

YASKAWA

II Ogólnopolski Konkurs Robotyki Przemysłowej

WARSZTATY YASKAWA



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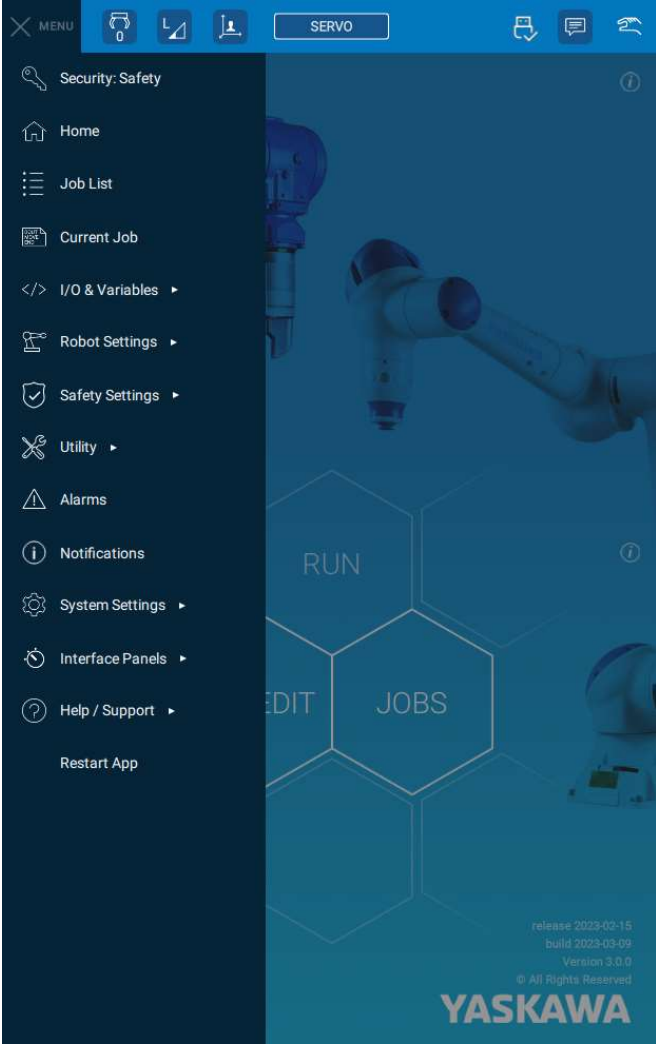
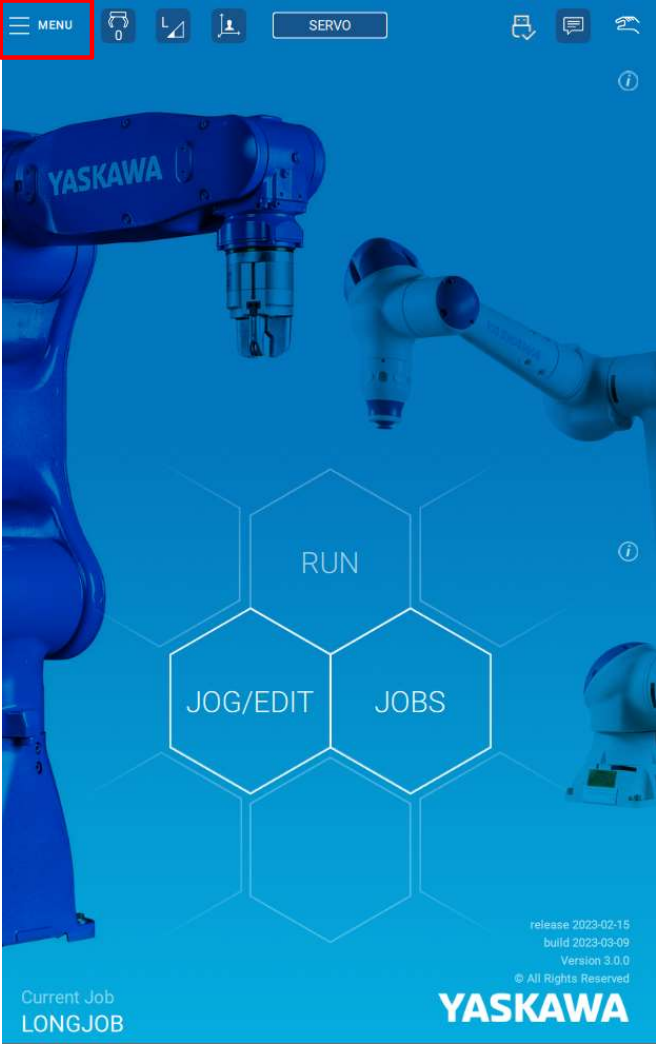
Polski oddział światowego lidera



TEACH PENDANT VS SMART PENDANT

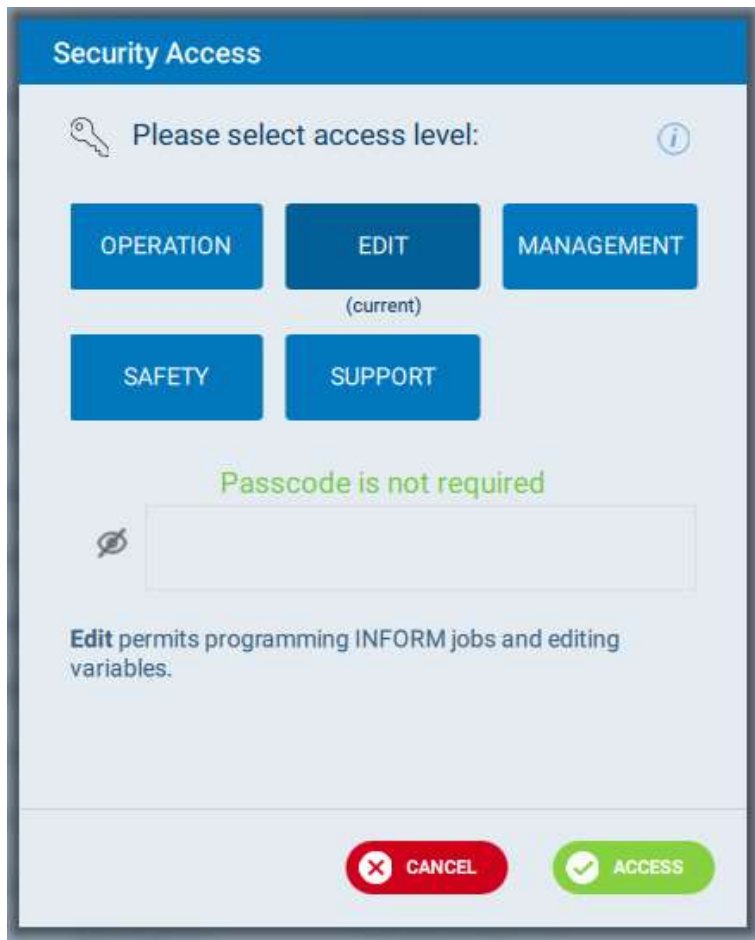


HOME SCREEN

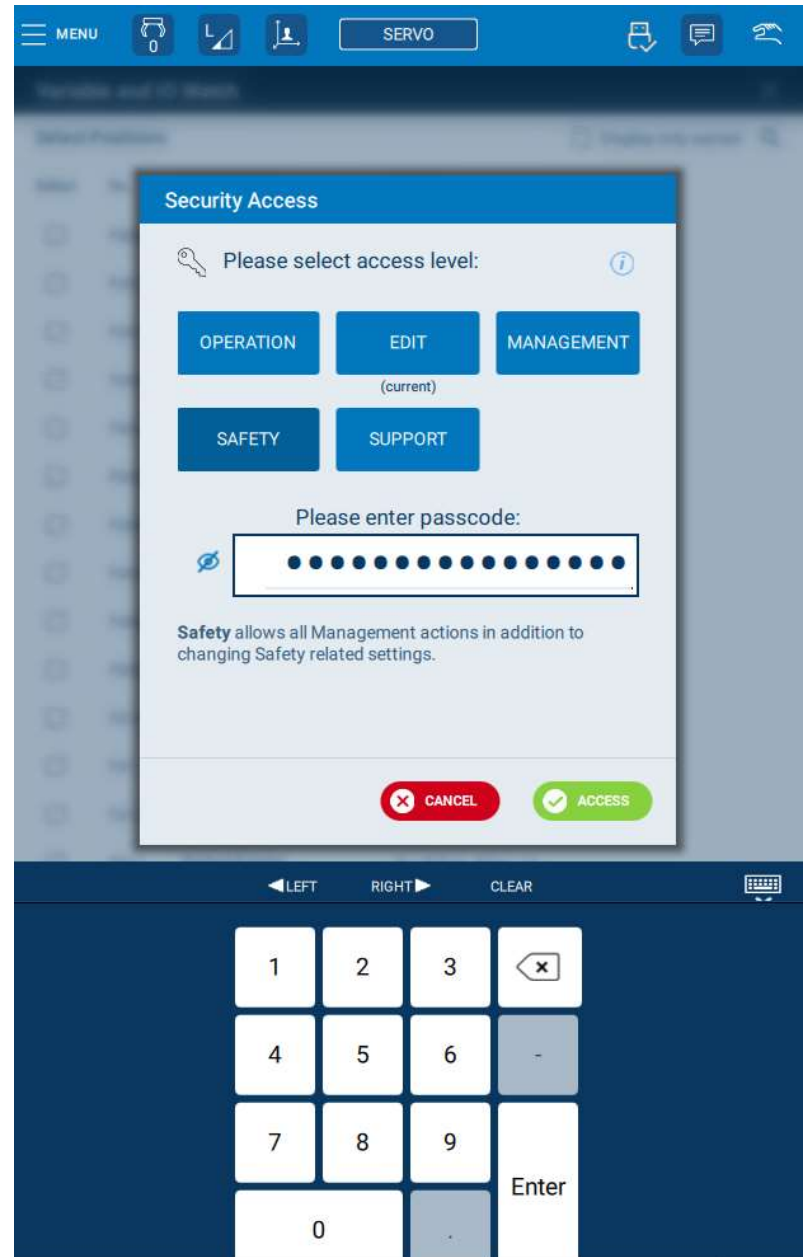


- Security: Safety
- Home
- Job List
- Current Job
- I/O & Variables
- Robot Settings
- Safety Settings
- Utility
- Alarms
- Notifications
- System Settings
- Interface Panels
- Help / Support
- Restart App

SECURITY



**DEFAULT EDIT MODE
NO PASSWORD REQUIRED**



- Security: Safety
- Home
- Job List**
- Current Job**
- I/O & Variables ▶
- Robot Settings ▶
- Safety Settings ▶
- Utility ▶
- Alarms
- Notifications
- System Settings ▶
- Interface Panels ▶
- Help / Support ▶
- Restart App

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**

- Security: Safety
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I/O & VARIABLES



← 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

- Security: Safety
- Home
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- I/O & Variables**
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I/O & VARIABLES



CHOOSE TYPE OF VARIABLE

The screenshot shows the 'Variables' configuration screen. At the top, there are tabs for 'Byte', 'Integer', 'Double', 'Real', 'String', and 'Position'. A red arrow points to the 'Position' tab. Below the tabs is a table of variables:

No.	Pos. Ref. Type	Name
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

Below the table is the 'Position Variable #0:' configuration panel. It includes a 'Reference Type' dropdown set to 'Joint', a 'Name' field with the placeholder 'Enter name here', and a 'Tool' dropdown set to '# 2 CTool2'. There are two buttons: 'SET TO CURRENT POSITION' (highlighted with a red arrow) and 'GO TO SAVED POSITION'. The panel also contains several numerical input fields for joint positions:

- (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 POSITION VARIABLE TO CURRENT POSITION OR GO TO SAVED POSITION

- Security: Safety
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ROBOT SETTINGS -> TOOLS

Robot Settings

- Tools**
- User Frames
- Zones
- Robot Configuration

Tool #0: CTool0

General Interference **VISUALISATION**

Tool Interference Model

	X	Y	Z	Radius
1 Point 1	0 mm	0 mm	0 mm	40 mm
1 Point 2	140 mm	0 mm	85 mm	
2 Point 1	140 mm	0 mm	-30 mm	25 mm
2 Point 2	140 mm	0 mm	250 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

ENTER TOOL DATA MANUALLY

PRESETS

General Interference

Name: CTool2 Block I/O: 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·m ²
Y _G	0.000 mm	I _y	0.000 kg·m ²
Z _G	0.000 mm	I _z	0.000 kg·m ²

- Security: Safety
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- I/O & Variables ▶
- Robot Settings ▶**
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- Interface Panels ▶
- Help / Support ▶
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ROBOT SETTINGS -> TOOLS

CHOOSE CALIBRATION METHOD

CHOOSE RECORD

← TCP Calibration for Tool #0: CTool0

- Select Calibration Method
TCP (X, Y, Z - Recommended) ▾
- Record Five Postures for TCP Calibration
CLEAR ALL
- Calculate Tool Center Point

Recommended Posture for Point 1

Calculate TCP & Send for Review

SET POSTURE 1

GO TO POSTURE 1

← Load Estimation for Tool #0: CTool0

- Properties to Estimate
Weight + Center of Gravity + Inertia ▾
- 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

- Security: Safety
- Home
- Job List
- Current Job
- I/O & Variables
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- Interface Panels
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- Restart App

ROBOT SETTINGS -> USER FRAMES

- Robot Settings
- Tools
- User Frames**
- Zones
- Robot Configuration
- Robot Status Watch
- Shock Detection
- Limit Release
- Brake Release

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			
Z	10.270 mm	Z	10.270 mm	Z	10.270 mm			

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.

User Frames (UF) + NEW USER FRAME Search by name

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 °

Robot Jog Panel

- Security: Safety
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- Restart App

ROBOT SETTINGS -> ZONES

- Robot Settings
- Tools
- User Frames
- Zones**
- Robot Configuration
- Robot Status Watch
- Shock Detection
- Limit Release
- Brake Release

← Zones + NEW ZONE Search by name 🔍

Zone No.	Status	Name	Type
1	●	Pallet	Cubic (User)
2	○	Loading Area	Cubic (World)

Name: Pallet

Setting Type: Corners Center

Type: Cubic Ref. Coord.: User

Action: Alarm User Frame #: 1

Center Dimensions

X	-75.000 mm	ΔX	350.000 mm
Y	200.000 mm	ΔY	200.000 mm
Z	-150.000 mm	ΔZ	200.000 mm

SET CENTER GO TO CENTER

CHANGE SETTING METHOD

Zone #1: Pallet

Name: Pallet

Setting Type: Corners Center

Type: Cubic Ref. Coord.: User

Action: Alarm User Frame #: 1

Corner 1		Corner 2	
X	-250.000 mm	X	100.000 mm
Y	100.000 mm	Y	300.000 mm
Z	-250.000 mm	Z	-50.000 mm

SET CORNER 1 SET CORNER 2 GO TO CORNER 1 GO TO CORNER 2

Robot Jog Panel

- Security: Safety
- Home
- Job List
- Current Job
- I/O & Variables ▶
- Robot Settings ▶**
- Safety Settings ▶
- Utility ▶
- Alarms
- Notifications
- System Settings ▶
- Interface Panels ▶
- Help / Support ▶
- Restart App

ROBOT SETTINGS -> ROBOT STATUS WATCH & SHOCK DETECTION

- Robot Settings ▾
- Tools
- User Frames
- Zones
- Robot Configuration
- Robot Status Watch**
- Shock Detection**
- Limit Release
- Brake Release

**CHOOSE REFERENCE COORDINATE
JOINT / WORLD / USER / TOOL**

FLOATING WINDOWS

Robot Status

Current Job	Active Tool	System Status
Name LONGJOB	Tool # 0 - CTool0	Soft Limits Released <input type="radio"/>
Line # 4	Weight 0.00 kg	All Limits Released <input type="radio"/>
Robot Current Position		
S 10.00 °	Ref. Coord. Joint	Shock Detection Levels
L 45.00 °		S 40
U 90.73 °		L 50
R 0.50 °		U 60
B -45.40 °		R 70
T 0.01 °		B 80
		T 90

9 LinearMove Speed= 250.0 (mm/)

10 JointMove Speed= 50.00 (%)

Mode
Smart Frame []

CALIBRATE Smart Frame Not Available

Speed [] Low

AWAY UP RIGHT DOWN TOWARD

Shock Detection Watch (Teach)

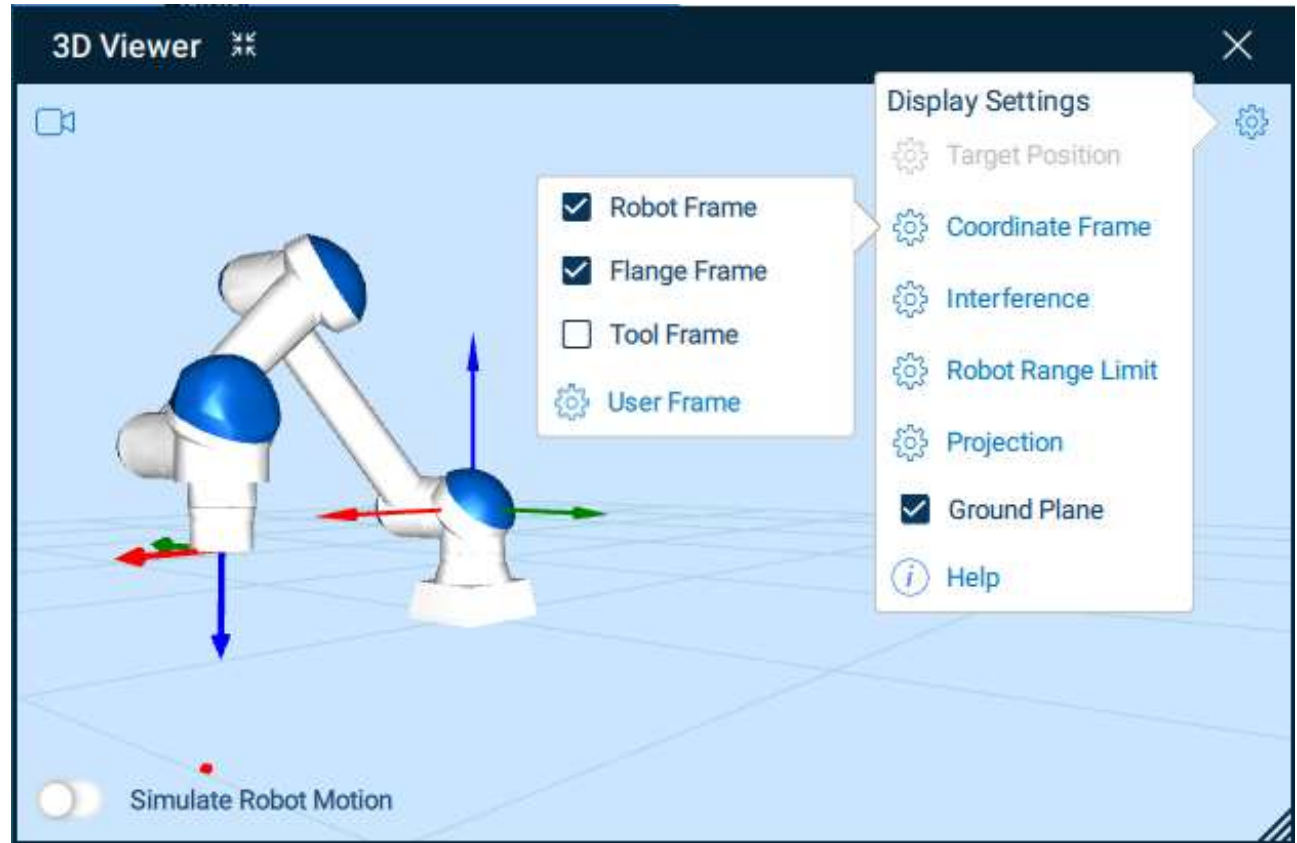
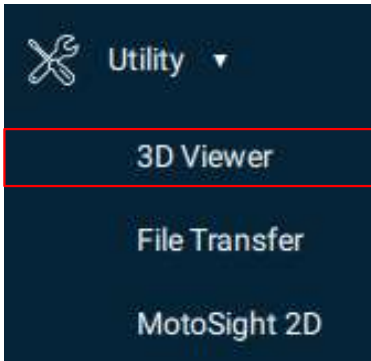
Status Inactive View/Edit Shock Settings []

Axis	Measured Max Torque	Allowable Max Torque
S	-	-
L	-	-
U	-	-
R	-	-
B	-	-
T	-	-

RESET MEASURED VALUES

- Security: Safety
- Home
- Job List
- Current Job
- I/O & Variables ▶
- Robot Settings ▶
- Safety Settings ▶
- Utility ▶**
- Alarms
- Notifications
- System Settings ▶
- Interface Panels ▶
- Help / Support ▶
- Restart App

UTILITY -> 3D VIEWER



LIVE VISUALISATION & SIMULATION ROBOT MOVEMENT

FLOATING WINDOW

UTILITY -> FILE TRANSFER

- Security: Safety
- Home
- Job List
- Current Job
- I/O & Variables ▶
- Robot Settings ▶
- Safety Settings ▶
- Utility ▶
- Alarms
- Notifications
- System Settings ▶
- Interface Panels ▶
- Help / Support ▶
- Restart App

Utility ▾

- 3D Viewer
- File Transfer**
- MotoSight 2D

- Job
- System Backup (CMOS, etc.)
- General Data
- I/O Data
- System Data
- Parameter
- All

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"/>	IFTMEN.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

- Security: Safety
- Home
- Job List
- Current Job
- I/O & Variables ▶
- Robot Settings ▶
- Safety Settings ▶
- Utility ▶
- Alarms
- Notifications
- System Settings ▶**
- Interface Panels ▶
- Help / Support ▶
- Restart App

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 SET PASSCODE ⓘ

Startup Level
Edit

- Enable Development Access ⓘ

Screen

Auto off idle time
10 min Auto Off

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

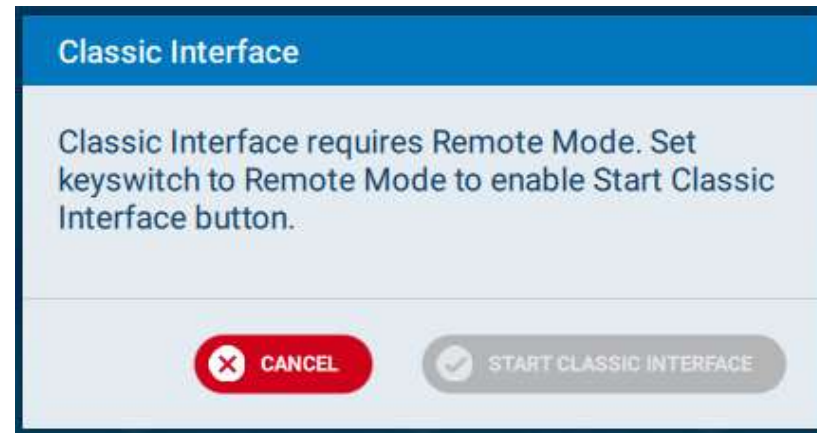
SYSTEM SETTINGS

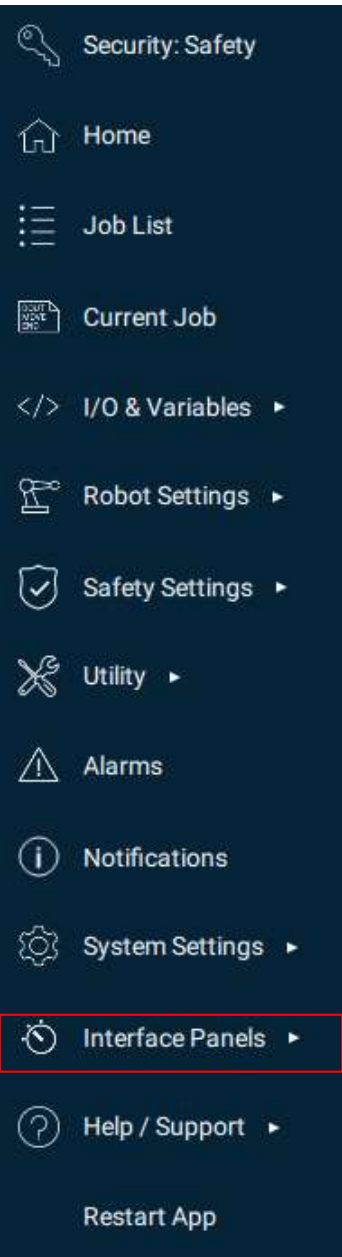
- Security: Safety
- Home
- Job List
- Current Job
- I/O & Variables ▶
- Robot Settings ▶
- Safety Settings ▶
- Utility ▶
- Alarms
- Notifications
- System Settings ▶**
- Interface Panels ▶
- Help / Support ▶
- Restart App

- System Settings ▾
 - General
 - Controller
 - I/O Configuration
 - Packages
 - Classic Interface**

**GO TO
CLASSIC INTERFACE
(TEACHPENDANT)**

**SET KEYSWITCH
TO REMOTE MODE**





INTERFACE PANELS -> PANEL LIST + SHORTCUT (CUSTOM)



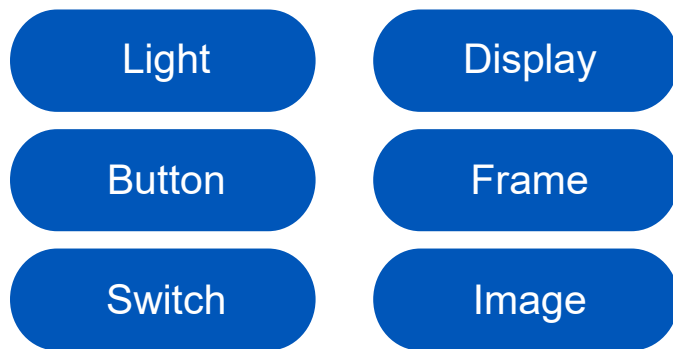
**ADD SHORTCUT
IN MENU**

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		

- Operation
- Edit
- Managem...
- Safety
- Support

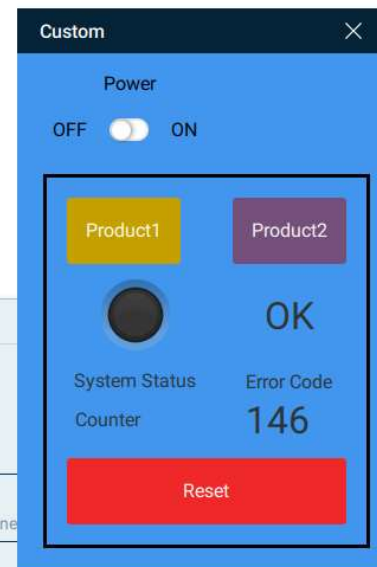
**ACCESS
LEVELS**

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



AVAILABLE CONTROLS

IMPORT PANEL (.YPN)



Panel Details: Custom

Date: 2023-07-25 01:34 PM

InterfacePanel Name: Custom

Comment: e.g. comment about the interfacePanel

Run Panel On Startup

DELETED | DUPLICATE | EXPORT... | EDIT | RUN

- Security: Safety
- Home
- Job List
- Current Job
- I/O & Variables ▶
- Robot Settings ▶
- Safety Settings ▶
- Utility ▶
- Alarms
- Notifications
- System Settings ▶
- Interface Panels ▶
- Help / Support ▶
- Restart App

HELP / SUPPORT

- Help / Support ▾
 - Yaskawa Support
 - Screenshot

**SCREENSHOTS
AUTOMATICALLY SAVED ON
USB**

PROGRAM

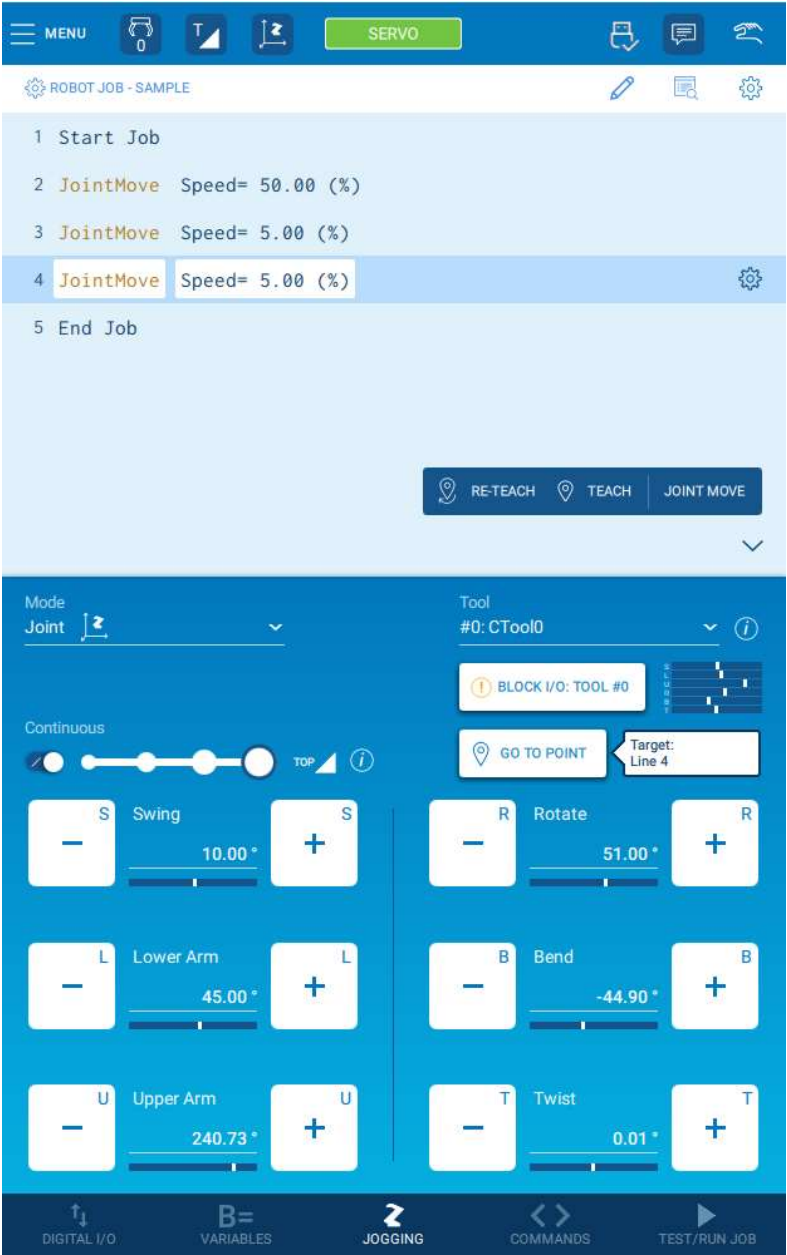
JOB CONTENTS VIEW

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

Classic Tool # Var. Name IO Name Favorites

Job Stack

2 DOUT OT#(5) OFF

3 SFTON P[B005]

4 MOVJ VJ=100.00 ACC=50

5 MOVJ VJ=75.00 ACC=50 DEC=20

Display

CHANGE DISPLAY TYPE

ROBOT JOB - SAMPLE

1 Start Job

2 JointMove Speed= 50.00 (%)

3 JointMove Speed= 5.00 (%)

4 JointMove Speed= 5.00 (%)

5 End Job

RE-TEACH TEACH JOINT MOVE

EXPAND EDITING OPTION OR SELECT SETTINGS IN CHOSEN LINE

SELECT MULTIPLE LINES AND EDIT THEM IN ONE TIME

MENU

SERVO

1 Start Job

2 JointMove Speed= 50.00 (%)

3 JointMove Speed= 5.00 (%)

4 JointMove Speed= 5.00 (%)

5 End Job

Edit

Detail Edit: JointMove Job Line #: 4 Job Step #: 3

Select a Motion Type

Motion Type: JointMove

Position: TaughtPosition

Speed: 5.00

Position Level: Unused

Until: Unused

Acceleration: Unused

Deceleration: Unused

Comment: Unused

- JointMove: Move to position using joint interpolation
- LinearMove: Move to position using linear interpolation
- CircularMove: Move to position using circular interpolation
- SplineMove: Move to position using spline interpolation

ROBOT MOVEMENT - 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

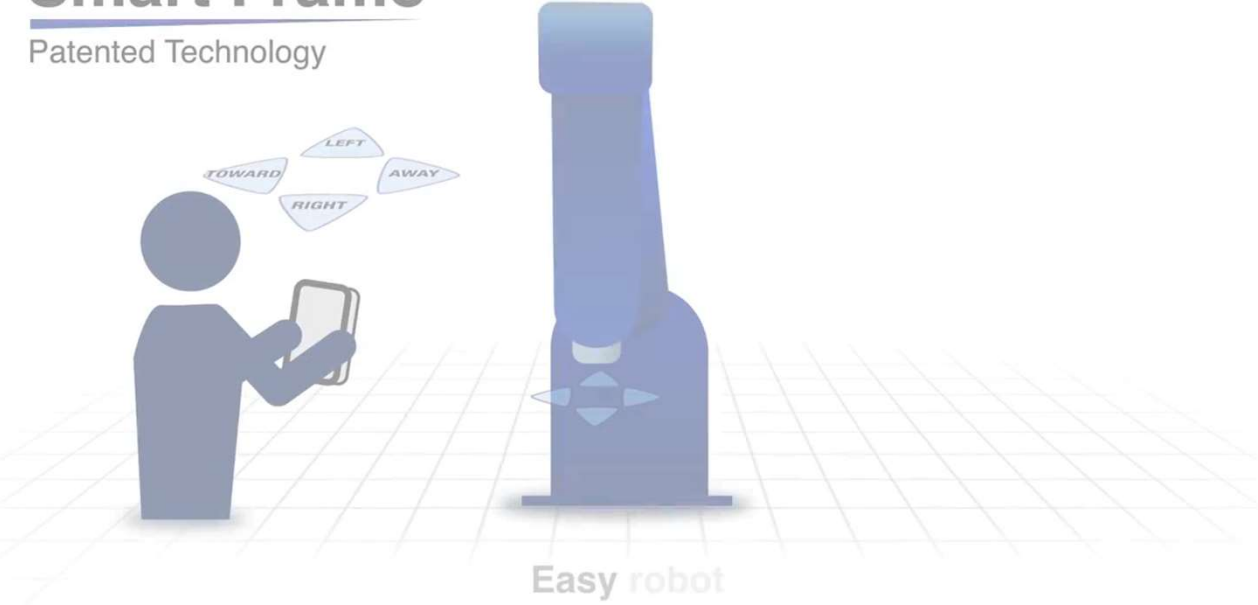
STANDARD OPTIONS

ONLY FOR COBOTS

ROBOT MOVEMENT – SMART FRAME

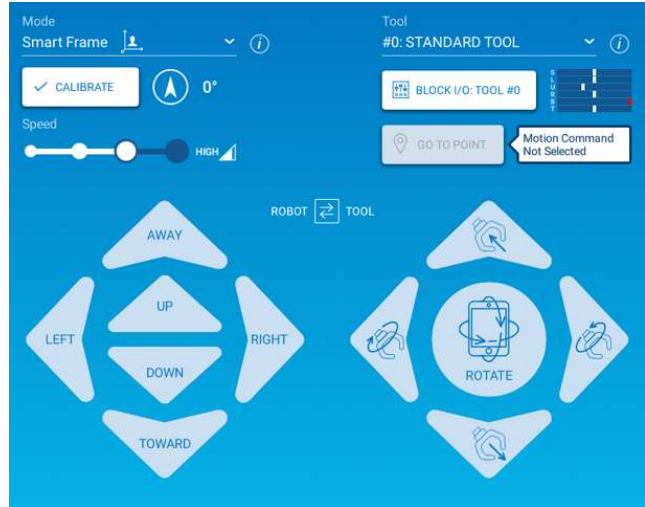
Smart Frame

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.



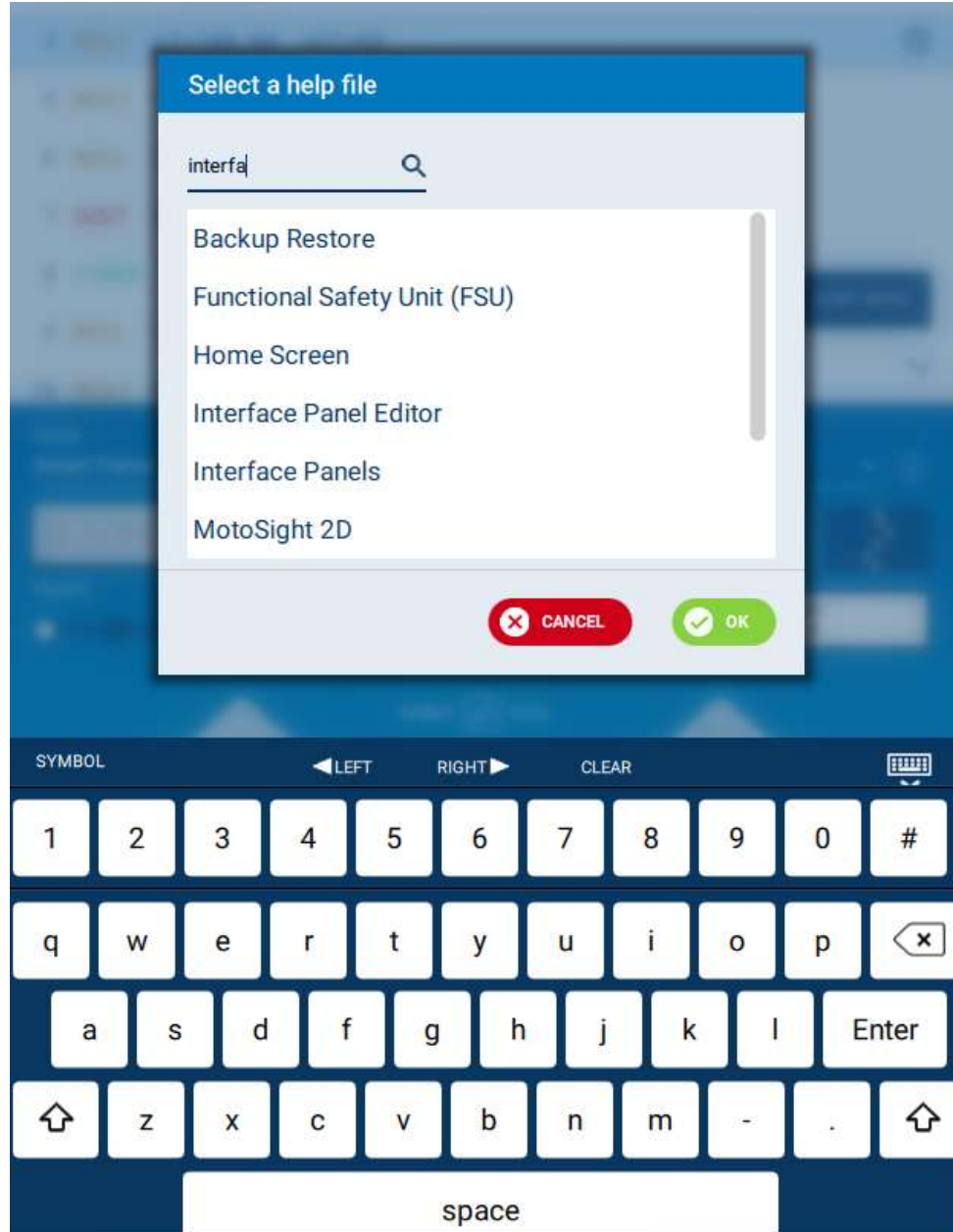
INFORMATION

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?



```
1 Start Job
2 DigitalOut Output#( 5 ) Off
3 [ 0 ] ShiftOn P[B005]
4 [ 0 ] JointMove Speed= 100.00 (%) Acceleration= 50 (%)
5 [ 0 ] JointMove Speed= 75.00 (%) Acceleration= 50 (%)
6 [ 0 ] LinearMove Speed= 250.0 (mm/sec) PositionLevel= 0
7 DigitalOut Output#( 5 ) On
8 Timer Time= 0.050 (seconds)
```

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)

COMMAND BUILDER

- Call**: Specifies the name of another job to open and execute before proceeding to the next line of the current job
- 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**: 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.

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 JointMove Speed= 250.0 (mm/sec) RE-TEACH TEACH JOINT MOVE
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:

- Select a Motion Type
- JointMove Move to position using joint interpolation
 - LinearMove Move to position using linear interpolation
 - CircularMove Move to position using circular interpolation
 - SplineMove Move to position using spline interpolation

Motion Type:

Position:

Speed:

Position Level:

Until:









Acceleration:







Deceleration:

Comment:

- 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 $Data1 = Data1 + Data2$
 Subtract	Subtracts Data 2 from Data 1, and stores the result in Data 1 $Data1 = Data1 - Data2$
 Multiply	Multiplies Data 1 by Data 2, and stores the result in Data 1 $Data1 = Data1 * Data2$
 Divide	Divides Data 1 by Data 2, and stores the result in Data 1 $Data1 = Data1 / Data2$
 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 $Data1 = Data2$
 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)

↑↓↑ Elseif

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