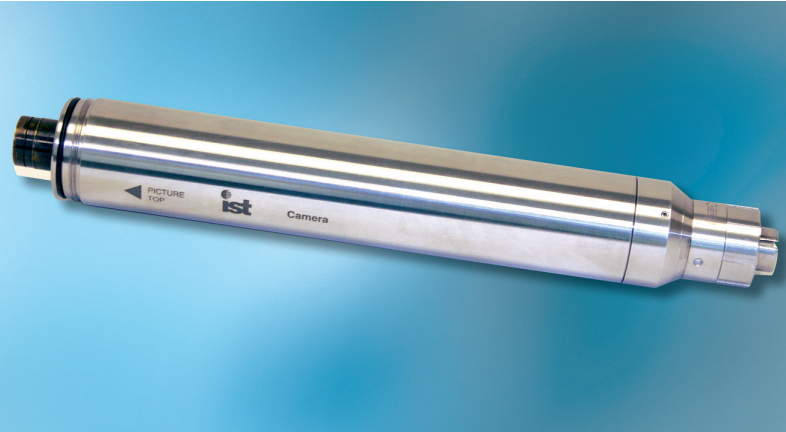




**MIRION**  
TECHNOLOGIES



### FEATURES

- Very high radiation tolerance (exceeding 2MGy)
- Easy decontamination
- Wide range of non-browning lens
- High resolution pictures for inspections
- Remote control of functions
- Wide range of attachments, lens bodies and viewing heads

## IST-REES R93 MK3

### General Purpose Nuclear Camera

Combining versatility, high radiation tolerance and wide-range viewing capabilities, the IST-Rees R93 Camera from Mirion is designed to meet your inspection needs.

### APPLICATIONS

- Underwater surveillance
- Fuel monitoring
- Reactor inspection
- Tube inspection
- Robotics and manipulator surveillance
- Serial number verification

imaging systems

A Mirion Technologies Division

Featuring:





## SPECIFICATIONS AND PERFORMANCE

The R93 Mk 3 Camera is housed in a rigid stainless steel casing that protects the sensor tube, drive circuits and remote function motors. High resolution optical performance is derived from the use of purpose designed 6mm, 9mm and 25mm D mount non-browning lenses with remotely driven motorized focus and auto iris functions. High reliability and simple maintenance is achieved using surface mount electronics and precision mechanics for all remote function controls. All materials are carefully selected to maintain long life in radioactive environments.

When fitted with an appropriate inter-changeable Viewing Head or Lens Body the R93 is fully waterproof for underwater applications to a depth of 200m (656'). A contamination prevention sleeve can also be fitted to allow retrieval of the uncontaminated camera capsule and connector.

The camera is designed to be used with the IST-Rees R90 Series Mk3 Camera Control Unit via a range of multicore cables with matching connectors to suit various applications. Fully compatible with international video standards, the R90 Mk3 CCU can be integrated or locked to external sources, image processors or machine vision systems. A range of portable or rack mounted versions are available with local control panel or remote control over twisted pair or video coaxial cables.

For integrated system applications the R93 can easily be interfaced with central switching units and remote control panels. Control systems using PC driven SCADA control techniques are also available.



**R93 Viewing Heads**



**R93 Lens Bodies**



**R93 CCU**

Maximum application flexibility is achieved using interchangeable Viewing Heads or Lens Bodies enabling the R93 to provide:

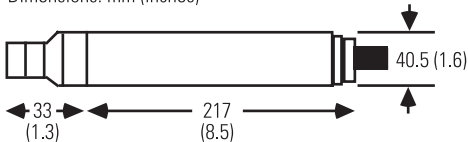
- Underwater applications to a depth of 200m (656')
- Lighting power from 0.7W to 100W
- Non-browning 12-72mm f/1.8 zoom capability
- Radial viewing with full 360° scan facility
- Complete hemispherical viewing ability
- Wide angle viewing

All the interchangeable Viewing Heads and Lens Bodies can be matched to the radiation tolerance of the R93 and are very easily fitted to the camera. For additional specifications refer to the following data sheets:

- IST-Rees R93 Interchangeable Viewing Heads
- IST-Rees R93 Interchangeable Lens Bodies
- IST-Rees R90 Mk 3 Camera Control Units
- IST-Rees R90 Series Cables and Connectors

SPECIFICATIONS AND PERFORMANCE: CAMERA HEAD	
Diameter	40.5mm (1.6")
Length (excluding connector)	217mm (8.5")
Length (including connector)	250mm (9.8")
Weight	1.25kg (2.8 pounds) without head or lens body

Dimensions: mm (inches)



ELECTRICAL (EXCLUDING VIEWING HEADS OR LENS BODIES)	
Max power	3 watts
Mechanical	Stainless Steel, non-browning optics
Optics	See table below.
Cable Length	
Minikevlar	200m max (656 feet)
TV36	200m max (656 feet)

## ENVIRONMENTAL

Operating temperature	-25 to 55°C (-13° to 130°F)
Storage temperature	-25 to 60°C (-13° to 140°F)
Humidity (non-condensing)	95%
<b>(The R93 Camera is fully waterproof when fitted with an appropriate viewing head or lens body.)</b>	
Radiation tolerance	2 MGy (H <sub>2</sub> O)[ <sup>60</sup> Co] (2 x 10 <sup>8</sup> rads) total dose >30k Gy/hour (>3 x 10 <sup>6</sup> rads per hour) Vidicon 1k Gy/hour (1x10 <sup>5</sup> rads per hour) Newvicon/Chalnicon

## PERFORMANCE USING R90 MK 3 SERIES CCU

Resolution (in air) dependent on viewing head as follows:

R93 Camera Head/Lens Body	Horizontal Resolution Center - Zone 1 (TV Lines per Picture Height)
R93/00, 01, 02, 05, 65, 65L	650
R93/03	500
R93/04	650
R93/09 (Dome or Cylinder)	500
Tube availability.	

## SIGNAL TO NOISE RATIO

(CCIR weighted)	>43dB (CCU standard gain) >36dB (CCU high gain)
Typical sensitivity	1 lux scene illumination (usable picture) 7 lux scene illumination (good picture)

Sensitivity using extended red Newvicon tube and F2.0 nonbrowning lens.

## SPECIFICATION AND PERFORMANCE: OPTICS

**Non-browning 9mm D mount auto iris lens fitted as standard. Optional non-browning 6mm and 25mm D mount lenses and C mount lenses available.**

Viewing angles in air (typical)	Horizontal	Vertical	Diagonal	Focus Range
Standard 9mm lens	50°	39°	61°	30mm to infinity
Optional 6mm lens	73°	58°	85°	5mm to infinity
Optional 25mm lens	20°	15°	25°	170mm to infinity

### SPECIFICATION NOTES

1. A “good” picture is defined as one where the illumination available is sufficient for the camera to produce a 1 volt composite video signal with a fully open iris.
2. A “usable” picture can usually be obtained dependent on the scene viewed and environmental factors etc, when the illumination available is only 1/3 that required to achieve a 1 volt composite video signal with a fully open iris.
3. Mirion should be consulted with regard to very critical viewing requirements, or in cases where there are important lighting, resolution, environmental or viewing angle considerations.
4. In applications where there are severe space constraints care should be taken to allow for the size of the camera cable mating connector and, if necessary, the bend radius of the connecting camera cable. Please refer to the IST-Rees R90 series cables and connectors data sheet.



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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.  
12/08

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