CLAIMS

1. A position sensor comprising an optical system configured to deliver radiation to an alignment mark on a substrate and to collect diffracted or scattered radiation from the substrate, and to process the collected radiation to derive at least one position-sensitive signal therefrom, wherein the optical system is operable to deliver, collect and process radiation selectively in a first wavelength range which includes radiation with a wavelength shorter than 800 nm and a second wavelength range which includes infrared radiation with wavelength longer than 1000 nm. , wherein the radiation of the first wavelength range and the second wavelength range share a common optical path in at least some portion of said optical system, while the radiation of the first wavelength range is processed by a first processing sub-system and the radiation of the second wavelength range is processed by a second processing sub-system characterized in that the optical system further comprises:

an illumination system for combining radiation of both the first and second wavelength ranges from a plurality of radiation sources into said common optical path for delivering radiation to a first objective lens and a second objective lens wherein the first objective lens for delivering and collecting radiation of the first wavelength range and the second objective lens for delivering and collecting radiation of the second wavelength range;

a spectral filter is provided to split the radiation of the first and second wavelength ranges from said common optical path for delivery to the first and second objective lenses wherein said radiation having different characteristics includes radiation having different wavelengths within said first wavelength range; and

a first half or quarter wave plate is positioned in the path of the radiation of the first wavelength range between said spectral filter and the first processing sub-system, and a second half or quarter wave plate is positioned in the path of the radiation of the second wavelength range between said spectral filter and the second processing sub-system.

2. The position sensor as claimed in Claim 1 wherein the illumination system for combining radiation of both the first and second wavelength ranges from one or more radiation sources into said common optical path and said common optical path further includes a common objective lens for delivering and collecting said radiation of both the first and second wavelength ranges to the alignment mark, the objective lens being included in said common optical path.

3. The position sensor as claimed in claim 2 wherein the spectral filter is provided to split the radiation of the first and second wavelength ranges collected by said common objective lens for delivery to the first and second processing sub-systems.

4. The position sensor as claimed in any preceding claim wherein a plurality of position-sensitive signals are obtained by processing the collected radiation in at least one of said wavelength ranges, each position-sensitive signal being obtained using radiation having different characteristics.

5. The position sensor as claimed in claim 4 wherein said radiation having different characteristics includes radiation having different wavelengths within said first wavelength range.

6. The position sensor as claimed in claim 4 or 5 wherein said radiation having different characteristics includes radiation having different wavelengths within said second wavelength range.

7. A method of manufacturing devices wherein a device pattern is applied to a substrate using a lithographic process, the method including positioning the applied pattern by reference to measured positions of one or more marks formed on the substrate, the measured positions being obtained using a position sensor as claimed in any preceding claims wherein different device patterns are applied to different layers on the substrate and wherein said measured positions are obtained using a first wavelength range for patterning a first layer and using a second wavelength range for a second layer.

8. A lithographic apparatus for use in applying a pattern to a substrate, the lithographic apparatus including a position sensor as claimed in any of claims 1 to 6 and a controller configured for causing the position sensor to measure the position of one or more alignment marks using a radiation in a selected one or both of said wavelength ranges, and for using the measured position of the target structure to control the positioning of one or more patterns applied to the substrate.