Call for platforms
Standardizing robot manipulation learning
http://www.msrm.tum.de/en/rsi/icra19_workshop

2019 IEEE International Conference on Robotics and Automation

Fact Sheet

SCHUNK platform for Robot manipulation learning

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Fact sheet (1 of 3)

Price of every component from quantity 1

Platform package	30.000,- € incl. VAT	excisting of 6 DoF, gripper with integrated camera, Raspberry Pi control and ROS drivers
7 DoF package	38.000,- € incl. VAT	similar to platform package but with 1 additional axis
Force torque sensor	8.000,- € incl. VAT	direct attachable between robot and gripper
PG+ gripper	2.950,- € incl. VAT	Position and force (motor current) controlled gripper
SVH (5-finger hand)	45.000,- € incl. VAT	Dexterous 5-finger hand also with ROS driver
SDH (3-finger hand)	50.000,- € incl. VAT	Dexterous 3-finger hand also with ROS driver
FWS Manual tool changer	1.500,- € incl. VAT	excisting of 1 head and 2 adapters

Where available

worldwide availability through the local SCHUNK subsidiaries or distributors

Fact sheet (2 of 3)

Hardware configuration

How many parts in total?	The arms comes completely assembled including the gripper and the Raspberry Pi
Power requirements (Average / Maximum)	250 /400 W, 24 V DC
Cable connections for any external devices	1 x Power Supply 24 VDC, 2 x CAN (1 x for arm control, 1 x free) , 1 x serial interface - availability of 1 x CAN and 1 x serial interface is depending on configuration

Sensors

In robot arm	Encoder (position) sensor and motor current sensor in each axis
In robot gripper	2 position sensors for package gripper Encoder (position) sensor and motor current sensor in PG+ gripper (optional) Encoder (position) sensor and motor current sensor in SVH hand (optional) Encoder (position) sensor and motor current sensor in SDH hand (optional)
In camera	CMOS color
Additional sensors	6-Axis force torque measurement with Force torque sensor (optional)

Fact sheet (3 of 3)

Low-level interface (means explicit command of values at every interface cycle)

API language (s) (e.g. C++, Python; Java)	CANopen and ROSdriver (APIs available in the ROS community)
Interface frequency (read and write)	500 Hz (at 1.000 kBaud) - answering frequency at bus telegram level
Command level	Joint position and velocity
Robot state: What data is available via the interface?	Joint position, velocity and current - current_actual_value 0x6078/0, peak
Model: Is the robot model (i.e. M, C, G, J) available at interface frequency?	No - basic drive data are separately available for modelling
Gripper commands: What commands can the gripper receive (e.g. position, velocities, forces)	2 x Digital Input for package gripper Position, velocity and current command for PG+ gripper, SVH or SDH (all optional)
Gripper state: What data is available via the interface?	2x Digital Output for package gripper Position, velocity and current information and general state for PG+ gripper, SVH or SDH (all optional)
Gripper access: Can the gripper be accesses at interface frequency (read and write)?	REALTIME as its I/O controlled for package gripper Yes for the PG+ gripper, SVH or SDH (all optional)
Hardware: How can the interface be connected to external computers?	via CAN-Bus adapter (optional available)
Protocol: What protocol does the interface use?	CANopen (DS(CiA)301 and 402 profile, industrial standard)
Minimum requirements of external PC to run the interface?	Single Board Computer (for example BananaPi)

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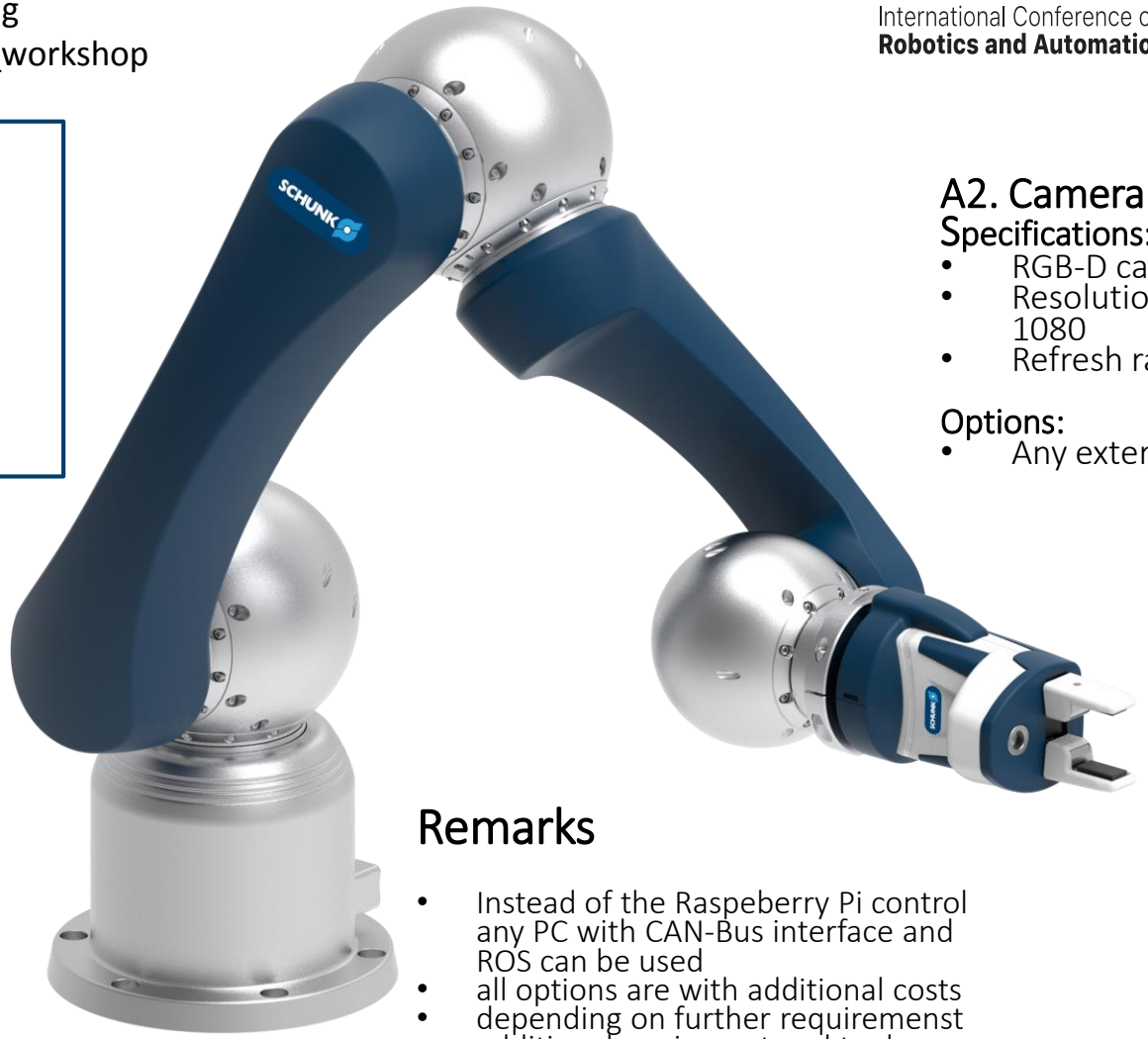
Platform requirements

Prize: 30.000,- € incl. VAT
excisting of 6 DoF, gripper with integrated camera, Raspberry Pi control and ROS

Availability: worldwide



A1. Robot manipulator

Specifications:
- 6 DoF
- Joint velocity and torque (motor current) interface
- Payload 3kg
- ROS
- Position, velocity and torque (motor current) measurements
- Control rate 50 Hz

Options:
- 7 DoF
- 125 Hz over Keba control
- External torque and wrench measurement over Force Torque sensor

A2. Camera

Specifications:
- RGB-D camera
- Resolution 1920 x 1080
- Refresh rate 50 Hz

Options:
- Any external camera

A2. End effector

Specifications:
- 2-finger parallel gripper
- Open/close functionality over I/O
- Integrated camera (see A.3)

Options:
- Position and force (motor current) controlled gripper
- Dexterous hands
- Manual changing system

Remarks

- Instead of the Raspeberry Pi control any PC with CAN-Bus interface and ROS can be used
- all options are with additional costs
- depending on further requiremenst additional equipment and tools are available