

Configuration manual for Lansen Concentrator (C4)

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Introduction

- The C4 ethernet concentrator is an easy-to-install device used for collecting data from wM-Bus meters and sensors. The device will decrypt the data and convert it to M-Bus UDP or TCP format. Extra information to the M-Bus telegram such as RSSI, duration (age of message) and error information.
- We highly recommend using a telnet client, such as PuTTY, that send complete strings as a means to configure the device.
- The data is made available using the secondary address for an easy integration with your PLC/DUC/Substation that has an internal MBUS parser. The concentrator decrypts all meter and sensor packets, and encrypts all keys stored. The device can store the latest received message from up to 950 sensors/meters.
- Perform easy mass installation of sensors by the use of a simple TXT or CSV file with relevant information (under development).

Setting up your network IP

Before attempting to establish a connection, make sure your network card is set to IP 192.168.11.1.

1. Go to your Control Panel > Network and Sharing Center.



2. In the Network and Sharing Center, select "Change Adapter Settings" in menu on the left-hand side.

Control Panel Home



3. Select the network that the concentrator is connected to, right click and select "Properties".



4. Select "Internet Protocol Version 4 (TCP/IPv4) and click on "Properties".

Ethernet Properties	\times
Networking Sharing	
Connect using:	
Intel(R) Ethemet Connection (16) I219-LM	
Configure	
This connection uses the following items:	
🗹 🏪 Klient för Microsoft-nätverk	^
Fil och skrivardelning för Microsoft-nätverk	
✓ 4 QoS Packet Scheduler	
✓ Internet Protocol Version 4 (TCP/IPv4)	
Imicrosoft Network Adapter Multiplexor Protocol	
Interest Protocol Univer	
	Ť
Install Description	
Install Uninstall Properties	
Description	
Transmission Control Protocol/Internet Protocol.	
nätverk.	
OK Cano	cel

5. Enter the IP Address and Subnet Mask according to image below:

Internet Protocol Version 4 (TCP/IPv4) Properties													
General													
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.													
Obtain an IP address automatically													
Use the following IP address:													
IP address:	192.168.11.1												
Subnet mask:	255 . 255 . 255 . 0												
Default gateway:													
Obtain DNS server address autor	matically												
Use the following DNS server add	dresses:	- 1											
Preferred DNS server:													
Alternate DNS server:													
Validate settings upon exit Advanced													
	OK Cance	I											

Connecting via PuTTY

The default IP address is 192.168.11.5. Connect via port 23 and Telnet as a connection type. Make sure you have setup your <u>network IP</u> as mentioned above.

🕵 PuTTY Configuration		? ×
Category:		
Category: Session Comparison Comparison Category: Session Comparison Comparison Colours Connection Colours Connection Proxy SSH Serial Telnet Rlogin SUPDUP	Basic options for your PuTTY Specify the destination you want to cor Host Name (or IP address) 192.168.11.5 Connection type: ○ SSH ○ Serial ● Other: Load, save or delete a stored session Saved Sessions 192.168.11.5 Default Settings 192.168.11.5 Default Settings 192.168.11.5 Close window on exit: ○ Always Never ● Only o	r session nnect to Port 23 elnet ✓ Load Sa <u>v</u> e Delete n clean exit
<u>A</u> bout <u>H</u> elp	Open	<u>C</u> ancel

Once a connection has been made, use the password provided at <u>www.lansenonline.com</u> to login for the first time. Your device remembers the password entered for a full 8 hours after login and only requires it to be re-entered after 8 hours, a power loss or if you logout.

Note: At first login the client will ask for a "Default password", but once the password has been changed it will ask for a "User password".

P 192.168.11.5 - PuTTY	_	×
User password for 00178498 is required! Enter password:		^
		\sim

Commands for the concentrator

After a successful login you are met with a help menu showing you all available commands including the Hardware model/version, Software model/version, device type and SVN version of the main and secondary PCB. This list can be **reproduced by writing the command "h".** Please not that all commands can be made either with capital or lower case letters.

🛃 192.168.11.5 - PuTTY					-	- 🗆	×
User password for 00178498 is r	equired!						~
Enter password: 1234							
Device number LAS.00178498	HW Model 3	HW Version 2	SW Version 1	DeviceType 49	SVN Ve	rsion 14	
LAN	HW Model 3	HW Version 1	SW Version 1	DeviceType 50	SVN Ve	rsion 15	
HELP MENU							
- SET IP <ip></ip>							
- GET IP							
- SET GW <ip></ip>							
- GET GW							
- SET IN PORT <port></port>							
- GET IN PORT							
- SET OUT PORT <port></port>							
- GET OUT PORT							
- SET MASK <mask></mask>							
- GET MASK							
- GET MAC							
- ADD SENSOR <mancode> <serial< td=""><td>NUMBER> <device< td=""><td>TYPE> <protocol< td=""><td>VERSION> <key></key></td><td></td><td></td><td></td><td></td></protocol<></td></device<></td></serial<></mancode>	NUMBER> <device< td=""><td>TYPE> <protocol< td=""><td>VERSION> <key></key></td><td></td><td></td><td></td><td></td></protocol<></td></device<>	TYPE> <protocol< td=""><td>VERSION> <key></key></td><td></td><td></td><td></td><td></td></protocol<>	VERSION> <key></key>				
- LIST SENSOR <mancode> <serial< td=""><td>NUMBER> <device< td=""><td>TYPE> <protocol< td=""><td>VERSION></td><td></td><td></td><td></td><td></td></protocol<></td></device<></td></serial<></mancode>	NUMBER> <device< td=""><td>TYPE> <protocol< td=""><td>VERSION></td><td></td><td></td><td></td><td></td></protocol<></td></device<>	TYPE> <protocol< td=""><td>VERSION></td><td></td><td></td><td></td><td></td></protocol<>	VERSION>				
- LIST SENSORS							
- NUMBER OF SENSORS							
- CLEAR ALL SENSORS							
- DELETE SENSOR <mancode> <seri< td=""><td>AL NUMBER> <devi< td=""><td>CE TYPE> <protoc< td=""><td>OL VERSION></td><td></td><td></td><td></td><td></td></protoc<></td></devi<></td></seri<></mancode>	AL NUMBER> <devi< td=""><td>CE TYPE> <protoc< td=""><td>OL VERSION></td><td></td><td></td><td></td><td></td></protoc<></td></devi<>	CE TYPE> <protoc< td=""><td>OL VERSION></td><td></td><td></td><td></td><td></td></protoc<>	OL VERSION>				
- SET AUTO <y n=""></y>							
- GET CONFIG							
- SAVE SETTINGS*							
- REBOOT							
- SET PASSWD <password></password>							
- LOGOUT							
*Saving of new settings cause a	n immediate rese	t and must be va	lidated within a	period of 2 min	utes ot	herwise t	che
original settings will be retur	ned. This proced	lure ensures that	invalid setting	s do not render	the dev	ice unrea	acha
ble.							
>							

Set passwd

After the first installation use Set passwd to change the default password to a user password. Example command: "Set passwd 123456"



Set ip / gw / mask

Set IP/GW/MASK are the commands for altering the IP, gateway and netmask for your concentrator. Example command "set ip xxx.xxx.xxx.xxx".

Once a new IP/GW/MASK has been set you need to use the "save settings" command. This will disconnect you and you will have 2 minutes to connect with the new IP or it will be reverted back to the old one. This applies to all 3 commands.

Get ip / gw / mask

PuTTY will reply back with the currently set IP/GW/MASK.

>get ip 192.168.11.5 >get mask 255.255.255.0 >get gw 192.168.11.1

Set in port / out port

Default ports are 10000 (in) and 10002 (out). Once set to a new port the command "save settings" is not needed and will be altered immediately. Example command: "set in port xxxxxx".

Get in port / out port

PuTTY will reply back with the currently set IN/OUT ports.



Get mac

PuTTY will reply back with the mac address.

>get mac a0-41-2d-f0-00-16

Get config

The "Get config" command will give you a list of configurations currently set in the device. The list will show as follows:

IP: IN PORT: OUT PORT: NETMASK: GW: MAC: TCP PORT:



Save settings

The "Save settings" command is only used in combination with the "SET IP/GW/MASK" commands. All other commands are immediate and will not require a separate "Save settings" command to be used. Once used, PuTTY will close, and you will have 2 minutes to log in with the new settings or they will be reverted back. This is to avoid invalid settings to render the device unreachable.

Reboot

This command will cause the device to reboot itself, also causing PuTTY to lose connection to the device.

Logout

Using the command "Logout" will log you out and close PuTTY, this will in turn require you to use your password once opened again.

Sensors

The concentrator allows the user to add sensors both manually one by one and by using a CSV/TXT file (under development) to add multiple at once. Furthermore, it comes equipped with a command that will allow the concentrator to pick up sensors around it. However, this command does not allow you to add encryption keys, but can be useful if the sensors are not encrypted.

Add sensor

The command "Add sensor" allows you to manually add a sensor to your device. To add a sensor, you are required to fill in the following:

- Manufacturer code
- Serial number
- Device type (HEX)
- Protocol version (HEX)
- AES key

Alt 1. Example command: "add sensor las 00160668 1b 09 0CD9FB72C55943F1EFFFFC896479023" Alt 2. Example command: "ADD SENSOR LAS.00160668.1B.09 0CD9FB72C55943F1EFFFFC896479023" Alt 2 format is the format you will receive if you scan the QR code on your sensor. Key does not come with scanning QR code. As mentioned previously, all commands work with lower and upper case.

>add sensor las 00160668 1b 09 0CD9FB72C55943F1EFFFFFC896479023 LAS.00160668 1B 09 key 0CD9FB72C55943F1EFFFFFC896479023 ADDED

List sensor

"List Sensor" will allow you to list a specific sensor added to the device. Compared to the command "<u>List Sensors</u>" this will also include the raw data sent from that specific sensor. Example command: "list sensor las 00160668 1b 09".

The information output from the concentrator when using this command include Key status, Status Reg, Duration(s) and RSSI.

Key status comes with 4 different responses as follows:

OK = Key set and verified, or key not needed.

SET = Key set, but no data received yet.

NOT SET = Key is not set and no data is received yet.

KEY WRONG = Key set, but key is wrong, or key is missing.

Status Reg is the error message for Key Status but in hex.

Duration is the duration since last package received.

RSSI (dBm) is the Received Signal Strength Indication. General rule of thumb is that the closer to zero it is, the better signal strength you have. Please note that having something very close to the device might also cause it to have a worse connection (we recommend at least 1 meter distance between meter and device).

>lis	st sen	sor 1	as	0016	0668	8 11	b 0	9																															
Mfg	SN		D	evic	ety	pe (1	hex	:) V	ers	ion	(he	x)		Кеу	St	atu	នេ		St	atu	s Re	eg		D١	ura	tio	n(s)	RS	SI(d	iBm)								
~~~~																																							
LAS	00160	668	1	в				0	9					OK						0)						20	0		-2	1									
Data	a from	sens	or:	68	45 4	45	68	08	FD	72	68	06	16	00	33	30	09	1B	A4	00	00 :	20 (	DC 1	78 9	98	84 3	17	00 0	3 74	15	00	00	01	FD	71	EB	01	FD	17
0.0	81 40	FD 1	7 0	0 02	65	2E	09	42	65	1D	09	82	01	65	91	0.8	01	FB	18	21	41	FB	1B	22	81	01	FB	1B	1E 0	2 23	3 28	3 02	61	7 16	5				

Note: If you know that there is a sensor with a unique serial number, made by a single manufacturer, added to your device, it is possible to use the command "List sensor <serial number>" and it will fetch the information.

>lis	st sens	sor O	0160	668																																				
Mfg	SN		De	vic	ety	pe (	hex	:) V	/ers	ion	(he:	x)	I	Key	St	atu	S		St	atu	s Re	eg		D١	ura	tio	n (s)	)	R	SSI	(dE	3m)								
~~~~																																								
LAS	001606	668	1B					0	9				(ΟK						0)							9			21										
Data	from	sens	or:	68	45	45	68	80	FD	72	68	06 1	16 (00	33	30	09	1B .	A3	00	00 2	20 (DC '	78 9	98	84 :	17 (00 0	3 7	4 0	9 0	00 (00	01	FD	71	EB	01	FD	17
00	81 40	FD 1	7 00	02	65	27	09	42	65	1C	09	82	01	65	91	08	01	FB	1B	21	41	FB	1B	22	81	01	FB	1B	1E	02	23	28	02	5A	16					

List sensors

The "List sensors" command will allow you receive a list of all sensors added to your device. Unlike the command "List Sensor" it will not show you the raw data for each sensor.

The information output from the "List sensors" command include Key status, Status Reg, Duration(s) and RSSI.

Key status comes with 4 different responses as follows: OK = Key set and verified, or key not needed. SET = Key set, but no data received yet. NOT SET = Key is not set and no data is received yet. KEY WRONG = Key set, but key is wrong, or key is missing.

Status Reg is the error message for Key Status but in hex.

Duration is the duration since last package received.

RSSI (dBm) is the Received Signal Strength Indication. General rule of thumb is that the closer to zero it is, the better signal strength you have. Please note that having something very close to the device might also cause it to have a worse connection (we recommend at least 1 meter distance between meter and device).

>list sensor	:s					
Mfg SN	Devicetype(hex	Version(hex)	Key Status	Status Reg	Duration(s)	RSSI (dBm)
~~~~~~			~~~~~~	~~~~~~		~~~~~~~~~~
LAS 00160667	7 1B	09	SET	(7E)	-1	Na
LAS 00160668	3 1B	09	OK	(0)	9	-21
LAS 00160669	) 1B	09	OK	(0)	24	-35
~~~~~~						
Number of se	ensors: 3					
~~~~~~~~~	~~~~~~					
OK =	Key set and verifi	ed or key not n	eeded.			
SET =	Key set, but no da	ta received yet				
NOT SET =	Key is not set and	no data is rec	eived yet.			
KEY WRONG =	Key set, but key i	s wrong or key	is missing.			

#### Number of sensors

PuTTY will respond back with the number of sensors installed in the concentrator.

#### **Clear all sensors**

This command will clear all sensors installed in the device.

#### Delete sensor

This command is used to manually remove a single sensor. Example command: "Delete sensor las 00160668 1b 09"



#### Set auto Y/N

This command allows the device to pick up on all sensors nearby that it can receive. This can be very useful if you have a lot of sensors which are not encrypted. However, if you need encryption keys you will have to add them manually afterwards. Example command: "Set auto y", or "Set auto n".

# Indications of a concentrator

## Visual indications

Board	LED name	LED color	LED behavior	Description
Main		Blue	Blinking	Receiving wM-Bus packets
Main		Red		
Main		Green	Static ON	Turned on
Shield	PWR	Green	Static ON	Turned on
Shield	TXD	Blue	Blinking once	Received prompt
Shield	RXD	Orange	Blinking once	Received prompt
Shield	STATUS	Blue	100ms ON, 100 ms OFF	Application started
Shield	STATUS	Blue	1000ms ON, 1000 OFF	Application got PHY link
Shield	STATUS	Blue	400ms ON, 100ms OFF	Application found upgrade power detect cable
Shield	STATUS	Blue	STATIC ON	Bootloader will be started

Note that this is without poke protection to showcase the LED's and their positions.



# Additional information

## Help command

If you have been working for a longer period of time in PuTTY and would like to see the help menu with each command, type "h" as a command in PuTTY and it will show up again.

🖉 192.168.11.5 - PuTTY						_		
h								$\wedge$
Device number LAS.00178498	HW Model	3 HW	Version 2	SW Version 1	DeviceType 49	SVN Vers	ion 14	
LAN	HW Model	3 HW	Version 1	SW Version 1	DeviceType 50	SVN Vers	ion 15	
HELP MENU								
- SET IP <ip></ip>								
- GET IP								
- SET GW <ip></ip>								
- GET GW								
- SET IN PORT <port></port>								
- GET IN PORT								
- SET OUT PORT <port></port>								
- GET OUT PORT								
- SET MASK <mask></mask>								
- GET MASK								
- GET MAC								
- ADD SENSOR <mancode> <serial< td=""><td>NUMBER&gt; <d< td=""><td>EVICE TYPE</td><td><pre>S&gt; <protocol< pre=""></protocol<></pre></td><td>VERSION&gt; <key></key></td><td></td><td></td><td></td><td></td></d<></td></serial<></mancode>	NUMBER> <d< td=""><td>EVICE TYPE</td><td><pre>S&gt; <protocol< pre=""></protocol<></pre></td><td>VERSION&gt; <key></key></td><td></td><td></td><td></td><td></td></d<>	EVICE TYPE	<pre>S&gt; <protocol< pre=""></protocol<></pre>	VERSION> <key></key>				
- LIST SENSOR <mancode> <serial< td=""><td>NUMBER&gt; &lt;</td><td>DEVICE TYP</td><td>E&gt; <protoco< td=""><td>L VERSION&gt;</td><td></td><td></td><td></td><td></td></protoco<></td></serial<></mancode>	NUMBER> <	DEVICE TYP	E> <protoco< td=""><td>L VERSION&gt;</td><td></td><td></td><td></td><td></td></protoco<>	L VERSION>				
- LIST SENSORS								
- NUMBER OF SENSORS								
- CLEAR ALL SENSORS								
- DELETE SENSOR <mancode> <seri< td=""><td>AL NUMBER&gt;</td><td><device 1<="" td=""><td>TYPE&gt; <proto< td=""><td>COL VERSION&gt;</td><td></td><td></td><td></td><td></td></proto<></td></device></td></seri<></mancode>	AL NUMBER>	<device 1<="" td=""><td>TYPE&gt; <proto< td=""><td>COL VERSION&gt;</td><td></td><td></td><td></td><td></td></proto<></td></device>	TYPE> <proto< td=""><td>COL VERSION&gt;</td><td></td><td></td><td></td><td></td></proto<>	COL VERSION>				
- SET AUTO <y n=""></y>								
- GET CONFIG								
- SAVE SETTINGS*								
- REBOOT								
- SET PASSWD <password></password>								
- LOGOUT								
*Saving of new settings cause a	n immediat	e reset ar	nd must be va	alidated within a	period of 2 min	utes othe	rwise th	
e original settings will be ret	urned. This	s procedur	ce ensures th	nat invalid setti	ngs do not rende	r the dev	ice unre	
achable.								
>								¥

#### Example MBUS data request

- PLC -> Select using secondary address:
  68 0B 0B 68 53 FD 52 55 51 09 00 33 30 FF FF XX 16
- C4 -> NACK: FF
- C4 -> ACK:
  - E5
- PLC -> Request data:
  - 10 7B FD 78 16
- C4 -> Data response:
  68 45 45 68 08 FD 72 67 64 04 00 33 30 09 1B CA 00 00 20 0C 78 63 02 16 00 03 74 59 00 00 01 FD 71 D0 01 FD 17 00 81 40 FD 17 00 02 65 C8 08 42 65 CA 08 82 01 65 B5 08 01 FB 1B 10 41 FB 1B 10 81 01 FB 1B 13 02 23 B4 01 17 16

## Adding multiple sensors through a TXT/CSV file

A separate program is under development which will allow you to upload TXT/CSV files with sensor information to add sensors more easily to the device.

## MBUS IP/UDP Data format table

DR	MBUS header with meter serial	72 67 64 04 00 33 30 09 1B CA 00 00 20	LAS.00046467.09.1B
1	C4 fabrication number	0C 78 63 02 16 00	00160263
2	Age of message ( seconds)	03 74 59 00 00	89 seconds
3	RSSI	01 FD 71 D0	-48 dBm
4	Sensor Status byte (error flags)	01 FD 17 00	
5	GW information flags (error flags)	81 40 FD 17 00	0x01 = encryption key is not set 0x02 = data was received, not encrypted 0x04 =no data received yet 0x08 = data could not be decryp- ted, wrong encryption key. 0x10 = not supported WMBUS header 0x20 = not supported encryption mode 0x40 = too long WMBUS packet
6	Data copied from sensor DR1	02 65 C8 08	22.48 °C
7	DR2	42 65 CA 08	22.50 °C
8	DR3	82 01 65 B5 08	22.29 °C
9	DR4	01 FB 1B 10	16%
etc			