

IoT Gateway IBHsoftec OPC UA Server function



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1 Relevant manuals

This "Quick Start Manual" only describes the necessary steps to put the hardware into operation and to parameterise the corresponding functions.

Further details can be found in the relevant manuals.

Manual name [manual number]	Description
MELSEC iQ-R C intelligent function module Linux Startup manual (Copyright© 2008-2020 Lineo Solutions, Inc. All rights reserved)	
MELSEC iQ-R C Intelligent Function Module User's Manual (Startup) [SH-081566ENG]	Specifications, procedure before operation, wiring, and operation examples of a C intelligent function module
MELSEC iQ-R C Intelligent Function Module User's Manual (Application) [SH-081567ENG]	Functions, input/output signals, buffer memory, parameter setting, and troubleshooting of a C intelligent function module
MELSEC iQ-R Module Configuration Manual [SH-081222ENG]	The combination of the MELSEC iQ-R series modules, common information on the installation/wiring in the system, and specifications of the power supply module, base unit, SD memory card, and battery
MELSEC iQ-R C Intelligent Function Module Programming Manual [SH-081568ENG]	Programming specifications and dedicated function libraries of a C intelligent function module
MELSEC iQ-R C Controller Module/C Intelligent Function Module Programming Manual (Data Analysis) [SH-081756ENG]	Programming specifications and dedicated function libraries for analysing the data of a C controller module and a C intelligent function module
CW Workbench/CW-Sim Operating Manual [SH-081373ENG]	System configuration, specifications, functions, and troubleshooting of CW Workbench/CW-Sime-Manual
GX Works3 Operating Manual [SH-081215ENG]	System configurations, parameter settings, and operation methods for the online function in GX Works3
GT Designer3 (GOT2000) Screen Design Manual [SH-081220ENG]	

2 Overview

Under the catchword "Industry 4.0", more and more new communication and information technologies are finding their way into industrial automation. In order to be able to implement these requirements efficiently and as quickly as possible, attempts must be made to reduce the high level of complexity through modularisation and standardisation.

In this context, OPC UA has proven to be a forward-looking communication standard. This is because OPC UA fulfils the Industry 4.0 requirement for independence from manufacturer, industry and operating system communication.

Since OPC UA not only transmits machine data, i.e. process values and measured values, but can also describe them semantically, OPC UA is becoming increasingly important when it comes to transferring machine data from controllers to higher-level systems.

One solution for reading process data from Mitsubishi Electric controllers and robots that do not have an OPC interface as standard is the RD55UP12-V module with installed IBH Link UA software, called IoT Gateway.

This solution is a server/client module. The OPC client function also enables OPC servers to exchange data with each other. For example, controllers or other devices with OPC UA from different manufacturers can exchange data via this function.

Communication with the controller is via TCP/IP.

The IoT Gateway has an Ethernet port for the machine level and an Ethernet port for the control level.

Only OPC accesses are possible on the control level. A firewall is integrated between the two levels. The ports are configured via the GX-Works3 programming software of the iQ-R CPU.

2.1 System structure

As a minimum configuration, the IoT Gateway always requires a base rack, an iQ-R CPU and the RD55UP12-V module. To establish a connection to several controllers, a switch is required at the process level.



2.2 Security

The IoT Gateway has a certificate management for secure communication. A corresponding software interface is supplied for this purpose, which can be displayed in any web browser. The configuration of the security levels and the administration of the certificates are carried out in this interface. This is based on the mechanisms defined by the OPC Foundation. OPC UA Security includes authentication and authorisation, encryption and data integrity through signing. In this way, the control system can be protected against uncontrolled access via a higher-level system.

2.2.1 Encryption

There are different levels of encryption (Encrypt): None, Basic128Rsa15 and Basic256.

None	No encryption
Basic128Rsa15	128 bit encryption
Basic256	256 bit encryption

The IBH Link UA function supports the Level Sign and SignAndEncrypt

None	No security level, fastest data transmission
Sign	The messages contain signed certificates
Sign and Encrypt	The messages contain signed certificates and are encrypted
Sign + Sign and	The messages may contain only signed certificates, or can be
Encrypt	signed and are encrypted as well



2.2.2 Certificates

Another security level of OPC UA is the exchange of certificates. Communication is only possible when both server and client have been assigned a valid certificate by the respective partner.



	OPC server is running	Logout Updat	te password		
Network	Status	Name	Valid From	Valid To	Orga
Security	Server	IBHLinkUA plant 3	12/12/14 14:09:14	12/11/19 14:09:14	IBHso
Certificates	🗱 Untrusted	UaExpert@Hotline	10/24/14 12:30:26	10/24/15 12:30:26	IBH ►
Time settin	g s Trust	Reject Delete	New Server Certificate	pload Server Certificate	C

3 Commissioning

Each RD55UP12-V can be started as an IoT Gateway module. For this purpose, a corresponding image must be written to an SD card.

The image file contains the Linux operating system and the corresponding programme from IBH for the OPC UA server function.

In order to be able to use the OPC UA server function without restriction, it must be activated for the hardware used with a licence code created at IBH. For this purpose, the serial number and MAC addresses from the type plate of the module are required.

	ELSEC 10-R
	PASSED
C INTELLIGENT FUNCTION MODEL RD55UP12-V	ON UNIT
CH1:MAC ADD.58528AECO CH2:MAC ADD.58528AECO	ID27 ID28
SERIAL 01017B06F12101	5VDC 1.10A 91-0

3.1 Software used

Product	Description
DDWIN (Download link: <u>http://download.si-</u> linux.co.jp/dd_for_windows/DDWin_Ver0998.zip)	Program for writing the IBHsoftec image file to an SD card
UaExpert (Download link: <u>https://www.unified-</u> automation.com/de/downloads/opc-ua-clients.html)	Free OPC UA client program for testing the server function
MELSOFT GX Works3 EU version	Programming tool for programming the iQ-R CPU
GT Designer3	Programming tool for HMIs of the GOT series
RT Toolbox3	Programming tool for robots
IBH OPCUA Edit https://download.ibhsoftec.com/neutral/IBHOPCUAEditor749Setup.exe	Offline Configuration tool for IoT Gateway

In addition, a web browser must be installed on the PC.

If you have received an already configured IoT Gateway from Mitsubishi Electric, the following setup chapters 3.2 to 3.5 are not required.

For your security, we recommend that you create a backup copy of the inserted SD card, as described in Chapter 3.6.

3.2 Prepare SD card

To write the image file with the Linux OS to an SD card, you need the programme "DDWIN" on a Windows computer. After downloading, the ZIP file must be unpacked, an SD card inserted into the PC and the file "DDWIN.EXE" executed as administrator.

🔛 DDWin.exe 👘	27.05.2014 20:23	Anwendun
DDwin.ini	<u>Ö</u> ffnen	iti
DDwinE.ini	Search Administrator ausführen	iti
Help-Eng.txt	👌 Klassifizieren und schützen	m
Help-JP.txt	<u>B</u> ehandeln von Kompatibilitätsproblemen	m

- 1. Select the SD card in the PC under "Choose disk".
- 2. Select the Linux image file from IBHsoftec under "Choose file".
- 3. Select "<<Restore>>".

2 ≥ <i>DD</i> for Windows							
1. Choose disk	>> Backup >> Verify << Restore	e <<					
Target disk	3.	Target file					
F:(2,1) 1.9GB (Removable)	Path	D:\001 Projects\104 RD55UP12\RD55 IE					
	Filename	RD55UP12-V-ibhlinkua-v5_21-Mitsubish					
Protection is removed on cons	ent. MD5						
Copyright (C) 2004	シリコンリナックス	/ 					

When writing to the SD card is finished, the "DDWIN" program can be closed and the SD card removed from the PC and inserted into the RD55UP12-V module.

3.3 Prepare hardware

Unpack the selected iQ-R hardware, mount it to the base rack and connect it as instructed (refer to Mitsubishi Electric hardware manuals). The control unit can now be switched on.



3.4 Set IP addresses for RD55UP12-V IBH

First, you have to create a project in GW-Works3 that matches the hardware you have plugged in.

Under "Parameters" \rightarrow "Module Information" \rightarrow RD55UP12-V " \rightarrow Basic Setting" \rightarrow "Own node setting" the IP addresses for the control and process level can then be set.

MELSOFT GX Works3 RD55UP12\W	/issenspool\R04Sample_	BH_OPC_R	RLI.gx3 - [0000:RD55UP12	-V Module Pa	arameter]					
Project Edit Find/Replace Con	vert <u>V</u> iew <u>O</u> nline	De <u>b</u> ug <u>R</u> e	ecording <u>D</u> iagnostics	<u>T</u> ool <u>W</u> ir	ndow <u>H</u> elp					
i 🗅 😁 💾 😂 😗 🕑	i 🔏 🗈 🗂	in ai 🛛	🙀 🛤 📾 🚵 🚚	, 🕫 👧	周 調 🐘	🐘 🖉 🦊 🛃 🛼 🔜 🕀 🔾 🕂		📲 🚝 😰 Max.:	•	~ <u>.</u>
1299 B = M - M - M		? 😼 🚧	s 🏇 😽 - 🔤		: 🗆 🖗	-				
Navigation 무 ×	0000:RD55UP12-V	Module Par	ra ×							40.
🖳 🗠 🏟 All 🔹	Setting Item List	Se	tting Item							
Project	Input the Setting Item to	<i>i</i> h								
FB/FUN		<u>Г</u>		Item				Setting Value		
🖬 🌆 Label	Basic Setting	-	Various Operations Se Mode Settings	ttings		Perform the various operations settings Online	k			
= 😥 Parameter	Interrupt Settin	a E	Own Node Setting			Set the information of the own node su	ch as IP address.			
🧬 System Parameter	🗄 🚮 Refresh Settin	2	IP Address Setting CH1 Setting			Set the IP address, subnet mask, and Set the network information of Etherne	I detault gateway for the own node et nort (CH1) such as IP address	L.		
E 😥 R04CPU			To Use or Not to	Use		Use				
CPU Parameter			IP Address			192.168.178.90		Managem	ent level	
Memory Card Param			Subnet Mask			255.255.255.0				
E S Module Information			CH2 Setting			Set the network information of Etherne	et nort (CH2) such as IP address			
3 0000:RD55UP12-V			To Use or Not to	Use		Use				
0020:RD81OPC96			IP Address			192.168.0.3		Contro	ol level	
🙀 Remote Password			Subnet Mask			255.255.255.0		e on a o	Tiever	
			Default Gateway			192.100.0.1				

Once all settings have been made, the new project is transferred to the CPU. The control unit must be switched off and on again once after the transfer.

The channel "CH1" of the RD55 module is now in the address range of the management level and the channel "CH2" is in the range of the control level.

3.5 IoT Gateway OPC UA Server Setup

3.5.1 Launch web interface

Depending on the level via which the PC is connected to the IoT Gateway, the parameterisation interface can be called up by entering the corresponding IP address in a web browser.

In the following example, the PC is connected via the process level, only "192.168.0.3" is entered in the browser.

0 🔏 192.168.0.3/

The login screen is displayed. For a new system, the default user name and password are both "admin".

OPC server is running	
Login	
The password is case-sensitive.	
User name Enter your user name Password Enter your password	
Remember me Keeps login for 2 weeks	
www.ibhsoftec.com Contact Wiki	

After pressing "Log in", you are in the configuration interface.

	OPC server is running	Logout Update password
Network	Management Level	Control Level TeamViewer IoT
Security	Network Configuration Endpoint URL	opc.tcp://rd55up12-v:48010
Certificates	or DHCR	opc.tcp://192.168.178.90:48010
System	IP address	192.168.178.90
Users	Subnet mask	255.255.255.0
Siemens slots	Global System Configura	tion
History	Hostname	rd55up12-v
OPC Client	Port Default gateway	48010
Diagnostics	Nameserver 1	
MQTT	Nameserver 2	
SoftPLC	Apply Revert	
Modbus		
Mitsubishi		
Rockwell		
IIIIIRH.	enftac	
	סטונכנ	IBH OPC UA Server/Client
www.ibhsoftec.com	<u>Contact</u> <u>Wiki</u>	SPC UA

3.5.2 Activate licence code

After you have received the license file from IBHsoftec matching the module serial number and MAC addresses, this must be imported into the module once.

To do this, select the "System" menu in the configuration interface.

etwork	System		
ecurity	Device information		
ertificates	Serial number	01017B06F1210191	3 .5
ystem	MAC address Variable count	58:52:8A:EC:0D:27 15	
sers	CPU load (%) Memory usage (%)	72.7 15.4	
iemens slots			
istory			
PC Client	Backup and Restore Configuration file	Datei auswählen Keine ausgewählt	Configuration file to restore previously saved
iagnostics	Postoro		settings. Typically the file name is pi-settings.xn
QTT	Backup	Download	After downloading the configuration file pi-
oftPLC			settings.xml, it is possible to perform a firmware update.
odbus	Firmware Update:	Datai auswählen Koino ausgowählt	Firmware file to perform an undate. Typically th
itsubishi	Object in this are the	Dater auswannen Kenne ausgewannt	file name is fw-update-vXXX.tar.
ockwell	Upload Firmware Licensefile:	Upload Firmware	
1	Select License file	Datei auswählen 01017B0210191.lic	Upload License file. Normally the name is mac-
			address-pi-core.lic.

On this page, click on "Browse" at "Select licence file" to search for the corresponding file and then click on "Upload licence file" to copy it to the SD card.

After a restart of the system, the IoT Gateway can be used without restrictions.

The basic set-up of the IoT Gateway is now complete. The individual functions are explained in the following chapters.

3.6 Backup / Restore of SD card

After all the necessary configurations have been made and the project functions have also been parameterized, a backup copy can be created from the SD card using the "DDWIN" software. This backup can only be used in the RD55UP12-V module with the hardware ID for which the IoT Gateway license was created.

3.6.1 Create Backup

To create the backup, switch off the controller with the IoT Gateway and remove the SD card from the IoT Gateway module. Insert the SD card into the PC and run the "DDWIN.EXE" program as administrator.



- 1. Select the SD card in the PC under "Choose disk"
- 2. Select a drive path under "Choose file" and enter the desired file name
- 3. Select ">>Backup>>"

Si	DD fe	or Wi	indows	2 🗙
1.	Choose disk	>> Backup >> Verify << Restore	<pre>Choose file file</pre>	
Target disk	¥	-	Target file	
F:(3,1) 3.7GB (R	emovable)	Path	C:\Backup\	
		Filename	220121 IoTGatewayBackup.ddi	
Protection is re	moved on conser	nt. MD5		
Cop	oyright (C) 2004 シ	リコンリナックス	<u> ス株式会社 si-linux.co.jp</u>	

The data will now be read from the SD card

DD for Windows							
Choose disk	>> Backup >> Verify << Restore	>> 35 45	hoose file				
Target disk		Target file					
F:(3,1) 3.7GB (Removable)	Path	C:\Backu	ıp\				
F	ilename	220121 IoTC	GatewayBackup	o.ddi			
Protection is removed on consent.	MD5						
reading (198.	DMB/3781.5	MB) ESC:Car	ncel				
Copyright (C) 2004 S/U:	コンリナックン	R株式会社 si	-linux.co.ip				
_							
	R	eading l	has com	pleted.37	81.5ME	yte	
DDWinBackup							
					* 🔻		
↑Name		Erw.	Größe	Datum			
全 []			<dir></dir>	21.01.202	22 12:45		
220121 IoTGatewayB	ackun	ddi 3.96	5 190 144	21 01 202	2 12.49		
	actup	aur 5,50	, 100, 144	21.01.202			

The SD card can now be reinserted into the IoT Gateway and the controller can be started.

3.6.2 Restore the SD card

To load the image onto a new SD card, the "DDWIN.EXE" program must be run as an administrator

Then insert a new SD card into the PC



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- 1. Select the SD card in the PC under "Choose disk"
- 2. Select the previously created backup copy under "Choose file".
- 3. Select "<<Restore<<"

After the message "Writing has completed ..." the SD card can be plugged into the corresponding RD55UP12-V module and then the controller can be switched on.

4 OPC UA server function

This chapter explains how to connect the IoT Gateway to controllers and make their global variables available as OPC UA tags for clients.

4.1 iQ-R CPU

4.1.1 Configure SLMP Connection

In order for the Mitsubishi controller to be accessible via OPC UA, the **SLMP** Connection Module must be inserted using the GX Works configuration software.



Important: In order for data to be written externally to the OPC UA tags, "Enable all (SLMP)" must be selected!

4.1.2 Export global variables

■ (篇 Label ■ (循 Global Label GlobalLabel01		rupt Sel esh Set			
🚡 SmartChe 🗎	<u>C</u> opy Data Ctrl+	C			
🗉 🔠 Structured D	Delete Data D	el			
🖽 🚰 Device	Rena <u>m</u> e f	F2			
🗏 🛃 Parameter	Import File				
System Para	Export to File				
🗎 🛃 КО4СРО 🕕					
Export to File		×			
Export label inform Export to <u>C</u> SV (Exclude comm device of struct	mation to the specified file. File. nent for array element/bit sp tures.)	pecification and assignment			
EXPORT to <u>XML</u> (Include comm device of struct	Hie. hent for array element/bit sp tures and structure arrays.)	ecification and assignment			
Caution - It may take seve Manual	eral minutes to export if a nu	umber of labels are included.			
醋 Export to File					X
← → · ↑ 📙 > Dieser	PC > Lokaler Datenträger (D:) > 0(1 Pro_rts > .,24 RD .,11P12 >	ٽ ~	"104 RD55UP12" durchsu	uchen
Organisieren 🔻 Neuer Org	dner			== -	?
000L .cjiingen		Name	Änderungsdatum	Тур	Größe
🔥 001 Pr 🗯 tts		📊 🖾 🕺 în	06.04.2021 13:10	Dateiordner	
Wildene moeu, sho	-'me	Rui 5 (J. 14SD	06.04.2021 14:28	Dateiordner	
les		W ms ₁ . col	06.04.2021 14:23	Dateiordner	1/
5			25.10.2019 12:56	XML-Dokument	10
00011		SmartChecheml	04.03.2021 13:23	XML-Dokument	4
011 CC					
095.57					
1.1.1.1.W					
101					
.C3 TOT una Come	ex				
10±3055U913		v <			>
Dateiname: GlobalLat	bel01.xml				~
Dateityp: XML (*.xn	nl)				~
~					
 Ordner ausblenden 			Г	Speichern Abbrech	ien

4.1.3 Add a controller via web interface

Insert station

	OPC server is running Logout Update password
Network	Controllers Robots
Security	Mitsubishi
Certificates	Insert station Modify station Remove station
System	Insert cpu Modify cpu Load project Remove cpu
Users	Load XML Store XML Remove all
Siemens slots	
History	
OPC Client	
Diagnostics	
MQTT	
SoftPLC	
Modbus	
Mitsubishi	
Insert station	×
Station Name: IQ-R	
Ethernet address: 192.168.	D.38
	OK

4.1.4 Insert CPU

	OPC server is running Logout Update password
Network	Controllers Robots
Security	Mitsubishi
Certificates	Insert station Modify station Remove station
System	Insert cpu Modify cpu Load project Remove cpu
Users	Load XML Store XML Remove all

Insert cpu ×
CPU Name: R04
Destination network No. : 0x00
Destination station No. : 0xFF
Destination module I/O No. : 0x03FF
Destination multidrop station No.: 0x00
Steuerung der FX-Serie:
OK Cancel Default settings

4.1.5 Import XML file

The European version of GX Works 3 offers the function to export the project as an XML file.

Ha Mi	LSUFT GX Works3dware R	LI\UUT IQ-K Kack\H	KU4_KT6KT_GT25W_	002.gx3 - [GIO		
<u>P</u> ro	ect Edit Eind/Replace	<u>C</u> onvert <u>V</u> iew	<u>O</u> nline De <u>b</u> ug	<u>R</u> ecording		
10	<u>N</u> ew	Ctrl+N	lia 🔓 🗠 👁	📴 🔄 🗠		
1 🖻	<u>O</u> pen	Ctrl+0	P 🚱 😨 🔗	😤 🔽 🚧		
-	<u>C</u> lose					
	Save	Ctrl+S	4 х	T Module Co		
	S <u>a</u> ve As				MELSOFT GX Works3	\times
	<u>D</u> elete					
1	Project Verify			1 0		rt tha
ĸ	Project Revision	1	•	2 Count	- POUs (local labels ar	nd bodies)
	C <u>h</u> ange Module Type/Ope	ration Mode		3 Count	- SDTs	
=	Data Op <u>e</u> ration		•	4 Rand 5 Rand	- Global labels of the project?	
	Intelligent <u>Function Modu</u>	le	· — I	6 Rand		
	Open Othe <u>r</u> Format File	1	•	7 Rand 8 Rand		
E.	Save Other Format File		ML Forn	nat nd	la	<u>N</u> ein
E.	Liberry Occurting			TU moat	7	

The file created by this function can be uploaded to the IoT Gateway web server.

	OPC server is running	Logout Update p	assword			
Network	Controllers Rol	bots				
Security	Mitsubishi					
Certificates	▼iQ-R	_	_			
System	Insert station Modify st					
	Insert cpu Modify cpu	Load project Remo	ove cpu			
Siemens slots	Load XML Store XML	Remove all				
History		Load Me	soft XML Project		×	
OPC Client		Project fro Upload:	m Melsoft (*.xml): Natei auswählen Keine ausgewäh	It Upload: Load Melsoft X	(ML Project	
Diagnostics						
MQTT				Apply Melsoft XML Proj	ect Cancel	
Organisieren 💌	Neuer Ordner					
organisieren +	Neder Ordifer					
001 Testha	ardware RLi	^	Name		Status	Änderu
📙 001 iQ-F	Rack Rack		R04_IBH.xml		C	09.08.20
📙 100 3rdF	arty-Hardware		TestIBH.xml		0	26.07.20

Load Melsoft XML Project	×
Project from Melsoft (*.xml):	
Upload: Datei auswählen R04_IBH.xml Upload: Load Melsoft XML Pro	oject
Apply Melsoft XML Project	ancel
Load Melsoft XML Project ×	
Project from Melsoft (*.xml):	
Upload: 100 % Upload: Load Melsoft XML Project	
Apply Melsoft XML Project Cancel	
Information	
The project file was imported.	
OK	

Now all global variables of the imported project are automatically available in the OPC UA Server.

Controllers Robots
Mitsubishi
▼iQ-R
▼R04
DeviceManual
DeviceRevision
HardwareRevision
Manufacturer
Model
RevisionCounter
SerialNumber
SoftwareRevision
▶ Programs
▶ Tasks
DeviceHealth
▼GlobalVars
▼ GlobalLabel01
Counter01
Counter02
Counter03
Random_01
Random_02
Random_03
RandomScale_01
RandomScale_02
RandomScale_03
Exchange001

4.1.6 Connect external OPC UA Client

The free UaExpert is used here as a test client.

https://www.unified-automation.com/de/downloads/opc-ua-clients.html

	per me or e onmean actue energy mentojeer
<u>File View Server D</u> ocur	ment <u>S</u> ettings <u>H</u> elp
🗋 💋 🕞 🖉 🧿	💠 🗕 🜣 💥 💫 🙎 🖹 🖹 🥌
Project	🗗 🗙 Data Access View
 Project Servers Doc Add Data Access Vi 	ew # Server Nod
	OPC server is running Logout Update password
Network	Management Level Control Level TeamViewer IoT
Security	Network Configuration
	Endpoint URL opc.tcp://rd55up12-y:48010
Certificates	DHCP
System	IP address 192.168.0.3
Users	Subnet mask 255.255.255.0
Project	B X Data Access View B Server Settings - R04 ?
V D Servers	Server Information
V Documents	Endpoint Url 0pc.tcp://192.168.0.3:48010
Data Access View	Security Settings
	Security Policy None
	Message Security Mode None
L	
Address Space	Authentication Settings
Address Space	Authentication Settings Anonymous
Address Space	Authentication Settings Authentication Settings Username Username
Address Space	Authentication Settings Authentication Settings Authentication Settings Username Password Store
Address Space	Authentication Settings Authentication Settings Authentication Settings Username Password Certificate
Address Space	Authentication Settings Authentication Settings Anonymous Username Password Certificate Private Key
Address Space	Authentication Settings Authentication Settin
Address Space	Authentication Settings Authentication Settings Authentication Settings Username Password Certificate Private Key Session Settings Session Name
Address Space	Authentication Settings Authentication Settings Authentication Settings Certificate Private Key Session Settings Session Name
Address Space	Authentication Settings Authentication Settings Username Password Certificate Private Key Session Settings Session Name
Address Space	Authentication Settings Authentication Settings Username Password Certificate Private Key Session Settings Session Name
Address Space	Authentication Settings Authentication Settings Authentication Settings Certificate Private Key Session Settings Session Name OK Cancel

🗋 🖉 🕞 🖉 💽 🐥 🗕 🔯	(🔏 🖉 📋
Project 🗗 🗶	Data Access View
Project Servers R04 Documents Data Access View	# Server
Address Space 🗗 🗙	
夕 No Highlight 🗸 🗸	
Root	
 Client Client Client Modbus Modbus PLCs R04 DeviceRevision Counter01 Counter01 Counter01 Counter03 RandomScale_01 RandomScale_03 Random_01 Random_02 Random_03 	
HardwareRevision Manufacturer	c





	Data Access View						
]	#	Server	Node Id	Display Name	Value	Datatype	Source Timestar
	1	R04	NS11 String iQ	Counter01	7793	Int16	17:25:39.223
1	2	R04	NS11 String iQ	Counter02	-28871	Int16	17:25:39.223
	3	R04	NS11 String iQ	Counter03	7333	Int16	17:25:38.973
1	4	R04	NS11 String iQ	RandomScale_01	13	Int16	17:25:39.223
1	5	R04	NS11 String iQ	RandomScale_02	213	Int16	17:25:39.223
ł	6	R04	NS11 String iQ	RandomScale_03	36	Int16	17:25:38.973
L	7	R04	NS11 String iQ	Random_01	1358	Int16	17:25:39.223
1	8	R04	NS11 String iQ	Random_02	21327	Int16	17:25:39.223
	9	R04	NS11 String iQ	Random_03	3657	Int16	17:25:38.973

4.2 Robot

4.2.1 Communication settings RT Toolbox3

Project setting

诸 Edit Project # 1			
Step.3.Communication			
Set the communications with th	e robot controller.		
Step 1.Out Line 2.Robot Model	* Set the robot controller network.	<u>I</u> P Adress: S <u>u</u> bnet Mask:	192 . 168 . 0 . 20 255 . 255 . 255 . 0
3.Communication 4.Language		Default Gateway:	0.0.0.0
6.Robot Additional Axis 7.Tool 8.Weight and Size	Connection Method * Set the connection method of RT To <u>M</u> ethod: CRnQ_R	oolBox3 and a robot.]
	Communication Setting PC side I/F Connection Path Target CPU Timeout [sec]	Etherne Etherne CPU 2 30	, et port IP address designate communicatic

Parameter setting

Workspace 4 ×	Ethernet 1:RC1 (Online) ×						
 Q172DRCPU 3D Monitor 	É Ethernet 1:RC1 (Online)						
⊿ 🜌 RC1 ▷ 🔀 Offline	Men <u>u</u> :	Menu: Copy PC Network Settings					
: 🛆 🛃 Online 🗊 RV-4FL-Q	IP Address Device & Line Realtime Monitor Real-time External Command	IP Address: (NETIP)	192 . 168 . 0 . 20				
Operation Panel		Subnet <u>M</u> ask: (NETMSK)	255 . 255 . 255 . 0				
Spline		Default Gateway: (NETGW)	192 . 168 . 0 . 254				
. ☐ Parameter List ▷ 値 Movement Parameter							
▷ 🝵 Program Parameter ▷ 🝵 Signal Parameter							
△ 🖞 Communication Parameter 🖞 RS-232							
<mark>│ Ethernet</mark> ▷ │ PLC Cooperation Paramete							
▷ ☐ Monitor ▷ № Maintenance			Explain Write				
Board	<u></u>	1					

Workspace 🛛 🕹 🕹	📋 Ethernet 1:RC1 (Online) 🗙								
Q172DRCPU 3D Monitor	Ethernet 1:RC1 (Online)						×		
⊿ Z RC1 ▷ X Offline	Men <u>u:</u>				Device Allocation: (COMDEV)				
	IP Address		Device	Mode	IP Address	Port #	COM1:	RS232	-
KV-4FL-Q	Device & Line		OPT11	1: Server	192.168.0.3	10002	COM2:	OPT14	*
	Realtime Monitor		OPT12	0: Client	192.168.0.4	23	COM3:	OPT13	•
Soline			OPT13	0: Client	192.168.0.15	50002	COM4:	OPT15	-
	Real-time External Command		OPT14	0: Client	192.168.0.250	1281	COM5:	OPT12	-
Parameter List			OPT15	0: Client	192.168.0.6	50001	COM6:	(No Selection)	-
Movement Parameter			OPT16	1: Server	192.168.0.7	10006	COM7:	(No Selection)	Ŧ
Program Parameter			OPT17	1: Server	192.168.0.8	10007	COM8	(No Selection)	÷.
b i Signal Parameter			OPT18	1: Server	192.168.0.9	10008	COMO.	(NO Selection)	<u> </u>
Communication Parameter			OP 119	1: Server	192.168.0.10	10009			
RS-232									
📋 Ethernet			<u>S</u> et						
D I PLC Cooperation Paramete		_							
Monitor							Explain	Write	
D Maintenance									-
Board		-							

4.2.2 Insert robot via web interface

🗱 RD55UP12-V - Mitsubishi	× +	
← → ♂ ଢ	0 🛿 192.168.0.3/?_=/de/slmp	120% 🗵 🗴
	OPC Server läuft Abmelden Passw	ort ändern
Netzwerk	Steuerungen Roboter	
Sicherheit	Robotername	Roboteradresse
Zertifikate	Add Robot Edit Robot Delete Robot	192.168.0.20:10002
System	Lade XML Speichere XML Alles löschen	
Benutzer		-
Siemens Slots	5	
Historie		
OPC Client		
Diagnose		
MQTT		
SoftSPS		
Modbus		
Mitsubishi		

The station name (freely selectable) and the IP address of the robot with port number must be entered manually. If the Ethernet connection is OK, the robot model and the number of axes are entered automatically by pressing "Read type".

Insert station	×
Station Name <mark>: Robot</mark>	1.
Ethernet address: 192.168.	0.20:10002 2.
Roboter model: RV-4FRLM	I-R
Number Axes: 6	
3	Read type OK Cancel

Then press "OK".

After a few seconds, the web interface will again show "OPC server running" in a green box.

		OPC server is running Logout Update password						
	Network	Controllers Robots						
	Security	Robot Name	Robot Address					
	Certificates	🖉 Robot	192.168.0.20:10002					
		Add Robot Edit Robot Delete Robot						
	System	Load XML Store XML Remove all						
	Users							

4.2.3 Display in the external OPC UA Client

As soon as the server is running again, it can be selected in the Client Tool (here UaExpert) and you have access to all OPC UA tags from the robot that are defined in the OPC UA Companion Specification Part1.



4.2.4 Add additional outputs

In the IoT Gateway OPC UA Server, the "Robot Companion Specification Part 1" is implemented first. In addition, the robot inputs and outputs 0 to 63 ($M_In(0)/M_Out(0)$ to $M_In(63)/M_Out(63)$) can be accessed by default.

However, it is possible to add further inputs and outputs.

The following steps are necessary for this:

- Export XML file
- Add the required inputs or outputs to the XML file using a text editor.
- Load the XML file back into the RD55-IBH module (the server is then automatically restarted).



Depending on the browser, the file is then automatically saved in the "Download" folder or you are asked for a destination folder.



Edit XML file

Open the downloaded file with a text editor and scroll it to the desired "Inputs" or "Outputs" section.

<outputs></outputs>	
<output< td=""><td><pre>name="Outputs_0_15" address="0" type="UInt16"/></pre></td></output<>	<pre>name="Outputs_0_15" address="0" type="UInt16"/></pre>
<output< td=""><td><pre>name="Outputs_16_31" address="16" type="UInt16"/></pre></td></output<>	<pre>name="Outputs_16_31" address="16" type="UInt16"/></pre>
<output< td=""><td><pre>name="Outputs_32_47" address="32" type="UInt16"/></pre></td></output<>	<pre>name="Outputs_32_47" address="32" type="UInt16"/></pre>
<output< td=""><td><pre>name="Outputs_48_63" address="48" type="UInt16"/></pre></td></output<>	<pre>name="Outputs_48_63" address="48" type="UInt16"/></pre>
<output< td=""><td>name="Output_0" address="0" type="Boolean"/></td></output<>	name="Output_0" address="0" type="Boolean"/>
<output< td=""><td><pre>name="Output_1" address="1" type="Boolean"/></pre></td></output<>	<pre>name="Output_1" address="1" type="Boolean"/></pre>
<output< td=""><td><pre>name="Output_2" address="2" type="Boolean"/></pre></td></output<>	<pre>name="Output_2" address="2" type="Boolean"/></pre>
<output< td=""><td><pre>name="Output_3" address="3" type="Boolean"/></pre></td></output<>	<pre>name="Output_3" address="3" type="Boolean"/></pre>
<output< td=""><td><pre>name="Output_4" address="4" type="Boolean"/></pre></td></output<>	<pre>name="Output_4" address="4" type="Boolean"/></pre>
<output< td=""><td>name="Output_5" address="5" type="Boolean"/></td></output<>	name="Output_5" address="5" type="Boolean"/>
<output< td=""><td><pre>name="Output_6" address="6" type="Boolean"/></pre></td></output<>	<pre>name="Output_6" address="6" type="Boolean"/></pre>
<output< td=""><td><pre>name="Output_7" address="7" type="Boolean"/></pre></td></output<>	<pre>name="Output_7" address="7" type="Boolean"/></pre>
<output< td=""><td>name="Output_8" address="8" type="Boolean"/></td></output<>	name="Output_8" address="8" type="Boolean"/>
<output< td=""><td><pre>name="Output_9" address="9" type="Boolean"/></pre></td></output<>	<pre>name="Output_9" address="9" type="Boolean"/></pre>
<output< td=""><td><pre>name="Output_10" address="10" type="Boolean"/></pre></td></output<>	<pre>name="Output_10" address="10" type="Boolean"/></pre>

The required inputs or outputs can then be inserted here as new lines accordingly, e.g. for $M_{Outw}(10224)$:

<outputs></outputs>
<pre><output address="10224" name="Outputs_10224_10231" type="UInt16"></output></pre>
<output address="0" name="Outputs_0_15" type="UInt16"></output>
<output address="16" name="Outputs_16_31" type="UInt16"></output>
<output address="32" name="Outputs_32_47" type="UInt16"></output>
<output address="48" name="Outputs_48_63" type="UInt16"></output>
<output address="0" name="Output_0" type="Boolean"></output>
<output address="1" name="Output_1" type="Boolean"></output>
<output address="2" name="Output_2" type="Boolean"></output>
<output address="3" name="Output_3" type="Boolean"></output>

Once all the desired entries have been made, the file is saved.

Load XML file

The modified file can now be loaded again in the RD55-IBH web server:

		OPC server is running Logout Update pas	sword		Augurys	HMPVCsde a 1000 PMPVCsde, 1042 HRPVCsde, 1042	Units Units Listin	
	Network	Controllers Robots		💿 Öffnen		10000	URLY .	
		Robot Name						
		🖉 Robot			-uni>			
		Add Robot Edit Robot Delete Robot		Organisieren 👻 Neuer Ordner				
		Load XML Store XML Remove all		PointConstanting is appoint to the second	1.0727.77.19	• Name		Änderur
				📰 Bilder		✓ Heute (2)		
				Desktop		ibhlinkua-mits	ubishi (12).xml	09.08.20
						DU Gal IIA K	41ip	09.08.20
				Dokumente		V Letzten Monat	(43)	
		Load XML configuration	×	Downloads		B 20.029.07 777	(13)	20.07.20
		XML configuration (*.xml):		🔶 Favoriten		202 0000		2 30.07.20
		Upload: Datei auswählen Keine ausgewä	ahlt Upload: Load XML configuration	🕐 Gespeicherte Spiele		ibhiining mite	11).xml	29.07.20
			-	III Kontakte		20210700_1112	12_11_3d_80_00_27_28.scd	2 28.07.20
			Apply XML configuration Cancel	Links		📄 idallakon taitse	ubishi (10).xml	26.07.20
				MicrosoftEdgeBackups		🖟 tr'	Con-c · · · · · · · · si	26.07.20
				👌 Musik		in single sector in the sector in the sector is the sector		26.07.20
						📾 et 🖾 Lecup (undi	26.07.20
14	R04 NS	s11 String lestRack_R04.R04.GlobalVars.GlobalLabel.V	Vord_Na Word_Name	{0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,	Int16	08:24:20.274	08:24:20.486	Good
15	R04 NS	513 Strin <mark>g RT16.Outputs.Outputs_10224_10231</mark>	Outputs_10224_10231	65354	UInt16	08:28:51.459	08:28:52.178	Good

4.3 Inverter

The following chapter only deals with the connection with inverters of the 800 series.

Depending on the inverter type, the permissible address range of the variables that can be read via SLMP is different. This quick start guide only provides an overview using examples; details about the individual parameters and registers can be found in the corresponding manuals for the Mitsubishi Electric Inverter.

What they have in common, however, are the settings of the inverter parameters for Ethernet communication.

IP Address

The IP address of the inverter must be in the same network area as the control level (CH2) of the IoT gateway. In the quickstart example this area is at "192.168.0.xx", the inverter gets the address "2" for the A800/F800 Inverter and "11" for the E800 through the corresponding entries in parameters 1434 to 1437.

1434	Ethernet IP address 1	0 to 255	1	192	192
1435	Ethernet IP address 2	0 to 255	1	168	168
1436	Ethernet IP address 3	0 to 255	1	50	0
1437	Ethernet IP address 4	0 to 255	1	1	2

Other communication settings may have to be carried out, such as adapting the subnet mask (parameters 1438 to 1441).

1438	Subnet mask 1	0 to 255	1	255	255
1439	Subnet mask 2	0 to 255	1	255	255
1440	Subnet mask 3	0 to 255	1	255	255
1441	Subnet mask 4	0 to 255	1	0	0

For all other settings, please refer to the corresponding inverter manuals.

SLMP Connection

The communication between the IoT gateway and the inverter takes place via SLMP TCP / IP. To do this, the value 5012 or 5013 must be entered in one of the inverter parameters 1427 to 1429.

Pr.1427 to Pr.1429 setting	Application*1	Protocol*1	Number of connectable clients	Refer to page	
502	Modbus/TCP	TCP/IP	3	38	
5000 5001 (Pr.1427 initial value)		UDP/IP	No limit		
5002	MELSOFT / FA product	TCP/IP	1	25	
5006	connection	UDP/IP	No limit		
5007		TCP/IP	1		
5008		UDP/IP	No limit		
5010			No limit		
5011	SIMD	ODF/IF	INO IIITIIL	06	
5012	SLIVIP		1	20	
5013			1		
45237 (Pr.1428 setting)	iQSS	UDP/IP	No limit	*2	
9999 (Pr.1429 initial value)	Unselected	•	_		

In the example, parameter 1428 is set.

1427	Ethernet function selection 1	502,5000 to 5002,5006 to 5008,5010 to 5013,45237,61450,9999	1	5001	5001
1428	Ethernet function selection 2	502,5000 to 5002,5006 to 5008,5010 to 5013,45237,61450,9999	1	45237	5012
1429	Ethernet function selection 3	502,5000 to 5002,5006 to 5008,5010 to 5013,45237,61450,9999	1	9999	5008

Add Inverter to IoT Gateway

After the communication parameters have been set, the inverter can be registered as a station in the IoT gateway. For this we use the IBHsoftec software "OPCUAEdit". The IoT Gateway server has already been created here.



Right-click on the "IoTGateway" server and select "Add Mitsubishi configuration".



The inverter is then added as "New PLC station ...".



The name can be freely selected, the Ethernet address must correspond to the inputs of the inverter parameters.

Mitsubishi Station			×			
Name: INV_01						
<u>E</u> thernet address:	192.168.0.2:5012					
<u>0</u> K	<u>C</u> ancel	<u>H</u> elp				

Now a "New CPU ..." has to be added



You only have to enter a freely selectable name and press "OK"

Mitsubi	shi CPU	×
<u>N</u> ame:	FU_01	
Network n	umber:	0x 00
Station nu	mber:	0x FF
Module I/O	Onumber:	0x 03FF
Multi <u>d</u> rop :	station number:	0x 00
	EX series	
Q	(<u>C</u> ancel <u>H</u> elp

The variables are entered in a structure that has yet to be created.



Add new user-defined structure					
Struct	ure name VarList				
<u>o</u> ĸ	<u>C</u> ancel	Help			

The desired variables can now be added.

Project • 4 × • • • • • • • • • • • • • • • • • • •	- → Variables - → Program variables - → VarList C × メ & = ■ ▲ ▲ ▲ → ✓ ♥					
Variables	Name		Address	PL		
	Nev	w variable				
	Del	lete				
	Cut	t				
	Cor	ру				
	Ins	ert				
	Sho	ow in tree structure				
	Wri	ite protection on				
	Wri	ite protection off				
	Pro	perties				
	Sel	ect all				

The selection of the possible variables is now dependent on the inverter type

Mitsubishi variab	le properties		×
<u>N</u> ame:	1		
<u>A</u> ddress:		imber of field elements: 0	
Data type:	Length: 32	Access rights:	
Co <u>m</u> ment: UA Identifier:	INV_01.FU_01.Global	Vars.VarList.	
<u>o</u> k	<u>C</u> ancel	Hel	p

4.3.1 A800/F800

With the A800 / F800 inverters, the status can be monitored and controlled with certain special registers.

In order for this to be possible, the PLC function of the inverter must be activated

Below are a few examples; the complete list of special registers can be found in the relevant manual.

Device number	Name	Setting increments	Data example		
SD1133	Output frequency monitor	0.01 Hz	Device content 6000→60.00 Hz		
SD1134	Output current monitor	0.01 A	Device content 200→2.00 A		
SD1135	Output voltage monitor	0.01 V	Device content 1000→10.0 V		

Example: error history

	b15 to b8	b7 to b0	
SD1136	Faults history 2	Faults history 1	
SD1137	Faults history 4	Faults history 3	Newer
SD1138	Faults history 6	Faults history 5	
SD1139	Faults history 8	Faults history 7	Older

Error code	Fault record	Error code	Fault record		Error code	Fault record	Error code	Fault record
HOO	No failure	H80	E.GF		HC2	E.P24	HDA	E.MB6*1
H10	E OC1	H81	E.LF		HC4	E.CDO	HDB	E.MB7*1
H11	E OC2	H90	E.OHT	1	HC5	E.IOH	HDC	E.EP*1
H12	E OC3	H91	E.PTC		HC6	E.SER	HDE	E.MP*1
H20	E OV1	HA0	E.OPT		HC7	E.AIE	HE1	E.IAH*2
H21	E OV2	HA1	E.OP1		HC8	E.USB	HE4	E.LCI
H22	E OV3	HA4	E.16		HC9	E.SAF	HE5	E.PCH
H30	E THT	HA5	E.17		HCA	E.PBT	HE6	E.PID
H31	E THM	HA6	E.18		HD0	E.OS	HF1	E.1
HAD	E FIN	HA7	E.19		HD1	E.OSD*1	HF2	E.2
H50		HA8	E.20		HD2	E.ECT*1	HF3	E.3
H51		HB0	E.PE		HD3	E.OD*1	HF5	E.5
1151	EUE	HB1	E.PUE		HD5	E.MB1*1	HF6	E.6
H60	EOLT	HB2	E.RET		HD6	E.MB2*1	HF7	E.7
	ESOT	HB3	E.PE2		HD7	E.MB3*1	HFB	E.11*1
	E.SOT	HC0	E.CPU		HD8	E.MB4*1	HFD	E.13
пло	E.DE	HC1	E.CTE		HD9	E.MB5*1		1

Entering the variable

Example 1: output frequency

Mitsubishi variab	le properties		×
<u>N</u> ame:	OutputFrequency	Monitor	
<u>A</u> ddress:	SD1133	imber of field elements: 0	
Data type:		Access rights:	
⊖ <u>B</u> it		Read	
O <u>D</u> ouble Word		Write_	
Int			
O Double Int			
◯ <u>F</u> loat			
○ <u>S</u> tring	Length: 32		
Comment:			
	THE OF FUL OF C	helves Velick Outer /Free uses Mariles	
UA Identifier:	1110_01.FU_01.Gld	baivars, vartist, output requency Monitor	
<u>O</u> K	<u>C</u> ancel	Help	

Project - + × St C + X & C + + + + + + + + + + + + + + + + + +	☐-☐ Variables ☐ Program variables ☐ VarList					
È∰ INV_01	CX & B B B B B / Y					
E- FU_01	Name	Address	PLC type	Origin	Access	OPC type
Sariables		Address	i ce type	Cirgin	Access	oretype
	VarList.OutputFrequencyMonitor	SD1133	Int16	Generic	RW	Int16

Right-click on the Mitsubishi station and then select "Write Mitsubishi configuration to server ..." to transfer the changes to the IoT gateway.

Project	→ ‡ ×	Station name	Ethe	ernet add	re						
🖻 🕾 🗶 🐰	6 16 🛧 🏚	1NV_01	192	.168.0.2:5	01						
🖃 📢 IoTGateway	/										
🗄 🗅 Externa	l data										
📥 📑 Mitsubi	shi			_							
ė- ė	New PLC station										
Ė.	New robot station	n									
	<u>D</u> elete										
	Read Mitsubishi c	configuration from se	rver								
	Write Mitsubishi o	configuration to serv	er								
Address Space		ā ×	Dat	a Access Vie	V Performance V	ew					
- Mo Highlight		•	#	Server	Node Id	Display Nam	ie	Value	atatyr Source Timestamr	Server Timestamp	Stat
C Root			1	R04	NS11 String IN	OutputFrequencyMonitor	1435		Int16 12:00:48.802	12:00:49.016	Good
🛩 🚞 Objects											
> 💑 Client											
> 💑 DeviceSet											
> 💑 Modhus											
🗸 💑 FU_01											
> 🔲 Device	eHealth										
Device	Manual										
Device	Revision										
Y 💑 Globa	IVars										
V U Va	arList	iter									
A Hardw	areRevision										
Manuf	acturer										
Model											
> 👶 Progra	ams										
💡 Revisio	onCounter										
SerialN	lumber										
Softwa	reKevision										
🤉 🚒 lasks											

Further parameters can be added:

Name	Address	PLC type	Origin	Access	OPC type
InverterStatus	SD1151	Int16	Generic	RW	Int16
OutputFrequencyMonitor	SD1133	Int16	Generic	RW	Int16
OutputCurrentMonitor	SD1134	Int16	Generic	RW	Int16
OutputVoltageMonitor	SD1135	Int16	Generic	RW	Int16
InputPower	SD1160	Int16	Generic	RW	Int16
OutputPower	SD1161	Int16	Generic	RW	Int16
RunningSpeed	SD1153	Int16	Generic	RW	Int16
MotorTorque	SD1154	Int16	Generic	RW	Int16
ErrorHistory_01	SD1136	Int	Generic	RW	Int16
ErrorHistory_02	SD1137	Int	Generic	RW	Int16
ErrorHistory_03	SD1138	Int	Generic	RW	Int16
ErrorHistory_04	SD1139	Int	Generic	RW	Int16

#	Server	Node Id	Display Name	Value	ətə
1	R04	NS11 String IN	InputPower	3	Int
2	R04	NS11 String IN	InverterStatus	-32693	Int
3	R04	NS11 String IN	MotorTorque	0	Int
4	R04	NS11 String IN	OutputCurrentMonitor	63	Int
5	R04	NS11 String IN	OutputFrequencyMonitor	1435	Int
6	R04	NS11 String IN	OutputPower	3	Int
7	R04	NS11 String IN	OutputVoltageMonitor	742	Int
8	R04	NS11 String IN	RunningSpeed	431	Int
9	R04	NS11 String IN	ErrorHistory_01	12593	Int
10	R04	NS11 String IN	ErrorHistory_02	12593	Int
11	R04	NS11 String IN	ErrorHistory_03	12593	Int
12	R04	NS11 String IN	ErrorHistory_04	12593	Int

Example: Interpretation of the displayed value of the "Error History":

5 6 7 8	R04 R04 R04 R04	NS11 String IN NS11 String IN NS11 String IN NS11 String IN	OutputFrequencyMonitor OutputPower OutputVoltageMonitor RunningSpeed	1435 3 742 431		-	12,593	ood ood ood ood
9 10 11 12	R04 R04 R04 R04	NS11 String IN NS11 String IN NS11 String IN NS11 String IN	ErrorHistory_01 ErrorHistory_02 ErrorHistory_03 ErrorHistory_04	12593 12593 12593 12593 12593	HEX DEC OCT BIN	31 <mark>31</mark> 12,593 30 461 0011 0001 0011 0001	E.THM	ood ood ood ood

XML-Ex-/Import

The configuration generated in the OPCUAEdit tool can be exported as an XML file in the IoT Gateway web server.

Controllers Robots
Mitsubishi
▶INV_01
Insert station Modify station Remove station
Insert cpu Modify cpu Load project Remove cpu
Load XML Store XML Remove all

This generated XML file can then be edited in any text editor and then transferred back to the IoT Gateway using "Load XML".

Sample XML file:

```
<?xml version="1.0" encoding="UTF-8"?>
<Objects Version="1">
   <Device name="INV 01" URL="192.168.0.2:5012">
      <CPU name="FU 01" network="0" pcno="255" moduleio="1023" moduleno="0" hexio="1">
          <GlobalVars>
             <struct name="VarList">
                <Variable name="InverterStatus" address="SD1151" type="Int16"/>
                <Variable name="OutputFrequencyMonitor" address="SD1133" type="Int16"/>
                <Variable name="OutputCurrentMonitor" address="SD1134" type="Int16"/>
                <Variable name="OutputVoltageMonitor" address="SD1135" type="Int16"/>
                <Variable name="InputPower" address="SD1160" type="Int16"/>
                <Variable name="OutputPower" address="SD1161" type="Int16"/>
                <Variable name="RunningSpeed" address="SD1153" type="Int16"/>
                <Variable name="MotorTorque" address="SD1154" type="Int16"/>
                <Variable name="ErrorHistory_01" address="SD1136" type="Int16"/>
<Variable name="ErrorHistory_02" address="SD1137" type="Int16"/>
<Variable name="ErrorHistory_03" address="SD1138" type="Int16"/>
                <Variable name="ErrorHistory_04" address="SD1139" type="Int16"/>
             </struct>
          </GlobalVars>
      </CPU>
   </Device>
</Objects>
```

4.3.2 E800-E

With the E800 inverters, the status can be monitored and controlled with certain special SLMP Link registers.

In order for this to be possible, the PLC function of the inverter must be activated

Link Register

Parameter

Pr.	Register	Name	Read/write	Remarks
0 to 999	W0 to W999	For details on parameter names, refer to the parameter list in the FR-E800 Instruction Manual (Function).	Read/write	
C2 (902)	W902	Terminal 2 frequency setting bias (frequency)	Read/write	
C3 (902)	W4802	Terminal 2 frequency setting bias (analog value)	Read/write	Analog value (%) set in C3 (902)
	W4902	Terminal 2 frequency setting bias (terminal analog value)	Read	Analog value (%) of the voltage (current) applied to terminal 2
125 (903)	W903	Terminal 2 frequency setting gain (frequency)	Read/write	
C4 (903)	W4803	Terminal 2 frequency setting gain (analog value)	Read/write	Analog value (%) set in C4 (903)
	W4903	Terminal 2 frequency setting gain (terminal analog value)	Read	Analog value (%) of the voltage (current) applied to terminal 2
C5 (904)	W904	Terminal 4 frequency setting bias (frequency)	Read/write	
C6 (904)	W4804	Terminal 4 frequency setting bias (analog value)	Read/write	Analog value (%) set in C6 (904)
	W4904	Terminal 4 frequency setting bias (terminal analog value)	Read	Analog value (%) of the current (voltage) applied to terminal 4
126 (905)	W905	Terminal 4 frequency setting gain (frequency)	Read/write	
C7 (905)	W4805	Terminal 4 frequency setting gain (analog value)	Read/write	Analog value (%) set in C7 (905)
	W4905	Terminal 4 frequency setting gain (terminal analog value)	Read	Analog value (%) of the current (voltage) applied to terminal 4
C39 (932)	W4832	Terminal 4 bias (torque/magnetic flux)	Read/write	Analog value (%) set in C39 (932)
	W4932	Terminal 4 bias (torque/magnetic flux) (terminal analog value)	Read	Analog value (%) of the current (voltage) applied to terminal 4
C41 (933)	W4833	Terminal 4 gain (torque/magnetic flux)	Read/write	Analog value (%) set in C41 (933)
	W4933	Terminal 4 gain (torque/magnetic flux) (terminal analog value)	Read	Analog value (%) of the current (voltage) applied to terminal 4
C43 (934)	W4834	PID display bias analog value	Read/write	Analog value (%) set in C43 (934)
	W4934	PID display bias analog value (terminal analog value)	Read	Analog value (%) of the current (voltage) applied to terminal 4
C45 (935)	W4835	PID display gain analog value	Read/write	Analog value (%) set in C45 (935)
	W4935	PID display gain analog value (terminal analog value)	Read	Analog value (%) of the current (voltage) applied to terminal 4
1000 to 1499	W1000 to W1499	For details on parameter names, refer to the parameter list in the FR-E800 Instruction Manual (Function).	Read/write	

Inverter Status

Register	Monitor item	Read/write	Register	Monitor item	Read/write
W5001	Output frequency/speed	Read	W5040	PLC function user monitor 1	Read
W5002	Output current	Read	W5041	PLC function user monitor 2	Read
W5003	Output voltage	Read	W5042	PLC function user monitor 3	Read
W5005	Set frequency / motor speed setting	Read	W5045	Station number (CC-Link)	Read
W5006	Operation speed	Read	W5050	Energy saving effect	Read
W5007	Motor torque	Read	W5051	Cumulative energy saving	Read
W5008	Converter output voltage	Read	W5052	PID set point	Read
W5009	Regenerative brake duty	Read	W5053	PID measured value	Read
W5010	Electronic thermal O/L relay load factor	Read	W5054	PID deviation	Read
W5011	Output current peak value	Read	W5058	Option input terminal status 1 (for communication)	Read
W5012	Converter output voltage peak value	Read	W5059	Option input terminal status 2 (for communication)	Read
W5014	Output power	Read	W5060	Option output terminal status (for communication)	Read
W5015	Input terminal status	Read	W5061	Motor thermal load factor	Read
W5016	Output terminal status	Read	W5062	Inverter thermal load factor	Read
W5017	Load meter	Read	W5067	PID measured value 2	Read
W5018	Motor excitation current	Read	W5077	32-bit cumulative energy (lower 16 bits)	Read
W5020	Cumulative energization time	Read	W5078	32-bit cumulative energy (upper 16 bits)	Read
W5023	Actual operation time	Read	W5079	32-bit cumulative energy (lower 16 bits)	Read
W5024	Motor load factor	Read	W5080	32-bit cumulative energy (upper 16 bits)	Read
W5025	Cumulative power	Read	W5083	BACnet valid APDU counter	Read
W5032	Torque command	Read	W5091	PID manipulated amount	Read
W5033	Torque current command	Read	W5097	Dancer main speed setting	Read
W5038	Trace status	Read		•	

Preventive maintenance data

Register	Definition	Read/write	Remarks
W6000	Control method	Read	H02: V/F control
			H04: Advanced magnetic flux vector control
			H08: Real sensorless vector control
			H09: Vector control
			H18: PM sensorless vector control

Model information monitor

Register	Definition	Read/write	Remarks
W8001	Model (1st and 2nd characters)	Read	The inverter model can be read in ASCII code.
W8002	Model (3rd and 4th characters)	Read	"H20" (blank code) is set for blank area.
W8003	Model (5th and 6th characters)	Read	Example) FR-E820-EPA:
W8004	Model (7th and 8th characters)	Read	H40, H52, H2D, H45, H38, H32, H30, H2D, H45, H50, H41, H20H20
W8005	Model (9th and 10th characters)	Read	
W8006	Model (11th and 12th characters)	Read	
W8007	Model (13th and 14th characters)	Read	
W8008	Model (15th and 16th characters)	Read	
W8009	Model (17th and 18th characters)	Read	
W8010	Model (19th and 20th characters)	Read	
W8011	Capacity (1st and 2nd characters)	Read	The capacity in the inverter model can be read in ASCII code.
W8012	Capacity (3rd and 4th characters)	Read	Data is read in increments of 0.1 kW, and rounds down to 0.01 kW increments.
W8013	Capacity (5th and 6th characters)	Read	Example) 0.75K: " 7" (H20, H20, H20, H20, H20, H37)

Serial number

Register	Definition	Read/write	Remarks
W8001	Model (1st and 2nd characters)	Read	The inverter model can be read in ASCII code.
W8002	Model (3rd and 4th characters)	Read	"H20" (blank code) is set for blank area.
W8003	Model (5th and 6th characters)	Read	Example) FR-E820-EPA:
W8004	Model (7th and 8th characters)	Read	H40, H52, H2D, H45, H38, H32, H30, H2D, H45, H50, H4 I, H20H20
W8005	Model (9th and 10th characters)	Read	
W8006	Model (11th and 12th characters)	Read	
W8007	Model (13th and 14th characters)	Read	
W8008	Model (15th and 16th characters)	Read	
W8009	Model (17th and 18th characters)	Read	
W8010	Model (19th and 20th characters)	Read	
W8011	Capacity (1st and 2nd characters)	Read	The capacity in the inverter model can be read in ASCII code.
W8012	Capacity (3rd and 4th characters)	Read	Data is read in increments of 0.1 kW, and rounds down to 0.01 kW increments.
W8013	Capacity (5th and 6th characters)	Read	Example) 0.75K: " 7" (H20, H20, H20, H20, H20, H37)

Details on the parameters can be found in the E800 manual "Instruction Manual (Communication)".

Entering the variable

Example 1: output frequency

Mitsubishi variab	le properties		×
<u>N</u> ame:	OutputFrequency		
<u>A</u> ddress:	W1389	imber of field elements: 0	
Data type:		Access rights:	
Bit WORD		Read	
O Double Word		Write_	
◯ <u>I</u> nt			
O Double Int			
◯ <u>F</u> loat			
○ <u>S</u> tring	Length: 0		
Comment:			
UA Identifier:	INV_02_E800.FU_0	2.GlobalVars.VarList.OutputFrequency	
<u>O</u> K	<u>C</u> ancel	Help	

Right-click on the Mitsubishi station and then select "Write Mitsubishi configuration to server ..." to transfer the changes to the IoT gateway.

Project	→ ‡ ×	Station name	Ethernet addr	ess	CPU name	Se	Sta	Modul/IO	Multidrop stati	FX serie
🛃 📽 🗙 🖇 🖻	B 1 A	PLC 🛛	192.168.0.38:1	280	R04_39	00	FF	03FF	00	N&o
		TNV_02_E800	192.168.0.11:5	5012	FU_02	00	FF	03FF	00	N&to
🚊 🖧 External da	ata									
🕀 🥵 Conne	cted Servers									
😚 Variabl	e transfer									
ሮያ User-de	efined variable									
	configuration									
🚊 🛃 Mitsu	New PLC statio	n								
	New robot stat	ion								
	<u>D</u> elete									
1.	Read Mitsubis	ni configuration from	n server							
	Write Mitsubis	hi configuration to s	erver							

	Data	Access View							
	#	Server	Node Id	Display Name	Value	Datatype	Source Timestamp	Server Timestamp	Statuscode
1		RLi	NS11 String INV	OutputFrequency	1000	UInt16	12:17:22.415	12:17:22.661	Good

Further parameters can be added:

Name	Address	PLC type	Origin	Access	OPC type
VarList.OutputFrequency	W1389	Word	Generic	RW	UInt16
VarList.OutputCurrent	W1390	UInt16	Generic	RW	UInt16
VarList.OutputVoltage	W1391	UInt16	Generic	RW	UInt16
VarList.SetFrequency	W1392	UInt16	Generic	RW	UInt16
VarList.OperationSpeed	W1393	UInt16	Generic	RW	UInt16
VarList.MotorTorque	W1394	UInt16	Generic	RW	UInt16

Data	Access View					
#	Server	Node Id	Display Name	Value	Datatype	Source Timesta
1	RLi	NS11 String INV	MotorTorque	3197	UInt16	12:30:39.602
2	RLi	NS11 String INV	OperationSpeed	0	UInt16	12:18:54.685
3	RLi	NS11 String INV	OutputCurrent	3181	UInt16	12:30:42.786
4	RLi	NS11 String INV	OutputFrequency	1000	UInt16	12:30:37.286
5	RLi	NS11 String INV	OutputVoltage	0	UInt16	12:30:40.776
6	RLi	NS11 String INV	SetFrequency	0	UInt16	12:30:40.336

XML-Ex-/Import

The configuration generated in the OPCUAEdit tool can be exported as an XML file in the IoT Gateway web server.

Controllers Robots
Mitsubishi
▶ PLC
▶INV_02_E800
Insert station Modify station Remove station
Insert cpu Modify cpu Load project Remove cpu
Load XML Store XML Remove all

This generated XML file can then be edited in any text editor and then transferred back to the IoT Gateway using "Load XML".

Sample XML file:

```
Beispiel-XML-Datei:
<?xml version="1.0" encoding="UTF-8"?>
<Objects Version="1">
<Device name="INV 02 E800" URL="192.168.0.11:5012">
  <CPU name="FU_02" network="0" pcno="255" moduleio="1023" moduleno="0" hexio="1">
     <GlobalVars>
        <struct name="VarList">
           <Variable name="OutputFrequency" address="W1389" type="UInt16"/>
           <Variable name="OutputCurrent" address="W1390" type="UInt16"/>
           <Variable name="OutputVoltage" address="W1391" type="UInt16"/>
           <Variable name="SetFrequency" address="W1392" type="UInt16"/>
           <Variable name="OperationSpeed" address="W1393" type="UInt16"/>
           <Variable name="MotorTorque" address="W1394" type="UInt16"/>
        </struct>
     </GlobalVars>
  </CPU>
</Device>
</Objects>
```

5 Diagnostics

The browser window "Diagnostics" has several tabs to display details about established or faulty connections.

5.1 Controller diagnostics

The configured connections and their status (error-free / faulty) are displayed.

	OPC se	rver is running	ogout Update password				
Network	Co	ontroller diagnostics	Client diagnostics	Network diagnostics	Syste	em Log	
Security	ID	Connection name	Address	Time	Sour	Error number	Error Text
	Q -	R04CPU	192.168.0.38:1280	21.10.2021 5:34:36	Netwo	104	The connection was closed from the remote station
Certificates	🧼 -	Mitsubishi_Robot_01	192.168.0.20:10002	21.10.2021 5:26:39	PLC	0	Connection established
System	Clear	r diagnose C					
Diagnostics							
MQTT							
History							
OPC Client							

5.2 Client diagnostics

The current states of the configured OPC client connections (error-free / faulty) are displayed.

	OPC server is running Logout Update password
Network	Controller diagnostics Client diagnostics Network diagnostics System Log
Security	Diagnostic output of the client
Certificates	<pre>@ 21.10.2021 14:47:18:349 : 0x0 Good (0x00000001) : opc.tcp://rd55up12-v:48010 : ConnectionStatusChanged @ 21.10.2021 14:47:18:350 : 0x0 Good : opc.tcp://rd55up12-v:48010 : Connect</pre>
System	 21.10.2021 14:47:18:358 : 0x0 Good : opc.tcp://rd55up12-v:48010 : CreateSubscription 21.10.2021 14:47:19:245 : 0x0 Good (0x00000001) : opc.tcp://192.168.0.5:4840 : ConnectionStatusChanged
Users	
Siemens slots	 21.10.2021 14:47:19:256 : 0x0 Good : opc.tcp://192.168.0.5:4840 : CreateSubscription 21.10.2021 14:47:33:373 : 0x0 Good (0x00000002) : opc.tcp://192.168.0.5:4840 : ConnectionStatusChanged
History	21.10.2021 14:47:49:380 : 0x0 Good (0x00000003) : opc.tcp://192.168.0.5:4840 : ConnectionStatusChanged 21.10.2021 14:48: 4:495 : 0x800a0000 BadTimeout : opc.tcp://192.168.0.5:4840 : ConnectError
OPC Client	21.10.2021 14:48:19:643 : 0x800a0000 BadTimeout : opc.tcp://192.168.0.5:4840 : ConnectError
Diagnostics	 21.10.2021 14:48:34:757 : 0x800a0000 BadTimeout : opc.tcp://192.168.0.5:4840 : ConnectError 21.10.2021 14:48:49:872 : 0x800a0000 BadTimeout : opc.tcp://192.168.0.5:4840 : ConnectError
MQTT	21.10.2021 14:49: 4:986: 0x800a0000 BadTimeout: opc.tcp://192.168.0.5:4840: ConnectError
SoftPLC	Ø 21.10.2021 14:49:20100 : 0x800a0000 Bad Imeout : opc.tcp://192.168.0.5:4840 : Connecterror Download logfile Clear diagnose C

By clicking the "Download logfile" button, the saved states of the configured OPC client connections (error-free / faulty) can be displayed in an editor or saved as a text file.

	IBHLinkUA-ClientDiag.log - Editor
	Datei Bearbeiten Format Ansicht Hilfe
	=== IBH Link UA Client Diagnostics ===
 21.10.2021 14:49: 4:986 : 0x800a0000 E 21.10.2021 14:49:20:100 : 0x800a0000 Download logfile Clear diagnose 	21.10.2021 14:47:18:349 : 0x0 Good (0x00000001) : opc.tcp://rd55up12-v:48010 : ConnectionStatusChanged 21.10.2021 14:47:18:350 : 0x0 Good : opc.tcp://rd5up12-v:48010 : ConnectSubscription 21.10.2021 14:47:18:356 : 0x0 Good : opc.tcp://rd5up12-v:48010 : ConnectSubscription 21.10.2021 14:47:19:245 : 0x0 Good : opc.tcp://95.108.0.5:4840 : ConnectionStatusChanged 21.10.2021 14:47:19:245 : 0x0 Good : opc.tcp://92.168.0.5:4840 : ConnectSubscription 21.10.2021 14:47:19:256 : 0x0 Good : opc.tcp://92.168.0.5:4840 : ConnectSubscription 21.10.2021 14:47:33:373 : 0x0 Good (0x00000002) : opc.tcp://192.168.0.5:4840 : ConnectSubscription 21.10.2021 14:47:33:373 : 0x0 Good (0x00000002) : opc.tcp://192.168.0.5:4840 : ConnectionStatusChanged 21.10.2021 14:47:33:380 : 0x0 Good (0x00000002) : opc.tcp://192.168.0.5:4840 : ConnectionStatusChanged 21.10.2021 14:47:47:45:80 : 0x0 Good (0x00000002) : opc.tcp://192.168.0.5:4840 : ConnectionStatusChanged 21.10.2021 14:47:47:45:80 : 0x0 Good (0x00000002) : opc.tcp://192.168.0.5:4840 : ConnectionStatusChanged 21.10.2021 14:47:47:45:80 : 0x0 Good (0x00000000) : opc.tcp://192.168.0.5:4840 : ConnectionStatusChanged

5.3 Network diagnostics

An ICMP (Internet Control Message Protocol) ping is sent to the specified IP address (host name) by clicking the "Send ping" button.

Controller diagnostics Client diagnostics	Network diagnostics	System Log
Diagnostic output		
<pre>ping 192.168.178.49 192.168.178.49 : [0], 84 bytes, 2.34 ms (2.34 avg, 04 192.168.178.49 : [1], 84 bytes, 1.70 ms (2.02 avg, 04 192.168.178.49 : [2], 84 bytes, 2.20 ms (2.08 avg, 04 192.168.178.49 : xmt/rcv/%loss = 3/3/0%, min/avg/d </pre>	% loss) % loss) % loss) max = 1.70/2.08/2.34	
Hostname / IP Address: 192.168.178.49	Send Ping Reso	lve hostname
Select or type Trace filter	Start trace	Stop trace
Download frace Delete frace		

If the Wireshark diagnostic software is installed on the PC, a very extensive network analysis can be carried out.

After selecting the ethernet interface and the port to be checked press the "Start trace" button.

OPC server is running Logout Update password
Controller diagnostics Client diagnostics Network diagnostics System Log
Diagnostic output
tcpdump pid: 15455 tcpdump exited with status 9
Hostname / IP Address: 192.168.178.49 Send Ping Resolve hostname
-i eth1 -s0 -l port 48010 🗸 -i any -s0 -l port 48010 Start trace Stop trace
Download Trace Delete Trace

After stopping the trace, the recorded data is in a buffer inside the IoT Gateway.

Diagnostic output	
🕳 tcpdump pid: 16226	
Hostname / IP Address: 192.168.178.49	Send Ping Resolve hostname
-i eth1 -s0 -l port 48010 🗸 -i any -s0 -l port 48010	Start trace Stop trace
Download Trace Delete Trace	

The data can be downloaded to the connected PLC by pressing "Download trace"

-i eth1 -s0 -l port 48010 🗸 -i any -s0 -l port 48010	Start trace Stop trace
Download Trace Delete Trace	

Double clicking on the downloaded file starts Wireshark and shows the communication running on the selected interface.

	OPC server is running Logout Update password
Network	Controller diagnostics Client diagnostics Network diagnostics System Log
Security	Diagnostic output
Certificates	 tcpdump pid: 16226 tcpdump exited with status 9
System	
Users	Hostname / IP Address: 192.168.178.49 Send Ping Resolve hostname
Siemens slots	-i eth1 -s0 -l port 48010 ▼ -i any -s0 -l port 48010 Start trace Stop trace
History	Download Trace Delete Trace
OPC Client	
BHLinkUA-Tracepcap	<u>^</u>
6 5	

Since the evaluation of Wireshark-Trace requires some specialist knowledge, this diagnosis should be carried out in the event of a malfunction using the IBHsoftec hotline.

Mitsubishi Electric Europe B.V.

■ IbricitivOA+ iface (0, pcdp) Datei Bearbeiten Ansicht Navigation Aufzeichnen Analyse Statistiken Telephonie Wireless Iools Hilfe Image:	
Date Bearbeiten Ansicht Navigation Aufzeichnen Analyse Statistiken Telephonie Wireless Iools Hilfe Image: Image: International Control of Control o	
▲ ■ Ø ●	
Anzeigefilter anwenden <ctrl-></ctrl-> No. Time Source Destination Protocol Length Info	
No. Time Source Destination Protocol Length Info	
□ 10.000000 192.168.0.54 192.168.0.3 TCP 152 59041 → 48010 [PSH, ACK] Seq=1 Ack=1 Win=513 Len=96	
2 0.000140 192.168.0.3 192.168.0.54 TCP 56 48010 → 59041 [ACK] Seq=1 Ack=97 Win=483 Len=0	
3 0.001978 192.168.0.3 192.168.0.54 TCP 130 48010 → 59041 [PSH, ACK] Seq=1 Ack=97 Win=483 Len=74	
4 0.045752 192.168.0.54 192.168.0.3 TCP 62 59041 → 48010 [ACK] Seq=97 Ack=75 Win=512 Len=0	
5 1.212238 192.168.0.3 192.168.0.54 TCP 141 48010 → 59041 [PSH, ACK] Seq=75 Ack=97 Win=483 Len=85	
6 1.225103 192.168.0.54 192.168.0.3 TCP 122 59041 → 48010 [PSH, ACK] Seq=97 Ack=160 Win=512 Len=66	
7 1.266402 192.168.0.3 192.168.0.54 TCP 56 48010 → 59041 [ACK] Seq=160 Ack=163 Win=483 Len=0	
8 2.213536 127.0.0.1 127.0.0.1 TCP 153 48010 → 33794 [PSH, ACK] Seq=1 Ack=1 Win=1423 Len=85 TSval=319874 TSec	r=319381
9 2.213678 127.0.0.1 127.0.0.1 TCP 68 33794 → 48010 [ACK] Seq=1 Ack=86 Win=1605 Len=0 TSval=319874 TSecr=319	874
10 2.221707 127.0.0.1 127.0.0.1 TCP 134 33794 → 48010 [PSH, ACK] Seq=1 Ack=86 Win=1605 Len=66 TSval=319875 TSe	cr=319874
11 2.242445 127.0.0.1 127.0.0.1 TCP 164 33794 → 48010 [PSH, ACK] Seq=67 Ack=86 Win=1605 Len=96 TSval=319877 TS	ecr=319874
12 2 242776 127 0 0 1 127 0 0 1 TCP 68 48010 + 33794 [ACK] Sen=86 Ack=163 Win=1423 Len=0 TSval=319877 TSecr==	19875
<	
> Frame 1: 152 bytes on wire (1216 bits), 152 bytes captured (1216 bits)	
> Linux cooked capture v1	
> Internet Protocol Version 4, Src: 192.168.0.54, Dst: 192.168.0.3	
> Transmission Control Protocol, Src Port: 59041, Dst Port: 48010, Seq: 1, Ack: 1, Len: 96	
> Data (96 bytes)	

0000	00 00 00 01 00 06 00 50	b6 16 24 94 00 00 08 00	·····P ··\$····
0010	45 00 00 88 ef 6a 40 00	80 06 89 7b c0 a8 00 36	E····j <mark>0</mark> ····{···6
0020	c0 a8 00 03 e6 a1 bb 8a	ee 66 35 21 2b 06 8c 96	
0 7	IBHLinkUA-Trace (6).pcap		

5.4 System log

The IoT Gateway diagnosis creates a log file in which activities are recorded with a time stamp.

	OPC server is running Logout Update password
Network	Controller diagnostics Client diagnostics Network diagnostics System Log
Security	Logged Events
Certificates	 12. 8.2021 16:38:11 : Status 0x0 : System : Starting device up 12. 8.2021 16:38:11 : Status 0x0 : Configuration : Saving changed Stacktrace
System	 12. 8.2021 16:38:11 : Status 0x0 : Configuration : Saving changed SamplingRates 12. 8.2021 16:38:12 : Status 0x0 : Configuration : Saving changed SecurityPolicy
Users	12. 8.2021 16:38:45 : Status 0x0 : System : IBH Link UA started
Siemens slots	 12. 8.2021 16:39:26 : Status 0x0 : Webinterface : User admin logged in 12. 8.2021 16:41:56 : Status 0x0 : Configuration : Saving changed SecurityPolicy
History	 12. 8.2021 16:42: 8 : Status 0x0 : System : IBH Link UA started 12. 8.2021 16:42:31 : Status 0x0 : Webinterface : User admin logged in
OPC Client	12. 8.2021 16:43:38 : Status 0x0 : Mitsubishi : Mitsubishi configuration uploaded
Diagnostics	 12. 8.2021 16:43:38 : Status 0x0 : System : IBH Link UA stopped 12. 8.2021 16:43:52 : Status 0x0 : System : IBH Link UA started
MQTT	 12. 8.2021 16:52:45 : Status 0x0 : Mitsubishi : Mitsubishi configuration uploaded 12. 8.2021 16:52:45 : Status 0x0 : System : IBH Link UA stopped
SoftPLC	12. 8.2021 16:52:59 : Status 0x0 : System : IBH Link UA started

Buttons are provided to display the log file in an editor or to save it as a text file or to delete it. In the event of a malfunction, an analysis can be carried out using the IBHsoftec hotline.

21.10.2021 15:24:22 : Status 0x0 : Diagnostics : Network trace started
21.10.2021 15:24:54 : Status 0x0 : Diagnostics : Network trace stopped
Download logfile Clear system log
Enable Trace
Enable Trace Download logfile Delete logfile

All the background operations of the IoT Gateway can be made visible by activating the "Enable Trace" checkbox.

Enable Trace			
Chable Trace	Download logfile	Delete logfile	

After the event that should be evaluated has occurred, the current recorded data can be downloaded

www.ibhsoftec.com	Contact	V
UaServerCPP (4).log	^	

and opened in a text editor.

To evaluate this information requires some specialist knowledge, this diagnosis should be carried out in the event of a malfunction using the IBHsoftec hotline.

UaServerCPP (3).log - Editor	-		×
Datei Bearbeiten Format Ansicht Hilfe			
** urn:rd55up12-v:IBHsoftec:IBHLinkUA: start trace			
** Product version: IBHsoftec GmbH IBH Link UA 5.22.			
** C++ SDK Version: 1.7.3.505			
** C Stack Version: Version:1.4.13 276			
** Platform Layer: PlatformName:Linux			
** C++ SDK Version: 1.7.3.505			
** C Stack Version: Version:1.4.13 276			
** Platform Layer: PlatformName:Linux			
** C++ SDK Version: 1.7.3.505			
** C Stack Version: Version:1.4.13 276			
** Platform Layer: PlatformName:Linux			
** C++ SDK Version: 1.7.3.505			
** C Stack Version: Version:1.4.13 276			
** Platform Layer: PlatformName:Linux			
** C++ SDK Version: 1.7.3.505			
** C Stack Version: Version:1.4.13 276			
** Platform Layer: PlatformName:Linux			
** Date: 2021-10-21			
**			
06:38:12.256Z 4 B3BB0000* ==> UaCoreServerApplication::start			
06:38:12.257Z 6 B3BB0000*> ServerConfigXml::loadConfiguration			
06:38:12.263Z 2 B3BB0000* Warning: ServerConfigXml - AllowDeprecatedSecurityPolicies is set to true	2. You	may r	run
<pre>06:38:12.271Z 2 B3BB0000* Warning: UaEndpointXml::setXmlConfig - SecurityPolicyUri: http://opcfound</pre>	lation	.org/l	JA/:
06:38:12.2732 2 B3BB0000* Error: UaEndpointXml::setXmlConfig - invalid KeyLength 1024. Using 2048 i	nstea	d	
06:38:12.2742 6 B3BB0000* < ServerConfigXml::loadConfiguration [ret=0x0]			
06:38:12.4232[2]B3BB0000* WARNING: No ApplicationControlCallback available, cannot create ServerCor	figur	ation	l yp
06:38:12.747Z[1 B3BB0000* [uastack] Opendir failed !!!			
06:38:12./4/2[1]B3BB0000* [uastack] Error code: No such file or directory			
06:38:15.2542[1]838B0000% [uastack] Opendir failed !!!			
06:38:15.2542/1/B3BBB0000* [uastack] Error code: No such file or directory			
06:38:15.2612/1/B3B80000* [uastack] Upendir tailed !!!			
05:38:15.2612[1]535B00000* [Uastack] trror code: No such file or directory			

6 OPC Client Function Example

The IoT Gateway can also be used as an OPC UA client. This makes it possible to exchange data between different OPC UA servers and thus also between controllers from different manufacturers.

The following structure serves as an example:

On the iQ-R rack there is an R04 CPU (192.168.0.38), an IoT Gateway (192.168.0.3) and an RD81OPC96 module (192.168.0.5). Both OPC UA servers on RD55 and RD81 are active.



RD55UP12-V OPC Server Setting

	OPC Server läuft	Abmelden	Passwort ändern	
Netzwerk	Steuerungen	Roboter		
Sicherheit	Mitsubishi			
	▼iQ-R			
Zertifikate	T R04			
System	DeviceManua	l		
oystem	DeviceRevisio	n		
Benutzer	HardwareRev	ision		
Sigmono Sloto	Manufacturer			
Stemens Stots	Model			
Historie	RevisionCour	nter		
	SerialNumber			
OPC Client	SoftwareRev	sion		
Diagnose	► Programs ► Tasks			
MOTT	DeviceHealth			
MIGET I	▼ GlobalVars			
SoftSPS	▼ GlobalLab	el01		
Modbus	Count	er01		
moubus	Count	er02		
Mitsubishi	Count	er03		
Deekwall	Rando	m_01		
KOCKWEII	Rando	m_02		
	Rando	mCcolo 01		
	Rando	mScale_01		
	Rando	mScale_02		
	Robot			
	▶ SysQ			
	au in		CL 12 12 1	

RD810PC96 Server Setting

🔣 MX OPC UA Module Configurator-R	- D:\001 Projects\666 IDA Sho	wroom\020	MELIPC Tisch\R	D81config.mxcfg	-		<
<u>File E</u> dit <u>V</u> iew <u>G</u> o <u>T</u> ool <u>O</u> nlin	ne <u>H</u> elp						
🗋 🖆 🔚 🗢 🔿 🔁 🕉 🛍 🛍	× 🖭 🗄 🎬 🗰	💷 🖬 🐻	• 🗄 🛛 🗊	🗉 🖓 🚽 📲 📲 🚳	N 🚽		
	Name	No Re	Enable	Device	Device Data Type	Data Type	е
	Counter01		True	D1000	WORD	INT	
Conversion Definitions	Counter 02		True	D1001	WORD	INT	
Polling Method Definitions	🛯 🐔 🐻 Counter 03		True	D1002	WORD	INT	
Structure Type Declarations	🛯 🐔 🖓 Random_01		True	D1010	WORD	INT	
	🛯 🐔 🖓 Random_02		True	D1011	WORD	INT	
	📑 🔂 Random_03		True	D1012	WORD	INT	
	🛉 🔂 RandomScale_01		True	D1020	WORD	INT	
	🐔 🐻 RandomScale_02		True	D1021	WORD	INT	
	🛛 🐔 🐻 Random Scale_03		True	D1022	WORD	INT	
	🐻 Tag000		True	D0	WORD	INT	

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7 MODBUS

The IoT Gateway can connect to MODBUS servers and provide their data as OPC UA tags or communicate further via MQTT.

The configuration is done with the IBH OPC Editor software.

7.1 Add MODBUS Configuration

Right-clicking on an existing server configuration opens a menu window.

Click on "Add modbus configuration..." in this window.



The new empty MODBUS configuration is displayed.



Clicking on the icon entering the MODBUS server connection data:

	Modbus device properties X
	Device name:
	Interface:
	Ethernet URL or IP address:
	O Serial Number of simultaneously possible requests: 1
	Optional informations:
	Description:
	Manufacturer:
	Model:
	Serial number:
	PavicionCounter:
Add new Modbus device.	Hardware revision:
🕀 📷 Mitsubishi	
Modbus configuration	OK Cancel Help
\rightarrow	

Only the connection name (freely selectable) and the connection data are required here.

Modbus device properties						
1	Device <u>n</u> ame:	SCM Kit COMPACT				
	Interface:	<u>U</u> RL or IP address:	192.168.0.39			
	◯ Serial	Number of simultaneously p	ossible requests:	1		

The optional data is used for project documentation.

Optional informations:							
Description:	MODBUS TCO Smart Condition	MODBUS TCO Smart Condition Monitoring					
Manufacturer:	Mitsubishi Electric						
Model:	SCM Kit COMPACT	SCM KIT COMPACT					
Serial num <u>b</u> er:	2021-001						
RevisionCounter:	Α	Device revision:	Α				
Hardware revision:	1.0	Software revision:	2.10.0				

After clicking on "OK" the new MODBUS connection is displayed.



7.2 Add Variables

In the next window, which is opened by right-clicking on the desired connection, select "New variable..."



In this window you enter a name for the new variable and select the desired MODBUS data type with the corresponding MODBUS address.

Properties modbus	variable		×				
<u>N</u> ame:	Variable_1	Unit ID:	255				
Type: Boolean UInt16 UInt22 Int32 @Ejoat UInt54 Int64 Double	Access: Read: Read Agdress: ReadInputRegisters ReadHoldingRegisters Number: 1	Write: Write Addr <u>e</u> ss: WriteMultipleRegisters 32-bit swap word order					
Analog limit values:	es <u>M</u> inimum: ⁰	Ma <u>xi</u> mum:	0				
History:	Sampling interval (sec): 0.5	Buffer si <u>z</u> e:	1000				
UA node recognition: ns=9;s=SCM Kit COMPACT.Variable_1							
<u>O</u> K	Cancel		Help				

The IoT Gateway supports the following MODBUS data types:

- Inputs
- \rightarrow Read only
- Coils

•

- \rightarrow Read/Write
- Input registers → Read only
 - Holdingregisters \rightarrow Read/Write

In the following example, communication takes place with the MODBUS TCP server of an iQ-F controller, accessing holding registers. The address range of the holding registers is between 0 and 999

🗊 🙋 Basic Settings	Subnet Mask			•	TimeSync_Sensor_01			
Own Node Settings CC-Link IEF Basic Settings	Communication Data Code	Binary	MODBUS Device Allocation Parameter			-		×
O MODBUS/TCP Settings	CC-Link IEF Basic Settings							
Application Settings	To Use or Not to Use CC-Link IEF Basic Setting	Not to Use						
FTP Server Settings	Network Configuration Settings	<detailed setting=""></detailed>	Item	Input	Input Registers	Holding Regis	tera /	<u>_</u>
FTP Client Settings Web Server Settings	Refresh Settings MODBUS/TCP Settings	<detailed setting=""></detailed>	MODBUS Device Allocation Parameter	Set the parameter so that the MC)DBUS device can be relate	d to the device memory	of PLC (
Simple CPU Communication Setting	To Use or Not to Use MODBUS/TCP Setting	Used	- Allocation 1					
Time Setting	Device Assignment	<detailed setting=""></detailed>	Device			R0		
Secuny	External Device Configuration		Start MODBUS Device No.	0	0	0		
	External Device Configuration	<detailed setting=""></detailed>	Allocation Points	0	0	1000		

The first variable in the example is of type INT16, the data from holding register 100 is read/written

Properties modbus	Properties modbus variable X								
<u>N</u> ame:	SC1_Device_Status	Unit ID: 255							
Type: O <u>B</u> oolean	Access: Read:	Write:							
○UInt <u>1</u> 6 ●Int16	Address: 100	Address: 100							
○ UInt <u>3</u> 2 ○ Int3 <u>2</u> ○ <u>F</u> loat	 ReadInputRegisters ReadHoldingRegisters 	WriteSingleRegister							

The unit ID is only relevant for a serial connection and specifies the slave number.

The second variable is of type FLOAT, 32bit.

Properties modbus variable									
		<u>N</u> ame:	SC1_ISO_Value		<u>U</u> nit ID:	255			
	Type:		Access:						
	OBoolear	n	Read:		Write:				
	⊖ UInt <u>1</u> 6		<u> </u>		<u> </u>				
	◯ Int1 <u>6</u>		A <u>d</u> dress:	122	Addr <u>e</u> ss:	122			
	○ UInt <u>3</u> 2								
	O Int32		ReadInputRegist	ters	WriteMultipleReg	isters			
	Eloat		ReadHoldingReg	isters					
	OUT-ICA								

After all desired variables have been created, the configuration can be transferred to the IoT Gateway

7.3 Usage of MODBUS-Data

After the transfer to the IoT Gateway, the new MODBUS connection is visible in the web interface.



This means that the data is available to every OPC UA client, ...

Address Space & ×	Dat	a Access View	Performance Vi	ew					
😏 No Highlight 👻	#	Server	Node ld	Display Name	Value	ataty	Source Timestamp	Server Timestamp	Statuscode
C Root	1	R04	NS9 String SCM	SC1 DeviceStatus	1	Int16	11:50:04.131	11:50:04.374	Good
X 🔁 Objects	2	R04	NS9 String SCM	SC1_ISO_Status	1	Int16	11:50:06.200	11:50:06.437	Good
	3	R04	NS9 String SCM	SC1_ISO_Value	-3.76322e+011	Float	11:53:17.025	11:53:17.255	Good
> 💑 Client	4	R04	NS9 String SCM	DeviceManual	MODBUS TCO Smart Co	Stri	11:50:02.909	11:52:38.565	Good
> 💑 DeviceSet	5	R04	NS9 String SCM	DeviceRevision	A	Stri	11:50:02.910	11:52:38.565	Good
A MOTT	0	R04	NS9 String SCM	HardwareRevision	1.0	Stri	11:50:02.909	11:52:38.566	Good
	6	R04	NS9 String SCM	Manufacturer	"en", "Mitsubishi Electric"	Loc	11:50:02.910	11:52:38.566	Good
🗸 🔪 Modbus	8	R04	NS9 String SCM	Model	"en", "SCM KIT COMPACT"	LOC	11:50:02.910	11:52:38.300	Good
ClearConfiguration	10	R04	NS9 String SCIVI	RevisionCounter CasialNumber	2021-001	Int52	11:50:02.910	11:52:58.307	Good
> 🔹 ReadConfiguration	11	P04	NS01String1SCM	SeffauroPavision	210.0	Stri	11,50,02,910	11:52:44.710	Good
	12	R04	NS9IStringISCM	Statuc	connected	Stri	11.50.02.910	11.52.44.718	Good
SCIVIKITCompact	13	R04	NS9IStringISCM	Url	192 168 0 39-502	Stri	11.50.02.921	11.52.44.718	Good
DeviceHealth		110-1	ressioninglocitin	011	1521100101551502	561111	111301021310	11132141110	0000
DeviceManual									
DeviceRevision									
A Handware Devision									
 Hardwarekevision 									
Manufacturer									
Model									
RevisionCounter									
SC1 DeviceStatus									
SC1_ISO_Status									
SC1_ISO_Value									
SerialNumber									
Software Revision									
V Status									
Url 🔍 Vrl									
Status									
> in WriteConfiguration									

... and can also be sent to the IT world via MQTT

🚾 IoT Gateway INV_MB.opu - OPCUAEdit		
<u>F</u> ile <u>E</u> dit <u>H</u> elp	Variable selection	
Project Image: Connected Servers Image: Connected Servers Image: Conne	Client Client Conversion Client Conversion Client Conversion Client Conversion Client Conversion Client Conversion Client Clien	✓ Select: Name

8 MQTT Settings

The IoT gateway supports the MQTT protocol to send data to the cloud or to receive it from the cloud.

In order to create an MQTT connection, access to an MQTT broker is required. The corresponding configuration takes place in the IBH OPCUAEdit tool.

Knowledge of the corresponding IT infrastructure and the operation of an MQTT broker must be available and are not part of this document.

8.1 Create new Broker connection

Open an existing OPCUA server configuration and select "New MQTT broker"



In the next window enter the broker IP address and the necessary login data and press "OK".

In addition, the MQTT message format can be selected under "Message template". With "Default" the simple JSON format is used. If you want to communicate Iconics format, you can select it here accordingly.

MQTT connectio	on properties			×
Standard connect	ction		Message in case of connection	on failure:
	Broker address:	I40.Demobroker:1883	Send message in e	case of connection failure
	Client Identifier:	FAEDC	Message text:	
O Connecting with	TeamViewer IoT		MQTT topic:	
	Broker address:		Message quality:	Low (Qos=0) reception is not guaranteed $\qquad \lor$
	Client Identifier:		Remanent messag	ge storage
O Connection to A:	zure IOT		Security:	
	Logon <u>t</u> ext:		Certificate:	
			CA certificate:	
Maximum numbe	r of buffered mes	sages: 1	Private key:	
Eolder nam	e for remanent sto	prage:	Log in with user n	ame and password
			User <u>n</u> ame:	Iconics01
Me	essage template:	Default v Edit	Password:	•••••
		Iconics		
QK	<u>C</u> ancel	User Defined		Help

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Example Simple JSON-format:



Example Iconics-JSON-format:



8.2 Publish of values (Send data to Broker)

Two steps are required to "publish" values:

- 1. Create a new topic
- 2. Link the topic with data

8.2.1 Create Topic

Open the newly created "SampleBroker" by pressing, then right-click on "Publish" to open the menu and select "New topic"



Fill in the properties of the "Publish-Topic" and press "OK":

Properties MQTT-Pu	blish-Topic			×	
Topic <u>n</u> ame:	МуТоріс				
	Message guality:	Low (Qos=0) reception is r	not guaranteed V		
	Remanent message storing				
Trigger variable:					
Trigger condition:	Value change	~			
Variable identifier:	PLC.R04CPU.GlobalVars.Glob	alLabel01.RandomScale_(Namespace: 11		
	Numeric variable identifier		Select variable		
Display name:	RandomScale_03	Data type:	Int16		
ampling interval (ms):	1000	Trigger only on value change	e greater than:		
Ctatus variables					
status variable.					
Variable identifier:			Namespace:		
	Numeric variable identifier		Select variable		
Display name:		Data type:			SampleBroker
					🕀 🛅 Publish
<u>O</u> K	<u>C</u> ancel		<u>H</u> elp	_	🔚 🔤 Subscribe

In this example, the selected variable is checked for changes every 1000ms and "Publish" is started if the condition is met.

The variable to be checked can be selected from the OPC UA server (UA nodes).

Select data source	—		×
IoTGateway → Objects → Colent →			
Server name:			
Server address:			
Va <u>r</u> iable identifier:			
Namespace: Numeric variable identifier			
		<u>H</u> el;	•

8.2.2 Create new variable (data to be sent)

Open "Publish" and click the newly created topic, then right-click on the topic in the "Select variables..." menu



Select the required data in the next window and press "OK"

Jan Variable selection		×
E IoTGateway	Select:	
UA Nodes	Name	Data type
Dijects		
B R04CPU		
H- M Server		
🛪 🛅 Slots		
Stations		
🖬 🛄 Types		
India Views		
·		
<u>QK</u> <u>C</u> ancel		Help

The selected data are then displayed in the active topic in the editor

	l 🔊 🕸 🕫 🔀 👗 🛍 🛍 🧭	Name	Data type	Node name	Data source
E 🔇 SampleBroker		RandomScale	Int16	SampleBroker.Publish.MyTopic.RandomScale_01	IoTGateway::PLC.R04CPU.GlobalVars.GlobalLabel
	😑 🧰 Publish	RandomScale	Int16	SampleBroker.Publish.MyTopic.RandomScale_02	IoTGateway::PLC.R04CPU.GlobalVars.GlobalLabel
	🖨 😭 MyTopic	RandomScale	Int16	SampleBroker.Publish.MyTopic.RandomScale_03	IoTGateway::PLC.R04CPU.GlobalVars.GlobalLabel
	🔗 RandomScale_01				
	🔗 RandomScale_02				
	RandomScale_03				
	Subscribe				

Send the new setting to the IoT gateway and after the transfer has taken place, check whether the IoT gateway is connected to the broker.



8.2.3 Check data in Broker

🚭 MQTT.fx - 1.7.1	- 0	×
File Extras Help		
ب سریستان می از مان المعالی الم	nect	-
Publish Subscribe Scripts Broker Status Log		
LWT Subscribe	Qc50 Qc51 Qc52 Autorcol	007
MyTopic 189 Dump Messages Mute Unsubscribe	MyTopic	201 QoS 0
	MyTopic	202 QoS 0
Topics Collector (3) Scan Stop 😋	MyTopic	202
LWT	20-10-2021 11:56:59.43019664	QoS 0
МуТоріс	{"RandomScale_01":186,"RandomScale_02":319,"RandomScale_03":78}	
Roboter_Structure		

8.3 Subscription to values (receive data from broker)

In the following example, the program "MQTT.fx" "publishes" data to a broker. The IoT gateway should "subscribe" this data and write it into the corresponding PLC register in order to reset various counters (Counter01 to Counter03) to "0".

8.3.1 Create Topic

Open SampleBroker "by pressing, then right-click on" Subscribe "and select" New topic ".



Enter a name for the new topic and confirm with "OK".

Properties MQTT subscribe to	pic ×
Topic name	MySubTopic
<u>Q</u> K <u>C</u> ance	Help

Pressing "11" next to "Subscribe" shows the new topic



8.3.2 Create new variable

Select the new topic, right-click to open the menu and press "Select variables..."



Select the required data in the next window and confirm with "OK"



Counter01
 Counter02
 Counter03

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8.3.3 Function test of "Subscribe"

In the Sunscribe topic, the IoT Gateway expects a string in JSON format from the publisher, which must look like this:

{"Counter01":0,"Counter02":0,"Counter03":0}

Befor "Publish" on Broker-side 🔷 🔛 MELSOFT GX gnotics Joel Window Help 個 學 學 教 教 教 影 影 解 解 解 解 解 解 解 解 解 例 。 影 例 色 〇 化 100% 平。 評時 > 〇 修 器 即 Max: 0.232mi Project Edit Eind/Replace Con Ŷ Debug Re Dia 🗅 🖻 💾 🎯 🗌 - 🗄 🗶 🗈 🖪 🗠 🗠 🔤 🖼 🖼 🖄 MQTT.fx - 1.7.1 × File Extras Help el 4 ▶ ⊊ 40.mitsubishielectric.de 1883 Connect Disconnect **-**igle 🛛 😰 Updati Name Current Value Counter01 11189 Counter02 5594 Counter03 1119 Display Format Decimal Decimal Decimal Data Type Word [Signed] Word [Signed] Word [Signed] Publish Subscribe Scripts Broker Status Log « MySubTopic ["Counter01":0,"Counter02":0,"Counter03":0]

Short after "Publish" on Broker-side

MQTT.fx - 1.7.1			- 0	×	Ŧ				
File Extras Help					el 4	⊧ ≑	Watch 2[Watching]		
1883 Connect Disconnect				-		Di		MON/OFF toggle	Update
_						^	Name	Current Value	Display
Publish Subscribe Scripts Broker Status Log							Counter01	8	Decimal
						- 1	Counter02	4	Decimal
MySubTonic	Publish	0050 0051 0052	Retained	0°	-	-	Counter03	1	Decima
		door door			-	-			
{"Counter01":0,"Counter02":0,"Counter03":0}						- ~			
						>			

9 Teamviewer IoT Connection

A TeamViewer software is pre-installed in the IoT Gateway from firmware V 7.5. This offers the possibility of accessing almost all Mitsubishi Electric automation components at any time and from anywhere.

Complex modem solutions or the use of a PC on site are a thing of the past.

	OPC server is running Logout Update password
Network	Management Level Control Level TeamViewer IoT
Security	TeamViewer loT Status Online State message from Teamviewer loT
Certificates	TeamViewerID
System	Assignment Token
Users	Group TeamViewer auto start
Siemens slots	Log level Info V
History	Proxy settings
OPC Client	Proxy address (IP:Port) Internet access over proxy
Diagnostics	Start Ston New assign Remove assignment Download logfile Delate logfile MOTT settings
MQTT	
SoftPLC	Global System Contiguration Hostname rd55up12-v
Modbus	Port 48010
Mitsubishi	Nameserver 1
Rockwell	Nameserver 2
	Apply Revert

To establish a connection via *TeamViewer-IoT*, the Ethernet subnet of the control level must have access to the Internet.



The RD55UP12-V manages two firewall-separated subnet addresses, each with its own MAC address.

Level	Port	Subnet
Control level	CH 1	Must be different
Process level	CH 2	Must be different

9.1 PC preparations - connected to the Ethernet port of the control level

In order to use the access options of the pre-installed TeamViewer software, the conditions mentioned in the following sub-chapters must be fulfilled.

9.1.1 TeamViewer Software

The PC that is to be used to access the external IBH Link UA must have TeamViewer software version 15.9.4 or newer installed.



A TeamViewer account with an appropriate licence must be ready to activate.



If not already present, a new group must be added under Computers and Contacts after logging in.

🔁 TeamV	ïewer					_		×
Verbind	ung Extras Hilfe Feedba	ck		Partner-ID	eingeben	↔ v	erbinden	
0	Corporate + IoT	Q Suche	<mark>!</mark> ↓ Diesen Computer hinzu	Löschen Ifügen]			
↔ Fernsteuerung		✓ Verlauf Entfernten Computer hinzufügen ✓ rd55up12-v Kontakt hinzufügen ✓ Meine Computer Neue Gruppe hinzufügen			igen			
	Remote Management	▼ Showroom	Sitzungscode erstellen		3			
(ģ)	Meeting	► Offline (2)	Kontakte und Geräte in	der Umgebung	en			
8	Computer & Kontakte			Sitzungscode ers	tellen			
	Chat			Teilen				

9.1.2 IBHNet IoT setup

Install the software IBHNet-IoT-Setup.exe on the PC. This software is available under

https://download.ibhsoftec.com/neutral/IBHNet-IoT-Setup.exe

is available for download.

Install and start IBHNet-IoT software

IBHNet-IoT-Setup.exe Execute

the downloaded file.

Then run the *IBHNet-IoT* programme, which will start the ibhsoftec-agent-service.

The service is displayed as an *IBHNet-IoT tray* in the taskbar. If necessary, change the properties of the taskbar to display the icon.

If the icon shows a stopped service, start the service.



9.1.3 TeamViewer IoT Management Console

With the link

https://teamviewer-iot.com/en/

go to the *TeamViewer Internet of Things* login page and log in.



After logging into the **TeamViewer IoT Management Console**, open the **Assignment** *token* dialogue box.

			•	English 🔻 Contact Us	s Licensed	con 🔻
≡				klicken	Help	
வ் Home	TeamViewer IoT Home			klicken	API Key Assignmer	nt token
	DEVICE SUMMARY	ALARMS			(I Log Out	
 Device Configuration 	Devices Metrics • 0 Online 0 Total • 1 Offline 1	Critical	Major	Minor	Warning	
⊐⊈ Rules	۵ گ	×			1	
✿ Alarms	+ Add Device					
Notifications >						
① Dashboard	Documentation				iewer IoT: H	
	Getting Started C TeamViewer IoT Agent Installation C TeamViewer IoT Agent Remote Control C Edge Device Management C					

Click on the Copy symbol to copy the assignment token to the Windows clipboard.

TeamViewer		🌐 English 🔻 Cont	tact Us	Ralf.Lichte@meg.mee.com ▼ Licensed	
≡	Accimentation				
வி Home	Assignment token				
Oevice Configuration	Assignment token is used to assign the device to the account.				
⊐‡ Rules					
🗘 Alarms	Renew				
Notifications >					
Dashboard					
😵 Extensions >					

The **assignment token** must then be copied into the field of the same name in the **IBH** Link UA web browser window Network / TeamViewer IoT.

In addition, the group name previously created in TeamViewer must be entered and the check mark for **Automatically switch on TeamViewer** must be set.

Now you can click on **Reassign**

	OPC server is running Logout Update password
Network	Management Level Control Level TeamViewer IoT
Security	TeamViewer IoT
Certificates	TeamViewerID
System	Assignment Token
Users	Group Showroom
Siemens slots	Log level Info V
History	Proxy settings
OPC Client	Proxy address (IP:Port) Internet access over proxy
Diagnostics	Start Stan New assign Remove assignment Deveload leafile Delete leafile MOTT settings
MQTT	State Stop Trew assignment Download logine Delete logine Incert settings
SoftPLC	Hostname rd55up12-v
Modbus	Port 48010
Mitsubishi	Nameserver 1
Rockwell	Nameserver 2
	Apply Revert

To apply the settings, the **TeamViewer IoT End User Licence Agreement** must be accepted by clicking the **Agree** button.

TeamViewer® IoT End-User License Agreement
Team∀iewer® IoT End-User License Agreement
You find the full version of the IoT EULA here => <u>http://www.teamviewer.com/link/?url=653670</u>
This End-user License Agreement including its Annex ("EULA") applies to you
and TeamViewer Germany GmbH ("TeamViewer" or "We") for the licensing and use of our software,
which includes the TeamViewer software and all versions, features, applications and modules thereto
("Software"). This EULA also covers any associated media, printed materials and electronic documentation
that we make available to you (with our Software and "Product").
Future releases of our Product may warrant amendments to this EULA.
BY CLICKING "ACCEPT", DOWNLOADING OR OTHERWISE USING OUR SOFTWARE,
YOU AGREE TO ALL TERMS AND CONDITIONS OF THIS EULA.
IF YOU DO NOT AGREE TO ANY OF THE TERMS OF THIS EULA,
PLEASE IMMEDIATELY RETURN, DELETE OR DESTROY ALL COPIES OF OUR SOFTWARE IN YOUR POSSESSION.
If you want to use this software, you have to agree to the terms stated in <u>http://www.teamviewer.com/link/?url=653670</u>
bestätigen Zustimmen Nicht Zustimmen

It may take some time for the assignment token to be sent to TeamViever.

After successful login, the online connection to the TeamViewer IoT server is established.

	OPC server is running	Logout Update password
Network	Management Level	Control Level TeamViewer IoT
Security	TeamViewer IoT Status	Online
Certificates	TeamViewerID	2001 Arts
System	Assignment Token	
Users	Group TeamViewer auto start	Showroom
Siemens slots	Log level	Info 🗸

Double-click on the ID now entered by TeamViewer and copy it to the clipboard.

Right-click on the **IBHNet-IoT Tray** icon to open the context menu. The command **Agents...** opens the **TeamViewer Shortcuts** dialogue box.

		RD55_IBH	
		Close TeamViewer connection	
		Agents	
		Help	
IBHNet-IoT Tray - IBHsoftec GmbH Ready		<u>H</u> omepage	
		<u>W</u> iki	
		Information	
		Close IBHNet-IoT Tray	

Insert the TeamViewer ID number in the field with the same name. The display name is transferred to the **TeamViewer account.** This name can be used to establish a connection to the IBH Link UA via the internet.

	leamviewer-UKL			
RD55_IBH	teamviewer8://remotecontrol/?remotecontrolic	l= 2029613303 &forward	ports=[31711:localhos	t:31711:3]
	will be inserted			
onnection				
Connection	RD55_IBH 2.: enter any name			
ionnection visplay name: F	2 _3773_03 1.: insert			

Clicking the *Properties* button opens a dialogue box with the specification of the network card via which the IoT Gateway is connected.

Properties				×
-Language	German	C Eng	Jlish	
Ethernet card with I	nternet Access			
Intel(R) Ethernet	Connection (7) I219-LM			•
-Teamviewer Connec	tion establishment			
Local Port	31711	Timeout [m	ns]: 10000	
		confirm	<u>OK</u> <u>C</u> ancel	

Click on the *Add to list* button to adopt the display name and the TeamViewer ID. Click *OK* to close the dialogue box.

The installation of **TeamViewer IoT** in the IoT Gateway is hereby completed.

9.1.4 Connection setup

From any PC, a connection can be established via the Internet to the IoT Gateway and thus to the PLC controllers and other devices connected to the control level ports.

The *IBHNet-IoT software* must be installed on this PC, TeamViewer must be started and the login to the *TeamViewer account* must have taken place.

Right-click on the **IBHNet-IoT Tray** icon to open the context menu. The devices registered with the **TeamViewer account** are listed in the upper section of the context menu. Click on the desired device (RD55_IBH) to establish the connection.

Close TeamViewer connection Agents
He <u>l</u> p <u>H</u> omepage <u>W</u> iki Information
Close IBHNet-IoT Tray

The establishment of the connection is displayed.



After the connection has been successfully established, the *IBH Link loT* appears as a *WireGuard tunnel* under the network adapters of the PC.



From now on, all controllers and devices that are connected via the *IBH Link UA* control level are accessible.

	Logout Update password	
Network	Management Level Control Level TeamViewer IoT	
Security	TeamViewer IoT	
Certificates	TeamViewerID 2011 5003	
System	Assignment Token	
Users	Group Showroom	
Siemens slots	Log level Info	
Historv	Proxy settings	
OPC Client	Proxy address (IP:Port)	
Diagnostics	Internet access over proxy	
MQTT	Start Stop New assign Remove assignment Download logfile Delete logfile MQTT settings	
SoftPLC	Global System Configuration	
Modbus	Hostname rd55up12-v	
Mitaubiabi	Default gateway	
MILSUDISHI	Nameserver 1	
Rockwell	Nameserver 2	
	Apply Revent	
	naftan	

During the TeamViewer start-up process, it can happen that no connection is established and error messages are displayed. These error messages are to be closed with Cancel. The start process must be restarted. After the connection has been successfully established, the *IBHNet-IoT tray* icon in the taskbar changes. It gets an additional green marking.



From the PC whose *IBHNet-IoT tray* icon displays the existing online connection, controllers (CPUs / devices) connected to the control level ports can be accessed with the corresponding software (programming system).

9.2 Access to controllers (CPUs / devices) that are connected to the ports of the control level.

9.2.1 iQ-R CPU



9.2.2 Robot

Example: Connection with Q172DRCPU

Hardware structure:



Communication setting in the RT Toolbox 3:

Workspace □ □ Q172DRCPU □ 30 Monitor □ ○ RC1 □ ○ C1 □ □ □ Delete Pro □ □ Update Pro □ 0 Update Pro □	t pect }				
Edit Project # 1 Step.3.Communication Set the communications with the	robot controller.				×
Step 1.Out Line 2.Robot Model 3.Communication 4.Language	Network of the Robot Set the robot controller network. Cogy This PC Setting	IP Adress: Subnet Mask: Default Gateway:	192 . 168 . 0 . 20 255 . 255 . 255 . 0 0 . 0 . 0 . 0		
5.Travel Axis 6.Robot Additional Axis 7.Tool 8.Weight and Size	Connection Method * Set the connection method of RT To Method: CRnQ_R *	olBox3 and a robot.			
	Communication Setting PC side I/F Connection Path Target CPU Timeout [sec]	Etherna CPU 2 30	et et port IP address designate comm	unicatic	
			< <u>B</u> ack	<u>N</u> ext > <u>F</u> inish	Cancel





< Back Next > Einish Cancel

9.2.3 GOT

In the GT-Designer3, it is not necessary to select an IoT tunnel if one exists; entering the destination IP address of the GOT is sufficient:

