DLMS/COSEM Driver for Tridium Niagara

User Guide

baudrate.io

niagara4

July 22, 2026

Contents

1 Introduction

DLMS/COSEM[1] is an international standard for reading utility meters, widely used by electricity, gas, water, and heat meters. It carries the same COSEM application layer over two physical paths:

- HDLC over a serial or optical link (an optical probe, an RS-485 bus, or an RS-232 port)
- HDLC or the IEC 62056-47 wrapper over TCP/IP (a meter with a network port, or a meter reached through a TCP-to-serial gateway)

The DLMS driver for Niagara discovers the points in a meter and then polls them periodically. It provides a cost-effective way for building management systems and energy monitoring systems to read metering values for analysis.

DLMS meters expose their data through the COSEM object model. Every object is named by an OBIS code, so each discovered point carries a human-readable name and unit assigned automatically by the driver. Meter vendors are identified using FLAG codes.

The driver can only read (poll) the meter, so no writing is implemented. Under no circumstances can the meter's values or settings be changed by Niagara.

2 Abbreviations

- **DLMS** – Device Language Message Specification, the application-layer protocol that defines the messages a client and a meter exchange to read metering data.
- **COSEM** – Companion Specification for Energy Metering, the object model that represents a meter's data as interface-class objects, each addressed by an OBIS code.
- **HDLC** – High-level Data Link Control, the data-link layer that frames DLMS messages over a serial, optical, or TCP link, handling addressing, sequencing, and error checking.
- **OBIS** – Object Identification System (IEC 62056-6-1), the six-part code that identifies each measured value in a meter, e.g., active energy import or voltage.
- **FLAG** – the three-letter manufacturer identifier carried in a meter's identification message and registered with the DLMS User Association, used to resolve the vendor name.

3 Requirements

- Niagara-powered device with software v4.8 or later, including JACE and all its OEM versions
- dlms-rt.jar driver module and license

[1] All trademarks or registered trademarks are the property of their respective owners

- One of the following communication paths to the meter:
  - a TCP/IP path, either directly to a meter with a network port or through a TCP-to-serial gateway
  - an RS-485 or RS-232 serial port, or an optical probe

The driver supports DLMS over TCP/IP and DLMS over a serial or optical link. It also supports the classic IEC 62056-21 ASCII readout modes A, B, C, and D, so a meter that answers only with a plain ASCII data readout can be read on the same serial or TCP path. Mode E is the entry to HDLC: an E-capable meter signs on with IEC 62056-21 and then switches to the binary HDLC transport that carries DLMS, so an optical or serial meter reaches its full COSEM object model through Mode E. The mode is selected per device and, where possible, detected automatically.

If the meter is not equipped with an RS-485 or RS-232 port, then it can be connected through a physical level interface converter:

- optical probe to RS-485
- current loop to RS-485

Multiple meters can be connected to one RS-485 port using standard daisy-chain topology, or reached through one TCP-to-serial gateway.

4 Quick Start

There are two networks, one for meters reached over TCP/IP and one for meters on a serial line. Choose the network that matches the physical path to the meter.

A meter reached over TCP/IP:

1. Copy dlms-rt.jar to the Workbench *modules* folder.
2. Restart Workbench software.
3. Deploy dlms-rt.jar to the JACE from *Software Manager*.
4. Restart the JACE station.
5. Add a **Dlms Ip Network** to the JACE station.
6. Enter the license code in the **License** property under the network.
7. Open the network's Device Manager and press **Discover**. Enter the meter's **Ip Address** and **Port**, and, for a secured meter, its client address, server address, and password. Niagara probes the endpoint and lists each meter it finds. Select a row and press **Add**, or add a **Dlms Ip Device** manually and set its **Ip Address**, **Port**, and **Mode**.
8. Niagara starts polling the meter and, if successful, displays the read-only identity properties: **Detected Mode**, **Manufacturer**, **Identification**, and **Logical Device Name**.

9. If communication is established, open the device's point extension and **Discover** points in the meter.
10. Niagara displays the discovered points with their OBIS codes, descriptions, values, and units. Select and **Add** the points of interest to the station.

A meter on a serial or optical line:

1. Follow steps 1 to 4 above.
2. Add a **Dlms Serial Network** to the JACE station.
3. Enter the license code in the **License** property under the network.
4. Select the COM port in the **Serial Port** property and, if the meter does not start at 300 baud, set the **Initial Baud** property to match it.
5. Open the network and add a **Dlms Serial Device**. Enter the meter's **Device Address** if you know it (it is usually printed on the meter front panel); leave it empty if only one meter is connected. Set the **Mode** (use *auto* if the meter type is unknown).
6. Niagara polls the meter and, on success, displays its read-only identity.
7. Open the device's point extension, **Discover** the points, and **Add** the points of interest.

5 Dlms Ip Network

A **Dlms Ip Network** contains meters reached over TCP/IP. Each device opens its own socket. Devices behind one TCP-to-serial gateway share an address and port, and the network serializes their sessions so they never open a second connection to the gateway at the same time; meters at distinct endpoints stay fully parallel.

The network contains many standard Niagara properties, as well as a few driver-specific ones:

- **License** – the code that allows the driver to run on your host.
- **Poll Scheduler** – specifies the polling rates for periodic data reading:
  - Fast Rate: 30 seconds
  - Normal Rate: 60 seconds
  - Slow Rate: 300 seconds
- **Discovery Preferences** – the default inputs for the Device Manager's Discover pane: the **Ip Address** and **Port** to probe, plus an optional client address, server address, and password used verbatim by the probe when a secured meter is discovered.

In most cases only the **License** value needs to be changed before adding devices.

6 Dlms Serial Network

A **Dlms Serial Network** contains meters on one shared serial or optical line. The serial-port settings live on the network, not on each device, because an optical or RS-485 bus is shared by all of its meters, each addressed by its IEC 62056-21 device address. The network serializes sessions across its devices so that two meters never talk over each other on the one line.

The network contains the following driver-specific properties:

- **License** – the code that allows the driver to run on your host.
- **Serial Port** – the JACE serial port to which the meters are connected. The **Port Name** and the line settings are configured here.
- **Initial Baud** – the baud rate the sign-on runs at before any mode B or C baud switch. IEC 62056-21 requires meters to start at 300 baud for an optical link, however, some meters and fixed RS-485 buses expect a higher speed.
- **Reaction Delay** – the reaction time (tr) the driver waits after receiving a message before it transmits the next one, in milliseconds.
- **Baud Switch Delay** – the delay after the mode C acknowledgement before the driver switches baud, so the acknowledgement drains at the old rate, in milliseconds.
- **Poll Scheduler** – the polling rates, identical to the Dlms Ip Network (Fast 30 seconds, Normal 60 seconds, and Slow 300 seconds).

In most cases only the **License** and **Serial Port** values need to be changed.

7 Device Discovery

Unlike the classic IEC 62056-21 ASCII protocol, DLMS can be probed, so the Dlms Ip Network offers automatic device discovery. Open the network's Device Manager and press **Discover**. In the dialog, enter:

- **Ip Address** and **Port** – the endpoint to probe.
- **Client Address**, **Server Address**, and **Password** – optional. Leave the password blank to probe with the public client address 16 and no authentication. Set them to try a secured meter's exact credentials from its datasheet.

The probe works through the endpoint in layers: it checks that the endpoint is reachable, detects the interface (HDLC, wrapper, or an IEC 62056-21 sign-on), detects the referencing (Logical Name or Short Name), reads the meter identity, and then tries authentication with the public client address and, if a password was supplied, the exact credentials given. It emits one row per confirmed meter. Press **Add** to create a fully configured device from a row.

The probe is read-only and never changes the meter. A wrong password is always reported, never silent: the meter still appears as a row so that it can be added and corrected, and the reason (“wrong password”) is written to the job log. If nothing is reachable at the endpoint, the layered diagnosis is written to the job log and no row is added.

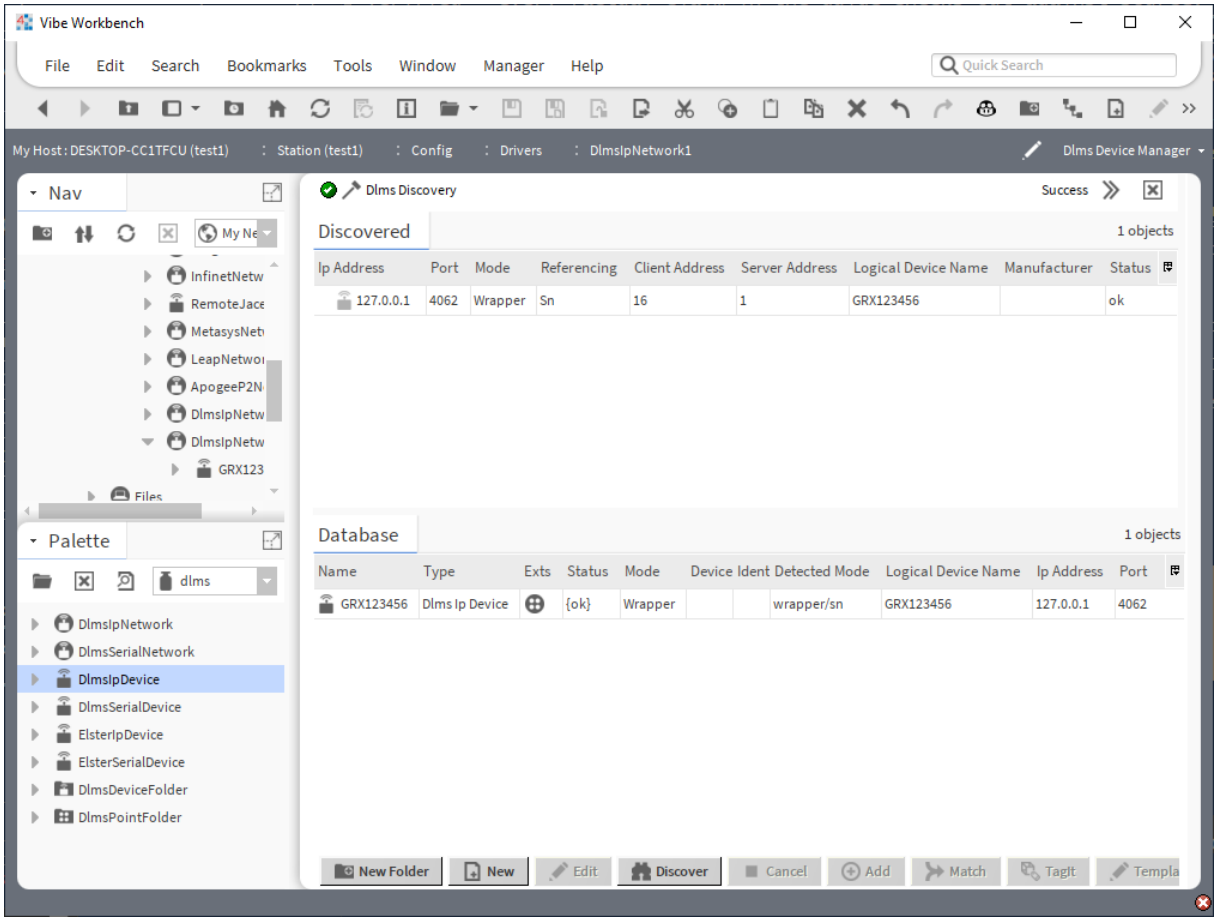

Figure 1: Device discovery: the Discovered pane lists the meter found at the probed endpoint, and the Database pane shows the device after Add

8 Dlms Devices

A DLMS device represents one meter. The same device model serves both families: a direct DLMS session over the COSEM object model, and, where the meter answers with a plain ASCII readout, an IEC 62056-21 data readout. The active family follows the meter’s response, so one device covers a DLMS meter and an ASCII-only meter alike.

A device contains the following properties:

- **Ip Address** – the meter or gateway address (Dlms Ip Device only).
- **Port** – the TCP port, default 4059 (Dlms Ip Device only).
- **Device Address** – the IEC 62056-21 device address placed in the `/?address!` sign-on, often printed on the meter front panel. Leave it empty to address any meter when only one is connected. Used by the serial device and by the auto and iec modes.
- **Mode** – how the driver talks to the meter:
  - *auto* – send an IEC 62056-21 sign-on, then continue as a DLMS session on a Mode E meter or as an ASCII readout on a mode A, B, C, or D meter. The family is detected, not configured.
  - *iec* – always the classic IEC 62056-21 ASCII readout, even on an E-capable meter.
  - *hdlc* – direct DLMS over HDLC, with no sign-on. This is the usual choice for a meter reached through a TCP-to-serial gateway or on a fixed-rate direct HDLC link.
  - *wrapper* – direct DLMS over the IEC 62056-47 wrapper (WPDU)[2]. This framing is TCP-only and is not valid on a serial device.
- **Referencing** – how a direct DLMS session addresses objects: *auto* proposes Logical Name and retries once with Short Name if the meter rejects it, *ln* forces Logical Name, and *sn* forces Short Name. It applies only to the hdlc and wrapper modes and is available on the property sheet.
- **Client Address** – the client (host) address, default 16. Address 16 is the public client that most meters answer without authentication.
- **Server Address** – the server (meter) address, default 1. Many meters use a different value (see below).
- **Server Physical Address** – a second meter address that only a few meters need. Almost every meter is reached with a single **Server Address**, so leave this at its default of -1, which means "not used". Set it only when the meter's datasheet lists two separate server addresses – usually several meters sharing one connection, where it takes both numbers to single out the one you want to read (see below).
- **Password** – the LLS[3] password, masked in the property sheet and encrypted at rest. Leave it empty to associate with authentication None.
- **Response Timeout** – how long the driver waits for a meter response, default 5000 milliseconds. Raise it for a meter with a longer wait time.
- **Baud Override** – caps the readout baud rate on a weak optical or RS-485 link; *auto* accepts the rate the meter advertises.
- **Poll Frequency** – fast, normal, or slow. Determines the polling rate; see the network **Poll Scheduler**.

The driver also displays read-only identity properties, populated after the first successful ping:

[2] WPDU (Wrapper Protocol Data Unit, IEC 62056-47) – an eight-octet header that carries a DLMS message over TCP/IP in place of HDLC framing.

[3] LLS (Low Level Security) – password authentication in which the client sends a shared secret to the meter to open a session.

- **Detected Mode** – the detected IEC 62056-21 mode character (A to E) for a readout session, or the transport and referencing (for example `hdlc/ln`) for a direct DLMS session.
- **Manufacturer** – the meter manufacturer name resolved from its FLAG code.
- **Identification** – the meter identification string.
- **Logical Device Name** – the COSEM logical device name (DLMS sessions only).

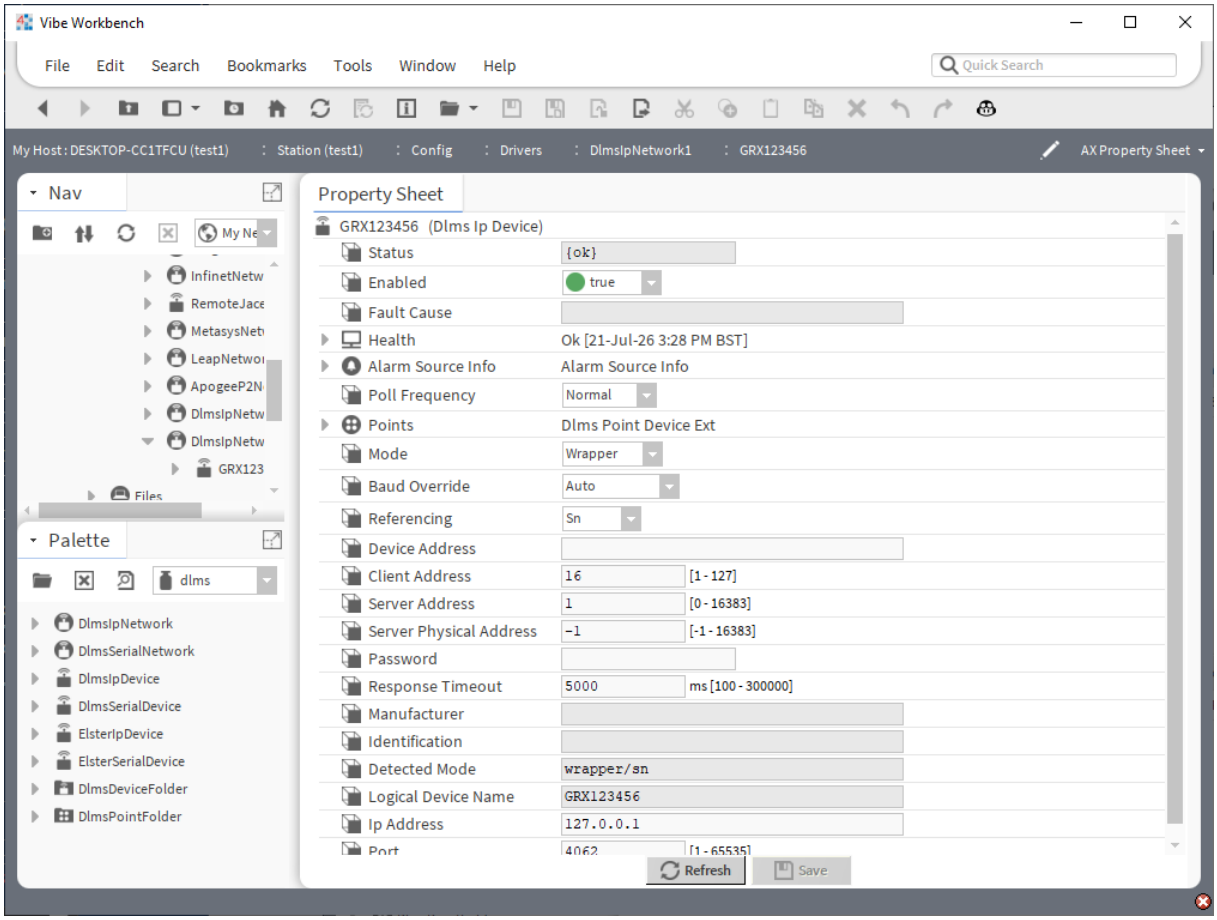

Figure 2: Dlms Ip Device property sheet

The most common commissioning mistake is the server address. A meter that has a single server address must be configured with its value in **Server Address** and **Server Physical Address** left unset (-1). Setting a physical address changes the way the meter is addressed, so a meter that expects a single address no longer recognizes it and stays silent until the poll times out. Use **Server Physical Address** only for a meter whose datasheet genuinely gives two separate server address numbers.

9 Dlms Points

A DLMS device contains multiple points, each identified by an OBIS code together with its COSEM interface class and attribute. OBIS codes are described in the IEC 62056-6-1 standard and consist of six values. Each part identifies a different aspect of the point:

- medium
- channel
- physical value
- algorithm
- measurement type
- time range or processing

The driver translates OBIS codes and, in most cases, shows a human-readable description for each point that also serves as its default name when the point is added to the Niagara database. The driver also determines the point type (numeric or string) automatically, and, for numeric points, the facets: the physical unit and the decimal precision, resolved from the meter's scaler and unit.

A point exposes the merged identity as read-only proxy extension properties:

- **Obis** – the point identity. It holds the six-part OBIS code for a DLMS point, or the IEC 62056-21 telegram address verbatim for an ASCII readout point.
- **Class Id** – the COSEM interface class. A value of 0 marks an ASCII readout point.
- **Attribute** – the COSEM attribute of the object to read (the value attribute for a register).

The driver can only read (poll) the meter's points; no writing is implemented. Under no circumstances can the meter's values or settings be changed by Niagara.

9.1 Point discovery

Open the point extension and press **Discover** to learn the points in the meter. The Discover dialog offers one option:

- **Include Non Readable** – off by default. When off, the pane lists only the points that can be added and polled. When on, it also reveals structured objects that carry no single scalar value to poll, such as Profile Generic histories, Activity Calendar objects, schedules, and setup blocks.

Registers, extended registers, demand registers, clocks, and data objects are listed as addable points with values and units. Structured objects are shown for reference but cannot be added as a scalar point.

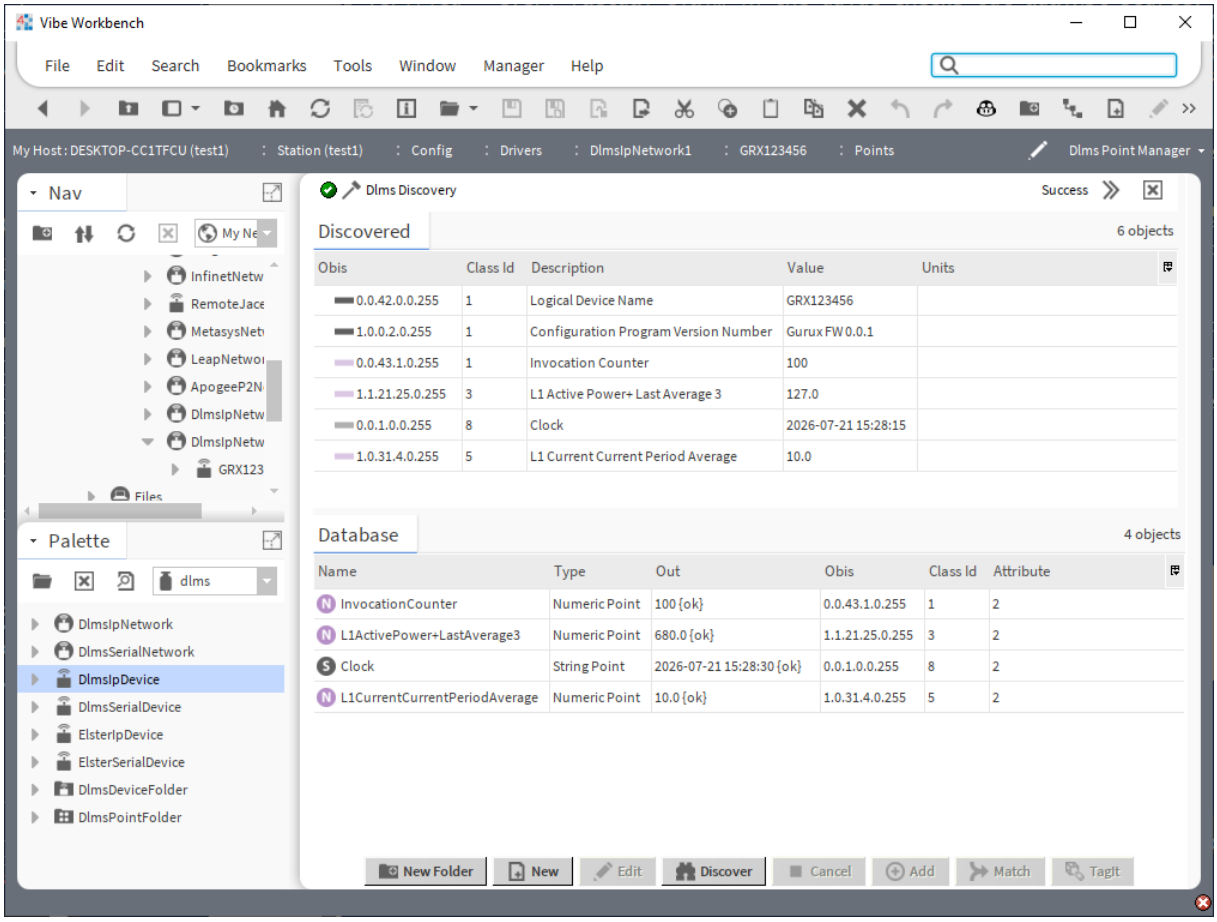

Figure 3: Point discovery: the Discovered pane lists the meter's OBIS points, and the Database pane shows the points added to the station

9.2 Polling

All points are polled when at least one point on the device is assigned a *subscribed* status by the Niagara framework. That happens in one of the following cases:

- the point has an alarm, history, or any other extension, except for the proxy extension
- the point is linked to another Niagara component
- the point is used on a Niagara graphics page *and* that page is open now

All subscribed points on a device are polled together, so the polling rate is set per device by its **Poll Frequency**, which selects one of the network **Poll Scheduler** rates.

10 Licensing

The driver is licensed by the **License** property on the network. Two kinds of code exist: a full license and a time-limited demo. A demo runs for a limited window from each station boot, after which the network faults and communication stops.

When the code is invalid or the demo has expired, the network reports a fault, and every ping, poll, and discovery on its devices is blocked until a valid code is entered. Paste a valid full code into the **License** property to restore communication.

To request a license code, contact info@baudrate.io with the Host ID of the Niagara host.

11 FAQ

11.1 I cannot communicate with the meter

- For a TCP meter, verify the **Ip Address** and **Port**, and that the meter or gateway is reachable from the JACE.
- For a serial meter, verify the **Serial Port** name and the wiring between the JACE and the meter, and try setting **Initial Baud** to match the meter.
- Check the **Mode**. Use *hdlc* for a direct DLMS meter or gateway, *wrapper* for a meter that uses the IEC 62056-47 wrapper framing, *iec* for a plain ASCII meter, or *auto* if the meter type is unknown.
- Check the **Client Address** and **Server Address**. Many meters answer client 16 without authentication; a secured meter needs its own client, server, and password. See the server address note under Dlms Devices.
- If the meter uses a password, verify the **Password** is correct and that **Client Address** and **Server Address** match the meter's association.
- Raise the **Response Timeout** for a meter with a long wait time.
- Check that the license is valid.

11.2 I cannot connect a Kamstrup meter

A Kamstrup meter usually requires an authenticated (Low Level Security) association rather than the public client, so the default settings do not connect. Set **Client Address** to 18, **Server Address** to 16, and **Password** to 12345, with **Referencing** *ln* (or *auto*). Use **Mode** *hdlc* for a meter reached through a TCP-to-serial gateway: it answers a direct SNRM but does not respond to the IEC 62056-21 sign-on that *auto* begins with, so *auto* would time out. Adjust the values to match the meter's datasheet if they differ.

11.3 Which Mode should I use?

- Use *auto* on an optical or serial link when the meter type is unknown. The driver signs on with IEC 62056-21 and continues as a DLMS session on a Mode E meter or as an ASCII readout on a mode A, B, C, or D meter.
- Use *hdlc* for direct DLMS over HDLC. This is the usual choice for a meter reached through a TCP-to-serial gateway or on a fixed-rate direct HDLC serial link.
- Use *wrapper* for direct DLMS over the IEC 62056-47 wrapper (WPDU). This framing is TCP-only and is used by meters and gateways that expect the wrapper header.
- Use *iec* to force the classic IEC 62056-21 ASCII readout, even on a meter that is capable of DLMS.

11.4 Discovery finds objects I cannot add

Some COSEM objects are structured and carry no single scalar value to poll, for example a Profile Generic (class 7) history, an Activity Calendar, or a schedule. The point discovery pane hides these by default and shows only addable points. To see them for reference, turn on **Include Non Readable** in the Discover dialog. A Profile Generic object is a history rather than a control point, so it is listed but not offered as a scalar point.

11.5 Points show no values

- Ensure at least one point on the device has a *subscribed* status: it is linked, has an extension, or is on an open graphics page.
- Verify the device is online and the read-only identity properties (for example **Detected Mode** and **Manufacturer**) are populated.
- Confirm the **Mode**, addresses, and password match the meter.