

Universal Robots UR20 Heavy Payload Cobot



Universal Robots UR20 Heavy Payload Cobot Instruction Manual

[Home](#) » [UNIVERSAL ROBOTS](#) » Universal Robots UR20 Heavy Payload Cobot Instruction Manual 

Contents

- [1 Universal Robots UR20 Heavy Payload Cobot](#)
- [2 Product Information](#)
- [3 Product Usage Instructions](#)
- [4 FAQs](#)
- [5 Release Versions](#)
- [6 Key Features](#)
- [7 How to use](#)
- [8 Bug Fixes](#)
- [9 User Assistance](#)
- [10 Documents / Resources](#)
 - [10.1 References](#)



Universal Robots UR20 Heavy Payload Cobot



Product Information

- **Specifications:**

- **Software Version:** 5.16.0

- **Key Features:**

- Improved path following for UR20 and UR30 robots
 - Enhanced repeatability and stabilization time with high payloads
 - New joint servo tuning for optimized motion performance
 - Enables CNC machine connectivity with custom Ethernet/IP Adapter data layouts
 - PolyScope GUI Controller

Product Usage Instructions

- **How to Use the Flexible Ethernet/IP Adapter:**

- The Flexible Ethernet/IP functionality is provided by a built-in service on the UR Robot. Follow these steps to gain full access to data exchanged with an Ethernet/IP Scanner:
 - Use the Interface for enabling custom assembly instances, which is an XML-RPC interface with a few functions.
 - Use the Interface for configuring data layout and accessing process data available in URScript.
 - Both interfaces are documented in the Script Manual in the Flexible Ethernet/IP Adapter chapter.
 - You can use it directly from URScript as a script library or from URCap using XML-RPC API and contributing script functions.
 - Examples for both use cases will be available on Universal Robots GitHub account.
 - The Flexible Ethernet/IP Adapter can be used for communicating with any external Ethernet/IP scanner that requires custom data layout via custom configurations, not limited to CNC machines. It also allows for avoiding conflicts in general-purpose register usage.

- **Bug Fixes:**

- Fixed issue in PolyScope GUI where the Ethernet/IP status is always shown as green (connected) even when the PLC is not connected.

FAQs

- **Q: Can I use the Flexible Ethernet/IP Adapter with any external Ethernet/IP scanner?**
 - **A:** Yes, the Flexible Ethernet/IP Adapter can be used for communicating with any external Ethernet/IP scanner that requires custom data layout via custom configurations.
- **Q: How can I monitor data exchange with the scanner device?**
 - **A:** You can use the Watchdog feature for Flexible Ethernet/IP instances to monitor if data is exchanged promptly. Use the provided methods to set, start, and stop the watchdog as needed.

Release Versions

- **UR Software Update:** 5.16.0
- **URCap Software Platform:**
 - **URCap API:** 1.14.0
 - **URCap SDK:** 1.14.0
- **URSim Linux:** 5.16.0
- **URSim Virtual Machine:** 2.0.299
- **User Manuals:** 5.16

Key Features

Improved motor control for UR20 and UR30

- Users of UR20 and UR30 robots will see at least 30% better path following.
- Improved repeatability and stabilization time when running with high payloads.
- New joint servo tuning for optimized motion performance on UR20 and UR30.

MotionPlus

- This optional add-on module provides coordinated motion between the robot TCP and a single, external rotary axis.
- Applications include welding and part inspection. Motions within user-defined frames are supported, with time and pose synchronization between the robot TCP and the external axis position.
- Requires the optional MotionPlus URCap. Coordinated motion functions are provided as an extension to the UR Script API. A limited set of EtherCAT-capable servo drives are supported for this initial release.

World Model

- The world model introduces the ability to add a kinematic tree via user-defined frames.
- Extensions to existing motion commands (move, move, move, move, and speed) provide the ability to set the motion of the chosen TCP within a designated frame, simplifying the creation of relative motion to a part or other object in the world coordinate system.
- In addition, frame tracking will cause the robot TCP to move along with a tracked frame in the world model. While MotionPlus requires the World Model, the World Model features are available independently of the

MotionPlus add-on.

Flexible Ethernet/IP Adapter – Release for production

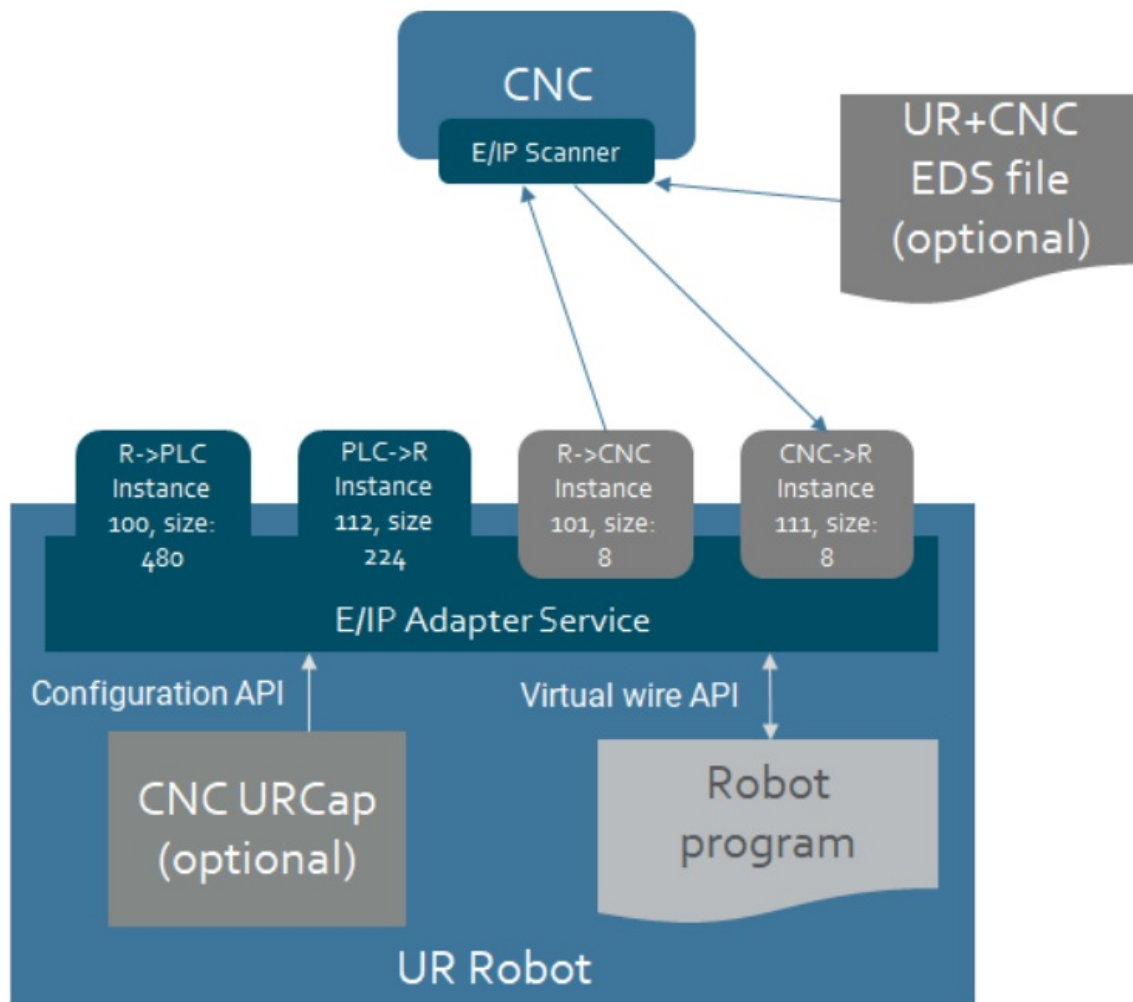
- Enables CNC machine connectivity with custom Ethernet/IP Adapter data layouts

PolyScope GUI

- Added support for UR30 to Remote TCP URCap. UR30 owners must update to SW 5.16.0 to use remote TCP features.

Controller

- **Flexible Ethernet/IP Adapter – Release for production**
 - A flexible Ethernet/IP Adapter allows to add of custom E/IP assembly instances to the existing Adapter interface running on a UR robot.
 - Flexible Ethernet/IP Adapter developed primarily for integration with CNC machines equipped with
 - Ethernet/IP Scanner. Existing built-in input and output assembly instances do not match the data layout expected by CNC machines.
 - For example, DMG-MORI NLX lathes use 8 bytes for both input and output assembly instances.
 - Most of the data are Boolean flags requesting operation, or indicating status.
 - Another example is Mazak CV5 machines using 210 bytes for both input and output.
 - Below is an example integration diagram where grey components are customized by OEM or integrator.



- Note that neither the CNC machine nor UR software needs to be modified, just configured.

How to use

How to use it?

Flexible Ethernet/IP functionality is provided by built-in service on UR Robot.

It's necessary to use two interfaces to gain full access to data exchanged with Ethernet/IP Scanner:

1. Interface for enabling custom assembly instances. This is an XML-RPC interface with few functions.
2. Interface for configuring data layout and accessing process data available in URScript.
 - Both interfaces are documented in the Script Manual in the “Flexible Ethernet/IP Adapter” chapter.
 - It can be used either directly from URScript – as a script library or from URCap using XML-RPC API and contributing script functions.
 - Examples for both use cases will be available on Universal Robots GitHub account.
 - Flexible Ethernet/IP Adapter could be used for communicating with any external Ethernet/IP scanner that requires custom data layout via custom configurations, not just the CNC machines
 - On top of having the option of exchanging just the right data, it also allows for avoiding conflicts in general-purpose register usage.

Watchdog for Flexible Ethernet/IP instances

- Similarly to the RTDE watchdog, an Ethernet/IP custom instance can monitor if data is exchanged with the scanner device promptly.
- Custom E/IP read handle (opened with `eip_reader_factory`) has the following new methods:
- `set_watchdog(frequency, action)`
- Registers a new watchdog on the handle. This can only be called on a read handle. After the call, the new watchdog will start immediately

Parameters:

- **frequency** – float, minimum allowed communication frequency. Allowed values are between 0 and 10 Hz. Fractional frequencies are allowed.
- **action** – integer
- **0: IGNORE** – no reaction when the watchdog timeouts
- **1: PAUSE** – protective stop and the program will be paused
- **2: STOP** – protective stop and the program will be stopped
- If called again on the same handle, the watchdog will be reconfigured with the new parameters.

Example: # pause program if no data was received from master for more than 400ms
`reader_handle.set_watchdog(2.5, 1)`

`start_watchdog()`

- Starts the watchdog if it was registered. Throws a runtime error if the watchdog is not registered.
- **NOTE:** Watchdog starts automatically when it's created. This function can be used in combination with `stop_watchdog()`.

`stop_watchdog()`

- Stops the watchdog if it is registered. Throws a runtime error if the watchdog is not registered.
- This method can be used to temporarily mute watchdog

Ethernet/IP Adapter XML-RPC interface

Introduced new function `is_instance_connected(instance_id)` to check the connection status of the given PLC→Robot assembly instance.

Bug Fixes

PolyScope GUI

- Fixed issue where Ethernet/IP status is always shown green (connected) even when PLC is not connected.
- Fixed an issue where a suppressed SetPayload node was loaded as a CircleMove node when loading a program.
- Improved responsiveness of PolyScope File Manager on a large number of files and folders (1000+). Fixed an issue where the File Manager would become very slow to open and navigate.

- Fixed issue with the Force node where in some situations the robot would perform unexpected movements in force mode while executing the program. This would only occur if the force mode type was changed to “Motion” after the Force node had been configured to be compliant in the x-axis with a different type of force mode.
- Fixed issue where the “The robot is already at his position!” dialogue was not displayed the first timethe “Move here” button on the Waypoint node was pressed immediately after the position of the Waypoint had been set.

Controller

- Fixed issues were initiating a new move command at non-zero velocity would sometimes cause the program to stop progressing.
- Fixed a heap overflow during the startup of URControl
- Fixed a heap overflow in **socket_read_line()** builtin when it encounters an empty string as input
- Fixed an issue where global variables initialized during interpreter mode could be lost after a **clear_interpreter()** call or after exiting interpreter mode.
- Fixed an issue where calling **path_offset_enable()** and **path_offset_set()** immediately after **end_freedrive_mode()** would result in unexpected robot motion.

Embedded

- Fixed an issue where on rare occasions the Teach Pendant did not respond after a soft robot reboot and required complete power down.

User Assistance

Manuals

- Added notice about connecting and disconnecting the Teach Pendant while the Control box is powered on.
 - **Minor updates to the Script Manual:**
 - clarified default parameters for **speedl ()** function
 - Documented modulo % operator for numerical types
 - Script functions for requesting value from the operator through PolyScope UI are documented in the Script Manual. Script functions can request Boolean, integer, decimal or string values from the operator. Documentation can be found in the “Interfaces” section of the Script Manual.
-

Documents / Resources

