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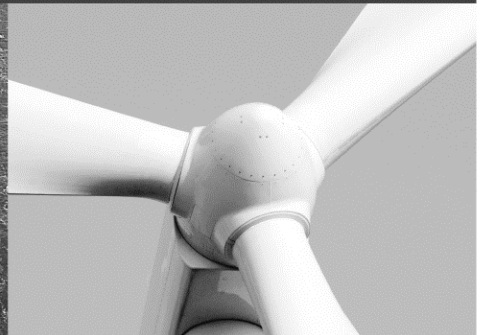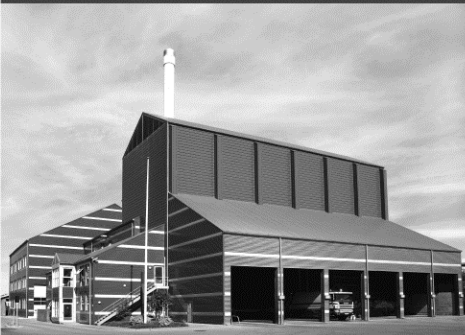**APPLICATION NOTES**

DELOMATIC 400, DM-400

Remote Monitoring

- TCP/IP DSL – DSL
- TCP/IP DSL – Mobile
- TCP/IP Mobile – DSL
- TCP/IP Mobile – Mobile

Table of contents

1. About this document

General purpose

This document contains the application notes for DEIF's Delomatic 400, DM-400, used in GAS or HYDRO applications.

For functional descriptions, the procedure for parameter setup, complete standard parameter lists, etc., please see the Installation Instructions.

The general purpose of the application notes is to offer the designer information about TCP/IP DSL-DSL communication.

Please make sure to read this handbook before working with the DM-400 controller and the gen-set to be controlled. Failure to do this could result in damage to the equipment or human injury.

Intended users

The document is mainly intended for the person responsible for designing DM-400 systems. In most cases, this would be a panel builder designer. Naturally, other users might also find useful information in this document.

Contents/overall structure

The document is divided into chapters, and in order to make the structure of the document simple and easy to use, each chapter will begin from the top of a new page.

2. Warnings and legal information

Legal information and responsibility

DEIF takes no responsibility for installation or operation of the generator set. If there is any doubt about how to install or operate the generator set controlled by the unit, the company responsible for the installation or the operation of the set must be contacted.

> **The DM-400 is not to be opened by unauthorised personnel. If opened anyway, the warranty will be lost.**

Electrostatic discharge awareness

Sufficient care must be taken to protect the terminals against static discharges during the installation. Once the unit is installed and connected, these precautions are no longer necessary.

Safety issues

Installing the unit implies work with dangerous currents and voltages. Therefore, the installation should only be carried out by authorised personnel who understand the risks involved in working with live electrical equipment.

> ⚠ **Be aware of the hazardous live currents and voltages. Do not touch any AC measurement inputs as this could lead to injury or death.**

Definitions

Throughout this document, a number of notes and warnings will be presented. To ensure that these are noticed, they will be highlighted in order to separate them from the general text.

Notes

> ⓘ **The notes provide general information which will be helpful for the reader to bear in mind.**

Warnings

> ⚠ **The warnings indicate a potentially dangerous situation which could result in death, personal injury or damaged equipment, if certain guidelines are not followed.**

3. Abstract

For remote monitoring purposes, the DM-400 can be connected to the internet, using different protocol methods. For these, the DM-400 uses the TCP/IP protocol.

TCP: Transmission Control Protocol
IP: Internet protocol

The following variants exist between Client and Server:

    1) DSL – DSL
    2) DSL – mobile
    3) Mobile – DSL
    4) Mobile – mobile

The **Client** is the user, the **Server** is DM-400. These two are interconnected.

The internet is the communication medium. For safety reasons it is recommended always to use keyword-protected VPN tunnels (Virtual Private Network) between the Client and the Server.
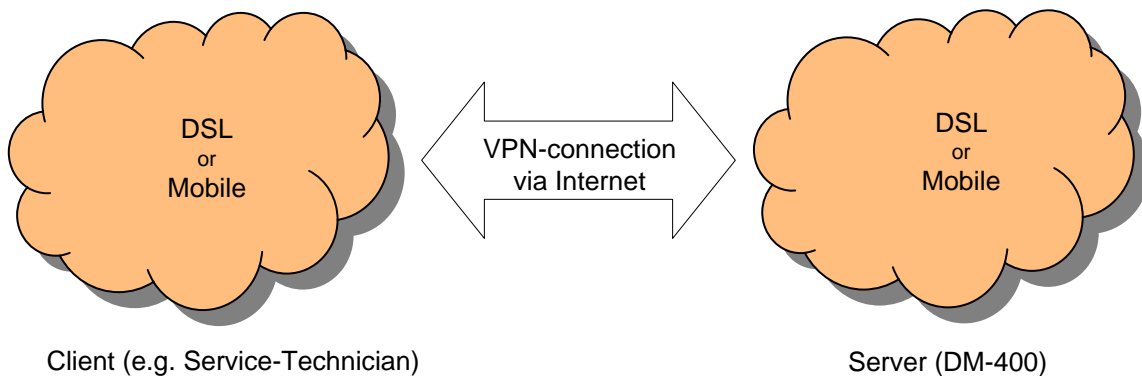
A VPN tunnel is a connection of 2 endpoints using an existing unsafe network (e.g. the internet). The two end points and the units connected to these ends form their own local network. An authentication serves the security of the data.
As authentication, the following methods can be used:
    - Static key
    - Username/password
    - Individual certificate and key

The method "static key" serves as access key to the transferred data and supports the connection between a Client and a Server.
If more Clients are to be connected to a common server, another method must be used.

DSL
or
Mobile

VPN-connection
via Internet

DSL
or
Mobile

Client (e.g. Service-Technician)

Server (DM-400)

4. DSL Client

Conditions

- DSL connection (internet access)
- DSL modem
- Administrator access to configure your firewall
- HMI Client software (freeware from DEIF)
- OpenVPN software (freeware)

Installation

Install the DSL modem according to the installation guide from the manufacturer.

Install the HMI Client-Software on your computer.

Follow the installation instructions from the on-screen installation assistant.

Install the OpenVPN software on your computer. This software is by the time this was written freeware and can be downloaded from here:

www.openvpn.net

During the installation, an icon "openVPN GUI" will be made. This is necessary for the later-on building of the connection.

Follow the installation instructions from the installation assistant.

Configuration

Configure the DSL modem with the access data given by your DSL provider.

Make sure that you have internet access with your computer.

Reconfigure the firewall in case the application port for the VPN connection is not released.

The VPN port can be found in the ConfigFile.

5. Mobile Modem Client

Conditions

- Mobile internet access (e.g. using web 'n' talk from T-Mobile)
- HMI Client software (freeware from DEIF)
- OpenVPN software (freeware)
- Mobile to Mobile application only: internet additional service (e.g. mdex-fixed.IP)

Installation

Install the mobile internet access according to the installation guide from the provider.

Install the HMI-Client-Software on your computer.

Follow the installation instructions from the installation assistant.

Install the OpenVPN software on your computer. This software is by the time this was written freeware and can be downloaded from here:

www.openvpn.net

During the installation, an icon "openVPN GUI" will be made. This is necessary for the later-on building of the connection.

Follow the installation instructions from the installation assistant.

Mobile to Mobile application only:
Apply an internet additional service (e.g. mdex-fixed.IP).
Mdex-fixed.IP is an internet service which may cost a fee.
Through the mdex-fixed.IP service, a mobile unit (e.g. a modem) can be provided with a fixed IP address. By doing this, it is possible to access the mobile unit (modem) from another mobile unit.

Follow the instructions from the additional service provider (e.g. www.mdex.de)

Configuration

Configure the mobile internet access with the access data given by your internet provider.

Make sure that you have internet access with your computer.

Establish a secure VPN connection (e.g. with static key).

Follow the instructions for your DSL router (server)/internet additional service provider.

6. DSL Server

Conditions

- DSL connection (Internet access)
- DSL modem
- Administrator access to configure your firewall (should you be connected to a company network, you need to contact the system administrator)
- DM-400
- DSL Router, e.g. MOROS-LAN-PRO (hardware recommended by the company Insys)

Installation

Install the DSL modem according to the installation guide from the manufacturer.

Install the DSL router according to the installation guide from the manufacturer.

Use a network cable with RJ45 plugs to connect the LAN interface on the DM-400 with a free LAN input on the DSL router.

For mobile modem clients:
Use a network cable with RJ45 plugs to connect the LAN(ext) interface on the DSL router with a free LAN input on the DSL modem.

Establish a DynDNS account.
DynDNS means "dynamic Domain-Name-System". It is a free of charge internet service. DynDNS establishes connection to an IP address using a freely selectable name, also if the IP address is dynamically established.

(i) Follow the instructions of the DynDNS provider, e.g. www.dydns.org

Configuration

Configure the DSL modem with the access data given by your DSL provider. For testing of the functions, connect a PC to the modem.

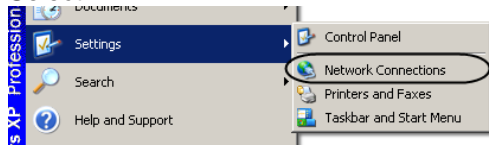**(i) Make sure that you have internet access.**

Configure the DM-400 controller. By this, you establish a local network connection between your PC and the controller. Use an Ethernet cable (RJ45).

Change the LAN settings of your PC. This example is from a Windows XP PC:
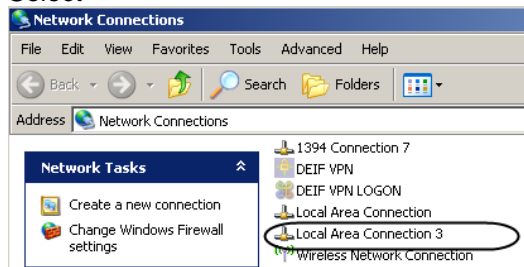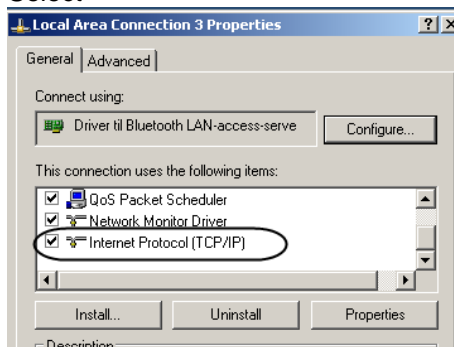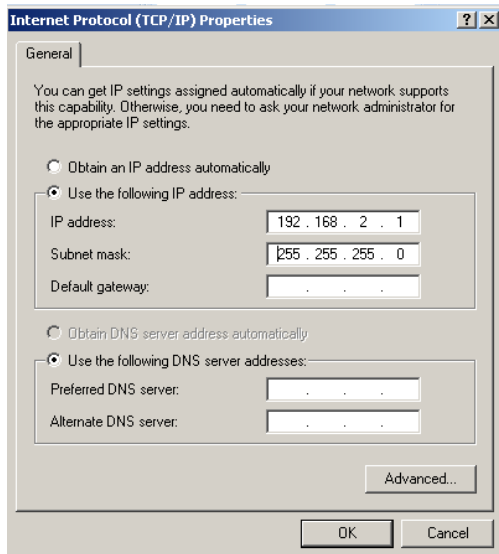
Click

Select

Select

In this example, Local Area Connection 3 is selected.

Select

Set the address:

The Gateway and DNS server are not used.

Configurable data can be changed using a web browser (e.g. Internet Explorer). Start the Explorer and write the DM-400 address 192.168.2.21 in the URL (Uniform Resource Locator) window.

Choose "Network configuration".

Now you have to log in on the DM-400. The user name is "admin" and the password is "admin".

If a change of the factory setting is needed (e.g. by connection to an existing network), acknowledge your changes with "set" and initialise the web module with "restart".

After this, change the necessary settings in your PC LAN configuration.

The DM-400 uses port 30000 as application port. This cannot be changed.

> ⚠️ **If you change the IP address, it is very important that you write down the new address. If you lose the address, the access to configurations is no longer possible and the connection cannot be used.**

Configure the DynDNS function of your DSL router. To do that you need:
- The DynDNS provider   (e.g. dyndns.org)
- Your domain name   (e.g. DM400.dyndns.org)
- Your username   (e.g. Max)
- Your password   (e.g. Password)

> ℹ️ **Follow the instructions of the DSL router manual.**

Establish a port-forwarding rule, by which you can forward a request to your domain name (router address) to the DM-400.
IP address: 192.168.2.21   (DM-4 IP address)
Port: 30000   (DM-4 application port)

Establish a secure VPN connection (e.g. with a static key).

If the application port for the VPN connection is not opened, you need to re-configure your firewall.

7. Mobile Modem Server

Conditions

- DM-400
- Mobile modem router, e.g. MOROS-EDGE-PRO (hardware recommended by the company Insys)
- GSM antenna connected to the mobile modem router
- Mobile phone access to GSM with data transfer capable SIM card
- Mobile to mobile application only: additional internet service (e.g. mdex-fixed.IP)

Installation

Install the mobile modem router according to the installation guide from the manufacturer.

Use a network cable with RJ45 plugs to connect the LAN interface on the DM-400 with a free LAN input on the mobile modem router.

Establish a DynDNS account.
DynDNS means "dynamic Domain-Name-System". It is a free-of-charge internet service. DynDNS establishes connection to an IP address using a freely selectable name, also if the IP address is dynamically established.

(i) Follow the instructions of the DynDNS provider, e.g. www.dydns.org

Configuration

Configure the mobile modem router with the access data given by your GSM provider. For testing of the functions, connect a PC to the mobile modem router.
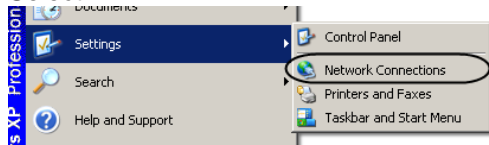
(i) Make sure that you have internet access.

Configure the DM-400 controller. By this, you establish a local network connection between your PC and the controller. Use an Ethernet cable (RJ45).
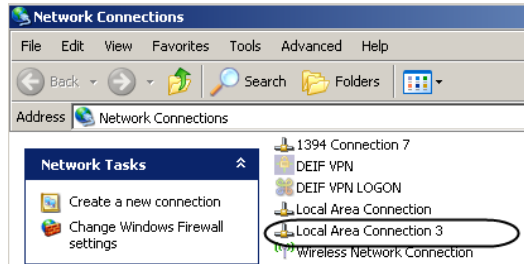
Change the LAN settings of your PC. This example is from a Windows XP PC:

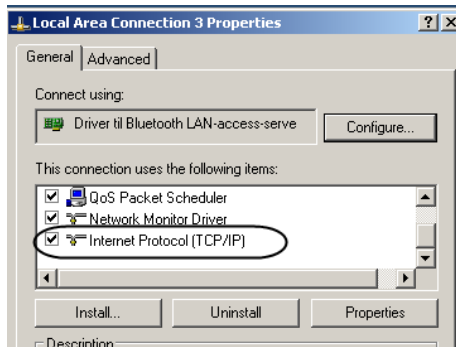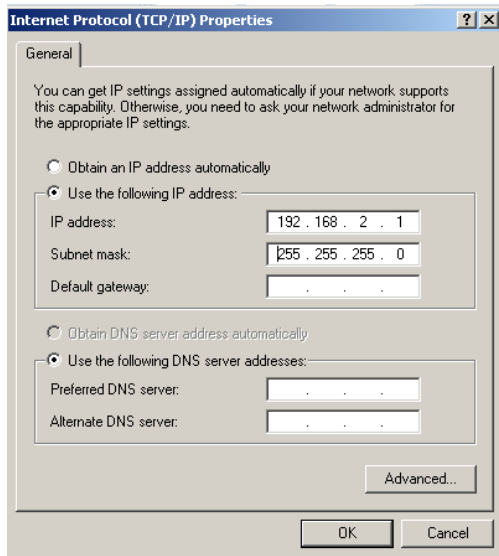Click **Start**

Select

Select

In this example, Local Area Connection 3 is selected.

Select

Set the address:

The Gateway and DNS server are not used.

Configurable data can be changed using a web browser (e.g. Internet Explorer). Start the Explorer and write the DM-400 address 192.168.2.21 in the URL (Uniform Resource Locator) window.

Choose "Network configuration".

Now you have to log in on the DM-4 GAS. The user name is "admin" and the password is "admin".

If a change of the factory setting is needed (e.g. by connection to an existing network), acknowledge your changes with "set" and initialise the web module with "restart".

After this, change the necessary settings in your PC LAN configuration.

The DM-4 uses port 30000 as application port. This cannot be changed.

> **If you change the IP address, it is very important that you write down the new address. If you lose the address, the access to configurations is no longer possible and the connection cannot be used.**

Configure the DynDNS function of your DSL router. To do that you need:
- The DynDNS provider   (e.g. dyndns.org)
- Your domain name   (e.g. DM400.dyndns.org)
- Your username   (e.g. Max)
- Your password   (e.g. Password)

> **Follow the instructions of the DSL router manual.**

Establish a port-forwarding rule, by which you can forward a request to your domain name (router address) to the DM-4 IP address.
IP address: 192.168.2.21   (DM-400 IP address)
Port: 30000   (DM-400 application port)

Establish a secure VPN connection (e.g. with a static key).

Mobile to Mobile applications only:
Establish a secure VPN connection to your additional internet service provider. Set the mobile modem according to the instructions from the additional internet service provider (access point, username and password).

8. Building a connection

As you start the "OpenVPN-GUI" and establish a connection to your server (connect), you create a secure VPN connection.

By successful connection, the colour of the OpenVPN symbol in the status list turns green.

Start the HMI Client Software. Use your DynDNS name (e.g. DM4.dyndns.org) as IP address and 30000 as port address. Click "connect". The visualisation starts when the first macros have been loaded.

9. Links

www.deif.com

www.insys-tech.de

www.openvpn.net

www.dyndns.org

10. Glossary

Client
Computer programme which connects via the Client-Server model connection to a server, and exchanges information with the server.

DSL
Digital Subscriber Line. Broadband digital internet connection via communication networks.

DynDNS
Dynamic Domain Name System. A service that connects to an IP address using a name. Also works with dynamic IP addresses.

Firewall:
Network component, which limits the communication between different networks in order to maintain a certain level of security.

HMI
Human Machine Interface. User interface between man and machine.

IP
Internet Protocol. Basic protocol in the internet and many local networks.

LAN
Local Area Network. Local computer network between multiple computers.

Port-forwarding
Forwarding of a connection in a network to a specific port to another unit in the network.

Server
Computer programme which connects to a client programme, and exchanges information with the client.

TCP
Transmission Control Protocol. Network protocol in the internet.

URL
Uniform Resource Locator. An address under which a web browser service can be found.

VPN
Virtual Private Network. Software for connection between units of different networks, without having the two networks compatible with each other.