Control a JVL motor from a Universal Robots robot via Modbus TCP

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This document is aimed at robot technicians that need an external motor for a robot application. This document describes the setup process for communicating with the motor. The data is accessible through variables in the robot scripts.

The communication used is Modbus TCP. The JVL device is a Modbus slave, so this guide configures a Modbus slave in the Universal Robots robot.
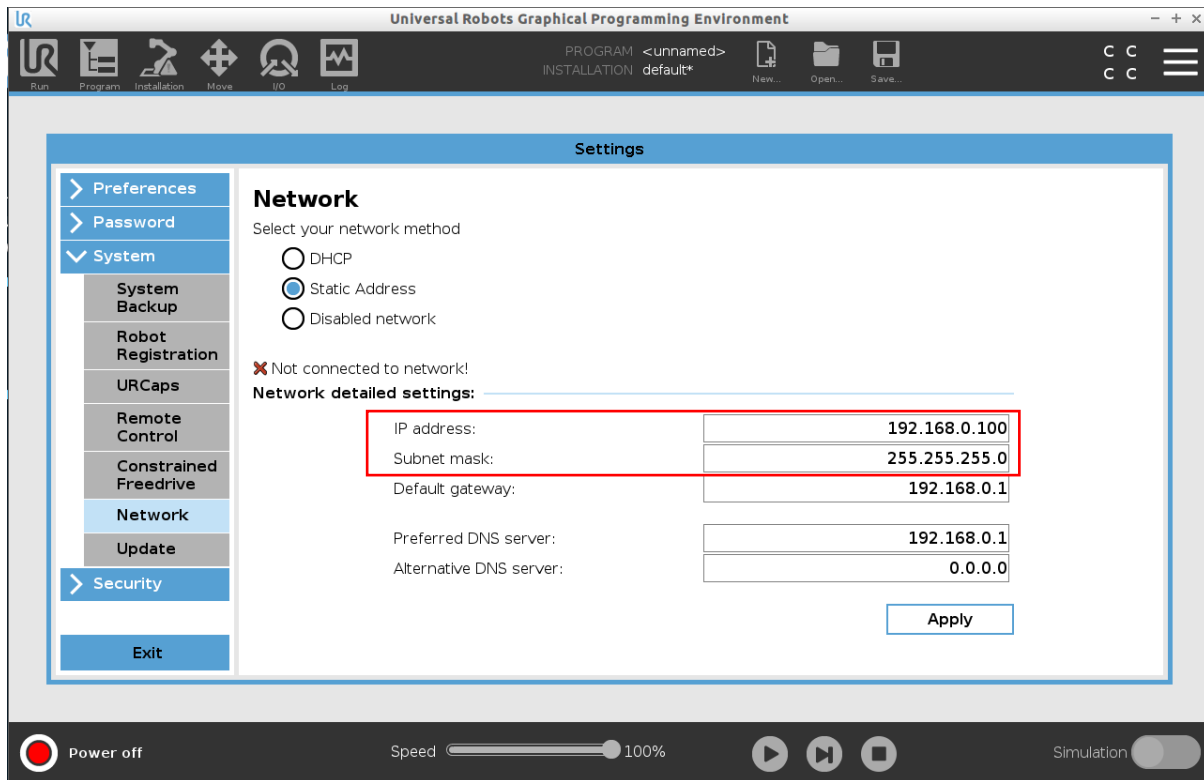
1. Network Configuration

Make sure that robot and motor are connected to the same network and network mask.

In this scenario both robot and motor are connected to network 192.168.0.0 / 24

Before setting the Ethernet settings in the JVL device, read the robot network setup to know the assigned network. Find a vacant IP address for the JVL device on the same network.
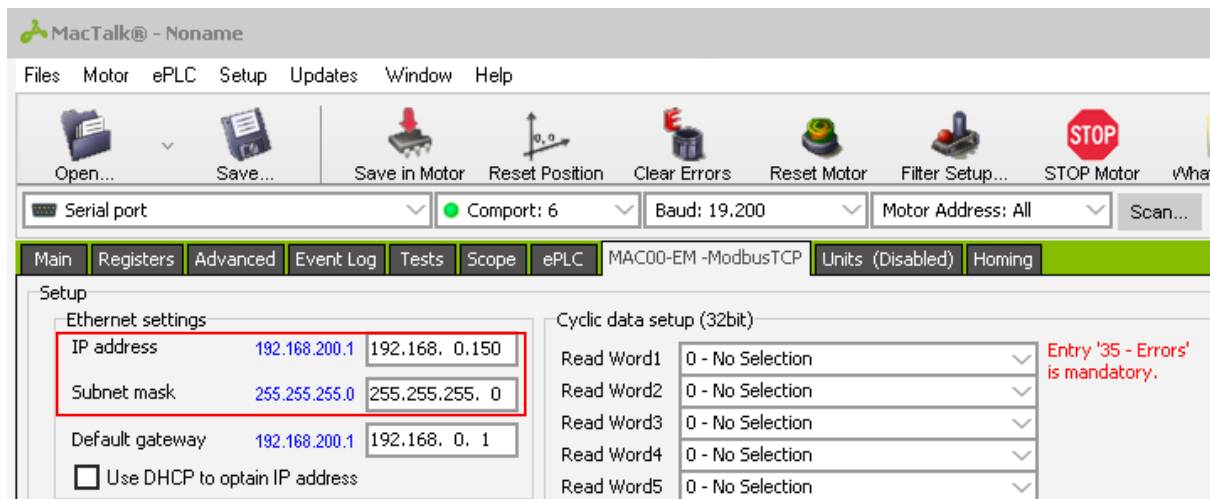
Robot network

JVL motor network

Make sure that the JVL device includes Modbus TCP firmware, and the Modbus tab is shown in MacTalk®.

2. Create Modbus TCP Master

Navigate to the fieldbus configuration on the Universal Robots Polyscope software.

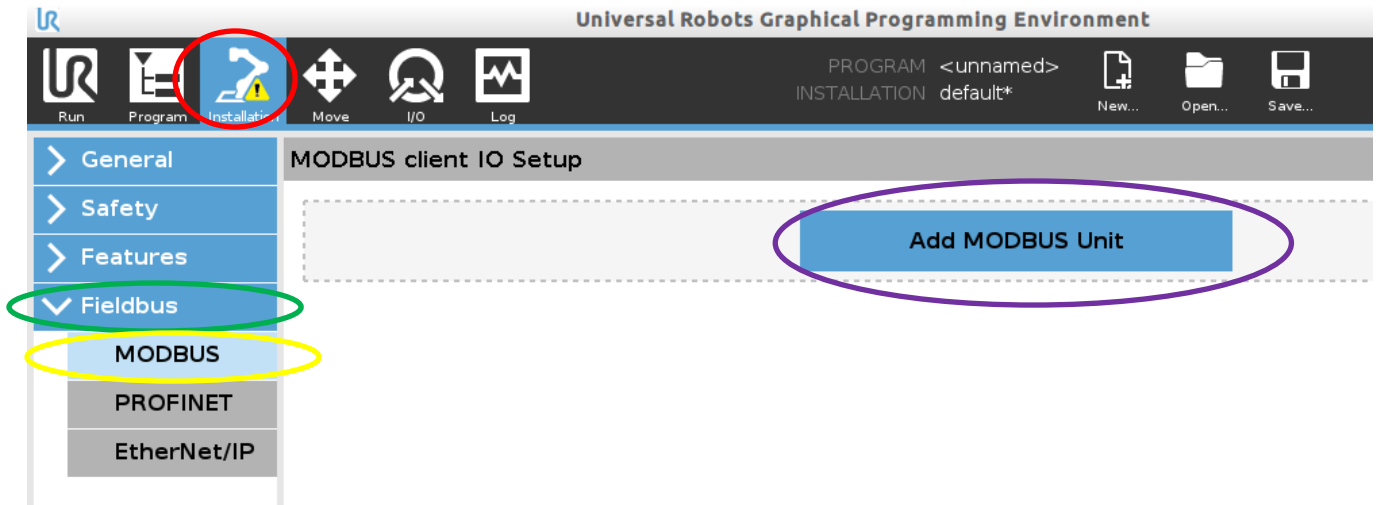This guide is made with version 5.8 of Polyscope.

Press the Installation menu

Go to the Fieldbus setting

Select the Modbus configuration

Add a Modbus master by selecting "Add MODBUS Unit"

A new master can be configured

Enter the address of the slave. This should be the address of the motor slave. In this case IP address 192.168.0.150.

The register type should be "Register Output" for holding registers, which is the type used in JVL Modbus slaves.

"Register Output" reads the register cyclic, and if there is a change, the robot sends a write "single register" until the slave has confirmed the message.

"Register Input" writes to the slave cyclic.

The address is set to the Modbus address you should read or write

The name is the variable identifier used in your robot script.
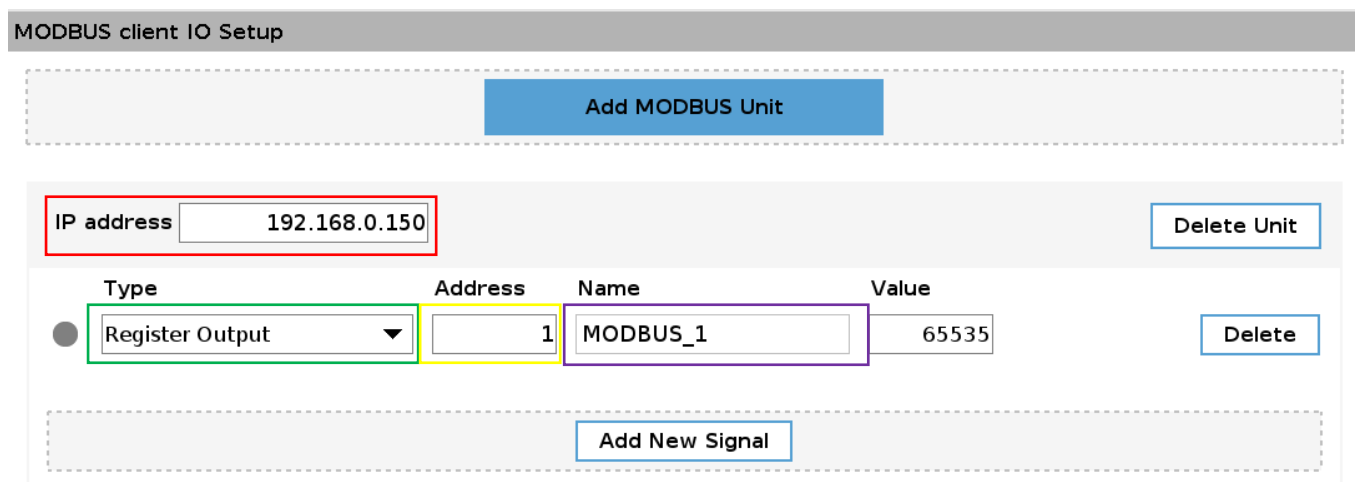
Reading more Modbus registers

Press the "Add New Signal" button. Enter the address of the Modbus register, and give it a name to use in the Robot script.

3.   Calculating the Modbus Addresses

All registers in JVL motors are 32 bit. This means that all registers occupy two Modbus addresses: a low word part, and a high word part.

E.g. to read the position in the motor from the Actual Position register 10 you need to read these addresses:

Low word address = register * 2   = 10 * 2   = 20

High word address = register * 2 + 1   = (10 * 2) + 1   = 21

4.   Setup Example

This is an example where the following are accessed in a JVL device.

Actual Position (P_IST):   address 20 and 21

Mode (MODE_REG):   address 4 (high word is not used)

Requested Position (P_SOLL):   address 6 and 7

Requested Velocity (V_SOLL):   address 10 and 11

IP address	192.168.0.150	
Type	**Address**	**Name**
Register Output ▼	20	ACTPOS_LOWORD
Register Output ▼	21	ACTPOS_HIWORD
Register Output ▼	4	SETMODE
Register Output ▼	6	REQPOS_LOWORD
Register Output ▼	7	REQPOS_HIWORD
Register Output ▼	10	REQVEL_LOWORD
Register Output ▼	11	REQVEL_HIWORD

NB. You can find a list of motor registers in the relevant user manuals for the ServoStep™ and the MAC motor® series. Go to www.jvl.dk and click Downloads:

JVL Literature

JVL A/S publishes a wide selection of literature to help our customers to get full and precise information about our products before a purchase and to get full information about their use after a purchase. Here you have the possibility to download what you need of information.

- Getting Started - Help for MAC and MIS and other JVL products
- User Manuals
- Datasheets, Brochures, JVL News, Technical News, Application Notes
- Special documents: UL, CE, RoHS, ISO-9001 and others