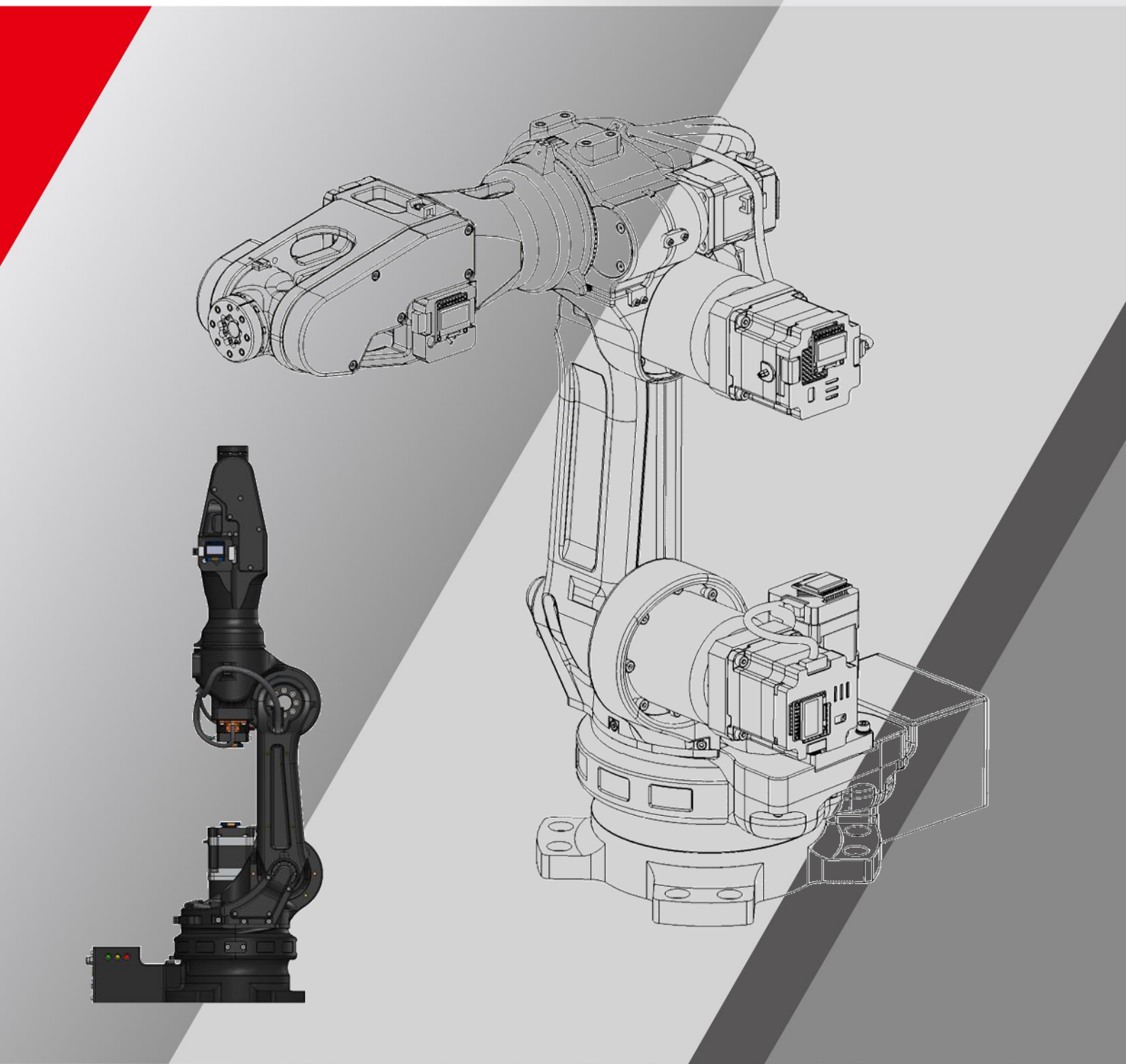
Kawasaki Robotics

ASTORINO

Firmware Revision History



Preamble

This document shows the revision history of the ASTORINO firmware. It starts with firmware 3.6.1

For further questions, contact Kawasaki Robotics support.

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ASTORINO Firmware Revision History

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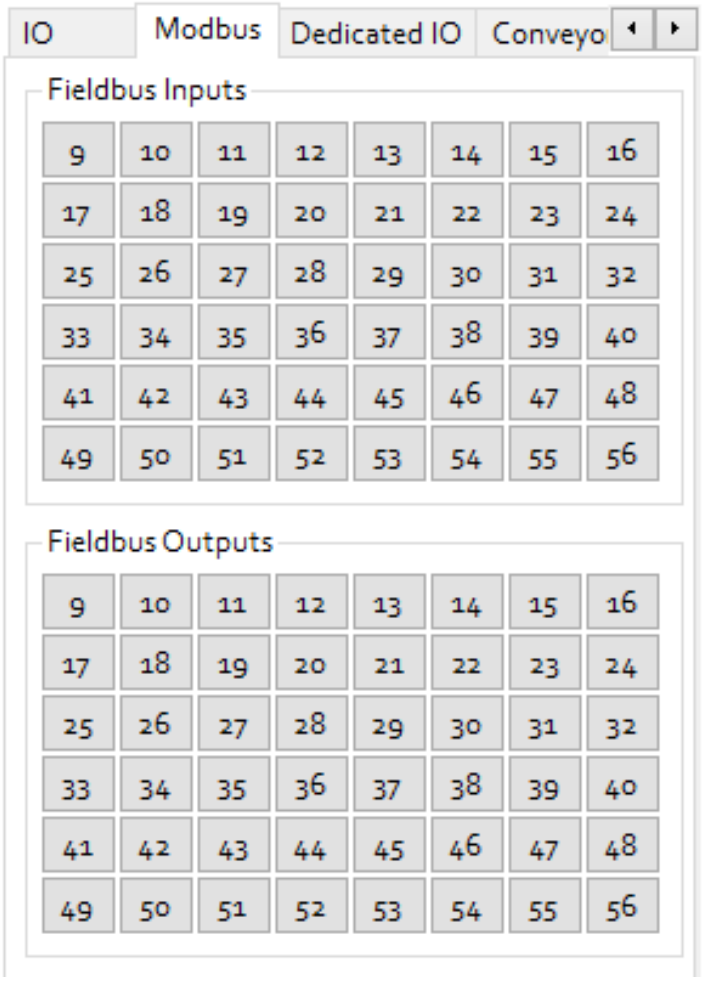
1 Firmware 3.6.1 and Software 1.55

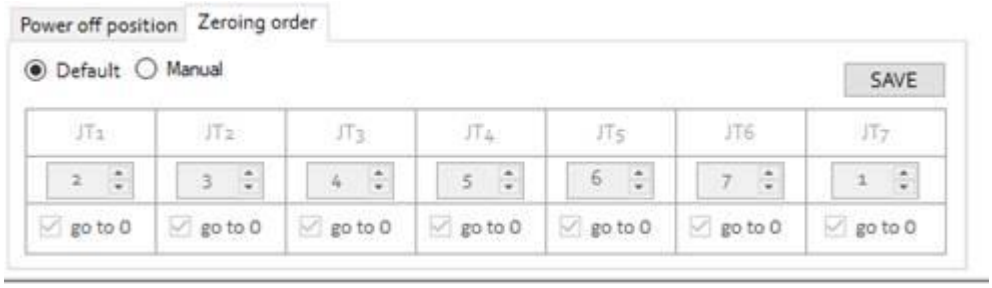
Updates:

- Added MODBUS TCP support – 3xholding registers (40001,40002,40003) as inputs (56 inputs) 3xholdingregister (30001,30002,30003) as outputs (56 outputs)



- Added CALL function (example CALL INIT) – nesting programs
- Point adding is now possible (ex. POINT TEST = P0 + P1)
- Added INT() function

- ADDED point with slash functions:
  - o Point/x
  - o Point/y
  - o Etc.
- Added zeroing order – now you can choose the zeroing order. Many axes can zero at the same time to decrease zeroing time, also you can choose if the axis should or should not go to 0 deg after finding location



- Inverse and forward kinematics on point variable is working – (ex. POINT temp = #p0 or POINT #temp = P0)
- Array variables are now available (real and string) – ex. tab[0] = 100 , $data[0] = "hello"
- Added DECOMPOSE function (ex. DECOMPOSE tab[0] = P0)
- Now when Cycle is ON you can use AS functions in Terminal (ex. SIGNAL 1 or TEST = 10)
- Auto recovery of SD card added – if some files are missing robot will try to repair them. Used also after firmware update to create new required files.
- ALWAYS parameter is now working (ex. SPEED 100 MM/S ALWAYS)
- Running program line indicator is now working inside LOOPS

Bug fixes:

- Only one user can connect to the robot – deleted problem with communication if one user is connected via USB and second want to connect via Ethernet
- Stability and error handling improved

2 Firmware 3.7.3 and Software 1.8

Updates:

- added support for astorinoIDE

- added **FRAME** function

- increased point list to 100 P0..P99

- now only saved points are displayed in astorino software

- increased connection to robot speed

- added array of points - POINT tab[0] = p0

- now user points names are stored inside SD card, for example POINT pick and loaded to RAM after power up

- added French language

- added Japanese language

- rebuild point system - old backup must be modified by hand to load

- added input/output 57/58 for B version of a robot

- as language - fixed some minor bugs

- added **RETURN** function (from CALL)

- added **STEP** keyword for FOR loop

- added functionality of skipping arguments for example TRANS(,,,100,,,,), skipped value is set to 0

- added ^ for exponentiation operations

- added **DELETE/L. DELETE/P DELETE** without an argument will delete a program

- added **OPENI** (57 ON 58 OFF)

- added **CLOSEI** (57 OFF 58 ON)

- removed need for **ANY** in **CASE** function

- improved brackets in IF/WHILE:

if ((sig(2001) == true) and sig(2002) == true)) then =>

 if sig(2001) == true and sig(2002) == true then

Bug fixes:

- fixed power off position saving procedure

- fixed error in OAT angles

- fixed error of out off range when power off position on jt2 was set to 90 deg

- fixed HERE function, now works in both way HERE P10 and POINT P10 = HERE

3 Firmware 3.7.4 and Software 1.8.2

Updates:

- Added Example projects in astorinoIDE

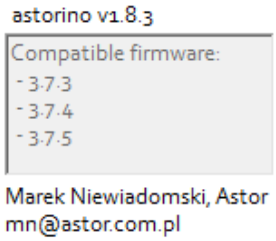
Bug fixes:

- Solved problem with stoping movement at LMOVE command, robot now will not execute stoped LMOVE as a first movement in the new cycle
- Updated and fixed line indicator of running program, now multiple FOR loops will not break line counting
- Fixed signal numbers 56 and 57 to 57 and 58
- Fixed problem when creating an array point from shift function

4 Firmware 3.7.5 and Software 1.8.3

Updates:

- Added Compatible firmware version in astorino PC software



Bug fixes:

- Fixed problem with saving points on the SD – OATs are now correctly saved
- Fixed problem with incorrect calculation of OAT when adding points

5 Firmware 3.7.6 and 3.7.6B. Software 1.8.4 and 0.87

Updates:

- Added warning "Robot not ready!" before calibration if Motors are OFF
- Added 6-point TCP calculation method
- Added Drag&Drop functionality to load programs from file
- Autocalibration of colision detection added for B-version of the robot
- Added SAFETY-FENCE – works with B-version of the robot
- 1.8.4 and 0.87 is compatible only with 3.7.6 and 3.7.6B firmware. Using older versions will effect TOOL robot data.

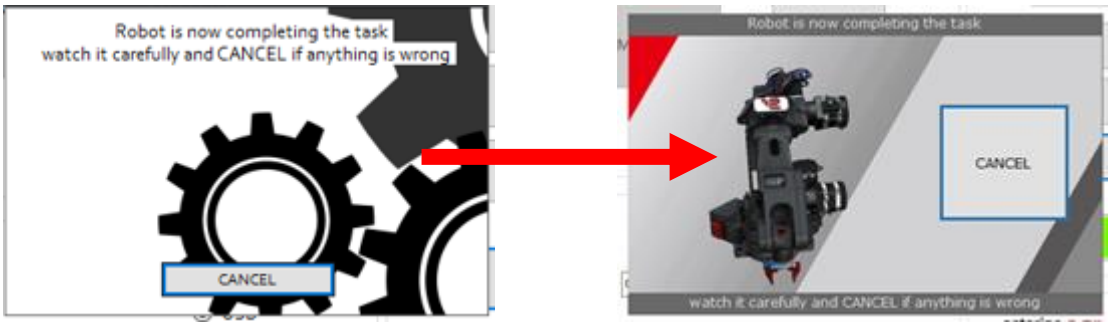
Bug fixes:

- ALIGN function now works properly
- Fixed BUG when adding point with a function for example POINT temp = RZ(90) + P0
- Fixed FRAME function, now X dir reads Z coordinate properly
- Fixed zeroing problem – after reverse rotation during zeroing now robot reads zero position correctly

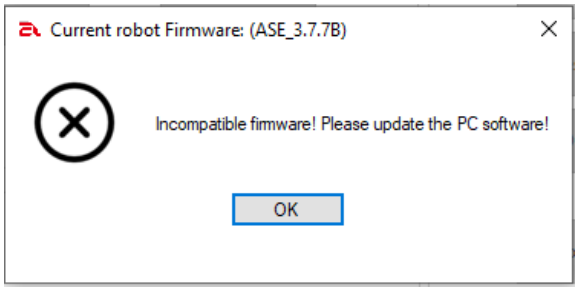
6 Firmware 3.7.7 and 3.7.7B. Software 1.8.5 and 0.87

Updates:

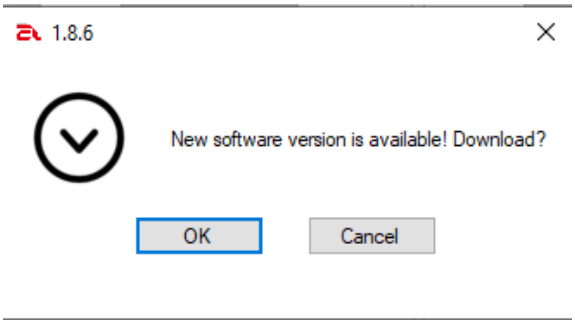
- Changed JT1, JT3 and JT5 directions in B version of a robot (now the same as in Kawasaki robots)
- Added auto retry for firmware update, only if two attempts during firmware update will fail the error is shown
- Added possibility to use SHIFT as a point in motion commands, ex. LMOVE SHIFT(P1 By 0,100,0)
- Added mathematical operations in the index brackets ex POINT TAB[4-I] = P12
- Added comments section in astorinoIDE for points
- Now first line of code in the programming Window is blocked, you cannot change the program name in the code.
- If program is modified and not loaded, the warning is displayed when changing the program from the program list
- Now selecting the same program from the program list will not modify the code in the program window.
- Added POINT/8 and POINT/9 functions
- Added multiple signal number reference in SIGNAL function ex. SIGNAL 1,-2,3 – maximum of 6 numbers can be specified
- Now after communication error, you do not need to restart the astorino application, reconnect works.
- Serial communication now works faster, no delay after receiving the data
- Changed warning window look



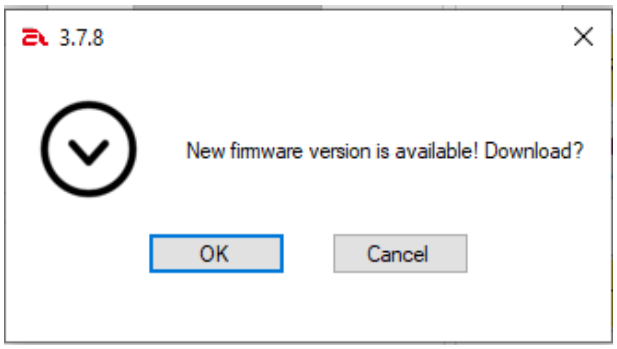
- Added compatible firmware test after connection. If firmware is not compatible with PC software then connection is closed. The current firmware version is displayed in the Warning Window.



- Added auto software update check. Now astorino software will check if there is a new version on the server and will give an user possibility to download it.



- Added auto firmware update check. Now astorino software after connecting to the robot will check if there is a new firmware version on the server.



Bug fixes:

- Fixed motion when robot reaches maximum workingspace
- Fixed Collision Detection function, now is much more responsive.
- Added 500ms filter-delay after signal is turned ON/OFF not to trigger CollisionDetection after closing and opening the gripper (pneumatic)
- Fixed loading of the settings after connection to the robot when the CYCLE is ON
- Fixed error when receiving data from TCP/IP and UDP

- Fixed problem with turning off Cycle when using only no-motion commands in a program like PRINT, TWAIT, SEND etc.
- Fixed the problem when downloading the program in TeachMode. Error appering after the download and robot switches to RepeatMode
- Fixed out off numeric range error when using TOOL 3
- Fixed problem with unstable work of warming window that shows up when executing motion in TeachMode
- Fixed the bug with linear motion to precision point (#point) when TOOL data contains rotations (OAT <> 0). Example LMOVE #P0
- Fixed the bug with loading points to the robot in Ethernet mode
- Points list now clears after pressing disconnect button or the conneciton was lost,
- Solved problem with CALL function – now maximum number of nested program is 5,
- CALL now cannot call parent program.
- Now you can skip „==TRUE" or „==FALSE" when usisng SIG() in the IF statments
- Fixed critical bug when using FOR loop without a viariable ex. FOR 1 TO 4, now will display an error
- Fixed bug with SHIFT() function when point is declared as NULL, ex SHIFT(NULL BY 100,0,0)
- VAL function now return double not int.
- Fixed problem of jerk movement when typing command in the Terminal during LMOVE executions.
- Fixed problem with TOOL command after stopping the aplication.

Known Issues:

7 Firmware 3.7.8 and 3.7.8B. Software 1.8.6 and 0.88

Updates:

- Now as in AS language system, when variable is not defined error will be shown.
- Firmware is compatible with TeachPendant, now you can use TP to move and program the robot,
- Added new things to Visualization window:
    - .stl files can be added as TOOL, WORK or OBSTACLE,
    - Simple shapes gererator for adding objects (Cube, Cuboid, Cone, Cylinder, Sphere, Piramid, Pipe) as Tool, Work or Obstacle
    - TrackLine visualization, recording and exporting
    - Robot position can be changed in the Visualization window
    - Work objects can be moved by a robot.
    - Exporting and importing scene from/to xml file.
- Added TIMER function
- Added variable is not defined functionality when initialized variable is used.
- Added virtual encoder counter for conveyor simulations
- In IDE added virtual conveyor visualization
- In IDE collision detection between objects in visualization added
- In IDE visualization layout can be saved to the Project folder
- In IDE added conveyor tracking Example project
- In IDE added UDP communication example in the TCP example project,
- Increased the connection speed when there is no program on the robot,

Bug fixes:

- Fixed error of jerk move with very small arcs using CMOVE,
- Fixed error with Conveyor setup
- Fixed error with POINT/OAT etc. commands that resolved in CPU freeze,
- Fixed syntax error error that happened when first command was SPEED and next one was function without argument e.x. HOME
- Fixed problem with external encoders, configuration and general working problem,
- Fixed error with saving encoder data to points. POINT/8 and POINT/9
- Fixed CONV Tech movement, now you can switch between conv1 and conv2 with a CVCOOPJT command
- Fixed XMOVE – OAT now are correctly calculated
- Fixed maximum range calculation – now XYZ is correctly calculated

- Fixed WorkingSpace in play mode, now WorkingSpace is checked during program execution, not only during Teach movements
- Fixed error numbering order,

8 Firmware 3.7.9 and 3.7.9B. Software 1.8.7 and 0.89

Updates:

Bug fixes:

- Fixed error with Ethernet connection,
- Fixed problem when using CALL function with Ethernet Connection that resulted in CPU reset,
- Fixed problem with freeze when using older firmware than 3.7.7 during connection

9 Firmware 3.8.0 and 3.8.0B. Software 1.8.8 AstorinoIDE 0.9

Bug fixes:

- Fixed errors with point editor – program was not uploading changed values
- Fixed error with loaded program icon on the project tree, now after uploading the program "program not loaded" arrows disapear.
- Fixed error when project open was canceled and still there was a reset in a project tree view
- Fixed error with an Unexpteced symbol after stoping the program which contains a CALL function
- Fixed problem with uploading a program opened from a file.
- Fixed INRANGE function – now in range test is performed correctly
- Fixed problem with small letters program name in IDE
- Fixed problem when presing download button and no program was selected

Known issues:

- HERE inside loops and inside IF statements is not working ex HERE TEMP, solution POINT TEMP = HERE
- $ENCODE in loops might result in null pointer and CPU reset

10 Firmware 3.8.1 and 3.8.1B. Software 1.8.9 AstorinoIDE 0.95

Bug fixes:

- Fixed error when loading programs with non ASCII characters
- Fixed problem with HERE inside loops and IF statements,
- Fixed error with loading backup to the robot, now all files and settings are removed before loading data from file
- Updated motion range calculation.
- Fixed error with poweroff position default button.
- Fixed multiple issues with screen scalling on high DPI monitors.
- Fixed problem with deleting all point from the Point list if loaded file did not have .TRANS or .JOINT points. Now points will be deleted only if in the file are any points of specific type.
- Non “do” Commands are executed in the terminal even if robot is in error/ estop or hold state
- Fixed error line indicator
- $ENCODE in loops now will not result in CPU reset
- Fixed error of deletion of the information about start-up program after uploading programs.

Updates:

- Added functionality to move robot in Teach mode with keyboard arrows, LEFT/RIGHT (X+,X-), UP/DOWN (Y+,Y-), +/- (on numpad) (Z+/Z-),

SHIFT + LEFT/RIGHT (RX+,RX-), UP/DOWN (RY+,RY-), +/- (on numpad) (RZ+/RZ-),

- Added progress bar to points tab for visualisation of loading data to the robot
- Added modbus client, now you can connect two astorinos by modbus or to modbus server (same signal poll as previously) – **Client does not update (poll) during motion of a robot**
- SD card auto repair/update is now done automatically, one does not need to connect to the robot and then restart it.
- Added warning when program line is to long (more than 115 characters line cannot be loaded to the robot)
- Added user point names in Points List in JOG tab - IDE,
- Changed Status layout,
- Changed IO layout
- Added pop-up window when error occurred – errors are translated to currently selected language
- Point list dropdown list now contains user-named points, not only Pxx or #Pxx
- User-named points selected in the dropdown list can be rethought or motion to selected point can be executed
- If entered command in the Terminal caused an error robot will not be stopped and the error code will be displayed in the Terminal

Known issues:

- Sometimes if the Cycle is on, entered command into the Terminal will return an error – variable is not defined.

11 Firmware 3.8.2 and 3.8.2B. Software 1.9.0 AstorinoIDE 1.0

Bug fixes:

- Fixed error with Warnings – not pop up window will show text.
- Fixed error with updates from TP
- Many stability and functional updates when working with TP

Known issues:

- Sometimes if the Cycle is on, entered command into the Terminal will return an error – variable is not defined.

12 Firmware 3.8.3 and 3.8.3B. Software 1.9.1 AstorinoIDE 1.1

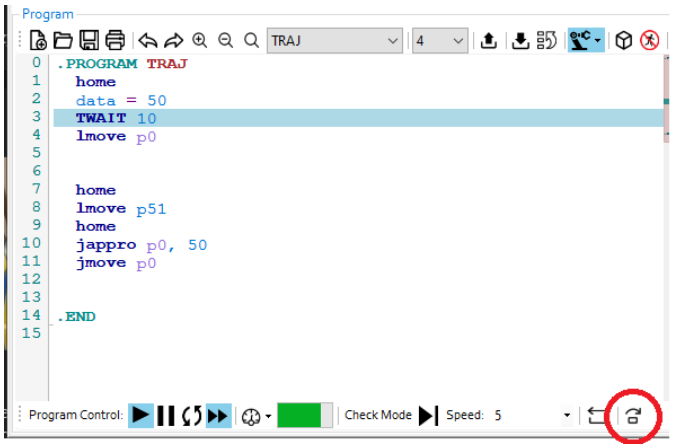
Bug fixes:

- Fixed error with app crash when syntax error in code accured
- Fixed problem with Delete key on Points List, now delete key will work the same as delete button in the app.
- Motion window now will close automatically when motion is executed to current location of a robot,
- Fixed minor error codes spell errors,
- Fixed problem with duplicating program names,
- Fixed problem with CTRL+X, CTLR+C, CTRL+V, CTRL+A in code editor,
- Fixed problem with 7th axis motion with TP
- Now reset button on TP will close any Error, Warning window that is open on PC
- Fixed problem with JUMP function and #Px points
- Fixed problem with Motion Warning Window not showing up when executed motion is at very low speed,
- Reduced loud noise of JT2/3 motors,

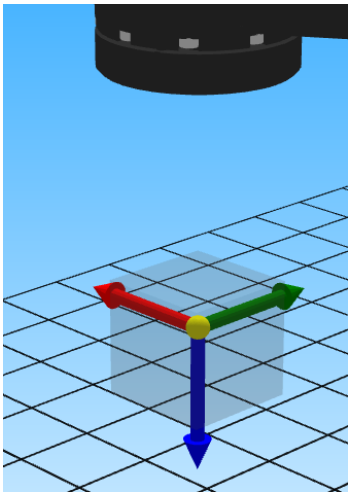
- Fixed problem with connection to TP or PC when there is a lot of programs > 30
- Fixed memory leak problem with DECODE function
- Fixed problem with LAPPRO, JAPPRO, JUMP, CVLAPPRO functions when second argument was a variable

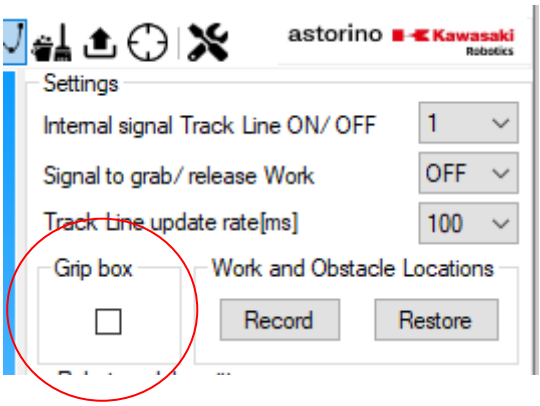
Updates:

- Added Terminal commands: **HALT, RUN, CONTINUE NEXT, REP_ONCE ON/OFF, STP_ONCE ON/OFF, STPNEXT, ZIOACTIVE 1/0, STOP**
- Extended WAIT functionality -now it can hadle complex code for example WAIT TIMER(3) >2
- Extended SWAIT functionality, now it can handle more that one argument ex. SWAIT 2001,1001 (works as AND statement)
- Added TRADD,TRSUB function
- Added ACCURACY x **ALWAYS**
- Removed IO Enable button – replaced by ZIOACTIVE command
- Added functionality to skip waiting for condition (ex. SWAIT, WAIT SIG(x), TWAIT)

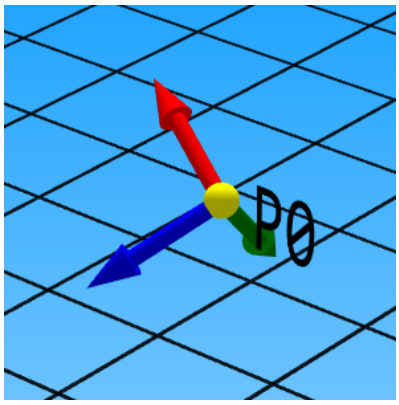


- Disabled possibility to edit program code in Repeat mode and when Cycle is ON,
- Added grabzone to the Visualization, WORK is grabed when work and Grabzone collide,

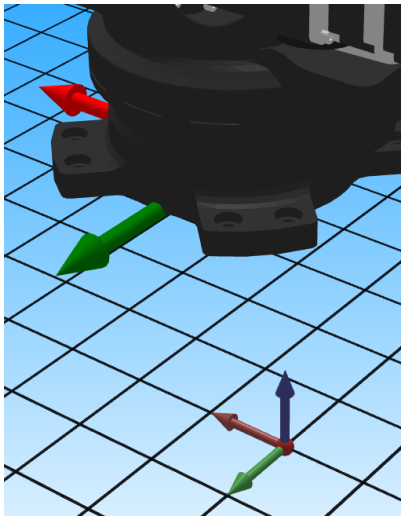




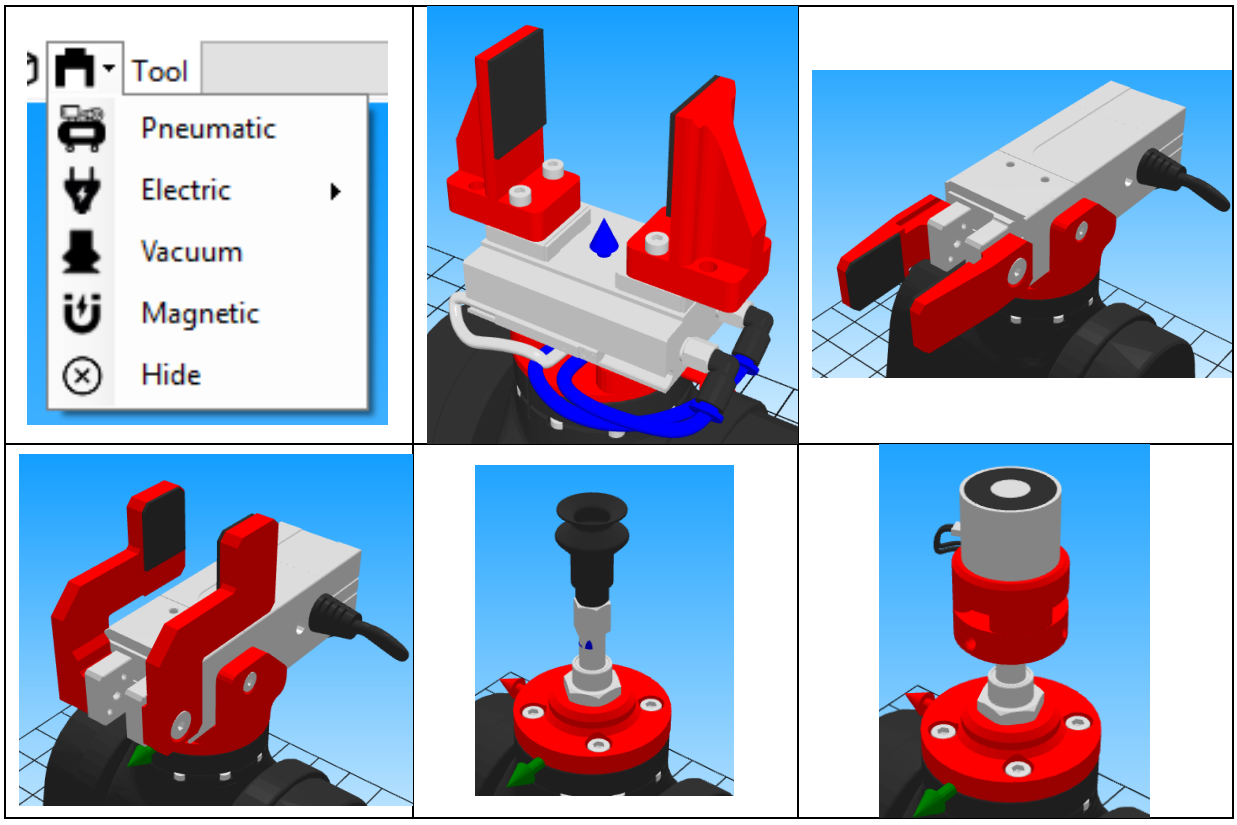
- Added Points 3D models in the Visualization



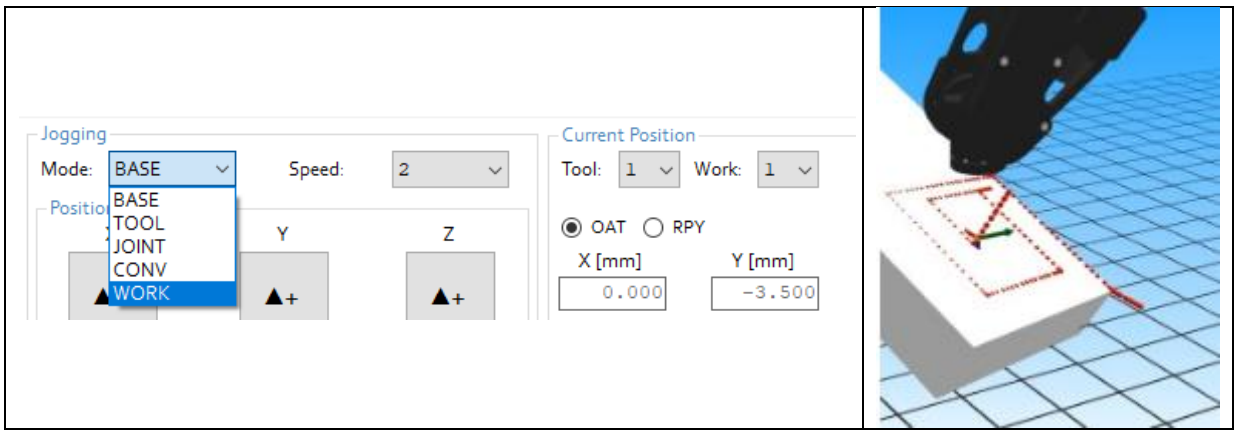
- Added separate BASE and WORLD coordinate system Visualization



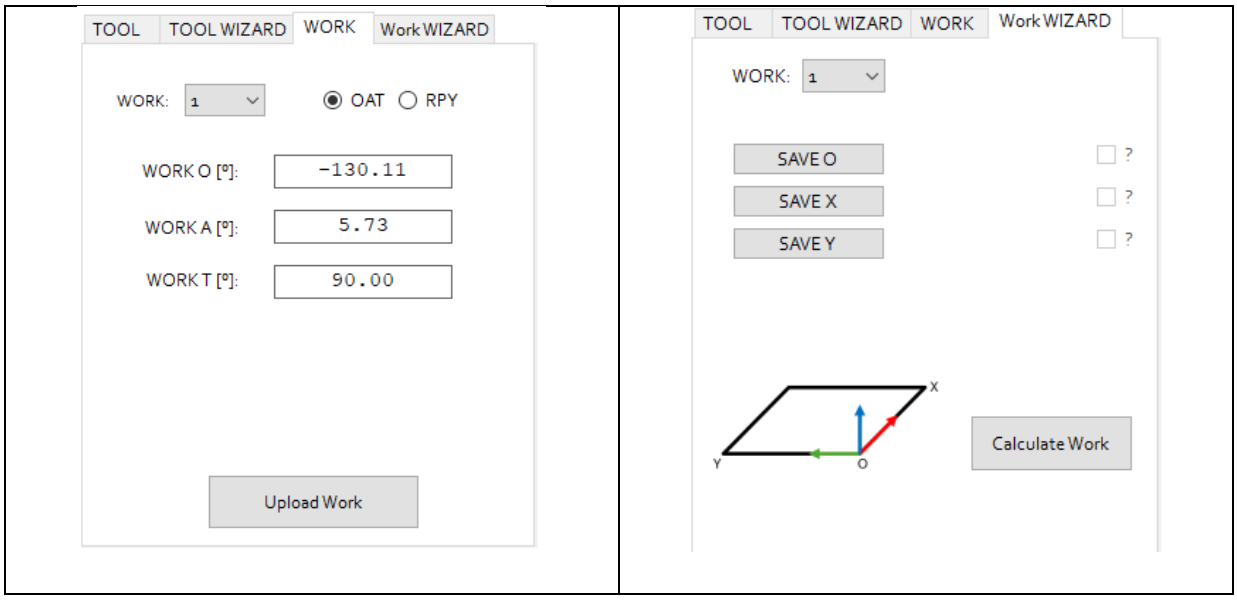
- Added new grippers 3D models



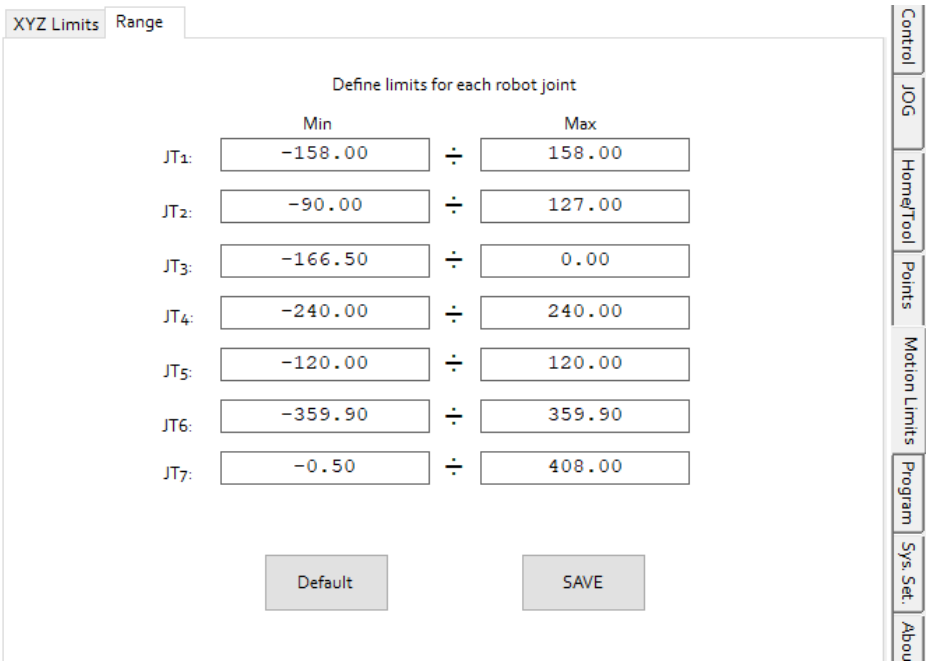
- Now after successful connetion by ethernet, IP adress will be stored and will be loaded after running the app
- Added WORK coordinate system to move the robot in TEACHMODE,



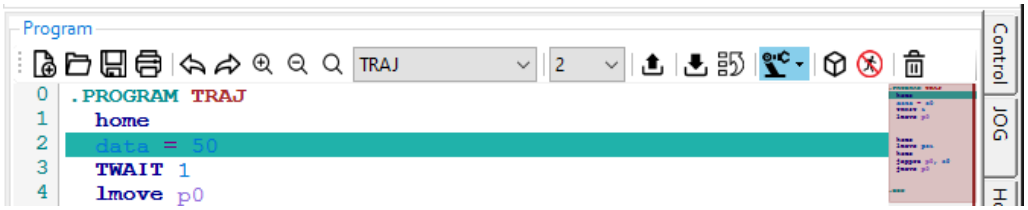
- Added work calculation wizard, two WORK coordinate systems can be calculated



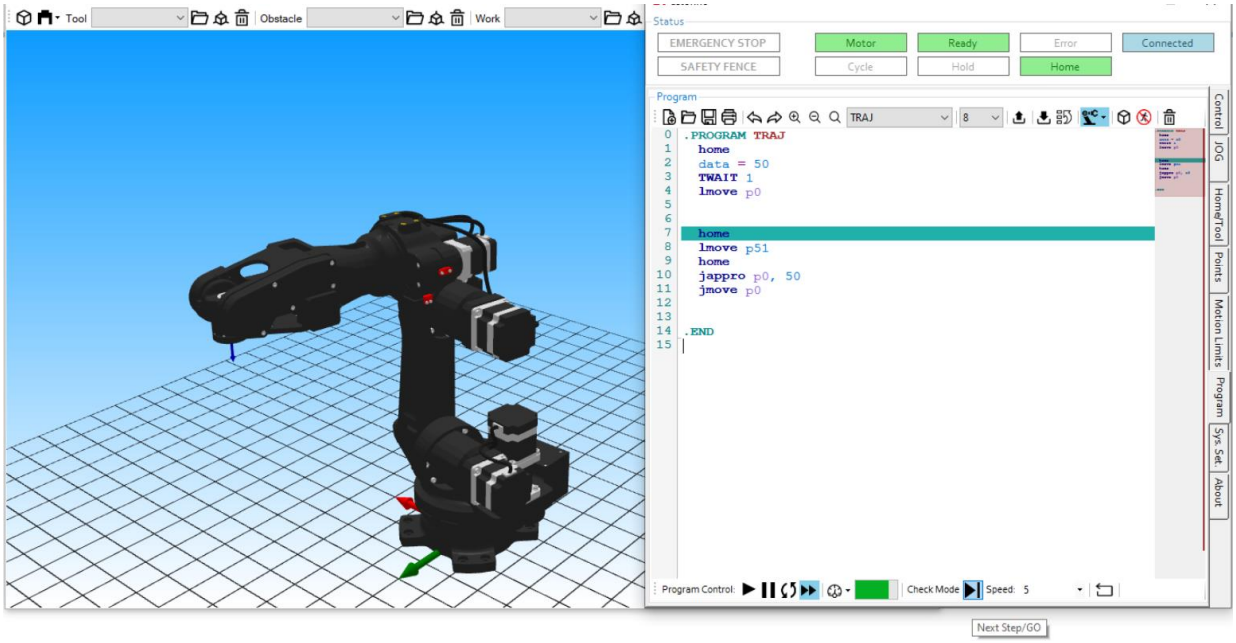
- Added a functionality to reduce the range of motion in JT space

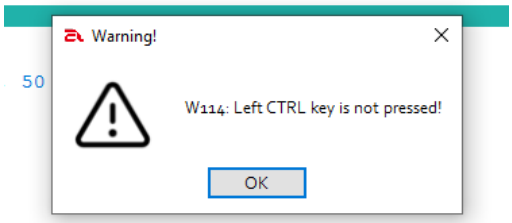


- Added program selection line in code editor

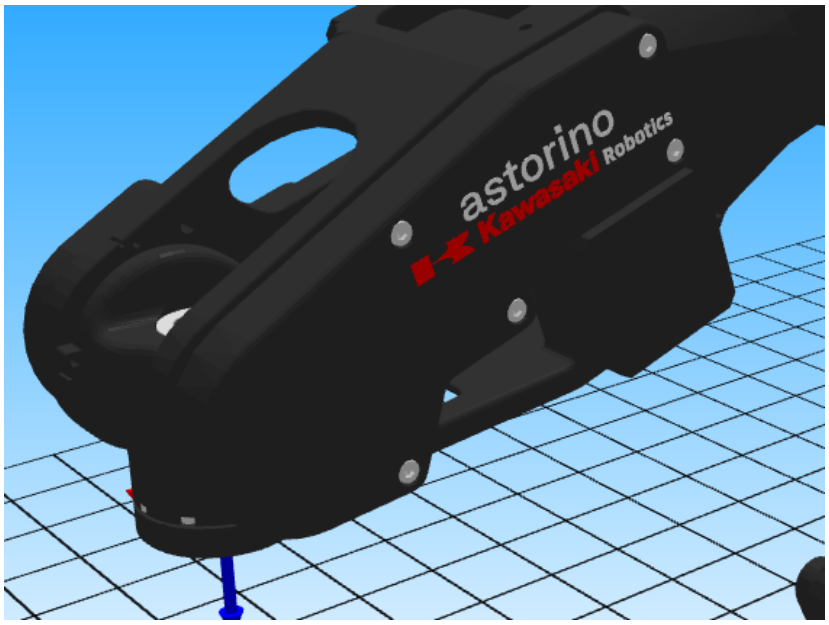


- Now after selecting the code line user can run this line by pressing CTRL button on the keyboard and NextStep/Go button on the Program control tab

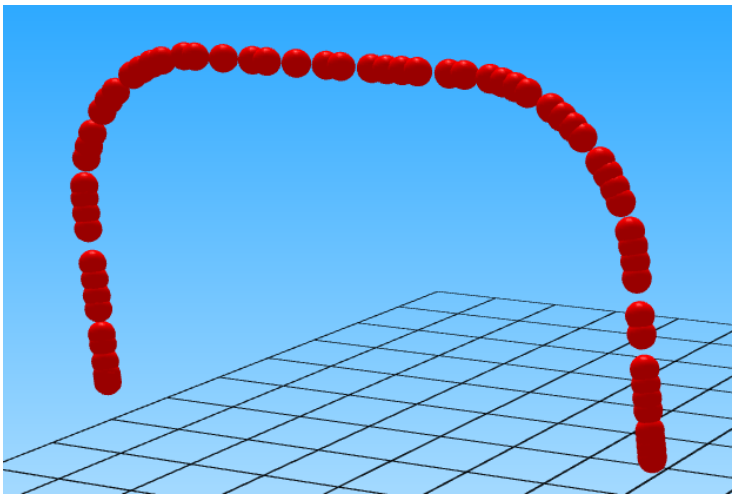




- Added logo to the robot arm in the Visualization window



- Changed jump function. Now it creates a continues path with an arc defined by an accuracy parameter



- Fixed problem with TCP/IP communication – Connection to server is now fixed

Known issues:

- Sometimes if the Cycle is on, entered command into the Terminal will return an error – variable is not defined.

13 Firmware 3.8.4 and 3.8.4B. Software 1.9.2 AstorinoIDE 1.2

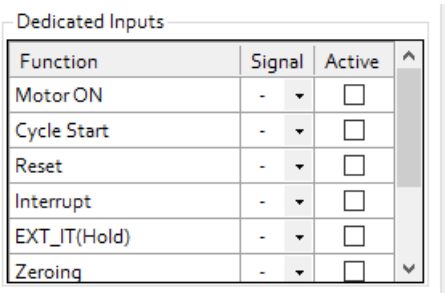
Bug fixes:

- Fixed minor errors with error codes numbers,
- Fixed problem with IO module when SD card was autorepaired.
- Fixed problem with many pop up windows during initialization
- Fixed problem with FRAME function when entered JOINT (#...) points
- Fixed problem with editor, now entering ".end" will not block lines underneath
- Fixed problem with connection to PC when robot is running a cycle
- Fixed problem with connection lost if Teaching a point takes longer time,
- Fixed problem with zeroing in an A version of a robot

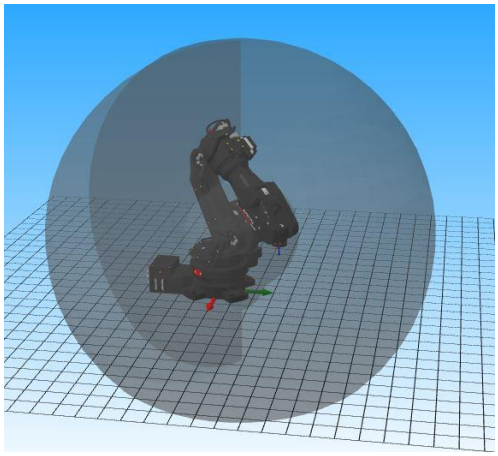
- Fixed problem with zeroing buton after zzero command was typed in the terminal
- Fixed problem with SHIFT command used in motion commands, now it will not result in memory leak.
- Fixed problem with jerk in JUMP command where difference in orientation between points is very small.
- Fixed problem with a wrong program code displaying on the TP, when using CALL function and at the same time robot is connected to the PC

Updates:

- Added warning information before teaching a point if it already exists,
- Added posibility to run program from selected line – works only on simple code, running from inside loops, conditions etc will result in a error
- Added German language
- Added possibility to set INTERNAL signal as dedicated output or input.
- Changed Dedicated IO layout

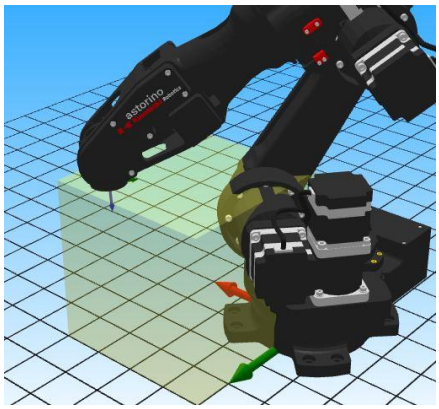


- Added working Range in the visualization



- Added four Working Space regions
- Added four dedicated outputs for Working Space

- Added Working Space (1-4) visualization in Visualization window



- Added a firmware file check before upload to disable a possibility of uploading robot firmware to a TP and vice versa

Known issues:

- Sometimes if the Cycle is on, entered command into the Terminal will return an error – variable is not defined.
- JUMP function in high speeds in some cases might result in error: JT suddenly changed.

14 Firmware 3.8.5 and 3.8.5B. Software 1.9.3 AstorinoIDE 1.3

Bug fixes:

- Fixed starting a cycle when connected via ethernet
- Fixed some minor problems with backup file loading
- Fixed problem with loading/saving backup file, not all data was loaded/saved.
- Fixed dedicated output numbering,
- Fixed problem with JT6 zeroing when JT5 after zeroing is not set to 0 seg.
- Fixed lot of minor stability problems,

Updates:

- Added possibility to load AS files. AS file can contain programs, locations and other settings on a single file,
- Added possibility to look for IP adress of astorino robot,

- Added communication protocol to control astorino from separe software,
- Created C# API,

Known issues:

- Sometimes if the Cycle is on, entered command into the Terminal will return an error – variable is not defined.
- JUMP function in high speeds in some cases might result in error: JT suddenly changed.

Kawasaki Robot
ASTORINO
Firmware Revision History

2024-09: 8th Edition

Publication: KAWASAKI Robotics GmbH

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