

Note: This document shows an implementation proposal for the described application. This is without guarantee, alternative implementations are possible.

Application Guide - Automated Screw Insertion

1 Description of the application

In this application, screws are to be inserted with the aid of an automatic screw driving machine. The VISOR® is used to obtain the correct 3D position of the screw hole. An image of any contour on the object is taken and a frame shift is performed.

Setup:

Vision sensor: VISOR® V20 Robotic Professional

Objective: Integrated

Focal length: Medium

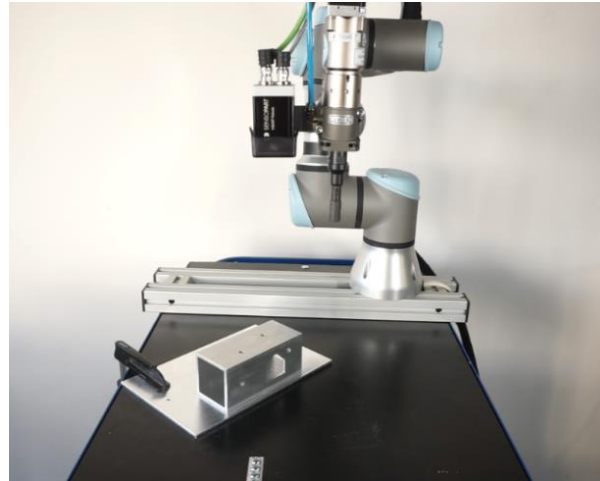
Field of view: 100x100 mm

Working distance: 315 mm

Accuracy: < ±0.1 mm

Additional component: Polarizing filter

[Link to video](#)



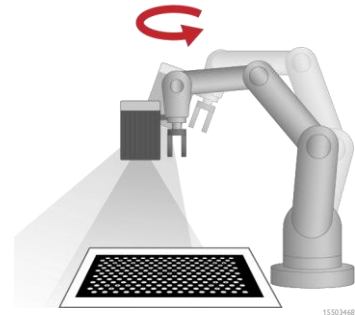
2 Setup

2.1 Calibration

Hand-Eye (robotics)" was selected as calibration method because the calibration plate was not placed on the object but in an arbitrary location. Hand-Eye calibration allows to calibrate here and work there. Additionally the 3D position of the object can be obtained more precisely with readjusting the image acquisition position according to the objects position (see sketch to the right).

This has the great advantage that screws can be tightened even in places that are difficult to access.

For more information on this calibration, refer to the User Manual and the Hand-Eye Calibration Functional Guide.



2.2 VISOR® settings

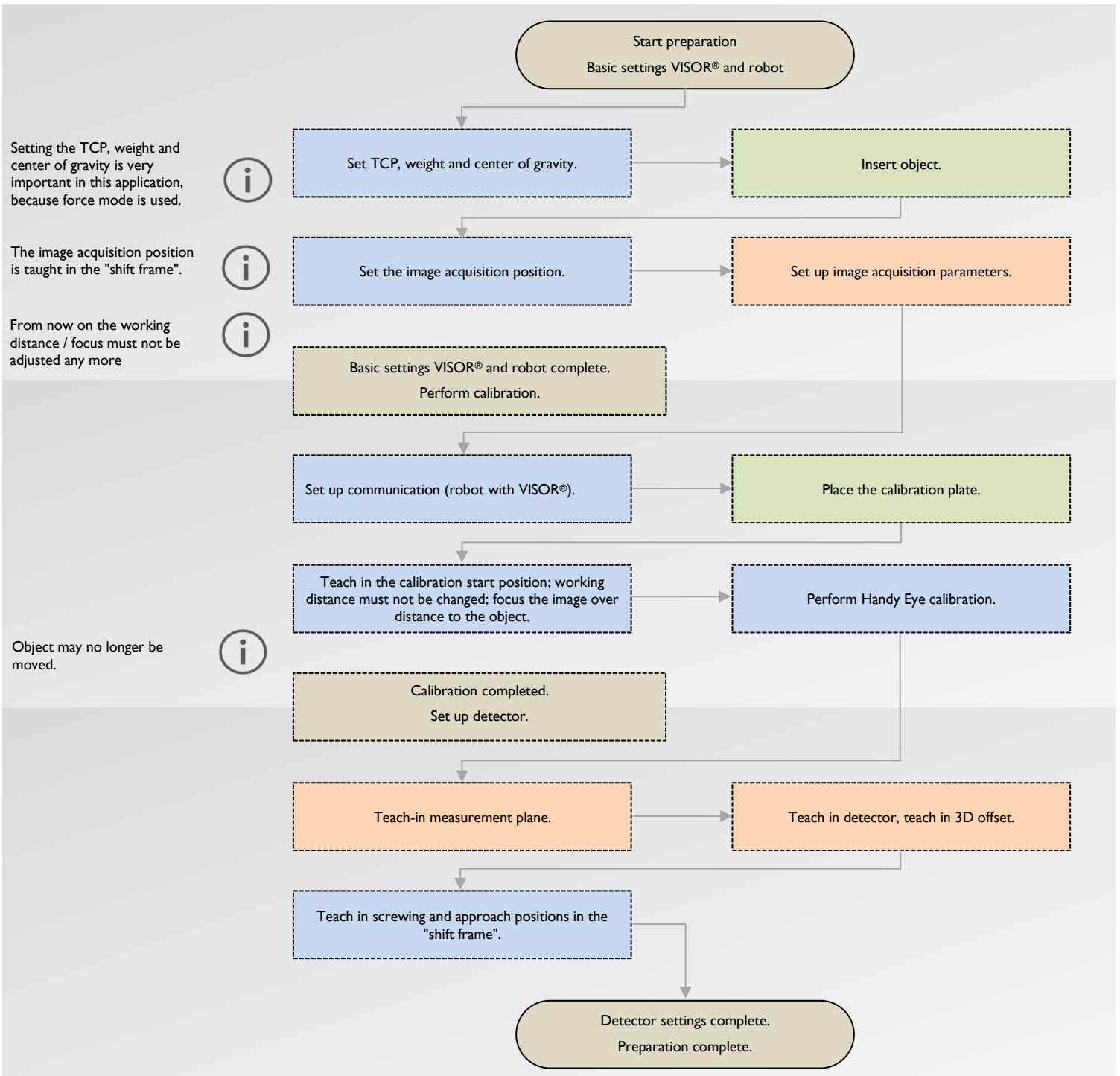
The following table shows the telegram settings in SensoConfig.

		Example job "Automated_screw_insertion.job"
Detector		Contour 3D
3D Offset		To origin of the robot coordinate system
Interface		Ethernet TCP/IP
Data output	Separator	","
	Start	(005,
	Trailer)

Payload						
	Active	Detector	Value	Min. length	No. of results	Factor
1	<input checked="" type="checkbox"/>	Detector1	Overall result	0		1
2	<input checked="" type="checkbox"/>	Detector1	Pose 3D (X, Y, Z, Angle X...	1	1	1000

2.3 Robot programming

2.3.1 Preparation



2.3.2 Implementation

