# HAL Compatibility

*01/01/2014 | HAL 0.5.0.0*

| Available | To be tested | Not yet available | x Cannot be implemented |
|---|---|---|---|

| Component | Feature | ABB | KUKA | UR |
|---|---|---|---|---|
| Robot presets | | ● | ● | ● |
| | *Very small range* | IRB120<br>IRB140 | KR5 R650<br>KR5 R850<br>KR6 R900 | UR5<br>UR10 |
| | *Small range* | IRB1600 120<br>IRB1600 145<br>IRB2400 M94<br>IRB2600 165 | KR6-2<br>KR16-2 | x |
| | *Medium range* | IRB4400 196<br>IRB4600 205<br>IRB4600 255 | KR30-3<br>KR60-3<br>KR210-2 | x |
| | *Large range* | IRB6620 220<br>IRB6640 (+ID)<br>IRB6400 280<br>IRB6660 190 | KRXX-2500<br>KRXX-2700<br>KRXX-2900<br>KRXX-3100 | x |
| | *Very large range* | x | KR1000 | x |
| Robot creator | | ● | ● | x |
| Robot data extractor | | ● | ● | ● |
| Robot axis configuration | | ● | ● | ● |
| Positioner presets | | ● | ● | x |
| | *Tracks* | IRBT6004 | | x |
| | *Tables* | | DKP400 | x |
| Rotary table creator | | ● | ● | ● |
| Track creator | | ● | ● | ● |
| 2-Axis table solver | *Towards a given direction* | ● | ● | ● |
| | *"" with increment* | ● | ● | ● |
| | *2-Axis horizontal optimization* | ● | ● | ● |
| Track solver | *Closest to position* | ● | ● | ● |
| | *Offset from position* | ● | ● | ● |
| External axis manager | | ● | ● | x |
| Collisions solver | *Against the context* | ● | ● | ● |
| | *Against the tool* | ● | ● | ● |
| | *Between the arm and the base* | ● | ● | ● |
| | *Joints 1-3 against joints 4-6* | ● | ● | ● |
| | *Against parts* | ● | ● | ● |
| Flip value list | *Elbow* | ● | ● | ● |
| | *Wrist -/+* | ● | ● | ● |
| | *Elbow* | ● | ● | ● |
| | *Elbow & Wrist -/+* | ● | ● | ● |
| | *Shoulder* | ● | ● | ● |
| | *Shoulder + Elbow* | ● | ● | ● |
| | *Shoulder + Elbow + Wrist* | ● | ● | ● |
| Forward kinematics solver | *Constrained FK solving* | ● | ● | ● |
| | *Robots with link and/or hydraulic cylinders* | ● | ● | x |
| | *Singularities detection* | ● | ● | ● |
| Inverse kinematics solver | *Multi-robot compatible IK solving with flips* | ● | ● | ● |
| | *Robots with link and/or hydraulic cylinders* | ● | ● | x |
| | *Singularities detection* | ● | ● | ● |
| | *Simulation of DO-synced mechanical tools* | ● | ● | ● |
| | *Large reorientation detection* | ● | ● | ● |
| | *Graphical error display* | ● | ● | ● |
| | *Advanced attributes matching* | ● | ● | ● |
| | *Advanced error log* | ● | ● | ● |
| Mode value list | *Code generation* | ● | ● | ● |
| | *Toolpath preview* | ● | ● | ● |
| Mode switch | *Mode switch with DO status history* | ● | ● | ● |
| Motion interpolation value list | *Linear* | ● | ● | ● |
| | *Non linear* | ● | ● | ● |
| | *Joint* | ● | ● | ● |
| | *Linear + digital output* | ● | ● | ● |
| | *Joint + digital output* | ● | ● | ● |

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|---|---|---|---|---|
| Toolpath | | ● | ● | ● |
| Toolpath data extractor | | ● | ● | ● |
| Toolpath interpolation | | ● | ● | ● |
| Autofix toolpath | | ● | ● | ● |
| Merge toolpaths | | ● | ● | ● |
| Partition toolpath | | ● | ● | ● |
| Reverse toolpath | | ● | ● | ● |
| Toolpath display | | ● | ● | ● |
| Attributes list manager | | ● | ● | ● |
| Attributes tree manager | | ● | ● | ● |
| Divide curve | | ● | ● | ● |
| Sort by attributes | | ● | ● | ● |
| Target deviation check | | ● | ● | ● |
| Target naming | | ● | ● | ● |
| Target orientation | | ● | ● | ● |
| Update check | | ● | ● | ● |
| Overrides | | ● | ● | x |
| Speed preset | *TCP velocity* | ● | ● | ● |
| | *TCP reorientation velocity* | ● | ● | x |
| | *Axis velocity* | x | ● | ● |
| | *External axis velocity* | ● | ● | x |
| | *TCP acceleration* | ● | ● | ● |
| | *TCP deceleration* | ● | x | x |
| | *Axis acceleration* | x | ● | ● |
| | *External axis acceleration* | x | ● | x |
| Tool preset | | ● | ● | ● |
| Reference system preset | | ● | ● | x |
| Zone preset | | ● | ● | ● |
| Post processor | *Condensed code* | ● | ● | ● |
| | *Extended code* | ● | ● | ● |
| | *Speed presets detection* | ● | x | x |
| | *Zone presets detection* | ● | x | x |
| | *Tool presets detection* | ● | x | x |
| | *Reference coordinate system presets detection* | ● | ● | x |
| | *Default interpolation zone* | ● | ● | ● |
| | *Default reference coordinate system* | ● | ● | x |
| | *TCP coordinates* | ● | ● | ● |
| | *TCP rotation matrix* | ● | ● | ● |
| | *External axis* | ● | ● | x |
| | *Joints configuration* | ● | ● | ● |
| | *Synced digital outputs* | ● | ● | ● |
| | *Velocity, time and acceleration overrides* | ● | ● | ● |
| | *Reference coordinate system override* | ● | ● | x |
| | *Tool override* | ● | ● | ● |
| | *Speed override* | ● | ● | ● |
| | *Zone override* | ● | ● | ● |
| Quick task | | ● | ● | ● |
| Module | | ● | x | x |
| Procedure | | ● | x | x |
| Program Exporter | | ● | ● | ● |
| Program Importer | *Program name* | ● | ● | ● |
| | *Cartesian position declarations* | ● | ● | ● |
| | *Joint position declarations* | ● | ● | ● |
| | *External axis values* | ● | ● | x |
| | *Position names* | ● | ● | ● |
| | *Speed presets* | ● | ● | x |
| | *Zone presets* | ● | ● | x |
| | *Tool presets* | ● | ● | x |
| | *Reference coordinate system presets* | ● | ● | x |
| | *Time-based movements* | ● | ● | ● |
| | *Linear move commands* | ● | ● | ● |
| | *Non linear move commands* | ● | ● | ● |
| | *Joint move commands* | ● | ● | ● |
| | *Linear move with DO commands* | ● | ● | ● |
| | *Joint move with DO commands* | ● | ● | ● |
| Frame Translator | | ● | ● | ● |
| Box Dimensions | | ● | ● | ● |
| Extract Face | | ● | ● | ● |
| Face Value List | | ● | ● | ● |

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|---|---|---|---|---|
| Sort Geometry | | ● | ● | ● |
| Datatree Recorder | | ● | ● | ● |
| Always Even/Odd | | ● | ● | ● |
| First 'N' Last | | ● | ● | ● |
| Path To Tree | | ● | ● | ● |
| String Multi-Join | | ● | ● | ● |
| String Multi-Split | | ● | ● | ● |
| Add/Subtract | | ● | ● | ● |
| Assign | | ● | ● | ● |
| Comment | | ● | ● | ● |
| Increment/Decrement | | ● | ● | ● |
| Number | | ● | ● | ● |
| String | | ● | ● | ● |
| Clock | | ● | x | x |
| Clock reset | | ● | ● | x |
| Clock start/stop | | ● | ● | x |
| For…From…To | | ● | ● | x |
| If…Then…Else | | ● | ● | ● |
| Test…Case…Default | | ● | ● | x |
| While…Do | | ● | ● | ● |
| GoTo | | ● | ● | x |
| Label | | ● | ● | ● |
| Clear | | ● | ● | x |
| Error | | ● | ? | x |
| Halt | *Break in the program execution* | ● | ● | ● |
| | *Immediate break in the program execution* | ● | ● | x |
| | *Abort program execution* | ● | ● | x |
| | *Temporary break in the program execution* | ● | x | x |
| | *Break in the current cycle* | ● | x | x |
| Raise error | | ● | ? | x |
| Retry/TryNext | | ● | ? | x |
| Store/Restore | | ● | ? | x |
| Call by variable | | ● | x | x |
| Call procedure | | ● | ● | ● |
| Function | | ● | ● | ● |
| Trap | | ● | cf. Interrupt | x |
| Enable/Disable | | ● | ? | x |
| I/O device | | ● | ? | x |
| Invert DO | | ● | ● | ● |
| Set/Reset DO | | ● | ● | ● |
| Set xO | *Analog output* | ● | ● | ● |
| | *Digital output* | ● | ● | ● |
| | *Signal group* | ● | ● | x |
| Connect | | ● | cf. Interrupt | x |
| Interrupt ID | | ● | ● | x |
| Interruption | | ● | ● | x |
| Wait | *For an input state* | ● | ● | x |
| | *For an output state* | ● | ● | x |
| | *For a certain amount of time* | ● | ● | ● |
| | *For a condition* | ● | ● | x |
| Load/Unload | | ● | ? | x |
| Open/Close | | ● | ? | x |
| Rewind | | ● | ? | x |
| Save | | ● | ? | x |
| Write | | ● | ? | x |
| Pulse DO | | ● | ● | x |
| Read input | *Analog input* | ● | ● | ● |
| | *Digital input* | ● | ● | ● |
| | *Signal group* | ● | x | x |
| Read output | *Analog input* | ● | ● | ● |
| | *Digital input* | ● | ● | ● |
| | *Signal group* | ● | x | x |
| Test DI | | ● | ● | ● |
| Teach pendant | | ● | ● | ● |
| HAL to controller | *Detection of robots on the network* | ● | ● | x |
| *ABB: necessitates an IRC5 controller with "PC Interface" option.* | *Task uploading* | ● | ● | ● |
| | *Execution controls* | ● | ● | x |
| | *Task management operations* | ● | ● | x |
| | *Real-time streaming* | ● | ● | ● |

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|---|---|---|---|---|
| | *Real-time I/O management* | 🟢 | 🔴 | x |
| | *Real-time I/O monitoring* | 🟢 | 🔴 | 🔴 |
| | *Real-time axis monitoring* | 🟢 | 🔴 | 🔴 |
| | *Real-time TCP monitoring* | 🟢 | 🔴 | 🔴 |
| | *Real-time execution monitoring* | 🟢 | 🔴 | 🔴 |
| HAL OSC Listener | | 🟢 | 🔴 | 🔴 |
| | *TouchOSC template for iPad* | 🟢 | 🔴 | 🔴 |
| | *TouchOSC template for iPhone* | 🟢 | 🔴 | 🔴 |
| ECM Generator | | 🟢 | 🔴 | x |
| Execution value list | | 🟢 | 🔴 | x |
| Time gate | | 🟢 | 🟢 | 🟢 |
| Quick sync | | 🟢 | x | x |
| Sync declarations | | 🟢 | x | x |
| Sync operations | | 🟢 | x | x |
| Sync ID | | 🟢 | x | x |
| Sync motion | | 🟢 | x | x |
| Sync MoveX | | 🟢 | x | x |
| Task list | | 🟢 | x | x |
| Task naming | | 🟢 | x | x |
| Hotwire cutter | | 🟢 | 🟢 | 🟢 |
| Tool shifting | | 🟢 | 🟢 | 🟢 |
| Ruled surface | | 🟢 | 🟢 | 🟢 |
| HWC orientation solver | | 🟢 | 🟢 | 🟢 |
| Extend ruled surface | | 🟢 | 🟢 | 🟢 |
| Panel nesting | | 🟢 | 🟢 | 🟢 |
| Milling head | | 🟢 | 🟢 | 🟢 |
| Parallel finish | | 🟢 | 🟢 | 🟢 |
| Parrallel roughing | | 🟢 | 🟢 | 🟢 |
| Parallel gripper | | 🟢 | 🟢 | 🟢 |
| Pick and place | | 🟢 | 🟢 | 🟢 |
| Stack Generator | | 🟢 | 🟢 | 🟢 |