

YASKAWA

SMART PENDANT MANUAL



Karolina Krupnicka
Product Support Engineer

Yaskawa Polska

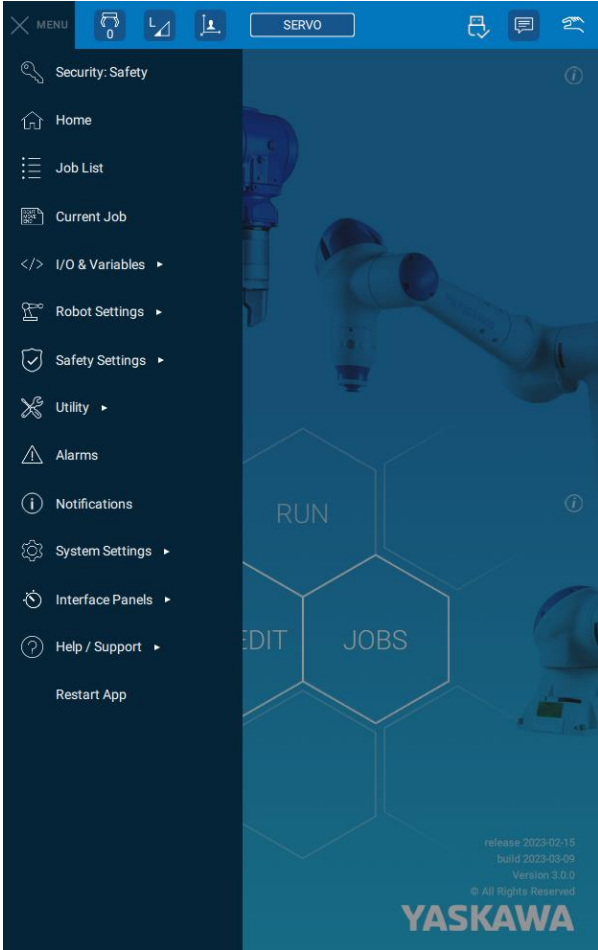
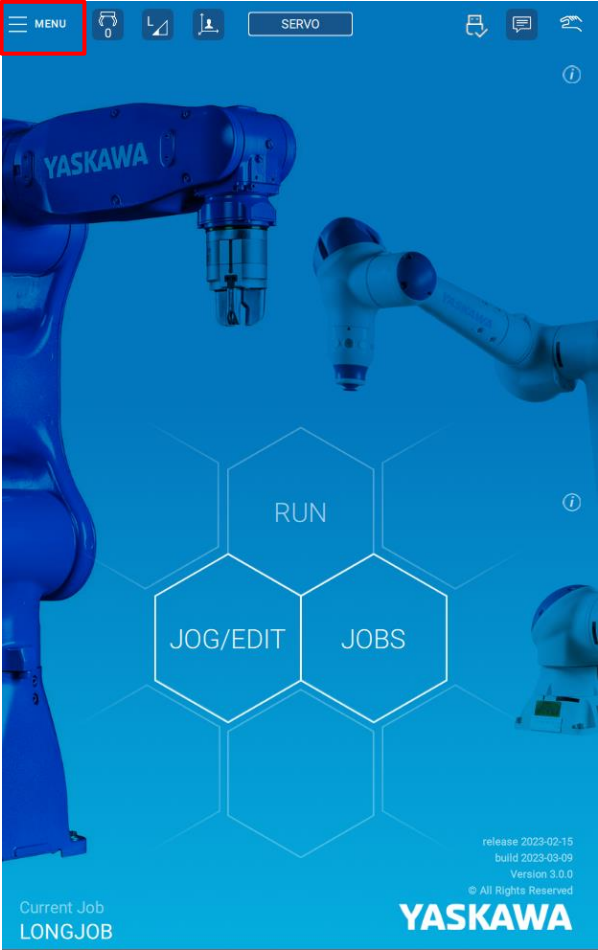
Polski oddział światowego lidera



TEACH PENDANT VS SMART PENDANT





HOME SCREEN



SECURITY

Security Access

 Please select access level: 

OPERATION


EDIT
(current)

MANAGEMENT


SAFETY


SUPPORT

Passcode is not required







Edit permits programming INFORM jobs and editing variables.




 CANCEL

 ACCESS



DEFAULT EDIT MODE
NO PASSWORD REQUIRED

 MENU   

SERVO

Security Access

 Please select access level: 

OPERATION


EDIT
(current)

MANAGEMENT


SAFETY


SUPPORT

Please enter passcode:



Safety allows all Management actions in addition to changing Safety related settings.


 CANCEL


 ACCESS

◀ LEFT

RIGHT ▶

CLEAR



123

456-

789

0.
Enter

YASKAWA

© 2023 YASKAWA CONFIDENTIAL INFORMATION ALL RIGHTS RESERVED

March 26, 2024

5


JOB LIST & CURRENT JOB

← Job List

⊕ NEW JOB

Search by name

🔍

| Job Name | Tag | Edited | Attributes |
|----------|------|---------------------|---|
| SAMPLE | | 2017-07-19 10:01 AM |  |
| IFTHEN | | 2017-07-19 08:56 AM | |
| LONGJOB | LONG | 2017-07-19 08:54 AM | ✓ |

Job Details: SAMPLE




🗑️ DELETE

📄 DUPLICATE




✎ EDIT

▶ RUN

MENU



SERVO



⌕ ↩ ⏪ ⏩ ✂ 📄 📋 🗑️ // abc 📄 ✎ Edit

1 Start Job

2 DigitalOut Output#(5) Off

3 ShiftOn P[B005]

4 JointMove Speed= 100.00 (%) Acceleration= 50 (%) ⚙

5 JointMove Speed= 75.00 (%) Acceleration= 50 (%) ▶


6 LinearMove Speed= 250.0 (mm/sec) PositionLevel= 0


7 DigitalOut Output#(5) On

8 Timer Time= 0.050 (seconds)

9 LinearMove Speed= 250.0 (mm/sec)

10 JointMove Speed= 50.00 (%) Acceleration= B000(%)

 RE-TEACH

 TEACH

JOINT MOVE

USE CURRENT JOB IN MENU
TO CHANGE SCREEN
TO LAST EDITING JOB

I/O & VARIABLES


 I/O & Variables ▾

I/O

Block I/O

Variables

Variable & I/O Watch

 I/O

Inputs

Outputs

Go To: 1

Settings


| Group | Outputs | Status (Bits) | | | | | | | | |
|-------|-----------|---------------|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | |
| 1 | 1-8 | 8 | ○ | ○ | ○ | ○ | ● | ○ | ○ | 1 |
| 2 | 9-16 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| 3 | 17-24 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| 4 | 25-32 | ● | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| 5 | 33-40 | ○ | ● | ○ | ○ | ○ | ○ | ○ | ○ | |
| 6 | 41-48 | ○ | ○ | ● | ○ | ○ | ○ | ○ | ○ | |
| 7 | 49-56 | ○ | ○ | ○ | ● | ○ | ○ | ○ | ○ | |
| 127 | 1009-1016 | ○ | ○ | ○ | ○ | ● | ○ | ○ | ○ | |

GROUP: 1
OUTPUT: 1-8
TYPE: Terminal Block

VALUE (DEC): 9
VALUE (HEX): 0x09

☐ Multi-byte view ☒ Enable toggle

| Outputs | Status | Name | Toggle |
|---------|--------|----------------------|-------------------------------------|
| 1 | ● | io10010 | |
| 2 | ○ | | |
| 3 | ○ | | |
| 4 | ● | <input type="text"/> | <input checked="" type="checkbox"/> |
| 5 | ○ | | |
| 6 | ○ | | |
| 7 | ○ | | |
| 8 | ○ | | |

 I/O

Inputs

Outputs

Go To: 1

Settings

| Group | Inputs | Status (Bits) | | | | | | | | |
|-------|-----------|---------------|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | |
| 1 | 1-8 | 8 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | 1 |
| 2 | 9-16 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| 3 | 17-24 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| 4 | 25-32 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| 5 | 33-40 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| 6 | 41-48 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| 7 | 49-56 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| 127 | 1009-1016 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |

GROUP: 1
INPUT: 1-8
TYPE: Terminal Block

VALUE (DEC): 4
VALUE (HEX): 0x04

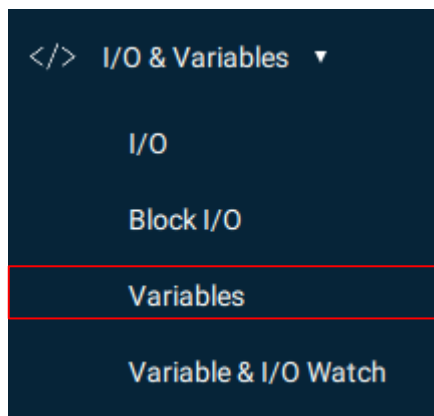
☐ Multi-byte view

| Inputs | Status | Name |
|--------|--------|------|
| 1 | ○ | io10 |
| 2 | ○ | |
| 3 | ● | |
| 4 | ○ | |
| 5 | ○ | |
| 6 | ○ | |
| 7 | ○ | |
| 8 | ○ | |

SEE THE STATUS OF INPUTS

CLICK ENABLE TOGGLE & TOGGLE SWITCH TO CHANGE OUTPUT STATUS

I/O & VARIABLES



CHOOSE
TYPE OF
VARIABLE

SET POSITION VARIABLE TO
CURRENT POSITION
OR
GO TO SAVED POSITION

Variables

| No. | Pos. Ref. Type | Name | Byte | Integer | Double | Real | String | Position |
|------|----------------|------------------|------|---------|--------|------|--------|----------|
| P000 | Joint | | | | | | | |
| P001 | Tool Frame | My Robot PVar 1 | | | | | | |
| P002 | Robot Frame | | | | | | | |
| P003 | Robot Frame | | | | | | | |
| P004 | User Frame | My Robot PVar 4 | | | | | | |
| P005 | Robot Frame | | | | | | | |
| P006 | Robot Frame | | | | | | | |
| P007 | Robot Frame | My Robot PVar 7 | | | | | | |
| P008 | Robot Frame | | | | | | | |
| P009 | Robot Frame | | | | | | | |
| P010 | Robot Frame | My Robot PVar 10 | | | | | | |

Position Variable #0:

Reference Type: Joint

Name: Enter name here

Tool: # 2 CTool2

(S)wing: 20.5000 °

(L)ower Arm: 10.6000 °

(U)pper Arm: -23.0000 °

(R)otation: 45.0000 °

(B)ending: 12.4000 °

(T)wist: 1.1000 °

SET TO CURRENT POSITION

GO TO SAVED POSITION

Robot Jog Panel

ROBOT SETTINGS -> TOOLS

Robot Settings

Tools

User Frames

Zones

Robot Configuration

Tool #0: CTool0

PRESETS

General

Interference

VISUALISATION

Tool Interference Model

Point 1

0 mm

0 mm

0 mm

Point 2

140 mm

0 mm

85 mm

Point 1

140 mm

0 mm

-30 mm

Point 2

140 mm

0 mm

250 mm

Radius

40 mm

25 mm

Tools

Display only named

| Tool No. ▲ | Tool Name | Weight | Block I/O Name |
|------------|----------------|--------|----------------|
| 0 | CTool0 | 0.000 | - |
| 1 | CTool1 | 0.000 | - |
| 2 | CTool2 | 10.000 | - |
| 3 | GRIPPER & PART | 85.000 | - |
| 4 | CTool 4 | 4.250 | - |
| 5 | CTool5 | 0.000 | - |
| 6 | CTool6 | 0.000 | - |
| 7 | CTool7 | 0.000 | - |

Tool #2: CTool2

PRESETS

General

Interference

ENTER TOOL DATA MANUALLY

Name

Block I/O

CTool2

Not Assigned

Tool Center Point (TCP)

Orientation

ESTIMATE

Show without tool

X_F

0.000 mm

R_X

0.0000 deg

Y_F

0.000 mm

R_Y

0.0000 deg

Z_F

0.000 mm

R_Z

0.0000 deg

Weight

ESTIMATE

W

10.000 kg

Center of Gravity

Moment of Inertia

X_G

0.000 mm

I_X

0.000 kg-m²

Y_G

0.000 mm

I_Y

0.000 kg-m²

Z_G

0.000 mm

I_Z

0.000 kg-m²

ROBOT SETTINGS -> TOOLS

CHOOSE CALIBRATION METHOD

CHOOSE RECORD

TCP Calibration for Tool #0: CTool0

1. Select Calibration Method
TCP (X, Y, Z - Recommended)

2. Record Five Postures for TCP Calibration

CLEAR ALL

2

3

1

4

5

Recommended Posture for Point 1

3. Calculate Tool Center Point

Calculate TCP & Send for Review

SET POSTURE 1

GO TO POSTURE 1

Load Estimation for Tool #0: CTool0

1. Properties to Estimate
Weight + Center of Gravity + Inertia

2. Estimate Tool Load with Robot Motion

Weight

--.-- kg

X_G

--.-- mm

Y_G

--.-- mm

Z_G

--.-- mm

I_x

--.-- kg-m²

I_y

--.-- kg-m²

I_z

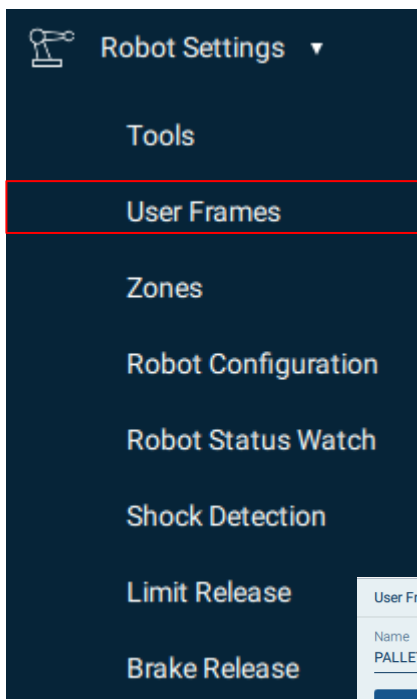
--.-- kg-m²

Press Estimate button to initiate procedure...

Hold to Estimate Tool Load

GO STEP BY STEP TO ESTIMATE TOOL LOAD

ROBOT SETTINGS -> USER FRAMES



CREATE USER FRAME USING 3 POINTS

User Frame #2: PALLET3

Name: PALLET3 Tool Number: #1: CTool1

| ORIGIN | | | XX | | | XY | | | |
|--------|-------------|---|-------------|---|-------------|----|-------------|---|-------------|
| X | 100.000 mm | X | 100.000 mm | X | 100.000 mm | Y | -250.500 mm | Y | -250.500 mm |
| Y | -250.500 mm | Y | -250.500 mm | Y | -250.500 mm | Z | 10.270 mm | Z | 10.270 mm |
| Z | 10.270 mm | Z | 10.270 mm | Z | 10.270 mm | | | | |

[SET ORIGIN] [SET XX] [SET XY]
 [GO TO ORIGIN] [GO TO XX] [GO TO XY]

Teach positions for (1) Origin, (2) XX, and (3) XY to create a User Frame (UF). Z-axis direction is determined by these taught positions. Use a pointer tool for increased accuracy.

Robot Jog Panel

User Frames (UF) [+ NEW USER FRAME](#)

| User Frame No. | Name |
|----------------|---------|
| 1 | DEFAULT |
| 2 | PALLET3 |

User Frame #2: PALLET3

Name: PALLET3

| | | | |
|---|-------------|----|-----------|
| X | 390.974 mm | Rx | 69.9399 ° |
| Y | -203.878 mm | Ry | 0.0000 ° |
| Z | 186.219 mm | Rz | 63.9278 ° |

[VIEW 3-POINTS](#)

Robot Jog Panel

ROBOT SETTINGS -> ZONES

Robot Settings

Tools

User Frames

Zones

Robot Configuration

Robot Status Watch

Shock Detection

Limit Release

Brake Release

Name
Pallet

Type
Cubic

Action
Alarm

Ref. Coord.
User

User Frame #
1

Setting Type:

Corners
Center

Center

Dimensions

X
-75.000 mm

Y
200.000 mm

Z
-150.000 mm

ΔX
350.000 mm

ΔY
200.000 mm

ΔZ
200.000 mm

SET CENTER

GO TO CENTER

CHANGE SETTING METHOD

Name
Pallet

Type
Cubic

Action
Alarm

Ref. Coord.
User

User Frame #
1

Setting Type:

Corners
Center

Corner 1

Corner 2

X
-250.000 mm

Y
100.000 mm

Z
-250.000 mm

X
100.000 mm

Y
300.000 mm

Z
-50.000 mm

SET CORNER 1

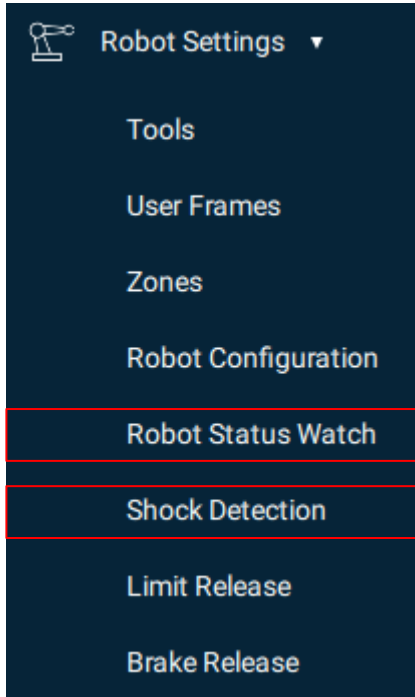
SET CORNER 2

GO TO CORNER 1

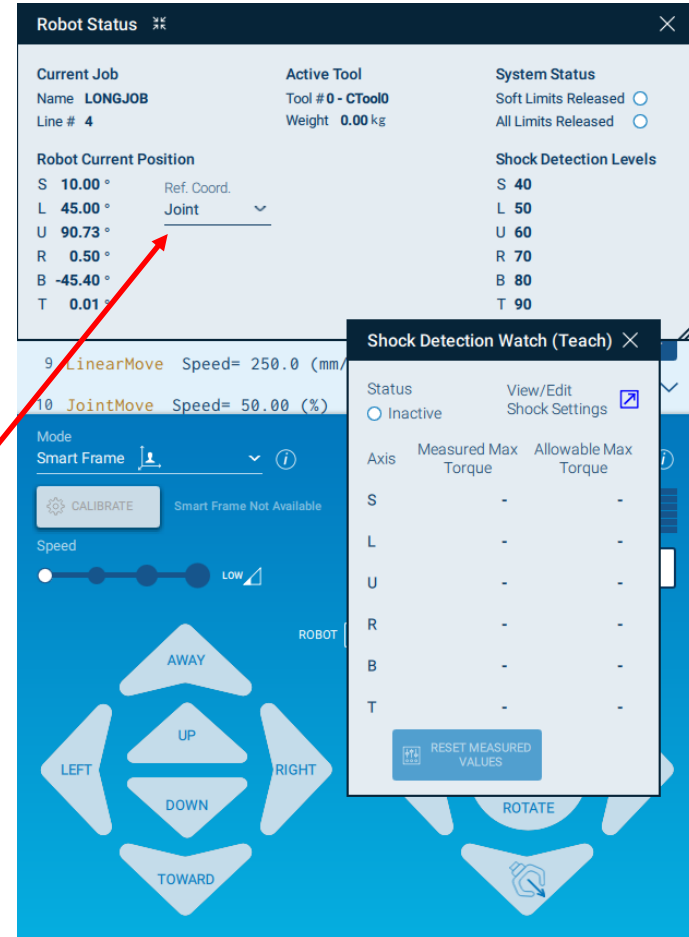
GO TO CORNER 2

Robot Jog Panel

ROBOT SETTINGS -> ROBOT STATUS WATCH & SCHOCK DETECTION

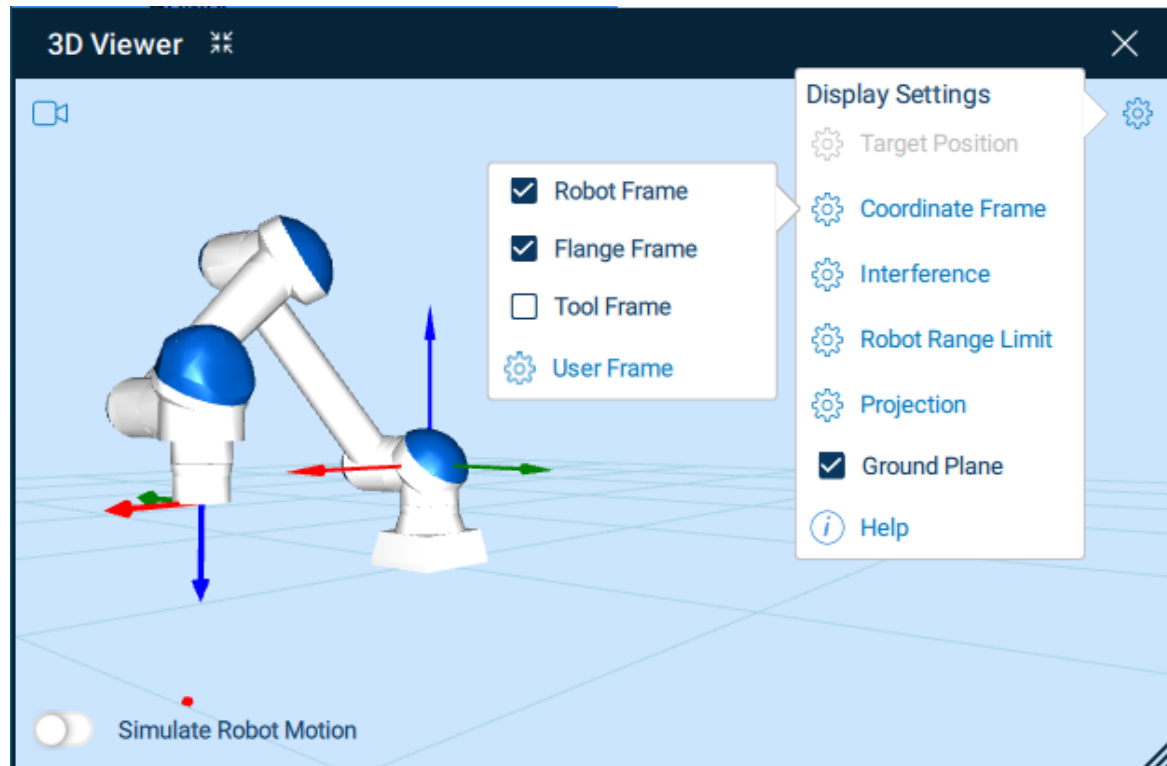
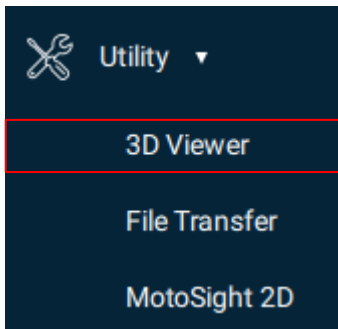


CHOOSE REFERENCE COORDINATE
JOINT / WORLD / USER / TOOL



FLOATING WINDOWS

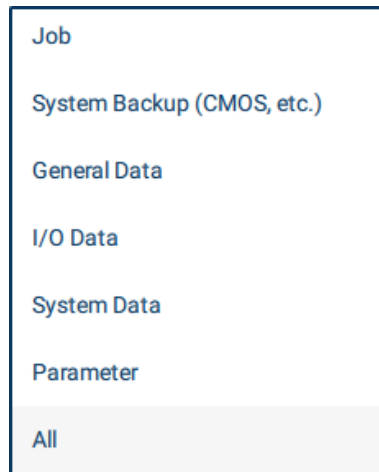
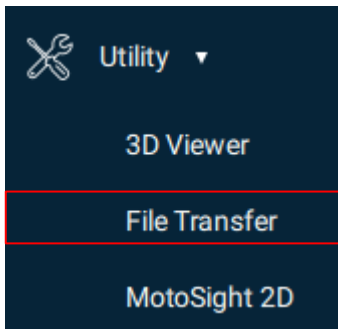
UTILITY -> 3D VIEWER



LIVE VISUALISATION & SIMULATION ROBOT MOVEMENT


FLOATING WINDOW

UTILITY -> FILE TRANSFER



←

File Transfer



From Controller

To Controller

Target: Pendant USB Storage Device

Status

USB Storage Device detected

Memory

441819 MBytes available

Target Folder

Path

USB:

CHANGE FOLDER

Filter by File Group:


All

| <input type="checkbox"/> | Name | Description | Group |
|--------------------------|--------------------------|------------------------|---------------|
| Job | | | |
| <input type="checkbox"/> | IFTTHEN.JBI | | Job |
| <input type="checkbox"/> | LONGJOB.JBI | | Job |
| <input type="checkbox"/> | SAMPLE.JBI | | Job |
| System Backup | | | |
| <input type="checkbox"/> | CMOS.BIN | System Backup | System Backup |
| <input type="checkbox"/> | SmartPendantSettings.zip | Smart Pendant Settings | System Backup |
| Parameter | | | |
| <input type="checkbox"/> | ALL.PRM | Batch parameter | Parameter |

6 file(s) on the controller, 0 file(s) selected,
0 file(s) in the target folder

COPY FILES FROM CONTROLLER

SYSTEM SETTINGS

 System Settings ▼

General

Controller

I/O Configuration

Packages

Classic Interface

← General Settings

Organization
Your organization name

Date & Time
2023-08-03 02:47:37 PM

Language
English ▼

☒ Enable Membrane Key Legend☒ Enable 3D Viewer

Security Level Settings

Access
Edit ▼

Startup Level
Edit ▼

SET PASSCODE

i

☐ Enable Development Access *i*

Screen

Auto off idle time
10 min

Brightness

100 %

Pendant Software

Version 3.0.0
Release 2023-02-15

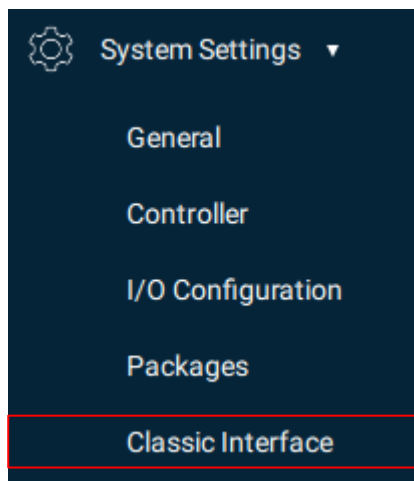
Pendant ID C4:CB:E1:35:5D:6B
USB ID -

Bundled Resources

EXPORT

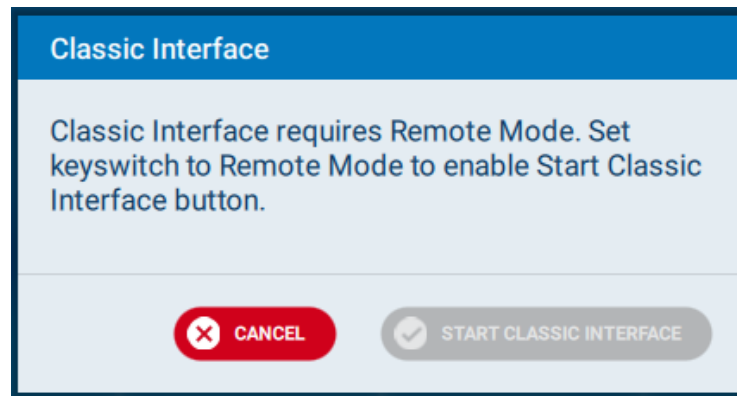
☐ Documentation☐ "Software Pendant" Application☐ Licenses

SYSTEM SETTINGS

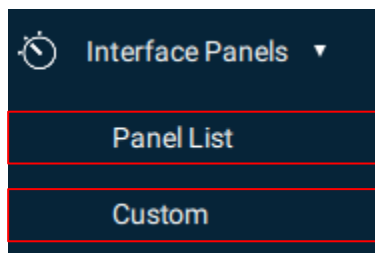


**GO TO
CLASSIC INTERFACE
(TEACHPENDANT)**

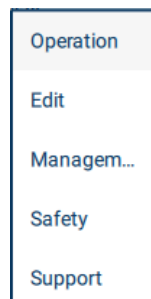
**SET KEYSWITCH
TO REMOTE MODE**



INTERFACE PANELS -> PANEL LIST + SHORTCUT (CUSTOM)



ADD SHORTCUT
IN MENU



ACCESS
LEVELS

3 SIZES OF PANELS
- QUATER
- HALF
- FULL SCREEN)



AVAILABLE CONTROLS

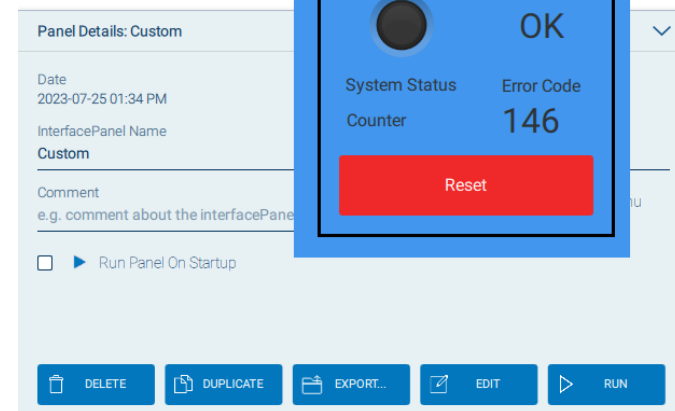
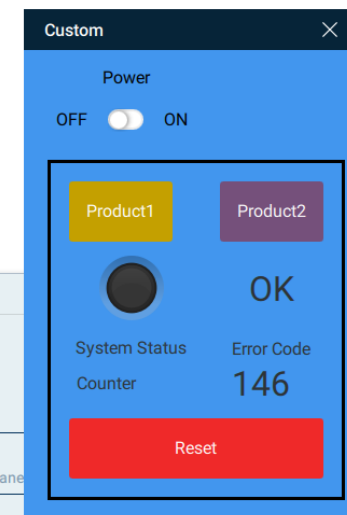
Interface Panel List

NEW PANEL

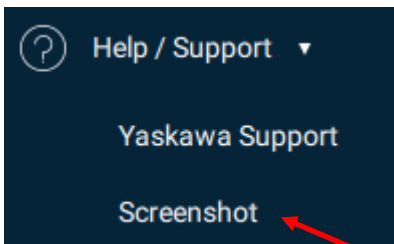
Search by name

| Panel Name | Version | Edited | Favorite | Default |
|------------|---------|---------------------|----------|---------|
| Custom | 1.0.0 | 2023.07.25 13:34:54 | ★ | |
| Panel2 | 1.0.0 | 2023.07.12 15:40:31 | | |
| Panel3 | 1.0.0 | 2023.07.12 15:29:49 | | |

IMPORT PANEL (.YPN)



HELP / SUPPORT



**SCREENSHOTS
AUTOMATICALLY SAVED ON
USB**

PROGRAM

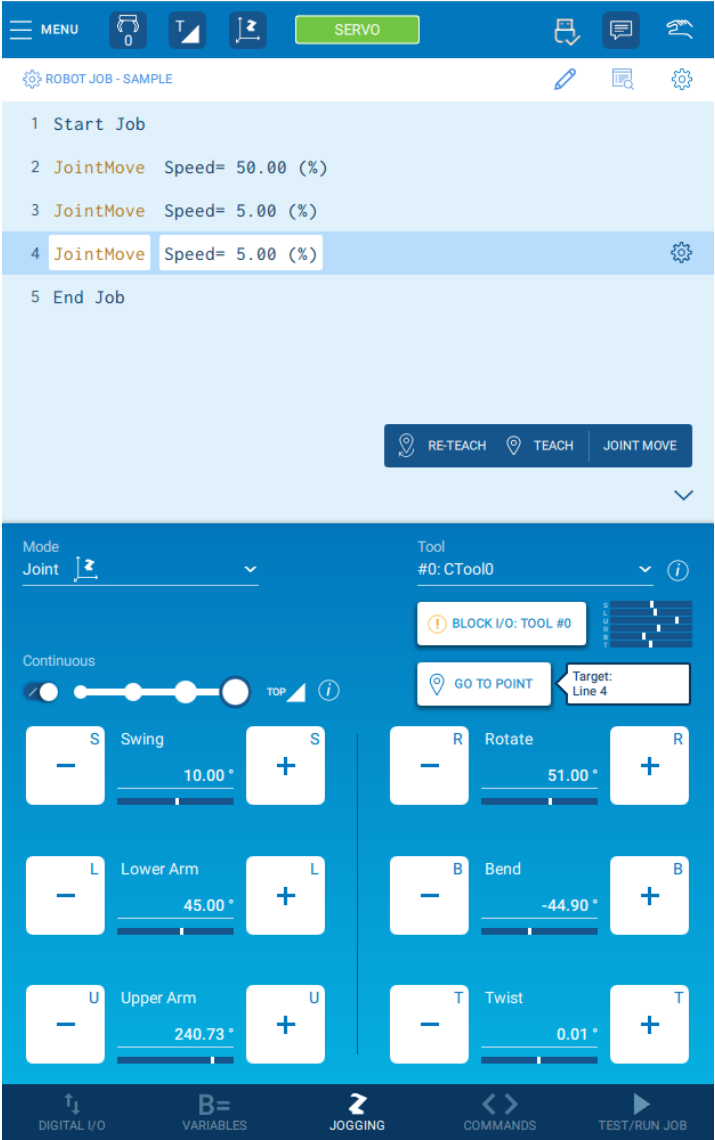
JOB CONTENTS VIEW

CONTAINS THE CONTENTS OF THE CURRENT JOB

BASIC JOB ACTIONS SUCH AS TEACHING POSITIONS, COPYING/PASTING INSTRUCTIONS AND EDITING INSTRUCTION PARAMETERS CAN BE PERFORMED

NAVIGATION BAR

USE THIS TO CHANGE THE CONTENT OF THE PROGRAMMING PANEL



STATUS BAR

VIEW STATUS AND ACCESS COMMON ACTIONS SUCH AS {MENU} AND {SERVO}

PROGRAMMING PANEL

CONTENTS WILL CHANGE BASED ON NAVIGATION BAR

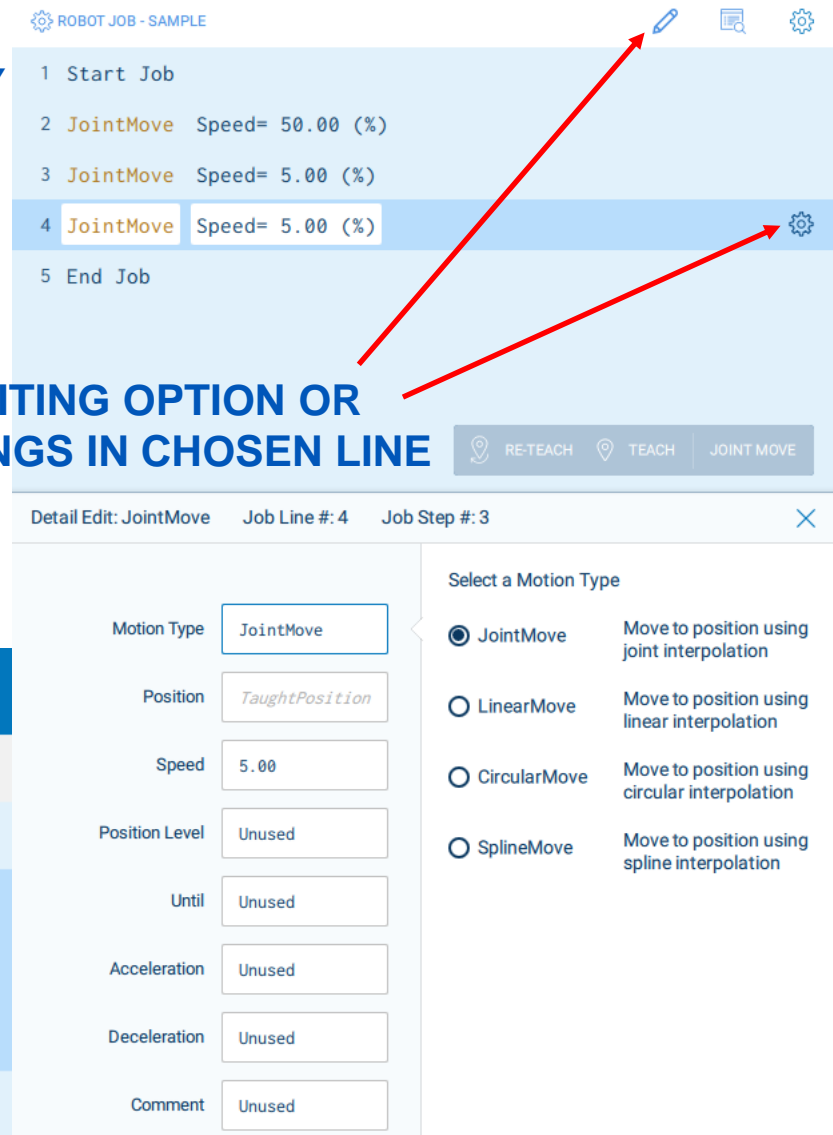
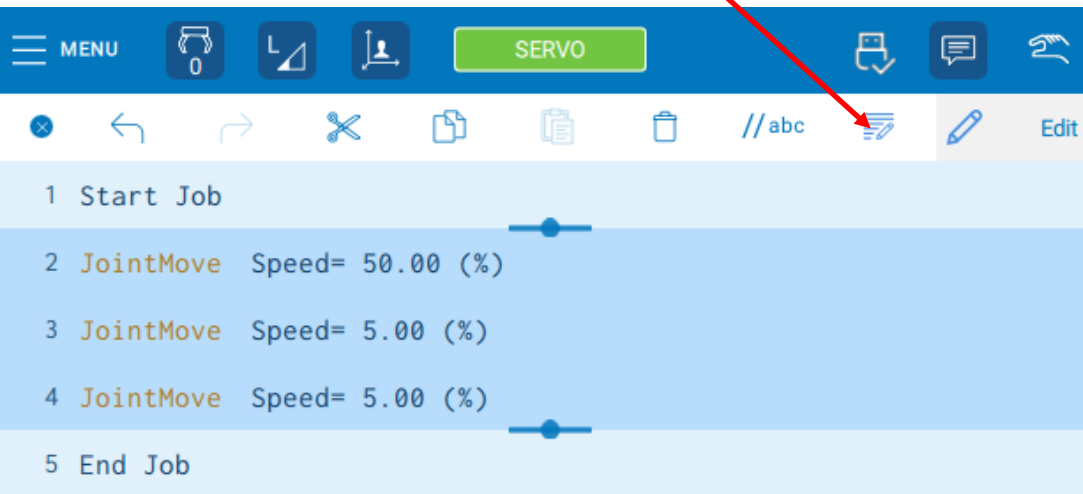
FOR EXAMPLE, THE ROBOT JOG PANEL IS SHOWN IN FIGURE "JOB LAYOUT"

EDIT LINES

CHANGE DISPLAY TYPE

EXPAND EDITING OPTION OR SELECT SETTINGS IN CHOSEN LINE

SELECT MULTIPLE LINES AND EDIT THEM IN ONE TIME



ROBOT MOVEMENT - OPTIONS

STANDARD
OPTIONS

Smart Mode

Select Jogging Mode

SMART
FRAME

Smart Frame mode allows you to move the robot in Cartesian directions relative to where the pendant is with respect to the robot.

JOINT

Joint mode allows you to move each joint axis independently.

XYZ:
WORLD

XYZ:World mode allows you to move the robot in Cartesian directions relative to the robot base.

XYZ:
TOOL

XYZ:Tool mode allows you to move the robot in Cartesian directions relative to the tool.

XYZ:
USER

XYZ:User Frame mode allows you to move the robot in Cartesian directions relative to a user frame.

HAND
GUIDING

Hand Guiding mode allows you to move the robot by applying a force to the robot arm using your hands instead of using the pendant controls.

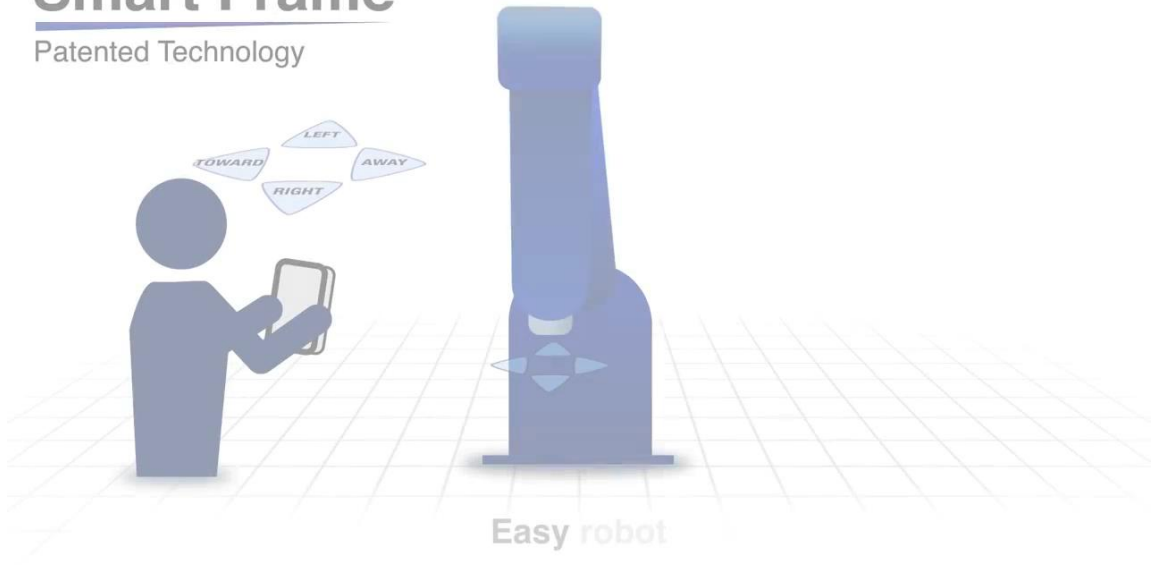
INTUITIVE
PROGRAMMING

ONLY FOR
COBOTS

ROBOT MOVEMENT – SMART FRAME

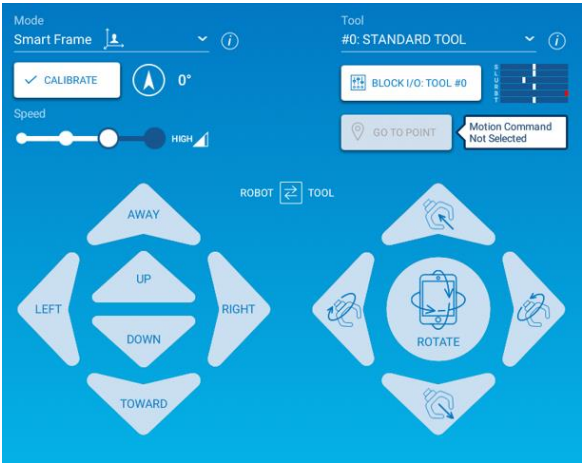
Smart Frame

Patented Technology



Smart Frame

The patented technology of the “Smart Frame” determines the user’s orientation relative to the robot. This eliminates the use of conventional coordinates (X, Y, Z) frames. The intuitive robot jogging by tilting the smart pendant makes it also easy to use.

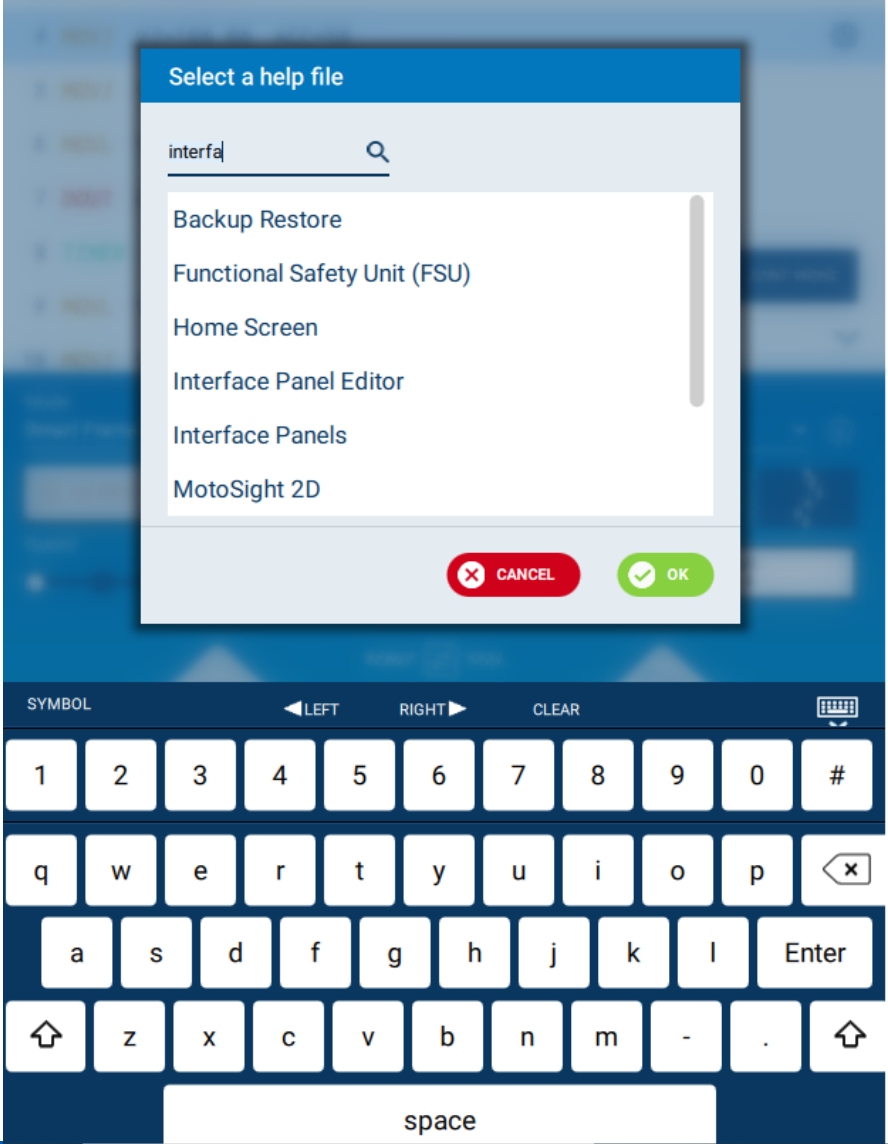


BUILT-IN HELP INFORMATION TO
FURTHER DESCRIBE THE INTERFACES

ACCESSED BY PRESSING THE ICON
THAT SHOWS UP ON MANY PAGES



START
SCREEN



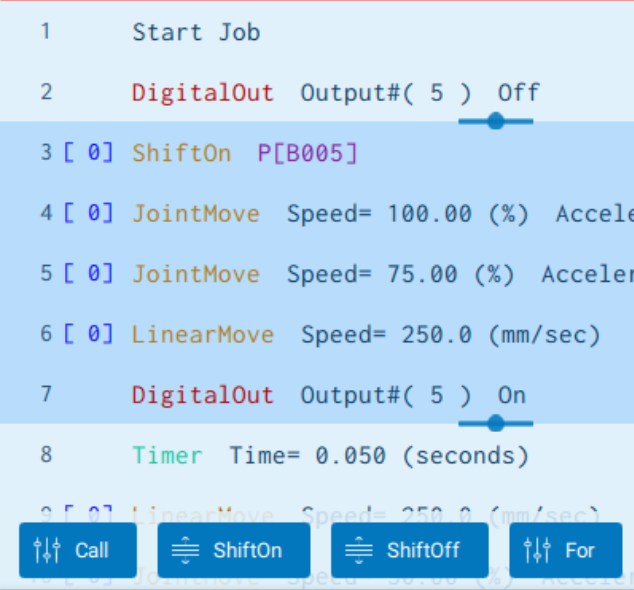
YASKAWA

SMART PENDANT INSTRUKCJE



GDZIE NALEŻY SZUKAĆ INSTRUKCJI?

W JAKI SPOSÓB MOŻNA EDYTOWAĆ INSTRUKCJE?



Multi-Selection Edit

Input Values to bulk change:

Joint Speed _____ % (2 selected)

Linear Speed _____ mm/sec (1 selected)

Acceleration _____ % (2 selected)

Deceleration _____ % (1 selected)

PositionLevel _____ (1 selected)



PODSTAWOWE INSTRUKCJE RUCHU

 JointMove


Moves to a user-defined **Position Variable** by joint interpolation.
Different from {TEACH} above that uses robot's CURRENT position

 LinearMove

Moves to a user-defined **Position Variable** by linear interpolation.
Different from {TEACH} above that uses robot's CURRENT position

 CircleMove

Moves to a user-defined **Position Variable** by circular interpolation.
Different from {TEACH} above that uses robot's CURRENT position

 SplineMove

Moves to a user-defined **Position Variable** by spline interpolation.
Different from {TEACH} above that uses robot's CURRENT position

```
6 JointMove Speed= 100.00 (%) Acceleration= 50 (%)
7 JointMove P000 Speed= 5.00 (%)
8 JointMove 75.00 (%) Acceleration= 50 (%)
9 LinearMove = 250.0 (mm/sec) PositionLevel= 0
10 CircleMove t#( 5 ) On
11 SplineMove 0 (seconds)
12 LinearMove speed= 250.0 (mm/sec)
13 JointMove Speed= 50.00 (%) Acceleration= B000(%)
```

Detail Edit: JointMove Job Line #: 7 Job Step #: 6

Motion Type

Position

Speed

Position Level

Until

Acceleration

Deceleration

Comment

JointMove

P000

5.00

Unused

Unused

Unused

Unused

Unused

Select a Motion Type

☒ JointMove

☐ LinearMove

☐ CircularMove

☐ SplineMove

Move to position using joint interpolation

Move to position using linear interpolation

Move to position using circular interpolation

Move to position using spline interpolation

Motion Type

Position

Speed

Position Level

Until

Acceleration

Deceleration

Comment

JointMove

P000

5.00

Unused

Unused

Unused

Unused

Unused

Specifies the approach level when the manipulator passes the taught position. Level: 0 to 8

☒ Unused

☐ Level 0 — 0.0 mm

☐ Level 1 — 12.5 mm

☐ Level 2 — 25.0 mm

☐ Level 3 — 50.0 mm

☐ Level 4 — 100.0 mm









☐ Level 5 — 200.0 mm







☐ Level 6 — 300.0 mm

☐ Level 7 — 400.0 mm

☐ Level 8 — 500.0 mm

DZIAŁANIA NA ZMIENNYCH

| | |
|--|---|
|  Increment | Adds 1 to the content of the specified variable |
|  Decrement | Subtracts 1 from a specified variable |
|  Add | Adds Data 1 and Data 2, and stores the result in Data 1 $\text{Data1} = \text{Data1} + \text{Data2}$ |
|  Subtract | Subtracts Data 2 from Data 1, and stores the result in Data 1 $\text{Data1} = \text{Data1} - \text{Data2}$ |
|  Multiply | Multiplies Data 1 by Data 2, and stores the result in Data 1 $\text{Data1} = \text{Data1} * \text{Data2}$ |
|  Divide | Divides Data 1 by Data 2, and stores the result in Data 1 $\text{Data1} = \text{Data1} / \text{Data2}$ |
|  SetElement | Sets Data 2 in the element of position type variable of Data 1 |
|  GetElement | Stores the element of position type variable of Data 2 in Data 1 |

| | |
|--|--|
|  Set | Sets Data1 to the value of Data2 $\text{Data1} = \text{Data2}$ |
|  Clear | In Data 1, the variable content from the specified number on, is cleared to 0 only by the amount specified in Data 2 |
|  And | Carries out logical multiplication of Data 1 and Data 2, and stores the result in Data 1 |
|  Or | Carries out the logical sum of Data 1 and Data 2, and stores the result in Data 1 |
|  Not | Carries out the logical negation of Data 2, and stores the result in Data 1 |
|  Xor | Carries out the logical exclusive OR of Data 1 and Data 2, and stores the result in Data 1 |

SYGNAŁY

 DigitalOut

Writes a value to a General Output Signal









 DigitalIn

Reads the status of an Input Signal


 Wait

Waits until the status of the external signal or byte variable is the same as the specified status

POZOSTAŁE

| | |
|--|--|
|  For | Create a repeated loop based on an index parameter |
|  While | Evaluates user-defined conditional expression(s) and executes all instructions between While/EndWhile as long as the conditional expression is true. |
|  IfThen | Evaluates user-defined conditional expression(s) to determine the proper execution of the following instruction(s) |
|  Elself | Adds an additional condition to the IfThen/EndIf structure. Can only be added between IfThen and EndIf. |
|  Else | Adds a final condition to the IfThen/EndIf structure to execute if all other conditions fail. Can only be added between IfThen and EndIf. |
|  Timer | Stops a job for the user-defined time |
|  Switch | Evaluate the specified variable and then perform corresponding Case instruction equal to its value. |
|  Case | Adds a branch to a Switch instruction. This branch will be executed if its value is equal to the variable in the Switch instruction. |

POZOSTAŁE

 Call

Specifies the name of another job to open and execute before proceeding to the next line of the current job

 Label

User-specified Label for a Jump

 Jump

Jumps to a user-specified Label

 ShiftOn

Begins the parallel shift operation. The amount of the parallel shift is set in a user-defined Position Variable by the increment value of X, Y, and Z in each coordinate system

 ShiftOff

Ends the parallel shift operation

```
For I000 = 0 to 4

  ShiftOn P000

  JointMove Speed= 5.00 (%)

  JointMove Speed= 5.00 (%)

  ShiftOff

  Add P000 P001

Next I000
```

YASKAWA