2025

MINT PLC settings

VERSION 1.0

EN

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Date	Version	Description of Changes	Status	Author
19-01-2024	1.0	Initial draft		Femke Parthoens

3 Firmware settings

The firmware version can be found in the top right corner (FW: YYYY.X.X LTS) and should match the software version, which can be found in the change notes of the library that is being used. To update the firmware, select “Firmware Update” from the main menu.

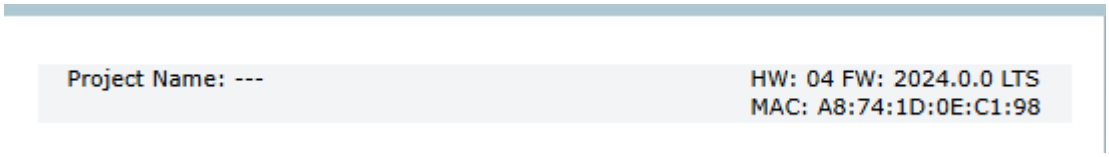

Figure 1: Firmware settings

4 System services

Select “System Services” from the main menu and check if these settings are deactivated:

- DATALOGGER
- ETHERNET IP
- OPCUA
- PROFINET CONTROLLER
- PROFINET DEVICE
- TRACING

If they are activated, unmark the tick box in the Activation column to deactivate them, and click “Apply and reboot” to finalise.

Figure 2: System services

5 Firewall settings

Select “Firewall” from the main menu and check if the firewall has started in the General Configuration. If not, mark the Activation tick box to start the firewall.

In the Basic Rules of the Basic Configuration, change the Action column of the last 4 items (Seq. 6, 7, 8 and 9) to “Reject”.

Click “Apply” to confirm.

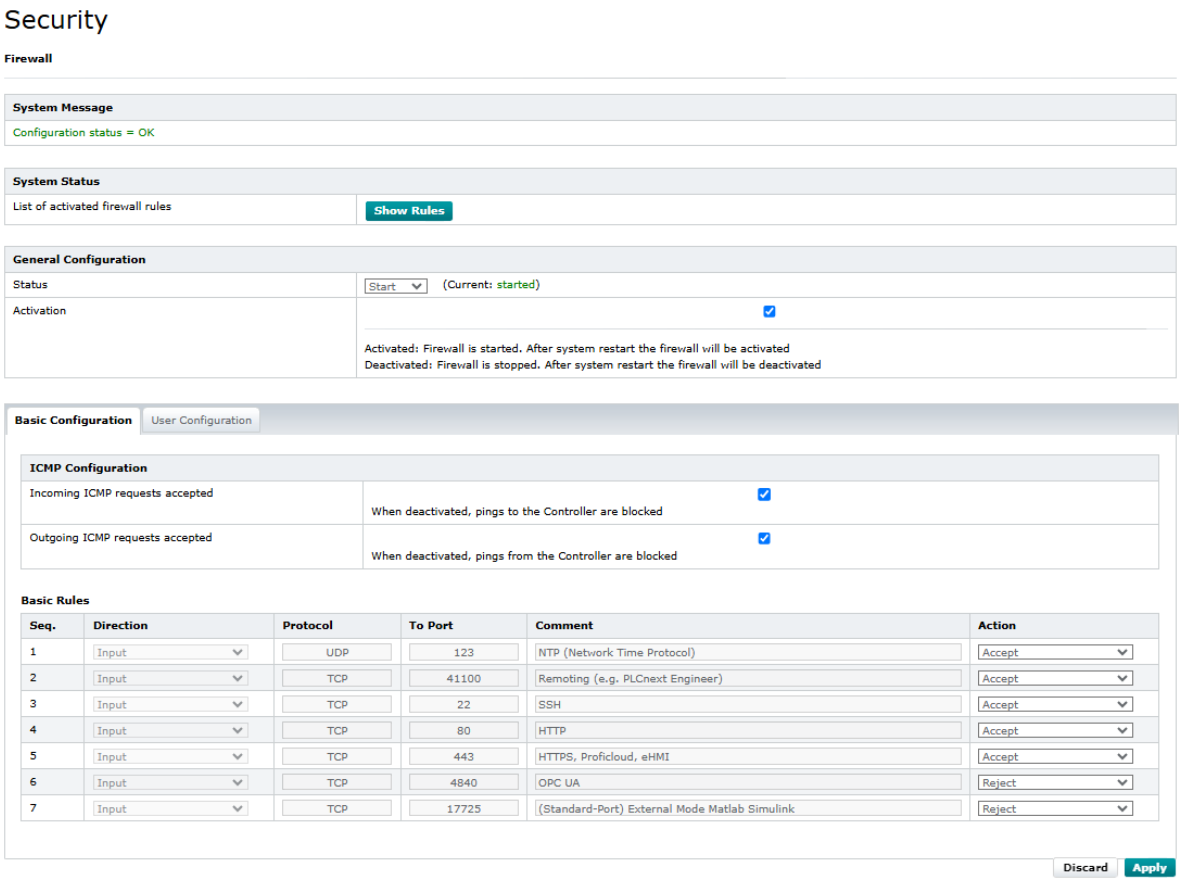

Figure 3: Firewall settings

6 Network Time Protocol (NTP) clock synchronisation

Select “Date and Time” from the main menu and make sure all server hostnames (0.pool.ntp.org, 1.be.pool.ntp.org, and 2.europe.pool.ntp.org) have a minimum polling of 1 minute and 4 seconds, and a maximum polling of 36 hours, 24 minutes and 32 seconds applied. To change the polling interval, click the pencil icon on the right of each server hostname, modify the Min. polling time and/or Max. polling time and click “OK”. Finally, click “Apply” to confirm.

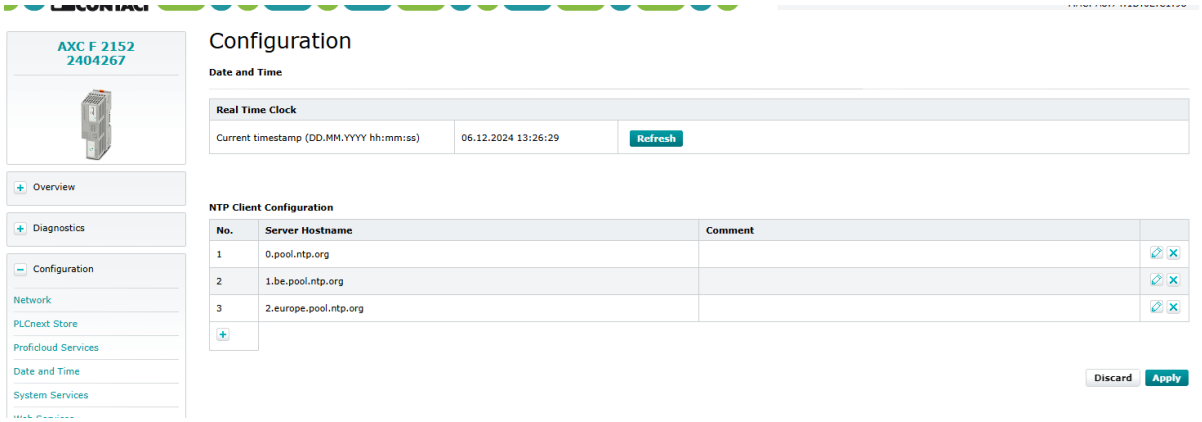

Figure 4: NTP clock synchronisation

6.1 Troubleshooting

Follow these steps if the synchronisation does not work.

To setup the NTP, the PLC needs internet access to the NTP server. Open an SSH tunnel to the Linux core of the PLC, for example with PuTTY, and use the following command to check the connection:

ping 8.8.8.8

Create a root user in Linux and set the password to[1]:

sudo passwd root

And enter the root user mode:

su

Set the date and time to the correct UTC time, either by using a command, or by configuring it in the PLC:

date -s “YYYY-MM-DD hh:mm:ss”

Now, edit the settings of the NTP server:

cd / etc

[1] The password can be modified, but unless there is a good reason to change it, using this one is preferred. If the password is changed, please make sure to remember it.

...

nano ntp.conf

And add the following line:

tos maxdist 20

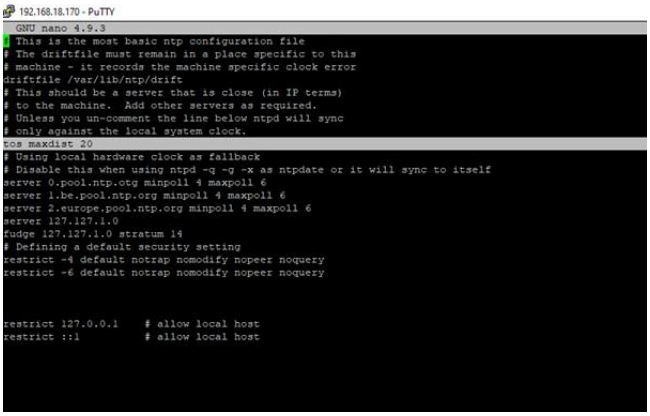

Figure 5: PuTTY

Press Ctrl + S and Ctrl + X in the WBM to restart the NTP daemon and click “Apply” in the previously opened Date and Time window. Wait 2 minutes and open the inquiry program.

ntpq –q

The ntpq -p command queries the NTP daemon (ntpd) on a Linux system, to retrieve information about its synchronised peers. Running ntpq -p displays a table-like output with detailed columns:

- **remote**: Hostname or IP address of each NTP peer.
- **refid**: Reference ID used by the NTP peer for synchronisation.
- **st**: Stratum level of the NTP peer.
- **t**: Type of peer (l for local, u for unicast, b for broadcast).
- **when**: Time in seconds since last successful communication.
- **poll**: Interval in seconds between NTP queries.
- **reach**: Octal representation of success/failure history.
- **delay**: Round-trip delay time to the peer (ms).
- **offset**: Time difference between system’s clock and peer’s clock (ms).
- **jitter**: Variability in round-trip times (ms).

Symbols like *, +, -, # denote the synchronisation status: * preferred, + candidate, - viable but not selected, # rejected.

Example

remote	refid	st	t	when	poll	reach	delay	offset	jitter
LOCAL(0)	.LOCL.	14	l	462	64	200	0.000	+0.000	0.002
*ntp2.belbone.be	10.0.0.5	2	u	63	64	377	5.789	+1.020	0.914
+vps-7d02b399.vp	152.78.229.49	2	u	3	64	377	12.236	-1.561	0.577

This output indicates the local clock (LOCAL(0)), a selected NTP peer (*ntp2.belbone.be), and a candidate peer (+vps-7d02b399.vp). In summary, the presence of a selected (*) peer ensures continuous clock synchronisation through the NTP protocol in a Linux environment. You can test this by changing the internal clock, wait a few minutes, and check the time using:

date