kamstrup

Interface description

Kamstrup HAN-NVE interface description

Contents

1. Revision history

Revisions history:

Document revision	Description	Meter software revision
2.0	First release of the interface description. Draft release.	OMNIPOWER direct meters FW no: - 50981173 rev. S1 - 50981165 rev. S1 - 50981251 rev. k1
3.0	Update of the DLMS fixed header - byte “09” is removed. See also the new examples at the end of the document. Official release.	OMNIPOWER direct meters FW no: - 50981173 rev. U1 - 50981165 rev. U1 - 50981251 rev. U1
3.1	Small corrections in supported meter list in section 2.2.	

2. General specification

This manual describes the interface of Kamstrup HAN-NVE module developed for electricity meter used in OMNIA Suite AMR systems. The main audience for the specification is mainly parties, which are developing reading solutions for connection to Kamstrup OMNIPOWER meter installed at Norwegian electricity consumers.

Figure 1: Kamstrup OMNIPOWER meter with HAN-NVE interface module.

2.1 General data push functionality

The main idea is that a specific set of meter data is pushed via the interface, when the interface is enabled from the OMNIA AMR system.

2.2 Supported meter types

The supported Kamstrup OMNIPOWER meter types for this specification are shown in the following list, together with their respective type numbers, that also used as the identification in the push data.

Description	Type number
• 1 phase direct meter	686-11-11x-Nxx-3101-040
• 3 phase direct meter	
◦ 3-wire	684-11-21x-Nxx-x101-040
◦ 4-wire	684-11-31x-Nxx-x101-040
• 3-phase CT meter	
◦ 3-wire	685-11-21x-Nxx-1101-040
◦ 4-wire	685-11-31x-Nxx-1101-040

The meter type can deviate with respect to the list of meter data that are pushed on the interface. For example, 1-phase meters only push phase-voltage data for phase 1, not phase 2 and 3.

2.3 System support

As mentioned earlier the meter exposes a HAN enable/disable configuration to OMNIA Suite. As default, the interface is disabled. Enabling the HAN-NVE push functionality must be done from the OMNIA suite AMR system.

Note! When HAN push functionality is enabled, CCC port is exclusively used for pushing data. Consequently, the port works as Tx only, meaning no Rx requests of any protocol is supported.

2.4 Hardware specification

The physical interface has to be MBUS (EN 13757-2) and a RJ45 connector is used to connect to the bus.

2.4.1 Environmental and reliability specification

The operational temperature range is the same as the electricity meter.

- Temperature range: -40°C to 70°C with a
- Relative humidity: 20%RH to 70%RH.
- Maximum operating altitude: 2000 m above sea level.
- Max load:
    - Maximum power to HEMS 144mW 4 unit loads according to EN 13757-2
    - Maximum current to HEMS 6mA 4 unit loads according to EN 13757-2

2.4.2 Interconnect

The external device is connected to the meter via a RJ45 connector. Pins 1 and 2 are used for the MBUS connection.

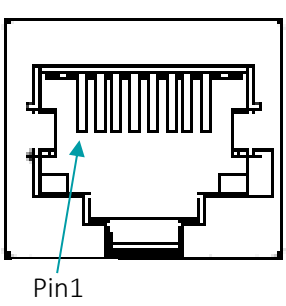

Figure 2: Drawing of the RJ45 socket showing pin 1.

Pin	Functionality
1	Communication
2	GND
3-8	Not connected

The module is designed for a cable length from the meter to the external device shorter than 3 meters.

2.5 Communication specification

2.5.1 DataNotification

- Long-Invoke-Id-And-Priority
  - long-invoke-id: 0
  - Reserved: 0
  - self-descriptive: 0
  - processing-option: 0
  - service-class: 0 (unconfirmed)
  - Priority: 0 (low)
- Date-time: trigger time

2.5.2 HDLC parameters

- Segmentation: Not supported
- Source address:
  - Type: 1 byte addressing
  - Logical address: 16
- Destination address:
  - Client address: 21
- Frame type:
  - UI-frame

2.5.3 HDLC setup

- Comm_speed: 2400 baud
- Window_size_transmit: 1
- Window_size_receive: NA
- Max_info_length_transmit: 1010
- Max_info_length_receive: NA
- Inter_octet_timeout: NA
- Inactivity_time_out: 0 (not operational)

2.6 List of attributes to be pushed

The two lists that are sent out can be modelled as attribute 2 (push_object_list) of a DLMS interface class 40 (Push setup). Although the values of the other attributes are set, they are not exposed on the interface. The attributes are added for illustrating the inner workings only.

2.7 Push Data List 1 (10 seconds interval)

The first list of data is pushed out every 10 seconds.

2.7.1 Push data setup 1:

- Logical_name: 0.1.25.9.0.255 (internal objId:)
- push_obj_list: (For 3 phased / 4 quadrant meters)

Class	Logical name	Object name	Attrib	Unit	Scaler
1	1.1.0.2.129.255	OBIS List version identifier	2	-	-
1	1.1.0.0.5.255	GS1 number	1	-	-
			2	-	-
1	1.1.96.1.1.255	Meter type	1	-	-
			2	-	-
3	1.1.1.7.0.255	P14	1	-	-
			2	W	0
3	1.1.2.7.0.255	P23	1	-	-
			2	W	0
3	1.1.3.7.0.255	Q12	1	-	-
			2	var	0
3	1.1.4.7.0.255	Q34	1	-	-
			2	var	0
3	1.1.31.7.0.255	IL1	1	-	-
			2	A	-2
3	1.1.51.7.0.255	IL2	1	-	-
			2	A	-2
3	1.1.71.7.0.255	IL3	1	-	-
			2	A	-2
3	1.1.32.7.0.255	UL1	1	-	-
			2	V	0
3	1.1.52.7.0.255	UL2	1	-	-
			2	V	0
3	1.1.72.7.0.255	UL3	1	-	-
			2	V	0

- Send_destination_and_method:
  - Transport_service: 5 (HDLC)
  - Destination: Client address 21
  - Message: 0 (A-XDR)
- Communication_window: array[0] (always possible)
- Randomisation_start_interval: 0
- Number_of_retries: 0
- Repetition_delay: 0

2.7.2 Time trigger setup

- **Push interval**: Fixed at 10s, sent at xx:xx:x0 (hh:mm:ss).

- **Priority**: Is pushed first (before List2)

2.8 Push Data List 2 (1 hour interval)

The second list of data is pushed out every hour. It consist of same data as list 1 added some extra registers.

2.8.1 Push data setup 2

- Logical_name: 0.2.25.9.0.255 (internal objId:)
- push_obj_list: (For 3 phased / 4 quadrant meters)

Class	Logical name	Object name	Attrib	Unit	Scaler
1	1.1.0.2.129.255	OBIS List version identifier	2	-	-
1	1.1.0.0.5.255	GS1 number	1	-	-
			2	-	-
1	1.1.96.1.1.255	Meter type	1	-	-
			2	-	-
3	1.1.1.7.0.255	P14	1	-	-
			2	W	0
3	1.1.2.7.0.255	P23	1	-	-
			2	W	0
3	1.1.3.7.0.255	Q12	1	-	-
			2	var	0
3	1.1.4.7.0.255	Q34	1	-	-
			2	var	0
3	1.1.31.7.0.255	IL1	1	-	-
			2	A	-2
3	1.1.51.7.0.255	IL2	1	-	-
			2	A	-2
3	1.1.71.7.0.255	IL3	1	-	-
			2	A	-2
3	1.1.32.7.0.255	UL1	1	-	-
			2	V	0
3	1.1.52.7.0.255	UL2	1	-	-
			2	V	0
3	1.1.72.7.0.255	UL3	1	-	-
			2	V	0
8	0.1.1.0.0.255	RTC	1	-	-
			2	-	-

Class	Logical name	Object name	Attrib	Unit	Scaler
1	1.1.1.8.0.255	A14	1	-	-
			2	Wh	1
1	1.1.2.8.0.255	A23	1	-	-
			2	Wh	1
1	1.1.3.8.0.255	R12	1	-	-
			2	varh	1
1	1.1.4.8.0.255	R34	1	-	-
			2	varh	1

- Send_destination_and_method:
  - Transport_service: 5 (HDLC)
  - Destination: Client address 21
  - Message: 0 (A-XDR)
- Communication_window: array[0] (always possible)
- Randomisation_start_interval: 0
- Number_of_retries: 0
- Repetition_delay: 0

2.8.2 Time trigger setup

- Push interval: Fixed at 3600s, The 10 second timer and the 1 hour timer must not collide since then one of the lists will not be pushed. So the 10 sec timer will be sent at xx:xx:x0 (hh:mm:ss) and the 1 hour timer is offset 5 seconds and sent at xx:00:05 (hh:mm:ss)

2.9 Variant Handling

Objects that do not exist for a specific meter variant, e.g. a single-phase meter, or a 1 or 2 quadrant meter, are not pushed.

2.9.1 Example:

In a single-phase meter measuring in 1 quadrant only, list 2 will look as follows:

Class	Logical name	Object name	Attrib	Unit	Scaler
1	1.1.0.2.129.255	OBIS List version identifier	2	-	-
1	1.1.0.0.5.255	GS1 number	1	-	-
			2	-	-
1	1.1.96.1.1.255	Meter type	1	-	-
			2	-	-
3	1.1.1.7.0.255	P14	1	-	-
			2	W	0
3	1.1.31.7.0.255	IL1	1	-	-
			2	A	-2
3	1.1.32.7.0.255	UL1	1	-	-
			2	V	0
8	0.1.1.0.0.255	RTC	1	-	-
			2	-	-
1	1.1.1.8.0.255	A14	1	-	-
			2	Wh	1

3. Examples of pushed frames

3.1 Example 1: /* 10s list, 3 phases, 4 quadrants */

```
7E A0E2 2B 21 13 239A E6E700
 0F 00000000 0C07D0010106162100FF800001
 0219
  0A0E 4B616D73747275705F5630303031
  0906 0101000005FF 0A10 35373036353637303030303030303030
  0906 0101600101FF 0A12 30303030303030303030303030303030303030
  0906 0101010700FF 0600000000
  0906 0101020700FF 0600000000
  0906 0101030700FF 0600000000
  0906 0101040700FF 0600000000
  0906 01011F0700FF 0600000000
  0906 0101330700FF 0600000000
  0906 0101470700FF 0600000000
  0906 0101200700FF 120000
  0906 0101340700FF 120000
  0906 0101480700FF 120000
5BE57E
```

3.2 Example 2: /* 1 hour list, 3 phases, 4 quadrants */

```
7E A12C 2B 21 13 FC04 E6E700
 0F 00000000 0C07E1081003100005FF800000
  0223
   0A0E 4B616D73747275705F5630303031
   0906 0101000005FF 0A10 35373036353637303030303030303030
   0906 0101600101FF 0A12 30303030303030303030303030303030303030
   0906 0101010700FF 0600000000
   0906 0101020700FF 0600000000
   0906 0101030700FF 0600000000
   0906 0101040700FF 0600000000
   0906 01011F0700FF 0600000000
   0906 0101330700FF 0600000000
   0906 0101470700FF 0600000000
   0906 0101200700FF 120000
   0906 0101340700FF 120000
   0906 0101480700FF 120000
   0906 0001010000FF 090C 07E1081003100005FF800000
   0906 0101010800FF 0600000000
   0906 0101020800FF 0600000000
   0906 0101030800FF 0600000000
   0906 0101040800FF 0600000000
C8867E
```

3.3 Example 3: /* 1 hour list, 1 phase, 1 quadrant */

```
7E A0AE 2B 21 13 A01B E6E700
 0F 00000000 0C07E1081003100005FF800000
 020F
  0A0E 4B616D73747275705F5630303031
  0906 0101000005FF 0A10 3537303635363730303030303030303030
  0906 0101600101FF 0A12 30303030303030303030303030303030303030
  0906 0101010700FF 0600000000
  0906 01011F0700FF 0600000000
  0906 0101200700FF 120000
  0906 0001010000FF 090C 07E1081003100005FF800000
  0906 0101010800FF 0600000000
05217E
```