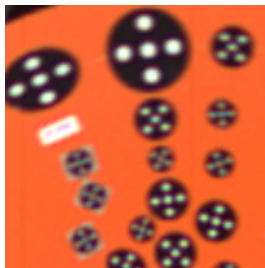


## FalCon MovXact – Marker Types + Algorithms FAQ

- *Which markers shall I use in my test?*

### MXT



<i>Marker type:</i>	5-/6-spot markers (FhG-IOSB)
<i>Definition:</i>	Marker diameter / spot diagonal = 1.6 Single spot size = spot diagonal / 4 Spot angle = 90 deg (MXT-5) or 72 deg (MXT-6) Minimum size ca. 12 pixel
<i>Set-up:</i>	Automatic detection in search area
<i>Tracking:</i>	Marker based MarkerXtrackT algorithm (FhG IOSB) Model with affined transformation: incl. Rotation and zoom. Unambiguous detection of close neighboring markers possible applying different relative orientations
<i>Feature:</i>	„Crash proven“: Extremely robust with regard to variations of illumination and geometrical changes (rotation, shearing). Additionally to the position you gain the measurement value MXT angle. Measurement accuracy < 0.2 pixel

### DOT

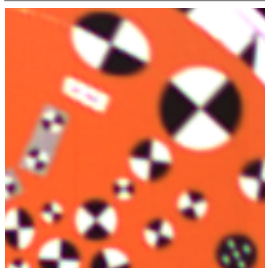


<i>Marker type:</i>	1-spot marker
<i>Definition:</i>	Ratio marker diameter / inner diameter = 1:1 Minimum size ca. 7 pixel
<i>Set-up:</i>	Automatic centering in search area
<i>Tracking:</i>	Marker based DOT algorithm Model = bright circular area with high contrast to dark background
<i>Feature:</i>	Fast automatic measuring of quite small markers Measurement accuracy < 0.2 pixel



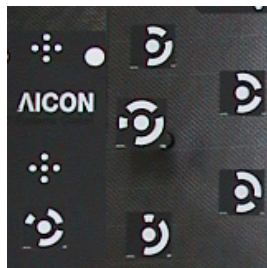
<b>DOT-I</b>	
<i>Marker type:</i>	1-spot marker inverse

### QUAD



<i>Marker type:</i>	Quadrant marker (4 segments)
<i>Definition:</i>	High contrast between the segments (attention using yellow-black markers!) Recommended size > 15 pixel
<i>Set-up:</i>	Automatic centering in search area
<i>Tracking:</i>	Marker based QUAD algorithm Model = circular symmetrical pattern
<i>Feature:</i>	Measurement accuracy > 0.2 pixel. Tip: avoid practical use for image analysis!

## CODE

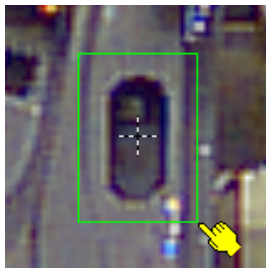


<i>Marker type:</i>	1-spot marker with code ring (AICON license required)
<i>Definition:</i>	Center marker like DOT, additional ring with thickness = DOT inner diameter, Code = number of marker Recommended size > 15 pixel
<i>Set-up:</i>	Automatic centering and code detection with free search in image
<i>Tracking:</i>	CODE algorithm similar to DOT, additionally recognition of the correct code
<i>Feature:</i>	Apply as control points on test fields or in tests with 3D analysis



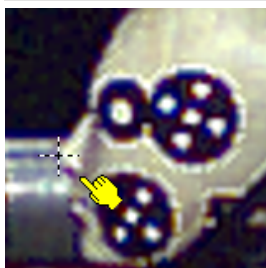
<b>CODE-I</b>	
<i>Marker type:</i>	1-spot marker with code ring inverse

## COR



<i>Marker type:</i>	(structured) image section (= template)
<i>Definition:</i>	Recommended size > 20 pixel
<i>Set-up:</i>	Interactive definition of center and size
<i>Tracking:</i>	COR algorithm (= correlation/matching of image templates) Standard model using non-adaptive templates (static from set-up image) and translatory displacement (no rotation)
<i>Feature:</i>	Flexible measuring of not specially signaled points. Recommended only in case of constant orientation

## PIX



<i>Marker type:</i>	1 single point
<i>Definition:</i>	Only coordinates of a picture element
<i>Set-up:</i>	Interactive input of the position by cursor (with sub-pixel accuracy)
<i>Tracking:</i>	Automatic motion prediction and interactive input of the positions
<i>Feature:</i>	Manual measuring of scales/rulers or not signaled points. Measurement accuracy > 1/zoom magnification pixel

### Note:

- All algorithms work with a black-and-white extract of the color image, i. e. they do not use color characteristics to identify markers. For most of the video cameras we recommend to work with the green extract of the image (configurable in MovXact).
- The markers should show a high contrast and should be absolutely mat.
- The physical size of the markers depends on the imaging geometry and the camera resolution. All markers are free in scale!
- MXT and DOT markers (in standard sizes) can be ordered for example from the printing office "Druckerei Franz Maier": [www.isen-druck.de](http://www.isen-druck.de)