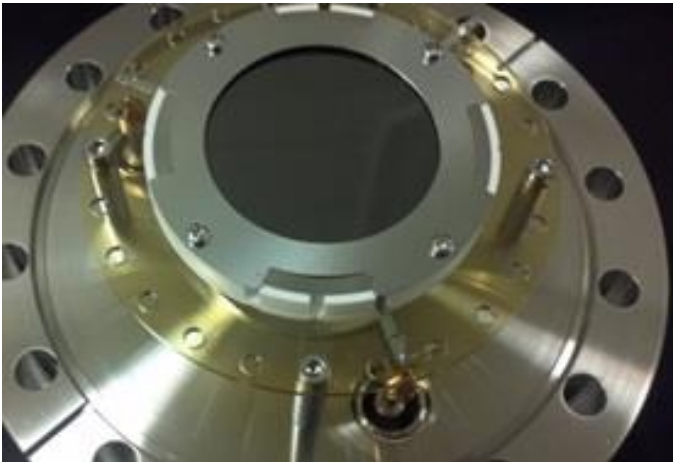


MCP Assembly

Microchannel Plate Detectors
 (see separate data sheet for MCP - Nude)



Mounting Type Examples: flange mounted

Mounting Types: short (left), long (right)

Microchannel Plates (MCP) and MCP detectors are used to detect electrons, positrons, protons, heavy ions, x-rays, VUV- and UV-radiation and to measure the Time-of-Flight (TOF) parameters. Several MCP detector versions are available. The MCP detectors could be assembled as single, double and triple MCP setup with metal anode or phosphor screen. As detector unit free mountable in your vacuum or mounted on a CF Vacuum flange or Viewport.

MCP detectors are offered with different diameters, as single MCP, Chevron and Z-Stack, long, regular or short mount, anode, fast anode or Phosphor Screens, as in vacuum assembly or flange mounted with or without view port. Ring and grid options are available also.

Typical applications are:

- Particle detection in analytical Systems counting mode
- Mass Spectrometer
- TOF-Mass Spectrometer
- Cosmic Rays
- Detection of Plasma ions
- Detection UV-,VUV-light and X-rays
- Elementary Particle Physics
- Detection of Ions, Electrons, Positrons, High energy particles and X-rays

KEY FEATURES AND BENEFITS

- | | |
|---|---|
| <input type="checkbox"/> High Efficiency | <input type="checkbox"/> Single, double and triple MCP setups |
| <input type="checkbox"/> Metal Anode Versions | <input type="checkbox"/> Phosphor Screen Versions |
| <input type="checkbox"/> Fast Time Response available | <input type="checkbox"/> Demountable |
| <input type="checkbox"/> Custom Design possible | <input type="checkbox"/> Bakeable to 200°C |

tectura offers MCP's for different applications in image and detection mode. It is possible to image electrons, positrons, protons, heavy ions, x-rays, XUV, VUV- and UV-radiation and measure position, cluster parameters, TOF and Ion- contribution depending on customers HV and readout system used.

MCP detectors offered in various versions which can be combined to build a detector which suits most applications.

- typical standard sizes with OD 12, 18, 25, 33, 50 and 90 mm
- single plate, Chevron (2 MCPs) and Z-Stack (3 MCPs)
- detection and imaging quality MCPs
- channel length/dia ratio 40:1 and 60:1
- 3 mount versions: regular, short and long mount
- anode or Phosphor screen (P43, P47, PB1, PG2)
- in-vacuum detectors and flange mounted detector (with and without viewport)

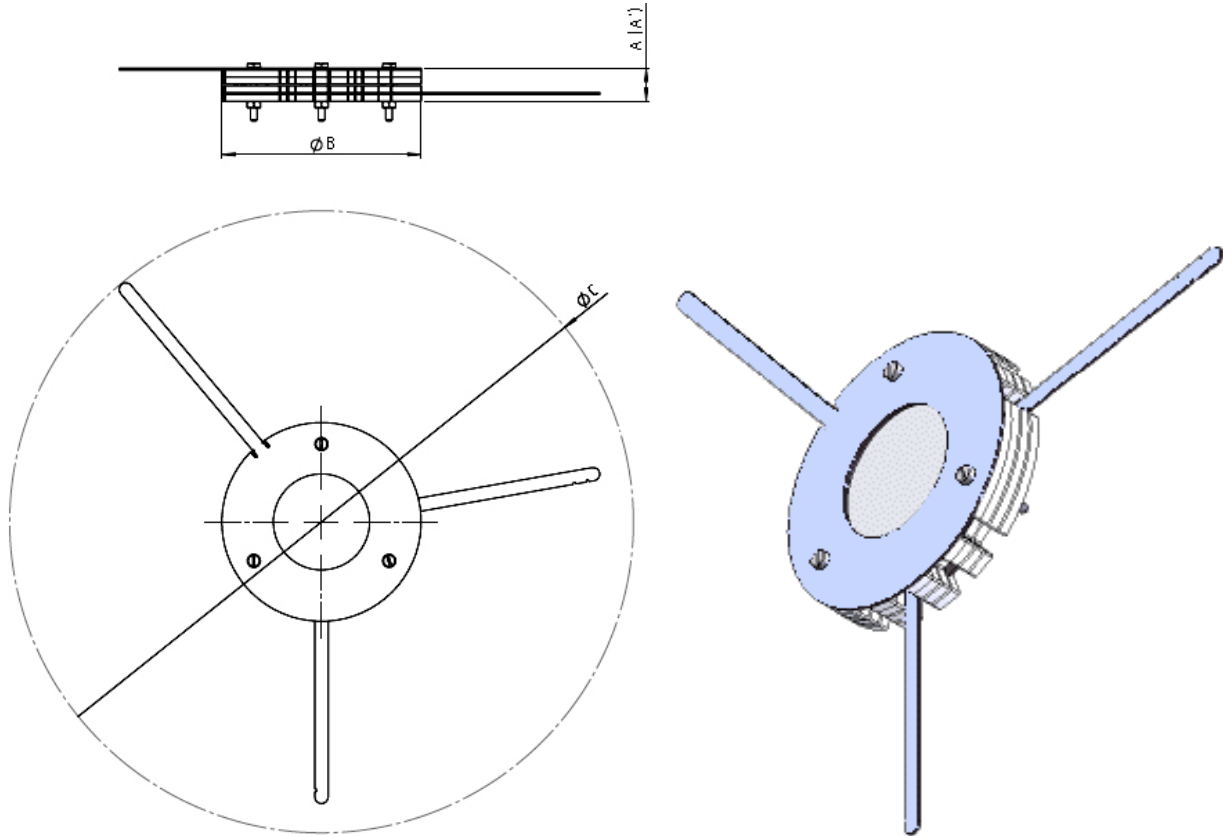
MCP Detector Types

Besides nude Microchannel Plates (MCP) we offer them for in-vacuum mount and flange mounted ones as fast sub ns detectors for electron and ion time-of flight as well as MCP phosphor based imaging detectors for profiling of ion / electron beam / soft x-ray / photon or other molecular

For high input currents our configurations are available with extended dynamic range MCPs. In addition the configurations are available with single, double and Z-stack MCP detectors. All the above combinations can be purchased stand alone or flange mounted with the appropriate high voltage feedthroughs.

In-vacuum Detectors

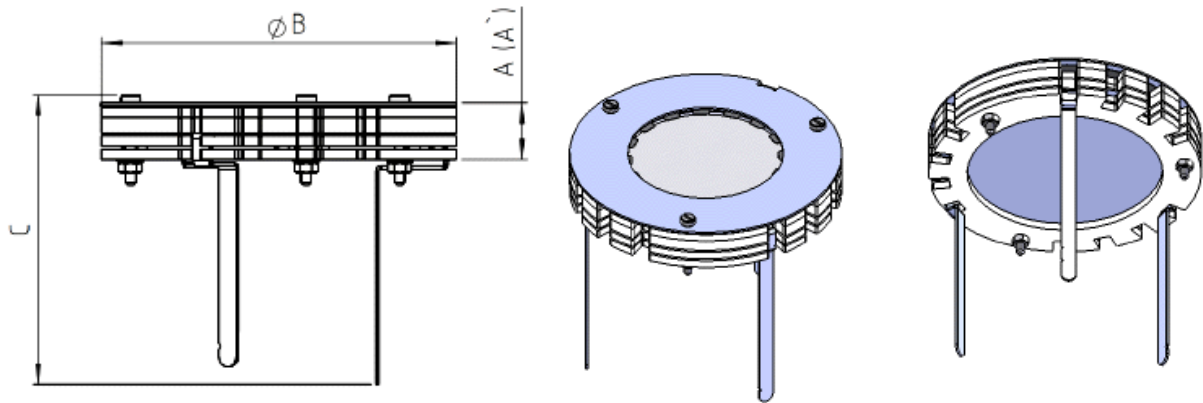
- Regular Mount (principle)



OD mm	Effective dia. mm	A mm	A' mm	B mm	C mm
12	8	5,0	-	20	57
18	14	5,0	8,0	30	85
25	18,8	5,5	8,6	35	94
33	25	5,5	8,6	44	88
50	46	5,5	8,6	65	109
90	77	14	17,5	118	166

A - with metal anode A' - with Phosphor screen

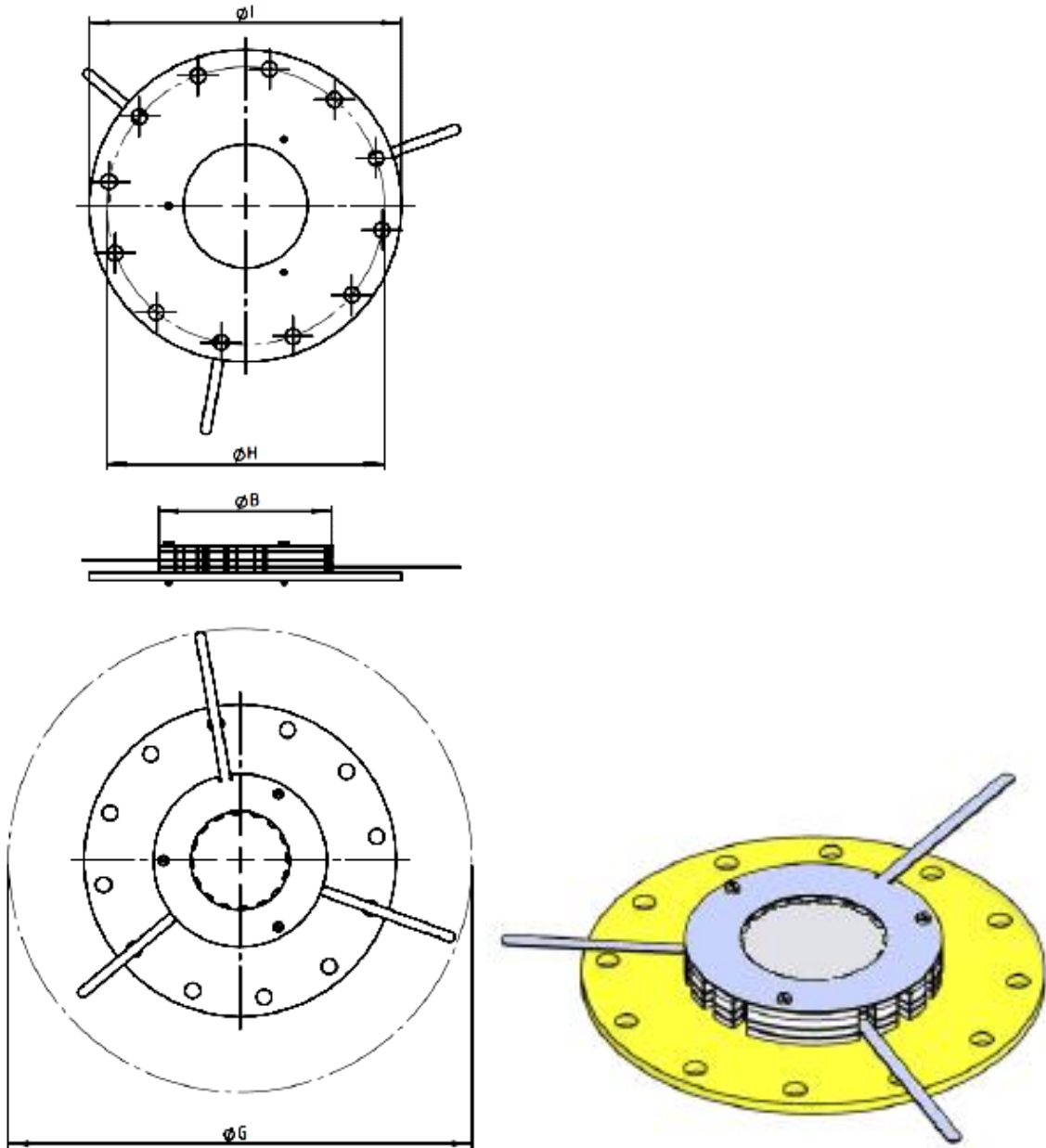
- Short Mount (principle)



OD mm	Effective dia. mm	A mm	A' mm	B mm	C mm
12	8	5,0	-	20	30
18	14	5,0	8,0	30	30
25	18,8	5,5	8,6	35	28
33	25	5,5	8,6	44	20
50	46	5,5	8,6	66	20
90	77	14	17,5	118	20

A - with metal anode, A' - with Phosphor screen, *max dim.

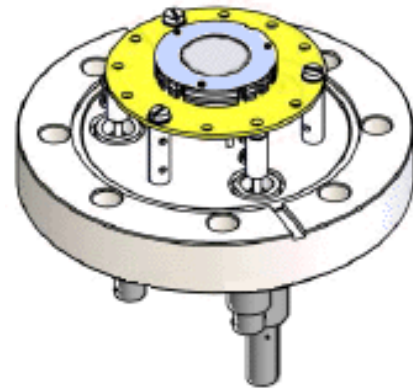
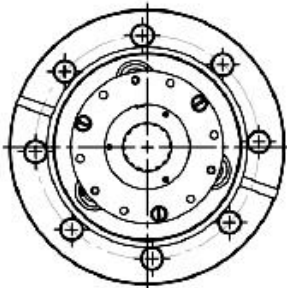
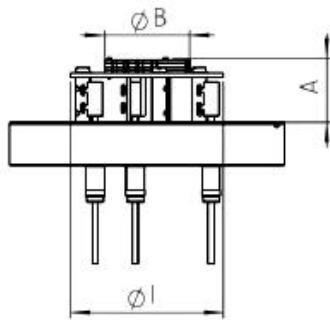
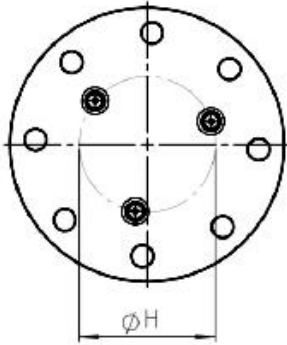
- **Long Mount (principle)**



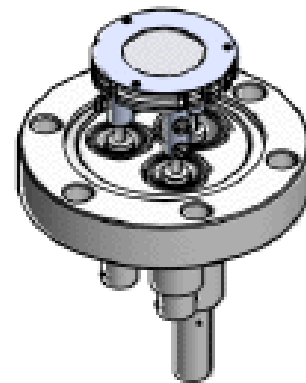
OD mm	Effective dia. mm	B mm	G mm	H mm	I* mm
12	8	20	57,3	56	63
18	14	30	93,6	56	63
25	18,8	35	93,6	85	92
33	25	44	88	85	92
50	46	65,8	100	85	92
90	77	118	178	132	140

* other dimensions of diameter available on request

- Flange Mounted Detectors



Long Version (Illustration)



Short Version (Illustration)

OD mm	Effective dia. mm	A mm	A' mm	B mm	H mm	I mm
18	14	28	31	30	56	63
25	18,8	29	32	35	85	93
33	25	29	32	44	85	93
50	46	29	32	65	85	93
90	77	37	41	118	132	140

x = available on request - Dim. 'I' mounting ring on request

A - with metal anode A' - with Phosphor screen

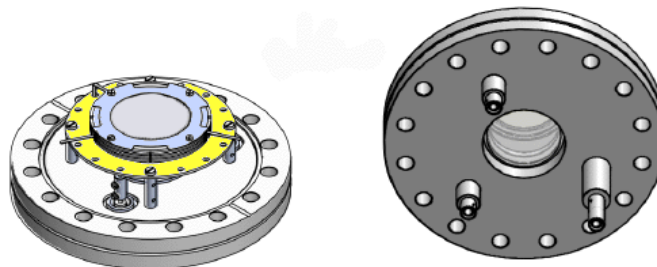
Standard Flange Selection Table

MCP Assembly with anode.

Flange OD	CF-40 (2.75")	CF-63 (4.5")	CF-100 (6")	CF-160 (8")	CF-200 (10")
12	L, S	L, S	L, S	L, S	L, S
18	S	L, S	L, S	L, S	L, S
25	-	S	L, S	L, S	L, S
33	-	S	L, S	L, S	L, S
50	-	S	L, S	L, S	L, S
90	-	-	S	L, S	L, S

MCP Assembly with phosphor screen

Flange OD	CF-40 (2.75")	CF-63 (4.5")	CF-100 (6")	CF-160 (8")	CF-200 (10")
12	S	L, S	L, S	L, S	L, S
18	-	L, S	L, S	L, S	L, S
25	-	S	L, S	L, S	L, S
33	-	-	L, S	L, S	L, S
50	-	-	L, S	L, S	L, S
90	-	-	-	L, S	L, S



Long Version (principle)

MCP Detector CF Flange Assembly - Anodes

tectra offers open MCP detectors with metal anode for different applications in counting mode. It is possible to count electrons, positrons, protons, heavy ions, x-rays, VUV- and UV-radiation and measure the TOF parameters. Due to the assembly in Ultra-High-Vacuum flanges (CF-Flange) it is possible to integrate the system in any analytic instrument which is based on the CF standard. On request it is also possible to integrate the systems on other flange standards like ISO-K, ASA or custom specific ones. The flanges are equipped with 3 integrated vacuum SHV feedthroughs to supply the high voltage to the MCP detector.

Whether you require a single, double (Chevron) or Z-stack, resistance matched MCP detector coupled to a standard anode giving $\sim 40\text{ns}$ time response or whether you need a fast anode for ion or electron time-of-flight detector with sub ns timing tectra has the off the shelf solution.

Alternatively you may need to image or profile your ion/electron beam / soft x-ray / photon or other molecular or sub atomic particle. For these applications we offer MCP detectors together with high quality phosphor screens offering industry leading spatial resolution.

All the above combinations are available stand alone or flange mounted MCP detectors with the appropriate high voltage SHV feedthroughs. Flange mounted versions can be supplied with or without viewport.

The **Standard Anode** has a time response of $\sim 40\text{ns}$ typically.

The **Fast Anode** is available in 2 versions:

1. **T Anode** (Time of flight anode):

This fast Anode solution gives a time response Full Width at Half Maximum (FWHM) $< 1\text{ns}$ and a rise time of $< 300\text{ps}$. This is achieved as the Anode is impedance matched to 50 Ohm. This ensures that reflections in the time response signal are reduced to $< 10\%$ of maximum signal. The effect of reflections on the time response signal are therefore significantly reduced and ringing in the time response is reduced to $< 10\%$ after 1ns. Because the solution uses a SMA connector to acquire the signal it is suitable for a signal that is acquired at ground voltage only. This means that the MCP Microchannel Plate can't be biased at less than $+2.000\text{V}$.

The T anode is currently available only for 33 and 50mm OD MCP detectors.

2. **ET Anode** (Electron Time of flight):

The ET anode gives a time response Full Width at Half Maximum (FWHM) $< 1\text{ns}$ and a rise time of $< 300\text{ps}$. This is achieved with a conical anode that is 50 Ohm impedance matched. The ET anode uses a N type connector that can be biased at up to $+3.000\text{V}$. It is therefore suitable for biasing the MCP_{input} up to $+1000\text{V}$ and will allow for capacitive decoupling of the signal from the high voltage enabling electron time-of-flight applications.

The ET anode type MCP is available only with a flange mounted version (min CF-63) but for all common Microchannel Plate sizes with OD 18, 25, 33, 50 and 90mm.

MCP Detector CF Viewport Assembly – Phosphor Screens

tectra offers open MCP detectors with phosphor screen for different applications in image mode. It is possible to image electrons, positrons, protons, heavy ions, x-rays, VUV- and UV-radiation and measure position and cluster parameters depending on the readout system used. Additional thread holes could be integrated from the non-vacuum side to allow the mounting of a camera or another readout system. Due to the assembly in Ultra-High-Vacuum flange (CF-Viewport) it is possible to integrate the system in analytic instruments which are based on the CF standard. On request it is also possible to mount the MCP assembly on other viewport standards like ISO-K, ASA or custom specific ones. The viewports are equipped with 3 integrated vacuum SHV feedthroughs to supply the high voltage to the MCP detector.

When it comes to phosphors we offer the standard P20, P43 and P47 and have developed additional phosphors for fast timing requirements.

Standard Phosphors available:

- P43 (green: typically for CCD camera read out)
- P47 (blue: typically for Photo Multiplier Tube (PMT) read out)

Fast Phosphors available:

- PB1 (blue: XBF (ZnO:Ga 395 nm spectrum peak, 5ns decay for PMT read out)
- PG2 (green: P46F (YAlCeO Ga 520 nm spectrum peak, ~ 45ns decay for CCD read out)

Typical data:

MCP	Chevron (2 MCP) 40:1 or 60:1, active area 14 mm
Gain	Min. gain 5×10^6
Anode	Metal anode SAE302
Screen	Glass B-270 or quartz with phosphor screen

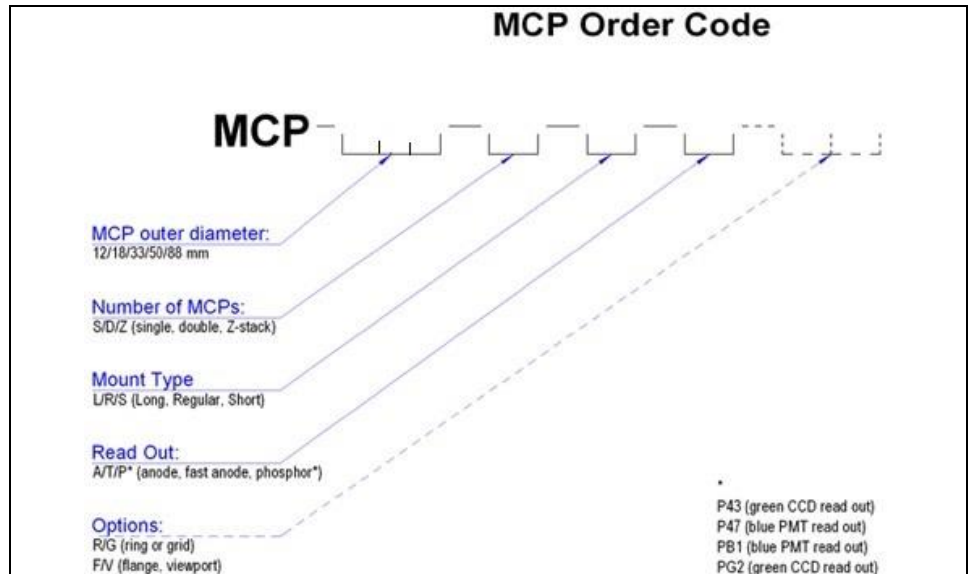
Phosphor	Peak wavelength	Decay time 10%
P20	530	~ 80 ms
P43	550	~ 1.2 ms
P47	400	~ 120 ns
P46	530	~ 100 ns
L46(F)	520	~ 50 ns
XBF	395	< 5 ns

Other Phosphor on request

Note: The location of the contacts can be changed in accordance to customer request

SPECIFICATION

Order Code



Technical Specification

Standard Sizes:	12 mm, 18 mm, 25 mm, 33 mm, 50 mm and 90 mm
Number of MCP's:	Single plate, Chevron (2 MCP's) and Z-stack (3 MCP's)
Quality:	Detection or Imaging
Channel Length / dia ratio	40:1 (standard)
Mounting versions:	Regular, short and long mount

Others

Standard Phosphor:	P43 (green – camera), P47 (blue – PMT)
Standard flange type:	CF

Options

Flange	On request (ASA, ISO-K, other)
Channel Length / dia ratio	60:1 (optional)
Fast Anode	With decoupling box
Fast Phosphor	PB1, PG2
Other:	View port, ring, grid



Please contact us for more Information.
We and our team behind us will be happy to help you!

tec tra GmbH
Reuterweg 51 – 53
60323 Frankfurt/M.
Germany

Phone: +49-(0)69-720040
Fax: +49-(0)69-720400
E-Mail: info@tectra.de
Web: www.tectra.de

