DEIF

-power in control

CE

DESCRIPTION OF OPTION

LAN Interface
for Energy and Power meters
AEM and APM

- Technical reference

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Table of contents

1. About this document

This chapter includes general user information about this handbook concerning the general purpose, the intended users and the overall contents and structure.

General purpose

This document describes the usage of the LAN interface used along with a DEIF Energy meter or Power meter.

Intended users

The document is mainly intended for the person responsible for the unit parameter setup and installation. In most cases, this would be a panel builder designer. Naturally, other users might also find useful information here.

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. The following will outline the contents of each of the chapters.

About this document

This first chapter includes general information about this handbook as a document. It deals with the general purpose and the intended users of the document. Furthermore, it outlines the overall contents and structure of the document.

Warnings and legal information

The second chapter includes information about general legal issues and safety precautions relevant in the handling of DEIF products. Furthermore, this chapter will introduce the note and warning symbols, which will be used throughout the handbook.

First part

The first part of this document describes the usage, wiring and technical data of the LAN interface.

Second part

The second part of this document describes the Modbus TCP/IP, DynDNS, DHCP and SNMP.

Last part

The second part of this document describes the web browser of the LAN interface.

2. Warnings and legal information

This chapter includes important information about general legal issues relevant in the handling of DEIF products. Furthermore, some overall safety precautions will be introduced and recommended. Finally, the highlighted notes and warnings, which will be used throughout this handbook, are presented.

Legal information and responsibility

DEIF takes no responsibility for installation. If there is any doubt about how to install or operate the product, the company responsible for the installation or the operation must be contacted.

The units are 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 or supply 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

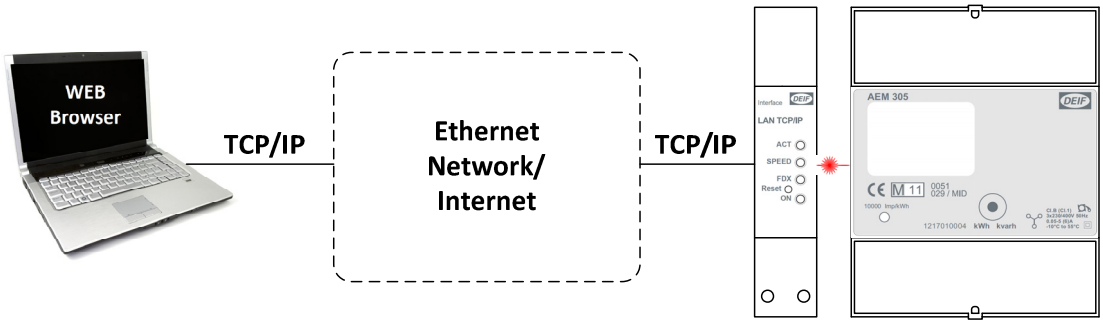
The warnings indicate a potentially dangerous situation which could result in death, personal injury or damaged equipment, if certain guidelines are not followed.

3. Preface

Overview

The product is intended to be placed side by side to an energy or power meter of its family, equipped with an Infra-Red port on the side, for the purpose of collecting the measurements data from the instrument and to access them by a web browser through a TCP/IP network or by Modbus TCP/IP. It also has an internal FTP server for direct access to the logged data..

It can be used in a local network (LAN) or a geographic network (WAN), which makes the product suitable for remote data collection via Internet. The communication interface automatically recognises the instrument connected to its infrared port and is in the position to transmit data provided by the instrument itself. The Modbus/TCP protocol provides the ability to access the measurement devices to a remote client over the network. The LAN interface also has DHCP and Dynamic DNS support.



System description

Configuration

Like all the most recent network devices, the product offers a web-based configuration interface. All the parameters that can be modified by the user can be set simply connecting to the apparatus through a normal web browser on a preset IP address. Such parameters are for instance the network parameters (IP address, subnet mask and gateway or DHCP), and general settings.

Plug and play

The interface is enabled to recognize automatically the instrument connected to its Infra-Red port. This is an advantage in terms of flexibility, because the same interface can be connected, for instance, to single-phase or three-phase energy and power meters.

Storage of the measurements

The measurements in transit from the instrument towards the TCP/IP network can be intercepted and stored inside the communication module itself, until the saturation of the space of memory available. The saturation condition depends, of course, on sampling frequency of the measurements and on the number of measurements (related to the type of energy meter connected to Infrared port, for instance single-phase or three-phase). The data can be stored in the interface and subsequently downloaded to user's PC, via web for a detailed examination. The data are stored in text format (CSV, Comma Separated Values).

Date and time

It has the capability to synchronize date and time using NTP (Network Time Protocol).

Baudrate

The pure speed of transmission is limited by the band capacity, which is 9600 baud on the IR interface.
The interface is enabled to operate in 10/100 Mbps networks

FTP Server

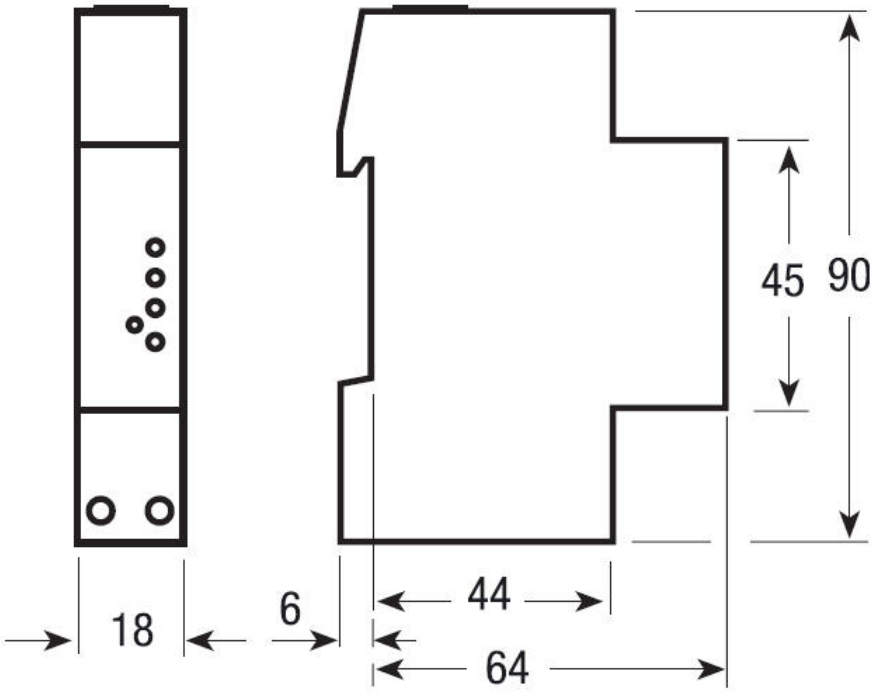
It is possible to access the logged data and real-time values by means of .csv files located in the internal storage. The FTP server provides the data, use an FTP client to retrieve them to an external location.

Modbus TCP/IP available quantities

Available quantities when connected with a single-phase counter:	**Available quantities when connected with a three-phase counter:**
Active energy imported, tariff 1	Active energy imported, tariff 1, L1
Active energy imported, tariff 2	Active energy imported, tariff 1, L2
Active energy exported, tariff 1	Active energy imported, tariff 1, L3
Active energy exported, tariff 2	Active energy imported, tariff 1, total
Active Power	Active energy imported, tariff 2, L1
Reactive energy imported, tariff 1	Active energy imported, tariff 2, L2
Reactive energy imported, tariff 2	Active energy imported, tariff 2, L3
Reactive energy exported, tariff 1	Active energy imported, tariff 2, total
Reactive energy exported, tariff 2	Active energy exported, tariff 1, L1
Reactive Power	Active energy exported, tariff 1, L2
Voltage	Active energy exported, tariff 1, L3
Current	Active energy exported, tariff 1, total
Apparent Power	Active energy exported, tariff 2, L1
Power Factor cos φ	Active energy exported, tariff 2, L2
Frequency	Active energy exported, tariff 2, L3
Tariff in use	Active energy exported, tariff 2, total
Status	Active Power L1
	Active Power L2
	Active Power L3
	Active Power total
	Reactive energy imported, tariff 1, L1
	Reactive energy imported, tariff 1, L2
	Reactive energy imported, tariff 1, L3
	Reactive energy imported, tariff 1, total
	Reactive energy imported, tariff 2, L1
	Reactive energy imported, tariff 2, L2
	Reactive energy imported, tariff 2, L3
	Reactive energy imported, tariff 2, total
	Reactive energy exported, tariff 1, L1
	Reactive energy exported, tariff 1, L2
	Reactive energy exported, tariff 1, L3
	Reactive energy exported, tariff 1, total
	Reactive energy exported, tariff 2, L1
	Reactive energy exported, tariff 2, L2
	Reactive energy exported, tariff 2, L3
	Reactive energy exported, tariff 2, total
	Reactive Power L1
	Reactive Power L2
	Reactive Power L3
	Reactive Power total
	Voltage L1-N
	Voltage L2-N

	Voltage L3-N Voltage L1-L2 Voltage L2-L3 Voltage L3-L1 Current phase1 Current phase2 Current phase3 Apparent Power phase1 Apparent Power phase2 Apparent Power phase3 Apparent Power Total Power Factor cos φ phase1 Power Factor cos φ phase2 Power Factor cos φ phase3 Frequency Tariff in use Status

4. Overall dimensions



5. Technical data

Data in compliance with IEEE 802.3 AS, IEC 60950, EN 61000-6-2, EN 61000-4-2.

General characteristics			
Housing	DIN 43880	DIN	1 module
Mounting	EN 60715	35 mm	DIN rail
Depth		mm	70
Auxiliary supply			
Auxiliary power rating		W	≤ 1.5
Auxiliary voltage rating Un		V(AC)	230
Auxiliary voltage range		V(AC)	(0.80 to 1.20)x Un
Frequency rating		Hz	50
Frequency range		Hz	45…65
Operating features			
System Start			Automatic at connection of auxiliary power
LAN Gateway data addressing			by means of IP address
Data transfer speed	LAN limited	Mbit/s	≤ 100
User interface for setup and management			
Data collection	Modbus TCP/IP		Modbus RTU Web browser
Suitable for both single-phase and three-phase meters			yes
LAN interface			
HW interface			RJ 45 connector
SW protocol			TCP/IP
Interface to Instrument			
HW interface	Optical IR	No.	2 (Tx, Rx)
SW protocol			proprietary
Safety acc. to IEC 60950			
Degree pollution			2
Overvoltage category			II
Working voltage		V	300
Clearance		mm	≥ 4.0
Creepage distance		mm	≥ 4.0
Test voltage	impulse (1.2, 50µs) peak		
	on AC power supply	kV	2.5
	on telecomm. network	kV	1.5
	50 Hz 1 min	kV	2.5
Housing material flame resistance	UL 94	class	V0
Connection terminals			
Cage type	Screw head Z±	POZIDRIV	PZ1
Terminal capacity	Solid wire min.(max)	mm²	0.15(2.5)
	Stranded wire with sleeve min.(max)	mm²	0.15(4)
Environmental conditions			
Operating temperature		°C	0...+55

Relative humidity		%	≤ 80
Limit temperature of transportation and storage		°C	-20...+70
Vibrations(sinusoidal)	5 Hz to ≤ 10 Hz constant displacement	mm	± 0.25
Protection class	Acc. to IEC 60950		II
Degree of protection	Housing when mounted		IP20

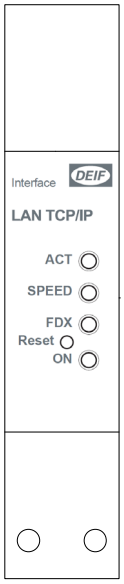
6. Front panel description

LED functionality

ACT (Yellow LED):	Blinking means link activity
SPEED (Green LED):	This LED is turned on if LAN is communicating at 100 Mbit/s, turned off if LAN is communicating at 10 Mbit/s
FDX (Yellow LED):	This LED is turned on if LAN is communicating in full-duplex, turned off if LAN is communicating in half-duplex
ON (Green LED):	Power supply is turned on

Reset pushbutton functionality

Holding the Reset pushbutton pressed for 3 seconds the FDX LED starts to blink and the network parameters are reset to factory values. Holding Reset pushbutton pressed again up to 10 seconds the FDX LED stops to blink and the administrator and user name and password are reset to factory values.



7. Modbus/TCP

The purpose of of the Modbus/TCP is to provide a direct interface between the TCP/IP network and the Modbus database that holds the data read from the measurement device connected to the LAN Interface via the Infra-Red port.

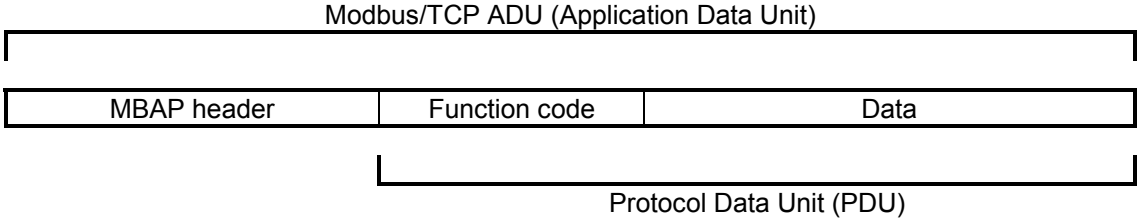
Connection management

According to the Modbus/TCP specification the LAN Interface reserves the 502 TCP port to Modbus communication. Additionally, another TCP port can be configured in the “Settings” page of the internal web site to give the possibility to the user to parameterise the Modbus port number (the 502 TCP port remains still available). The connection can be either closed after every transaction or keep open between transactions. The latter option is preferred, in accordance with the Modbus/TCP specification.

Data processing

The Modbus/TCP task in the LAN Interface/Gateway waits to receive from the TCP a Modbus/TCP Application Data Unit (ADU), check and manage the data in the MBAP header (Modbus Application Protocol header), extract the PDU and, if the function code matches with those implemented, executes the function. If the function is performed with success, the Modbus/TCP task arranges the response data, adds a correct MBAP header and replies on the TCP protocol. If the function fails, an error message conform to the Modbus protocol is sent on the TCP protocol.

Modbus/TCP packet



Modbus mode

The only supported mode of the Modbus/TPU is RTU. Modbus ASCII is not supported.

Slave addressing

On TCP/IP, the MODBUS server (the LAN Interface) is addressed using its IP address; therefore, the MODBUS Unit Identifier is useless. The value of the Unit Identifier is simply returned with the same value in the response by the LAN Interface.

Implemented functions

The interface supports only two types of commands, one for reading the register values, one for writing the configuration registers.

Read holding registers (function code 03)

This function code is used to read the contents of a contiguous block of holding registers (1 to 125 registers) in a remote device. The request frame specifies the starting register address and the number of registers.

Write single register (function code 06)

This function code is used to write a single holding register in a remote device. The request specifies the address of the register to be written. The normal response is an echo of the

request, returned after the register contents have been written.

Write multiple registers (function code 10_h)

This function code is used to write a block of continuous registers (1 to 125 registers) in a remote device. The requested written values are specified in the request data field. Data is packed as two bytes per register. The normal response returns the function code, starting address, and quantity of registers written.

Message checks

As requested by the Modbus protocol, there are three kinds of possible responses:

- If no error occurs in a properly received Modbus/TCP ADU, the data field of the response to the client contains the data requested.
- If an error is found in the MBAP header or the data length doesn't match the length field in the MBAP header, no response is sent.
- If an error is found in the PDU, a Modbus Exception Response is sent. The possible exception codes are the following:
    - 01 – Illegal function. The function code in the request is different from those managed (03, 06, 10_h).
    - 02 – Illegal data address. The request refers to an address not allowed.
    - 03 – Illegal data value. The request tries to write a value not allowed.

8. Modbus registers

The LAN interface collects the data received by the infrared port and fills an internal database that can be remotely read by the Modbus/TCP protocol.

Because of the limited size of a Modbus frame, not all the internal registers can be sent on a single reading request. This means that a complete snapshot can only be acquired performing more (three) read holding registers calls with different starting address.
Example:

poll nr. 1	**start 4099**	**nr. of registers 100**
poll nr. 2	**start 4197**	**nr. of registers 100**
poll nr. 3	**start 4297**	**nr. of registers 10**

Internal registers

This is the complete list of the internal registers.

Register Address	Designation	Three phase	Single phase	
4099	Device type	x	x	
4100	Firmware version	x	x	
4101	Range overflow alarm	x	x	
4102	Running tariff	x	x	
4104	PID (Product Identification) bytes 1 and 2	x	x	General reading registers
4105	PID – bytes 3 and 4	x	x	
4106	PID – bytes 5 and 6	x	x	
4107	PID – bytes 7 and 8	x	x	
4108	PID – bytes 9 and 10	x	x	
4109	PID – bytes 11 and 12	x	x	
4110	PID – bytes 13 and 14	x	x	
4111…4116	Not used	x	x	Writing registers
4117	Value format	x	x	
4118	Reset energy counters command	x	x	
4119…4122	Active Energy 1st phase T1, imp (kWh)	x	x	Reading quantities registers
4123…4126	Active Energy 2nd phase T1, imp (kWh)	x		
4127…4130	Active Energy 3rd phase T1, imp (kWh)	x		
4131…4134	Active Energy Σ T1, imp (kWh)	x		
4135…4138	Active Energy 1st phase T2, imp (kWh)	x	x	
4139…4142	Active Energy 2nd phase T2, imp (kWh)	x		
4143…4146	Active Energy 3rd phase T2, imp (kWh)	x		
4147…4150	Active Energy Σ T2, imp (kWh)	x		
4151…4152	Active Power 1st phase (kW)	x	x	
4153…4154	Active Power 2nd phase (kW)	x		
4155…4156	Active Power 3rd phase (kW)	x		
4157…4160	Active Power Σ (kW)	x		
4161…4164	Active Energy 1st phase T1, exp. (kWh)	x	x	
4165…4168	Active Energy 2nd phase T1, exp. (kWh)	x		
4169…4172	Active Energy 3rd phase T1, exp. (kWh)	x		
4173…4176	Active Energy Σ T1, exp. (kWh)	x		
4177…4180	Active Energy 1st phase T2, exp. (kWh)	x	x	
4181…4184	Active Energy 2nd phase T2, exp. (kWh)	x		
4185…4188	Active Energy 3rd phase T2, exp. (kWh)	x		
4189…4192	Active Energy Σ T2, exp. (kWh)	x		
4193…4196	Reactive Energy 1st phase T1, imp (kVArh)	x	x	
4197…4200	Reactive Energy 2nd phase T1, imp (kVArh)	x		
4201…4204	Reactive Energy 3rd phase T1, imp (kVArh)	x		
4205…4208	Reactive Energy Σ T1, imp (kVArh)	x		
4209…4212	Reactive Energy 1st phase T2, imp (kVArh)	x	x	
4213…4216	Reactive Energy 2nd phase T2, imp (kVArh)	x		
4217…4220	Reactive Energy 3rd phase T2, imp (kVArh)	x		
4221…4224	Reactive Energy Σ T2, imp (kVArh)	x		
4225…4228	Reactive Energy 1st phase T1, exp (kVArh)	x	x	
4229…4232	Reactive Energy 2nd phase T1, exp (kVArh)	x		
4233…4236	Reactive Energy 3rd phase T1, exp (kVArh)	x		
4237…4240	Reactive Energy Σ T1, exp (kVArh)	x		
4241…4244	Reactive Energy 1st phase T2, exp. (kVArh)	x	x	
4245…4248	Reactive Energy 2nd phase T2, exp. (kVArh)	x		

4249…4252	Reactive Energy 3rd phase T2, exp. (kVArh)	x	
4253…4256	Reactive Energy Σ T2, exp. (kVArh)	x	
4257…4258	Reactive Power 1st phase (kVAr)	x	x
4259…4260	Reactive Power 2nd phase (kVAr)	x	
4261…4262	Reactive Power 3rd phase (kVAr)	x	
4263…4266	Reactive Power Σ (kVAr)	x	
4267…4268	Voltage L1-N (V)	x	x
4269…4270	Voltage L2-N (V)	x	
4271…4272	Voltage L3-N (V)	x	
4273…4274	Voltage L1-L2 (V)	x	
4275…4276	Voltage L2-L3 (V)	x	
4277…4278	Voltage L3-L1 (V)	x	
4279…4280	Phase1 current (A)	x	x
4281…4282	Phase2 current (A)	x	
4283…4284	Phase3 current (A)	x	
4285…4286	Apparent Power phase1 (kVA)	x	x
4287…4288	Apparent Power phase2 (kVA)	x	
4289…4290	Apparent Power phase3 (kVA)	x	
4291…4294	Apparent Power Σ (kVA)	x	
4295…4296	Power Factor cos φ phase1	x	x
4297…4298	Power Factor cos φ phase2	x	
4299…4300	Power Factor cos φ phase3	x	
4301…4302	Power Factor cos φ Σ	x	
4303…4304	Frequency (Hz)	x	x

Interface and counter types

Depending on the type of counter connected to the LAN interface, you have a different set of registers at your disposal.

In the table above, you can see four columns where all the possible combinations are listed:

AEM 380/305
APM 380/305 — Three-phase counter and LAN interface; energy and power quantities on all phases.

AEM 180 — Single-phase counter and LAN interface; energy and power quantities on a single phase.

Anyway, all the registers can always be read but if you try to access a register not supported in the combination counter-interface shown above, you will get a value of 0.

Example: If you try to read the register 4231 (Active Energy Σ T1, imp (kWh)) when you have a single-phase counter and a LAN interface, you will always get a value of 0.

General reading registers

This family of registers store general information about the interface.
All the registers are always available regardless to the counter you have.

Register	Designation	Description
4099	Device type	Code that identify the combination interface counter 0 No communication with the counter on the IR port 2 Three-phase basic 4 Single-phase basic
4100	Firmware version	Version of the interface firmware
4101	Range overflow alarm	The register is set by the counter if it has detected a value over the voltage or the current nominal threshold. The lowest order byte of the register is bit-coded as follows: N.U.|N.U|OFV3|OFI3|OFV2|OFI2|OFV1|OFI1 Where: OFV Voltage overflow (on phase 1, 2 and 3) OFI Current overflow (on phase 1, 2 and 3) N.U. Not Used
4102…4103	Running tariff	0 Tariff 1 is currently in use 1 Tariff 2 is currently in use
4104…4110	PID	Part number identification string (a maximum of 14 bytes)

Writing registers

This set of registers is for the interface configuration. One register (4118) is dedicated to request the reset of the counters internal energy registers.
All the registers are always available regardless to the counter you have.

Any change to the registers 4117 and 4118 is immediately effective.

Register	Designation	Description	
4117	Value format	0	Quantities coded as floating point 32 bit (low byte first)
		1	Quantities coded as integers
4118	Reset energy counters command	1	Reset active energy registers
		2	Reset reactive energy registers
		3	Reset all the registers

Variables format
Depending on the value of the register 4117, the values can be read in two different formats:

- As single precision floating point, conform to IEEE 754 standard (reg. 4117 = 0). In this case a value fills two contiguous registers (lower address = MSB); for values with size = 4 registers, the value occupies the first and second register, the third and fourth are read as zero.
- As one or two 32 bit integer (reg. 4117 = 1). For values with size = 2 registers, the value of the integer stored in two contiguous registers (lower address = MSB) must be divided by a factor of 10000 to rebuild the original value. For values with size = 4 registers, the value of the integer stored in the first two registers must be multiplied by a factor of 10^9 (1000000000); then it must be added to the value of the integer stored in the following two registers; finally, the result must be divided by 10000.

The register 4118, is a "pass-through" register because the final target of the command is the counter connected to the interface. If you change the register value, a command will be given to the counter in order to call a reset of the counter internal registers.
All the other writing registers modify the interface behaviour.

Reading quantities

These registers hold the electrical quantities controlled by the counter connected to the interface. As stated in internal registers, the available quantities depend on the combination counter/interface you have. Three-phase counter/LAN interface or single-phase counter/LAN interface.

Register address	Designation	Three phase	Single phase	Size
4119…4122	Active Energy 1st phase T1, imp. (kWh)	x	x	4
4123…4126	Active Energy 2nd phase T1, imp. (kWh)	x		4
4127…4130	Active Energy 3rd phase T1, imp. (kWh)	x		4
4131…4134	Active Energy Σ T1, imp. (kWh)	x		4
4135…4138	Active Energy 1st phase T2, imp. (kWh)	x	x	4
4139…4142	Active Energy 2nd phase T2, imp. (kWh)	x		4
4143…4146	Active Energy 3rd phase T2, imp. (kWh)	x		4
4147…4150	Active Energy Σ T2, imp. (kWh)	x		4
4151…4152	Active Power 1st phase (kW)	x	x	2
4153…4154	Active Power 2nd phase (kW)	x		2
4155…4156	Active Power 3rd phase (kW)	x		2
4157…4160	Active Power Σ (kW)	x		4
4161…4164	Active Energy 1st phase T1, exp. (kWh)	x	x	4
4165…4168	Active Energy 2nd phase T1, exp. (kWh)	x		4
4169…4172	Active Energy 3rd phase T1, exp. (kWh)	x		4
4173…4176	Active Energy Σ T1, exp. (kWh)	x		4
4177…4180	Active Energy 1st phase T2, exp. (kWh)	x	x	4
4181…4184	Active Energy 2nd phase T2, exp. (kWh)	x		4
4185…4188	Active Energy 3rd phase T2, exp. (kWh)	x		4
4189…4192	Active Energy Σ T2, exp. (kWh)	x		4
4193…4196	Reactive Energy 1st phase T1, imp. (kVArh)	x	x	4
4197…4200	Reactive Energy 2nd phase T1, imp. (kVArh)	x		4
4201…4204	Reactive Energy 3rd phase T1, imp. (kVArh)	x		4
4205…4208	Reactive Energy Σ T1, imp. (kVArh)	x		4
4209…4212	Reactive Energy 1st phase T2, imp. (kVArh)	x	x	4
4213…4216	Reactive Energy 2nd phase T2, imp. (kVArh)	x		4
4217…4220	Reactive Energy 3rd phase T2, imp. (kVArh)	x		4
4221…4224	Reactive Energy Σ T2, imp. (kVArh)	x		4
4225…4228	Reactive Energy 1st phase T1, exp. (kVArh)	x	x	4
4229…4232	Reactive Energy 2nd phase T1, exp. (kVArh)	x		4
4233…4236	Reactive Energy 3rd phase T1, exp. (kVArh)	x		4
4237…4240	Reactive Energy Σ T1, exp. (kVArh)	x		4
4241…4244	Reactive Energy 1st phase T2, exp. (kVArh)	x	x	4
4245…4248	Reactive Energy 2nd phase T2, exp. (kVArh)	x		4
4249…4252	Reactive Energy 3rd phase T2, exp. (kVArh)	x		4
4253…4256	Reactive Energy Σ T2, exp. (kVArh)	x		4
4257…4258	Reactive Power 1st phase (kVAr)	x	x	2
4259…4260	Reactive Power 2nd phase (kVAr)	x		2

4261…4262	Reactive Power 3rd phase (kVAr)	x		2
4263…4266	Reactive Power Σ (kVAr)	x		4
4267…4268	Voltage L1-N (V)	x	x	2
4269…4270	Voltage L2-N (V)	x		2
4271…4272	Voltage L3-N (V)	x		2
4273…4274	Voltage L1-L2 (V)	x		2
4275…4276	Voltage L2-L3 (V)	x		2
4277…4278	Voltage L3-L1 (V)	x		2
4279…4280	Phase1 current (A)	x	x	2
4281…4282	Phase2 current (A)	x		2
4283…4284	Phase3 current (A)	x		2
4285…4286	Apparent Power phase1 (kVA)	x	x	2
4287…4288	Apparent Power phase2 (kVA)	x		2
4289…4290	Apparent Power phase3 (kVA)	x		2
4291…4294	Apparent Power Σ (kVA)	x		4
4295…4296	Power Factor cos φ phase1	x	x	2
4297…4298	Power Factor cos φ phase2	x		2
4299…4300	Power Factor cos φ phase3	x		2
4301…4302	Power Factor cos φ Σ	x		2
4303…4304	Frequency (Hz)	x	x	2

T1/T2 stands for Tariff 1 and tariff 2.
The symbol Σ indicates a total amount (for example: the reactive power Σ (kVAr) value is the total reactive power on the three phases. It is of course significant only if you have a three-phase counter connected to the interface).

Imp./exp. (imported/exported) indicates whether the energy is generated (exported) or consumed (imported).

Note that because a Modbus register is 2 bytes long, all the quantities are split on more registers (4 bytes: 2 registers; 8 bytes: 4 registers).

Notice: With this configuration (register 4117=0), all the quantities are coded as 32 bit floating point values. For each register, the first byte contains the low order bits and the second contains the high order bits. If you want to switch to an integer representation, you have to change the value of the configuration register 4117 to 1 (see writing registers).

Quantities coded as Integer values

While the notation using floating point 32 bit values is unambiguous, when you switch to the integer notation, something must be explained in order to allow the correct interpretation of original value.

Quantities 4 bytes long

The integer value stored in these registers (2) must be divided by a factor of 10000 to rebuild the original value.

Example:
Active Power 1st phase
Integer value: 122447
Original value: 122447/10000=12.2447 (kW)

Quantities 8 bytes long

The rebuilding of the original value is slightly more complicated.
The value stored in the first four bytes must be multiplied by a factor of 10^9 (1000000000).
Then it must be added to the value stored in the following four bytes.
Finally, the result must be divided by 10000.
Example: Active Power total
Integer value (most significant 4 bytes): 12344
Integer value (less significant 4 bytes): 765532
Original value: (12344*1000000000+765532)/10000=1234400076.5532 (kW)

9. DHCP

In order to allow greater flexibility in network management, the DHCP (Dynamic Host Configuration Protocol) is added to the TCP/IP suite. DHCP allows the LAN Interface to be configured automatically, eliminating the need for intervention by a network administrator.
When a DHCP-enabled LAN Interface connects to a network, it (as DHCP client) sends a broadcast query requesting necessary information from a DHCP server. The DHCP server manages a pool of IP addresses and information about client configuration parameters. On receiving a valid request, the server assigns the LAN Interface an IP address, a lease (length of time the allocation is valid), and other IP configuration parameters

Parameters

The choice whether to use DHCP or fixed IP address is made in the "Settings" page of the internal web site, where the item “IP Configuration” has two options: “Fixed IP” and “Use DHCP”, selecting "DHCP" fields "IP Address", “Subnet Mask” and “Gateway” are grayed out.

10. Dynamic DNS

Dynamic DNS is a service which allows users to have a sub domain that point to a node with regularly changing IP addresses, such as those served by many consumer-level internet service providers. The use of dynamic DNS allows the LAN interface to be accessible to other nodes on the internet while not owning a static address, such as using DHCP. An update client built into the LAN interface keeps the hostname up to date with its current IP address.

Dynamic DNS providers

There are several institutions that provide a dynamic DNS service, but with different and incompatible update algorithms. The LAN interface allows choosing between three providers, which provide dynamic DNS services both free and paid:

- dyndns.org
- zoneedit.com
- no-ip.com

Update

To manage the upgrade of its DNS record, the LAN interface must monitor its IP address and, if there are changes, send an update request to the provider. This task is automatic and completely transparent to the user.

Parameters

In the "Settings" page of the internal website, the box “services” has the item “Dynamic DNS”. Clicking the button “Set” opens a page related to the dynamic DNS. This page provides some items needed by the DynDNS service:

- Activation of the service, to enable/disable the agent
- If the service is active, current status of the agent and IP address currently accessible on the internet
- Provider of the service, selectable from the options above (see §**Error! Reference source not found.**)
- Host name (the name associated with the LAN interface, which must be set in your browser to access it)
- Username (required by the update algorithm to authenticate the LAN interface)
- Password (required by the update algorithm to authenticate the LAN interface)

11. FTP server

The internal FTP server gives the possibility to access the logged data and also the real-time values in stored .csv files.

Logic and filenames are as follows:

Logged data file.

- exp00dec.csv – German speaking comments, comma separator
- exp00ded.csv – German speaking comments, dot separator
- exp00itc.csv – Italian speaking comments, comma separator
- exp00itd.csv – Italian speaking comments, dot separator
- exp00ukc.csv – English speaking comments, comma separator
- exp00ukd.csv – English speaking comments, dot separator

Real-time data file.

- rtm00dec.csv – German speaking comments, comma separator
- rtm00ded.csv – German speaking comments, dot separator
- rtm00itc.csv – Italian speaking comments, comma separator
- rtm00itd.csv – Italian speaking comments, dot separator
- rtm00ukc.csv – English speaking comments, comma separator
- rtm00ukd.csv – English speaking comments, dot separator

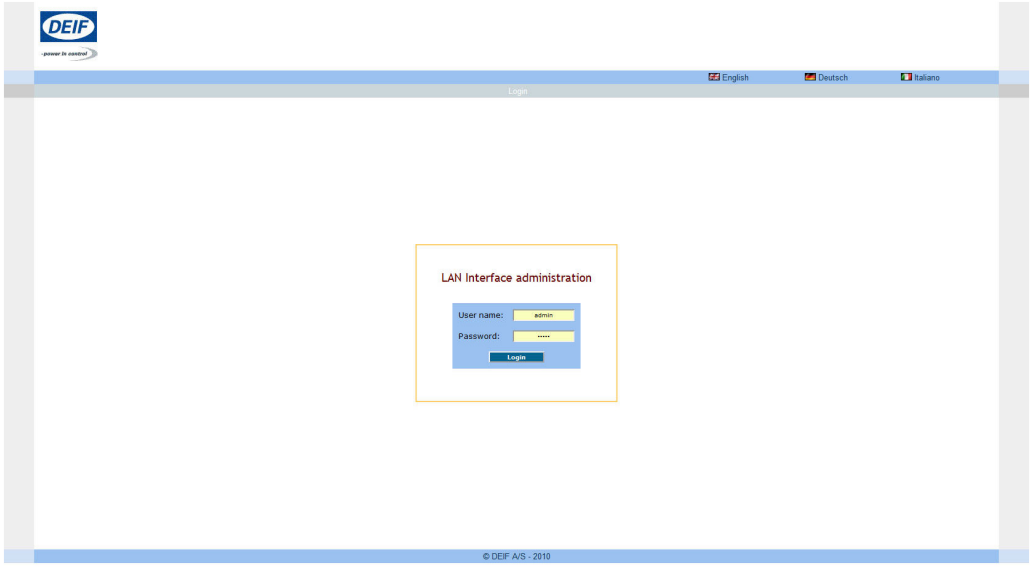
Note: Loads a real-time snapshot of the measures like the "Export instantaneous values" command in the Readings page of the web server.

User name and password to access the FTP server are the same as the ones for logging into the web server, both admin and user logins can be used for access.

12. Web browser

Log-in page

After entering the correct IP address (default: 192.168.1.253), the following page should appear:



At the first connection, use the following combination:

User Name: **admin**
Password: **admin**

both lowercase.

As we shall see in the next pages, it is possible to modify the user name and the password (2 available combinations, one for the administrator and one for the user is available, with different access privileges).

Once user name and password are entered, push **Login**, and you will enter into the index page.

In this document, we will describe the pages in English language. German and Italian languages are available, with the same meaning and functions. To switch to German or Italian, it is enough to push the corresponding national flag on the upper right side of the window which is possible in all views.

Index page

The page available after login:

This page shows all the possible choices with a short description.

The page appearance is the same for a login as “administrator” or as “user”, but for a “user” login, the settings and user’s options are disabled, so selecting these options has no effect.

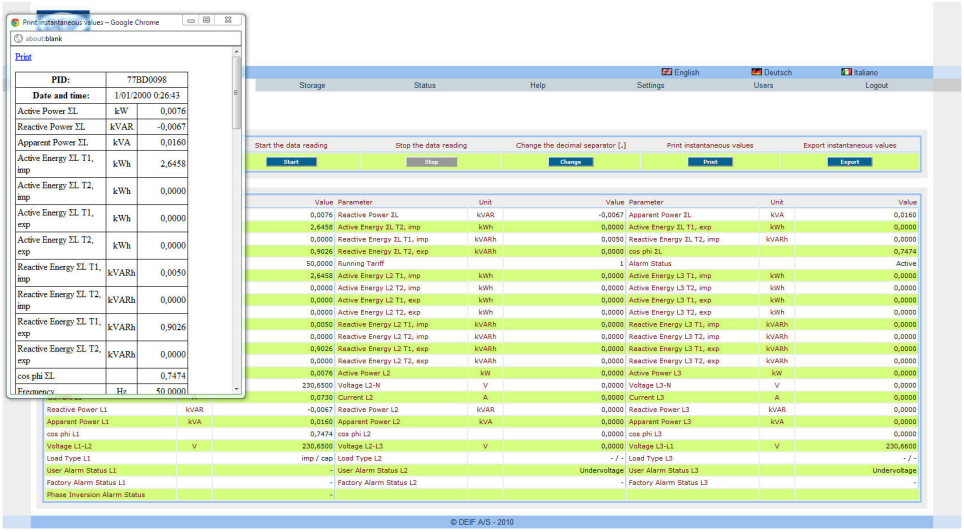
Readings

In the readings page, a complete list of the instrument data values are shown.

Through **Start** button, data begin to flow in real time (with a refresh time of ~5 seconds). **Stop** button stops the real time refresh, freezing the actual display.

It is possible to toggle the decimal separator, dot (.) or comma (,), by pushing the **Change** button.

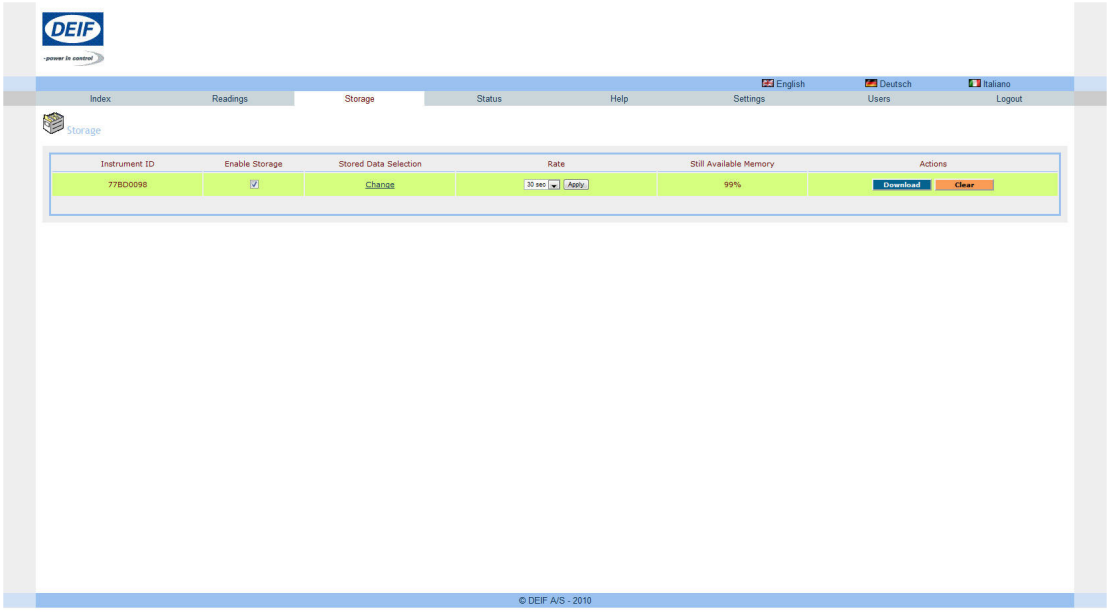
The **Print** function opens a window with a printer-compatible version of the page, pushing the "**print**" link you can send it to the default printer.



Export function lets you send instant data to a .csv file that you can open or save.

Storage

In the storage page, it is possible to manage the data storage in a non-volatile internal memory.



You can enable the storage of data read from the instrument selecting the Enable Storage checkbox to begin the process. The sampling rate can be changed selecting the proper rate and pushing the **Apply** button.

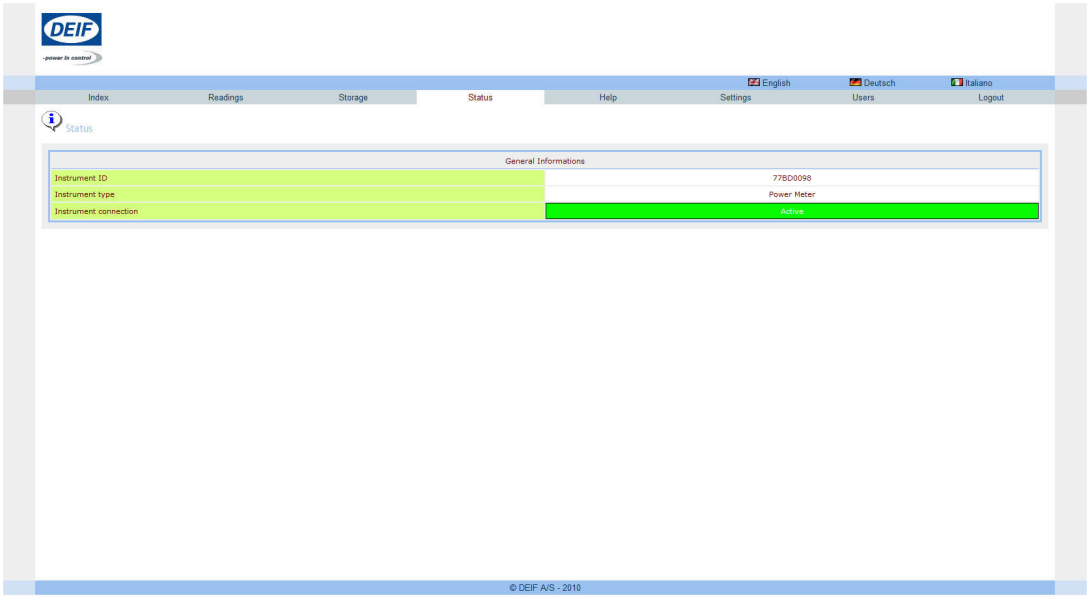
Download is for exporting stored data to a .csv file.
Clear deletes all the stored data.

The **Change** button opens a page to choose what kind of data you want to store:

In this page, for every item in the readings page, a checkbox allows to include or not this parameter in the stored data.
The **Select All** button marks as selected all the checkboxes, the **Deselect All** button marks as not selected all the checkboxes. **Accept** makes the settings effective, **Cancel** returns to the storage page without changes.

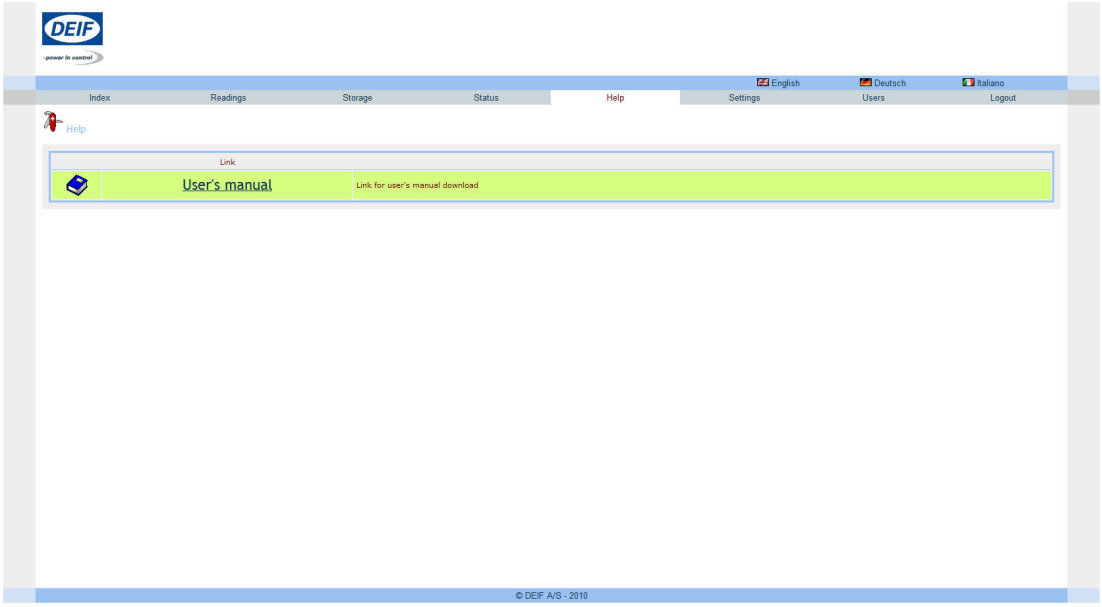
Status

This page shows some general information about the connected instrument, the status of the connection is displayed in real time.



Help

This page contains a link to an external site where the user's manual is available for download.



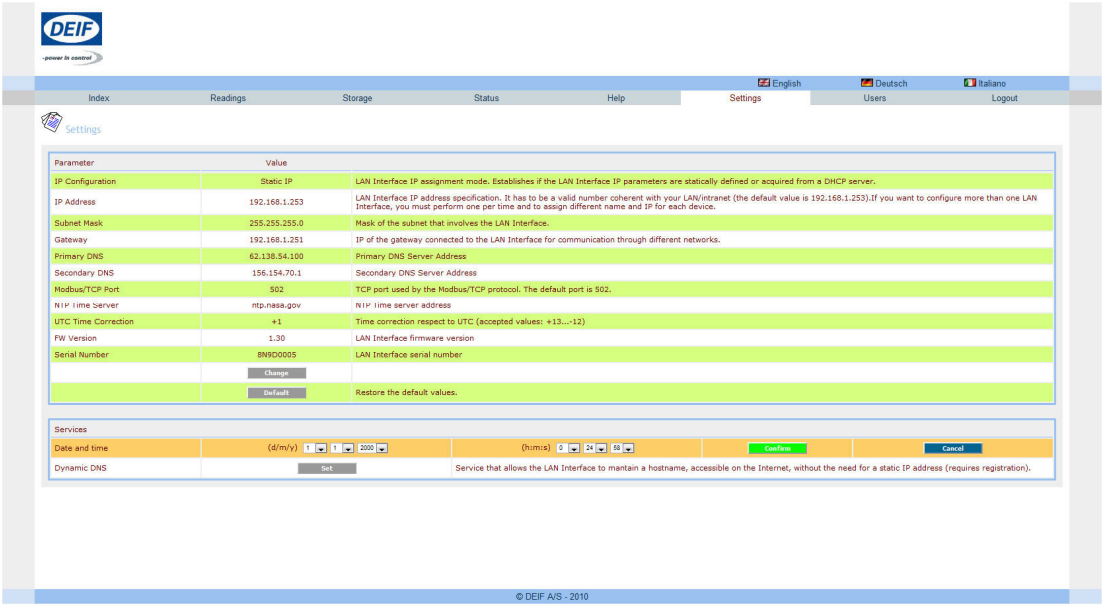
Settings

This page is available just for administrator.
Settings can be modified in order to adapt to the network in use.

Push the **Change** button in the upper box to set the network parameters. Push the **Default** button to reset all the parameters to factory values. Push the **Change** button in the lower box to set the internal date and time (needed only if a NTP server cannot be reached). **Set** will open a new page for setting the dynamic DNS server.

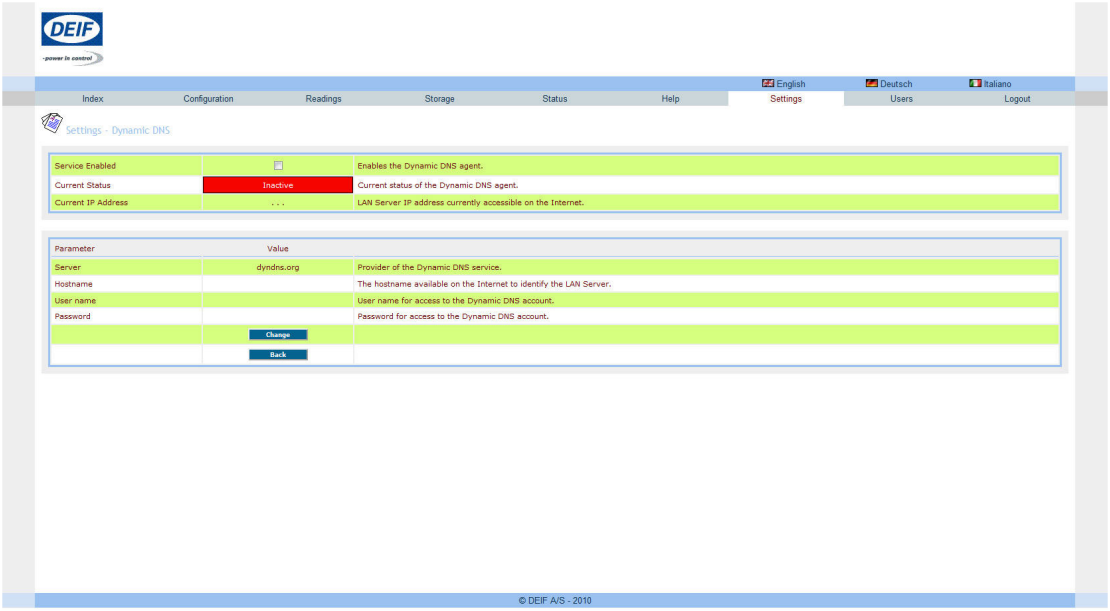
If you choose to set the network parameters, the page changes as follow:

If you choose to set date and time, the page changes as follow:



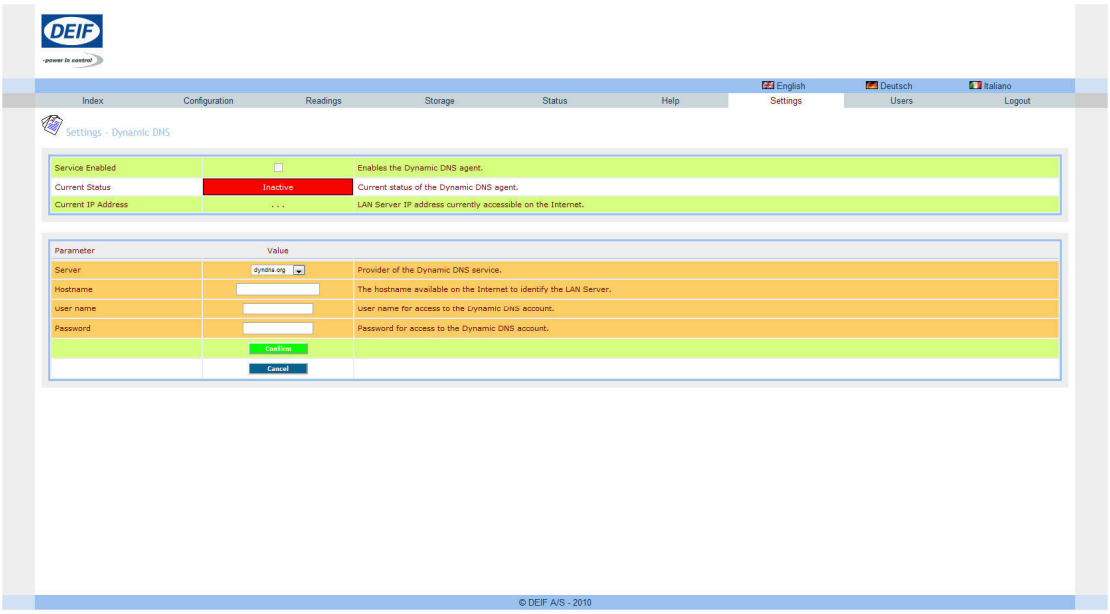
In both pages, when finished, push **Confirm** to make the settings effective, push **Cancel** to return to the settings page without changes

If you choose **Set,** the page changes to the Dynamic DNS page as follow:



Push **Change** to change the dynamic DNS settings, push **Back** to return to the settings page.

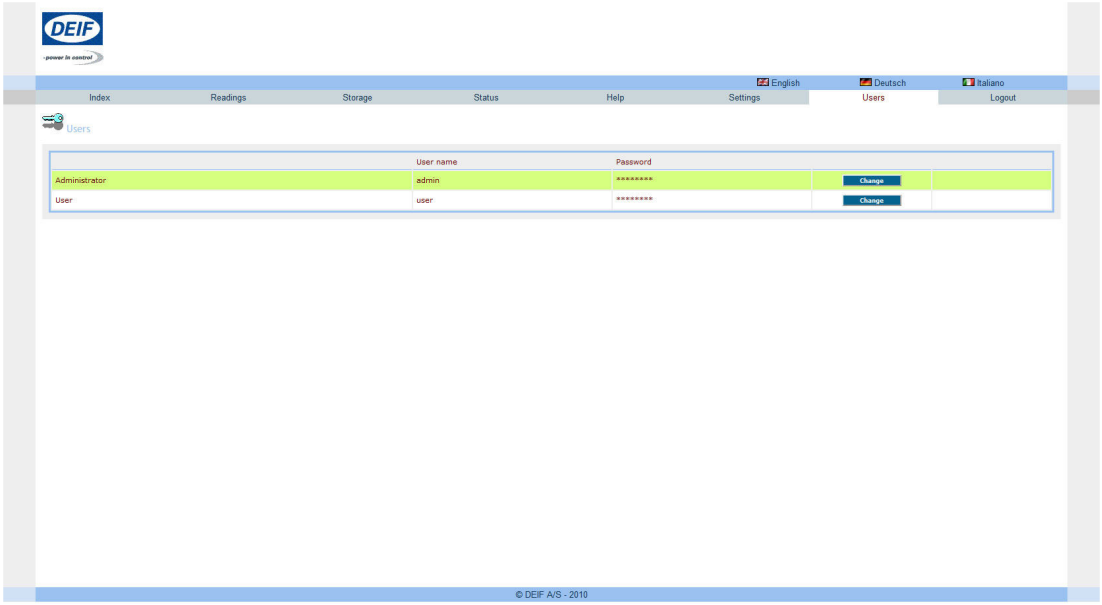
If you choose to set the dynamic DNS, the page changes as follow:



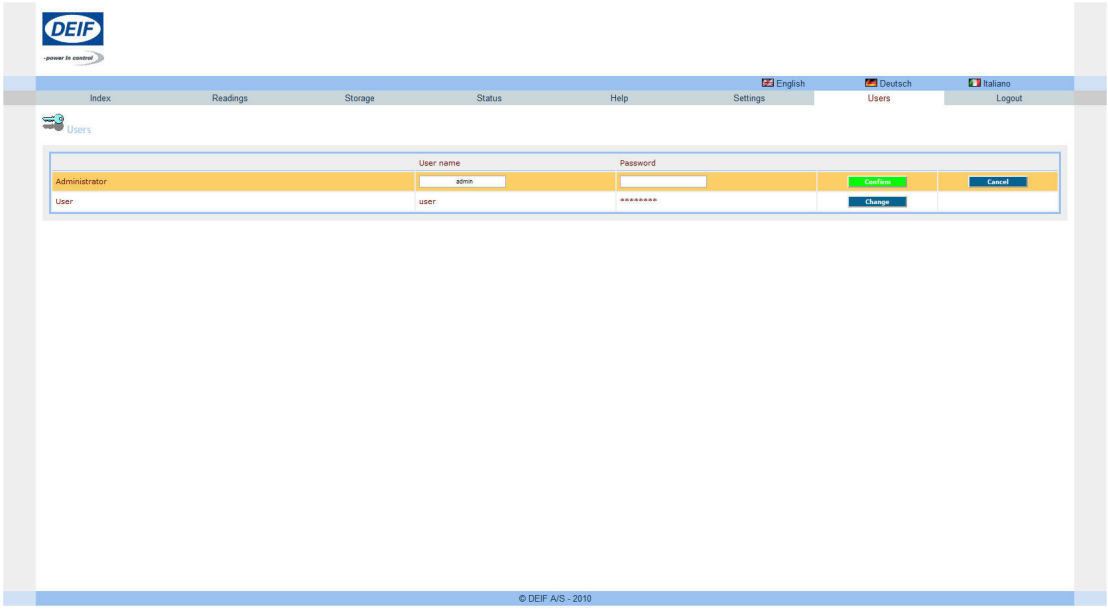
When finished, push **Confirm** to make the settings effective, push **Cancel** to return to the dynamic DNS page without changes.

Users

This page is available just for administrator. From this page is possible to change name and password for user and administrator.



Push the **Change** button near the item you want to modify. The page changes as follow (e.g.: for administrator):



Push **Confirm** to make the settings effective, push **Cancel** to return to the user's page without changes

DEIF A/S reserves the right to change any of the above.