

FAQ / Neles LoRa Communication Module

Technical

Which devices are supported by the Neles LoRa Communication Module

At this phase, we support all ND6, ND7, ND9 revisions and NDX rev.6 onwards. Older models (800 series) intentionally left out, and our recommendation is to replace them with newer ones. In the future, we might consider support VG9 and SG9 depending on customer cases.

Device versions of ND9000, NDX and what to do if not complying with it for the Neles LoRa Communication Module

Device support is depending on the device revisions. For ND9, ND7 and ND6 all the revisions are covered, but the amount of data gathered is slightly limited with the older versions. E.g., daily valve reversals are missing the first versions of ND9, and the on-line signature is included only in ND9 revision 4/10 onwards.

With NDX we are supporting only version 6 onwards. This is due to changes in diagnostic calculations over the revisions. The early version's firmware can be updated to the version 6 (or newer) to be compliant with LCM.

Is automation system capable of supplying power for both Neles LoRa Communication Module and Positioner?

A positioner with LCM will require more power out of system I/O card than without, but the change is not big. Positioner (ND9000) takes about 10V and the LCM will require max 1.4V, so the power need will increase less than 15%. Typically, the system supplies are 24V, from which the devices together require 11,4V and couple volts is taken by long cables. But still, there will be some reserve. Note, some customers have used an extra resistor at the I/O-card end to avoid low load alarms at the card, those should not be used (LCM works as an "extra resistor").

Neles LoRa Communication Module failure – what happens?

LCM is connected to the mA-control loop in series with the positioner. So, it is a crucial part of the loop in case of possible failure. LCM is not an active part in mA-loop, only things it does is taking power out of it and send / receives digital (HART) communication.

The powering of LCM is done over a simple resistor causing a voltage drop in mA-loop letting the same mA signal to go through both LCM and the positioner. It is possible, but very unlikely, that LCM failure would cause

cutting of the mA-loop. It's more likely that a failure disturbs LoRa and/or HART communication letting mA-signal still running.

Can some one else hear LoRa communication?

LoRaWan protocol works in a way that every gateway hears all the communication in its range. So, also Valmet gateways will hear other possible LoRa sensors at the range and they will deliver the messages to the LoRa server. And so does the other gateways as well. The LoRa server pass through the messages for which it owns the security keys. In other words, all communication can be heard, but the messages are encrypted and can be opened only at the servers with the right keys.

What happens if the connection is temporarily unavailable? Is data buffered locally and transmitted later?

Unfortunately, data is not stored at the gateway, the first node to store it is the LoRa server, so in case there is no connection to LoRa server the data is lost. But, if the issue concerns only one of the gateways at the site, then communication flows via the functioning gateways.

Is it possible for us to implement this for clients whose company rules prohibit sending data to external clouds?

For LoRa concept the only way of data collection is directly to our cloud. For wired concept of ValvesNow there is also an option of off-line data collection, where data is sent to Valmet by email.

Is it possible to install Starlink in a remote area without 4G internet?

Basically yes, but the gateways do not support it directly. A special communication module (an Ethernet/Starlink -module) is needed to be assembled between gateways and the LoRa server.

Can we sell it for classified Exi areas already?

No. Our Exi design is still under construction, and the timetable is a bit unclear still. Exi gateways are commercially available, but we have not tested them, needs to be done with the first cases requiring them. Normal gateways can be utilized by placing them outside of Atex zones.

What is the approximate installation time for LCM per actuator?

Our target was 20 minutes, based on our pilot cases seems that we are going to get there.

Does the LoRa network have to be a dedicated network, or can we use an existing LoRa network at the client's site?

A dedicated network is needed. Each gateway is paired with certificates with the LoRa server.

Is it possible to use LCM for other devices than Neles positioners

Now it's not possible, but we leave door open for possible uses cases. Technically it would be possible for any HART device. Each case needs LCM firmware update to work, and it means new type code etc.

How many devices one gateway can cover

We have made a conservative estimate that we can cover 1000 devices per customer site. The actual limiting factor is not the capacity of the gateway. It's more like how full of messages the air is. The LoRa protocol varies the communication speed based on signal strengths. Weaker signals, slower speed and the air is more occupied. In challenging situations, we can add extra gateways. Shorter distances between gateways and modules improve signal strength and reception increasing speed and shortening sending times which means less occupied air.

To which countries can we install the modules

At the first phase, we have support for Europe (EU & UK) and Brazil. The other areas are pending on the local radio certificates. The next areas to be covered we will decide based on customer interest.

Is there a need to update LCM fw and/or the gateway's fw

There might be needs, especially for the gateway, in case the vendor has found some security vulnerabilities. The update can be done remotely via Internet or 4G connection. For LCM is more unlikely that there will be a need for update, but if there is, it can be done via USB-C cable locally.

How cyber security has been taken into consideration

Communication is one way only, and there is no user interface for configuration changes on the device. Once the module is powered up it starts to ask diagnostic values from the positioner and sends them to the gateway via LoRaWan. In other words, there is no functionality in the module fw doing anything else than data reading and resending. Commanding the valve controller in any other way would need replacement of fw, which requires developers security keys and local USB-C connection to the device.

Security of data is according to LoRaWan protocol. Encryption of pay load data can be opened only with appropriate security keys.

What to do if some security vulnerabilities are observed?

Any identified vulnerabilities that affect product security, together with the corresponding mitigation measures and corrective actions, are published on

our website: [Security advisories](#). On the same web site new vulnerabilities can be reported.

Commercial

Terminology, how we name different parts in the concept

LoRa Communication Module (LCM) we sometimes refer just as a module, in some more technical discussion you can hear someone speaking about LoRa modem or just about a modem.

LoRa gateway we normally just call it a gateway. Gateways are devices located on end user's production area collecting LoRa messages from the modules and transferring them to the LoRa server. Gateways are connected to internet either through 4G or with Ethernet connection.

LoRa server is the one collecting right messages from the gateways and interpreting them to actual measured values. The server is on Valmet Industrial Internet cloud platform. The same server is used for all customer cases.

Some documentation speaks about devices, that normally refers to our valves, especially valve positioners to where a LoRa module is attached to.

Device (LCM) ownership?

Our service pricing includes LCM price, thus, after the full payment the devices becomes end user property. Note, the devices can communicate only with Valmet LoRa server, so, they cannot be used for any other purposes.

Set-up capex / minimum agreement length or termination cost

For monitoring services, we have two different pricing models:

- Set-up fee + monthly service fee
- Monthly service fee only (set-up fee is diluted to the monthly fee)

There is no exact minimum agreement length, but we won't see real analysis results under 3 months period, thus, agreement for 1 year or over are recommended. In "Monthly service fee only" option, we include termination cost equal to the left from Set-up fee.

Contract termination: data delivery package?

In case of monitoring agreement termination Valmet will deliver the collected data with latest analysis results in excel format (csv file). The customer portal ValvesNow dashboard UI with latest results is available for 6 months after agreement termination.

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What is the minimum number of modules in an agreement

There is no minimum number of modules defined. But, since even 1 module would need at least 1 gateway, and we need to travel for the installation, so, customer price per device gets quite high. And for ValvesNow analysis, we have the smallest license for 100 devices, which further increases the unit price.

What is customer price of one LoRa module and gateway

Each customer agreement will be priced as a lump sum, but in the calculations, we use customer prices roughly like 250 eur / module and 1000 eur / gateway.

Will we have safety stock in Brazil for potential warranty claims?

Yes, it makes sense. And even in normal deliveries it would speed up our delivery process, especially in establishing pilot cases. Similar stock can be established on Hakkila Service center for Europe options.

Are the LoRa gateways our production or any commercially available one?

The gateways are commercially available products. We have selected and tested two brands. Kerlink is our preference.