

# TC CORE series

Ultra compact bi-telecentric lenses up to 2/3"



INTERNATIONAL  
**PATENT**  
PENDING

## KEY ADVANTAGES

### Excellent optical performance

TC CORE bi-telecentric lenses deliver excellent optical performance as other comparable Opto Engineering® bi-telecentric lenses.

### Extremely compact

TC CORE lenses are up to 70% smaller than other telecentric lenses on the market.

### Designed for flexibility and smart integration

TC CORE lenses integrate a camera phase adjustment and can be mounted on multiple sides with or without clamps, allowing you to cut costs.

### Save you money

Systems integrating TC CORE lenses take much less space, resulting in lower manufacturing, shipping and storage costs.

### Boost your sales

A smaller vision system or measurement machine is the solution preferred by the industry.

### Detailed test report with measured optical parameters.

**TC CORE** bi-telecentric lenses for sensors up to 2/3" feature a truly revolutionary ultra compact opto-mechanical design.

These lenses deliver high-end optical performance and at the same time are up to 70% smaller than other double-sided telecentric lenses on the market, thus allowing you to significantly downsize a vision system.

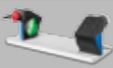


The unique shape has been expressly developed for maximum mounting flexibility.

TC CORE lenses can be mounted in different directions using any of the 4 sides even without clamps, allowing you to cut the system's cost, and can be easily fitted or retrofitted even into very compact machines.

TC CORE bi-telecentric lenses can also be coupled with the new ultra compact LTCLHP CORE series telecentric illuminators to build super small yet extremely accurate measurement systems.



Comparison of a "classic" telecentric lens present on the market and a TC CORE bi-telecentric lens: TC CORE lens delivers best optical performance and is extremely compact.

SEE ALSO		
	TCBENCH CORE series	p. 27
FULL RANGE OF COMPATIBLE ILLUMINATORS		
	LTCLHP CORE series	p. 110
FULL RANGE OF COMPATIBLE ACCESSORIES		
	Mounting mechanics CMHOCR and CMPTCR series	p. 203



Multiple lens surfaces can be used for direct mounting without clamps, thanks to the M6 threaded holes located on 4 sides. This also allows you to cut costs.

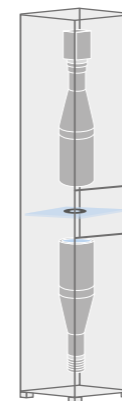


Front CMHOCR clamp available for added mounting flexibility.



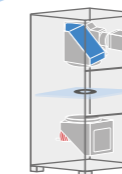
Built-in phase adjustment makes it easy to align the camera sensor.

## Off-line precision measurement systems:



Integrates a classic telecentric lens and a classic telecentric illuminator present on the market.

Save up to  
**70%**  
in height



Integrates a TC CORE bi-telecentric lens and LTCLHP CORE telecentric illuminator.

## ADVANTAGES



### Save more

- Lower manufacturing cost due to less material employed
- Less space required for storage and use
- Lower shipment expenses due to smaller size
- Lower transportation risks

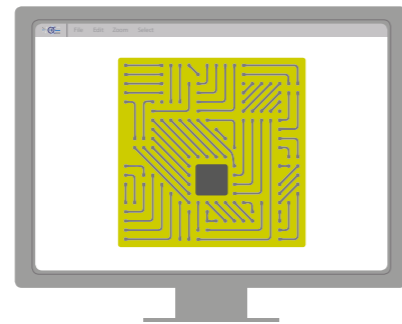
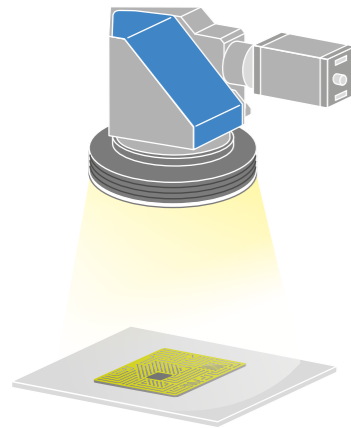
### Sell more

- A smaller vision system or measurement machine is preferred by the industry

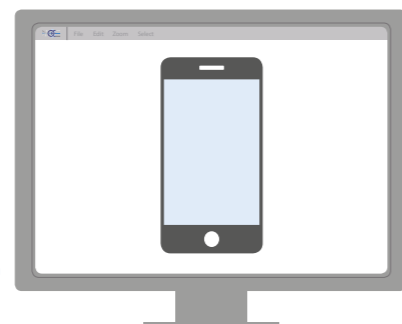
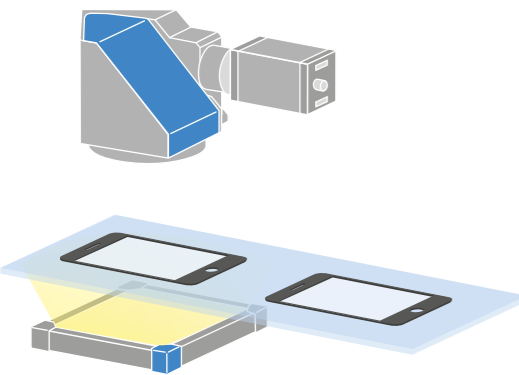
# TC CORE series

Ultra compact bi-telecentric lenses up to 2/3"

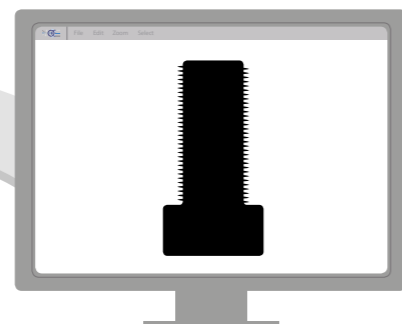
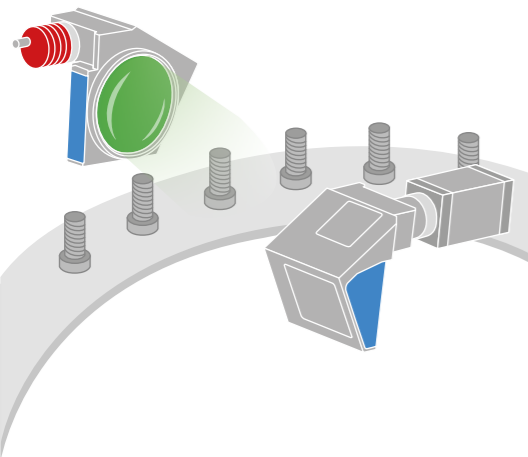
## Application examples



Electronic board inspection:  
TC CORE with top ringlight.



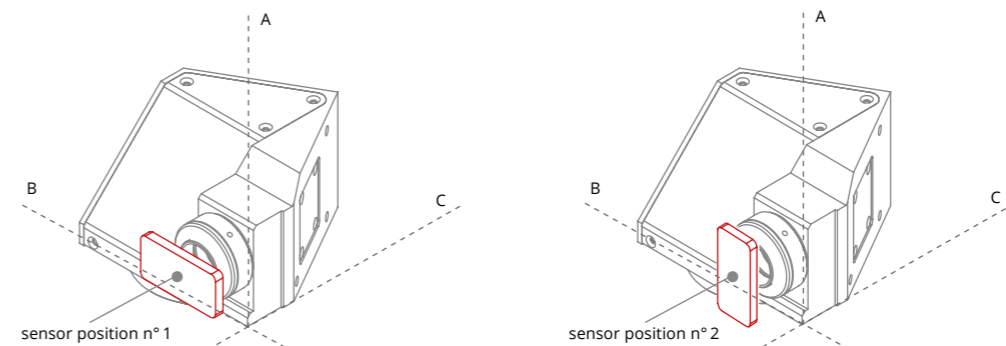
Smartphone glass inspection:  
TC CORE mounted directly  
on a plate and a flat backlight.



Screw measurement on a rotary  
glass table: TC CORE lens  
and LTCLHP CORE illuminator.



## TC CORE lens dimensions (A, B, C) and correct position of the sensor in relation to the lens:



The long side of sensor has to be aligned along axis B (position n°1) or axis A (position n°2).

Part number	Mag.	Image circle	Detector type					Optical specifications					Mechanical specs			
			1/3"	1/2.5"	1/2"	1/1.8"	2/3" - 5 MP	WD	wF/#	Telecentricity	Distortion	Field depth	CTF @70	Mount	Phase adj.	Dimensions
	(x)	(mm)	w x h	w x h	w x h	w x h	w x h	(mm)		(deg)	(%)	(mm)	(%)			A B C
			(mm x mm)	(mm x mm)	(mm x mm)	(mm x mm)	(mm x mm)		1 2	3	4	5		7		
<b>Object field of view (mm x mm) 6</b>																
TCCR 12 048	0.134	8.0	35.9 x 26.9	42.5 x 31.9	47.8 x 35.9	53.3 x 40.1	∅ = 52.8	132.9	8	< 0.07 (0.10)	< 0.06 (0.10)	37	> 40	C	Yes	77 106 115
TCCR 23 048	0.184	11.0	26.1 x 19.6	31.0 x 23.3	34.8 x 26.1	38.8 x 29.2	46.0 x 38.4	132.9	8	< 0.08 (0.10)	< 0.05 (0.10)	20	> 40	C	Yes	77 106 135
TCCR 12 056	0.114	8.0	42.0 x 31.5	49.9 x 37.4	56.0 x 42.0	62.3 x 46.9	∅ = 61.8	157.8	8	< 0.04 (0.08)	< 0.04 (0.10)	51	> 50	C	Yes	94 110 125
TCCR 23 056	0.157	11.0	30.6 x 22.9	36.3 x 27.2	40.7 x 30.6	45.4 x 34.2	53.8 x 45.0	157.8	8	< 0.05 (0.08)	< 0.03 (0.10)	27	> 45	C	Yes	94 110 145
TCCR 12 064	0.100	8.0	48.0 x 36.0	57.0 x 42.7	64.0 x 48.0	71.2 x 53.6	∅ = 70.6	181.8	8	< 0.05 (0.08)	< 0.04 (0.10)	67	> 50	C	Yes	101 122 133
TCCR 23 064	0.138	11.0	34.9 x 26.2	41.5 x 31.1	46.6 x 34.9	51.9 x 39.0	61.4 x 51.4	181.8	8	< 0.05 (0.08)	< 0.03 (0.10)	35	> 50	C	Yes	101 122 153
TCCR 12 080	0.080	8.0	59.8 x 44.8	71.0 x 53.2	79.7 x 59.8	88.7 x 66.8	∅ = 88.0	226.7	8	< 0.03 (0.08)	< 0.04 (0.10)	104	> 50	C	Yes	119 145 159
TCCR 23 080	0.110	11.0	43.5 x 32.6	51.7 x 38.8	58.0 x 43.5	64.6 x 48.7	76.5 x 64.0	226.7	8	< 0.04 (0.08)	< 0.02 (0.10)	55	> 50	C	Yes	119 145 172
TCCR 12 096	0.068	8.0	70.6 x 52.9	83.8 x 62.9	94.1 x 70.6	104.8 x 78.9	∅ = 103.9	278.6	8	< 0.06 (0.08)	< 0.03 (0.10)	145	> 45	C	Yes	139 172 183
TCCR 23 096	0.093	11.0	51.4 x 38.5	61.0 x 45.8	68.5 x 51.4	76.3 x 57.5	90.4 x 75.6	278.6	8	< 0.06 (0.08)	< 0.04 (0.10)	77	> 40	C	Yes	139 172 197

- Working distance: distance between the front end of the mechanics and the object. Set this distance within +/- 3% of the nominal value for maximum resolution and minimum distortion.
- Working F-number (wF/#): the real F-number of a lens when used as a macro. Lenses with smaller apertures can be supplied on request.
- Maximum slope of chief rays inside the lens: when converted to milliradians, it gives the maximum measurement error for any millimeter of object displacement. Typical (average production) values and maximum (guaranteed) values are listed.
- Percent deviation of the real image compared to an ideal, undistorted image: typical (average production) values and maximum (guaranteed) values are listed.
- At the borders of the field depth the image can be still used for measurement but, to get a perfectly sharp image, only half of the nominal field depth should be considered. Pixel size used for calculation is 5.5 µm.
- For the fields with the indication "∅ =", the image of a circular object of such diameter is fully inscribed into the detector.
- Indicates the availability of an integrated camera phase adjustment feature.
- Due to the special shape of TCCR120xx it might be necessary to check the mechanical compatibility with your camera.