

## Renishaw's fibre optic Raman probes



RP10 compact probe.

### Overview

Whenever a sample cannot easily be brought to the Raman spectrometer – whether computer hard discs in clean rooms, ancient frescoes in churches, or hazardous chemical and nuclear processes – Renishaw's fibre optic probes take the spectrometer to the sample. The range of measurement possibilities is therefore vastly extended.

### Types of probe

Renishaw can supply three types of probe:

- **RP10 compact probe** for general purpose applications
- **RP20 high performance probe** for general purpose applications, with optional video camera model (RP20V) for direct sample viewing (through Raman collection optic)
- **RP30 immersion probe** for high temperature and high pressure process monitoring applications



RP20V high performance probe with video viewer.

### Common features

- Compact, extremely robust designs for the toughest of environments
- In-probe filtering for background suppression and high efficiency
- Flexible armoured optical fibre protection tubing, to prevent fibre damage
- Routinely available for 514 nm, 532 nm, 633 nm, and 785 nm laser excitation – other wavelengths available on request
- Fibre lengths of up to 100 m
- Multiplexing capability with RA100 Raman analyser - data can be acquired simultaneously from multiple probes
- Complete sampling flexibility - probe heads can be free-standing, integrated into other systems, or bolted down into fixed monitoring positions



RP30 immersion probe.

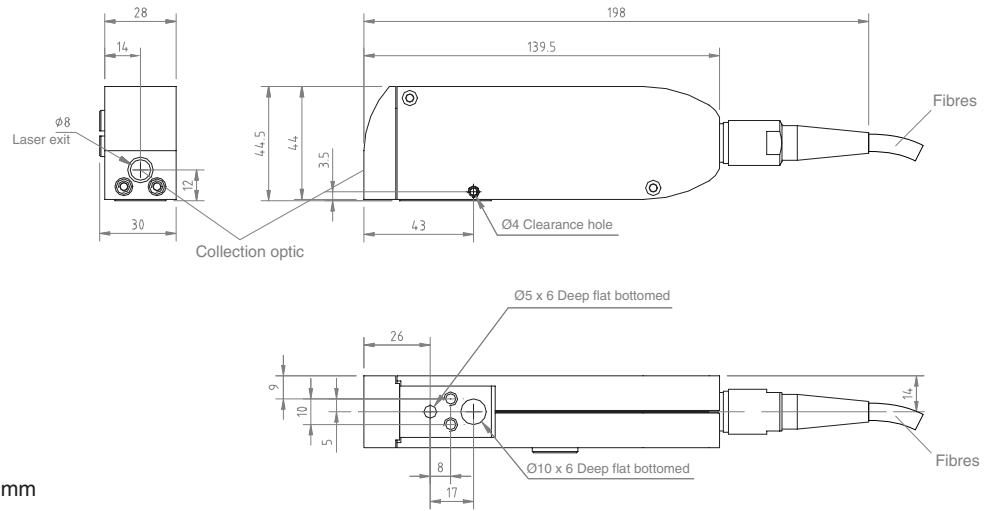
### RP10 compact and RP20 high performance probe additional features

- A wide range of working distances can be accommodated (to over 500 mm)
- RP20 high performance probe can be ordered with a video camera option (RP20V) for viewing the sample through the collection optic and confirming the exact location of the area being sampled
- Polarisation sensitive probe heads available for sample orientation measurement and many other applications

### RP30 immersion probe additional features

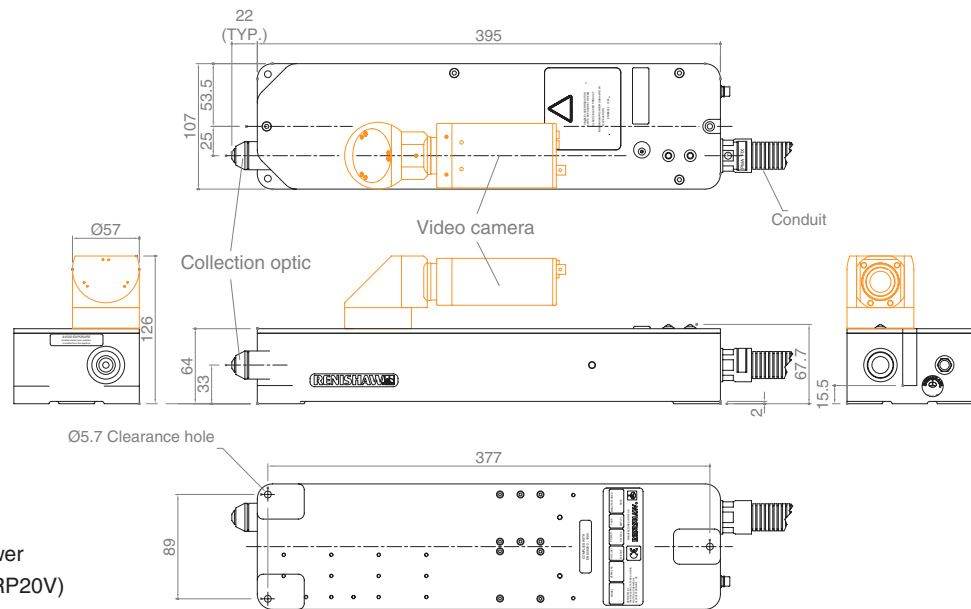
- Chemically inert sampling head: stainless-steel, with sapphire window and mechanical seals, which are resistant to many chemical environments; (other alloys, windows, and seal materials are available on request)
- Long sampling head for in-reactor use (cylindrical probe 250 mm long, 9.5 mm diameter)
- Sampling head can withstand pressures up to 20 MPa (3000 psi) and temperatures up to 500 °C
- Laser emission indicator and safety shutter

## Dimensions



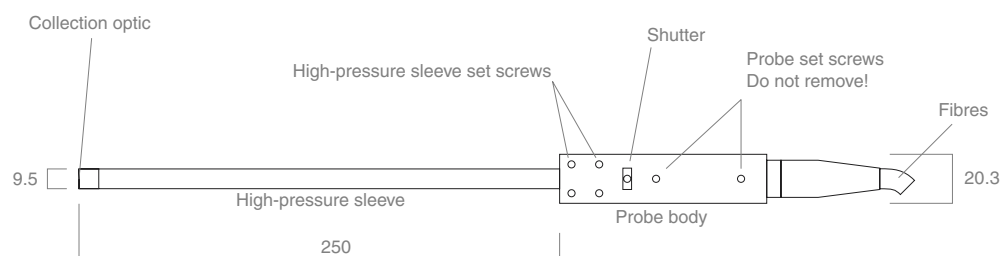
All dimensions in mm

### RP10 compact probe dimensions.



Optional video viewer shown in orange (RP20V)  
All dimensions in mm

### RP20 and RP20V high performance probe dimensions.



All dimensions in mm

### RP30 immersion probe dimensions.

## Configurations

### Step 1: Select one probe type

Item	Name	Probe type
1a	RP10	Compact
1b	RP20	High performance - suffix with V for video viewer option
1c	RP30	Immersion

### Step 2: Select probe excitation wavelength

Item	Wavelength	RP10	RP20	RP30
2a	514 nm	●	●	●
2b	532 nm	●	●	●
2c	633 nm	●	●	●
2d	785 nm	●	●	●

Notes: Please contact Renishaw for information about 488 nm and 830 nm variants.

### Step 3: Select laser rejection filter

Item	Filter type and cutoff	RP10	RP20	RP30
3a	High spec. holographic notch, 50 cm <sup>-1</sup> cutoff	×	◆	×
3b	Standard holographic notch, 100 cm <sup>-1</sup> cutoff	×	■	×
3c	Dielectric edge 200 cm <sup>-1</sup> cutoff	■	◆	■

Notes: 3a, 3b also available in special mounts for low signal level applications.

### Step 4: Select cable length (or extension cables if required)

Item	Length	RP10	RP20	RP30
4a	1 m	×	×	■ <sup>b</sup>
4a	2 m	■	■ <sup>b</sup>	×
4b	5 m	×	★ <sup>b</sup>	★ <sup>b</sup>
4c	10 m	○ <sup>a</sup>	★ <sup>b</sup>	★ <sup>b</sup>
4d	20 m	○ <sup>a</sup>	★ <sup>b</sup>	★ <sup>b</sup>

Notes: a additional extension cable lengths  
b total cable length  
Item 1c (RP30) can be supplied with lengths from 5 m to 200 m

### Step 5: Select collection optic(s)

Item	Optic	RP10	RP20	RP30
5a	Achromat FL = 18 mm	■	×	×
5b	Achromat FL = 45 mm	○	×	×
5c	Achromat FL = 100 mm	○	×	×
5d	Objective N Plan x5	○	○	×
5e	Objective N Plan x10	○	■	×
5f	Objective N Plan x50	○	○	×
5g	Objective N Plan L x20	○	○	×
5h	Objective N Plan L x50	○	○	×
5i	Objective SLW x20	○	○	×
5j	Objective SLW x50	○	○	×
5k	Singlet	×	×	■

Notes: See **Collection optic characteristics** below for further details

5d, 5e, 5f, 5g, 5h use M25 objective adapter (supplied)  
5i, 5j use RMS objective adapter (supplied)  
5k lens focal length chosen at time of purchase  
RP10 and RP20 can use the Renishaw Macro Sampling Set (contains additional lenses and sampling accessories)

### Step 6: Select polarisation options if required

Item	Polarisation option	RP10	RP20	RP30
6a	Unpolarised	■	■	■
6b	Polariser and analyser	★	★	×

### Step 7: Select instrument adapter kit

Item	Instrument	RP10	RP20	RP30
7a	inVia microscope	●	●	●
7b	RM series microscope	●	●	●
7c	RA100 analyser	●	●	●

Notes: 7b includes laser adapter for standard Renishaw supplied lasers. Adapters for alternative lasers available on request.

Legend:

- supplied as standard
- choose one only from column
- ◆ option
- accessory
- ★ special option; contact Renishaw
- × not available

### Collection optic characteristics

Item	Type	FL / mm	Mag	NA	WD / mm	D / mm	Mount
5a	Achromat	18		0.24	13.2	9.0	custom
5b	Achromat	45		0.10	41.3	9.0	custom
5c	Achromat	100		0.06	96.2	12.5	custom
5d	Objective N Plan x5		5	0.12	14.0		M25
5e	Objective N Plan x10		10	0.25	5.8		M25
5f	Objective N Plan x50		50	0.75	0.37		M25
5g	Objective N Plan L x20		20	0.40	10.8		M25
5h	Objective N Plan L x50		50	0.50	8.2		M25
5i	Objective SLW x20		20	0.35	21.0		RMS
5j	Objective SLW x50		50	0.45	15.0		RMS
5k	Singlet		1 to 5				custom

FL = focal length, Mag = magnification, NA = numerical aperture  
WD = working distance, D = diameter

## Details

	Probe type		
	RP10	RP20	RP30
Standard excitation wavelengths supported <sup>a</sup> / nm	514 532 633 785	514 532 633 785	514 532 633 785
Laser rejection filter cutoff <sup>b</sup> / cm <sup>-1</sup>			
Holographic notch filter (high spec)		50	
Holographic notch filter (standard)		100	
Dielectric edge filter	200	200	200
Laser input fibre core diameter / µm	50	50	100
Signal output fibre core diameter / µm	62.5	62.5	200
Fibre connection at probe	bonded	FC	bonded
Fibre connection at instrument	Fischer <sup>c</sup>	FC	FC
Standard fibre length <sup>d</sup> / m	2	2	1
Maximum fibre length / m	100	100	200
Mass / g (probe with standard length fibres)	700	3200	700
Polarisation options	z(x,x)z̄ <sup>e</sup> z(x,y)z̄ <sup>e</sup>	z(x,x)z̄ <sup>f</sup> z(x,y)z̄ <sup>f</sup>	none none
Interchangeable objective lens <sup>g</sup>	yes <sup>f</sup>	yes <sup>f</sup>	no
Interchangeable achromat/singlet lenses	yes <sup>f</sup>	yes <sup>f</sup>	yes <sup>e</sup>
Maximum working distance / mm	500	500	5
Video viewing option	no	RP20V	no
Maximum operating temperature of probe sampling head / °C	40	40	500
Maximum pressure of probe sampling head	-	-	20 MPa 200 bar 3000 psi

### Notes

- a Others available on request e.g. 488 nm, 830 nm  
b Chosen at time of purchase  
c Fischer is a hybrid electrical and optical connector  
d Other lengths (and extension cables) available on request  
e Chosen at time of purchase  
f Selectable  
g x10, x20, super long working distance etc.

## Accessories

### inVia Raman microscope interface kit

### RM series Raman microscope interface kit

### RA100 Raman analyser interface kit

### Tripods with motorised stages for probe positioning:

	Standard	Compact
Travel (lateral) / mm	45	45
Travel (focus) / mm	30	30
Tilt	+30°	+30°
Stage mass / kg	2	2
Elevation range / m	0.6 to 1.95	0.66 to 1.75
Collapsed height / m	1.02	0.7
Mass (tripod and stage) / kg	9.9	9.3



Using a RP10 compact probe and a manual tripod to analyse the gemstones in a gold cross.

## Applications

Any application where the sample cannot conveniently be brought to the instrument.

Examples include:

- **production lines** - quality assurance of materials, quality assurance of components, process monitoring
- **examination of cultural treasures** - frescoes in churches and monasteries, *in situ* studies of large artworks
- **hazardous environments** - chemical plants, nuclear power facilities
- **research** - MBE growth monitoring, *in situ* catalysis studies

## Safety

The fibre probes can be used with a variety of lasers. The safety guidelines appropriate to the laser should be followed at all times.

Typically a fibre probe will be used with a Class 3b laser, and will display a warning label similar to one of the following:



Renishaw is continually improving its products and reserves the right to change specifications without notice.