KOLABORATIVNÍ ROBOTY

PRECISE AUTOMATION

ControlTech

Vysoká flexibilita

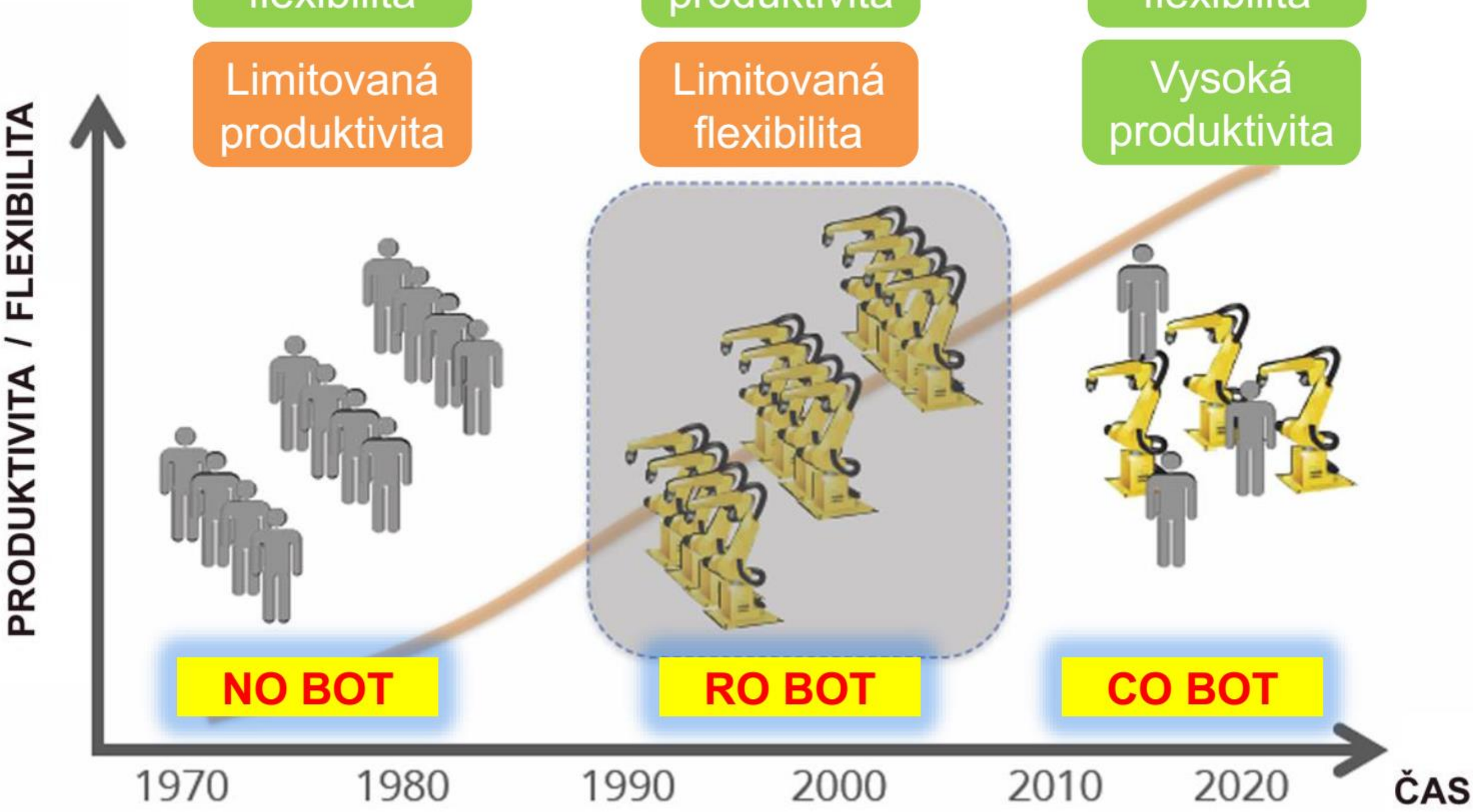
Limitovaná produktivita

Vysoká produktivita

Limitovaná flexibilita

Vysoká flexibilita

Vysoká produktivita



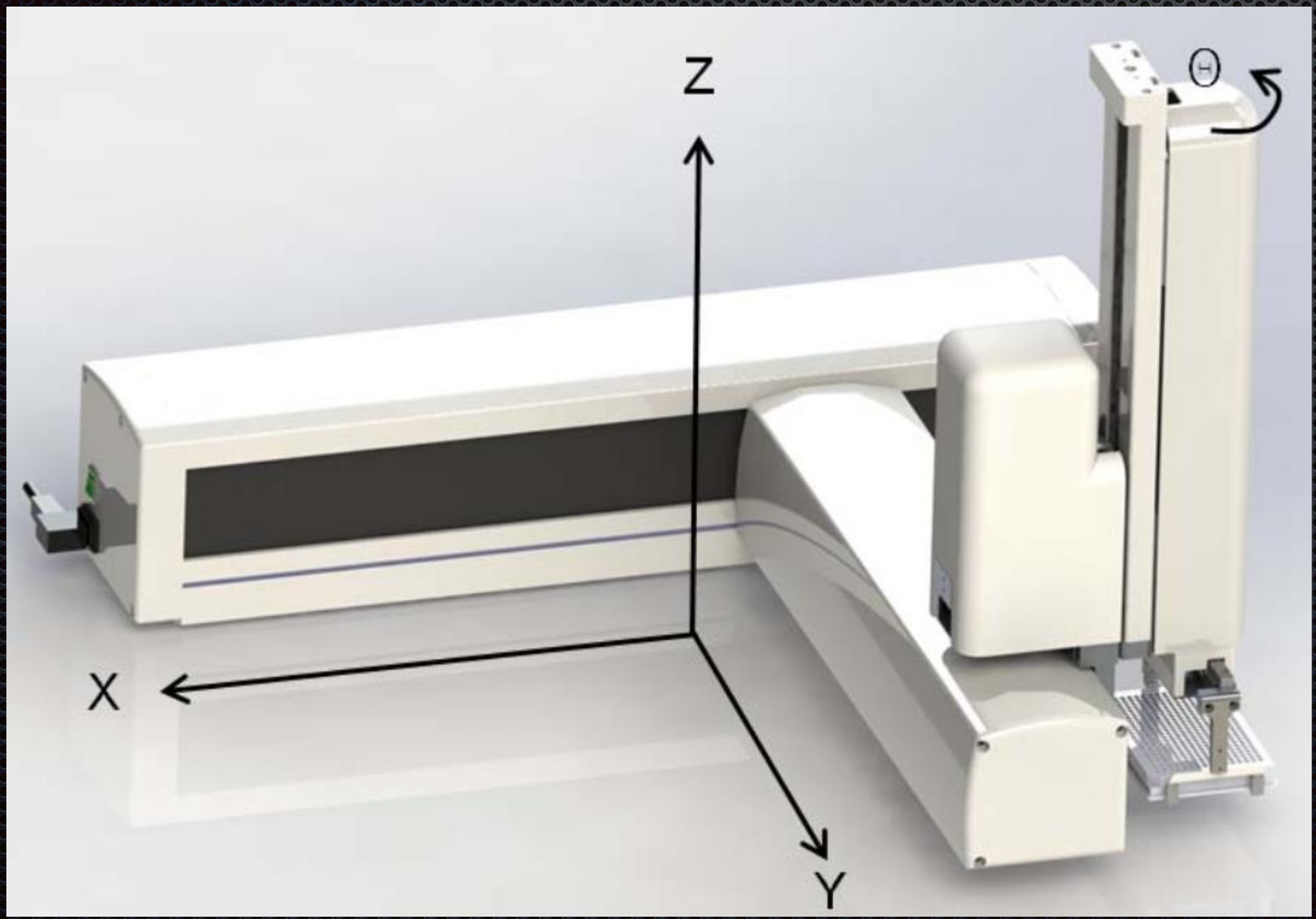
inteligentní senzorický systém

KOLABORATIVNÍ ROBOTY

KARTÉZSKÝ

KOLABORATIVNÍ ROBOTY

KARTÉZSKÝ



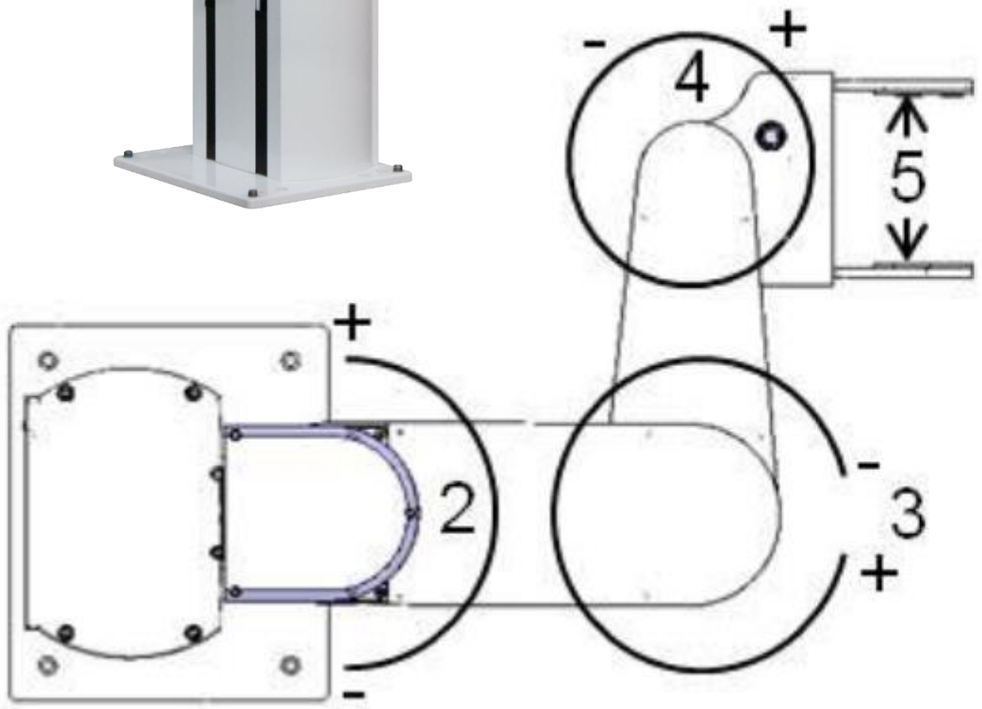
KOLABORATIVNÍ ROBOTY

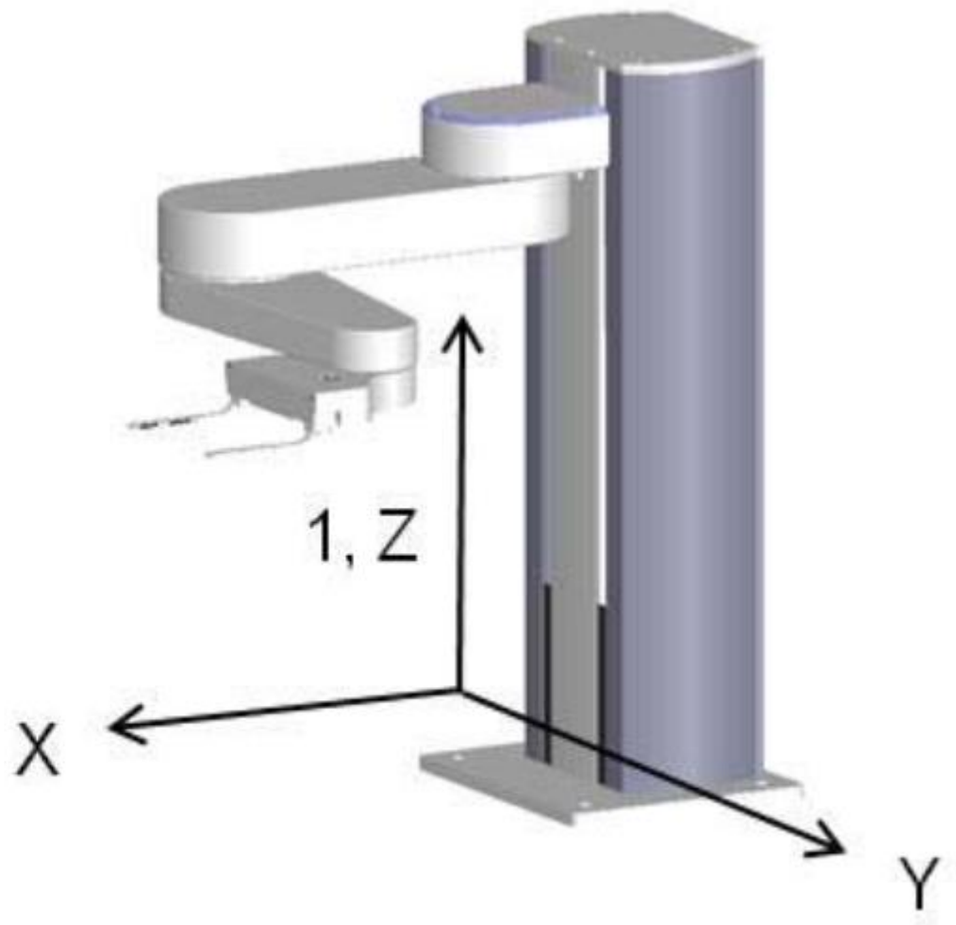
SCARA

Selective Compliant Articulated Robot Arm

KOLABORATIVNÍ ROBOTY

SCARA





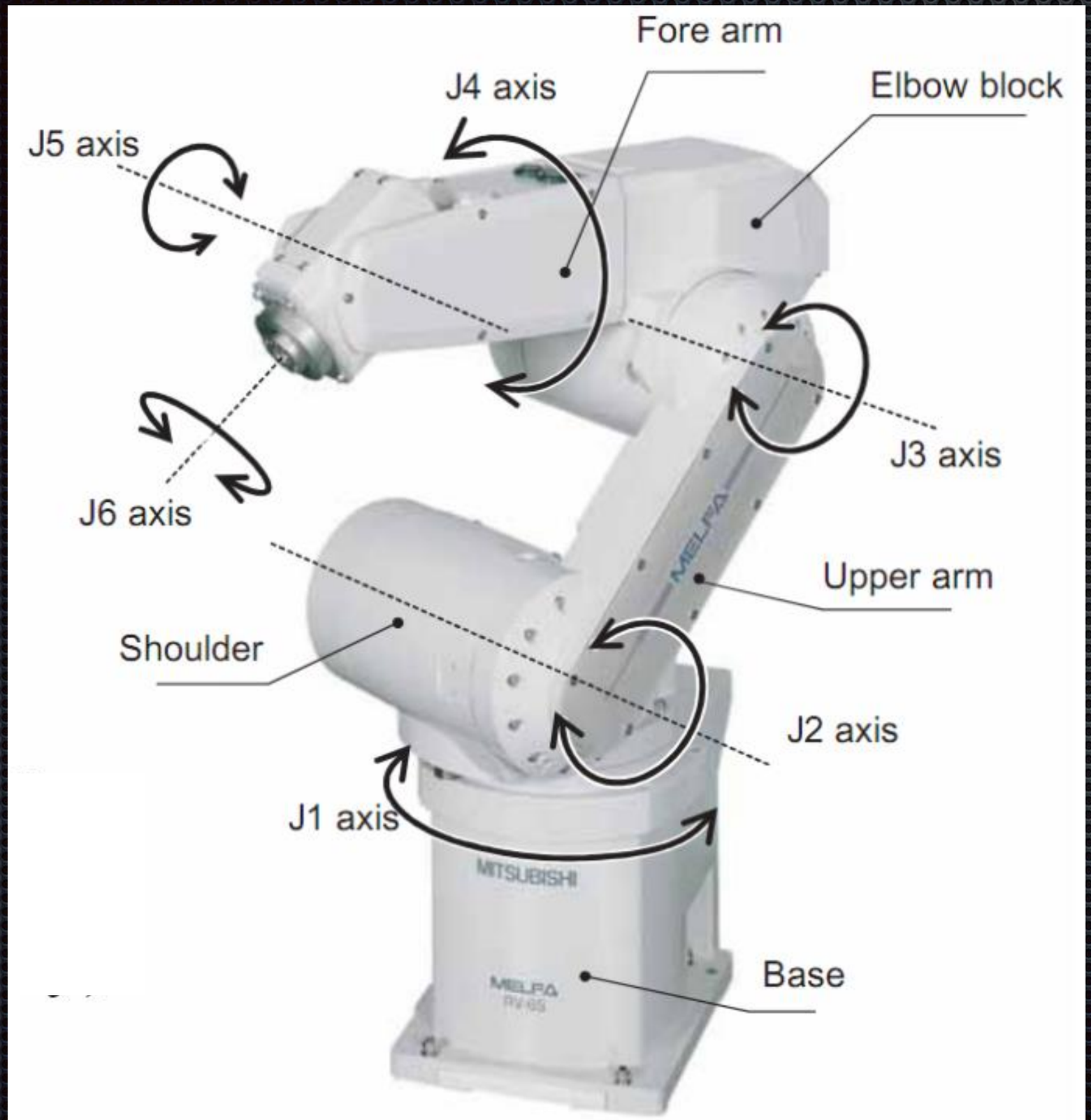
World Coordinates

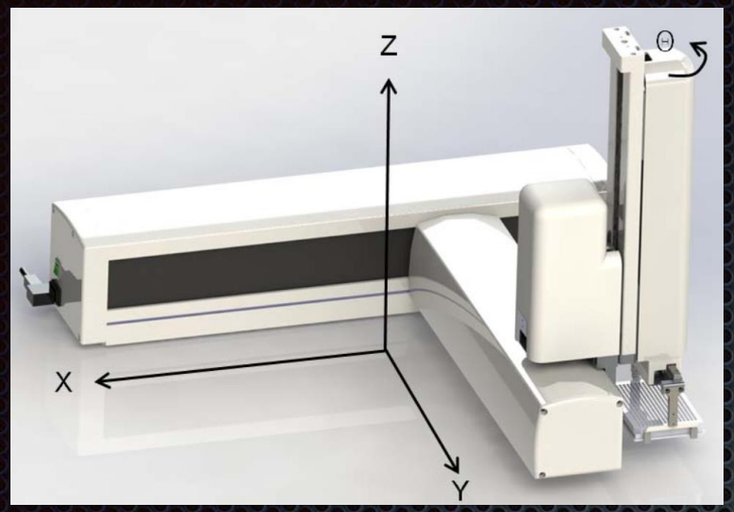
KOLABORATIVNÍ ROBOTY

6-ti OSÝ

KOLABORATIVNÍ ROBOTY

6-ti OSÝ





KOLABORATIVNÍ ROBOTY

KARTÉZSKÝ

Dvě základní konfigurace

XZ

XYZ

KOLABORATIVNÍ ROBOTY

KARTÉZSKÝ

- **2 kg** užitečné zatížení
- 3 kg bez gripperu
- **1.5 m/s** max rychlost
- **229** mm Z trasa
- **350** mm Y trasa
- **500 nebo 1085 mm** X trasa
- ±**100** um repeatability

KOLABORATIVNÍ ROBOTY

KARTÉZSKÝ

Precise Servo Gripper

0-23 N síla stisku

57 mm trasa

Spring-loaded

pružina zabraňující vypadávání dílů

PrecisePlace XYZ

bez gripperu

500mm X
300mm Y
225mm Z

1000mm X
300mm Y
225mm Z

Theta Axis Removed with End-of-Arm Facilities for Customer Tooling (ex. Pneumatic, Vacuum, Dispense)

KOLABORATIVNÍ ROBOTY

KARTÉZSKÝ

Digitální I/O

- Na koncovém uzávěru
- 4 vstupy, 4 výstupy
- Další 12 vstupů a 8 výstupů s GIO na zadním krytu

Interní vzduchový rozvod od koncového uzávěru k pneumatickému gripperu.

SCARA ROBOT
PreciseFlex 3400

Kompaktní stolní robot

První kolaborativní SCARA robot na trhu

Schopný pracovat v úzkém a omezeném prostoru

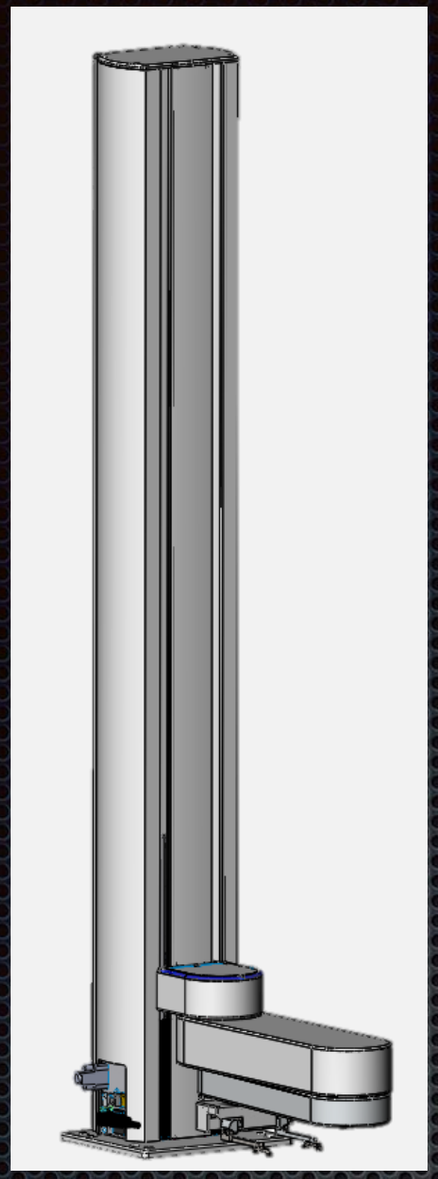
SCARA ROBOT PreciseFlex 3400

- 3 kg užitečné zatížení
- 1 m/s max. rychlost
- Dosah 731 mm
- „Easy to teach“ jednoduché učení
- Snadno přemístitelný

SCARA ROBOT
PreciseFlex 3400

Linear Rail – 1 m, 1,5 m a 2 m délky

SCARA ROBOT
PreciseFlex 3400



1160mm Z

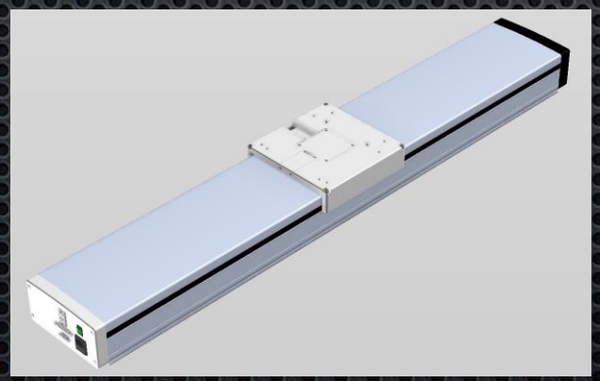
750mm Z

400mm Z

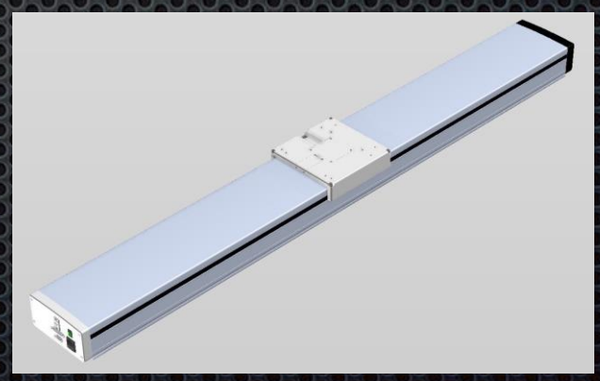
Servo
Pneumatic
Vac
Gripper Options

Dosah 731mm

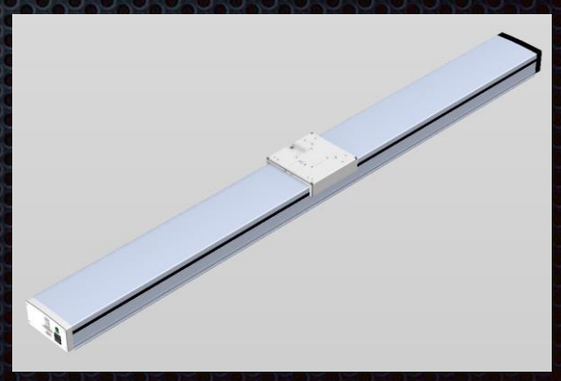
Linear
Rail



1m



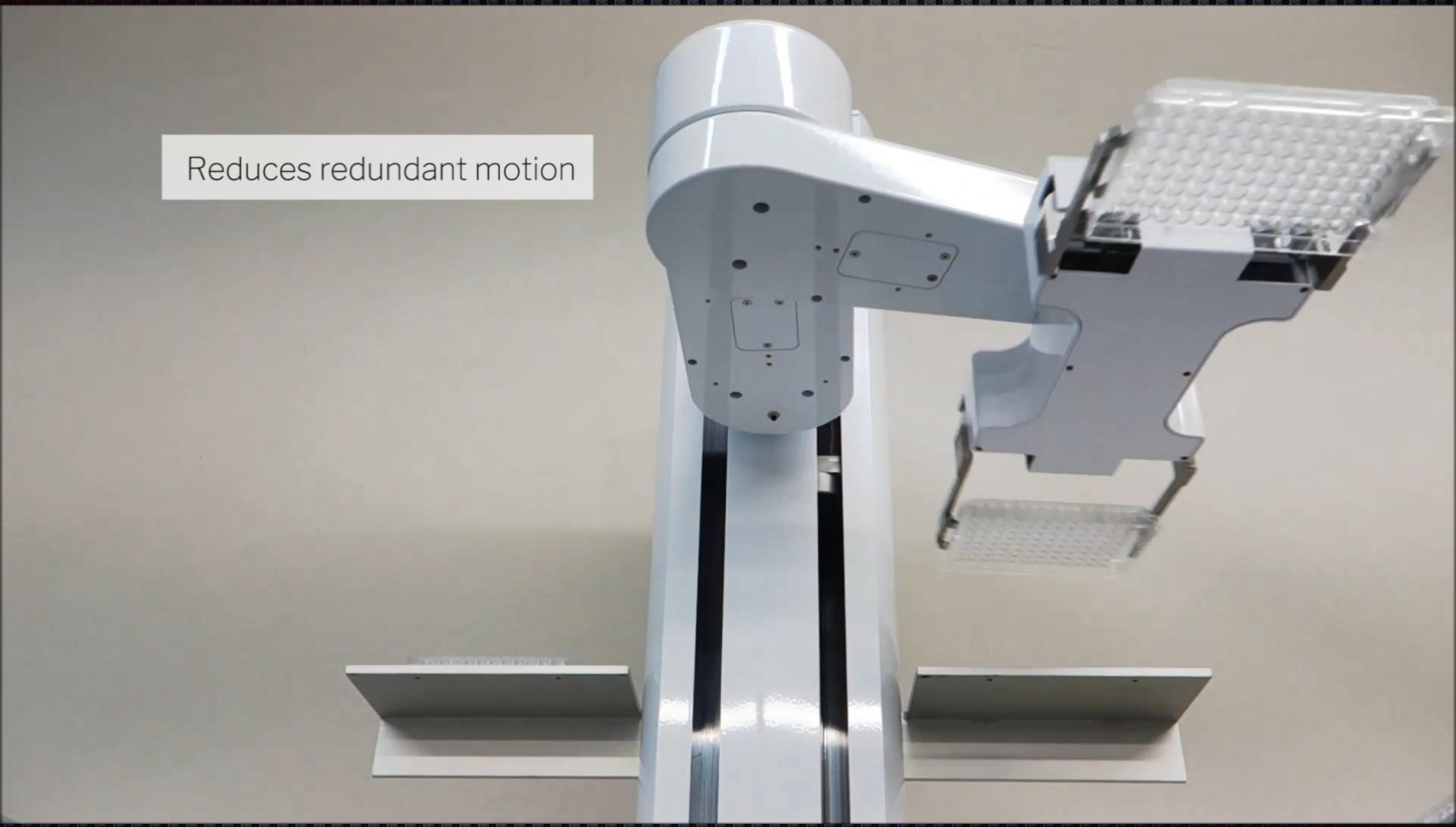
1.5m



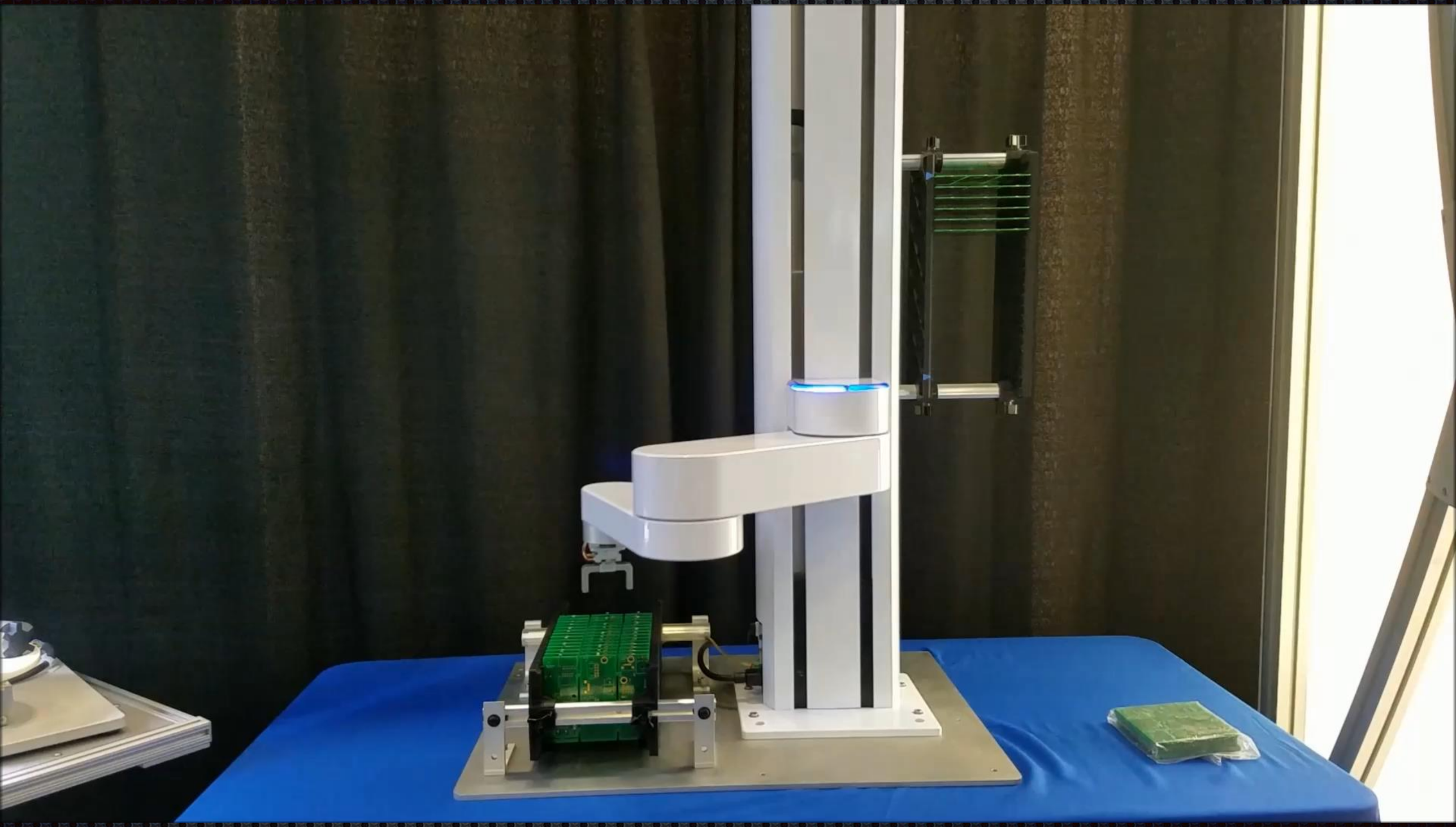
2m

SCARA Specialties: Compact, efficient motions

Reduces redundant motion




Easily services existing ICT
fixtures with no modifications
PRECISE
AUTOMATION



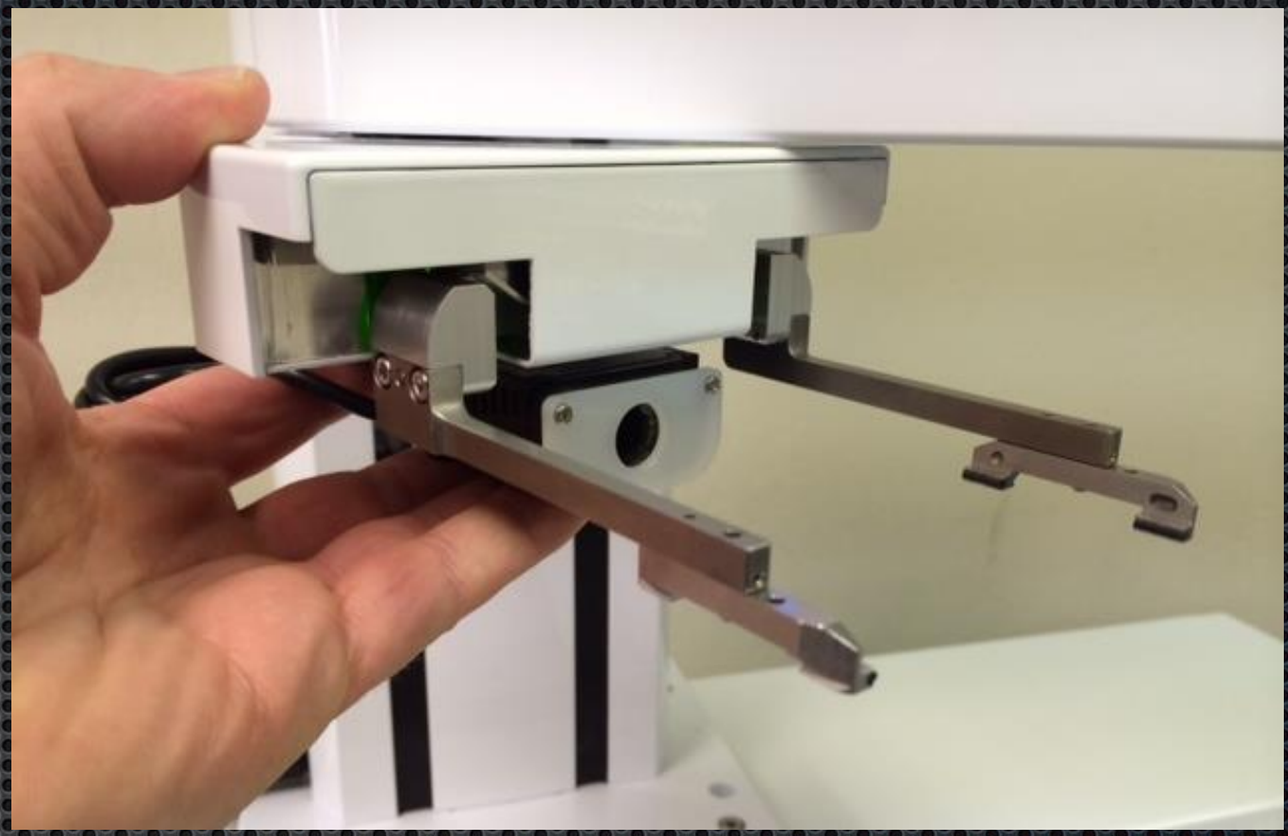
Large Work Envelope and Small Footprint

Precise Automation

PRECISE AUTOMATION

SCARA ROBOT PreciseFlex 3400

Kompatibilní se čtečkou čárových kódů



Keyence
BL-600 and BL-1300

Microscan MS-3 and MS-4

Cognex DataMan
50L and 60L

ŠESTI-OSÝ ROBOT PAVP6 a PAVS

ŠESTI-OSÝ ROBOT PAVP6

Denso VP-6242 robot s vestavěnou řídící jednotkou PreciseAutomation

- 2 kg užitečné zatížení
- 470 mm radius dosahu
- 800 mm/s max. rychlost

ŠESTI-OSÝ ROBOT
PAVS serie

Denso VS-G robot (6556 a 6577)
s externím řídícím boxem
PreciseAutomation

- **4-5 kg užitečné zatížení**
- **650 mm radius PAVS 650**
- **650 mm radius PAVS 850**
- **750 mm/s max. rychlost**

PAVP6 6-Axis Robot

Customizable GUI and Integrated Web Server

PRECISE AUTOMATION

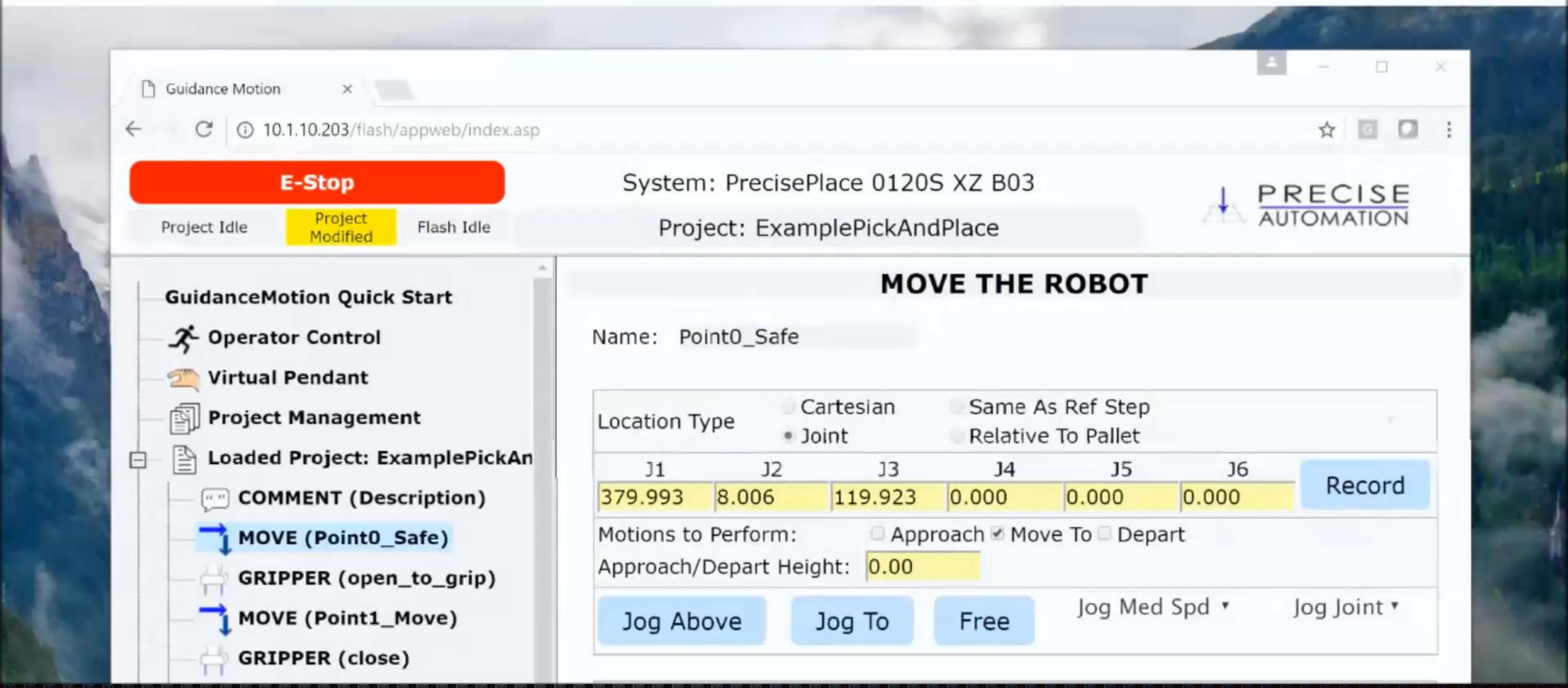
KOLABORATIVNÍ ROBOTY

- Programování
  - Guidance Motion
  - Guidance Programming Language
  - TCP/IP Command Server

- Maximální bezpečnost pro osoby pracující v blízkosti robota

- Malá hmotnost (cca 20kg) umožňuje snadné přemístění

PROGRAMOVÁNÍ ROBOTA



PROGRAMOVÁNÍ ROBOTA

Guidance Development Environment * Offline *

File Edit View Debug Search Outlining Tools Window Help

Project

Project Manager

PC (0) : C:\Program Files\Precise Autom
- CIDLO_TEST
- FM_Input_Triggered
- FM_Recover_PAVP6
- Pallet_demo
- PAVP6_Restart
- Pf400_exercise_rev118_recover
- PnP_Input_Triggered
- PnP_Simple
- PnP_Step_Recovery
- PP120S_recover_demo
- Reference_Frame_Ex
- Simple_Jar_Demo
- SPEL_01
- SPEL_LIS_001
- SPEL01
- SPEL02
- SPEL02_a
- SPEL02_b
  - GModule.gpo
  - Main.gpl
- SPEL02_priprava_v_kancelari
- Tcp_cmd_server_pa
- TEST_CT_1
- TEST_CT_1_cpy
- TEST_PV_20180326
- TEST_PV20180328
- TEST_PV20180328_estop
- TEST_PV20180328_estop_AR
- TEST_PV20180328_estop_cpy1
- TEST_PV20180328_estop_cpy2
- TEST002
- TEST003
- TEST004

GModule.gpo | Main.gpl

Motion Objects — view source

- Motion Location
  - KUZEL_PRIBLIZENI
  - KUZEL_PRIBLIZENI_B
  - KUZEL_UCHOPENI
  - KUZEL_UMISTENI
  - Location_A
  - Location_B
  - Safe_Location
  - VALEC_PRIBLIZENI_A
  - VALEC_PRIBLIZENI_B
  - VALEC_UCHOPENI
  - VALEC_UMISTENI
- Motion Profile
  - Gripper_Motion
  - Quick_Motion
  - Slow_Motion
- Motion Frame
- GPL Variable

Add | Delete | Record | 1

Jog To ... | Set Memory

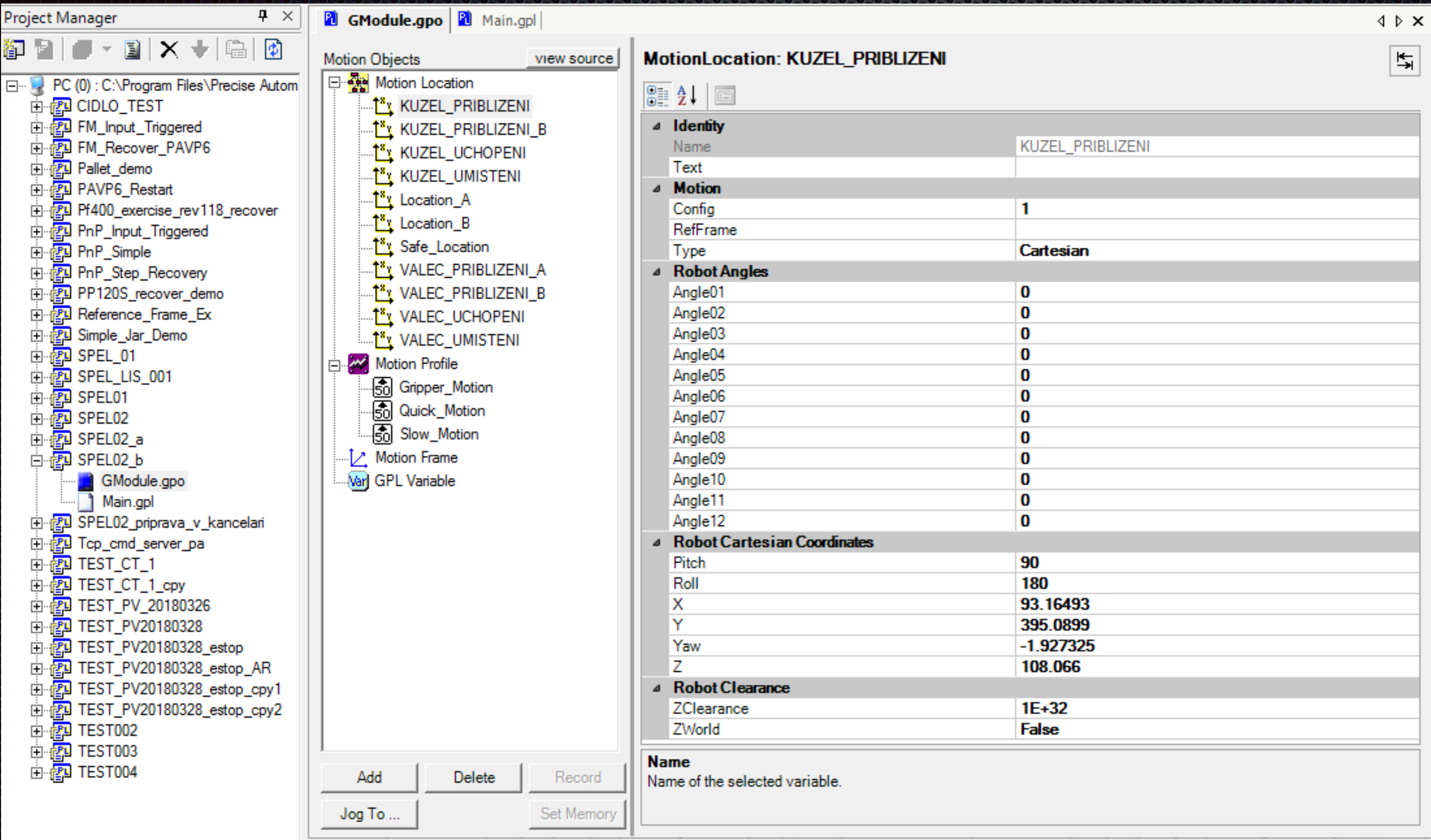
MotionLocation: KUZEL_PRIBLIZENI

Identity	
Name	KUZEL_PRIBLIZENI
Text	
Motion	
Config	**1**
RefFrame	
Type	**Cartesian**
Robot Angles	
Angle01	**0**
Angle02	**0**
Angle03	**0**
Angle04	**0**
Angle05	**0**
Angle06	**0**
Angle07	**0**
Angle08	**0**
Angle09	**0**
Angle10	**0**
Angle11	**0**
Angle12	**0**
Robot Cartesian Coordinates	
Pitch	**90**
Roll	**180**
X	**93.16493**
Y	**395.0899**
Yaw	**-1.927325**
Z	**108.066**
Robot Clearance	
ZClearance	**1E+32**
ZWorld	**False**

Name
Name of the selected variable.

GPL Output

PROGRAMOVÁNÍ ROBOTA



PROGRAMOVÁNÍ ROBOTA

GModule.gpo | Main.gpl

GPL | PC | MAIN

```
1   'Created: 3/26/2018 6:46:24 PM
2   Module GPL
3
4       Dim SIGNAL_A As Integer = 20001
5       Dim SIGNAL_B As Integer = 20002
6       Dim SIGNAL_C As Integer = 20003
7
8       Public Sub MAIN
9           Dim opakovani As Integer
10          Dim signal_state As Boolean
11          Dim err As New Exception
12          Dim Caught As Boolean = True
13          Dim state As String = "01"
14          Dim ukon As Integer
15
16  '       zacatek:
17
18          Controller.PowerEnabled = 1
19          Robot.Attached = 1
20          Robot.Home()
21
22          Move.Loc(Safe_Location, Slow_Motion)
23
24          opakovani = 1
25          Signal.DIO(800015) = False
26
27          While (Not Signal.DIO(810002))
28              Controller.SleepTick(1)
29          End While
30          Signal.DIO(800015) = True
31
32          Do
33              Try
```

GPL Object Browser

- Controller
- Exception
- File
- Function
- IPEndPoint
- Latch
- Location
- Math
- Modbus
- Move
  - Approach(location_l,profile_l)
  - Arc(location_1, location_2, profile_1)
  - Circle(location_1, location_2, profile_
  - Delay(seconds)
  - Extra(axis_position)
  - ForceOverlap(mode,criterion)
  - Loc(location_l,profile_l)
  - OneAxis(axis, position, rel, profile)
  - Rel(location, profile)
  - SetJogCommand(jog_mode,jog_axis,
  - SetRealTimeMod(changes_array)
  - SetSpeeds (speed_array, profile_1)
  - SetTorques(torques_array)
  - StartJogMode()
  - StartRealTimeMod(coordinates, char
  - StartSpeedDAC(scale_factor, dac_o
  - StartTorqueCntrl(motor_mask, adc_m
  - StartVelocityCntrl (mode, adc_mask,
  - StopSpecialModes
  - Trigger (mode, trigger_pt, channel)
  - WaitForEOM

Robot Control

Approach(location_l,profile_l)

Member Of: Move — Click for help.

Description: Moves to the clearance position for a specified Location.

KOLABORATIVNÍ ROBOTY A SAFETY

PRECISE AUTOMATION

REFERENCE

YouTube

ControlTech

EUROIMMUN AG
Publikováno 29. 7. 2016

https://youtu.be/SmOySrNQAXk

TTP Labtech
Publikováno 19. 9. 2016

https://youtu.be/fsG3-Y-xTwE

Biosero
Publikováno 15. 3. 2018

https://youtu.be/ACaPU2dUUbA

analytikjena CyBiosWorld
Publikováno 1. 3. 2016

https://youtu.be/luTriGj0lrI

HighRes Biosolutions vimeo

https://vimeo.com/highresbio/colabflex

sky news

https://news.sky.com/story/uk-lab-makes-dna-for-synthetic-biology-10231939

CNN tech

http://money.cnn.com/video/technology/2015/04/17/bayer-technology-automation.cnnmoney/index.html

ControlTech

DOBOT

DOBOT
Share Creating Pleasure

DOBOT-M1

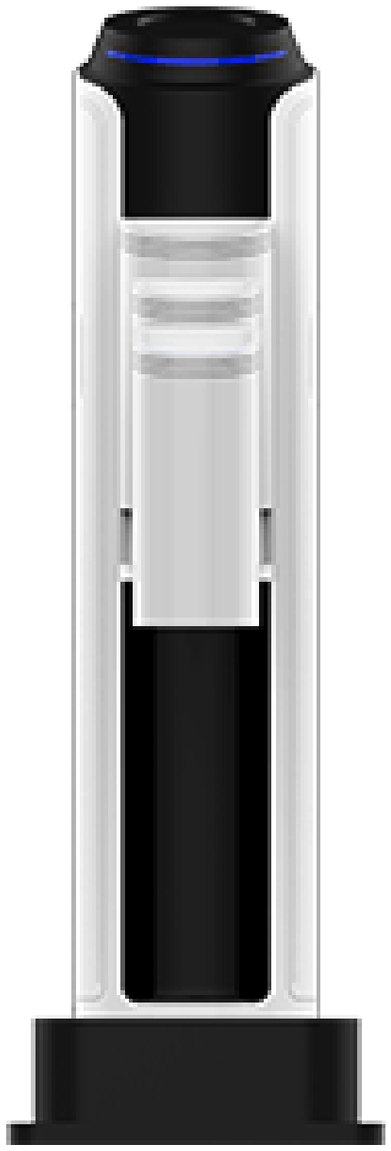
ControlTech

Opakovatelnost	Rychlost	Nosnost	Dosah
0.02mm	200°/s	1.5kg	400mm

DOBOT
Share Creating Pleasure

DOBOT-M1

ControlTech

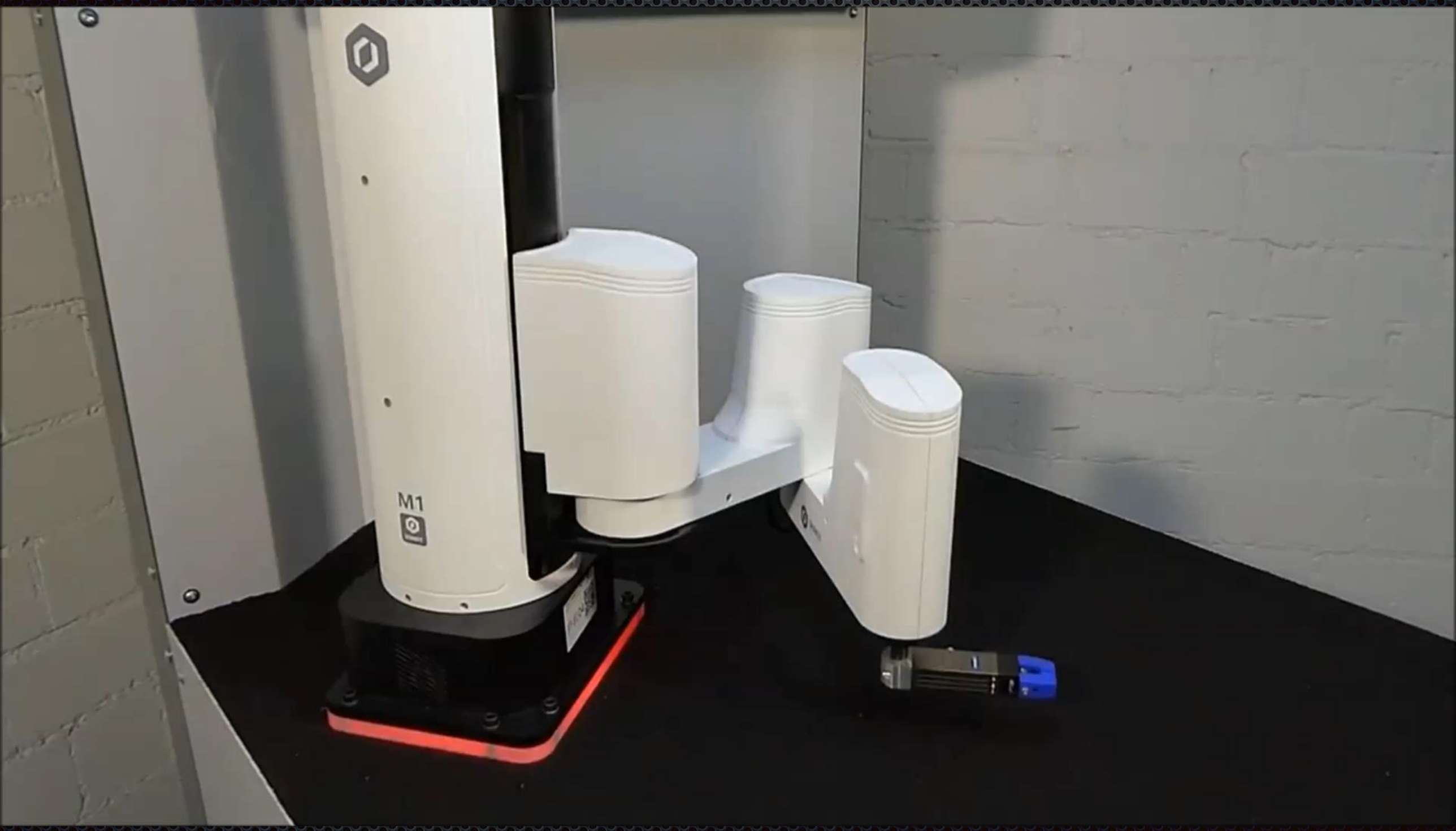


Řízené osy		4	Nosnost		1.5kg
Max. dosah		400mm	Opakovatelnost		0.02mm
Rozsah pohybu	J1	±90°	Maximální rychlost	J1	200°/s
	J2	±135°		J2	200°/s
	Z	250mm		J1+J2	2000mm/s
	R	±360°		Z	1000mm/s
Čas cyklu		0.45s	Zdroj		100-240VAC. 50-60Hz
I/O		24V vstup ×8, 24V výstup ×8	Operační systém		Linux
Komunikační rozhraní		Ethernet,RS-232C, USB HID	Software		DobotStudio
Procesorová platforma		ARM Cortex-A9 +ARM Cortex-M4+ FPGA			

DOBOT
Share Creating Pleasure

DOBOT-M1

ControlTech



DOBOT-M1

DOBOT
Share Creating Pleasure

ControlTech

M1Studio-V1.0.4 >> C:/Program Files/M1Studio/config/pbstore/Playback_Test_PV_01.playback

Settings Tools Help

Connect

DOBOT

Emergency Stop

Playback Script

New Open Save Save As Start Stop Infinite Loop Loop 5 DynRatio 100 % 1% 200%

Option

Index	Name	Type	Content
0		OUTPUT	OUT18=0V
1		MOVJ	To(154.0141, 298.2269, 96.0000, 22.6511), Vel/Jerk(20%, 50%), ArmOrientation(Right)
2		MOVJ	To(154.0141, 298.2269, 69.0000, 22.6511), Vel/Jerk(20%, 50%), ArmOrientation(Right)
3		OUTPUT	OUT17=0V
4		MOVJ	To(154.0141, 298.2269, 96.0000, 22.6511), Vel/Jerk(20%, 50%), ArmOrientation(Right)
5		MOVJ	To(78.1350, -386.5726, 96.0000, -161.1687), Vel/Jerk(50%, 50%), ArmOrientation(Left)
6		MOVJ	To(78.1350, -386.5726, 69.0000, -161.1687), Vel/Jerk(20%, 50%), ArmOrientation(Left)
7		OUTPUT	OUT17=24V
8		MOVJ	To(78.1350, -386.5726, 96.0000, -161.1687), Vel/Jerk(20%, 50%), ArmOrientation(Left)
9		WAIT	Pause 1.00 S
10		MOVJ	To(78.1350, -386.5726, 69.0000, -161.1687), Vel/Jerk(20%, 50%), ArmOrientation(Left)
11		OUTPUT	OUT17=0V
12		MOVJ	To(78.1350, -386.5726, 96.0000, -161.1687), Vel/Jerk(20%, 50%), ArmOrientation(Left)
13		MOVJ	To(154.0141, 298.2269, 96.0000, 22.6511), Vel/Jerk(50%, 50%), ArmOrientation(Right)
14		MOVJ	To(154.0141, 298.2269, 69.0000, 22.6511), Vel/Jerk(20%, 50%), ArmOrientation(Right)
15		OUTPUT	OUT17=24V
16		MOVJ	To(154.0141, 298.2269, 96.0000, 22.6511), Vel/Jerk(20%, 50%), ArmOrientation(Right)
17		WAIT	Pause 1.00 S

Add At Last
Insert Before Selected Row
OverWrite Selected Row

Enable Hand Hold Teach

Add Motion Command

PTP MOVJ

Vel 50 %

Jerk 50 %

Add Wait Command

1.00 s

Add I/O Command

Output Trigger

Apply DynRatio

Operation Panel

X	0,0000	Joint1	0,0000
Y	0,0000	Joint2	0,0000
Z	0,0000	Joint3	0,0000
R	0,0000	Joint4	0,0000

Joint

J1+ J2+ J2- J3+ J4+ J4-

Vel 35 %

Acc 52 %

Motor: Power:

DOBOT-M1

DOBOT
Share Creating Pleasure

ControlTech

Index	Name	Type	Content
0		OUTPUT	OUT18=0V
1		MOVJ	To(154.0141, 298.2269, 96.0000, 22.6511), Vel/Jerk(20%, 50%), ArmOrientation(Right)
2		MOVJ	To(154.0141, 298.2269, 69.0000, 22.6511), Vel/Jerk(20%, 50%), ArmOrientation(Right)
3		OUTPUT	OUT17=0V
4		MOVJ	To(154.0141, 298.2269, 96.0000, 22.6511), Vel/Jerk(20%, 50%), ArmOrientation(Right)
5		MOVJ	To(78.1350, -386.5726, 96.0000, -161.1687), Vel/Jerk(50%, 50%), ArmOrientation(Left)
6		MOVJ	To(78.1350, -386.5726, 69.0000, -161.1687), Vel/Jerk(20%, 50%), ArmOrientation(Left)
7		OUTPUT	OUT17=24V
8		MOVJ	To(78.1350, -386.5726, 96.0000, -161.1687), Vel/Jerk(20%, 50%), ArmOrientation(Left)
9		WAIT	Pause 1.00 S
10		MOVJ	To(78.1350, -386.5726, 69.0000, -161.1687), Vel/Jerk(20%, 50%), ArmOrientation(Left)
11		OUTPUT	OUT17=0V
12		MOVJ	To(78.1350, -386.5726, 96.0000, -161.1687), Vel/Jerk(20%, 50%), ArmOrientation(Left)
13		MOVJ	To(154.0141, 298.2269, 96.0000, 22.6511), Vel/Jerk(50%, 50%), ArmOrientation(Right)
14		MOVJ	To(154.0141, 298.2269, 69.0000, 22.6511), Vel/Jerk(20%, 50%), ArmOrientation(Right)
15		OUTPUT	OUT17=24V
16		MOVJ	To(154.0141, 298.2269, 96.0000, 22.6511), Vel/Jerk(20%, 50%), ArmOrientation(Right)
17		WAIT	Pause 1.00 S

Add At Last
Insert Before Selected Row
OverWrite Selected Row

Enable Hand Hold Teach

Add Motion Command

PTP MOVJ

Vel — 50 % +

Jerk — 50 % +

Add Wait Command

1.00 s

Add I/O Command

Output Trigger

DOBOT-M1

ControlTech

M1Studio-V1.0.4 >> C:/Program Files/M1Studio/config/bystore/Example.blockly

Settings Tools Help

Connect

DOBOT

Playback Script Blockly

New Open Save Save As Start Stop

- Logic
- Loops
- Math
- Text
- Lists
- Colour
- Variables
- Functions
- ▼ DobotAPI
  - Basic
  - Config
  - Motion
  - I/O

```
Set Coordinate Speed VelocityRatio 20 JerkRatio 50
Set Jump Params JumpHeight 20 ZLimit 200
repeat while true
do
    Set Arm Orientation Left
    Jump To X 223 Y 276 Z 60
    Set Arm Orientation Right
    Jump To X 223 Y 276 Z 60
    Set Arm Orientation Right
    Go to X 258 Y 177 Z 120
```

DOBOT-M1

ControlTech

New | Open | Save | Save As | Close | Close All | Add Pallet | Start | Stop

Search:

TEST_PV_PETvicka_barvy1

- Other
- QueueCmd
  - dType.GetQueuedCmdCurrentInde
  - dType.SetQueuedCmdStartExec(ap
  - dType.SetQueuedCmdStopExec(ap
  - dType.SetQueuedCmdForceStopEx
  - dType.SetQueuedCmdClear(api)
- Pose
  - dType.GetPose(api)
- Alarms
  - dType.GetAlarmsState(api, maxLe
  - dType.ClearAllAlarmsState(api)
- ArmOrientation
  - dType.SetArmOrientation(api, arm
  - dType.GetArmOrientation(api)
- JOG
  - dType.SetJOGCommonParams(api
  - dType.GetJOGCommonParams(api
  - dType.SetJOGCmd(api, isJoint, cmd
- PTP
  - dType.SetPTPJumpParams(api, jum
  - dType.GetPTPJumpParams(api)
  - dType.SetPTPCommonParams(api
  - dType.GetPTPCommonParams(api
  - dType.SetPTPCmd(api, ptpMode, x
- ARC
- WAIT
- TRIG
- IO

```
25      while not (dType.GetIODI(api, 19)[0]) == 0: # Cekani na stisk tlacitka
26          pass
27      if (dType.GetIODI(api, 20)[0]) == 1:
28          break
29      dType.SetArmOrientation(api,  1, 1)
30      dType.SetPTPCmd(api, 0, 79.55, 189, 27, 331, 1)
31      close_grip()
32      dType.SetArmOrientation(api,  1, 1)
33      dType.SetPTPCmd(api, 0, 162, 314, 89, 331, 1)
34      print(dType.GetIODI(api, 17)[0])
35      print(dType.GetIODI(api, 18)[0])
36      dType.SetWAITCmdEx(api, 1000, 1)
37      while (dType.GetIODI(api, 18)[0]) == 1 and (dType.GetIODI(api, 17)[0]) == 1:
38          pass
39      print(dType.GetIODI(api, 17)[0])
40      print(dType.GetIODI(api, 18)[0])
41      if (dType.GetIODI(api, 18)[0]) == 1 and (dType.GetIODI(api, 17)[0]) == 0:
42          dType.SetArmOrientation(api,  0, 1)
43          dType.SetPTPCmd(api, 0, x1, y, z, r, 1)
44          open_grip()
45          x1=x1-35
46      elif (dType.GetIODI(api, 18)[0]) == 0 and (dType.GetIODI(api, 17)[0]) == 1:
47          dType.SetArmOrientation(api,  0, 1)
48          dType.SetPTPCmd(api, 0, x2, y2, z, r, 1)
49          open_grip()
50          x2=x2-35
51      elif (dType.GetIODI(api, 18)[0]) == 0 and (dType.GetIODI(api, 17)[0]) == 0:
52          dType.SetArmOrientation(api,  0, 1)
53          dType.SetPTPCmd(api, 0, x3, y3, z, r, 1)
54          open_grip()
55          x3=x3-35
```

api : The object of Dobot Library.
cirPoint : List of transition positon
cirPoint[0] : Value of x-axis
cirPoint[1] : Value of y-axis
cirPoint[2] : Value of z-axis
cirPoint[3] : Value of r-axis
toPoint : List of target postion
toPoint[0] : Value of x-axis

DRV70L

DRV90L

DRS40L Series

DRS50L Series

DRS60L Series

DRS70L Series

Delta SCARA Robot DRS40L

- Dosah ramene: 400 mm
- Maximální nosnost 3 Kg
- Standardní čas cyklu 0.42 (při zatížení 1 Kg)
- Opakovatelnost ±0.01
- Hmotnost 16 Kg

Delta SCARA Robot DRS60L

- Dosah ramene: 600 mm
- Maximální nosnost 6 Kg
- Standardní čas cyklu 0.39 sec (při zatížení 1 Kg)
- Opakovatelnost ±0.015 mm
- Hmotnost 20 Kg

Human Machine Interface
HMI

Handheld Teach Pendant
DTS

PAD

PC

Machine Vision System
DMV

Robot Controller
DCS

+ Extensions: up to 6 axes of control

Servo Drive ASDA-A2
Servo Motor ECMA

SCARA Robot

DRS40L

DRS60L

DELTA

Delta Vertical Articulated Robot DRV70L/DRV90L

- Dosah ramene 700 a 900 mm
- Maximální nosnost 7 Kg
- Standardní čas cyklu 0.31 sec. (při zatížení 1 Kg)
- Opakovatelnost ±0.02 a ±0.03 mm

PRECISE AUTOMATION

DOBOT
Share Creating Pleasure

ControlTech

Pavel Vladyka

Produktový manažer
Třídvorská 1574, Kolín
Mobil: +420 607 170 914
Tel.: +420 321 742 036
pvladyka@controltech.cz
www.controltech.cz