

TMc300 Multiple-Grating Monochromator

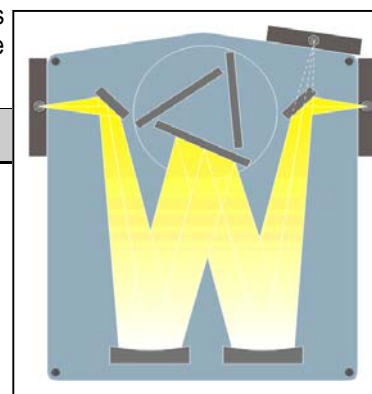
The TMc300 range of monochromators control grating position using precision gears and a microprocessor-controlled microstepping drive. Up to three gratings are mounted on a turret which can be rotated through 360° allowing software selection of grating type and position.

A programmable detector changeover mirror and detection electronics with software selectable dual inputs allow spectral scans over wide wavelength ranges to be accomplished without manual intervention. The advantages of this drive include constant wavelength accuracy at all grating angles, very fast wavelength acquisition and zero backlash.

The optical layout of these instruments has been developed to minimise scattered light and maximise throughput. Effective internal baffling reduces general scatter while the novel mirror arrangement avoids rediffracted light which is often a problem shorter wavelengths. The use of large rectangular gratings enhances light throughput and maintains constant f number at high grating angles. As an option, for use with array detectors, the focusing mirror can be mounted on an externally controllable translation stage which allows fine focusing without disturbing the array. As with all Bentham monochromators, the TMc300 is built in a single casting, giving the best rigidity and robustness.



For those applications where the scattered light performance of a single monochromator is not sufficient, the DTMc300 double monochromators are available. These devices are supplied with either additive or subtractive dispersion, or they can be converted from one to the other by changing one of the grating turrets and the controlling software. A swing away mirror allows instant change from double to single operation - a useful feature in UV-VIS-NIR systems. An order sorting filter wheel, essential for accurate measurement of continuous spectra, motorised slits, light sources and detectors are amongst the wide range of light measurement products available to complement the TMc300 family.



Specification

Configuration:	Czerny-Turner
Slits:	10 μ m to 10mm variable, fixed or motorised
Slit height:	20mm
Number of gratings:	1, 2 or 3
Grating size:	68mm x 84mm
Aperture ratio:	f/4.1 (at all grating angles)
Resolution:	0.1nm at reduced slit height, 0.3nm with full slit height of 20mm, both measured with 1200g/mm grating
Dispersion:	2.7nm/mm (1200g/mm)
Mechanical resolution of grating drive:	0.00072 degrees per motor step
Wavelength acquisition speed:	1000nm/sec
Wavelength accuracy:	\pm 0.2nm over full range of 1200g/mm grating
Wavelength reproducibility:	\pm 0.05nm (1200g/mm)

Options

252	Programmable filter wheel mounted just inside the entrance slit
SAM	Remote operated swing-away mirror, can be fitted at entrance or exit (or both) where it can be used with a second slit or, in the case of the exit, with slit and array. Order sorting cannot be implemented at the alternative entrance slit, but the SAM is still useful for light sources not requiring order sorting, eg deuterium
MVSS	Motorised slit, allows software control of slit width and hence operating bandwidth
FF	Fine focus, puts the focusing mirror on a translation stage and is a must for arrays. The FF option allows you to move the focal plane up to 25mm outside the monochromator housing to fine focus on the array surface

Bentham holds a stock of standard gratings for scanning and array use, as well as order sorting filters to cover up to 20 μ m.

Order Sorting Filters

Array Gratings

Part No	Grooves/mm	Spectral range with 25mm array
T301H	100	810nm
T3015H	150	540nm
T303H	300	270nm
T306H	600	135nm

Key to Bentham grating part numbers.:

H = holographic
R = ruled

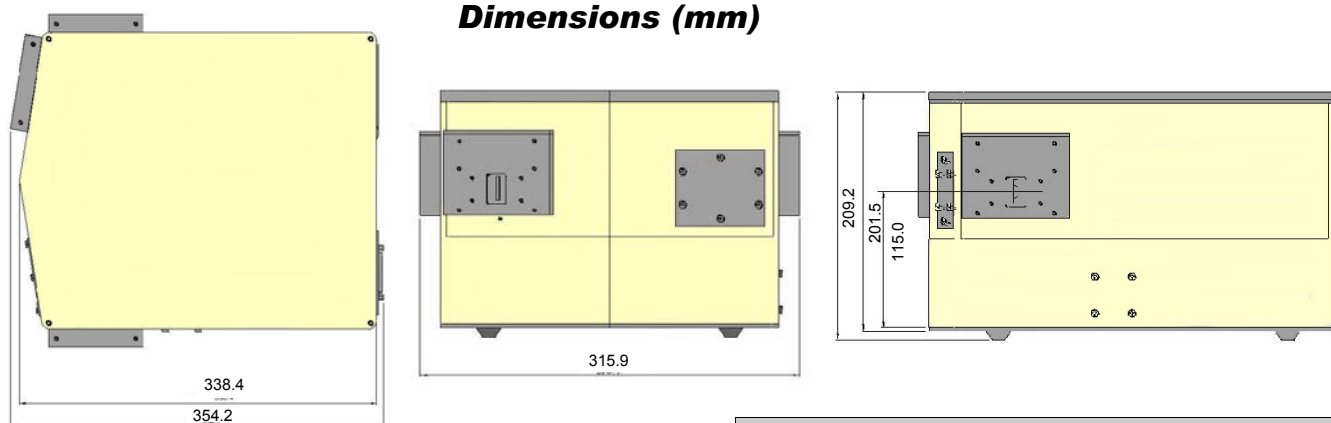
Blaze wavelength follows H or R, with 'U' as decimal point, e.g.
T312R0U5 = 0.75 μ m blaze

Part No.	Insertion Wavelength	Order sorts up to...
OS400	400 nm	720 nm
OS700	700 nm	1300 nm
OS1250	1250 nm	2000 nm
OS2000	2000 nm	3900 nm
OS3800	3800 nm	7000 nm
OS7000	7000 nm	13000 nm
OS12000	12000 nm	20000 nm

Scanning Gratings

Part No.	Grooves/mm	Recommended wavelength range	Comments
T324H0U24	2400	200nm - 675 nm	Optimum resolution in UV
T318H0U25	1800	200nm - 900nm	High resolution - low scatter in UV-VIS
T312H0U25	1200	250nm - 100nm	Low scatter, UV-VIS-NIR
T318R0U5	1800	200nm - 900nm	High resolution, high efficiency in UV-VIS
T312R0U5	1200	250nm - 1200nm	High efficiency in UV-VIS-NIR
T309R1U0	900	500nm - 1.8 μ m	Optimum resolution in 1.1 μ m to 1.8 μ m region
T306R1U6	600	0.8 μ m - 2.5 μ m	Fibre spectral loss
T303R3U0	300	1.5 μ m - 5.5 μ m	General purpose IR
T3015R4U0	150	2.4 μ m - 8 μ m	Recommended 3-5 μ m
T301R9U0	100	4.5 μ m - 16.2 μ m	General purpose IR - 10.6 μ m
T30075R12U0	75	6 μ m - 21 μ m	Recommended 8-14 μ m
T3005R18U0	50	9 μ m - 27 μ m	General purpose IR

Dimensions (mm)



Double Monochromators

The TMc300 is also available as a double monochromator with additive or subtractive dispersion. As an option, an extra grating turret can be supplied to allow in-situ conversion from additive to subtractive. The swing away mirror option mounted at the exit of the first monochromator allows instant switchover from double to single operation. This is particularly useful in UV-VIS-NIR monitoring systems when the higher efficiency of the single may be necessary in the IR where scattered light may not be a problem.

Specifications for DTMc300 as TMc300 except:

Focal length	600mm
Resolution - additive	0.05nm at reduced slit height 0.15nm with full slit height
- subtractive	As single TMc300
Dispersion - additive	1.35nm/mm (1200g/mm)