Sontex

Manual

Superstatic 470/479 SPF

Revision

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Contents

1. General

1.1 Introduction

This instruction describes the operation and installation of the Superstatic 470 SPF and 479 SPF, together with the technical data and specifications for the Superstatic 470/479 SPF.
The static flow sensor and the computing unit may only be operated within the range of conditions shown on the rating plate and in the technical specification. In the event of failure to comply with these criteria, all liability of the manufacturer is excluded.
Seals may only be removed by authorised persons, if at all. If these conditions are not respected the works guarantee expires and the manufacturer is no longer liable for calibration.
The cable between the flow sensor and the computing unit, together with the cable for the temperature sensors, may not be shortened or modified in any way whatever.

Notes on installation of the meter:
Comply with conditions of use as defined in Directive 2004/22/EC (MID) and correct installation positions

For further information about the installation instructions for the Superstatic 470/479, see document entitled "***Installation guidelines Static Heat Meter Superstatic 440/449***".

1.2 Application area of Superstatic 470/479

The Superstatic 470/479 enables the Seasonal Performance Factor (SPF) of a heat pump to be measured and its power determined. The performance factor is equivalent to the ratio between the delivered heat capacity or useful energy and the electrical energy absorbed during a given lapse of time. The measured values for the performance factors are shown on the Superstatic 470/479 display and can be read out via the M-Bus Communication Interface incorporated into the heat pump-module.

Electric energy

Useful energy
and hot water

Environmental heat
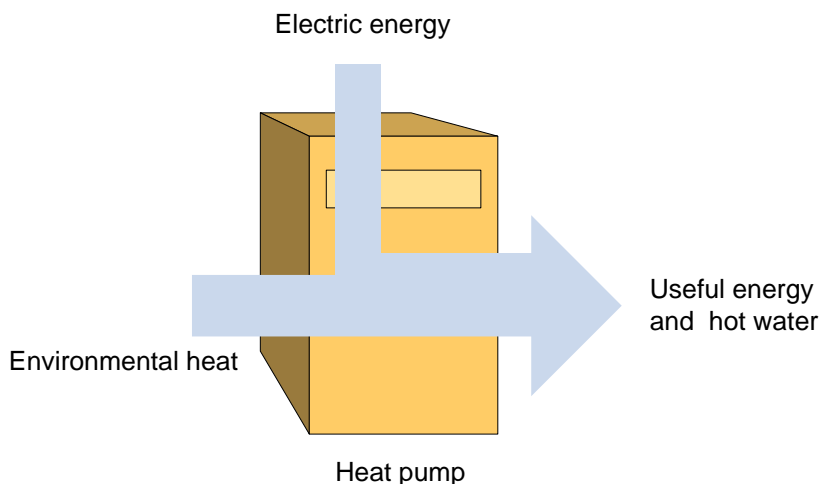
Heat pump

2. Instructions for installation

2.1 Communication interface

The Superstatic 470/479 contains a heat pump-Module, i.e. an additional double module with an M-Bus output, four configurable non-galvanically separated digital inputs and a temperature sensor input (not operational at present).
The main connection board of the computer unit has two additional inputs.
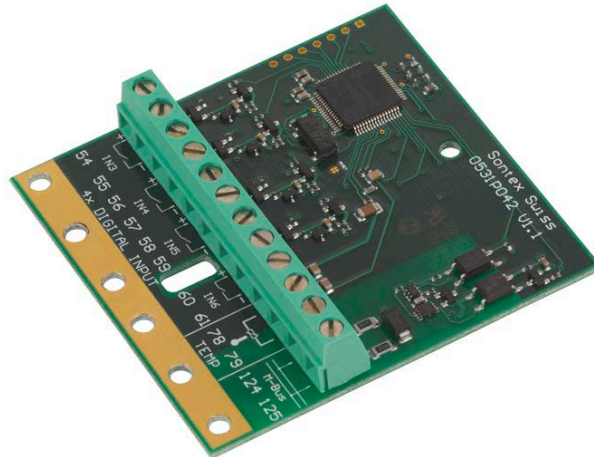
Heat pump module

2.2 Safety notes

Before using the Superstatic 470/479, avoid electrostatic discharges during fitting or use. Before touching the computing unit or the heat pump module, you are advised to touch an earthing source (e.g. a water pipe or a hot water pipe) to effect an electrical discharge from your own person.

2.3 Recognition of the heat pump module

By means of the Prog470/Prog479 software the configuration of the Superstatic 470/479 and the parameterisation of the inputs used for calculation of the performance factors can be detected and displayed.

2.3.1 Recognition of the heat pump module with the SW Prog470/479

The Prog470/479 software allows the recognition of the heat pump module and provides the following information:
- Firmware version of the heat pump module
- Configuration of the M-Bus interface
- Configuration of the four digital inputs

If the software has detected the heat pump module, the following parameters can be configured:
M-Bus interface:
- Transmission speed
- Primary address
- Identification number
- Reaction time
- Parity
Digital inputs:
- Counting type: deactivated/pulse counting/Operating time counting/Time factor for each digital input
- Determination of the units
- Pulse factor value

All the parameterization and read -out functions of the Superstatic 470/479 computing unit are identical to the functions of the Supercal 531/Prog531 computing unit.

Note: The Firmware version of the Superstatic 470/479 computing unit must be higher than V10.0.0.0.

The arrows on the LCD display symbolize the outgoing/incoming communication.

Communication sortante
Communication entrante
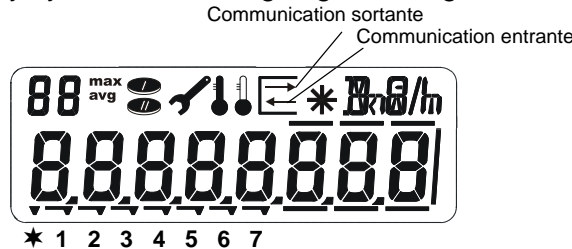
2.4 Differences between SPF1, SPF2, SPF3

Three different performance factors can be measured and displayed using the Superstatic 470/479.

The SPF1 value displays the performance factor of the heat pump over a particular period of time. The SPF1 can be equated with a seasonal performance factor (COPA). The value of the previous period is stored and can be displayed.

The value SPF2 shows the performance factor of the heat pump since its initial commissioning. The SPF2 is never reset.

The SPF3 value shows the performance factor of the heat pump in an event period of one day. The SPF3 is reset daily at midnight. An overview of the past 31 days can be shown on the display.

Each current meter of the heat pump can be connected to the heat pump module to enable the electrical energy absorbed by the whole facility to be determined.
Example of configuration:
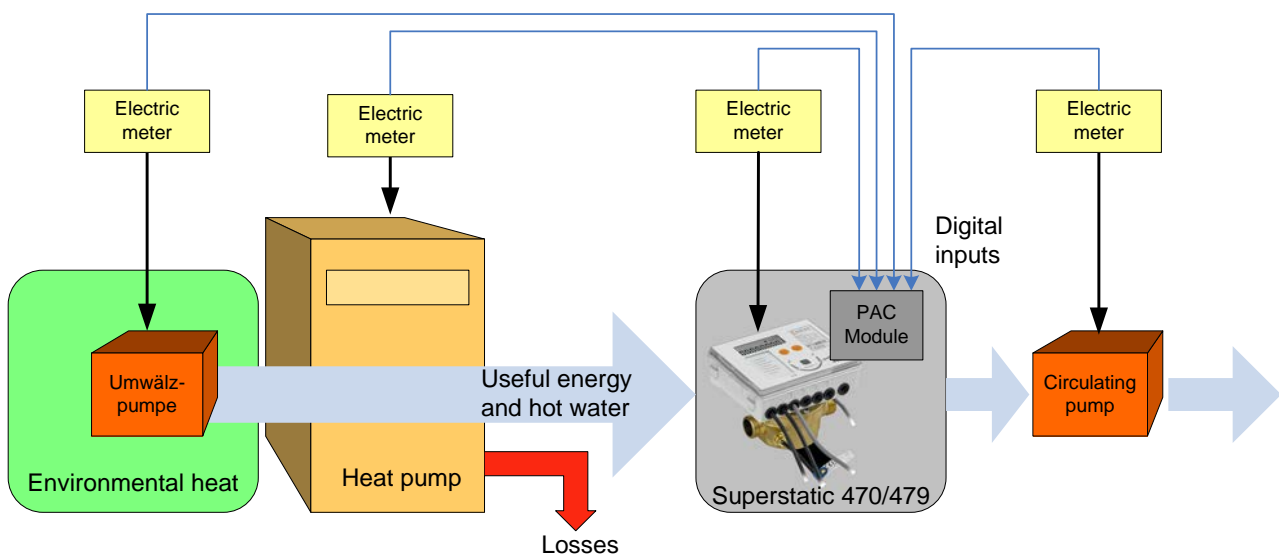
3. Functional description

3.1 Supply and safety

The Superstatic 470/479 must be operated with a mains power voltage of 230/90 VAC or 24 V AC/DC.
A battery supply is not permitted.
Please respect the following notes.

3.1.1 Power supply modules

The mains power module 230/90 VAC – 45/60 Hz is to be protected by an (inert) 1AT fuse.

Electrical connection of the power supply modules
The electrical connection is to be established by a qualified person in compliance with the valid standards and having regard to local safety requirements. The mains power line is to be laid in such a way that no hot parts (pipes etc. above 80 °C) may damage its insulation. The electrical connections must not come into contact with water.

3.1.2 Safety instructions

The Superstatic 470/479 has been manufactured and tested in compliance with safety standard EN60950 and was perfectly safe at the time of dispatch from the factory. To maintain that condition and ensure safe operation of the appliance the user must comply with the instructions set out in this document. When opening covers or removing components parts which carry voltage may be exposed. All interventions and repairs must therefore be performed by a specially trained and authorised professional. If the housing and/or the connection cable are damaged the power supply module must be disconnected and secured against accidental re-starting. In general, an installation situation with above average heat accumulation must be avoided. Above average heat accumulation is prejudicial to the service life of the electronic components.
For protection against damage and dirt, the packaging should not be removed until immediately before installation.
For cleaning purposes use only a cloth moistened with water. Do not use cleaning fluids or solvents.
The connection cables must not be secured to the pipe and under no circumstances may they be insulated.
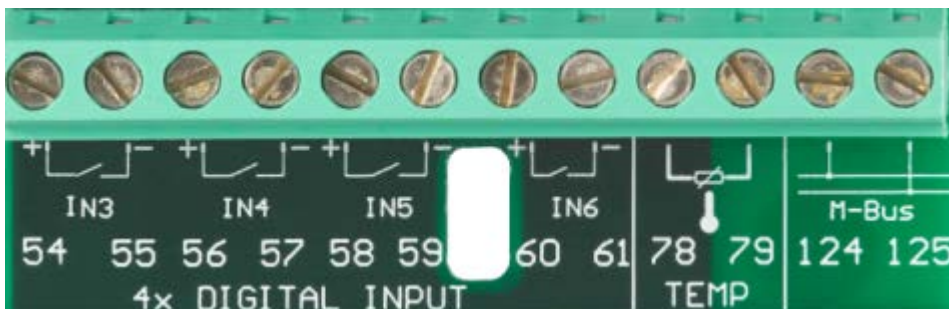
3.2 Cable connections

Before connecting, remove the upper part of the computing unit. Effect the connections as follows:

3.2.1 Main connection board of the computing unit

Terminal	Type of connection
1,2	Hot temperature sensor, twin conductor technology
1,2 and 5,6	Heat sensor, four conductor technology
3,4	Hot temperature sensor, twin conductor technology
3,4 and 7,8	Hot sensor, four conductor technology
10	(+) pulse input flow sensor 440/449 (white cable)
11	(-) pulse input flow sensor 440/449 (green cable)
9	(3.6 V) supply flow sensor 440/449 (brown cable)
50	(+) pulse input, additional meter 1
51	(-) pulse input, additional meter 1
52	(+) pulse input, additional meter 2
53	(-) pulse input, additional meter 2
16	(+) Open-Collector-Output 1
17	(-) Open-Collector-Outputs 1 + 2
18	(+) Open-Collector-Output 2
24	M-Bus (module fitted ex-works), connect nothing on top!
25	M-Bus (module fitted ex-works), connect nothing on top!

3.2.2 Heat pump Module

Terminal	Type of connection
124,125	M-Bus
54,55	(+,-) pulse input, additional meter IN3
56,57	(+,-) pulse input, additional meter IN4
58,59	(+,-) pulse input, additional meter IN5
60,61	(+,-) pulse input, additional meter IN6
78,79	Temperature sensor optional

Important: the screened cables must generally be earthed with the tension relief

Earthing
Make sure that all the earthing connection points (external power supply) of the system are equipotential.

Voltage supply modules
The voltage supply module is connected by means of a cable to the main connection board of the Superstatic 470/479 computing unit.

3.3 Error messages

The Superstatic 470/479 computing unit displays a fault message by means of the three letter "Err" and a code. If several codes occur simultaneously, the numbers of the fault reports are added together:
if a fault occurs it is detected and displayed as long as it is present. When the fault disappears the fault report is deleted and the normal display appears again.

3.3.1 List of error messages

Err1	The hot temperature sensor is open or short-circuited.
Err2	The cold temperature sensor is open or short-circuited.
⬦⬦	The temperature sensors have been inverted or the temperature in the cold line is higher than in the hot line.
Err4	Flow too high.
Err8	EEPROM fault in the upper part (relevant to the measurement) (active only after the second time).
Err16	EEPROM error in the lower part (terminal strip) (active only after the second time).
Err32	EEPROM configuration error in the upper part (relevant to the measurement).
Err64	EEPROM configuration error in the lower part (terminal strip)
Err128	Internal electronic fault, back to the manufacturer
Err256	Voltage failure (power supply module)
Err512	Defective module plug location 1
Err1024	Defective module plug location 2
Err2048	Flow error at additional input A1
Err4096	Flow error at additional input A2
Err8192	Internal electronic fault, back to the manufacturer
Crc err	EEPROM configuration fault (from firmware V4.2)
Conf err	Incoherent configuration (from firmware V4.2)

If a fault continues for more than one hour, it is recorded in the fault memory (EEPROM) with the date and time (start of fault) and duration (in minutes).
If a fault lasts for less than 60 minutes, it is automatically deleted without being memorised.
The fault reports disappear automatically from the display 60 seconds after the fault has ended.

Note on disposal
The Superstatic 470/479 must be discarded in an environmentally-friendly way or returned to the manufacturer for disposal. Our components are then compliant with the criteria governing electronic waste. If you effect disposal yourself please enquire about recycling possibilities in your particular region.

4. Use of the Superstatic 470/479

4.1 Communication protocol

For communication purposes, the Superstatic 470/479 uses the M-Bus Protocol compliant with European standard EN13757-3.
The M-Bus Protocol supports a primary and a secondary address. For further information see M-Bus documentation or the following internet site:
http://www.m-bus.com/

4.1.1 Prog470/Prog479

The Superstatic 470/479 can be configured with the Prog470/Prog479 software.
Prog470/Prog479 software may only be used by authorised persons. The software permits communication with the Superstatic via an optical communication interface or an M-Bus interface. By means of this software, the various digital inputs can be configured and parameterized depending on the desired SPF type.
For further information about the Prog470/Prog479 software, see Chapter 5.1 of this manual.

4.1.2 Read/write concept via an optical interface

Using a standardised optical head, the configuration data of the Superstatic 470/479 computing unit can be transferred directly to the Prog470/Prog479 software on a PC or vice versa.

4.2 Display

LCD operating concept

The **navigation key** enables the different menus or menu positions to be addressed. When inputting a number in the test mode, the numbers can be increased from 0 to 9 with this key.

Selection or **confirmation key** of the menu, position or entered number.

By simultaneous actuation of both keys, the display reverts to the first position of the selected menu or if the cursor is already in the first position, the cursor will be positioned in the 1st menu of the LCD display.

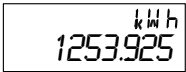The Superstatic 470/479 has the following menus:
See label below the LCD display
- Performance factor SPF1
- Performance factor SPF2
- Performance factor SPF3
- Heat energy emitted
- Electrical energy absorbed
- Digital input configuration

Cumulated energy	Performance factor SPF1	Performance factor SPF2	Performance factor SPF3	Heat energy emitted	Electrical energy absorbed	Digital input configuration
kWh 1253.925	SPF 1 4.25	SPF 2 4.20	SPF 3 4.31	kWh E0 129.63	kWh E1 129.63	A1 00000063

4.2.1 Main display

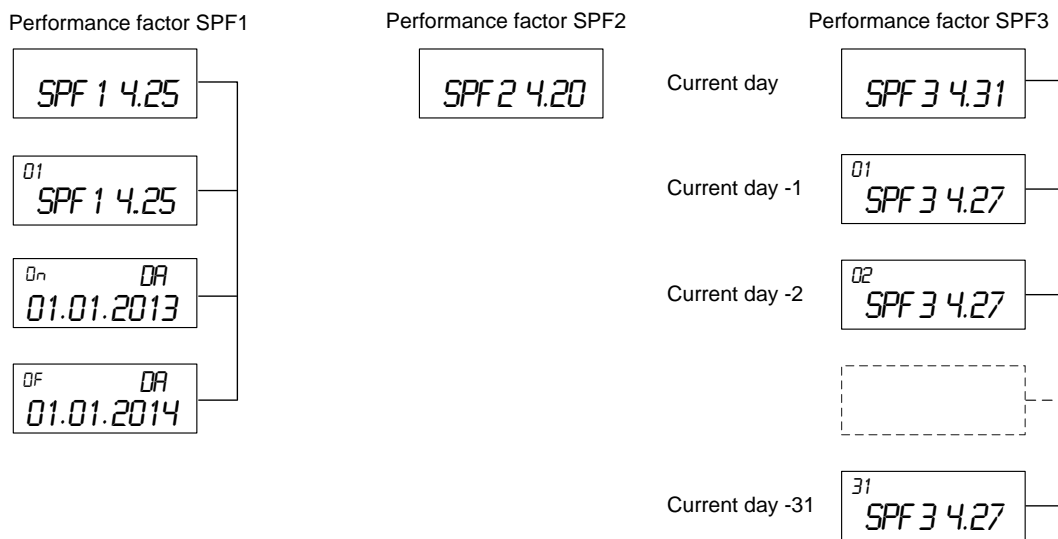The 1st display menu of the Superstatic 470/479 corresponds to the main display.

The main display contains the energy value.

When commissioning or upon simultaneous actuation of the two keys, the main display of the Superstatic 470/479 appears automatically. This applies from any desired initial menu.
If a fault occurs, it is detected and shown in the first position on the display as long as it is present. When the fault disappears, the fault report is deleted from the display.
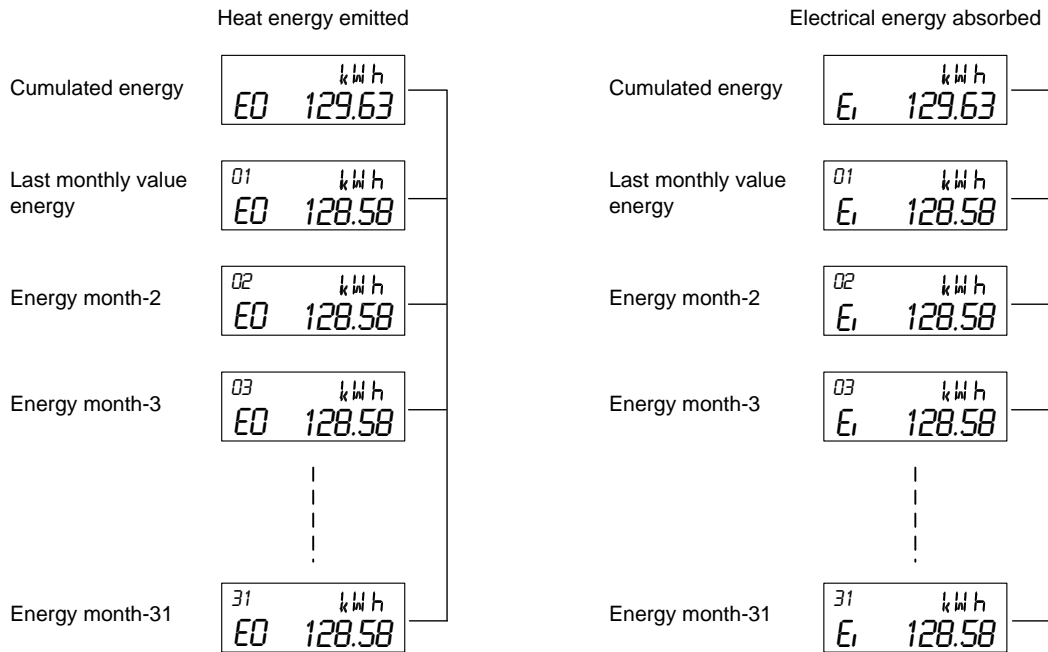
4.2.2 Display sequence

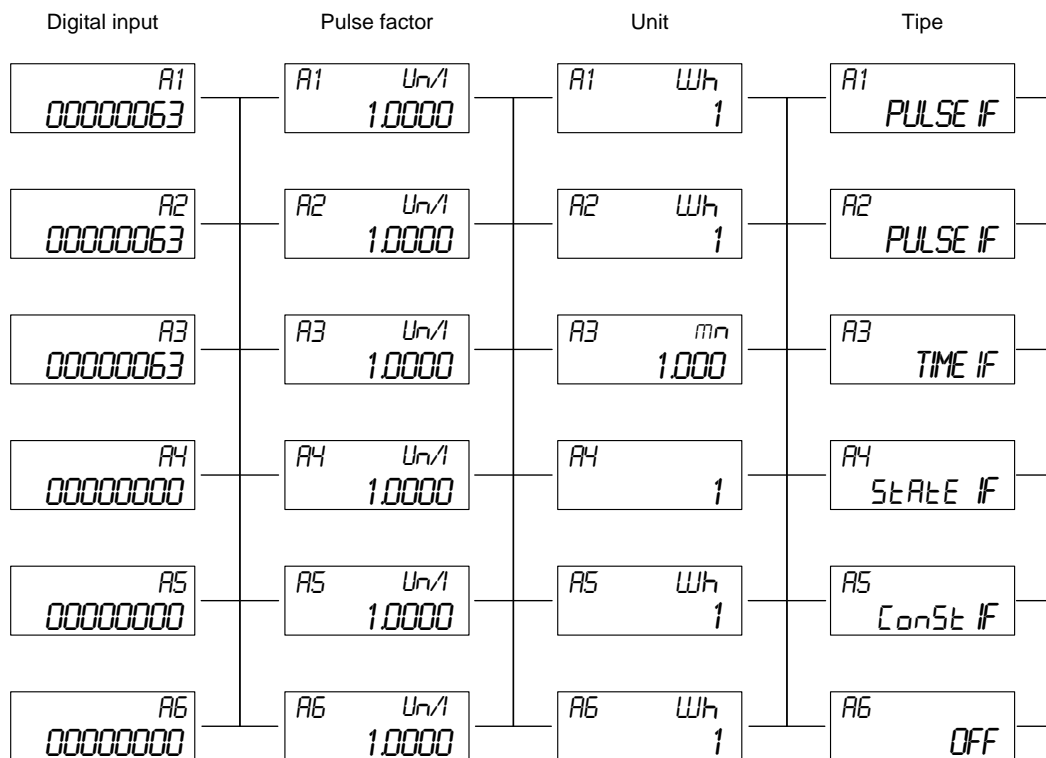The following display sequences can be shown on the LCD display:

Performance factor SPF1, SPF2 and SPF3

Heat energy and electrical energy:

Heat energy emitted		Electrical energy absorbed	
Cumulated energy	E0 129.63 kWh	Cumulated energy	Ei 129.63 kWh
Last monthly value energy	01 E0 128.58 kWh	Last monthly value energy	01 Ei 128.58 kWh
Energy month-2	02 E0 128.58 kWh	Energy month-2	02 Ei 128.58 kWh
Energy month-3	03 E0 128.58 kWh	Energy month-3	03 Ei 128.58 kWh
Energy month-31	31 E0 128.58 kWh	Energy month-31	31 Ei 128.58 kWh

Configuration of the digital inputs:

Digital input	Pulse factor	Unit	Tipe
A1 00000063	A1 Un/i 1.0000	A1 Wh 1	A1 PULSE IF
A2 00000063	A2 Un/i 1.0000	A2 Wh 1	A2 PULSE IF
A3 00000063	A3 Un/i 1.0000	A3 mn 1.000	A3 TIME IF
A4 00000000	A4 Un/i 1.0000	A4 1	A4 StAtE IF
A5 00000000	A5 Un/i 1.0000	A5 Wh 1	A5 ConSt IF
A6 00000000	A6 Un/i 1.0000	A6 Wh 1	A6 OFF

Pulse IF : Used with input « Binary counting ».
Time IF : Used with input « Time counting ».
State IF : Not used presently.
Const IF : Used with input « Amount counting ».
OFF : Input disabled.

5. Software Prog470 / Prog479

5.1 Operating instructions Prog470 / Prog479

5.1.1 Introduction

The Prog470/Prog479 software permits programming and read-out for the Superstatic 470/479. The installation instructions for the Supercal 531 computing unit and the installation instructions for the Prog531 software remain valid for most functions. The change from the Supercal 531 consists in the fact that the Heat pump module is an integral part of the Superstatic 470/479. When the module is detected by the Prog470/Prog479 software, the "SPF Module" tab is added. The configuration of the digital inputs is effected in this tab.

The following chapters provide important information about installation and use of the Prog470/ Prog479 software and about the parameterization of the different inputs which are used to calculate the various performance factors (SPF1, SPF2 und SPF3).

5.1.2 Installation

The Prog470/Prog479 software is supplied by Sontex SA by e-mail or can be downloaded from http://www.sontex.ch/downloads_e.html.

The data file must be downloaded into a folder on your PC (e.g. in C: \ Sontex \ Prog470\ Vx.xxx). Make sure that none of the data files contained in this folder are write-protected. If some data files are write-protected the characteristics of the data files must be altered (via Windows Explorer).

If the Prog470/Prog479 software is updated all the data files of the old version must be replaced by the new release.

5.1.3 Prog470/Prog479 software functions

The Prog470/Prog479 software provides the following functions:
- Configuration of the digital inputs of the SPF module.
- Read-out of the SPF1, SPF2 and SPF3 factor values.

All other parameterization and read-out functions of the Superstatic 470/479 computing unit are identical to the functions of the Supercal 531/Prog531 computing unit.

5.1.4 System requirements

The following equipment is needed for correct operation of the Prog470/Prog479 software:
- PC Pentium II or higher (400 MHz or faster)
- Operating system: Windows 2000/XP or higher
- 10 MB free memory space on the hard disc
- 256 MB RAM memory
- Internet Explorer V6.0 or higher installed on the PC

5.1.5 Operating instructions for Prog470/Prog479 software

Start the software with the Prog470.exe/Prog479.exe data file:
One of three tabs can be chosen in the main menu of the Prog470.exe/Prog479.exe software. The choice of tab is carried out by clicking on the corresponding key in the main window:
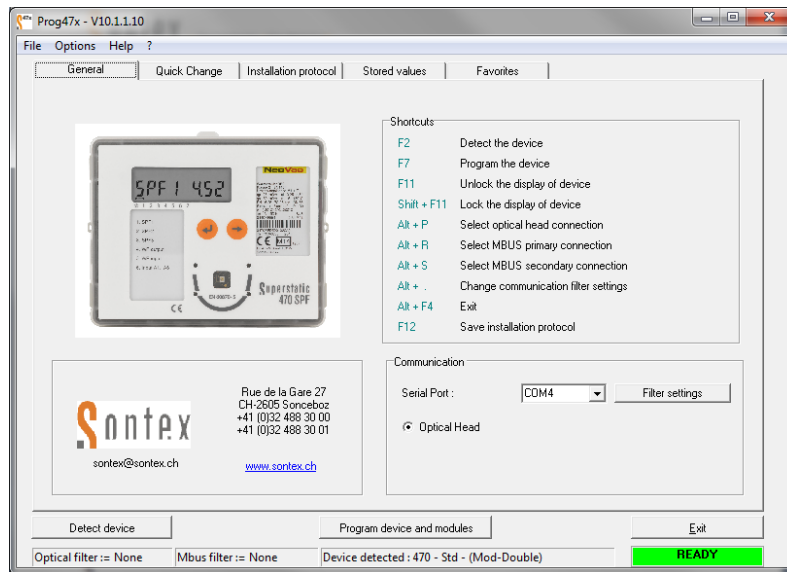

Fig. 1: Main display

5.1.6 "Communication" tab

Communication between the Prog470/749 software and the Superstatic 470 computing unit is possible only by means of the read-out head or by a serial cable (RS232) via the M-Bus protocol. The M-Bus protocol is used on the basis of European standard EN13757-3 for communication between the software and the computing unit.
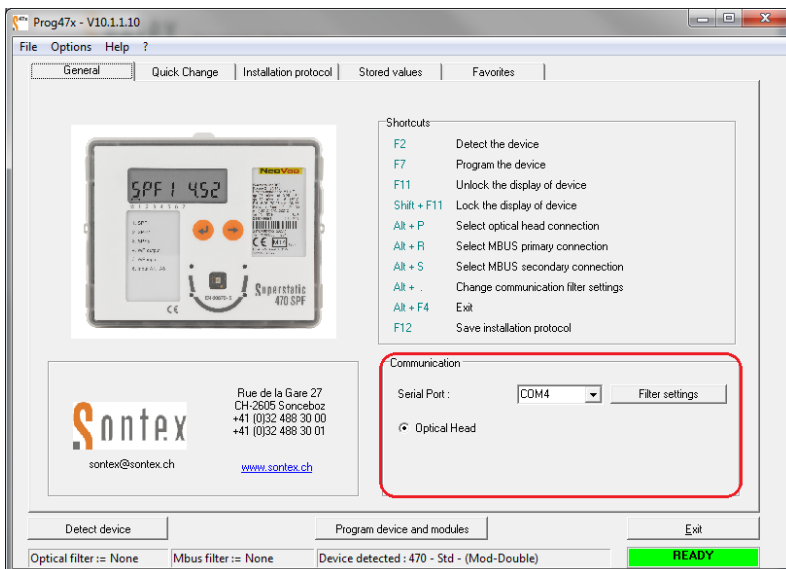
Fig. 2: Communication interface

Select the communication interface in the window: "Communication with the Superstatic 470/479 computing unit".
For communication via the optical or serial interface between the Prog470/Prog479 software and the computing unit, the upper cover of the computing unit must be located above the lower part. The computing unit 470/479 must be closed.

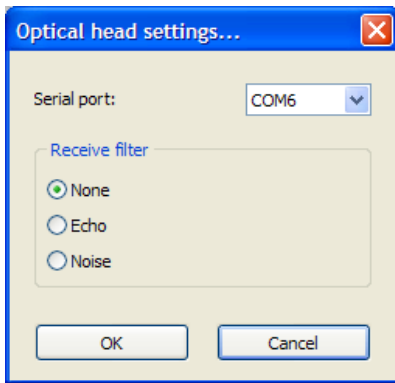If communication problems are experienced the filter settings must be altered as follows:

Fig. 3: Filter settings

- Check whether the correct COM-Port has been selected.
- Select the "Without filter" setting as standard for the read-out head.
  Depending on the read-out head type the signal must be filtered for successful communication.
- Close the window and attempt communication with the new setting again.

If detection fails:
- Set the filter to "Echo":
  Attempt communication again with the new setting.

If detection fails:
- Set the filter to "Noise".
  Attempt communication again with the new setting

If detection fails, use a different read-out head or PC.

5.1.6.1 Known configuration of certain read-out heads

The read-out heads listed below function with the indicated filter settings with Prog470/Prog479 software impeccably:

Read-out head	Filter setting
P+E Technology: "K1-98" or "K1-06"	Without filter
P+E Technology: "K01-USB"	Without filter
Siemens	Echo

5.1.6.2 Standard communication parameters

The transmission speed of the communication interfaces is defined by the following parameters:

Interface	Speed [Baud]	Parity
M-Bus (above RS232)	9600	straight
Optical	9600	straight

5.1.6.3 Reading the configuration of the Superstatic 470/479 computing unit

When configuration of the communication interface has been terminated, actuate the "Detect device" key in order to read the configuration of the computing unit 470/479:
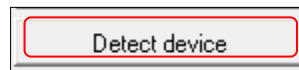

Fig 4: Detect device

5.1.7 "Modules" tab

As soon as the computing unit has been read by the software Prog470/Prog479, select the "Modules" tab and detect the SPF module. The configuration parameters are displayed in the "Modules" tab of the Prog470/Prog479 software.
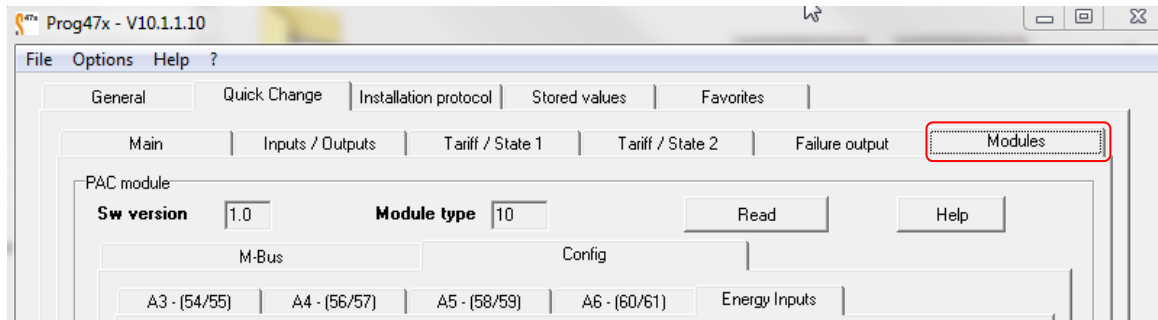
Fig. 5: Module tab

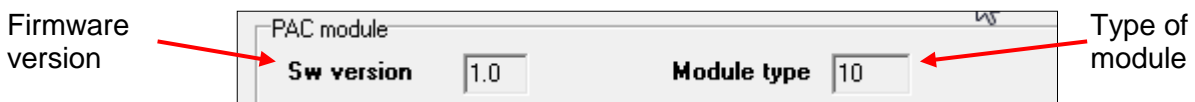The firmware version and the type of module are displayed:

Firmware version

Type of module

Fig. 6: Firmware version

### 5.1.7.1 Display/Change of digital inputs

The SPF module consists of two different parts:
The following equipment is needed for correct operation of the Prog470/Prog479 software:

- M-Bus communication interface
- Digital inputs

M-Bus communication interface

- Standard M-Bus communication interface configuration
- Transmission speed
- Primary address
- Possibility of connecting a modem.
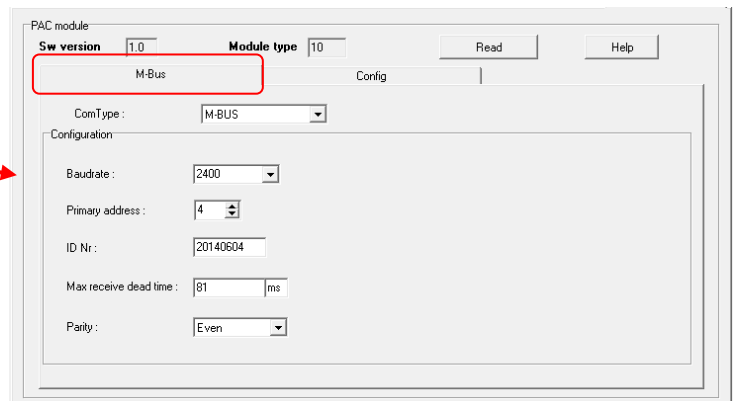

Parameterization of the SPF-Module inputs

- "SPF period" is the period for which the performance factor SPF1 is calculated. Here: 3.4. to 3.3. of the following year.
- "SPF Input" contains the inputs used in the SPF function (sum of electrical energies). Here: sum of inputs A3, A4 and A6.
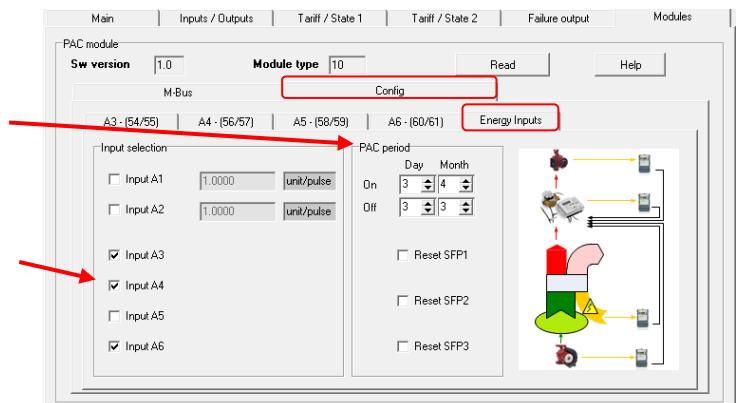
Type of counting:
Various counting types are possible for the inputs A3-A6:

- Disable: counting deactivated.
- Binary counting: pulse counting.
- Time counting: counting the operating time.
- Amount counting: time factor for each digital input.
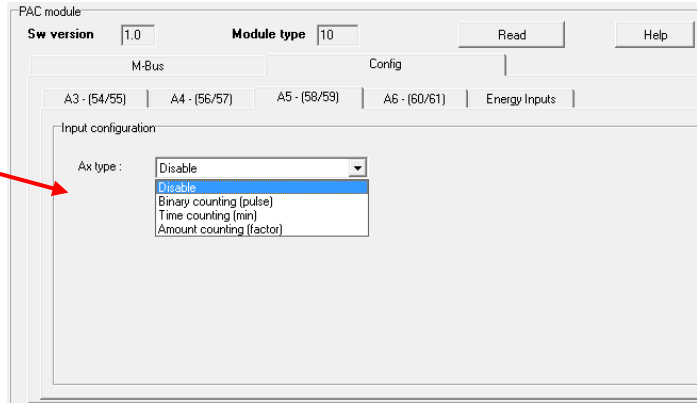
The Medium and ID are defined: e.g. for A3 ID 3 applies and for A6 ID 6. The Medium is always set to "Water".
The speed is automatically adjusted depending on the chosen counting type:

- Binary counting = Fast.
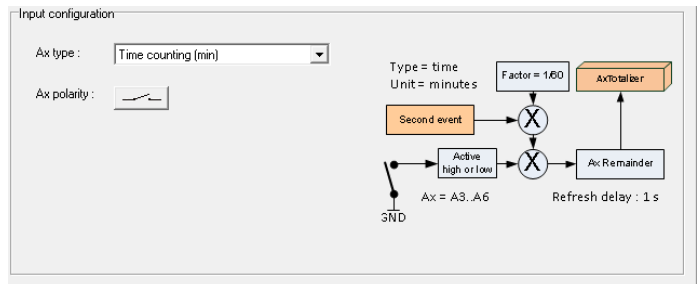- Time counting; Amount counting= Slow.

Binary counting : pulse counting.

- The work unit must be the Wh. The pulse factor « Ax factor » must be defined according to the unit Wh. The initial value « Ax value » corresponds to the starting value of the electricity meter. This value allows to compare the evolution of both meters, electricity and SPF.
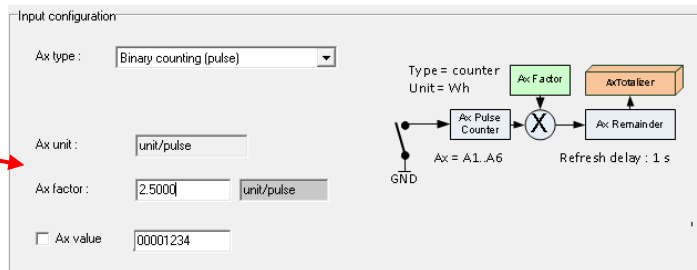

Time counting : counting the operating time.

- This function allows to know the duration operating time of the heat pump. The unit used is the minute.
- This value is independent of the electrical energy consumed by the heating pump.
- The counting can be by open or close contact.

Amount counting : time factor for each
digital input.

- The electrical device is not connected
  to an electricity meter.
  In this case, knowing the electrical
  power of this device, it is possible to
  integrate its power over the time or to
  define in Wh the consumption of
  electrical energy.
- The pulse factor « Ax factor » must be
  defined according to the unit Wh.
  Example: A pump of 400W switched on
  during 1 hour consumes an electrical
  energy of 400Wh.
  The factor (Ax factor) will be configured
  with 400 [Wh]/3600 [sec] = 0.111.
- The counting can be by open or close
  contact.
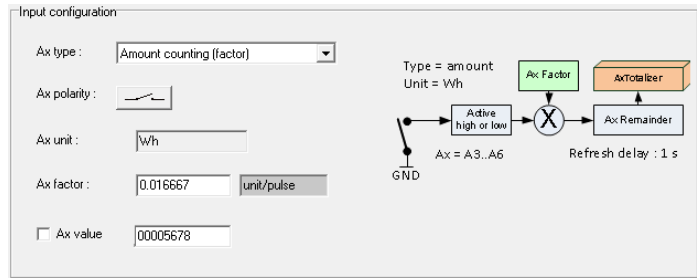
Inputs A1 and A2
- Inputs A1-A2 only allow "Binary
  Counting" and are controlled under the
  menu point "Inputs/Outputs".
  The inputs can be configured in the
  long (<=5 Hz) or fast (>5 Hz) mode.
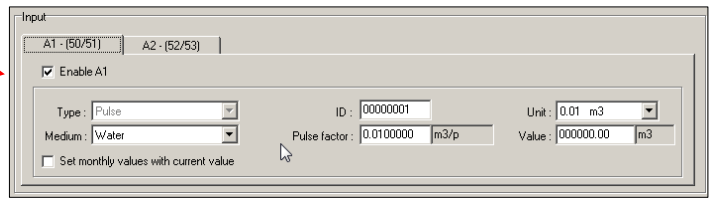
Notes

Technical Support
For technical support, please contact the local Sontex representations or Sontex SA directly.

Sontex hotline:
sontex@sontex.ch, +41 32 488 30 04