



## FEATURES

- Class leading radiation tolerance
- Pan, tilt, zoom, video and power over three twisted pairs
- Radiation Tolerant Telemetry
- One 19" sub-rack to control up to 8 cameras
- 8 channel lighting and microphone sub-racks
- RS-485 control of sub-racks
- Change cameras without adjustment
- Software protocol and hardware can address up to 128 channels of cameras and lighting
- Seismic qualification available
- Captions at the source
- Modular design for easy assembly/install
- Simple cable
- Integral version available

## IST-REES R981/C981 System Camera

Mirion Technologies is the world's most experienced supplier of large turnkey television surveillance systems to the world's nuclear industry. Major multi-camera radiation tolerant system installations are an essential part of the process monitoring requirements for nuclear power stations and waste handling facilities. New safety requirements relating to plant life extensions and new power plant construction demand the use of television systems to continuously monitor machinery and key plant areas within secondary containment.

The R981/C981 camera range has been specifically designed to suit these large multi-camera configurations. Alternatively, single camera channels can be supplied as ideal inspection and surveillance tools.

## APPLICATIONS

- Process monitoring
- Safe guard surveillance
- In-containment viewing
- Waste management
- Guidance and posting



imaging systems

A Mirion Technologies Division

Featuring:

 **ist-rees**

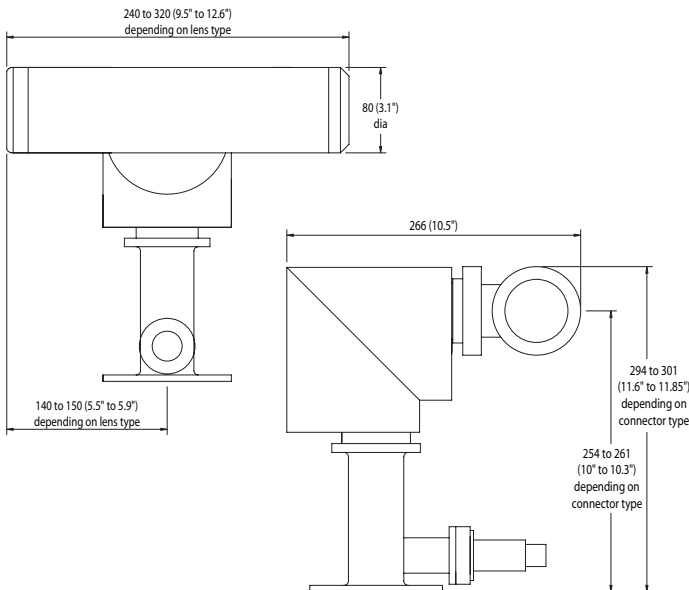
## R981 Specifications and Performance

CAMERA OUTSTATION	
<b>Housing Material</b>	Stainless steel
<b>Operating Temperature Ambient</b>	0°C to 55°C (35°F to 131°F) (Chalnicon tube) 0°C to 40°C (32°F to 104°F) (Vidicon tube)
<b>Operating Dose Rate</b>	1kGy/hour (Chalnicon tube) 30kGy/hour (Vidicon tube)
<b>Radiation Tolerance</b>	1MGy [ <sup>60</sup> Co] (H <sub>2</sub> O); 10 <sup>8</sup> Rad [ <sup>60</sup> Co] (H <sub>2</sub> O)
<b>Sealing</b>	IP68 (IEC529) 60m water depth (W.W. Fischer stainless steel connector type SE105Z069-27) IP66 (IEC529) fully washable (LEMO stainless steel remote handling cable connector type FZJ3N318TLMY)
<b>Maximum Operating Depth</b>	20 meters (66 ft)
<b>Maximum Submersion Depth</b>	60 meters (197 ft)
<b>Camera Midpoint Connector</b>	24-way
<b>Cable Connection</b>	18-way remote handling LEMO or 12-way Fischer
<b>Pan and Tilt</b>	Speed: 6° per second Travel: ±180° (adjustable)
<b>Size with Pan and Tilt</b>	294mm (H) x 267mm (W) x varying 241 to 320 (D) (11.6" x 10.5" x varying 9.5" to 12.6")
<b>Weight</b>	Approximately 13kg (28.7 lbs)

R981 NON-BROWNING LENS OPTIONS	
<b>Lens</b>	Viewing Angle: In Air
<b>6:1 12mm-72mm zoom</b>	40°W; 7°N
<b>6:1 24mm-144mm zoom</b>	21W; 3.5°N
<b>3:1 8mm-24mm zoom</b>	58°W; 21°N
<b>6mm, 9mm, 25mm fixed focal lens</b>	73°; 50°; 20° respectively

W=Wide; N=Narrow

### R981 Camera Outstation Dimensions



8 CHANNEL CAMERA SYSTEM SUB-RACK	
<b>Nominal Power Supply Input</b>	100-120/200-240V (auto-ranging); 50/60 Hz
<b>Operation Range</b>	85-132/170-264V (auto-ranging); 47-440 Hz
<b>Power Requirement</b>	150VA for a fully populated 8-channel CCU
<b>Outstation Cable Length</b>	300m (656') maximum CCU to camera (consult IST)
<b>Operating Ambient Temperatures</b>	Fully populated, convection cooling: 0°C to 40°C (32°F to 104°F) Up to 6 channels, convection cooling: 0°C to 50°C (32°F to 122°F) Fully populated, forced air cooling at 500 liters (132 gallons)/minute: 0°C to 50°C (32°F to 122°F)
<b>Relative Humidity</b>	20%-75% non-condensing
<b>Size</b>	134mm (H) x 483mm (W) x 300mm (D) (5.3" x 19" x 11.8") (excluding handles and connectors)
<b>Weight</b>	7kg (15.4lbs)

CCU CONNECTOR TYPES	
<b>AC Power</b>	IEC 320 plug (fitted with T4A fuse)
<b>Camera Inputs (8 off)</b>	15-way D type socket
<b>Video Outputs (8 off)</b>	75R BNC
<b>Genlock Input</b>	75R BNC (with 75R termination switch)
<b>Sync Pulse Output</b>	75R BNC
<b>Serial Control Input</b>	9-way D type plug
<b>Serial Control Loop Through</b>	9-way D type socket

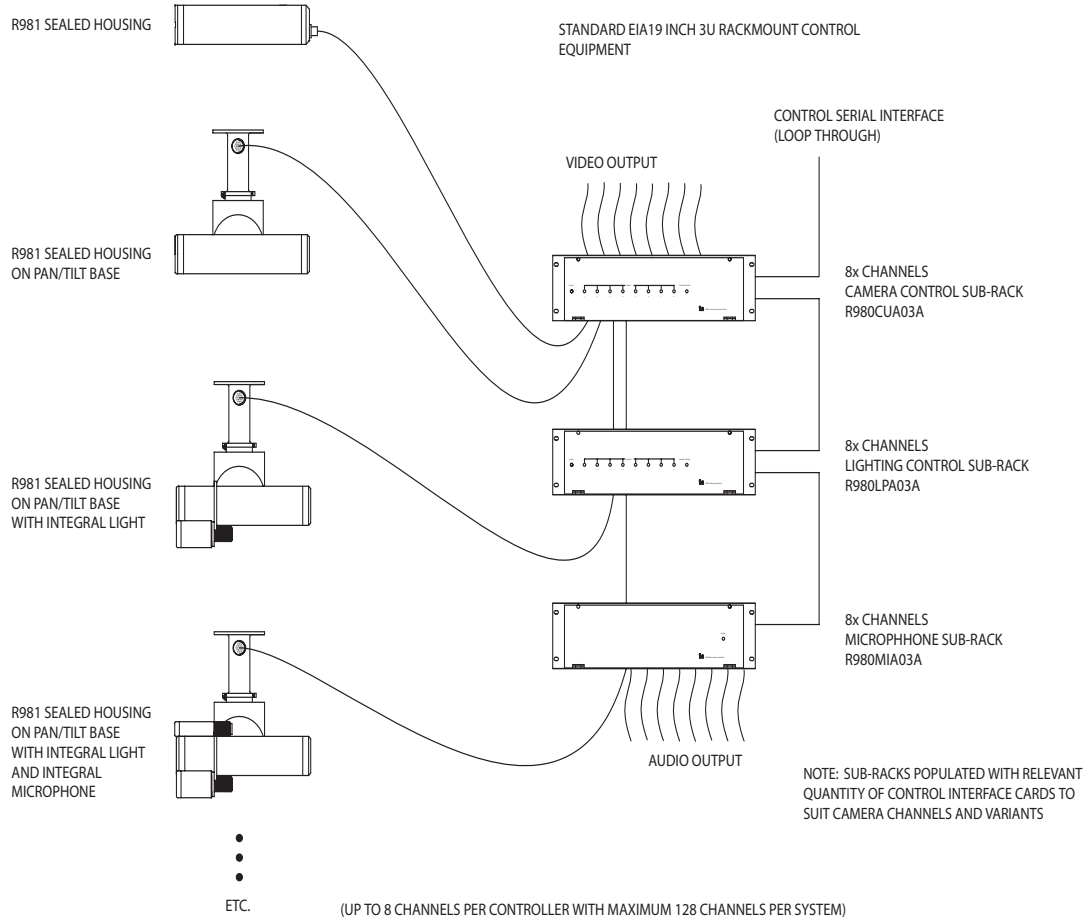
### CAMERA CHANNEL PERFORMANCE (CAMERA AND CCU COMBINED)

<b>Horizontal Resolution</b>	550 HTV lines
<b>Sensitivity (faceplate)</b>	1 lux (Chalnicon tube) 10 lux (Vidicon tube)
<b>AGC Range</b>	-6db to 20db
<b>Signal to Noise Ratio</b>	43db (CCIR weighted, AGC at 0db)
<b>Geometric Distortion</b>	2% maximum

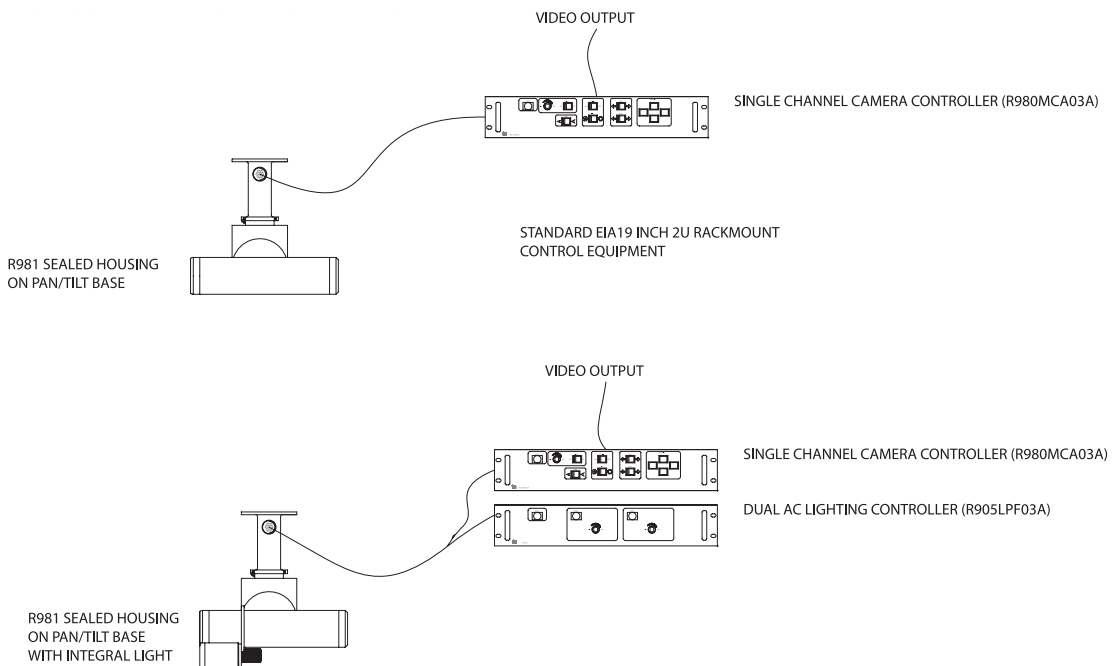
OPTIONAL ACCESSORIES	
<b>Camera Attachments</b>	Camera allows for up to 4 attach- ment positions for a combination of microphone and lights
<b>In-Air or Underwater Lights</b>	Up to 300W using 50, 75 or 100W lamps
<b>Lighting Sub-rack</b>	8 Channel
<b>Microphone</b>	For in-air use only
<b>Microphone Sub-rack</b>	8 Channel

Integral version available.

## Typical R981 Multi-Camera Configuration



## Typical R981 Single Unit Camera Configuration



## C981 High Resolution CCD Color Camera System\*

CAMERA OUTSTATION	
Housing Material	Stainless steel
Operating Temperature	0°C to 40°C (32°F to 104°F)
Radiation Tolerance	100Gy [ <sup>60</sup> Co] (H <sub>2</sub> O) 10 <sup>4</sup> Rad [ <sup>60</sup> Co] (H <sub>2</sub> O)
Operating Dose Rate	100Gy/hour (10 <sup>4</sup> Rad/hr)
Sealing	IP68 (IEC529) 60m water depth (W.W. Fischer stainless steel connector type SE105Z069-27) IP66 (IEC529) fully washable (LEMO stainless steel remote handling cable connector type FZJ3N318TLMY)
Maximum Operating Depth	20 meters (66 ft)
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Camera Midpoint Connector	24-way
Cable Connection	18-way remote handling LEMO or 12-way Fischer
Pan and Tilt	Speed: 6° per second Travel: ±180° (adjustable)
Size with Pan and Tilt	294mm (H) x 266mm (W) x varying 240 to 320 (D) (11.6" x 10.5 x varying 9.4" to 12.6")
Weight	13kg (28.7 lbs)

OPTICS	
Zoom Lens	18x optical (4.1-73.8mm) 4x digital
Iris	Auto F1.4
Electronic Shutter	Auto (1/3-1/10000 s)

CCU CONNECTOR TYPES	
AC Power	IEC 320 plug (fitted with T4A fuse)
Camera Inputs (8 off)	15-way D type socket
Video Outputs (8 off)	75R BNC
Genlock Input	75R BNC (with 75R termination switch)
Sync Pulse Output	75R BNC
Serial Control Input	9-way D type plug
Serial Control Loop Through	9-way D type socket

CAMERA CHANNEL PERFORMANCE	
Horizontal Resolution	460 tvl per picture height (optical)
Illumination	1 lux
Signal to Noise Ratio	48dB (weighted)

8 CHANNEL CAMERA SYSTEM SUB-RACK	
Nominal Power Supply Input	100–120/200–240V (auto-ranging); 50/60 Hz
Operation Range	85–132/170–264V (auto-ranging); 47–440 Hz
Power Requirement	150VA for a fully populated 8-channel CCU
Outstation Cable Length	300m (656') maximum CCU to camera (consult Mirion Technolo- gies)
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Size	134mm (H) x 483mm (W) x 300mm (D) (5.3" x 19" x 11.8") (excluding handles and connectors)
Weight	7kg (15.4lbs)

OPTIONAL ACCESSORIES	
Camera Attachments	Camera allows for up to 4 attachment positions for a combi- nation of microphone and lights
In-Air or Underwater Lights	Up to 300W using 50, 75 or 100W lamps
Lighting Sub-rack	8 Channel
Microphone	For in-air use only
Microphone Sub-rack	8 Channel

Integral version available.

\*C981 System Configuration generally the same as R981 (shown on previous page).



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The above specifications may vary according to system configuration. Mirion Technologies Incorporated reserves the right to amend or change the information on this sheet without prior warning.

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