

**HITACHI**

***COMPONENT TRIAX SYSTEM***

**TU-Z3/CX-Z3**

***OPERATING INSTRUCTIONS***

Please read this operating instructions carefully for proper operation,  
and keep it for future reference.

**Hitachi Denshi, Ltd.**

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# General

## 1. General

The CX-Z3 triax adapter and TU-Z3 triax base station can be used in combination with the Hitachi Z-3000 series digital 3 CCD cameras to compose a Triax system. Digital signal processing and advanced transmission technology can send high quality pictures and sound over a distance of up to 1.5 kilometers.

## 2. Features

### (1) High quality Video transmission

The video signal is component FM Y, Pb and Pr. High image quality and wide band are provided by 10 bit digital signal processing.

### (2) High quality sound transmission

Bi-directional digital transmission is used for audio signal and control data. High sound quality is obtained from the microphone output and intercom.

### (3) Versatile intercom functions

Two-wire, four-wire and other intercom systems can be accommodated. Two lines (producer and engineer) can be selected from the camera position.

### (4) Video signal outputs

The three encoder outputs are RGB or YPbPr, video monitor and waveform monitor.

### (5) Video signal inputs

Inputs are provided for two return video lines and a prompter video line. The prompter video input can be selected from the camera.

### (6) Digital video interface (optional)

Two D1 serial digital output lines and two D1 return video digital input lines can be provided as options.

### (7) AC/DC operation

Both AC and DC power supplies are accommodated.

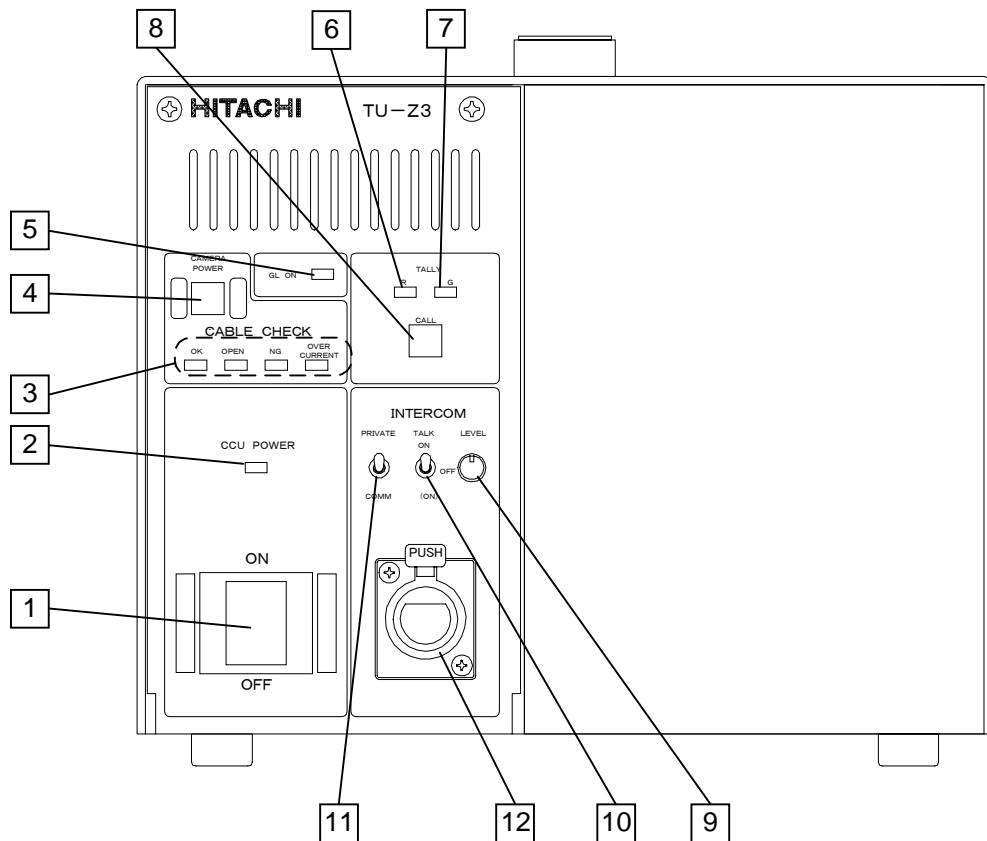
Note: Coax is used during DC operation.

### (8) Half rack size base station

The compact base station is half rack width and 4 units (installed in rack mount) high. An optional camera control panel (RC-Z3) can be built in.

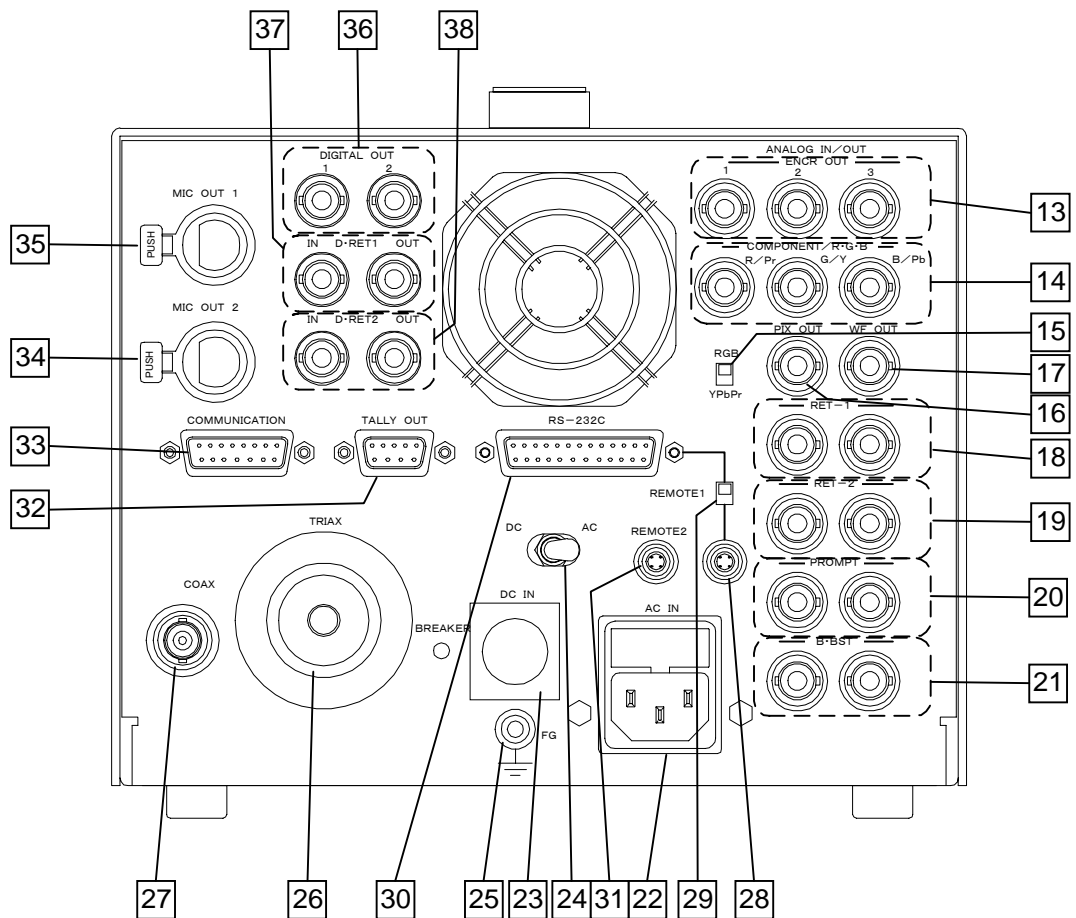
# Facility names and functions

## 1.TU-Z3



- |  |  |
|--|--|
| <p><b>1</b> CCU power switch</p> <p><b>2</b> CCU power LED</p> <p><b>3</b> Cable check LED<br/>OK<br/>Flashes: Cable check in progress.<br/>Camera power switch <b>4</b><br/>is inoperative.<br/>Lights : Camera power switch <b>4</b><br/>can be operated.<br/>OPEN : Triax cable not connected.<br/>NG :Triax cable abnormal.<br/>OVER CUR.:Excess current in triax cable.<br/>Note:Camera power switch <b>4</b> is inoperative<br/>when OPEN, NG or OVER LED is lighted.</p> <p><b>4</b> Camera power switch<br/>Camera power on/off switch; lights at power on.</p> <p><b>5</b> GL mode LED<br/>Lights during genlock operation.</p> | <p><b>6</b> R tally LED<br/>Lights at red tally input or when sending Call<br/>signal from camera.</p> <p><b>7</b> G tally LED<br/>Lights at green tally input.</p> <p><b>8</b> Call button<br/>Press to call from camera.</p> <p><b>9</b> Intercom level control<br/>Adjusts intercom listening volume.</p> <p><b>10</b> Talk switch<br/>Intercom microphone on/off switch.</p> <p><b>11</b> Private/common switch<br/>Private:<br/>Communicate with camera only<br/>Common:<br/>Communicate with entire system</p> <p><b>12</b> Intercom connector(XLR,5P)<br/>Connection for optional MT-12MF headset</p> |
|--|--|

# Facility names and functions



- 13** Encoder output connectors (BNC)  
Composite video outputs for 3 lines
- 14** Y, Pb, Pr, or RGB output connectors (BNC)  
Y, Pb, Pr, or RGB signal outputs
- 15** RGB/YPbPr switch  
Selects video signals at output connectors **14**
- 16** PIX output connector (BNC)
- 17** Waveform output connector (BNC)
- 18** Return 1 input connectors (BNC)  
Connect auxiliary video signal. Signal output can be sent to the camera viewfinder or RET 1 BNC. Select Return 1 signal from the camera.

Connect auxiliary video signal. Signal output can be sent to the camera viewfinder or RET BNC. Select Return 2 signal from the camera. When not selected, the Return 1 signal output is sent to the CX-Z3 Return output connector.

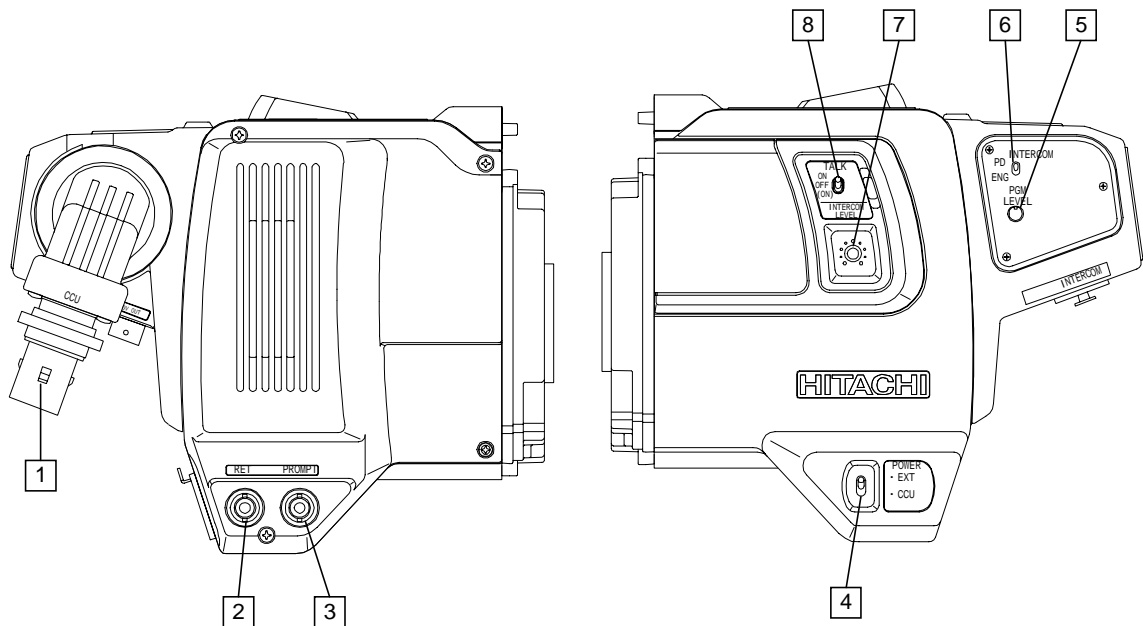
- 19** Return 2 input connectors (BNC)

- 20** Prompter input connectors (BNC)  
Prompter video signal connection. Signal output can be sent to Prompter BNC.
- 21** B.BST input connectors [BNC]  
Connection for black burst signal when using genlock.
- 22** AC input connector  
Connect to power source with accessory AC cable. Set the AC/DC switch **24** to AC.

- 23** DC input connector (XLR 4 pin)  
Connect when operating the TU-Z3 from 12 VDC. Set the AC/DC switch AC/DC switch **24** to DC. Note that camera power is not supplied from the TU-Z3 and must be prepared separately.
- 24** AC/DC switch  
AC: Use TU-Z3 in AC mode  
DC: Use TU-Z2 in DC mode
- 25** Frame ground
- 26** Triax connector  
Triax connector  
Connect triax cable. Cannot be used simultaneously with coax connector **27**.
- 27** Coax connector  
Connect coaxial cable for using in coax mode. Cannot be used simultaneously with triax connector **26**
- 28** Remote control 1 connector  
Connect to optional RC-Z2A/RC-Z21A
- 29** Remote control 1 switch  
Selects between input via Remote control 1 **28** and RS-232C **30** connector.
- 30** RS-232C [30] connector  
Use for camera control via RS-232C.
- 31** Remote control 1 connector  
Connect to optional RC-Z2A/RC-Z21A  
Cannot be used if RC-Z3 is contained.
- 32** Tally output connector  
Contact outputs for tally signals
- 33** Communication connector  
Intercom and tally inputs from external system
- 34** Mic output 1 connector (XLR 3 pin)  
Sound signal from camera output at about 0 dBm.
- 35** Mic output 2 connector (XLR 3 pin)  
Sound signal from CX-Z3 output at about 0 dBm.
- 36** SDI output connectors (BNC), optional  
Digital serial outputs compatible with EDH
- 37** SDI return 1 input connectors (BNC), optional  
Connect to digital serial auxiliary video signal. Use the TU-Z3 function menu to select between digital and analog AUX video signals.
- 38** SDI return 2 input connectors (BNC), optional  
Connect to digital serial auxiliary video signal. Use the TU-Z3 function menu to select between digital and analog AUX video signals.

# Facility names and functions

## 2.CX-Z3

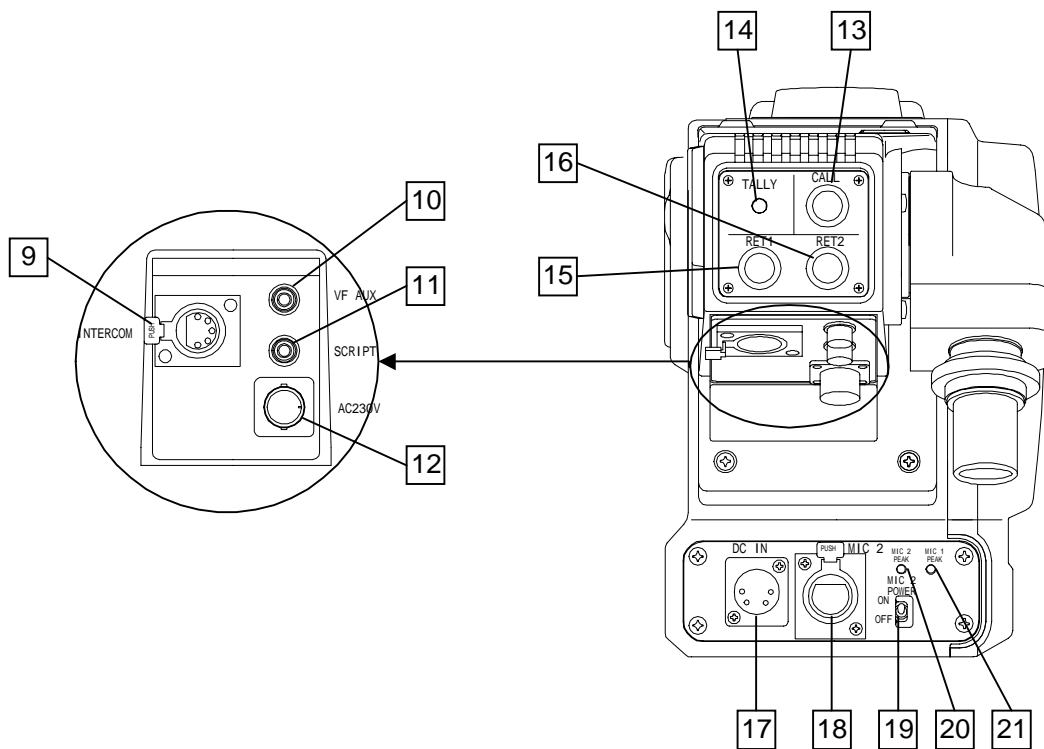


- 1** Triax connector  
Triax cable connection
- 2** Return output connector (BNC)  
Return signal output selected by Return buttons **15** and **16**
- 3** Prompter output connector (BNC)  
Prompter signal output.
- 4** Power select switch  
CCU : Power supplied via triax cable  
EXT : Power supplied via DC input  
connector **17**

When power is supplied via the triax cable and the switch is set to EXT, the protector operates to cut off the camera head power. Power is not supplied even if the switch is set to CCU. To supply power to the camera head, press the TU-Z3 Camera Power switch.

- 5** PGM level control  
Adjusts program audio volume
- 6** PD/ENG switch  
Selects between intercom system PD and ENG inputs.
- 7** Intercom level control  
Adjusts intercom sound volume
- 8** Talk on/off switch  
Intercom on/off switch

- 5** PGM level control



**9** Intercom connector (XLR 5 pin)

The optional MT-12BF headset can be connected.

**10** VF AUX connector

Remote control for the Talk on/off **8**, Return 1 **15** and Return 2 **16** switches.

**11** Script connector

Lights the 12 ± 0.3 V script lamp

**12** 230 VAC output connector

**13** Call button

Press to call the CCU.

**14** Tally LED

Lights at external R tally input or call signal from the TU-Z3

**15** Return 1 switch

Selects TU-Z3 Return 1 input. The Return 1 signal is sent to the camera viewfinder only while the switch is depressed.

**16** Return 2 switch

Selects TU-Z3 Return 2 input. The Return 2 signal is sent to the camera viewfinder only while the switch is depressed.

**17** DC input connector (XLR 4 pin)

Use in the camera coax\* or self-contained mode.

\*Note: Connect a BNC conversion adapter to

the triax connector **1**

**18** Mic input 2 connector (XLR 3 pin)

Connection for a commercially sold microphone. Phantom power can be supplied.

**19** Mic 2 phantom power switch

On/off switch for phantom power supplied to the Mic input 2 connector **18**

**20** Mic 2 peak level LED

Lights when the Mic 2 volume exceeds the rated level by about 10 dB.

**21** Mic 1 peak level LED

Lights when the Mic 1 (input from camera) volume exceeds the rated level by about

10 dB.



# System configuration

Attach the CX-Z3 triax adapter to the Z-3000 series color camera. Connect the camera control panel (RC-Z2A/Z21A/Z3) to the TU-Z3 triax base station. One or two camera control panels can be connected. The RC-Z3 can be incorporated into the TU-Z3.

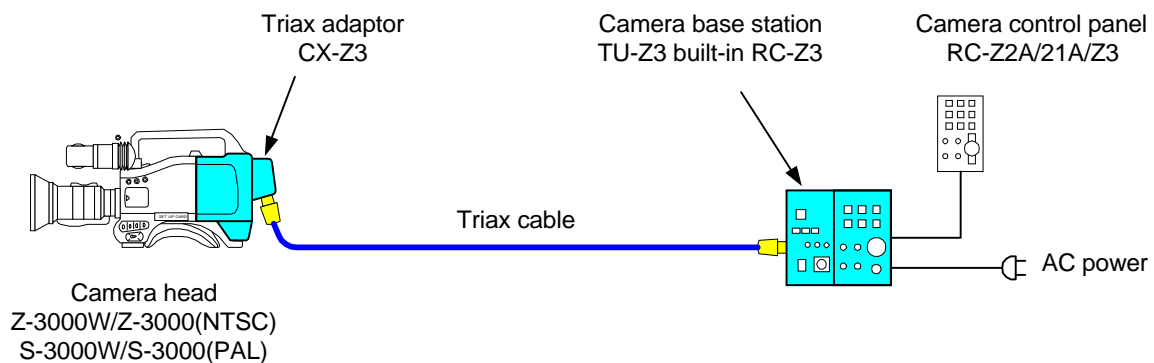
## 1. triax mode (AC) operation

When the TU-Z3 CCU power switch is set to on, the triax cable connection is checked automatically (about 10 seconds), then power can be supplied to the camera by pressing the camera Power button to produce a video output signal.

The cable check LED lights OK when the triax cable is normal.

The intercom can be used when the CCU power switch is on.

Note: Camera power is not supplied in the following situations.



## 2. coax mode (DC) operation

The CX-Z3 can operate with 12 VDC power supply and coax cable connection (conversion connector required). Set the CX-Z3 power select switch to EXT. Set the CCU power switch of the TU-Z3 to on to obtain a video signal output.

Note: During the cable check process, the LED may briefly indicate OPEN.

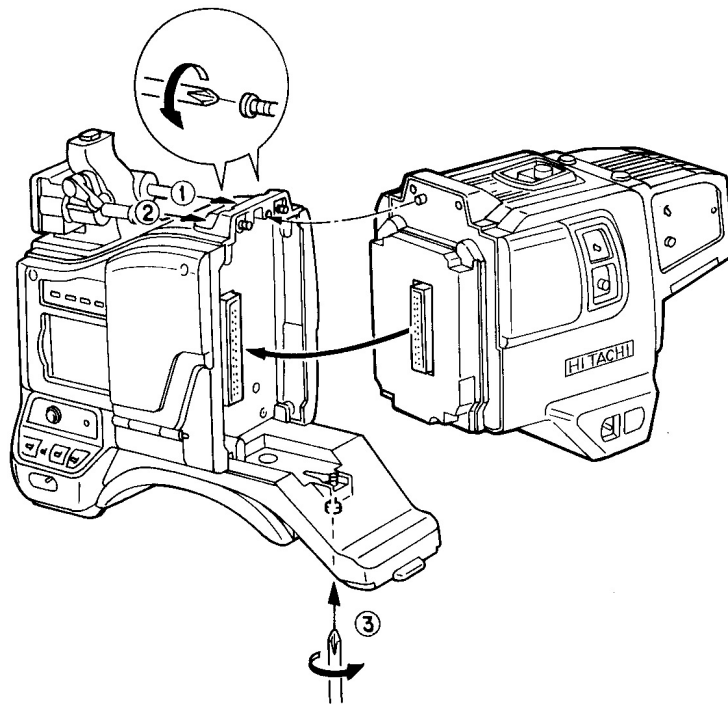
This is not due to fault or defect.

During the coax mode, the TU-Z3 can also be operated from 12 VDC.

## 3. Camera stand alone

Supply 12 VDC to the CX-Z3, but do not connect either triax or coax cable. The camera can be operated in stand-alone mode and the video signal obtained from the camera BNC output.

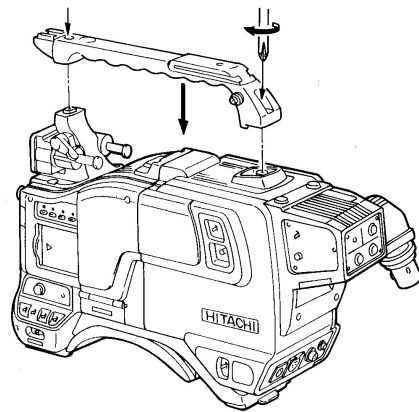
# Camera head installation



1. Align the adapter with the camera guide and guide pin. Attach the adapter and engage the connector.
2. Tighten the screws provided with the handle to secure the camera adapter to the camera.

 **CAUTION**

Tighten the screws completely. Check for absence of wobble between the camera and adapter.



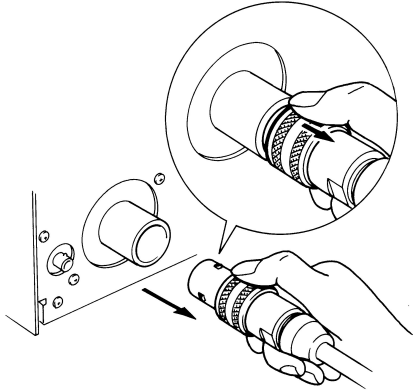
3. Install the handle with two screws.

# Triax cable connection

The triax cable connector has a locking mechanism. Release the lock to disengage the connector.

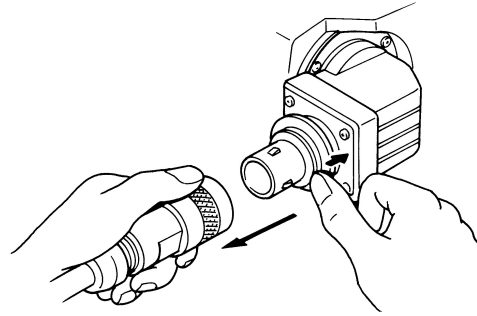
## 1. Kings connector

TU-Z3



Slide the plug connector ring outward when disengaging the connector.

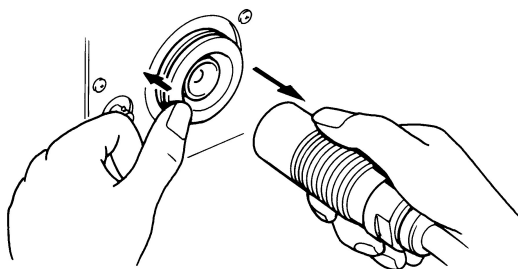
CX-Z3



Press the socket connector ring downward when disengaging the connector.

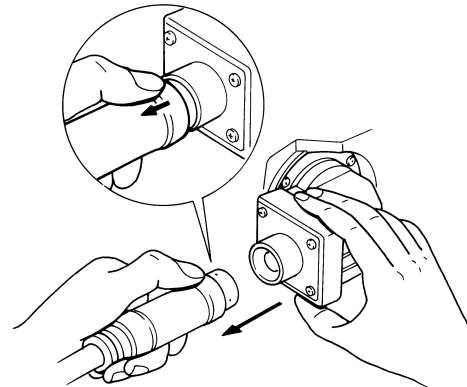
## 2. Fischer connector

TU-Z3



Press the socket connector ring downward when disengaging the connector.

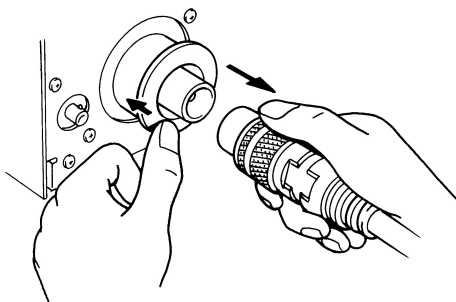
CX-Z3



Slide the plug connector ring outward when disengaging the connector.

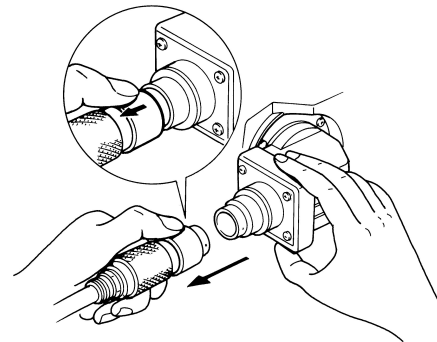
## 3. Tajimi connector

TU-Z3



Press the socket connector ring downward when disengaging the connector.

CX-Z3



Slide the plug connector ring outward when disengaging the connector.

# Function menu

Set the function menu with the control panel (RC-Z3/RC-Z2A) function buttons (Function, Up, Down, Left, Right).

## 1. Button functions

NO	Name	Operation
1	FUNCTION	To display the color bar, press this button to open the TU-Z3 control menu. To switch off the color bar, press this button to open the camera head control menu. (The menu contents differ according to the camera head.)
2	(UP)	Shift the cursor upward
3	(DOWN)	Shift the cursor downward
4	▪ (RIGHT)	Change setting data
5	▪ (LEFT)	Change setting data

## 2. TU-Z3 menu

FUNCTION	
H. PHASE	: 0
SC COARSE	: 0°
SC FINE	: 0
BUZZER	: ENABLE
AUX SEL	: ANALOG
COMB FILT	: OFF
MIC2 GAIN	: -60dB

# Function menu items

Set with the Left and Right buttons

Function menu

Menu item	Setting range	Operation
H. Phase	-128 · · +127	Genlock adjustment (horizontal phase)
SC Coarse	0 ° 90 ° 180 ° 270 °	Subcarrier phase coarse adjustment
SC Fine	-128 · · +127	Subcarrier phase fine adjustment
Buzzer	<b>ENABLE</b> DISABLE	Buzzer on/off when Call button is pressed
Aux Sel	<b>ANALOG</b> DIGITAL	Selects auxiliary input for analog or digital (D1)
Comb Filt	<b>OFF</b> ON	Selects comb filter engage/disengage
Mic 2 Sense	-70dB <b>-60dB</b> -50dB -40dB -30dB -20dB -10dB +4dB	Selects Mic 2 input level

# Message display

CAMERA CABLE OPEN

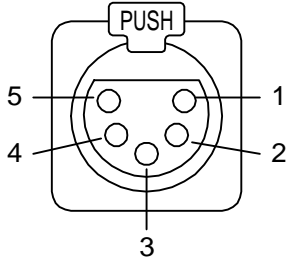
NO	Message	Description
1	CABLE LENGTH	Cable length indicated in meters. Indication is about 8 seconds after CCU power ready or connection after cable Open message.
2	CAMERA CABLE OPEN	Camera cable not connected
3	CAMERA CABLE NG	Camera cable faulty
4	OVER CURRENT	Over current protector operates and camera power is cut off.
5	INCOM LINE NG	Digital circuit cannot be established between camera and CCU.

# Service information

## Connector pin diagrams

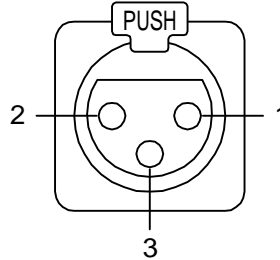
### TU-Z3

INTERCOM (5 pin XLR female:HA16PRH-5S)



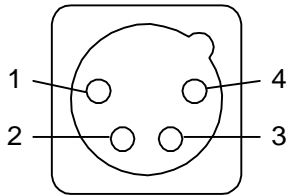
Pin	Signal
1	MIC IN(C)
2	MIC IN(H)
3	RECEIVE(C)
4	RECEIVE1(H)
5	RECEIVE2(H)

MIC OUT 1,2 (3 pin XLR female:HR16PRM-3SE)



Pin	Signal
1	MIC GND
2	MIC(H) IN
3	MIC(C) IN

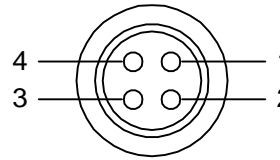
DC IN (4 pin XLR male:HA16RA-4P)



Pin	Signal
1	GND
2	NC
3	NC
4	+12V input

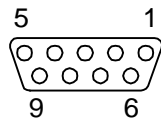
Remote 1,2 (4 pin female:HR10A-7R-4S(01))

Mating connector:HR10A-7P-4P

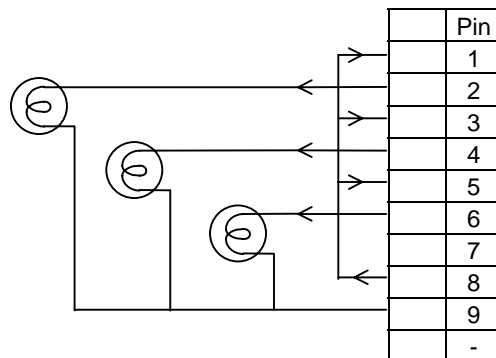


Pin	Signal
1	+9V output
2	SD input
3	SD output
4	SD ground

TALLY OUT(9pin D-sub female:CDS3109-0123)



Operating circuit example



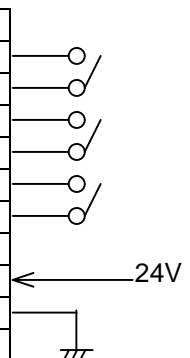
Plug

Pin	Signal
1	
2	
3	
4	
5	
6	
7	
8	
9	
-	

TU mainframe

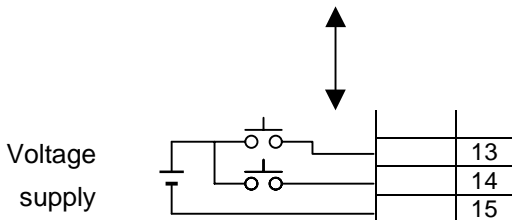
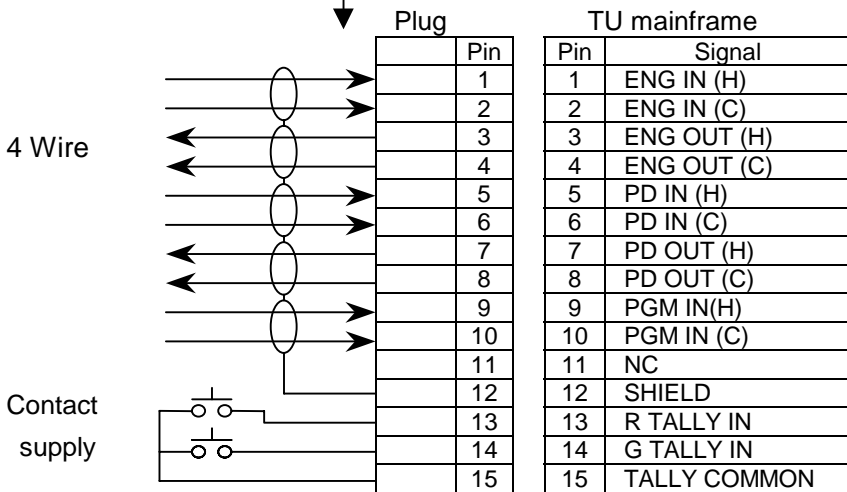
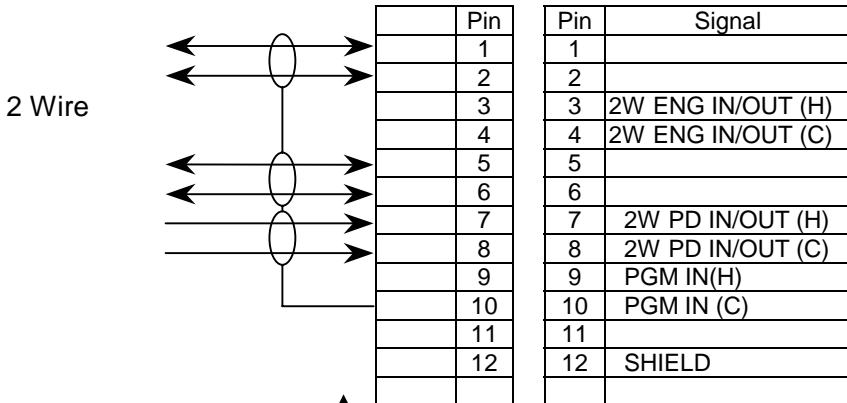
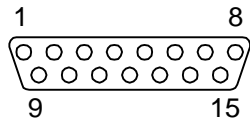
Pin	Signal
1	R TALLY 1
2	R TALLY 2
3	G TALLY 1
4	G TALLY 2
5	W/N TALLY 1
6	W/N TALLY 2
7	NC
8	+24V
9	GND
-	

Internal circuit

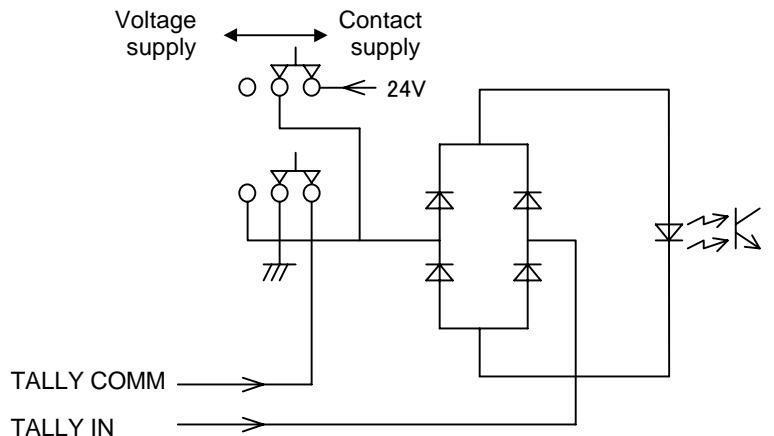


# Service information

COMMUNICATION(15pin D-sub male: CDC3115-0123)



TALLY ; TU internal circuit



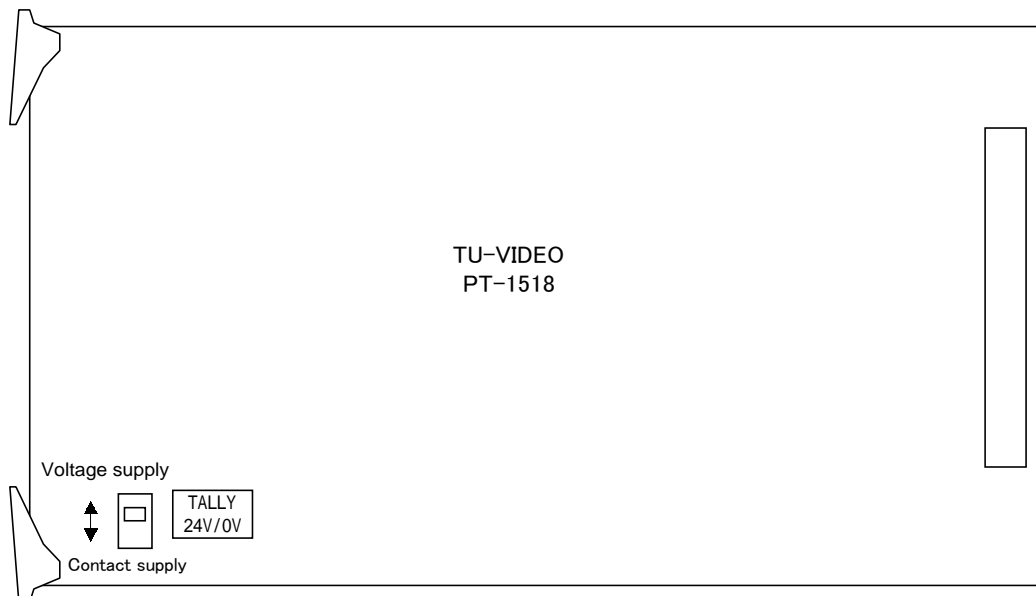


# Service information

Set the Tally and Intercom switches according to the systems connected to the TU-Z3 rear panel Communication connector.

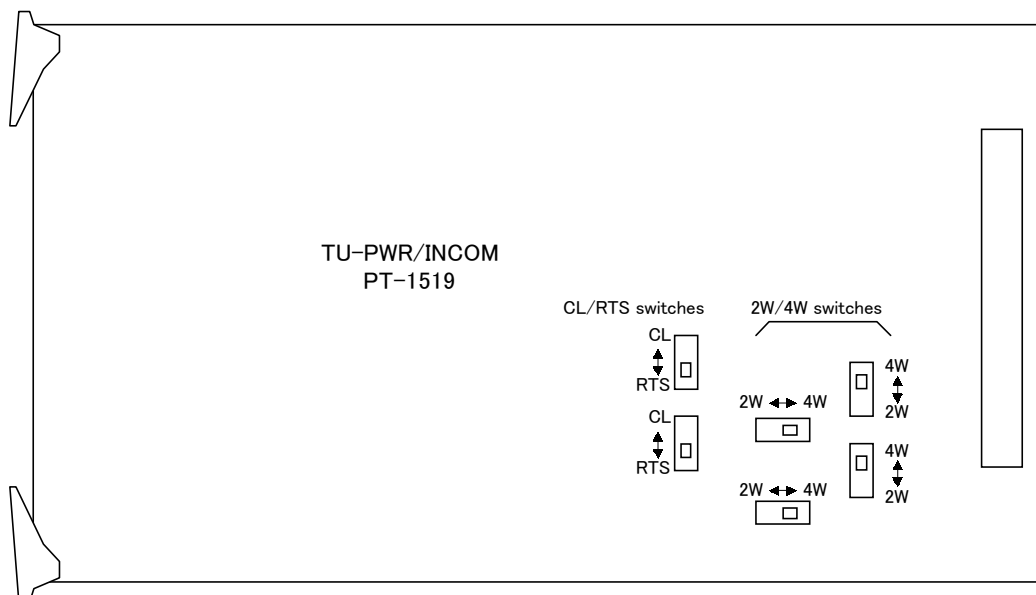
- The tally input can be contact or voltage supply.

When changing, set the TU-Z3 internal TV-VIDEO board switch accordingly.



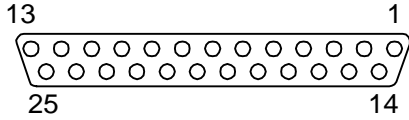
- The intercom can be 4 wire or 2 wire (Clearcom, RTS).

When changing, set the TU-Z3 internal TV-PWR/INCOM board switches accordingly.



# Service information

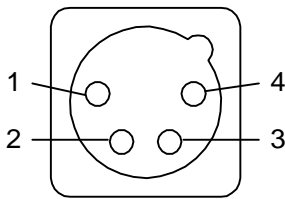
RS-232C(25pin D-sub female:CDS3125-0123)



Pin	Signal	Pin	Signal
1	GND	14	NC
2	TD	15	NC
3	RD	16	NC
4	RTS	17	NC
5	CTS	18	NC
6	NC	19	NC
7	GND	20	NC
8	NC	21	NC
9	NC (STAIR CTL)	22	NC
10	NC (STAIR OUT)	23	NC
11	NC (SHIELD)	24	NC
12	NC	25	NC
13	NC	-	

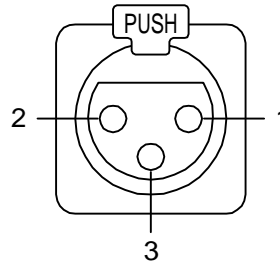
## CX-Z3

DC IN (4 pin XLR male:HA16RA-4P)



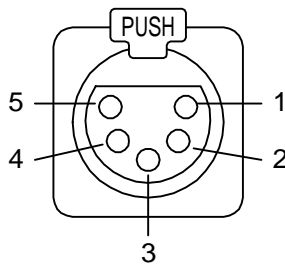
Pin	Signal
1	GND
2	NC
3	NC
4	+12V input

MIC 2 IN(3 pin XLR female:HR16PRQ-3SE(05))



Pin	Signal
1	MIC GND
2	MIC(H) IN
3	MIC(C) IN

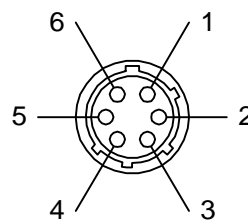
INTERCOM (5 pin XLR female:HA16PRH-5S)



Pin	Signal
1	MIC IN(C)
2	MIC IN(H)
3	RECEIVE(C)
4	RECIEVE1(H)
5	RECIEVE2(H)

VF AUX(6 pin female:HR10A-7R-6SB(01))

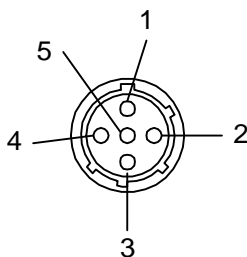
Mating connector:HR10A-7P-6P



Pin	Signal
1	AUX 1 CTL
2	AUX 2 CTL
3	NC
4	GND
5	MIC ON/OFF
6	GND

SCRIPT (5 pin female:HR10A-7R-5SB(01))

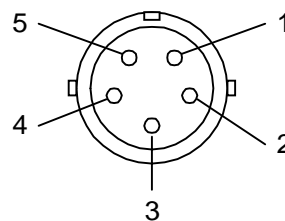
Mating connector:HR10A-7P-5P



Pin	Signal
1	SCRIPT +12V
2	GND
3	NC
4	NC
5	NC

AC230 V OUT (5 pin female:RM12BRB-5S)

Mating connector:RM12BPG-5PH



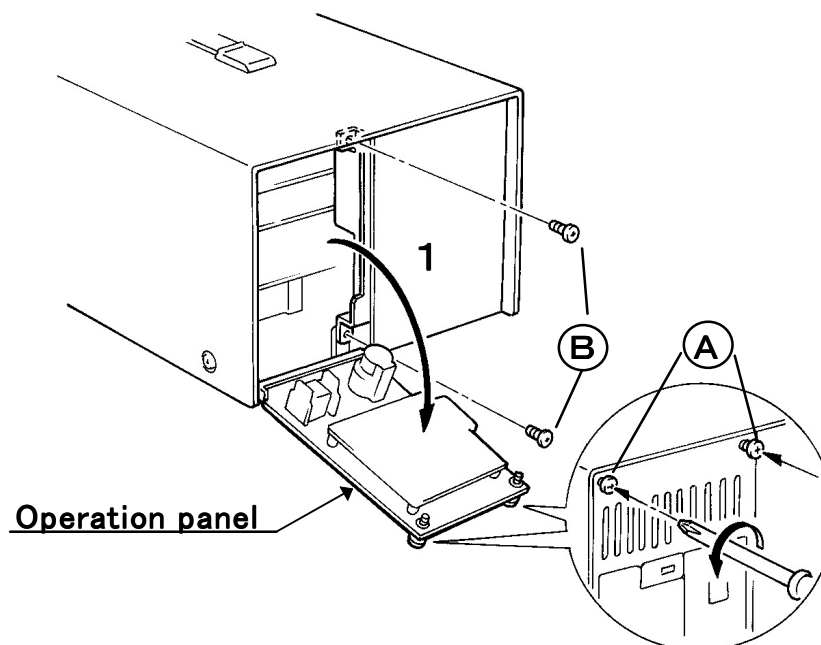
Pin	Signal
1	AC 230V
2	AC 0V
3	GND
4	TALLY OUT(*)
5	AC CTL

(\*) open collector

## Service information

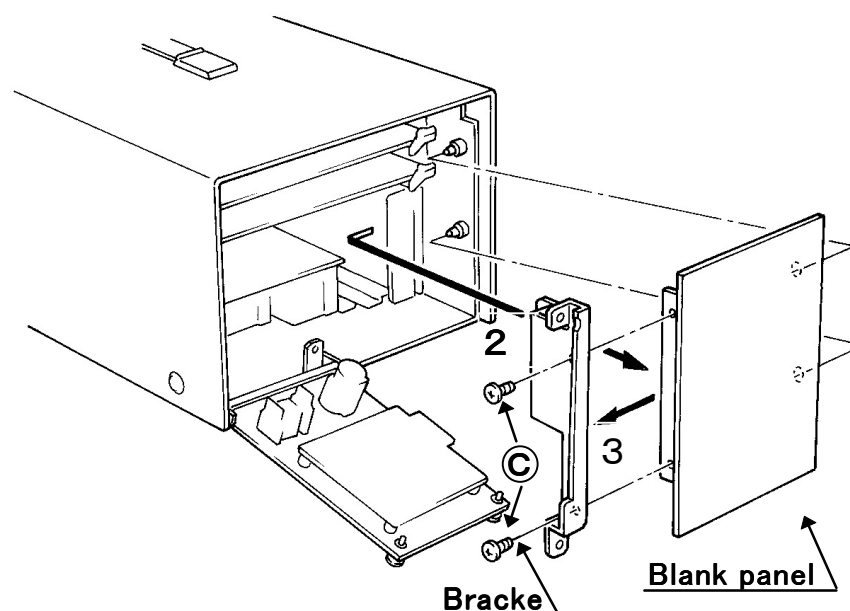
### Camera control panel installation

1. Take out 2 screws A and open the operation panel.



2. Take out 2 screws B and disengage the blank panel and bracket.

3. Take out 2 screws C and disengage the bracket from the blank panel.

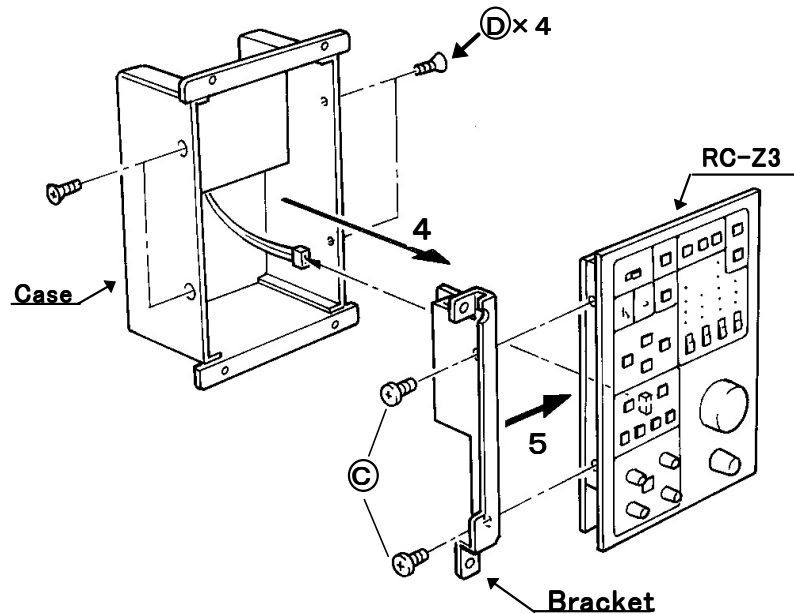


**Caution:** These steps must be conducted only by a qualified technician. There is risk of both electrical shock and equipment damage.

## Service information

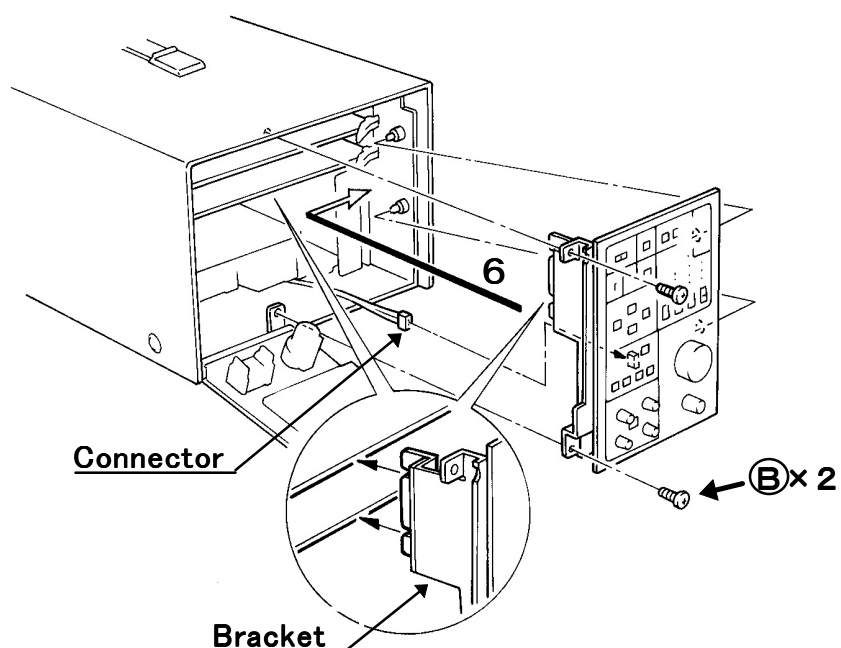
### Camera control panel installation

4. Take out 4 screws D from the RC-Z3. Disconnect the connector and disengage the case from the RC-Z3.
5. Attach the bracket to the RC-Z3 with 2 screws C.



6. Connect the TU-Z3 internal conductor to the RC-Z3. Align the RC-Z3 mounting holes with the TU-Z3 guide pins. Align the 2 notches of the bracket with the TU-Z3 units and secure the RC-Z3 with 2 screws B. Secure the operation panel with 2 screws A.

Note: Use care to avoid crimping the cables during mechanical assembly.



# Specifications

## 1 Specification of Direction

Direction	Model		Connector type			ENCR setup
	Base station	Adapter	Triax	Intercom headset	Audio output	
J	TU-Z3J	CX-Z3J	Tajimi	XLR-5pin	XLR-3pin(Male)	0mV
U	TU-Z3	CX-Z3	Kings	XLR-5pin	XLR-3pin(Female)	50mV
P	TU-Z3P	CX-Z3P	Fischer	XLR-5pin	XLR-3pin(Female)	0mV

## 2 General

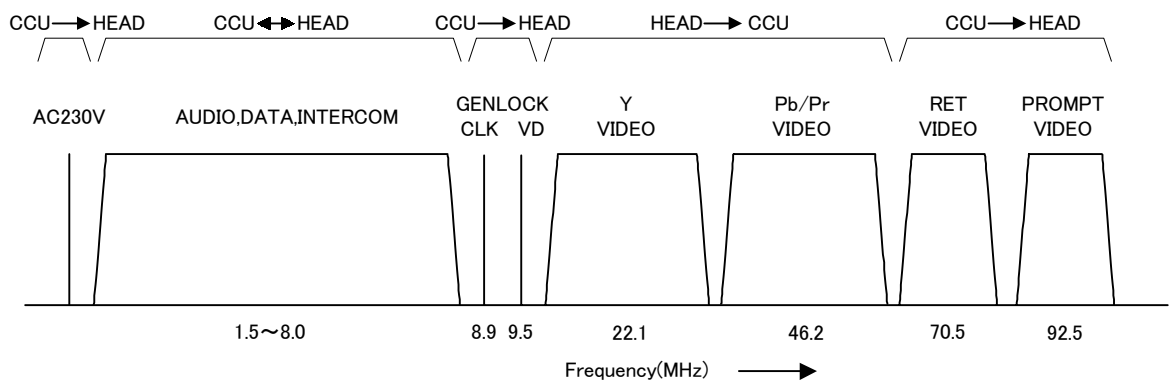
### (1) Vide band width(Base band)

Y signal:	10MHz
Pb,Pr signal:	5MHz
RET signal:	5MHz
PROMPT signal:	5MHz

### (2) Maximum cable length

Cable type	Diameter (mm)	Maker	Maximum cable length(m)	
			W/ PROMPT	W/O PROMPT
<b>Triaxial Cable</b>				
4.8/1.0 EFTXF	8.6	FUJIKURA	930	1100
9.6/2.2 EFTXF	14.5	FUJIKURA	1500	1900
9267	9.1	BELDEN	720	910
9232	13.2	BELDEN	1200	1500
1.0S/4.5S	8.5	FELTEN	740	920
1.4S/6.6S	11.0	FELTEN	1100	1400
<b>Coaxial Cable</b>				
5C-2V	7.5	----	550	700
7C-2V	10.2	----	700	850
10C-2V	13.1	----	850	1050

### (3) Frequency allocation



(3)Power supply voltage	TU-Z3J/CX-Z3J	AC100V 50/60Hz
	TU-Z3/CX-Z3	AC117V 60Hz
	TU-Z3P/CX-Z3P	AC230V 50Hz
(4)Power consumption	130W approx. (AC operation,including Z-3000W/GM-51 and AUX POWER OUT 50W)	
	TU-Z3	:25W approx. (DC operation)
	CX-Z3	:33W approx. (DC operation,including Z-3000W/GM-51)
(5)Ambient Temperature	Operating: TU-Z3 0 to +40°C	
	CX-Z3 -10 to +45°C	
	Storage: -20 to +60°C	
(6)Dimensions	TU-Z3	212(W)×163(H)×381(D)mm
	CX-Z3	135(W)×196(H)×215(D)mm
(7)Mass	TU-Z3	9.0kg approx.
	CX-Z3	3.0kg approx.

### 3. Input-output signal

#### 3.1 Triax base station (TU-Z3)

##### 3.1.1 Input signal

(1)GENLOCK	B-BST 0.45Vp-p/75 Ω (loop through)	BNC
(2)RET 1	VS or VBS 1Vp-p/75 Ω (loop through)	BNC
(3)RET 2	VS or VBS 1Vp-p/75 Ω (loop through)	BNC
(4)PROMPT	VS or VBS 1Vp-p/75 Ω (loop through)	BNC
(5)DIGITAL RET 1 (Factory option )	D1(Active through)/75 Ω	BNC
(5)DIGITAL RET 2 (Factory option )	D1(Active through)/75 Ω	BNC
(6)COMMUNICATION ·INTERCOM	0dBm ,HIGH at 4W 0dBs or -15dBs ,200 Ω at 2W	D-sub 15pin
·PGM	0dBm HIGH	
·R/G TALLY	24V DC or contact supply	
(7)REMOTE 1	1.5Vp-p or RS-232C (switchable)	4pin D-sub 25pin
(8)REMOTE 2	1.5Vp-p	4pin

##### 3.1.2 Output signal

(1)ENCR	VBS 1Vp-p/75 Ω	BNC (x3)
(2)Pr or R	NTSC:0.7Vp-p,PAL:0.525Vp-p/75 Ω VS 1Vp-p/75 Ω (switchable)	BNC
(3)Y or G	VS 1Vp-p/75 Ω VS 1Vp-p/75 Ω (switchable)	BNC
(4)Pb or B	NTSC:0.7Vp-p,PAL:0.525Vp-p/75 Ω VS 1Vp-p/75 Ω (switchable)	BNC
(5)DIGITAL OUT (Factory option )	D1	BNC (x2)
(6)PIX (R,G,B,ENCR)	VS or VBS 1.0Vp-p/75 Ω	BNC
(7)WF OUT (R,G,B,ENCR)	VS or VBS 1.0Vp-p/75 Ω	BNC
(8)MIC OUT 1	0dBm/600 Ω	XLR-3pin
(9)MIC OUT 2	0dBm/600 Ω	XLR-3pin
(10)COMMUNICATION ·INTERCOM	0dBm ,HIGH at 4W 0dBs or -15dBs ,200 Ω at 2W	D-sub 15pin
(11)TALLY OUT ·R/G TALLY ·W/N CONTROL	Contact Contact	XLR-3pin
(12)REMOTE 1	1.5Vp-p or RS-232C (switchable)	4pin D-sub 25pin
(13)REMOTE 2	1.5Vp-p	4pin

### 3.2 Triax Adapter

#### 3.2.1 Input signal

##### (1) Camera head

- Video signals (Y,Pb,Pr) each 10bit digital
- Control signal 1.5Vp-p
- MIC-1 input -20dBm

##### (2) DC IN

DC 12V (DC +10.5V~+17V)

XLR-4pin(Male)

##### (3) MIC-2 IN

-70,-60,-50,-40,-30,-20,-10,+4dBm

XLR-3pin(Female)

##### (4) INTERCOM(HEAD SET)

-70dBm

XLR-5pin(Female)

##### (5) VF AUX

6pin

#### 3.2.2 Output signal

##### (1) Camera head

- AUX VIDEO VS or VBS 1Vp-p/75Ω
- GEN LOCK B-BST 0.45Vp-p/75Ω
- Control signal 1.5Vp-p

##### (2) RET VIDEO

VS or VBS 1.0Vp-p/75Ω

BNC

##### (3) PROMPT VIDEO

VS or VBS 1.0Vp-p/75Ω

BNC

##### (4) INTERCOM(HEAD SET)

0dBs MAX+15dB

XLR-5pin(Female)

##### (5) SCRIPT

DC 12V / 0.3A

##### (6) AC 230V

AC 230V

5pin

### 4. Main accessories

#### (1) Camera control panel

RC-Z2A

#### (2) Camera control panel

RC-Z21A

#### (3) Camera control panel

RC-Z3

(Base station inclusion type)

#### (4) D1 digital interface

DI-Z3



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