

IEC 62056-21 Driver for Tridium Niagara

User Guide

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1 Introduction

IEC 62056-21 is an international standard describing computer protocol for reading electrical utility meters. The protocol is designed to operate over various physical media, including

- optical probe
- RS-485 port
- RS-232 port
- 20mA current loop

IEC 62056-21 driver for Niagara allows to discover all points in the meter and then poll them periodically. It provides a cost-effective way for building management systems and energy monitoring systems to read electrical energy values for analysis.

Discovered points have human-readable names and units automatically assigned by the driver based on Object Identification System (OBIS) codes. Meter vendors are assigned using FLAG codes.

2 Requirements

- Niagara-powered device with software v4.0 and later for N4 or v3.8 for AX, including JACE8000 and all its OEM versions
- iec62056-rt.jar driver module and license

Niagara JACE is connected to electrical meter via its RS-485 or RS-232 ports. If the meter is not equipped with any of these ports, then they could be connected via physical level interface converters:

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

Multiple IEC 62056-21 meters can be connected to one RS-485 port using standard daisy-chain topology.

3 Quick Start

1. Copy iec62056-rt.jar (N4) to WorkPlace *modules* folder
2. Restart WorkPlace software
3. Deploy iec62056-rt.jar to JACE from *Software Manager*
4. Restart JACE station
5. Add **Iec Network** to JACE station
6. Enter license code in **License** property under **Iec Network**
7. Select COM port **Serial Config / Port Name** property
8. IEC standard requires all meters to start communication using 300 baud rate, but not all vendors follow this requirement – if this case set your meter communication speed in **Serial Config / Initial Baud Rate**
9. Open **Iec Network** and add **New** device. Enter **Device Address** of the meter if you know it (it is usually printed on the meter front panel). If **Device Address** is unknown, make sure you have just one meter connected to the JACE and leave this field empty. Press **OK** to add the meter to the station.
10. Niagara starts polling the meter and, if successful, displays device properties: **Mode**, **Flag**, **Manufacturer** and **Identification**.

lecNetwork (Iec Network)

Status	{fault}
Enabled	<input checked="" type="checkbox"/> true
Fault Cause	No valid license or demo expired
Health	Fail [null]
Alarm Source Info	Alarm Source Info
Monitor	Ping Monitor
Tuning Policies	Tuning Policy Map
Poll Scheduler	N Poll Scheduler
Serial Config	Iec Serial Comm Config
Fault Cause	
Port Name	none
Baud Rate	Baud300
Data Bits	Data Bits7
Stop Bits	Stop Bit1
Parity	Even
Flow Control Mode	<input type="checkbox"/> RtsCtsOnInput <input type="checkbox"/> RtsCtsOnOutput <input type="checkbox"/> XonXoffOnInput <input type="checkbox"/> XonXoffOnOutput
Receive Timeout	0 ms [0 - 20000]
Inter Message Delay	000000h 00m 00.000s [0 ms - 1second]
Initial Baud Rate	Baud300
Baud Rate Delay	0 ms
Max Message Size	5000 B
License	Enter license code
IecDevice1	Iec Device

Figure 1: Iec Network properties

11. If communication is established, open point extension and **Discover** points in the meter. Depending on the baud rates supported by the meter, it may take up to a few minutes.
12. Niagara displays discovered points with their OBIS codes, descriptions, values and units.
13. Select and **Add** points of interest to the station.

4 Iec Network

Iec Network contains many standard Niagara properties, as well as driver-specific ones:

- **License** – the code which allows driver to run on your Host ID
- **Serial Config / Port Name** – JACE serial port name to which meters are connected
- **Serial Config / Initial Baud Rate** – IEC standard requires all meters to start communication using 300 baud rate, however, some meters expect different communication speed
- **Serial Config / Max Message Size** – maximum size of expected message, used to set communication timeout

IecDevice (Iec Device)	
Status	{ok}
Enabled	<input checked="" type="checkbox"/> true
Fault Cause	
▶ Health	Fail [null]
▶ Alarm Source Info	Alarm Source Info
▶ Address	
Mode	
Baud Supported	Baud300
Baud Selected	Auto
Flag	
Manufacturer	
Identification	
Poll Frequency	Normal
▶ Points	Iec Point Device Ext

Figure 2: Iec Device properties

5 Iec Devices

Each Iec Device contains the following properties:

- **Address** – unique device address of the meter, often printed on meter’s front panel. Can be left empty if there is only one meter connected to the JACE.
- **Mode** – A, B, C, D or E. Determines which protocol mode is supported by the meter.
- **Baud Supported** – Maximum baud rate supported by the meter.
- **Baud Selected** – Baud rate selected by Niagara for communication. In most cases should be *Auto*.
- **Flag** – Three-letter FLAG code identifying meter’s manufacturer.
- **Manufacturer** – Meter manufacturer’s name.
- **Identification** – Meter identification string.
- **Poll Frequency** – fast, normal or slow. Allows to select polling rate, see **Iec Network / Poll Scheduler**

IEC 62056-21 protocol does not have a device discovery mechanism, so device addresses should be entered manually by an engineer.

In case such address is unknown, it is possible to determine it. If only one meter is connected to the JACE and empty device address specified, Niagara will send a request without address and the meter shall respond. Then the unique meter address can be found in its point with OBIS = 0.0.0.

6 Iec Points

IEC 62056-21 device contains multiple points identified with OBIS codes. OBIS codes are described in IEC 62056-61 standard and consist of 6 hexadecimal numbers. Many electrical meters use shorter

4-part format. Each hexadecimal part determines different aspect of the point:

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

Niagara driver implements OBIS translation and in most cases it shows a human-readable description for each point, which also serves as a default point name when the point is added to Niagara database. Niagara driver also automatically determines point type (boolean, numeric, enum or string) and point facets: physical units and decimal precision for numeric points.

The driver can only read (poll) meter's points, no writing is implemented. It means that under no circumstances meter's values and settings can be changed by Niagara.

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

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

All points are polled with a single polling request, so polling frequency is specified for all points under **Iec Device**.

The screenshot shows the 'Iec62056 Discovery' window. At the top, there are tabs for 'Points' and 'Application Director'. Below the tabs, a status bar shows a green checkmark and the text 'Iec62056 Discovery' with a 'Success' indicator. The main area is divided into two sections: 'Discovered' and 'Database'. The 'Discovered' section contains a table with 5 rows of data. The 'Database' section is currently empty. At the bottom, there is a toolbar with buttons for 'New Folder', 'New', 'Edit', 'Discover', 'Cancel', 'Add', and 'Match'.

Obis	Description	Value	Units
1.8.1*21	Active Power+ Tariff 1 Period 21	018636.86	kWh
1.8.1*20	Active Power+ Tariff 1 Period 20	018636.86	kWh
1.8.1*19	Active Power+ Tariff 1 Period 19	018636.83	kWh
1.8.1*18	Active Power+ Tariff 1 Period 18	018636.62	kWh
1.8.1*17	Active Power+ Tariff 1 Period 17	018634.57	kWh

Figure 3: Iec points