zenitel

FCDC3 FLOWIRE CONFIGURATION
MANUAL

A100K11958

About this Document

Document Scope

This document provides a detailed guide to the system setup and configuration of the FCDC3 Flowire Converter in creating IP networks using conventional telecom star-wired infrastructure (2-wire).

Relevant Products

Product Description	Item Name	Item No.
Flowire Converter, 24-48V DC	FCDC3	1008080310
Power Supply 100-240VAC 24VDC 2A	WAGO-787-1606	2990000063
Power Supply 100-240VAC 24VDC 4A	WAGO-787-1616	2990000064
Power Supply 100-240VAC 48VDC 2A	WAGO-787-1623	2990000065
Power Supply 100-240VAC 48VDC 5A	WAGO-787-1633	2990000066
Turbine Extended Ex IP Intercom-1-Full Keypad with 4DAK	TFIX-1-V2	1008123010
Turbine Extended Ex IP Intercom-2-6 Call Buttons	TFIX-2-V2	1008123020
Turbine Extended Ex IP Intercom-3-1 Call Button	TFIX-3-V2	1008123030
Exigo Access Panel Ex	EAPFX-1	1023221511
Exigo Access Panel Ex	EAPFX-6	1023221516

Publication Log

Ver.	Date	Author	Status
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Related Documentation

For further information, refer to the following documentation:

Doc. number	Documentation
A100K11959	Flowire Guidelines for Exigo
A100K11957	Flowire Quick Guide
A100K11960	Replacing Flowire Converter
A100K11xxx	AutoCAD Dimension Drawing
A100K11499	Exigo & Turbine Ex Installation & Maintenance

Acronyms

Acronym	Meaning
FCDC	Flowire Converter Direct Current
Flowire Star Configuration	A star configuration consisting of two or more Flowire devices, with a link to each other, and one PSU.
NMK	Network Management Key
PLC	Power Line Communication. This is the basis of the Flowire technology for transporting both power and signal on power cables or any other cable with at least two conductors.
PSU	Power Supply Unit

Contents

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1 Product Description

1.1 General Description

The Flowire Converter enables Ethernet to run on the same two wires as power, providing simpler cabling and opening up for longer cable hauls. The Flowire converter is also capable of powering the Ethernet devices (Vingtor-Stentofon IP intercom stations) attached to it via spare pairs.

1. Status Indicators
2. PLC 2
3. PLC 1
4. Power Input

1. Password Reset Button
2. PoE On/Off Switch
3. Ethernet Port
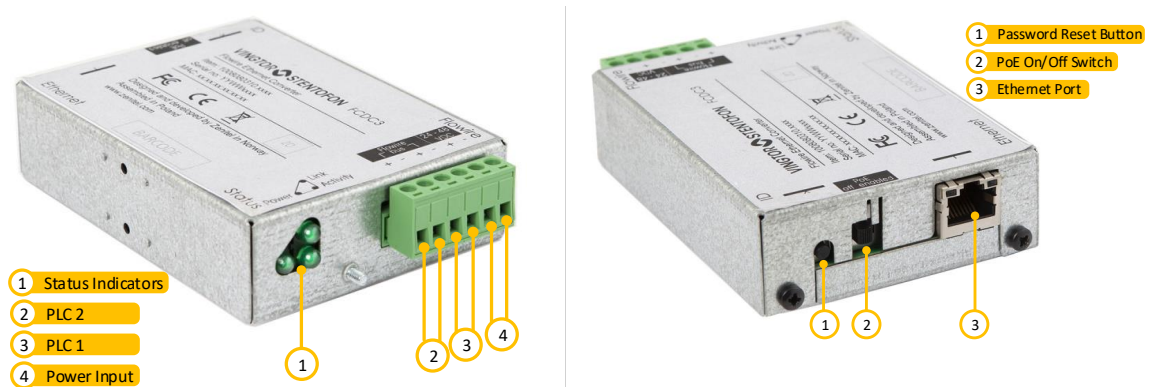
Figure 1   FCDC3 Flowire Converter

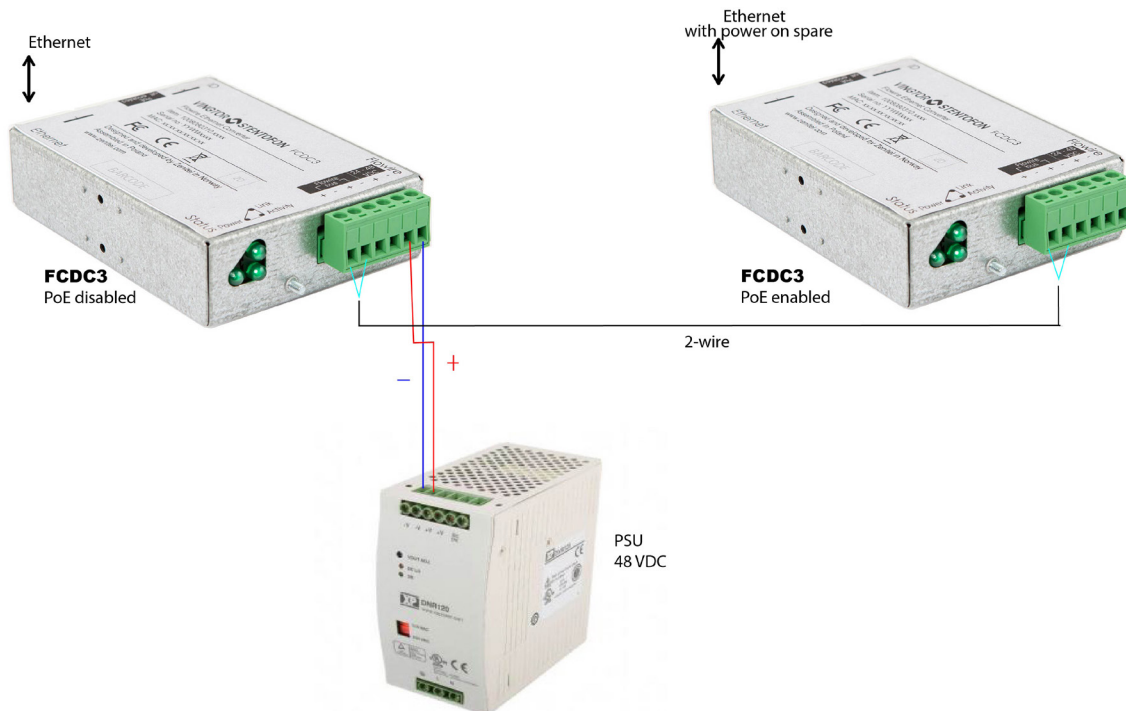| Model	Description
FCDC3	24-48 VDC Flowire Converter with power-forwarding (PoE, type 2) capabilities. Forwards 48V from the power supply to the spare pairs of the Ethernet port (not true PoE) if PoE-switch is in the ON position. Does not forward 48V to the spare pairs of the Ethernet port if PoE-switch is in the OFF position

Figure 2   FCDC3 PoE Enabled and FCDC3 PoE Disabled

ⓘ **It is recommended to use FCDC3 with PoE enabled only when you need to power the connected device via the spare pairs of the Ethernet port. In all other situations, use the FCDC3 with PoE disabled.**

1.2   Areas of Application

The main areas of application for the Flowire Converter are:

- Retrofitting older communication systems
- Providing Ethernet connectivity to remote locations in buildings

1.2.1   Retrofitting Older Intercom & Telephone Systems

- Analog and digital intercom systems
- Analog and digital telephone systems

The above solutions typically use a conventional star-wired telecom infrastructure with 0.5 mm² (20 AWG) single-pair twisted cables.

1.2.2   Remote IP Intercom Locations in New Buildings

In some new building projects, it is a challenge to provide Ethernet connectivity to remote locations (beyond 100 meters from the main equipment room) for critical communication.

By implementing Flowire Converters, it is possible to upgrade these systems with IP products without costly and time consuming re-cabling of CAT or fiber cables.

1.2.3   Cable Length

Cable length should be 600 meters maximum.

2   Upgrading Conventional Star-Wired Infrastructure

2.1   The Conventional System

A conventional star-wired infrastructure supports analog and digital intercom and telephone systems. These star-wired telecom infrastructures are typically used in both marine and onshore intercom applications.
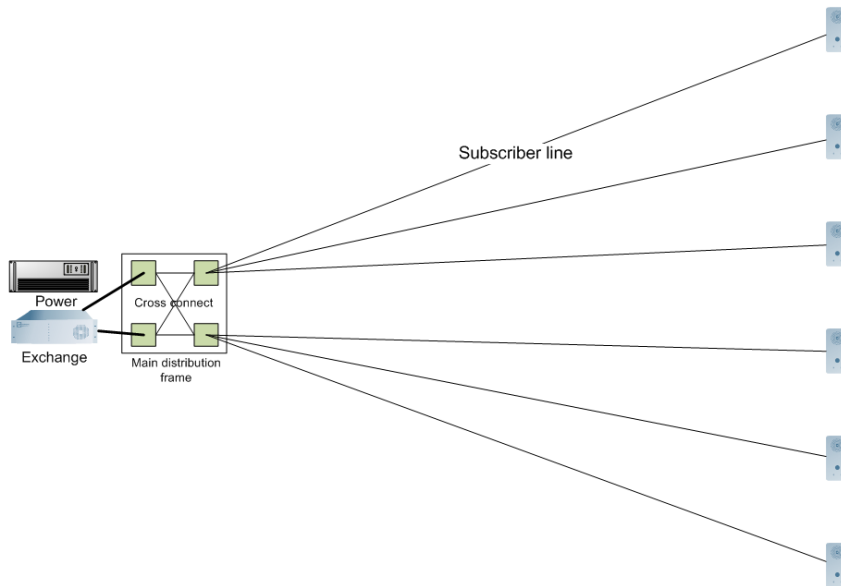

Figure 3   Conventional star-wired infrastructure

In this solution, you will have a centralized equipment rack with the following equipment:

- Telecom / Intercom Exchange
- Power Supply Unit
- Main Distribution Frame

The Main Distribution Frame connects the exchange to subscriber lines connected in a star structure.
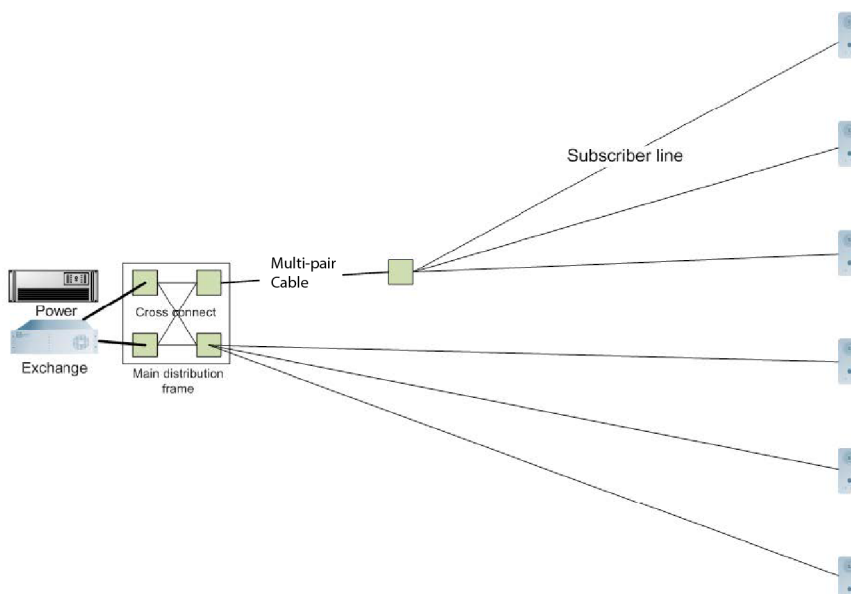

Figure 4   Conventional star infrastructure with multi-pair cables and junction boxes

In order to simplify maintenance and reduce cabling costs, it is common to use multi-pair cables and junction boxes in order to branch out to different locations.

Conventional star-wired telecom infrastructures commonly use one twisted wire pair to each telecom device. However, many systems, like AlphaCom, use two twisted pairs for each telecom device

2.2 Power on Conventional Infrastructure

In an analog and digital telecom/intercom system, it is usually a requirement to power the telephones/intercoms from the central equipment rack, thus supplying the power over the subscriber line.

Typical maximum subscriber line distances for intercom systems are:

Wire cross section	Distance
0.6 mm² (19 AWG)	2.0 km
0.5 mm² (20 AWG)	1.4 km

Table 1 AlphaCom Subscriber Line Distance

Wire cross section	Distance
0.5 mm² (20 AWG)	0.8 km

Table 2 AsaCom Subscriber Line Distance

2.3 Precaution & Limitations

- The cable shields must be interconnected in junction boxes and grounded in the central device only.
- Never use a cable run where the voltage drops below half of the PSU voltage.
- Do not connect more than 9 Flowire Converters on one Flowire star configuration.
- Powering of remote IP intercom stations through their Ethernet ports requires at least 40 VDC at the remote site.

2.4 Grouding

2.4.1 Installlations in Non-Ex Areas

It is always good practice to ground the cabinet of equipment installed in racks. This ensures safety and good EMC. The grounding connection of the Flowire Converter should be connected to the equipment rack's ground strip using a ground wire of at least 0.75 mm² (AWG 19).
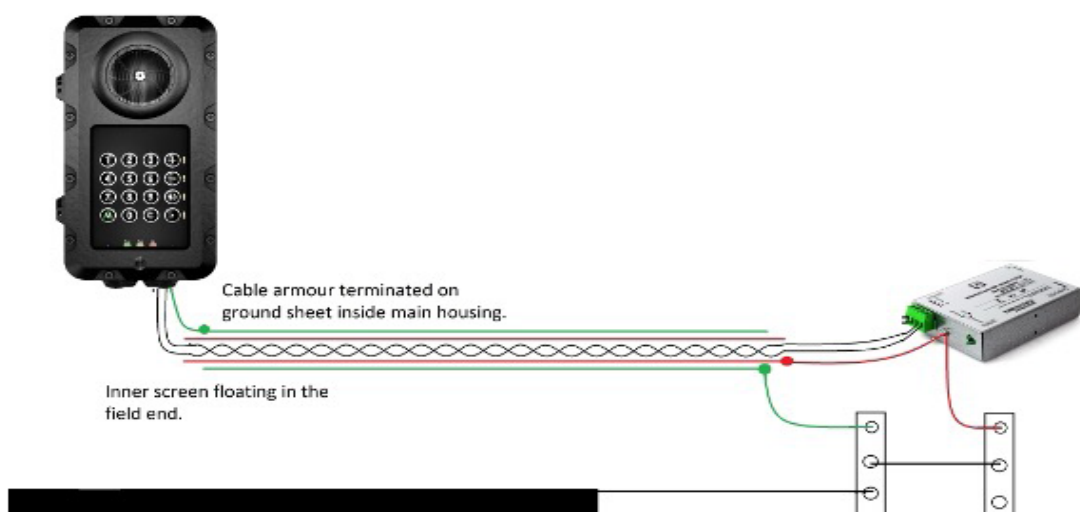
2.4.2 Grounding of Ex-Stations

Figure 5 For Ex-stations, connect the screen according to this illustration.

2.5 Recommendations

- Use twisted-pair shielded cables
- Unless the cables are shielded, you should avoid running wires from different Flowire star configurations in the same cable ducts.
- Avoid multi-pair cables with connections to other systems.
- If you are using a multi-pair cable, but not all its pairs, connect more pairs between two Flowire Converters to reduce voltage drop and increase bandwidth.

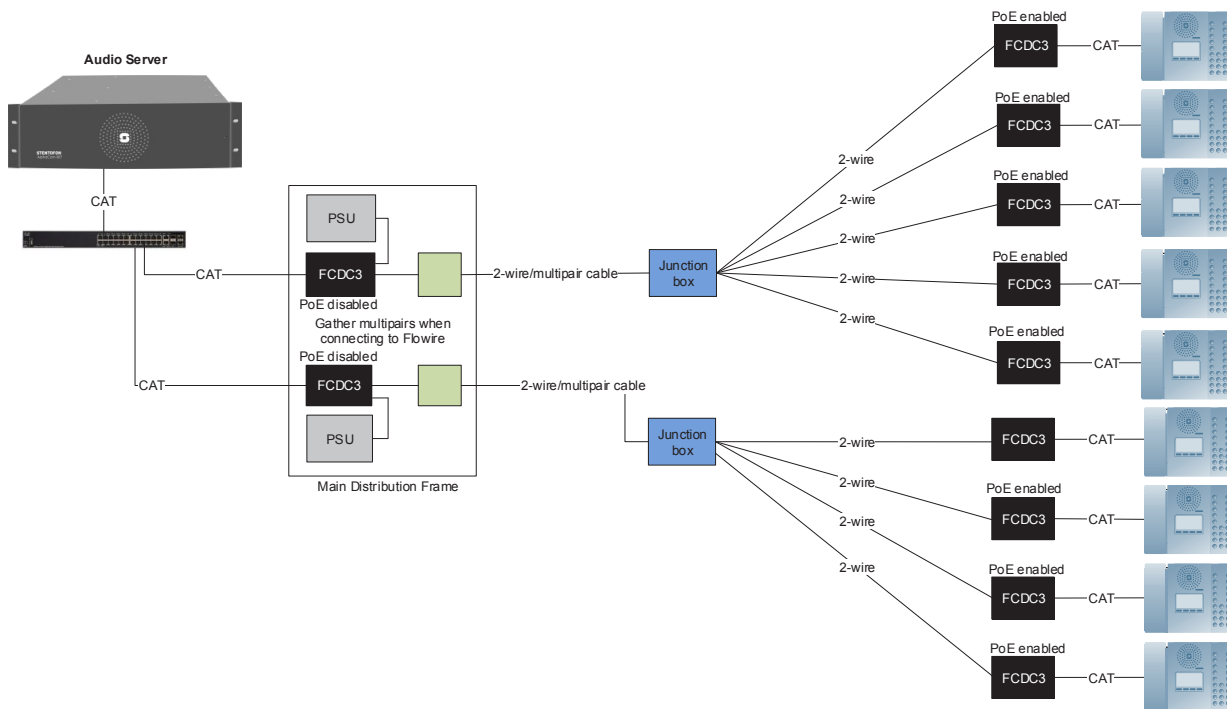## 2.6 System Configuration with Central Powering of Remote Intercoms

Figure 6   Flowire Upgraded configuration with central power distribution.

In the figure above, there are two Flowire star configurations, each with one central FCDC3 Flowire Converter with PoE disabled and one central PSU (Power Supply Unit). FCDC3 with PoE enabled is used to power the connected device via the spare pairs of its Ethernet port. There can be no cross connection between these star configurations inside the main distribution frame.

The figure above shows how the Flowire upgraded system configuration will look like when all remote IP products are powered by centrally located PSUs.

ⓘ *Only use FCDC3 with PoE disabled together with the central PSU in the main distribution frame.*

ⓘ *All multi-pair cables for one Flowire star configuration has to be gathered in the central FCDC3. This can be done directly in the FCDC3 if the plug has room for it, on connector rails or by some other means.*

ⓘ *You should avoid cross connecting two Flowire star configurations.*

ⓘ *You should avoid having wires from different Flowire star configurations share the same multipair cable as this will lead to a very detrimental form of crosstalk.*

ⓘ *You must never ground any of the devices at the remote sites as this may draw additional current from the central PSU to the remote sites, thus reducing the power distribution performance.*

2.7 System Configuration with Local Powering of Remote Intercoms
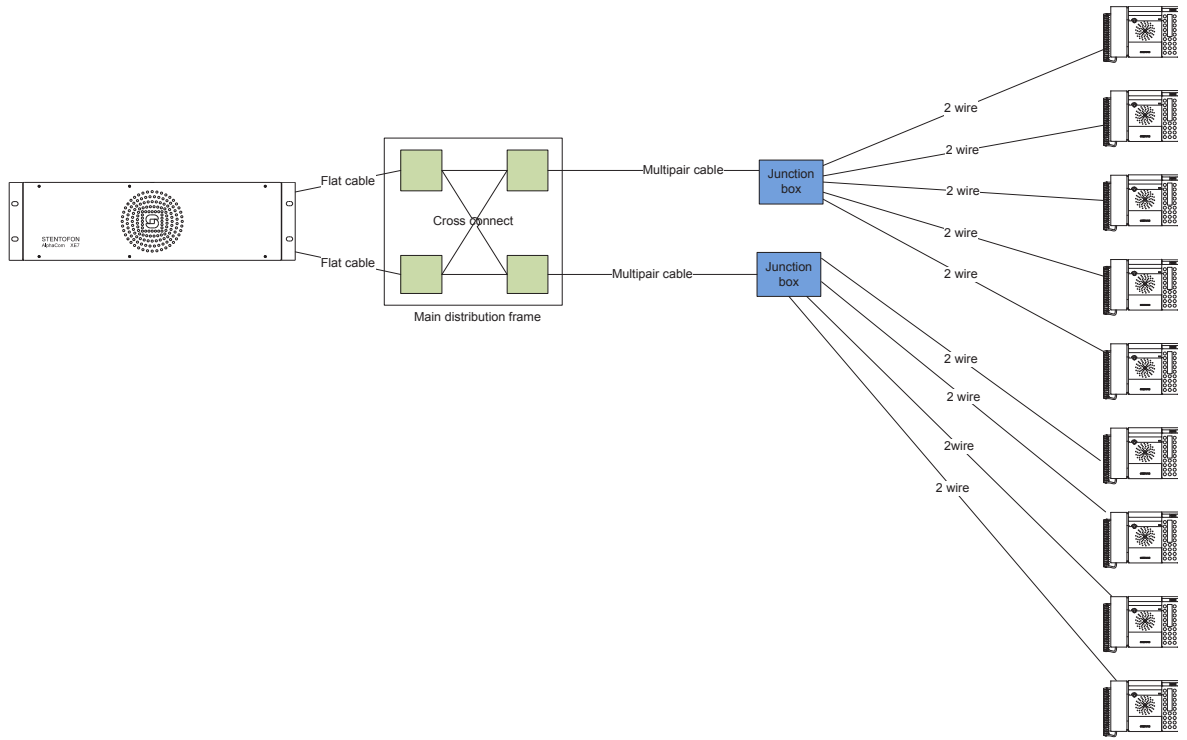
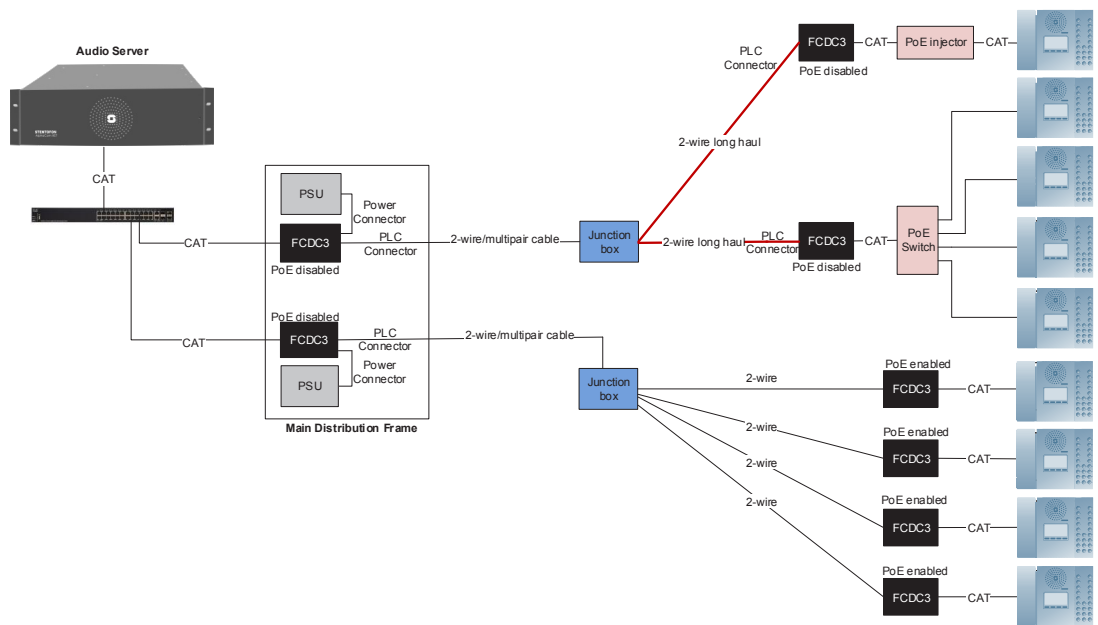*Figure 7   Conventional analog/digital system configuration*

Figure 8   Flowire Upgraded configuration with local power at remote locations

Red cables indicate long hauls where local power will be necessary to maintain a stable connection to the intercoms. FCDC3 with PoE enabled is used to connect to local power for intercoms at remote

locations. For single stations, a PoE injector will be ideal. For groups of intercom stations, it may be better to use a PoE switch.

ⓘ *DO NOT enable PoE on FCDC3 connected to local power for intercoms at remote locations.*

ⓘ *Maximum number of Flowire devices per star configuration is 9 (1 in main frame and 8 outside)*

ⓘ *ONLY use twisted-pair cables.*

2.8   System Configuration with Industrial & Ex Devices

The Ex device (TFIX station, EAPFX access panel) located in a hazardous zone is connected to the central equipment rack located in the safe zone using an Ex certified 2-wire shielded cable. FCDC3 is used to extend the Ethernet connection and support power distribution on the 2-wire cabling infrastructure.

Each industrial device (TFIE station, EAPII access panel) located in an outdoor area will require its own FCDC3 Flowire Converter.

To support the Flowire interface, the central equipment rack must be equipped with an FCDC3 PoE-disabled Flowire Converter.
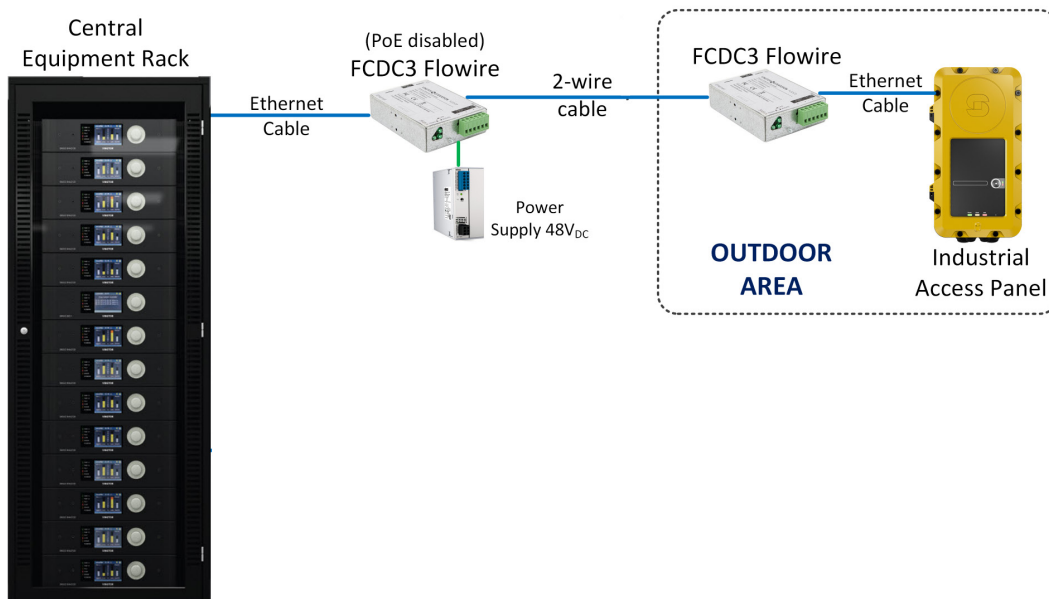

Figure 9   Cabling in Industrial Zones

ⓘ *Do NOT enable PoE on FCDC3 in the central equipment rack.*

3 Connections & Indications

3.1 Flowire Connection

The Flowire Converter (FCDC3) must be connected to the Flowire network star configuration using twisted cabling with positive and negative DC voltage connected as shown on the label. The power supply voltage used depends on the type of devices in the star configuration.

48 VDC PSU : Recommended when using Flowire with Zenitel IP intercoms and access panels.

24 VDC PSU : When using Flowire with Zenitel legacy Ex intercoms and access panels.

The converter is equipped with one dedicated power input connection and two connections to the other Flowire converters (PLC 1 & PLC 2).

Please note that the two connections (PLC 1 and PLC 2) are equivalent and that Power Input MUST NOT be connected to other converters.

1	Status Indicators
2	PLC 2
3	PLC 1
4	Power Input
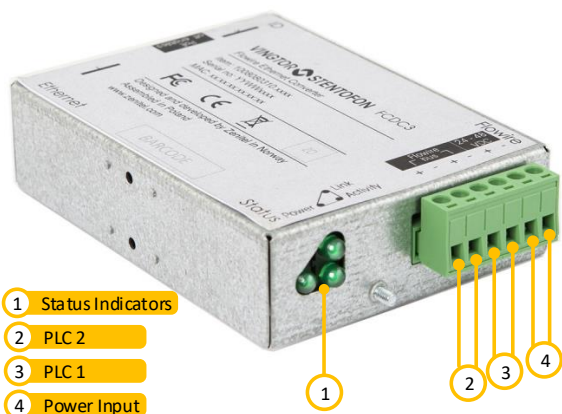
For the first converter unit on the configuration, the power input connection shall be used to connect the power supply, while the other connections can be used to connect to the actual star configuration. The power supply may be connected to the power input connection at any point on the star configuration, i.e. it can be connected to any of the Flowire Converters on the star configuration, but only to ONE converter per cluster.

3.2 Ethernet Connection

Ethernet is connected via the RJ45 port. This supports 1 Gbps Ethernet (in and out) and power out over spare pairs. Use the switch next to the RJ45 port to enable/disable PoE power to the spare pairs. The power on the spare pairs is the same voltage as the one supplied to the converter. Hence, at least 40 volts must be applied to the converter in order to ensure stable operation when powering IP intercom stations directly through their Ethernet ports. If the station has a 24-volt input, the voltage can be reduced to 24 volts by separating the spare pairs from the CAT cable and connecting it to this input.

1	Password Reset Button
2	PoE On/Off Switch
3	Ethernet Port
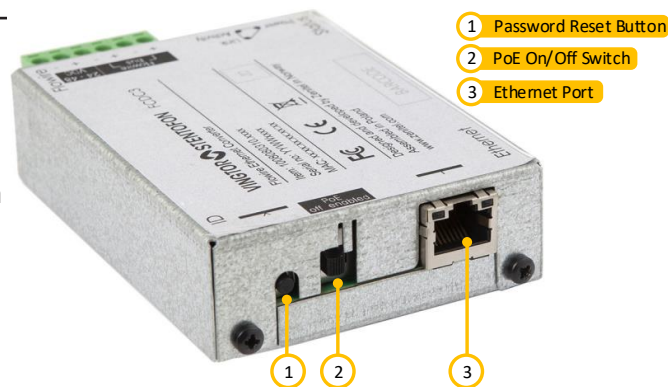
ⓘ *Do NOT power the Flowire Converter through the RJ45 Ethernet port. Trying to do so with a PoE injector will damage the converter.*

ⓘ *The RJ45 port on FCDC3 is NOT a PoE-compatible output but DC voltage on spare pairs which is always present. It must NOT be connected to any equipment that can be damaged by this voltage when PoE is enabled.*

3.3 Indicator LEDs

The Flowire Converter is equipped with three green LEDs. These indicate the status of the power, the connection/link to Flowire, and whether data is transmitted on Flowire or not.

LED1 - Power: This LED is lit when the converter is receiving enough power for powering up.

LED2 - Link: This LED is lit when the converter recognizes one or more converters on the Flowire star configuration.

LED3 - Activity: This LED flashes when data is transmitted to or from the converter.

3.4 Password Reset Button

Pressing and holding this button for more than 15 seconds will reset the NMK password to the default: **HomePlugAV0123**

In addition to resetting the NMK password to its default, the procedure will also set the following factory defaults:

- DHCP will be turned on
- IGMP snooping will be disabled.

4   Mounting & Recommendations

4.1   Mounting the Flowire Converter

The Flowire Converter should be mounted on-wall by using 2 x 4 mm screws or on NS35 DIN rail by using the mounting clips provided in a normal and ventilated indoor environment with a maximum temperature of 70°C. Make sure that there is sufficient space for cables and maintenance. When using more than one Flowire Converter, try to mount them minimum 2cm apart from each other.
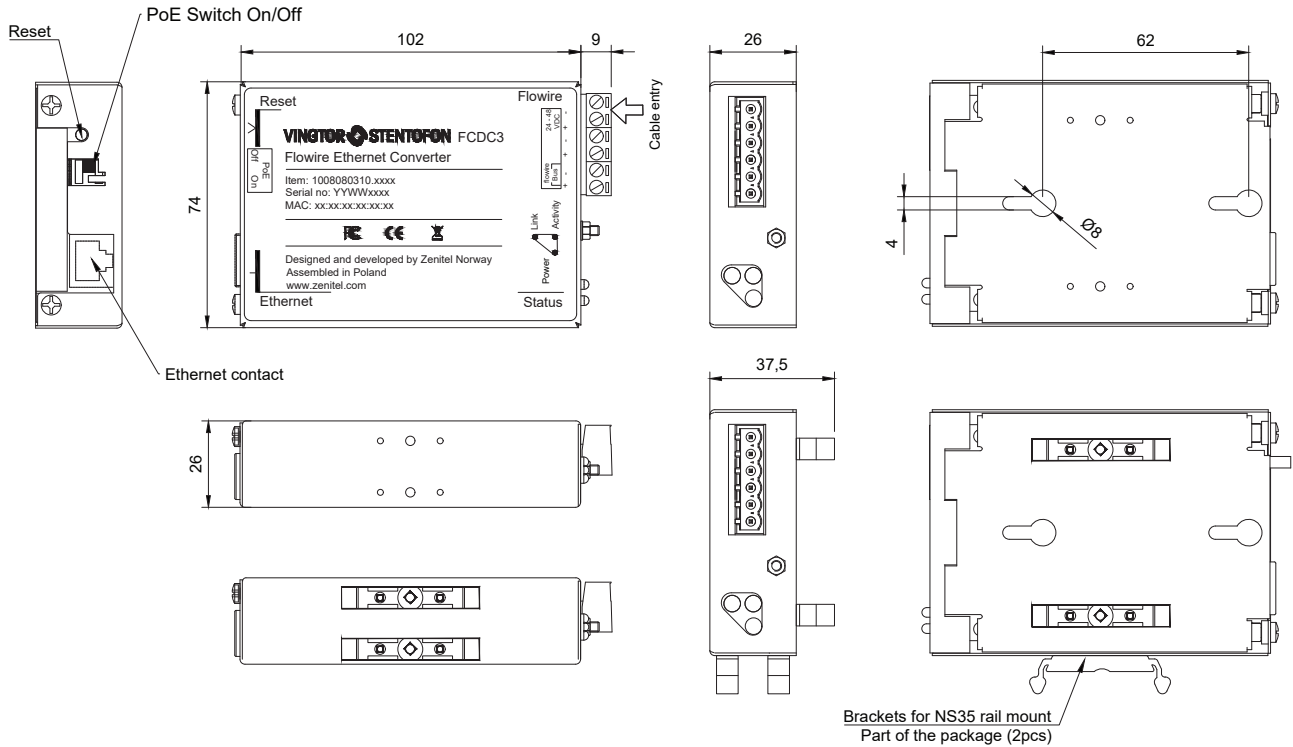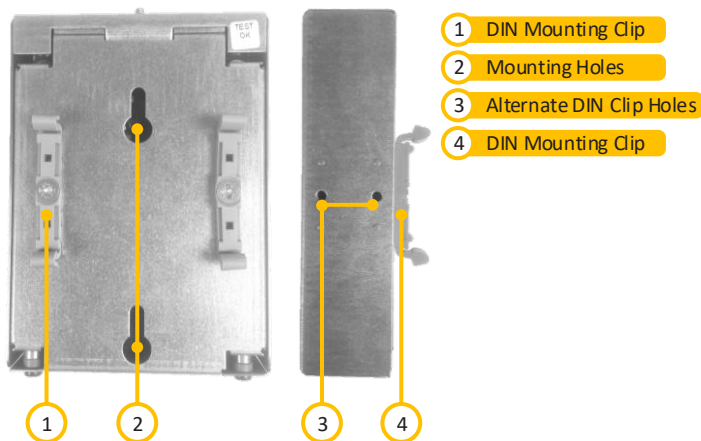

Figure 10   FCDC3 Flowire Converter Dimensions

1   DIN Mounting Clip
2   Mounting Holes
3   Alternate DIN Clip Holes
4   DIN Mounting Clip

Figure 11   DIN Mounting Clips

To mount the Flowire Converter:

- Press the Flowire Converter against the DIN rail of the rack until the mounting clips snap into place.

4.2 Power Requirements

A Flowire Converter needs at least 18V to operate, nominal voltage is 24V to 48V, and maximum voltage is 56V. The voltage at the remote Flowire Converter should never drop below half of the PSU's output voltage.

To power a Vingtor-Stentofon IP Intercom Station through its Ethernet port, we recommend at least 40V at the remote site.

For land-based installations, use XP PSU for FCDC3:

- XP 120 XP Power Supply Unit, 48V DC, 120W
  Item no. 2990101120
- XP 240 XP Power Supply Unit, 48V DC, 240W
  Item no. 2990101240

For maritime installations use Wago PSU for FCDC3:

- Wago 787-1623 Power supply 100-240VAC/48VDC 2A
  Item no. 2990000065
- Wago 787-1633 Power supply 100-240VAC/48VDC 5A
  Item no. 2990000066

If one or several Flowire clusters is powered from a PSU that can deliver more than 3A each Flowire in the system rack should have a 3A fuse on the power input. This power cable has no minimum length and does not need to be twisted or shielded.
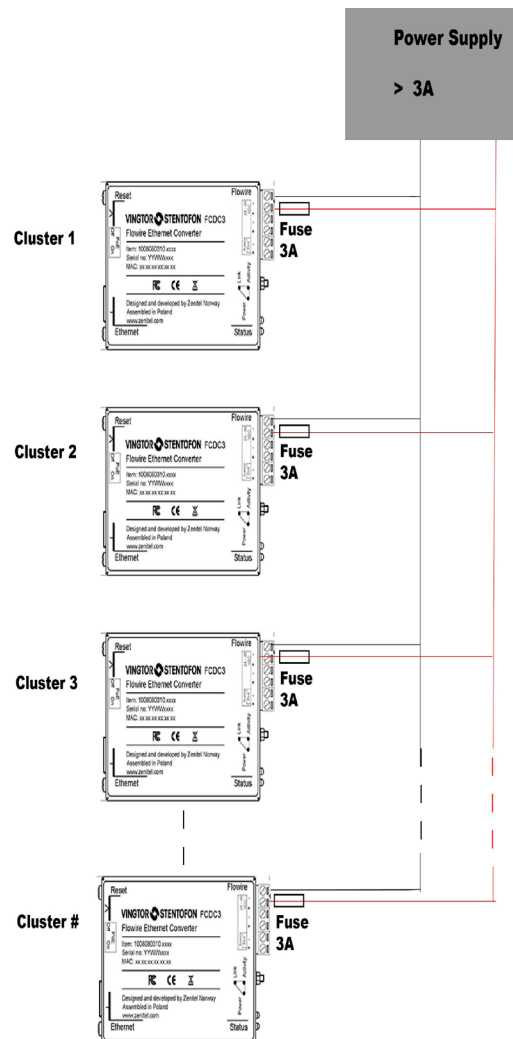
Figure 11 Using Power Supplies > 3A

5 Troubleshooting

5.1 Power for Stable Connection at Remote Site

The minimum voltage at the remote end for PoE is 40VDC. The minimum voltage for the TFIX Ex intercoms and EAPFX Ex access panels is 18VDC. For TFIX stations and EAPFX panels with external speaker the minimum voltage is 30VDC.

The PoE voltage can be read on the device's web interface:

- Select **Device Info > PoE**

Voltage and Current values shown are out of the FCDC3.

If you are not getting sufficient voltage for a stable connection at the remote site, you can:

- Adjust the output voltage on the PSU
- Use local power supply for the connected equipment
- Route the spare pairs in the Ethernet cable to the intercom station's 24V input (available on most Vingtor-Stentofon IP intercom stations and kits except for desktop master stations)

5.2 Cables & Bandwidth

- To get the best bandwidth you should use twisted-pair shielded cables.
- When using multi-pair cables, there should ideally not be any traffic on the pairs not being used for the Flowire Converter. A point-to-point connection between two Flowire Converters, however, will get better bandwidth when more wires are connected between them.
- Avoid unnecessary splicing. A continuous cable will carry the signal further.
- Regarding EMI, twisted/shielded cabling is highly recommended. When using unshielded parallel cables, try to avoid running them close to devices emitting strong fields in the 2 to 86 MHz bandwidth.
- Regarding cross-talk, there will always be some cross-talk when running unshielded cables close to each other or when using several pairs in a multi-pair cable for different devices. However, the most detrimental cross-talk can occur between different Flowire star configurations.

5.3 System Log

To enable system logging:

- Select **Management > System Log**
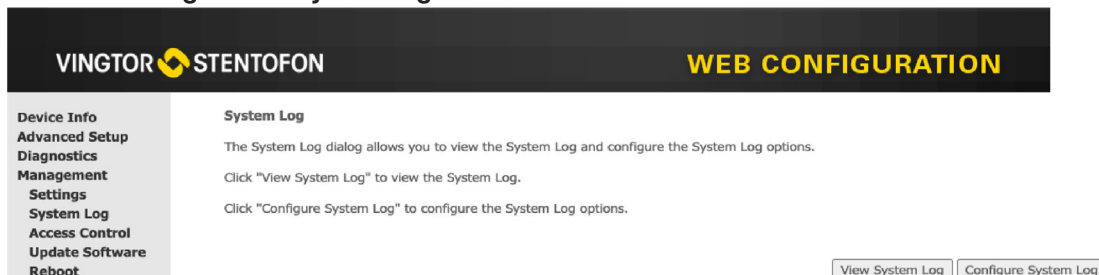
- Click **Configure System Log**

Device Info
Advanced Setup
Diagnostics
Management
  Settings
  System Log
  Access Control
  Update Software
  Reboot

System Log -- Configuration

If the log mode is enabled, the system will begin to log all the selected events. For the Log Level, all events above or equal to the selected level will be logged. For the Display Level, all logged events above or equal to the selected level will be displayed. If the selected mode is 'Remote' or 'Both,' events will be sent to the specified IP address and UDP port of the remote syslog server. If the selected mode is 'Local' or 'Both,' events will be recorded in the local memory.

Select the desired values and click 'Apply/Save' to configure the system log options.

Log: ● Disable ○ Enable

Log Level: [Debugging ▼]
Display Level: [Error ▼]
Mode: [Local ▼]

[Apply/Save]

Select the log levels to log and to display. The **Mode** dropdown box selects where the log is recorded.

If **Local** is selected the log will be saved in the local memory.

If Remote is selected the log will be sent to the syslog server that is set up in Server IP Address.

If Both is selected the syslog will be stored locally and sent to the syslog server.
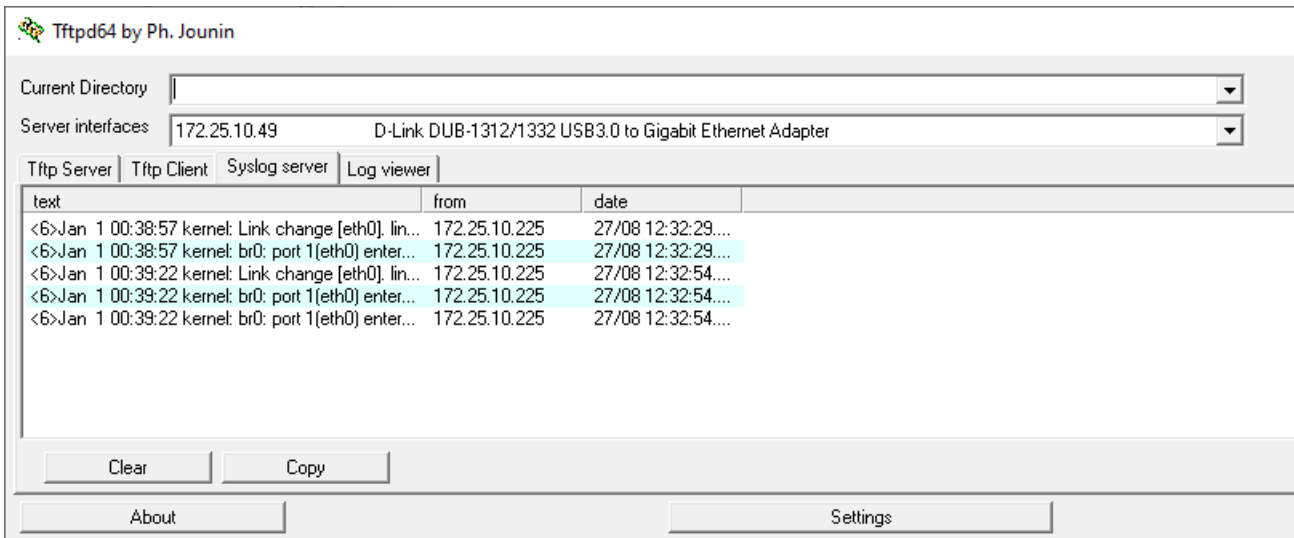
Local syslog:

System Log

Date/Time	Facility	Severity	Message
1st day 00:37:53	kern	warn	kernel: wait instruction: enabled
1st day 00:37:53	kern	info	kernel: ip_tables: (C) 2000-2006 Netfilter Core Team
1st day 00:37:53	kern	info	kernel: device eth0 entered promiscuous mode
1st day 00:37:53	kern	info	kernel: device plc0 entered promiscuous mode
1st day 00:37:53	kern	info	kernel: monitor task is initialized pid= 215
1st day 00:37:53	kern	info	kernel: br0: port 2(plc0) entered forwarding state
1st day 00:37:53	kern	info	kernel: br0: port 2(plc0) entered forwarding state
1st day 00:38:13	kern	info	kernel: Link change [eth0]. link_speed: 0, duplex: 1
1st day 00:38:13	kern	info	kernel: br0: port 1(eth0) entered disabled state
1st day 00:38:44	kern	info	kernel: Link change [eth0]. link_speed: 100000000, duplex: 1
1st day 00:38:44	kern	info	kernel: br0: port 1(eth0) entered forwarding state
1st day 00:38:44	kern	info	kernel: br0: port 1(eth0) entered forwarding state
1st day 00:38:57	kern	info	kernel: Link change [eth0]. link_speed: 0, duplex: 1
1st day 00:38:57	kern	info	kernel: br0: port 1(eth0) entered disabled state
1st day 00:39:22	kern	info	kernel: Link change [eth0]. link_speed: 100000000, duplex: 1
1st day 00:39:22	kern	info	kernel: br0: port 1(eth0) entered forwarding state
1st day 00:39:22	kern	info	kernel: br0: port 1(eth0) entered forwarding state

[Refresh] [Close]

Log shown in a syslog server:

Since there is no real time clock in the FCDC3, the timestamp in the device is related to the start-up time of the FCDC3.

    FCDC3 Flowire Converter Configuration Manual   A100K11958
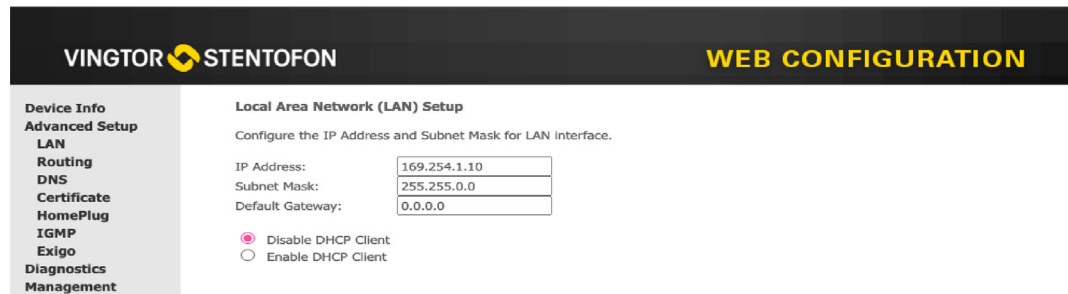
A: Advanced Configuration

IP addresses on a Flowire device can be set either by setting a static IP address or having one assigned from a temporary DHCP server. The Flowire device has, by default, DHCP enabled on one of their networking interfaces.

A.1 Setting a Static IP Address & Disabling DHCP

By default, all Flowire devices have 169.254.1.10 as a static IP address.

In order to set a new static IP address:

1. Isolate the Flowire device by disconnecting the line to other devices (if you have more than one Flowire device with default IP configuration).

2. Access the web interface of the Flowire device via the default address 169.254.1.10.
3. Select **Advanced Setup > LAN**
4. Select **Disable DHCP Client**
5. Enter the new **IP address, Subnet Mask** and **Default Gateway**
6. Click the **Apply/Save** button

The device will now use its new IP address.

A.2 Network Management Key (NMK) Configuration

To set a new NMK password:

1. Log into the Flowire device by entering its IP address in a web browser.

Device Info
Advanced Setup
  LAN
  Routing
  DNS
  Certificate
  HomePlug
  IGMP
  Exigo
Diagnostics
Management
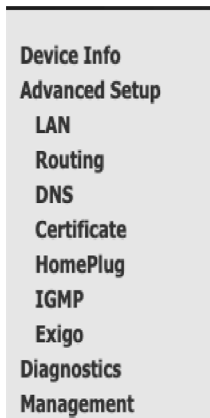
2. Select **Advanced Setup > HomePlug > Network password**
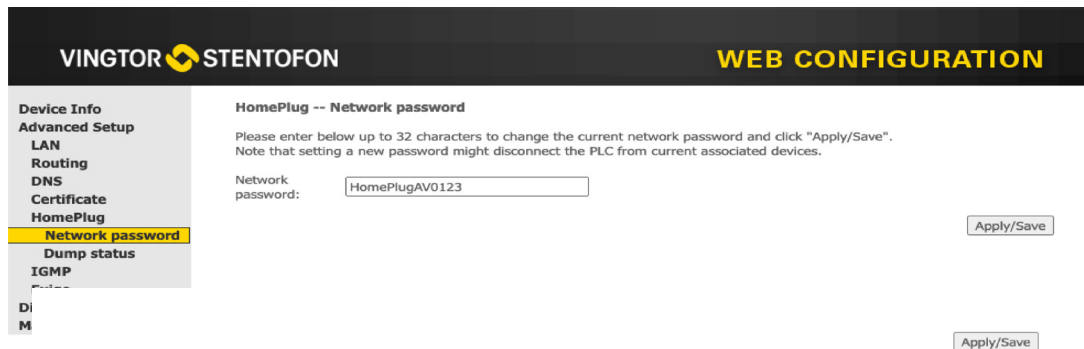
3. Enter a new password in the **Network password** field
4. Click **Apply/Save**

The NMK Password may be up to 32 characters long, and is case sensitive.

It is good practice to label the Flowire device with the new NMK.

Default NMK**: HomePlugAV0123**

A.3 CCo Settings

- Select Advanced Setup > HomePlug

In the Flowire web interface, each Flowire unit has a setting for CCo (Central Coordinator). In every Flowire network, there is always one CCo, but this is, by default, automatically selected. If the CCo should fail, another Flowire unit on the network is automatically selected to be CCo. In a star configuration, in order to optimize availability, it is recommended to always configure the FCDC3 in the rack to be CCo. Due to its location, it is least likely to suffer damage. If this Flowire unit fails, the star configuration will not function in any case, whether or not it is the CCo, as all other Flowire units are routed through it. In order for the FCDC3 in the rack to be configured as a CCo, it is necessary to set the device-side Flowire units to **not CCo.**

- For one-to-one connections, this setting can be left as **Auto/Blank.**

ⓘ *Note: After changing CCo settings, the Flowire unit needs to be rebooted.*

For more information, see the wiki page Flowire CCo on this subject.

A.4 Multicast and IGMP

FCDC3 has support for IGMP snooping. By default, IGMP snooping is disabled. It is possible to enable and disable IGMP snooping from the FCDC web (Advanced Setup/IGMP). (Versions prior to vsf-fcdc3-1.0.3.1 has IGMP snooping enabled, and no web config support for IGMP snooping).

FCDC3 does not have built in IGMP querier.

When IGMP snooping is disabled, FCDC3 will send a multicast packet to all other devices in the cluster. The packet is sent separately to each of the other devices on a fast unicast channel. (As opposed to sending it once on a slow broadcast channel)

When IGMP snooping is enabled, FCDC3 will only send a multicast packet to the devices that has expressed interest in the multicast address via IGMP.

FCDC3 IGMP snooping has some limitations, that is why it is disabled by default.

It does not work properly with IGMPv2 for groupcalls. There is a delay of multiple seconds before all stations join the groupcall.

FCDC3 can only track 16 different multicast streams (usually not a problem)

Each multicast group can only have 8 members.

If the network use IGMPv3, and there are less than 9 FCDC in the cluster, it is safe to enable IGMP snooping. On point-to-point links IGMP snooping do not add any value.

A.5 Multicluster Separation

A.5.1 Multicluster Groups and Separation

Crosstalk is a phenomenon by which a signal transmitted on one circuit creates an undesired effect in another circuit and it is caused by capacitive, inductive, or conductive coupling from one circuit or to another. When several Flowire clusters are installed physically close to each other there may be crosstalk between the clusters. Furthermore, when using common power supply to several Flowire clusters they will also be in the same multicluster group due to interference through the power cable.

To prevent crosstalk from one Flowire interfering with the communication in another cluster a unique Network password should be defined for each cluster. All Flowires within the same cluster should have the same Network Password.
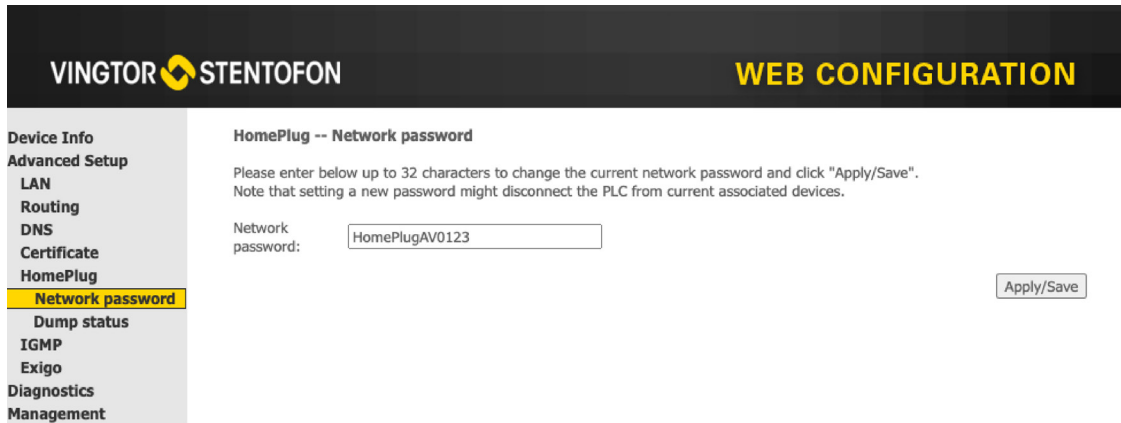
ⓘ *NOTE! There are 16 cluster ID's available allowing maximum 16 Flowire clusters in one   multicluster group. Having more than 50 Flowire units in one multicluster group should also be avoided.*

ⓘ *To avoid exceeding the limit of clusters or devices in a multicluster group sufficient physical separation should be implemented between the Flowires installed on the systems side.*
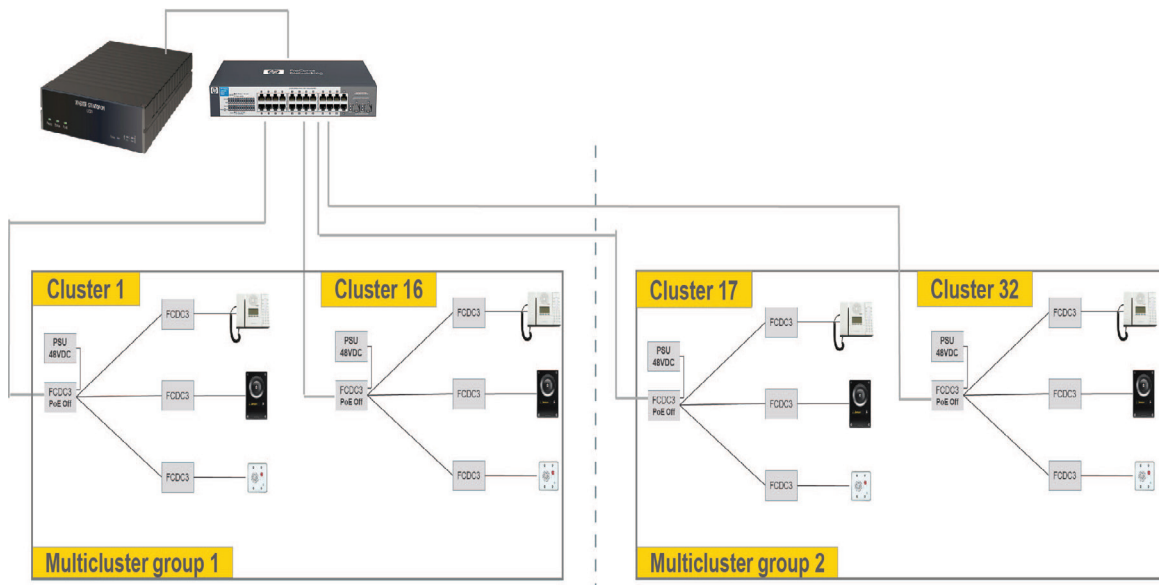
Figure 11 Multicluster Groups

A.5.2 Multicluster Verification and Tuning

Functionality for checking the number of clusters and unassociated devices in a multicluster group has been Implemented in the latest web GUI from SW version 1.0.3.

During installation it is possible to identify all Flowire stations that are associated either through cabled connection or through crosstalk. The table for associated devices will list all Flowire stations included in the same cluster whereas the table for unassociated devices will list all Flowire stations that are connected due to crosstalk.

Interference issues are more likely to occur the more stations from other clusters that are visible.

In order to reduce the number of stations associated in a multicluster group the signal output power can be reduced. There is an option for reducing signal power in the web interface.

VINGTOR ◇ STENTOFON

WEB CONFIGURATIO

Device Info
Advanced Setup
  LAN
  Routing
  DNS
  Certificate
  HomePlug
    Network passwor
    Dump status
  IGMP
  Exigo
Diagnostics
Management

HomePlug -- Setup

Device HFID (nickname):	84
MAC address:	00:13:cb:0a:40:15
Firmware version:	3.2.4 (SVN Rev: 14158 branch: 0)
HomePlug version:	2.0
Status:	Up
Role selection:	Auto ⌄ (Current: Not CCo)
Forced delay:	◉ 30 ○ 116
Output power:	-5 db ⌄ (Change require reboot)

Associated devices

MAC address	HPAV Rate (Tx/Rx)
00:13:cb:0a:43:fd	948 Mbps / 944 Mbps
00:13:cb:0b:17:a9	222 Mbps / 215 Mbps

[Apply/Save]

The available options for adjusting signal strength are -5, -10, -15 and -20 dB. The effect of reducing the power should then be seen as the number of unassociated devices go down. Do not reduce the power so much that the connection to assiciated devices is lost.

D: Upgrade FCDC1/FCDC2, EAPFX, TFIX to Operate with FCDC3

In order for the FCDC1, FCDC2, TFIX, or EAPFX to be able to work with the FCDC3, you need to upgrade the software in the Flowire to at least version 4.1.3.13 or higher.
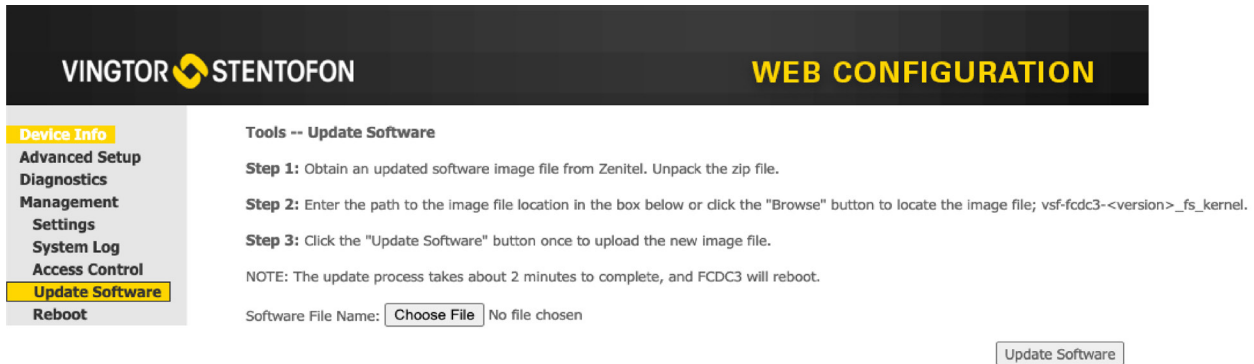
The procedure is described in the wiki page [Flowire Software Upgrade Procedure](#)

C: Software Upgrade

C.1 Upgrade via Web Interface on Flowire Device

To upgrade software:

1. Select **Management > Update Software**
2. Click the **Choose File** button and browse for the new software file
3. Click **Update Software**

The update will take about 2 minutes. When the update is complete the FCDC3 will reboot.

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⚠️ **The WEEE Directive does not legislate that Zenitel, as a 'producer', shall collect 'end of life' WEEE.**

This 'end of life' WEEE should be recycled appropriately by the owner who should use proper treatment and recycling measures. It should not be disposed to landfill.

Many electrical items that we throw away can be repaired or recycled. Recycling items helps to save our natural finite resources and also reduces the environmental and health risks associated with sending electrical goods to landfill.

Under the WEEE Regulations, all new electrical goods should now be marked with the crossed-out wheeled bin symbol shown. Goods are marked with this symbol to show that they were produced after 13th August 2005, and should be disposed of separately from normal household waste so that they can be recycled.