully open with Auto Back Focus function of a camera, use the following method to make iris fully open.

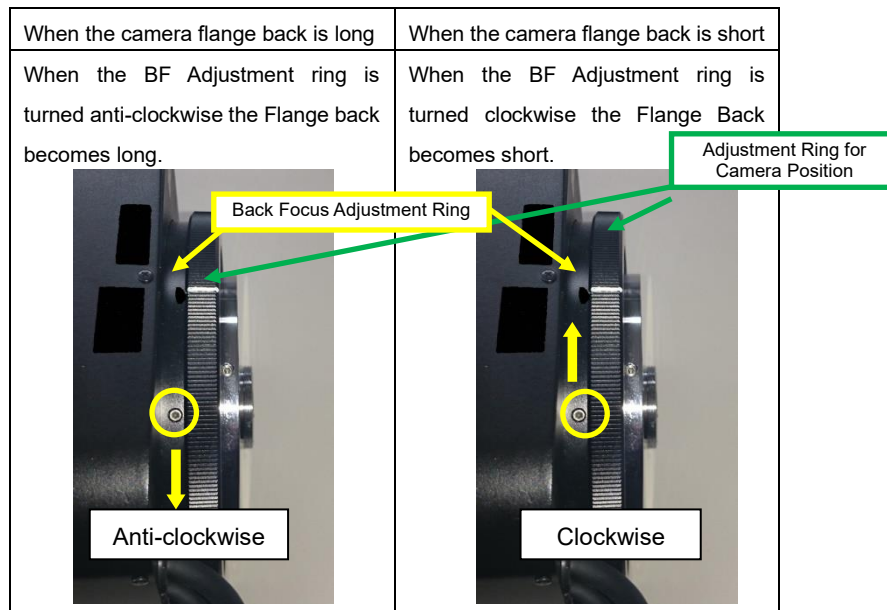
Set the electric shutter of the camera at the highest speed and make the image dark, then slow down the shutter speed gradually until the brightness of the image is at the correct level or slightly dark, then fix the shutter speed.

(3) Loosen the screws of the back focus adjustment with a hexagonal wrench.

- Enamel head screw: M3.0 x 3.0 mm x 3 pcs
- Size of a hexagonal wrench: 1.5 mm

* The adjustment ring for camera rotation position needs to be rotated to adjust the back-focus, and then the ring for back focus adjustment is rotated simultaneously.





(4) Make a sharp focus using the function of lens focus after the zoom position is brought to the tele-end.

(5) Adjust back focus by rotating the adjustment ring for camera position to get a sharp focus after the zoom position is brought to the wide-end.

It is highly recommended to focus on an object further than 1km. This procedure must be followed strictly when using auto focus zoom lens, because accuracy of back focus has influence on accuracy of auto focus.

(6) Do (4) again.

(7) Confirm the lens keeps a sharp focus after the zoom position is brought to the wide-end.

(8) Repeat the procedures from (4) through(7) unless the lens keeps a sharp focus

(9) Tighten all the set screws to lock the adjustment ring for back focus firmly after making sure the lens keeps a sharp focus at the wide-end.

(10) Apply thread locking glue to the fixing screws and screw the adjustment ring for the Back Focus.

* The image may become blurred due to vibration for a prolonged period unless glue is applied.

10.2. Rotational Position of the Camera

(1) Rotate the adjustment ring for rotational position of the camera by 1/8 of a rotation (approx. 45

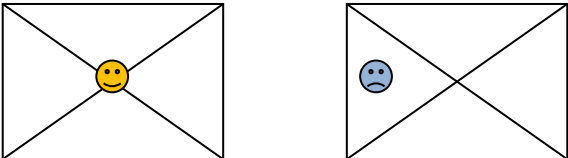
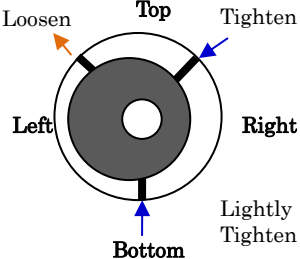
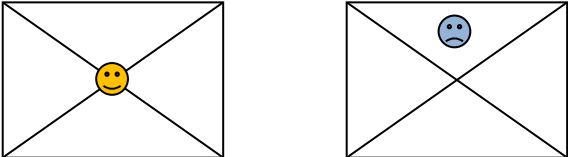
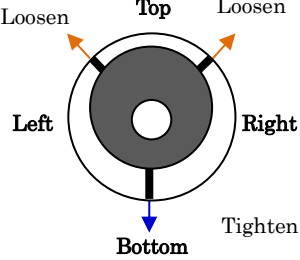
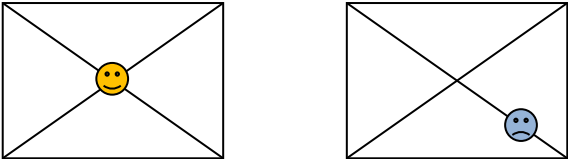
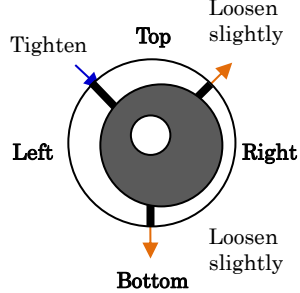
degrees) to the anti-clockwise direction (looking from the camera side) to loosen the ring.

- (2) Adjust the camera position by looking at the image.
- (3) Rotate the adjustment ring for rotational position of the camera to the clockwise direction firmly to tighten and fix the position of the camera.

10.3. Optical Axis

Lens' optical axis is adjusted at factory. However, optical axis may get off-center while zooming in/out due to camera sensor assembly tolerance. To avoid this, optical axis needs to be adjusted with Lens' Optical Axis Adjustment Mechanism after mounting a camera to the lens.

- (1) Set the subject (to be the standard point) at the center of the image after bringing the zoom to the tele-end.
- (2) Check and confirm the direction (top, bottom / left, right) to which the subject moved in the image after bringing the zoom to the wide-end.
- (3) Tighten or loosen the optical axis adjustment screws with a hexagonal wrench carefully to carry out the optical axis adjustment.
 - Enamel head screw: M3.0 x 3.0 mm x 3 pcs
 - Size of a hexagonal wrench: 1.5 mm

	The direction of the movement of the subject at the center of the image	Adjustment with optical axis screws
1	Tele Wide  When the subject is at the center at Tele end, but has moved to the left at Wide end	
2	Tele Wide  When the subject is at the center at Tele end, but has moved to the top at wide end	
3	Tele Wide  When the subject is at the center at Tele end, but has moved to the bottom right corner at wide end	

*1 - The diagrams above are as seen from the camera side.

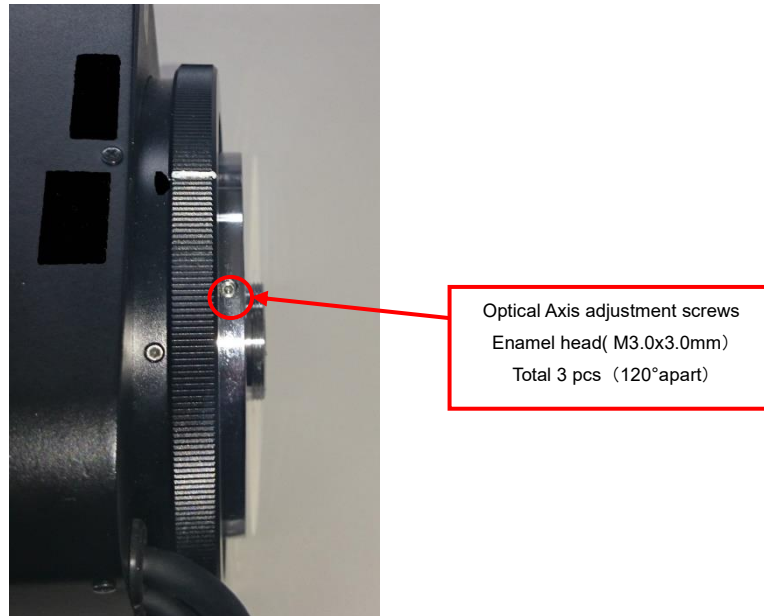
* It is difficult to have a look at the C mount's movement because the optical axis adjustment range is $\pm 0.5\text{mm}$ from the center.

- (4) Check that the center of the image does not shift throughout the zoom range (from tele-end to wide -end, or from the wide-end to the tele-end.).
- (5) Tighten the optical axis adjustment screws at 3 positions little by little while checking whether the center of the image does not shift.

* Tighten the loosened screws first, whereby forgetting to tighten the loosened screws can be surely prevented.

- (6) Reconfirm that the center of the image has not shifted throughout the zoom range.
- (7) Apply thread locking glue to the fixing screws on the adjustment ring for the optical axis.

* The center of the image may move due to vibration for a prolonged period unless glue is applied



10.4. Auto Iris (only for Video Iris Lens)

The adjustment of Auto light control (ALC) or Level may be needed by a lens which has a Video Auto Iris. It is controlled by video output signal from a camera.

(1) ALC adjustment (Set at the middle position at factory)

It can change from the average mode to the peak mode continuously.

- Average mode

This mode uses the average value of the video signal on the whole screen to control the iris.

The volume needs to be turned to the average (A) side if the contrast is not enough to see the image.

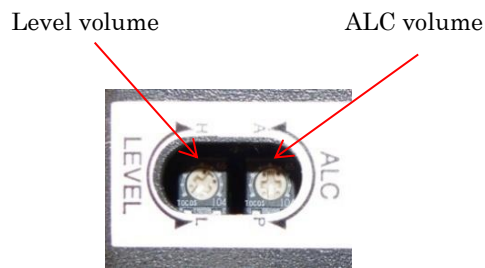
- Peak mode

This mode uses the peak value of the video signal on the whole screen to control the iris. The

volume needs to be turned to the peak (P) side if the contrast is so high that the blurred image occurs.

(2) Level adjustment (Set at 2 o'clock position at factory)

The brightness level needs to be adjusted in case the image is too bright or dark.



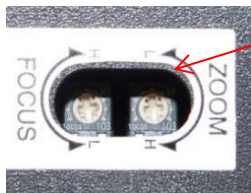
【Caution】

- Please make sure that iris hunting doesn't occur under any lighting conditions when the iris level is adjusted.
- Don't apply unusual forces on them by pushing them hard or turning them strongly in order to prevent them from being damaged when turning the volumes with a screw driver.

10.5. Zoom Operation Speed (Available for CVS circuit only)

The zoom operation speed can be changed by turning around zoom volume on the top of the lens cover.

The zoom volume is set at middle position at the factory.



- To get faster speeds - Turn to High (H)
- To get slower speeds - Turn to Low (L)

【Caution】

- Please set the volume between the middle and the maximum position. The zoom motor may not move especially under low temperature if the zoom volume is set at between minimum and middle position.
- Don't apply unusual forces on them by pushing them hard or turning them strongly to prevent them from being damaged when turning the volumes with a screw driver.

10.6. Remote Focus Operation Speed (Available for CVS circuit only)

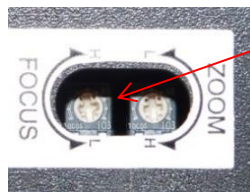
There are 2 modes to control the speed of the focus motor. They can be switched by using the volume.

(1) 2 Steps Speed Mode

The focus moves slowly for the first 3 seconds, and then the speed becomes faster automatically if the volume is set at the minimum position. This mode enables to focus on an object in a long distance easily. It is not recommended to use this mode if the preset function is used.

(2) Fixed Speed Mode

The focus motor moves in the same speed if the volume is set at between middle position and maximum position. The focus operation speed changes depending on the position of the volume. This mode needs to be applied if the preset function is used.



• To get faster speeds - Turn to High (H)

• To get slower speeds - Turn to Low (L)

【Note】

- This function is not for improving the auto focus speed.
- Power cycle the lens off and on again to make all the changes to take effect after the adjustment.

【Caution】

- Don't apply unusual forces on them by pushing them hard or turning them strongly to prevent them from being damaged when turning the volumes with a screw driver.

11. Operation of Auto Focus (only for the Lens with AF)

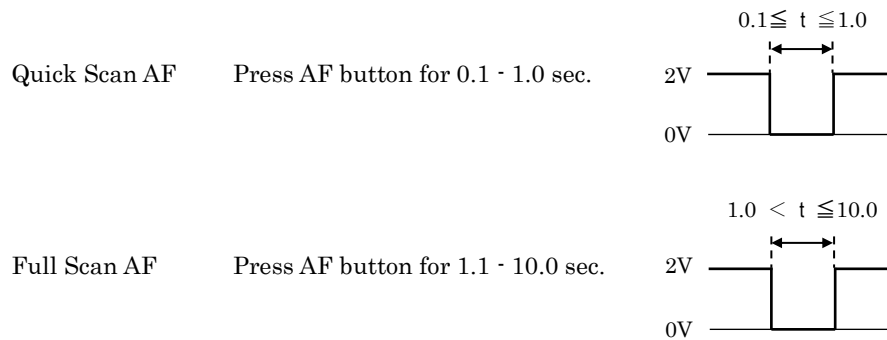
(1) One push AF

The One Push AF supports 2 modes depending on time to push the button. One mode is called "Quick Scan AF", the other one is "Full Scan AF".

A) AF Mode

"Quick Scan AF" searches focus point in the distance between 100m to infinity, which enables to focus on an object quickly. "Full Scan AF" searches a focus point in the distance between 25m to infinity, which enables to focus on an object in a short distance. It takes longer time in

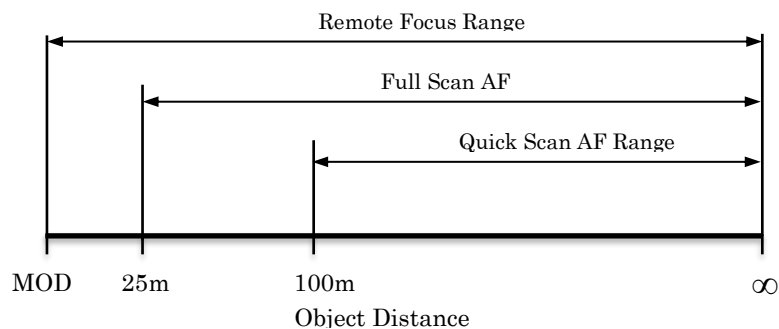
focusing than the Quick one.



B) Focus Range

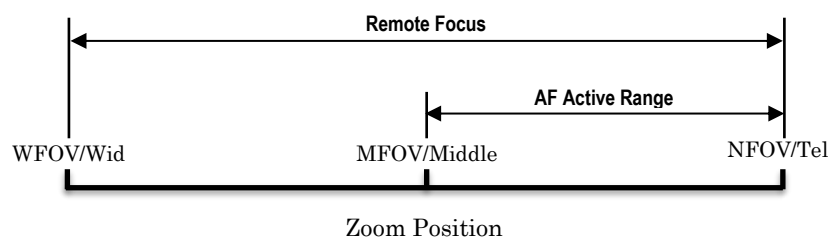
There are two focus ranges which are shown in the table below depending on AF Mode.

1. Quick Scan AF Mode : 100m - ∞
2. Full Scan AF Mode : 25m - ∞



C) Zoom range to activate AF

AF works in the zoom range between middle position and tele-end position, but it doesn't work in the zoom range between wide-end position and middle position because the depth of field is big enough. Thus, Yamano AF avoids such waste motion. To avoid unnecessary motion reduces number of focus barrel movement, by which, it improves focus barrel life longer as much as possible.



D) Other AF motion

- To Restart AF : Press AF button while AF is in motion
- To Stop AF : Press zoom/focus button while AF is in motion

(2) How to use AF.

It is recommended that Auto Focus is usually switched off, and that AF is operated as necessary by one-push Auto Focus method. This procedure can avoid earlier worn-outs at scraping points of lens.

【Note】

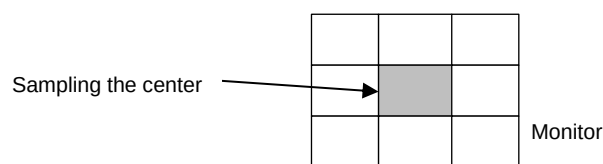
- Pressing AF button first time after lens is turned on, Full Scan AF is activated no matter how long the AF button is pressed.
- AF cannot be activated while zoom or focus is in motions
- When sky blue wire is disconnected, AF will be activated automatically every after the zoom motion is stopped. However, it's not recommended to use AF in such way because life time of lens barrel gets shorter.

【Caution】

- If AF is always left on, images are often blurred and kept such conditions in certain times. It will also prompt worn-out of scraping points of focus barrel.

(3) Mechanism

Yamano AF operates by sampling analog composite video signal in the center of the monitor.
Composite video signal: Brightness signal, Vertical & Horizontal synchronized signal in NTSC/PAL/Progressive.



AF microprocessor converts the change rate of horizontal contrast into voltage and detects the highest point of the voltage by moving front lens to get focus. Therefore, in some conditions below, it may be difficult to obtain a correct focus, or it may focus on some unintentional spots. Also, AF microprocessor try to keep searching, which will take a long time and you might want to abort the AF operation, then you can abort AF operation by pushing zoom button either tele or wide one time, then AF operation will stop.

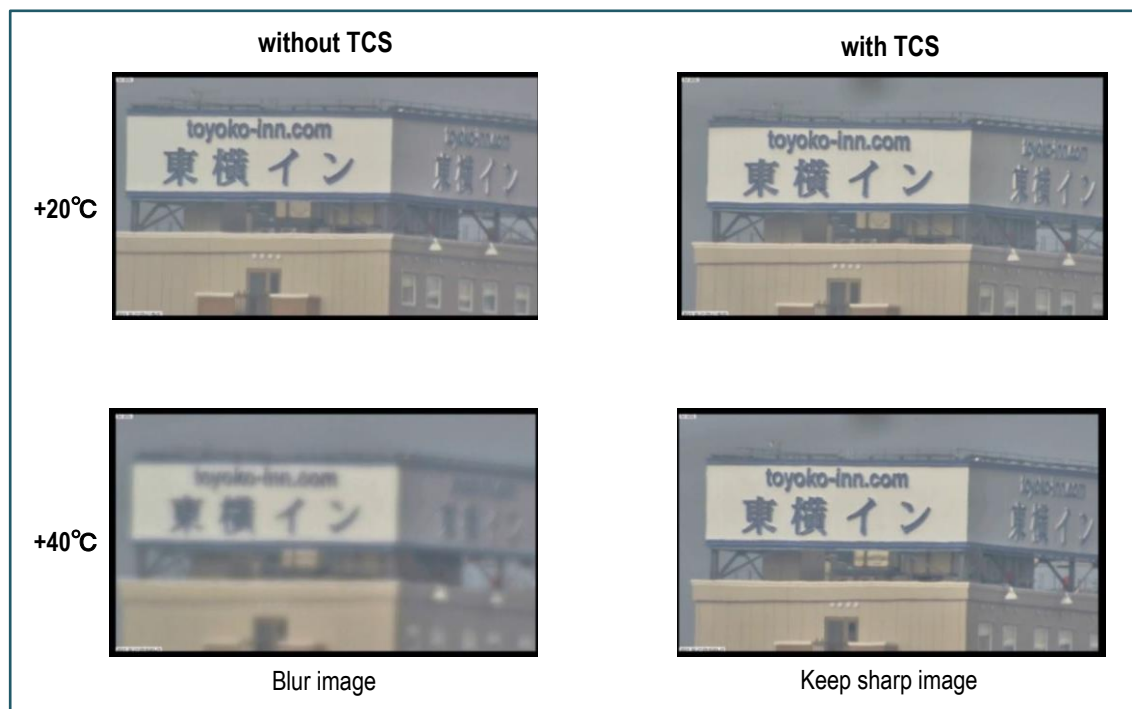
- Low contrast of an object (little difference of the converted voltage).

- The location is a bright environment such as beach or desert with strong sunlight.
- Two different objects in far distance and in near distance exist at a time in the center part of the monitor.
- A white part exists in the AF area. (The white part may be brighter when it's blurring than when it's in focus.)
- The Accumulation mode such as AGC of camera is turned on and in operation.
- The image is changed by panning or tilting while AF is in operation.
- The camera electric shutter is ELC mode. (Please set ALC mode instead. If ELC changes shutter speed while AF is in operation, it causes improper operation of AF.)

12. About Thermal Compensation System (TCS)

Yamano NIR Corrected Zoom Lens series with focal length over 500mm is integrated TCS as a standard function. TCS keeps correct back focus automatically by monitoring lens' barrel temperature. TCS is necessary for NIR Corrected Zoom Lens or Megapixel Zoom Lens which uses super low dispersion glass material in it. The SLD glass has high coefficient of thermal expansion which makes back focus shifted and image gets blur according to temperature change.

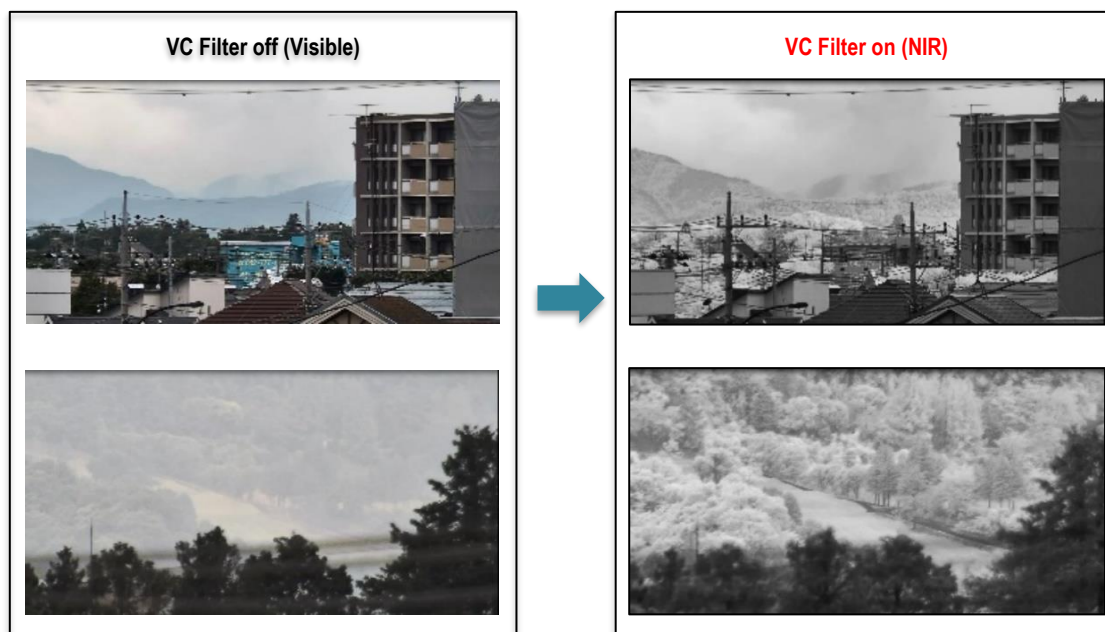
The pictures show the effectiveness of TCS. At 20°C, there is no difference in image quality, but when temperature goes up to +40°C, the picture with TCS doesn't change in image quality while the picture without TCS. TCS keeps image quality almost the same no matter how much temperature changes between -10°C to +50°C.



Another benefit using TCS is that when using lens in preset application, focus position related to object distance remains almost the same position when temperature changes, which means that it is unnecessary to reset preset positions of focus every time temperature changes and focus position changed.

13. About the Visible Light Cut Filter System

The Visible Light Cut Filter (IR76) cuts wavelength under 760nm to see objects hidden by haze with near infrared light. This is used as haze/fog reduction in a day time when there is enough brightness around objects.



14. ×2 Extender (only for the Y66Z15RH)

X2 Extender is to make focal length twice when it is on as below.

It is switchable between x1 and x2 by motorized operation.

When x1 is on, FL= 15.8 - 1040mm

When x2 is on, FL= 31.6 - 2080mm

15. Storing

- Avoid storing in such atmosphere as high temperature, high humidity, and corrosive atmosphere.
- Avoid storing for a long time, which may cause grease hardening.
- If a lens is brought into high temperature atmosphere from low temperature atmosphere, it may cause dew condensation inside a lens. It is recommended to leave the lens at normal temperature for a while before bringing it into high temperature atmosphere.

16. Maintenance

- To keep the focus and zoom moving smoothly
 - The lubricant is applied to the scraping points of the focus and zoom mechanism. It may harden or dry out unless these mechanisms are moved for a long time, and unexpectedly slow moving can be caused. Also, it may dry out in a shorter time than expected. To avoid the troubles mentioned above and to use lenses in good conditions for a long time, it is recommended to move them once a day to spread the lubricant to all the scraping points.

17. International Compliance Information

This section details the worldwide compliance information for this product, which is manufactured to be compliant in the regions where it is sold.

17.1. CE Compliance Information (European Union)

Products with CE Marking comply with EMC Directive (2014/30/EU), RoHS Directive (2011/65/EU, (EU) 2015/863) issued by the Commission of the European Community. Compliance with these directives implies conformity to the following European Norms:

- EN 55032:2015(Class A)
- EN 50130-4:2011+A1:2014 (It is applied under the condition of 3 meters or less in length of cable)
- EN IEC 63000:2018

The power supply which are shown below are used for EMC testing.

PBA10F-12 (COSEL Co., Ltd.)

EMC testing is required if other power supplies or other filters are used.

17.2. China Requirements — China RoHS

China RoHS refers to the Ministry of Industry and Information Technology Order No. 32, effective July 1, 2016, titled Management Methods for the Restriction of the Use of Hazardous Substances in Electrical and Electronic Products. To comply with China RoHS, we determined this product's Environmental Protection Use Period (EPUP) to be 10 years in accordance with the Marking for the Restricted Use of Hazardous Substances in Electronic and Electrical Products, SJT 11364-2014.

Table of Hazardous Substances' Name and Concentration

Environmental Protection Use Period	Part Name	Hazardous Substances				
		Pb	Hg	Cd	PBB	PBDE
	Inner Box	○	○	○	○	○
	Molded Parts	○	○	○	○	○
	Lens	○	○	○	○	○
	Mounted Board	×	○	○	○	○
	Metal Parts	×	○	○	○	○

○ : Indicates that this hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in GB/T 26572.

× : Indicates that this hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement in GB/T 26572.

18. Warranty

All products are under 1 year warranty after delivery except the following cases.

All failures caused by assembly problem or component's problem occur within one year after shipment will be repaired for free of charge except the damage caused by ;

- improper handlings
- handlings without following the instruction manual
- modifying or disassembling
- customer's responsibility
- natural disasters such as lightning, earthquakes, etc.

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