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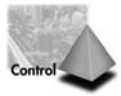

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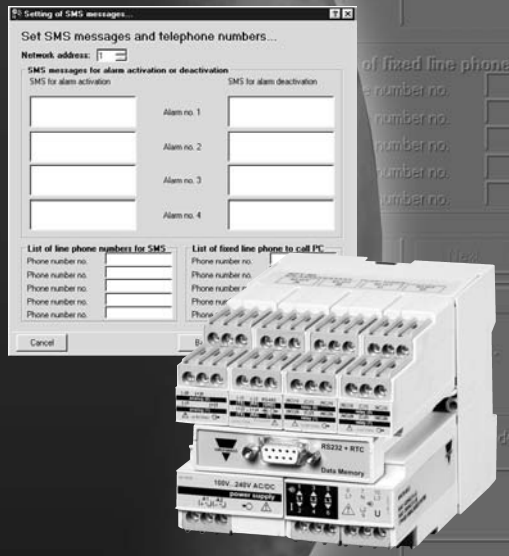
PqtSoft Network-Remote PQT-90

INSTRUCTION MANUAL



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Software for PQT90 data download and configuration

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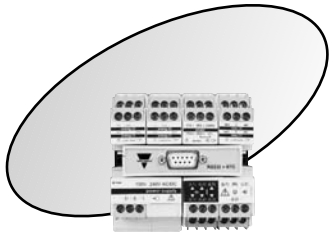

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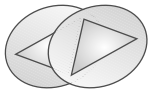
2 Warnings

PQTSoft Remote and Network, PQT-90 *modular quality network transducer,* ***Instruction manual:***
FW rev. 01 CARLO GAVAZZI Controls SpA

We suggest you to keep the orginal packing in case it is necessary to return the instrument to our Technical Service Department. In order to achieve the best results with your instrument, we recommen you to read this instruction manual carefully. When opening the packing, verify that the product is not damaged and that the following material is included: 1 PQT-90, 1 CD-ROM with the programming software, 1 instruction manual (one RS232 serial connection cable). PQT-90 must be equipped with all the modules necessary for its correct use. Before using the instrument, follow the instructions on page 40.

MEANING OF THE SYMBOLS USED IN THIS MANUAL


See correlated subject on page ...

Chapter starts on page...
Chapter ends on page...

Particularly important subject or information

More details are given on the current subject

Index 3

PQTSoft Remote

SETUP ***05***
■ PQTSoft Remote Setup 05
■ PQTSoft Remote Uninstall 05
■ PQTSoft Remote in brief 06
CONFIGURATION . . . . . ***.08***
■ Main menu 08
❑ Configuration archive and remote PQT programming . . .08
❑ Instrument composition... 09
❑ Instrument working mode, clock and system setup .10
❑ Digital input working mode setup 12
❑ Harmonics analysis and digital filter setup . . .13
❑ Setup of min-max values logging + rel. variables . .15
❑ Logging variables selection + dmd power calculation . .16
❑ Tariffs and installed power setup 18
❑ Dual-tariff setup 19
❑ Multi-tariff setup 21
❑ Multi-tariff setup with digital inputs 23
❑ Digital output setup 24
❑ Digital output alarm setup 26
❑ Analogue output alarm setup 27
❑ Set SMS messages and phone numbers 30
TRANSMISSION OF THE CONFIGURATION . . . . . ***.32***
■ Transmit the configuration 32
❑ Communication setup 33
❑ Phone numbers and dialling properties 34
❑ Network address and warning messages 35
■ Reading of instantaneous variables 35
LAST FUNCTIONS . . . . . ***.36***
■ Reset of partial and total meters. 36
■ Automatic modem configuration. 36
■ Selection of connections and setting of dialling properties 37
❑ Dialling properties. 38

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PQT-90

INSTALLATION 40
- ■ Overall dimensions, DIN-rail mounting 41
- ■ Position of slots and relevant modules 42
- ■ Connection of optional modules 45
- ■ Electrical diagrams 49

Useful info 53
- ■ Data logging operating principle and duration . . .53
- ■ Appl. bar: meaning of the icons 56
- ■ How to use SMS messages 56

TECHNICAL FEATURES 59

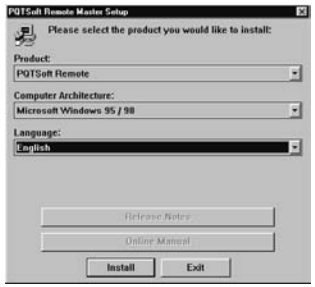
PQTSoft Network

PRELIMINARIES 68
- ■ Installing PQTSoft Network 68
- ■ The software in brief 69

CONFIGURATION 72
- ■ Main menu 72
- ■ Configuration of automatic data download 73
  - ❑ Setting of communication parameters 73
  - ❑ Selection of phone numbers and diall. prop. .74
  - ❑ Folder selection for data files, counter . . . . . file and event file 75
  - ❑ If “Local network of instruments” was selected . .76
  - ❑ Setting expiry date for automatic data download . . .76
- ■ Configuration of data manual download 78
  - ❑ Communication setup 78
  - ❑ Selection of phone numbers and setting of . . . dialling properties 79
  - ❑ Define file name for downloaded data 80
  - ❑ Selection of “Local network instrument” 81
- ■ Reading of instantaneous variables 82

LAST FUNCTIONS 84
- ■ Configuration of analogue modem and GSM 84
- ■ Contact management 85
- ■ PQT-90 data conversion in excel format 88

■ *PQTSof Remote setup*



When the CD-ROM is inserted, the setup programme is automatically executed (the CD-ROM drive is to be enabled) and the box on the left is displayed.
If the setup will not run, click on the right key of the mouse and select the “explore CD-ROM” command: then, double click the

icon to manually execute the application.
Afterwards, choose the operating system and the desired language from the drop-down menu (see picture above). Press “Install” to carry on with the installation following the “instructions” given in the following dialog boxes. **Save all current jobs and close all open applications before installing PQTSoft Remote.**

■ *“PQTSoft Remote” Uninstall*

Select “Uninstall PQTsoft Remote” to start the guided uninstallation of PQTSoft.

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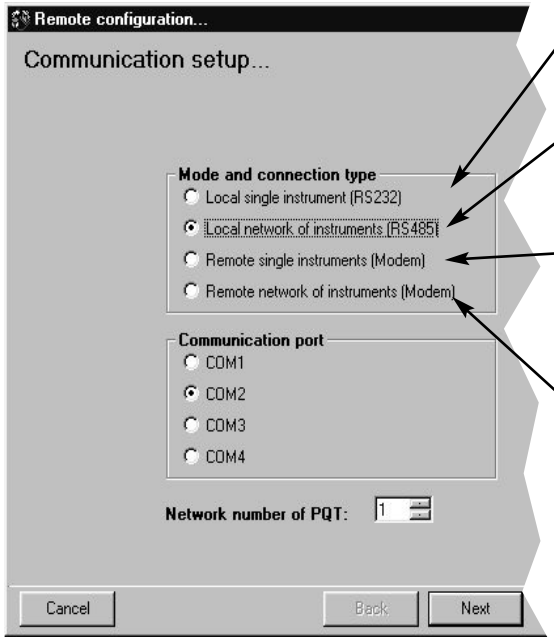
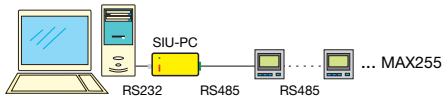
PQTSoft Remote in brief

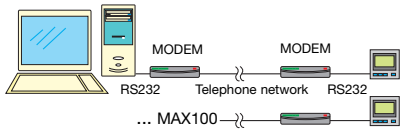
PQTSoft Remote has been conceived to program PQT-90 by means of a data transmission from the PC to the instrument via RS232 or RS485 serial interface. The choice between one interface or the other is therefore very important for the correct operation of the instrument as shown by the following figure:



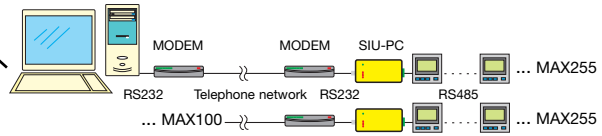
Local single PQT connected to the PC by RS232 serial port



Maximum 255 PQT's in an RS485 local network connected to the PC by RS232 thanks to the RS485-RS232 SIU-PC converter.



Maximum 100 remote single PQT's connected to the PC by means of a telephone network thanks to an analogue/GSM modem.



Maximum 25000 PQT's in max 100 remote RS485 networks connected to the PC by means of a telephone network and RS485-RS232 SIU-PC.

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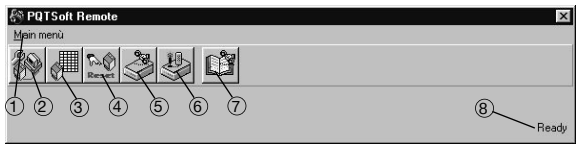
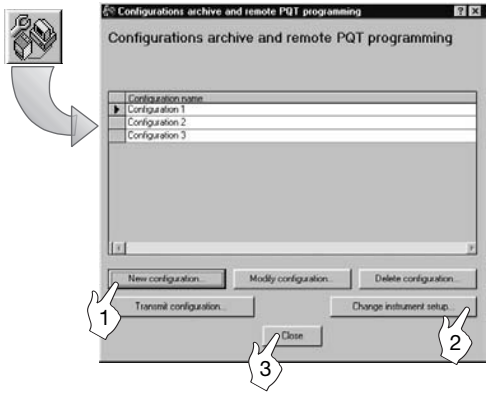
Main menu



1- Drop-down menu of the functions
2- Programming of PQT-90 and programming start-up
3- Reading of instantaneous variables (page 35)
4- Reset of all the water and gas energy meters (page 36)
5- Automatic configuration of analogue modem (page 36)
6- Automatic configuration of GSM modem (page 36)
7- Contact management (page 37)
8- Programme status.

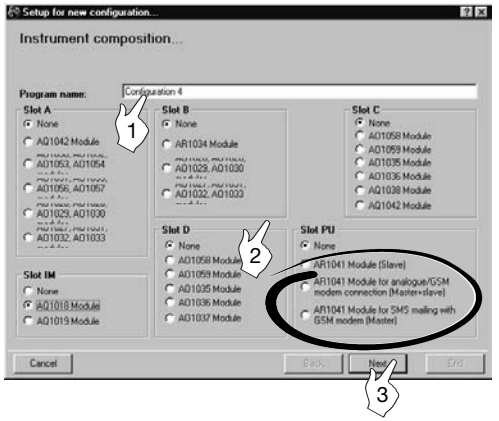
Configuration of PQT-90

❑ *Configurations archive and remote PQT programming*



PQTSoft Remote manages a configuration archive that may be selected at any time. At first, when the software has just been installed, this file is empty. **[1]** Click on new configuration to start the programming procedure of PQT90. **[2]** It allows to load from PQT-90 the pre-existing programming and to modify it, if required. **[3]** Close the window without modifications.

❑ *Instrument composition...*



[1] Enter the name required for the new configuration of PQT-90.
[2] Select the supplied modules installed in the instrument in the various slots. For the module AR1041 only, if it is present, also the operating mode is to be indicated as follows:
"AR1041 module (slave)": PQT-90 is enabled to the data-download only on request of the user;
"AR1041 module with analogue or GSM (Master+Slave)" modem: PQT-90 is enabled to the data download on request and to the independent transmission of SMS in case of alarm activation;
"AR1041 module with GSM modem for SMS (Master)": PQT-90 is enabled to transmit SMS messages and to send

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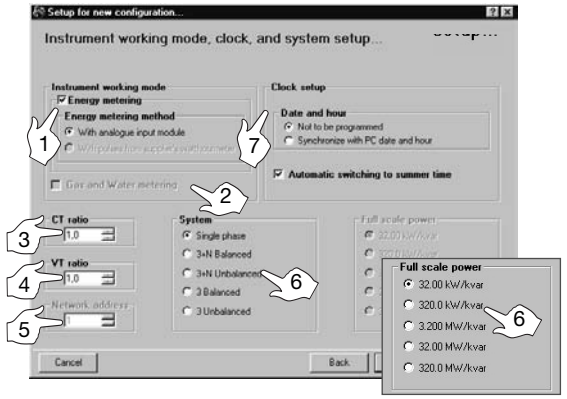
SMS messages when an alarm occurs. To carry out the data download, in this case, it is necessary to use the RS485 serial module.
[3] Click this button to continue the configuration of PQT-90.

The following windows will vary according to the modules selected in the box "*Instrument composition...*" (see previous page).

❑ *Instrument working mode, clock and system setup*



[1] Enables the energy metering. Select the alternative with

or without analogue measuring inputs (AQ1018, AQ10109)
[2] Enables the gas and water metering.
[3] Selects the ratio of the current transformer. Example: if the CT (current transformer) primary has a current of 300A and the secondary a current of 5A, the CT ratio corresponds to 60 (that results from: 300/5).
[4] Selects the value of the VT (voltage transformer) ratio. Example: if the VT primary connected to the instrument is 20kV and the secondary is 100V, the VT ratio corresponds to 200 (resulting from 20000/100).
[5] Selects the serial address of the instrument when the latter is part of a network of instruments.
[6] Selects the type of electrical system. If no measuring inputs (AQ1018, AQ1019) have been selected on the previous page, the box "Full scale power" will appear: select the most appropriate full scale.
[7] Selects the options for the clock of PQT-90. If the option "Not to be programmed" is selected, the clock will not be programmed; to program the hour, select the option "Synchronize with PC date and hour", the clock will be programmed with the date and hour present in the system of the PC. To make the instrument automatically switch to the summer time and viceversa, select the option "Automatic switching to summer time".

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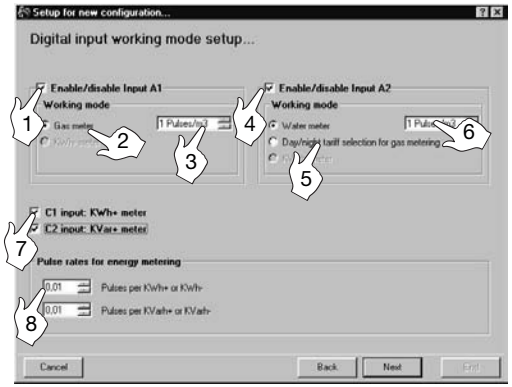
❑ *Digital input working mode setup*

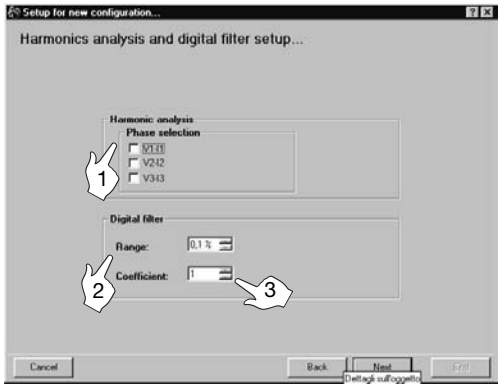


[1] Enables digital input A1 (input 1 of the digital input module installed in slot A of PQT-90);
[2] Enables digital input A1 working mode: "Gas meter" or "kWh- meter".
[3] Set the amount of the input pulse (pulse/m^3 ex.: if the value 10 has been set, then 10 input pulses will be required for the following gas metering: 1m^3).
[4] Enables digital input A2 (input 2 of the digital input module installed in slot A of PQT-90);
[5] Choose digital input A2 working mode: "Water meter", "Day, night tariff of the gas meter" or "kvarh- meter".
[6] Set the amount of the input pulse (pulse/m^3 ex.: if the value 10 has been set, then 10 input pulses will be required for the following metering: 1m^3).
[7] Enables digital input C1 to the function of kWh meter, C2 to the function of kvarh meter;
[8] Set the amount of the input pulse (pulse/kWh, kvarh ex.: set the value 10: 10 input pulses will be necessary for the energy metering of 1kWh, 1kvarh). **The input pulses C1**

and C2 are not available if PQT-90 is supplied with analogue measuring inputs AQ1018 or AQ1019.

❑ *Harmonics analysis and digital filter setup*

[1] Enables the harmonic analysis on the selected phases,



activate the relevant check boxes.
[2] Selects the value of the "Range" parameter of the digital filter.
[3] Selects the value of the "coefficient" factor of the digital filter.

Example: the value of the V_{L-N} variable fluctuates between 222V and 228V and it is therefore necesarry to stabilize it. The parameters of the digital filter must be set as follows:

• RANGE: the variable has fluctuations within the average value whose amplitude is equal to ±1,3% of the rated value of the variable itself (where ±1.3% results from (228-222)/ 2= ±3V, then ±3*100/231V= ±1.3%; 231V being the rated phase-neutral value of a 400V input). The "range" parameter is the action range of the digital filter and it is set at a value slightly higher than the percentage amplitude of the fluctuation: e.g. 1.5%.

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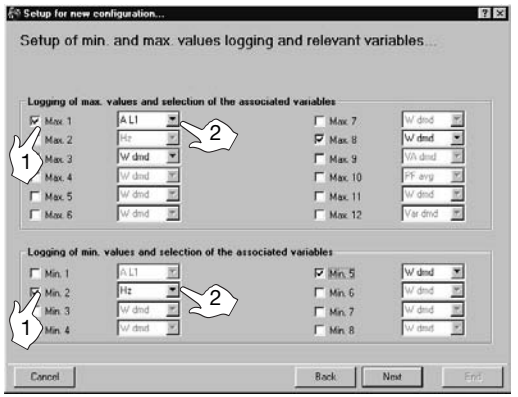
• COEFFICIENT: if the new value acquired by the instrument is within the action range of the filter, then the new displayed value will result from the sum of the previous value (A) to the variation (B) divided by the filtering coefficient (C), that is: [(A) + (B/C)]. As a consequence, a value higher than this coefficient, will result in a higher settling time and therefore a higher stability. Generally, the best result will be obtained by setting the filtering coefficient to a value equal to at least 10 times the value of the range parameter. In the example above: 1.5*10=15. To improve the stability, the filtering coefficient can be increased: the admitted values are within 1 and 255.

❑ *Setup of min. and max. values logging and relevant variables*



This dialog box allows to associate some variables to the automatic logging of max and min values (from Max. 1 to Max. 12 and from Min. 1 to Min. 8).
[1] Select the data to be logged activating the relevant check box.
[2] Select the variable to be logged among those available in the drop-down list that will appear after clicking on the arrow on the right of the box.

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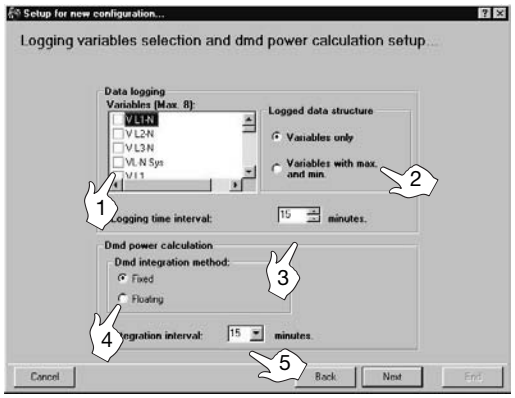
❑ *Logging variables selection and dmd power calculation*



This window allows the user to enable the variables to be logged (Max 8) in the data memory of PQT-90 and the working mode of this operation.

[1] Select the variables to be logged (Max8) activating the relevant check boxes.

[2] Select if, in addition to the logging of the average values of the variables, PQT-90 is required to log also the min and max values in the time interval.

[3] Select the value of the logging time interval (from 1 to 60 min.)

During the measurement, the instrument takes samples of the selected variables every 200ms approx; at the expiry of the set time interval, the instrument calculates the average of the samples and carries out the data logging. The **historical value** will therefore be guaranteed to be **highly accurate**.

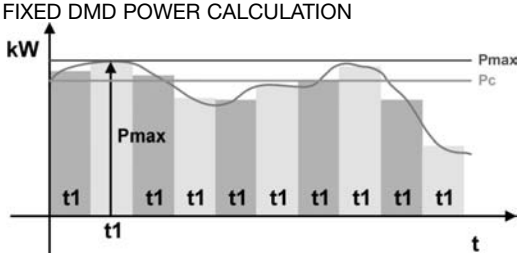
[4] Selects the dmd (W-VA-var-PF) calculation method between FIXED and FLOATING.

FIXED SELECTION: if a value of 15 minutes is selected, the

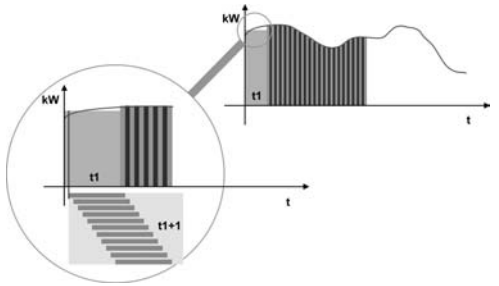
instrument calculates the dmd value and updates it every 15 minutes.
FLOATING SELECTION: if for example the value “15 minutes” is selected, the instrument calculates the dmd value and updates its value at first after 15 minutes and then every minute generating a window whose width corresponds to 15 minutes and shifts by units of 1 minute.

The following diagrams show the two working methods.

FIXED DMD POWER CALCULATION



FLOATING DMD POWER CALCULATION



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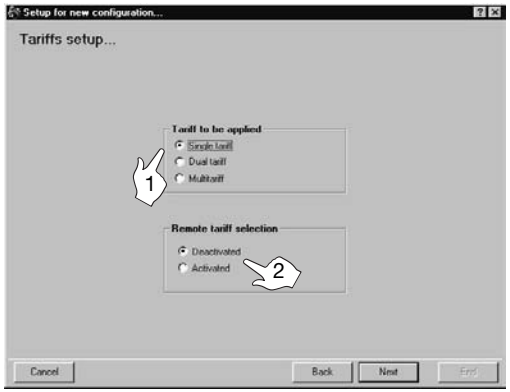
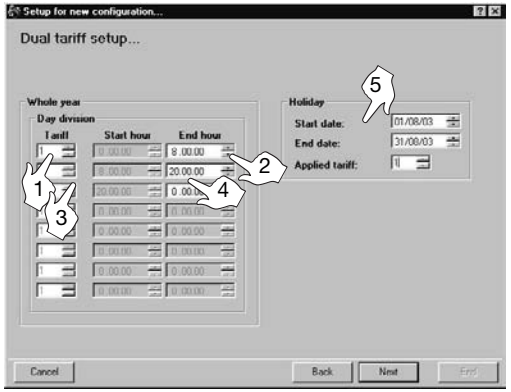
❑ *Tariffs and installed power setup*



This function allows the user to choose the type of management of the energy meters.
[1] Selects the type of tariff to be applied. “Single tariff”: the energy meters are set according to a single tariff which is the same for the whole year. “Dual tariff”: the energy meters are set with 4 different tariffs per day and two time periods per year (whole year/holidays). “Multitariff”: the energy meters are set with up to eight time periods per day (4 different tariffs) and three time periods per year (winter, summer and holidays).
[2] Selects if the remote tariff selection by means of digital inputs is to be activated or deactivated. It can be activated only if the digital input modules are inserted in slot A and C.

❑ *Dual tariff setup*



[1] Select the reference tariff.
[2] Select the Start Hour and the End Hour of the time period. The Start Hour of the following tariff is automatically displayed in the gray box of the second tariff.
[3] Select the tariff of reference.
[4] Select the End Hour of the second tariff. Proceed in the same way until the required number of tariffs is reached.
[5] Programme the Holiday period: set the start date and the end date and the relevant applied tariff.

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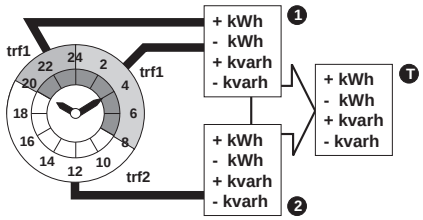
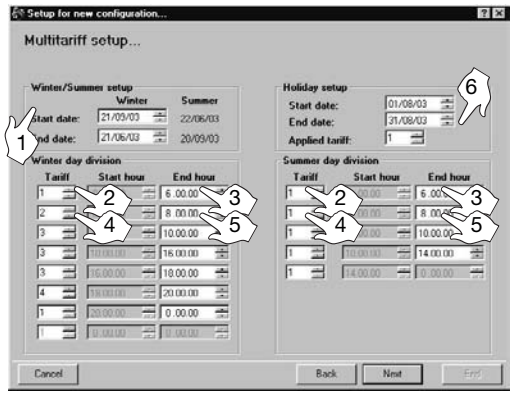
a) It's possible to divide the day into up to eight daily different time periods and up to four different tariffs as shown below:



The measured energy (partial energy) is placed in TARIFF 1 when the time period is from midnight to 8:00, in TARIFF 2 when the time period is from 8:00 a.m. to 8:00 p.m. and again in TARIFF 1 when the time period is from 08:00 p.m. to midnight.
The total measured energy is the result of the sum of all the partial measures as shown in the figure below:
b) the starting point of the first time period is always 24:00 (midnight) and cannot be changed;
c) the starting point of the following period is always the end hour of the previous time period.
d) the daily loop is closed by setting 24:00 as last hour of the last time period.

❑ *Multitariff setup*



[1] Select the duration time of the winter and summer time period, enter the start date and the end date of the winter time period. The Summer time period will be calculated automatically as a consequence.
[2] Select the reference tariff.
[3] Select the End Hour of the time period. The Start Hour of the following tariff is automatically displayed in the gray box of the second tariff.
[4] Select the reference tariff.
[5] Select the End Hour of the second tariff. Proceed in the same way until the required number of tariffs is reached.
[6] Programme the Holiday period: set the start date and the end date and the relevant applied tariff.

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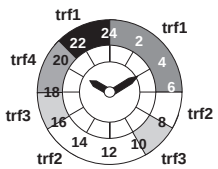
The WINTER and SUMMER time periods are conventional seasons mainly used to manage in the best way the different energy costs during the year. The reminds at steps a), b), c) d) on page 20 are also valid for the MULTI TARIFF function.

In the SINGLE TARIFF, only one period exists, referred to the whole year.
In the DUAL TARIFF, the “year” can be divided into two periods: whole year and holidays.
In the multitariff, the “year” can be divided into 3 periods: winter, summer and holidays.

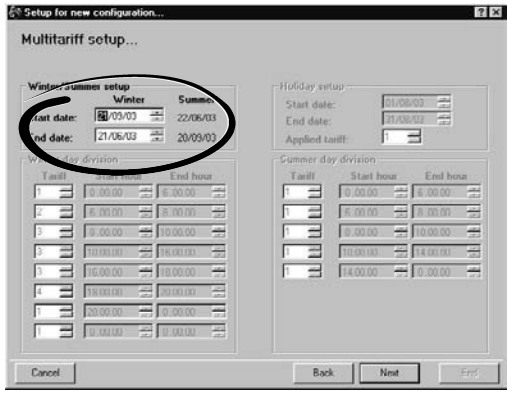
Example of winter day division:
On the picture below four different tariffs are shown which are coupled to seven different periods of the day.



Winter day division

Tariff	Start hour	End hour
1	0.00.00	6.00.00
2	6.00.00	8.00.00
3	8.00.00	10.00.00
3	10.00.00	16.00.00
3	16.00.00	18.00.00
4	18.00.00	20.00.00
1	20.00.00	0.00.00
1	0.00.00	0.00.00

❑ *Multitariff setup with digital inputs*



If “remote tariff selection: activated” has been selected, then only the “Start date” and “End date” of the winter/summer period need to be saved, as circled above.

HOW THE REMOTE TARIFF SELECTION IS CARRIED OUT		
CHANNEL 3 SLOT A	**CHANNEL 3 SLOT C**	**ACTION**
Open	Open	Tariff 4
Open	Close	2 Winter / 3 Summer *
Close	Open	1 Winter / 2 Summer **
Close	Close	Tariff 4
CHANNEL 2 SLOT A (if A2 is activated as GAS): If it is closed, the day GAS tariff is selected, if it is open, the night GAS tariff is selected.		

* PQT-90 applies tariff 2 in the winter period and tariff 3 in the summer period.
** PQT-90 applies tariff 1 in the winter period and tariff 2 in the summer period.

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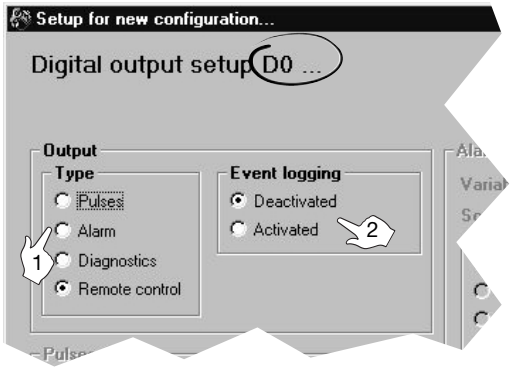
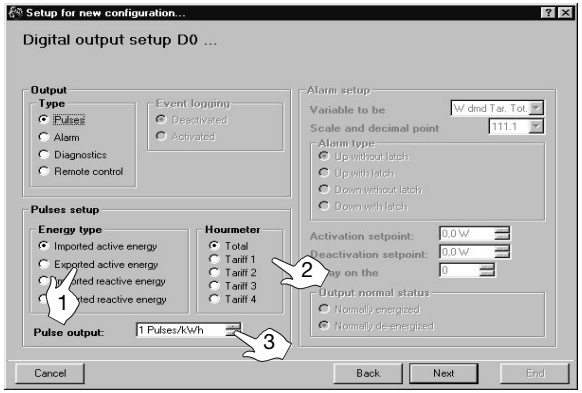
❑ *Digital output setup*



Where "**DO...**" shows the module and output to which the window refers. Digital outputs are referred to as follows:
C0 OUTPUT: SLOT C digital output, channel 1
C1 OUTPUT: SLOT C digital output, channel 2
D0 OUTPUT: SLOT D digital output, channel 3
D1 OUTPUT: SLOT D digital output, channel 4

[1] Select the digital output mode:
"Pulses": sets the parameters for the pulse output. It's possible to retransmit the total or partial energy by means of pulses. Selecting one of the available tariffs (from 1 to 4), the pulse output will be activated only when metering the energy referred to the selected tariff.
"Alarm": allows the user to activate a static or a relay output when an alarm condition is detected.
"Diagnostics": in a 3-phase system, unbalanced load with neutral, this function checks the presence of the neutral connection. If the connection to the neutral is not detected, an alarm is activated.

"Remote control": makes it possible to control the digital outputs by means of the RS485/RS232 serial port instead of using the instrument. The outputs can be activated by means of a PC or PLC by means of specific commands.
[2] Selects whether the event logging in the PQT-90 is to be activated or deactivated.



❑ *Digital output setup: pulses*

[1] Chooses the type of energy to be retransmitted by means of pulses.
[2] Selects the type of meter to be retransmitted by means of pulses.
[3] Selects the pulses amount (that is: how many pulses are needed for 1 kWh from 1 to 1000 pulses per kWh?).

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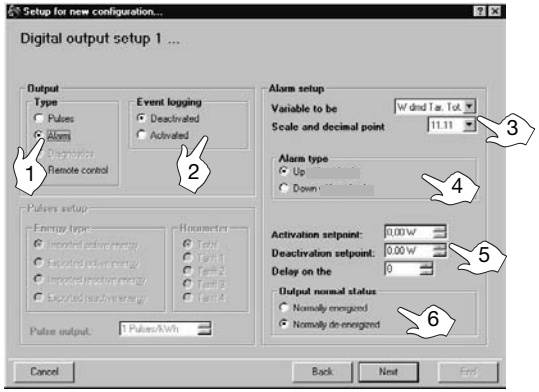
❑ *Digital output alarm setup*

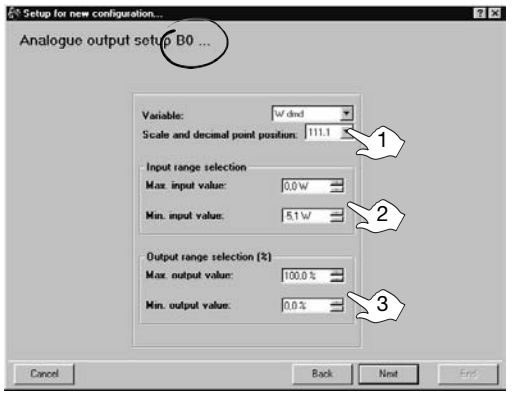


[1] Selects the alarm working mode for the digital output.
[2] Selection of activation or deactivation of the event logging of PQT-90.
[3] Selects the variable to be checked. Click the pointer of the "Variable to be (controlled)" drop-down menu.
Selects the scale and decimal point. Click the pointer of the "Scale and decimal point" drop-down menu.

[4] Selects the alarm type: selecting the "up-alarm" the alarm is activated when the selected variable increases above the activation set-point; "Down alarm" the alarm is activated when the selected variable decreases below the activation set-point.
[5] Activation setpoint: the alarm is activated when the variable increases above this value.
Deactivation setpoint: the alarm is deactivated when the variable decreases below this value.
Delay on the activation: selects the minimum delay of the event on the alarm activation.
[6] Chooses the normal status of the output.
Normally energized: the output is normally

energized and it's de-energized in case of alarm.
Normally de-energized: the output is normally de-energized and it's energized in case of alarm.

❑ *Analogue output alarm setup*



Where "**BO...**" shows the module and output to which the window refers. Analogue outputs are referred to as follows:
A0 OUTPUT: analogue output 1, SLOT A
A1 OUTPUT: analogue output 2, SLOT A
B0 OUTPUT: analogue output 3, SLOT B
B1 OUTPUT: analogue output 4, SLOT B
[1] Selects the variable to be retransmitted: click the pointer of the **"Variable"** drop-down menu. Click the pointer of the "**Scale and decimal point position**" drop-down menu to select the scale and decimal point.

[2] "**Max input value**": selects the max. value of the variable input range. "**Min. input value**": selects the min value of the variable input range. **[3]** "**Max output value**": value expressed as % of the full scale value (0-20mA, 0-10V, etc.) that is gen-

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erated by the measured value ("max. input value"). "**Min. output value**": value expressed as % of the zero of the output range (0-20mA, 0-10V, etc.) that is generated by the minimum measured value ("min. input value").

Example 1: to measure a consumed power up to 100kW and retransmit it with a signal from 4 to 20mA, the module to be used is AO1026 (2x from 0 to 20 mA) or AO1050 (1x from 0 to 20mA); the instrument is to be set-up as follows:

- Variable: WΣ (active system power)
- max. input value: 100.0 kW;
- min. input value: 0.0 kW;
- max output value: 100.0% corresponds to 20mA, then: (100*max. output)/fullscale output=100*20mA/20mA =100%
- Min. output value: 20.0% corresponds to 4mA, resulting from: (100* min. output) / fullscale output= 100*4mA/20mA= 20%

Example 2: to measure both the consumed power (up to 100KW) and the generated power (up to -100kW), and retransmit it with a signal from -10 to +10V, the module to be used is AO1033 (2x ±10VDC) or AO1057 (1x ±10VDC). The parameters can be setup as follows:

- Variable: WΣ (system active power)
- Max. input value: 100.0 kW;
- Min. input value: -100kW;
- Max. output value: 100.0% corresponds to 10V, then: (100*max. output)/ fullscale output = 100*20V/20V=100%.
- Min. output value: 0.0% corresponds to -10V, then: (100* min. output)/fullscale output= 100* 0V/20V= 0%; in this case also the "total" excursion of the analogue output is to be considered, therefore from -10V to +10V=20V

As a consequence, when the power is -100kW, the output will be -10V, when the power is 0, the output will be 0V and when the power is 100kW the output will be +10V.

Example 3: the whole range of the values admitted for the

variable PF corresponds to values between C 0.00 and L 0.00 (for each phase) which, after retransmission, will be respectively 0 and 20mA. When PF is equal to 1 (since it is in the middle of C 0.00 and L 0.00), the output will be equal to the centre of its scale, that is 10mA. As a consequence, the instrument is to be setup as follows:

- Variable: PF L1 (or L2 or L3);
- Max. input value: L 0.001: the max input value will correspond to C if its sign is negative and to L if its sign is positive.
- Min. input value: C 0.000; the min input value will correspond to C if its sign is negative and to L if its sign is positive.
- Max output value: 100%;
- Min. output value: 0.0%

The min. input value to be set for L is 0.001 to avoid any undesired variations of the analogue outputs.

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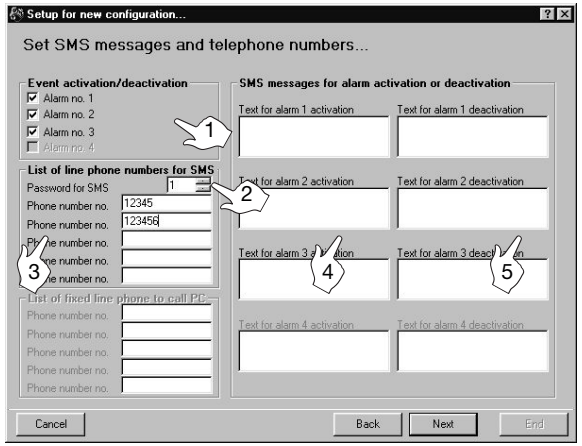
❑ *Set SMS messagges and telephone numbers*



If the "AR1041 module with GSM modem for SMS (Master)" in the window "Instrument composition..." has been selected, the above window will appear to enable the setup of the SMS alarm messages to be sent to the phone numbers typed in the relevant list.

[1] Select which alarms or events are activated to send SMS messages.

[2] Select a 3-digit password for the identification of PQT-90 when an SMS is received or some information are requested (see "useful information" on page 56).

[3] List of line phone numbers for SMS: type the phone numbers to which the messages are to be sent.

[4] SMS messages for alarm activation: type the messages to be sent when the alarms are activated (there's a max. number of characters available terminated which the user will not be allowed to continue typing the message).

[5] SMS messages for alarm deactivation: type the messages to be sent when the alarms are deactivated (there's a max. number of characters available terminated which the user will not be allowed to continue typing the message). In any case, the user who will receive the message on his mobile phone will be able to read not only the preset text, but also date and hour relating to the event.

Max. 5 GSM phone numbers can be typed; the instrument will send the same SMS activation and/or deactivation message to all the listed numbers.

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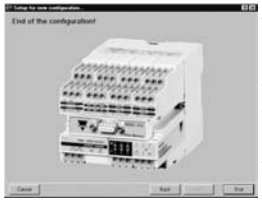
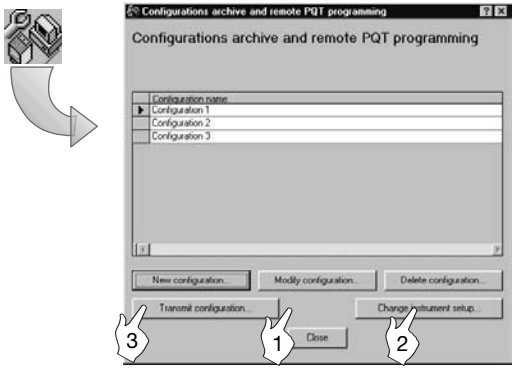
❑ *End of the configuration*



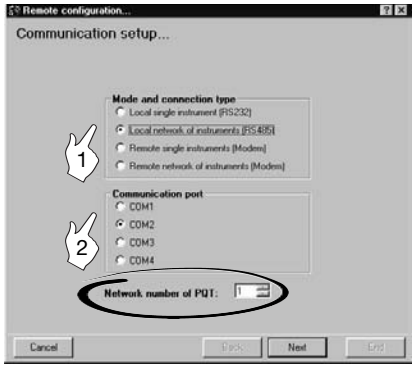
After the configuration of all the PQT-90 parameters, press the key “End”. The new configuration will be added to the list of the configurations archive where you can select it and transmit it to the instrument.

❑ *Transmit the configuration*



[1] Modify the configuration selected in the list.
[2] Delete the configuration selected in the list.
[3] Transmit the configuration selected in the list.

❑ *Communication setup*



[1] Choose the mode and connection type (see also “PQTSoft remote” on page 6). If “Local network of instruments (RS485)” has been selected, then also the network address of the PQT-90 with which the communication will take place is to be indicated (see figure above).
[2] Only if “Local single instrument (RS232)” or “Local network of instruments (RS485)” have been selected, the serial communication port of the PC can also be selected.

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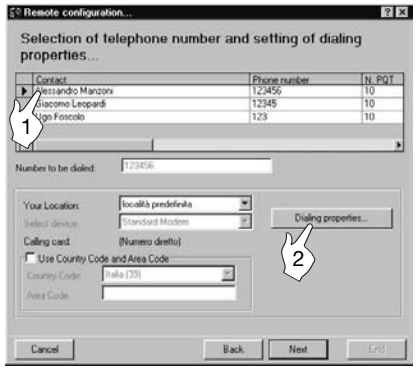
❑ *Selection of phone numbers and setting of dialling properties*



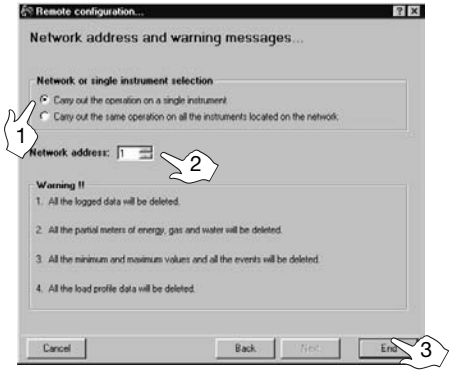
If in the "Communication setup" dialog box the option "modem" has been selected, then also the telephone number to be dialled by PQTSoft for the modem connection with the instrument will have to be selected.

[1] Click the contact to select it. The phone number of the contact will be shown in the "number to be dialled" box below the list.

The window for the selection of the contacts will be shown only in the case of "modem" selection in the "Communication setup" dialog box.

[2] For further information on the contact selection and dialling properties see pages 37 to 39.

❑ *Network address and warning messages*



[1] Selects whether to "carry out the operation on a single instrument" in the (local or remote) network, therefore the address of the selected instrument **[2]** will have to be indicated, or to "carry out the same operation on all the instrument located on the (local or remote) network"

[3] End the "communication setup" procedure, starting the transmission of the configuration to the PQT-90.

■ *Reading of instantaneous variables*

It allows the reading of all the variables in real time divided into two pages: one dedicated to the instantaneous variables and one dedicated to the meters.

After clicking the function button on the main menu bar, set the communication type, as explained from page 33, then click on the "end" button **[3]**.

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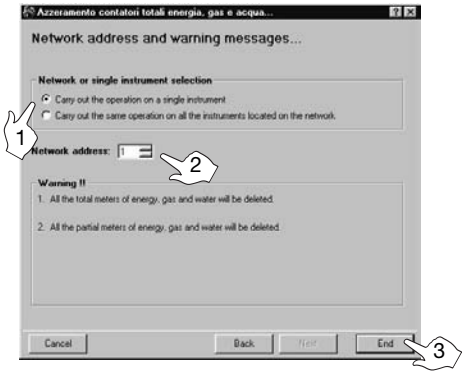
■ *Reset of partial and total meters*

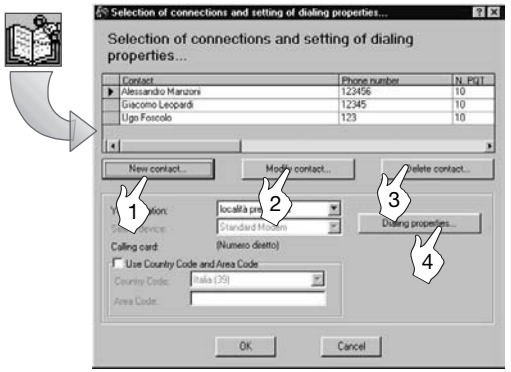
Reset all the energy, water and gas total and partial meters. After clicking on the function button on the main menu bar, set the type of communication, as explained from page 33.
At the following window:
[1] Select if the reset command is to be carried out for all the instruments located on the network or only on a single instrument.
[2] Select the network address corresponding to the required PQT. **[3]** Carry out the reset.
Steps 1 and 2 are active only for network instruments.



■ *Automatic modem configuration*

It allows the automatic configuration of the **analogic/GSM modem** for the best communication with PQT-90. Follow the instructions given in the window, then verify that the connections between modem and PC are correct, finally press the “OK” button.

❑ Selection of connections and setting of dialling properties



This function allows the selection of the list of contacts: create new contacts, modify them or remove them from the list, simply clicking on the relevant buttons.
[1] Enter a new contact in the list.
[2] Modify the data of a selected contact.
[3] Delete a selected contact.
[4] Select in detail the dialling properties and decide whether to use them or not when dialling the telephone numbers (see dialling properties on the following page).

The defined dialling properties relate to all telephone numbers present in the list. You can also decide not to use the above defined dialling properties by not ticking the relevant check box.

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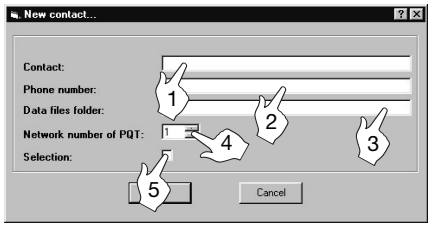
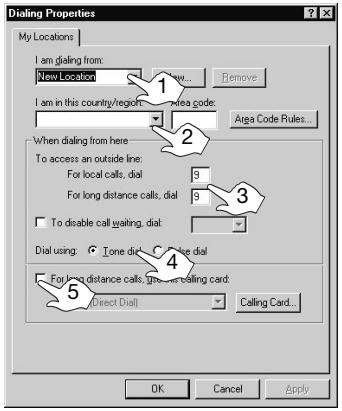


[1] Type the name of the contact
[2] Type the telephone number of the contact
[3] Type the name of the data file folder (where all the files of data downloaded from the instrument will be saved)
[4] Type the number of PQT located on the network.
[5] If selected, PQTSoft will dial this contact when the "automatic reading" working mode will be active.

❑ *Dialing properties*



[1] List the currently selected locations. To select a new location, click on "New...".
[2] Specify the area code, type it in the box on the right (.e.g. 0039 for Italy)
[3] In the first box write the number/s to be dialled to access to an external line for local calls (e.g. 0 or 9). In the second box write the number/s to be dialled to access to an external line for trunk (long distance) calls (e.g. 8). If no additional numbers are needed to make an external call, then leave these boxes empty.
[4] Specify the dialling type to be used. Select the pulse dial only if it is the only one available.
[5] If selected, the "calling card" will be used every time you call from this location (specified in the box "I am dialling from") and with any software installed in the PC.

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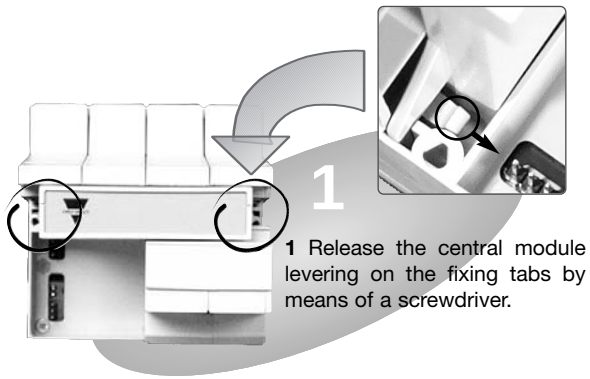
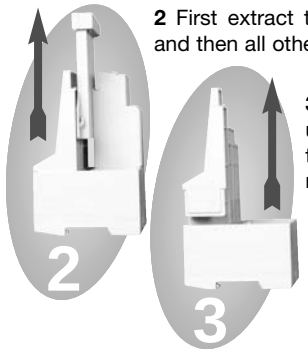
■ Preliminary Operations

Make sure that the supplied modules are placed in the correct slots as shown on the labels placed on the modules and as described on the following pages. A wrong insertion of the modules may damage the instrument.
When inserting and extracting the plug and play modules, make sure that the instrument is not connected to the power supply and that the measuring inputs are not connected.
Before powering the instrument, make sure that the power supply voltage correspond to the values on the label of the power supply module.



1 Release the central module levering on the fixing tabs by means of a screwdriver.

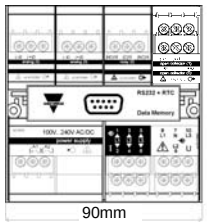


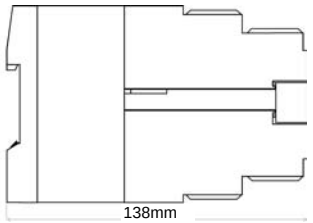
2 First extract the central dummy module and then all other modules.

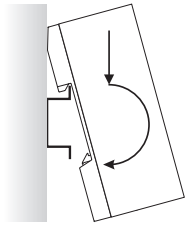
3 Extract the dummy modules and replace them with the desired plug and play modules.

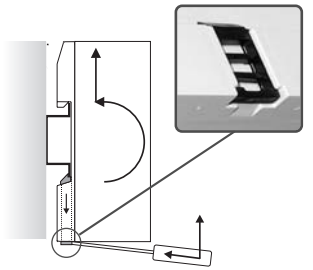
4 The last module to be placed will be the central module whose function is to lock all other modules.

■ Overall dimensions and DIN-rail mounting









52
Available modules 42

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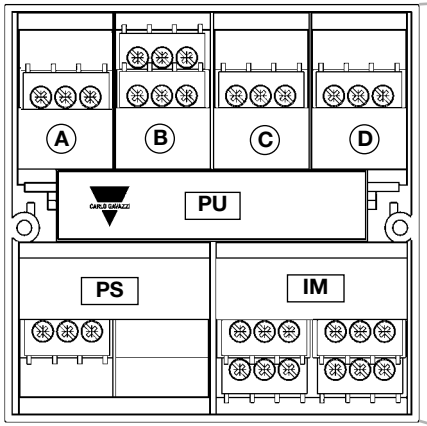
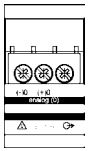
■ Position of the slots and relevant modules



DESCRIPTION	A	B	C	D	PU	PS	IM
Single analogue output	✓						
Dual analogue output	✓	✓					
RS485 serial output		✓					
RS232 serial output					✓		
Single relay output			✓	✓			
Open collector single output			✓	✓			
Dual relay output			✓	✓			
Dual open collector output			✓	✓			
Quadruple open collector output				✓			
3 digital inputs			✓				
3 digital inputs + AUX	✓		✓				
Power supply						✓	
Inputs							✓

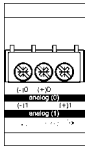
■ Available modules

❑ *Analogue output modules*



Single analogue output

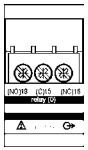
AO1050 (20mADC)	AO1054 (±20mADC)
AO1051 (10VDC)	AO1055 (±1VDC)
AO1052 (±5mADC)	AO1056 (±5VDC)
AO1053 (±10mADC)	AO1057 (±10VDC)



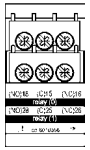
Dual analogue output

AO1026 (20mADC)	AO1030 (±20mADC)
AO1027 (10VDC)	AO1031 (±1VDC)
AO1028 (±5mADC)	AO1032 (±5VDC)
AO1029 (±10mADC)	AO1033 (±10VDC)

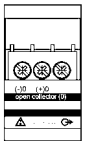
❑ Digital output open collector modules



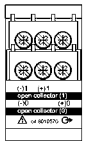
AO1058
Single relay output



AO1035
Dual relay output



AO1059
Single open collector output



AO1036
Dual open collector output

40

52

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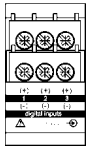
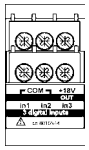
❑ *Digital input modules*

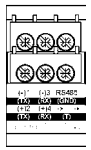


AQ1038
3 digital inputs



AQ1042
3 digital inputs + aux

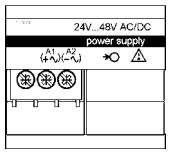
❑ *Serial output modules*



AR1034
RS485
Interface

AR1041
RS232 Interface + RTC+ 2Mb
Data Memory

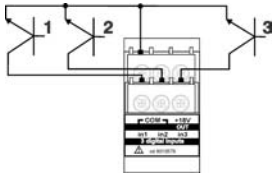
❑ *Power supply modules*



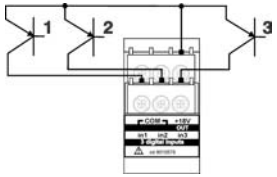
AP1020
90-260 VAC/DC Power supply
AP1021
18-60VAC/DC Power supply

■ ***Optional modules connections***

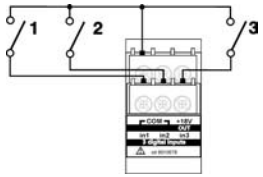
❑ *Digital inputs*



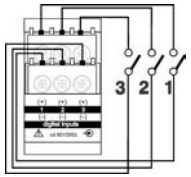
Connection by means of NPN transistor.
AQ1042
Digital inputs module.



Connection by means of PNP transistor.
AQ1042
Digital inputs module.



Connection by contacts.
Digital inputs module AQ1042.



Connection by contacts.
Digital inputs module AQ1038.

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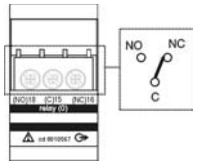
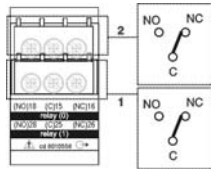
❑ *Relay outputs*

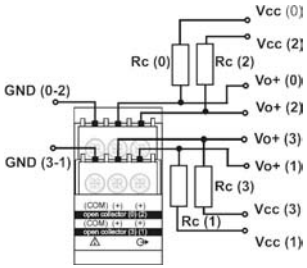


AO1058 Single relay outputs.



AO1035 Dual relay outputs.

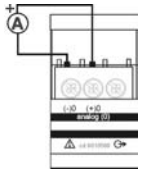
❑ *Open collector outputs*



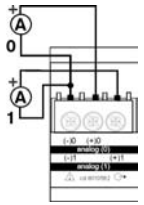
AO1059 open collector single output.
AO1036 open collector dual output.

This diagram is valid also for the single output open collector module.
The value of the load resistances (Rc) must be chosen so that the short circuit current is lower than 100 mA; the VDC voltage must be lower than or equal to 30VDC.

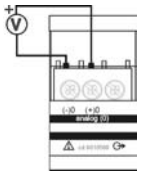
❑ *Analogue outputs*



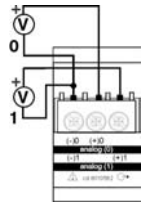
1 analogue output (mA)



2 analogue outputs (mA)



1 analogue output (V)



2 analogue outputs (V)

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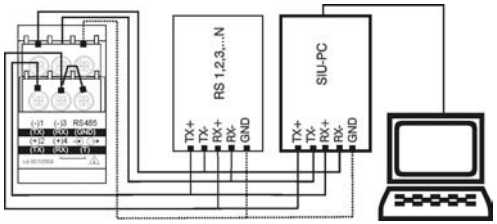
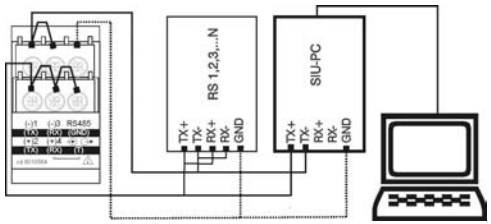
❑ *RS485/422 (AR1034) Serial port*



4-wire connection. Additional devices provided with RS485/422 (that is RS 1,2,3,...N) are connected in parallel.

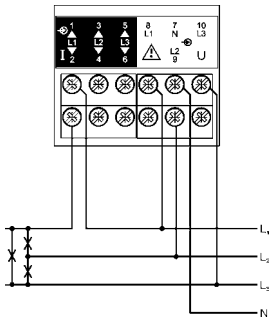


2-wire connection. Additional devices provided with RS485/422 (that is RS 1,2,3,...N) are connected in parallel.

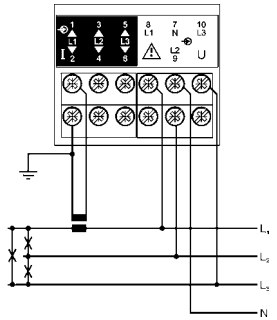
The termination of the serial output is carried out only on the last instrument of the network, by means of a jumper between (Rx+) and (T). We recommend you to use the 4-wire connection: by means of the serial port the data are exchanged faster.

■ *Electrical diagrams*

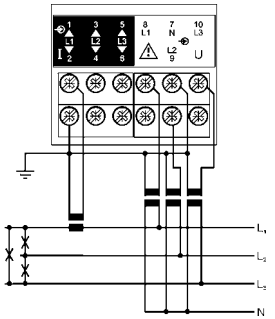
❑ *Three-phase, 3/4 wires, Balanced load*



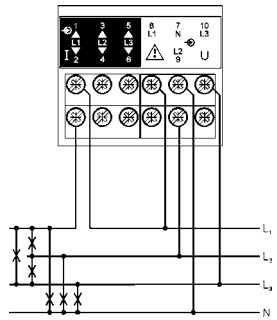
Direct connection
(3-wire system)



CT connection
(3-wire system)



CT and VT connection
(3-wire system)



Direct connection
(4-wire system)

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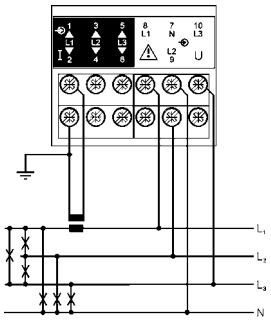
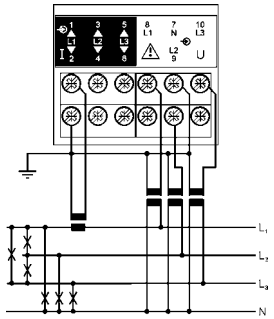
❑ *Three-phase, 4-wire connection, balanced Load*

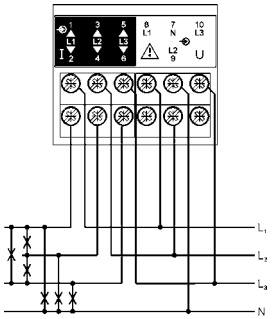


CT connection
(4-wire system)

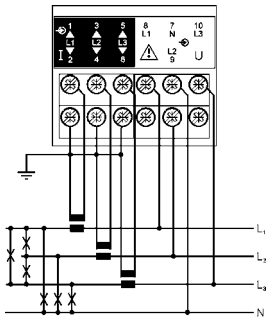


CT and VT connection
(4-wire system)

❑ *Three-phase, 4-wire connection, unbalanced load*

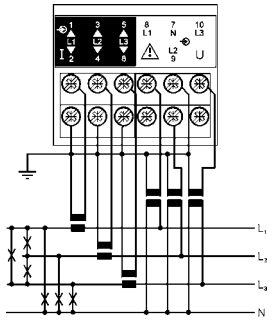


Direct connection
(4-wire system)

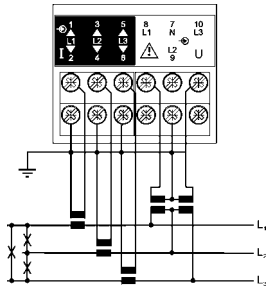


CT connection
(4-wire system)

❑ *Three-phase, 3/4 wire connection, unbalanced load*

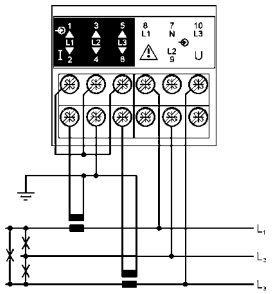


CT and VT connection
(4-wire system)

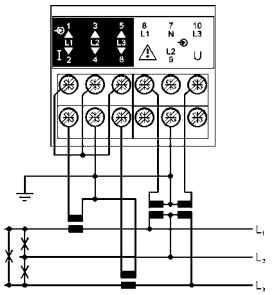


CT and VT connection
(3-wire system)

❑ *ARON connection, Three-phase, 3 wires, Unbalanced load*



ARON CT connection
(3-wire system)



ARON CT and VT con-
nection (3-wire system)

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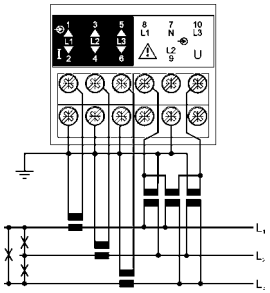
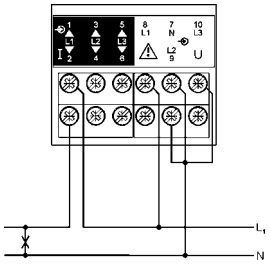
❑ *3-phase, 3-wire conn.*



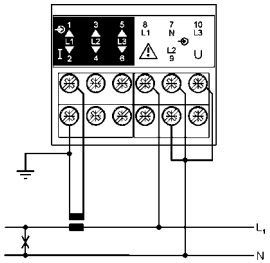
3 CT and 3 VT connection
(3-wire system)

❑ *Single phase connect.*

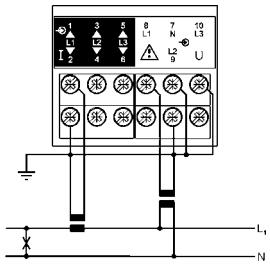


Direct connection

❑ *Single-phase connection*



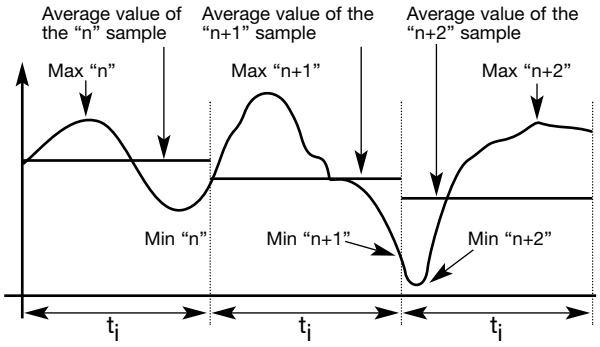
CT connection



CT and VT connection

■ *Data logging operating principle and duration*

The data logging duration depends on the number of variables that you want to log (from 1 to 8), from the selected integration time (from 1 to 60 minutes) and from the activation, if any, of the max./min. logging for each time interval. The following table simplifies the duration of the data logging according to the selections. The datum logged in the selected time interval (t_i as shown in the graph below) results from the continuous average of the measured values (samples). The average value is calculated with an interval of approx. 200 ms between two subsequent measurements (samples); as a result, the historical data value will be extremely accurate.



t_i= time interval (programmable from 1 to 60 minutes)

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Avg values	2 Sel. variables			4 Sel. variables			6 Selected variables			8 Selected variables		
Time intervals (min.)	Data logging duration			Data logging duration			Data logging duration			Data logging duration		
	DAYS	WEEKS	YEARS	DAYS	WEEKS	YEARS	DAYS	WEEKS	YEARS	DAYS	WEEKS	YEARS
1	122	17	-	81	12	-	61	9	-	49	7	-
5	610	87	1.7	407	58	1.1	305	44	-	244	35	-
10	-	174	3.4	814	116	2.2	610	87	1.7	488	70	1.3
15	-	262	5.0	-	174	3.4	915	131	2.5	732	105	2
20	-	349	6.7	-	232	4.5	-	174	3.4	976	139	2.7
25	-	436	8.4	-	291	5.6	-	218	4.2	-	174	3.4
30	-	523	10.1	-	349	6.7	-	262	5	-	209	4
35	-	610	11.7	-	407	7.8	-	305	5.9	-	244	4.7
40	-	697	13.4	-	465	8.9	-	349	6.7	-	279	5.4
45	-	785	15.1	-	523	10.1	-	392	7.5	-	314	6
50	-	872	16.8	-	581	11.2	-	436	8.4	-	349	6.7
55	-	959	18.4	-	639	12.3	-	479	9.2	-	384	7.4
60	-	-	20.1	-	697	13.4	-	523	10.1	-	418	8
Avg+Min+Max Values												
1	73	10	-	43	6	-	31	4	-	24	3	-
5	365	52	1	215	31	-	153	22	-	118	17	-
10	732	104	2	431	62	1.2	305	44	-	236	34	-
15	-	156	3	646	92	1.8	458	65	1.3	354	51	1
20	-	208	4	861	123	2.4	610	87	1.7	472	67	1.3
25	-	262	5	-	154	3	763	109	2.1	591	84	1.6
30	-	314	6	-	185	3.5	915	131	2.5	709	101	1.9
40	-	418	8	-	246	4.7	-	174	3.4	945	135	2.6
50	-	523	10.1	-	308	5.9	-	218	4.2	-	169	3.2
60	-	628	12.1	-	369	7.1	-	262	5	-	202	3.9

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Application bar: meaning of the icon

When the PC is going to start the connection with the remote instrument, one icon appears on the application bar **[1]** indicating the status of the connection.
[1] Represents a modem where two "green LEDs" flash alternately during RX and TX between a PC and a PQT.

How to use SMS messages

Once the instrument is enabled to send and receive SMS messages, the user may ask the instantaneous variables, the last available variables in the data logging, the energy meters and the alarm status. The table on next page identifies the codes to be entered in the mobile phone in order to obtain the desired information.
Generic message to be sent to the instrument: *"PQT. [instrument's password]. [code of required information]"*; then confirm the message and send it (follow the instructions given by your mobile phone).

"xxx": access password to read the variables via SMS messages. "Log1...Log8": last integrated variables stored in the flash memory (variables can be read only after programming them and enabling them).

Example: in order to ask information on the dmd variables, enter the following text: PQT.255.DMD; the reply will be: PQT.255: 12.45KWdmd, 16.04KVA dmd, 3.45kvar dmd, 0.79PF avg (where 255 is the password preset in the instrument).

Required Information	Question Code	Reply
V_{L1}, V_{L2}, V_{L3}, $V_{L-N\Sigma}$	PQT.xxx.VN	PQT.xxx:[info]
V_{L1-2}, V_{L2-3}, V_{L3-1}, $V_{L\Sigma}$	PQT.xxx.VL	PQT.xxx:[info]
A_{L1}, A_{L2}, A_{L3}, A_n	PQT.xxx.A	PQT.xxx:[info]
W_{L1}, W_{L2}, W_{L3}, W_Σ	PQT.xxx.W	PQT.xxx:[info]
VA_{L1}, VA_{L2}, VA_{L3}, VA_Σ	PQT.xxx.VA	PQT.xxx:[info]
var_{L1}, var_{L2}, var_{L3}, var_Σ	PQT.xxx.VAR	PQT.xxx:[info]
PF_{L1}, PF_{L2}, PF_{L3}, PF_Σ	PQT.xxx.PF	PQT.xxx:[info]
W_{dmd}, VA_{dmd}, var_{dmd}, PF_{avg}	PQT.xxx.DMD	PQT.xxx:[info]
Log1, Log2, Log3, Log4, Log5, Log6, Log7, Log8	PQT.xxx.LOG	PQT.xxx:[info]
Total kWh+, kvarh+, kWh-, kvarh-	PQT.xxx.TOTAL	PQT.xxx:[info]
Winter kWh+, kvarh+, kWh-, kvarh-	PQT.xxx. WINTER	PQT.xxx:[info]
Summer kWh+, kvarh+, kWh-, kvarh-	PQT.xxx. SUMMER	PQT.xxx:[info]
Holidays kWh+, kvarh+, kWh-, kvarh-	PQT.xxx. HOLIDAY	PQT.xxx:[info]
Alarm status	PQT.xxx. ALARM	PQT.xxx:[info]

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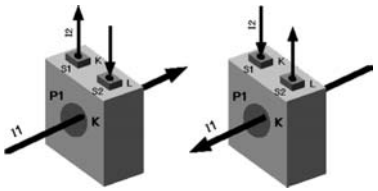
The variables measured by the instrument are correct if the inputs have been connected according to the right polarities (see figure below). Should the connection not be conforming to the right polarities, measuring and retransmission errors may occur, both due to the wrong direction of the current flowing in the primary/secondary of the ammeter transformer being connected.



What is ASY

The ASY variable allows you to control the asymmetry of the delta voltages (for systems without neutrals) and star voltages (for systems with neutral). The variable is calculated as follows:

$$ASY_{L} = 100\frac{\left[MAX(V_{L1}, V_{L2}, V_{L3}) - MIN(V_{L1}, V_{L2}, V_{L3})\right] \bullet 3}{V_{\Sigma}}$$

$$ASY_{L\text{-}N} = 100\frac{\left[MAX(V_{L1\text{-}N}, V_{L2\text{-}N}, V_{L3\text{-}N}) - MIN(V_{L1\text{-}N}, V_{L2\text{-}N}, V_{L3\text{-}N})\right] \bullet 3}{V_{L\text{-}N\Sigma}}$$

where the first formula is to be applied to delta systems, while the minimum value calculated between the two is to be used for the star systems.

Input specifications

Number of analogue inputs

Current: 1 (1-phase; system code: 3)
3 (3-phase; system code: 3)
Voltage: 1 (1-phase; system code: 3)
4 (3-phase; system code: 3)

Digital inputs

AQ1038 No. of inputs: 3 (voltage-free). Purpose: W_{dmd} measurement synchronisation + var_{dmd} and PF_{dmd}. Interfacing with watt-hour meters (+kWh, +kvarh). Tariff selection: energy. Contact measuring current: <8mA/ 17.5 to 25VDC

AQ1042 No. of inputs: 3 + excitation output

Purpose: W_{dmd} measurement synchronisation + var_{dmd}, PF_{dmd}. Interfacing with watt-hour meters (-kWh, -kvarh) and/or measurements of gas /water m^3. Tariff selection: energy or GAS.
Excitation output: 16V<+Aux<24VDC Max 15mA.
Contact measuring current: 15mA.

Common characteristics: Input frequency: Max 20 Hz, duty cycle 50%. Close contact resistance: ≤1kΩ. Open contact resistance: ≥100kΩ. Insulation: $4000V_{RMS}$ Max input number: 6 in the configuration: AQ1038+AQ1042 or 2*AQ1042

Accuracy (RS232, RS485) In: 5A, If.s.: 6A, Un: 240VL-N, Vf.s.: 300VL-N. Current (@25°C ±5°C, R.H. ≤60%, A_{L1}, A_{L2}, A_{L3}) ±0,5% RDG (0.2 to 1.2 In), ±5mA (0.02 to 0.2 In). Current (A_n) @ 40 to 100Hz ±1% RDG (0.02 to 1.2 In). Voltage (@25°C ±5°C, R.H. ≤60%) range AV5: ±0.5% RDG (from 48 to 300 V_{L-N}) ±1% RDG (from 84 to 519 V_{L-L}); range AV7: ±0.5% RDG (from 80 to 480 V_{L-N}) ±1% RDG (from 139 to 830 V_{L-L}) includes also: frequency, power supply and output load influences. Frequency: ±0.1% RDG
(40 to 440 Hz).
Active power (@ 25°C ± 5°C, R.H. ≤ 60%):
±0.5% (RDG + FS) (PF 0.5 L/C, 0.1 to 1.2 In, range AV5) or ±1% RDG (PF 0.5 L/C, 0.1 to 1.2 In, range AV5)
Reactive power (@ 25°C ± 5°C, R.H. ≤ 60%):

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±0.5% (RDG + FS) (PF 0.5 L/C, 0.1 to 1.2 In, range AV5) or ±1% RDG (PF 0.5 L/C, 0.1 to 1.2 In, range AV5)
Apparent power (@ 25°C ± 5°C, R.H. ≤ 60%):
±0.5% (RDG + FS) (0.1 to 1.2 In, range AV5) or ±1% RDG (0.1 to 1.2 In, range AV5).
Energies (@ 25°C ± 5°C, R.H. ≤ 60%): Active: class 1 according to EN61036. Reactive: class 2 according to EN61268, Ib: 5A, Imax: 6A 0.1Ib: 500mA Start-up current: 20mA Un: 240V (AV5), 400V (AV7).
Harmonic distortion: 1% FS (FS: 100%) (@ 25°C ± 5°C, R.H. ≤ 60%) phase: ±2°; Imin: 0.1Arms; Imax: 15Ap; Umin: $50V_{RMS}$; Umax: 500Vp. Sampling frequency 6400 samples/s @ 50Hz

Additional errors:
Humidity ≤ 0.3% RDG, 60% to 90% R.H.
Input frequency: ≤ 0.4% RDG, 62 to 400 Hz.
Magnetic field: ≤ 0.5% RDG @ 400 A/m
NOTE: all accuracies are referred to measurements carried out with the analogue input module.

Temperature drift: ≤ 200ppm/°C.

Sampling rate: 6400 samples/s @ 50Hz.

Measurements: current, voltage, power factor, energy, power factor, frequency, harmonic distortion. TRMS measurement of a distorted wave. Coupling type: direct. Crest factor: ≤ 3, max. 15Ap/500Vp AV5 (L-N), 15Ap/800Vp AV7 (L-N)

Ranges (impedances)
AV5: 58/100 V (> 500 kΩ) - 1 AAC (≤ 0.3 VA)
58/100 V (> 500 kΩ) - 5 AAC (≤ 0.3 VA)
240 V/415 V (> 500 kΩ) -1 AAC (≤ 0.3 VA)
240 V/415 V (> 500 kΩ) -5 AAC (≤ 0.3 VA)
AV7: 100/170 V (> 500 kΩ) -1 AAC (≤ 0.3 VA)
100/170 V (> 500 kΩ) - 5 AAC (≤ 0.3 VA)
400/690 V (> 500 kΩ) - 1 AAC (≤ 0.3 VA)
400/690 V (> 500 kΩ) - 5 AAC (≤ 0.3 VA)

Frequency: 40 to 440 Hz

Overload protection:

Continuous: voltage/current: AV5: $300V_{L-N}$ / $500V_{L-L}$ / 6A
AV7: $480V_{L-N}$ / $830V_{L-L}$ / 6A
For 1s: voltage/current: AV5: $600V_{L-N}$/$1040V_{L-L}$/120A
AV7: $960V_{L-N}$/$1660V_{L-L}$/120A

■ *Output specifications*

Analogue outputs (on request)
Number of outputs: up to 4
Accuracy: ±0.2% f.s. (@ 25°C ±5°C, R.H. ≤60%)
Range: 0 to 20 mADC, 0 to ±20 mADC 0 to ±10 mADC, 0 to ±5 mADC 0 to 10 VDC, 0 to ±10 VDC 0 to ±5 VDC, 0 to ±1 VDC
Scaling factor: programmable within the whole range of retransmission; it allows the retransmission management of all values from: 0 to 20 mADC, 0 to ±20 mADC, 0 to ±10mADC, 0 to ±5 mADC, 0 to 10 VDC, 0 to ±10 VDC, 0 to ±5 VDC, 0 to ±1 VDC. Variables to be retransmitted: all.
Response time: ≤ 200 ms typical (filter excluded, FFT excluded).
Ripple: ≤ 1% according to IEC 60688-1 and EN 60688-1.
Temperature drift: ≤ 200 ppm/°C.
Load: 20 mADC ≤ 600Ω, ±20 mADC ≤ 550Ω, ±10 mADC ≤1100Ω, ±5 mADC ≤ 2200Ω, 10 VDC ≥ 10 kΩ, ±10 VDC ≥ 10kΩ, ±5 VDC ≥ 10kΩ, ±1 VDC ≥ 10kΩ.
Insulation by means of optocouplers: 4000 V_{RMS} output to measuring input 4000 V_{RMS} output to supply input.

RS422/RS485 (on request): bidirectional (static and dynamic variables). Connections: 2 or 4 wires, max. distance: 1200m, termination directly on the module.
Addresses: from 1 to 255, software programmable.
Protocol: MODBUS RTU/JBUS. Data format: (bidirectional).
Dynamic (reading only): all variables.

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Static (writing only): all configuration parameters, energy reset, activation of digital outputs.
Data format: 1 start bit, 8 data bit, no parity/even parity/ odd parity, 1 stop bit.
Baud rate: 9600 bit/s. Insulation by means of optocouplers, 4000 V_{RMS} output to measuring input, 4000 V_{RMS} output to power supply input. **RS232 (on request):** bidirectional (static and dynamic variables). Connections: 3 wires, max. distance: 15m.
Data format: 1 start bit, 8 data bit, no parity, 1 stop bit.
Baud rate: 9600, 38400 bit/s. Protocol: MODBUS RTU (JBUS). Other features: as per RS422/485.
Communication by modem: analogue modem for the remote communication of all the data measured and managed by PQT. External communication modem (recommended type: US Robotics); GSM modem for the transmission of SMS messages: alarms, instantaneous variables, last available variables of data logging (only average values) and energy meters. The alarm messages are given with the date and the time of the event. The type and value of the set-point can be put into the alarm message (max 99 characters). The alarms can also be transmitted automatically, while the variables can be recalled by means of special SMS question codes. GSM kit type-tested for PQT: Siemens kit (external) model "TC35 TERMINAL" included GSM module, antenna and 230V power supply.
Digital outputs (on request): to be used as alarms and/or retransmission of the energy-gas-water metering and/or outputs remotely controlled by the serial communication port.
The outputs are completely programmable independently of the type of module being used.
Pulse outputs (on request): number of outputs: up to 4. Type: open collector, (NPN transistor) V_{ON} 1.2 VDC/ max. 100mA V_{OFF} 30 VDC max, from 1 to 1000 programmable pulses for k-M-G Wh, k-M-G varh. These outputs can be connected to total and/or partial meters. Pulse duration: 220 ms (ON), ≥ 220 ms

(OFF) according to DIN43864. Insulation by means of optocouplers, 4000 V_{RMS} output to measuring inputs
4000 V_{RMS} output to power supply input. Notes: the outputs can be either open collector type or relay type (for the relay output refer to the specifications described in the "alarm outputs" section).

Alarm outputs (on request):
Number of set-points: up to 4, independent
Alarm type: up alarm, down alarm, with or without latch, phase asymmetry, phase loss, neutral loss.
Monitoring of the variable: all variables.
Set point adjustment: 0 to 100% of the displayed electrical scale
Hysteresis: 0 to 100% of the electrical scale
On-time delay: 0 to 255 s
Relay status: selectable between normally energized or normally de-energized. Output type: relay, SPDT AC 1-8A, 250VAC.
DC 12-5A, 24VDC AC 15-2.5A, 250VAC DC 13-2.5A, 24VDC.
Min. response time: ≤ 150 ms, filters excluded, FFT excluded, set-point on-time delay: "0s".
Insulation: 4000 V_{RMS} output to measuring input, 4000V_{RMS} output to power supply input. Note: the outputs can be either relay type or open collector type (for the latter one, see the specifications mentioned in the pulse outputs).

Operating mode selection: direct measurements for the power quality analysis (LV or MV/HV connection); Indirect energy and power measurements by means of watt-hour meters (LV or MV/HV connection); direct measurements for the instantaneous variables (LV connection) and indirect measurements for the energy variables (LV or MV/HV). It's possible to add the management of gas and water metering to all of these working modes.
Pulse weight: water/gas meter inputs: selectable from 1 to 10000 pulses/m^3, energy from 1 to 10000.00 pulses/kWh/kvarh

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Transformer ratio: up to 6000 (CT up to 30kA).
Up to 6000 (VT up to 600kV).
Filters:
Filter operating range: 0 to 99.9% of the input electrical scale.
Filtering coefficient: 1 to 255
Filter action: display, alarms, serial outputs (fundamental variables: V, A, W and their derived ones).
Event logging: only with RS232+RTC+Data memory. Type of data: alarms and max./min. (max. 480 events) stored with date (dd:mm:yy) and hour (hh:mm:ss) reference and data logger. Sampling management: only for data logger.
The sample stored within the selected time interval results from the continuous average of the measured values. The average is calculated (min. sample) with an interval within two following measurements of approx. 200 ms. The variables (up to 8) can be stored as average value, minimum and maximum instantaneous values. Minimum is intended as lowest value among those sampled in the programmed time interval. Maximum is intended as highest value among those sampled in the programmed time interval. See table “the working mode of data logging”.
Data management type: FIFO.
Memory size: 2Mbyte.
Battery life: 10 years.
Data logger function: the data are stored at time intervals from 1 to 60 min.; up to 8 instantaneous variables can be selected.
Historical data storing time. Two different data logger modes can be selected: average calculation within the programmed time interval and minimum, maximum values and average calculation in the programmed time interval.
Data format: day, month; time: hour, minutes, seconds; type of stored variable: variable value.

■ *General Specifications*

Operating temperature: 0 to +50°C (32 to 122°F)
(R.H. < 90% non-condensing).
Storage temperature: -10 to +60°C (14 to 140°F)
(R.H. < 90% non-condensing).
Insulation reference voltage: 300 VRMS to ground (AV5 input)
Insulation: 4000 VRMS between all inputs/outputs to ground.
Dielectric strength: 4000 VRMS for 1 minute.
Noise rejection: CMRR 100 dB, 48 to 62 Hz.
EMC: EN 50081-2, EN 50082-2.
Other standards: safety IEC 61010-1, EN 61010-1.
Product: Energy Measurements: EN61036, EN61268.
Pulse output: DIN43864.
Approvals: CE, UL, CSA.
Connections: Screw-type. Max. section: 2.5 mm^2 (2x1.5mm^2)
Housing:
Dimensions 90x90x140 mm.
Material: ABS, self-extinguishing: UL 94 V-0.
Front degree protection: IP20.
Weight: approx. 600 g (packing included).

■ *Supply specifications*

AC/DC voltage: 90 to 260V (standard) 18 to 60V (on request). Power consumption: ≤ 30VA/12W (90 to 260V), ≤20VA/12W (18 to 60V).

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Harmonic distortion analysis

Analysis principle: FFT
Harmonic measurement: current, up to the 50th harmonic
Voltage, up to the 50th harmonic.
Type of harmonics:
THD (VL1) THD odd (VL1) THD even (VL1).
Same is for the other phases: L2, L3.
THD (AL1) THD odd (AL1) THD even (AL1).
Same is for the other phases: L2, L3.
Harmonic phase angle: the instrument measures the angle between the single harmonic of "V" and the single harmonic of "I" of the same order. According to the value of the "electrical angle" it is possible to know if the distortion is absorbed or generated. Note: if the system has 3 wires the angle cannot be measured.

Harmonic details: THD % / RMS value; THD even % / RMS value; THD odd % / RMS value / single harmonics in % / RMS value.
System: the harmonic distortion can be measured in single-phase, 3-wire or 4-wire systems. Tw: 0.02.

Time period management (energy, water and gas metering)

Time periods: energy, selectable: single time, dual time and multi time.
Single time: energy, water, gas.
Number of meters: 4(kWh+/kvarh+) from 0.00 to 999 999 999.99 (no partial meters) (kWh-/kvarh-) from 0.00 to -999 999 999.99
Dual time: energy, gas.
Number of total/partial meters: 4 (kWh+/kvarh+) from 0.00 to 999 999 999.99 (kWh-/kvarh-) from 0,00 to -999 999 999.99.
Time periods: 2, programmable within 24 hours.

Multi-time: energy.
Number of total meters: 4; partial meters: 48; (kWh+/kvarh+) from 0,00 to 999 999 999.99 (kWh-/kvarh-) from 0,00 to -999 999 999.99
Time periods: 4, programmable within 24 hours.
Time seasons: 3, programmable within 12 months.

Pulse output: to be connected to the total and/or partial meters (dual time, multi-time periods).

Energy metering recording: Energy consumption history, recording of energy metering by months, oldest data: 2 months before current date. Recording of total and partial energy metering. Energy metering recording (/EEPROM). Max. 999 999 999.99 kWh/kvarh.

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Installing PQTSoft Network

When the CD-ROM is inserted in the drive, the installation software is automatically executed (the CD-ROM drive is to be enabled) and the dialog box on the left is displayed. If the setup will not run, select “explore CD-ROM” and manually execute the application double clicking the icon MSetup.exe .

Then, choose the operating system and the desired language from the drop-down menus (see figure above). Press “Install” to carry on with the installation following the instructions given in the following dialog boxes.

It is recommended to save all current jobs and close all open applications before installing the PQTSoft Network.

Uninstalling PQTSoft

Select “Uninstall PQTSoft” to start the guided uninstallation of PQTSoft.

The software in brief

The PQTSoft Network has been developed for the data transfer from the instrument (PQT90) to the PC. The data download from PQT90 to the PC allows the reading and saving of the values logged in the 2MB memory of PQT; the values can be saved as an Excel table.
The PQTSoft Network has been mainly developed to automatically download the values logged in the PQT; it is therefore necessary to configure first of all the “automatic data download” dialog boxes. The data transfer can be carried out in various modes: it depends if the PQT is part of a local or of a remote network of instruments. The figure on the following page shows the possible communication modes and the correct selection to be made in the PQTSoft Network.

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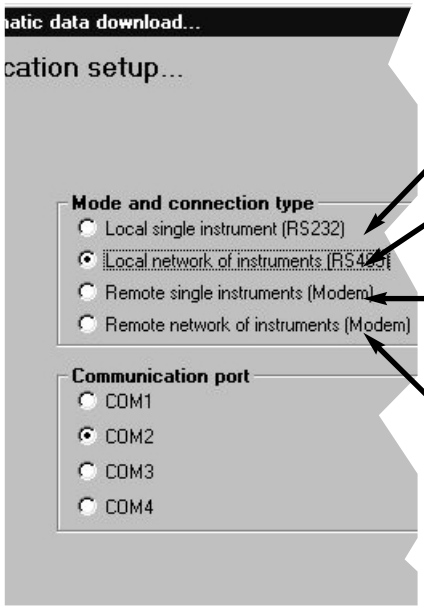
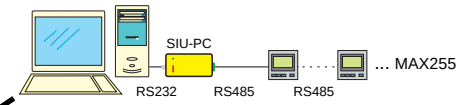
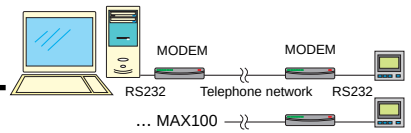


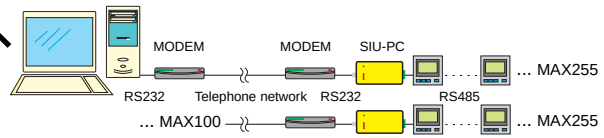
Local single PQT connected to the PC by RS232 serial port.



Maximum 255 PQT's in an RS485 local network connected to the PC by RS232 thanks to the RS485-RS232 SIU-PC converter.



Max. 100 remote single PQT's (PQTSoft can manage max. 100 phone numbers to be chosen among those listed in the phone book) connected to the PC by means of a telephone network thanks to an analogue modem (make sure that the "nullmodem" connector is always connected between PQT and modem).



Max 25,000 PQT's in max 100 remote RS485 networks (each made of 250 instruments) connected to the PC by means of a telephone network and RS485-RS232 SIU-PC converter.

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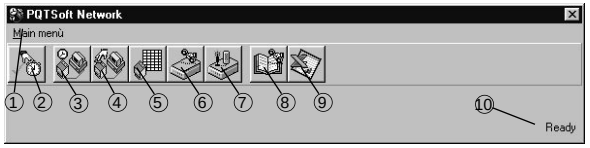
■ *Main menu*



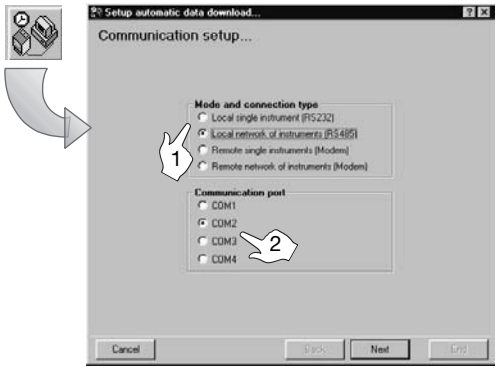
1) Drop-down menu of the functions.
2) Enabling automatic control: enables the automatic reading of the PQT-90 according to the configurations. Once the automatic reading has been enabled, the main menu disappears; the programme will be working in the background and an icon will appear in the Windows execution-bar. To delete the automatic download and restore the main menu, double click the icon in the Windows application-bar.
3) Configuration of the automatic data download: it allows the parameter configuration for the automatic download of the data.
4) Enabling of the manual data download: it allows the user to manually download the data stored in the memory of PQT-90.
5) Reading of the instantaneous variables: it allows the reading in real time of the instantaneous variables and meters.
6) Configuration of the analogue modem: it allows the automatic configuration of the analogue modem connected to the instrument.
7) Configuration of GSM modem: it allows the automatic configuration of the GSM modem connected to the instruments.
8) Management of the phone book: it allows the management of the user names and relevant phone numbers plus telephone parameters.
9) File conversion into XLS format: it converts the data files of the PQT-90 into XLS format files which can be opened by Microsoft Excel.
10) Software status: if any error occurs during the execution, their description will be displayed.

56 Meaning of the icon

■ *Configuration of the automatic data download*

This function allows the configuration for an automatic reading, at programmable dates, of the data logged in the data logger of PQT-90 (AR1041). PQTSoft will question the instrument on the programmed dates.

❑ *Communication setup*



[1] Select the currently used mode and connection type. Select the data corresponding to the PC configuration.
[2] Choose the serial port to be used.

83
Manual data-download 78

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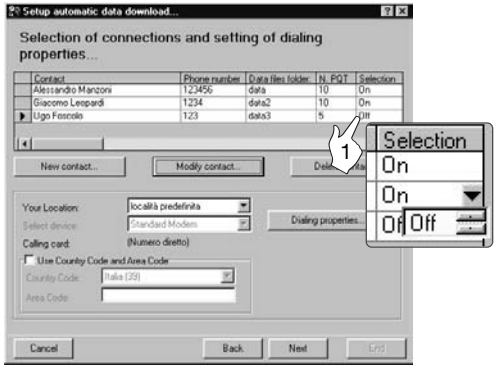
❑ *Selection of phone numbers and dialling properties*

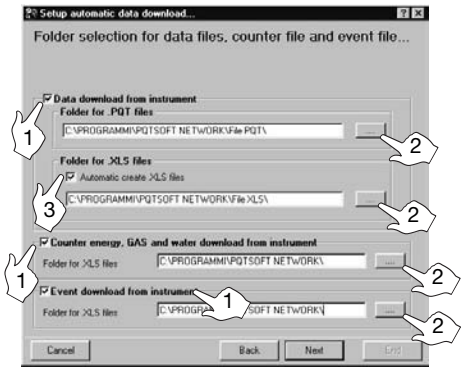


If in the "Communication setup" dialog box the option "modem" has been selected, then also the telephone number/s to be dialled by PQTSoft for the modem connection with the PQT/s remote will have to be selected. Type in the "Data file folder" column the name of the folder where the data are to be saved and type also the number of instruments related to that telephone number.

[1] Enable the desired contacts by selecting "ON" in the "Selection" column, as shown in the figure above. The PQTSoft will dial, one by one, all the enabled phone numbers, downloading the data of each related PQT; should one of the remote connections not have a positive result (e.g. the line is engaged), then PQTSoft will pass on to the following number until the list of the "ON" selected contacts is completed. Any connection error will be shown to the user.

For any further information on the "Selection of phone numbers and dialling properties", see on page 87.

❑ *Folder selection for data files, counter file and event file*



[1] Tick the box on the left to select the data to be downloaded from the data logging of the instrument relevant to the preselected variables and/or the meters and/or logged events.

[2] It is possible to select the desired directory where the data are to be saved by means of the relevant "...." button (see figure above).

[3] For the data relevant to the variables it is possible to automatically obtain the conversion into XLS format (useful to display files as Microsoft Excel) by ticking the "automatic create XLS files" check box.

Once this phase is completed, proceed with the next settings by clicking the "Next" button.

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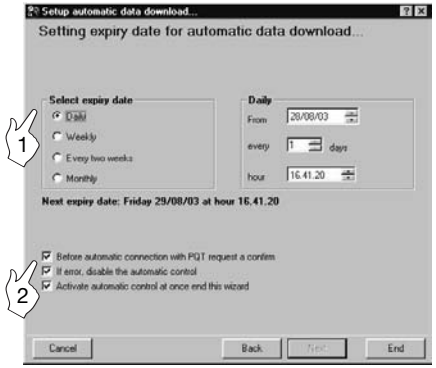
❑ *If "Local network of instruments (RS485)" was selected*

If the "Local network of instruments (RS485)" has been selected in the "communication parameter" setup, in addition to selecting the directory for the files to be saved, [1] the user also has to enter the number of PQT-90s present in the network (from 1 to 100) using the arrows in the numeric box named "Network number of PQT" (Number of PQTs located on the network). This selection box is only valid for the selection "Local network of instruments (RS485)"; for the other selections this box will not be shown.

❑ *Setting expiry date for automatic data download*



[1] Select expiry date for automatic data download

Daily: PQTSoft Network will download the data in the period specified by the "daily expiry date" box. The exact expiry date is shown in bold letters after "Next expiry date...".
Weekly: PQTSoft downloads the data once a week. The PC will download the requested data at 00,00 of the first Monday following the activation of the measurement; the next download will be carried out at intervals of one week. The date and time are shown in bold after "Next expiry date...".
Every two weeks: PQT-90 downloads the data every two weeks. The PC will download the requested data at 00,00 of the Monday following the date of activation of the measurement. The following download will be carried out at intervals of two weeks from the previous one. The date and time are shown in bold after "Next expiry date...".
Monthly: PQTSoft downloads the data monthly. The PC will download the requested data at 00,00 of the first day of each month. The date and time are shown in bold after "Next expiry date...".
Tick one of the above check boxes according to your needs. To complete the setup procedure, press the "End" button.
[2] Before automatic connection with PQT request a confirm: PQTSoft will ask the user for a confirmation before connecting to PQT.
[2] If error, disable the automatic control: should PQTSoft find an error while downloading data, it will disable the following controls.
[2] Activate automatic control at once end this wizard: PQTSoft will activate automatic control at the end of this wizard, that is when the "End" button is pressed. In this case the main menu will disappear, the software will continue working in the background and an icon will appear on the Windows application-bar.

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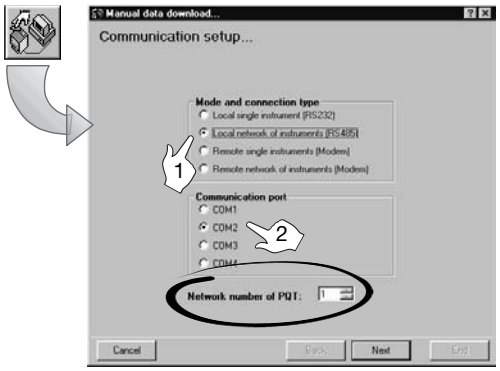
To interrupt the automatic control mode, double click the icon present on the application bar. To activate the automatic control in a second time, press the button shown on the left. The programme will disappear from the PC screen (it will continue working in the background) and an icon will appear on the Windows application bar as shown on the previous page.

■ *Manual data download*

This function allows the manual download of the data stored in the 2MB memory (AR1041) of the instrument. The PQTSoft will question the instrument at the end of the procedure shown below.



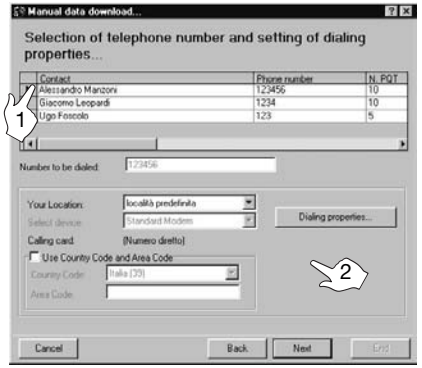
❑ *Communication setup*

[1] Select the mode and connection type of your PC.
[2] If you have chosen RS485, specify the number of PQTs

in the network as shown in the figure above. Once this procedure is ended, proceed with the next settings pressing the "Next" button.

❑ *Selection of telephone number and setting of dialling properties...*

If the option "modem" has been selected in the "Communication Setup" dialog box, then also the telephone number to be dialled by PQTSoft for the modem connection with PQT-90 will have to be selected among those available in the "Contact" list.



[1] Click the contact to select it. To proceed, press the "Next" button.
[2] For any further information on the contact selection and dialling properties see page 87.

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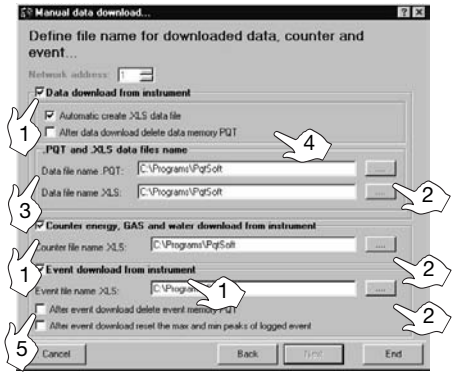
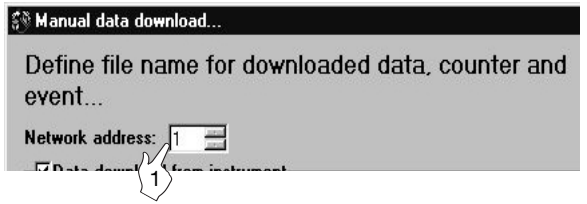
❑ *Define file name for downloaded data, counter and event....*



[1] Choose the data to download from the instrument (AR1041 module) ticking the relevant check box: these data relate to the preselected variables and/or to the meters and /or events.
[2] It's possible to select the desired directory where the data are to be saved by means of the "...." button.
[3] For the data relevant to the variables, it's possible to automatically convert the file into XLS format (Microsoft Excel format) by ticking the relevant check box ("Automatic create XLS data file"). Once this phase is ended, proceed with the next settings by pressing the "Next" button.
[4] Ticking the relevant check-box you can choose whether to delete PQT's data logging after downloading the data.
[5] Ticking the relevant check-boxes you can choose if, after reading the events, these data are to be deleted or not. You can also choose if, after reading the events, the max. and min. peak values are to be deleted.

❑ *Define file name for downloaded data, counter and event... after selecting "Local network of instruments (RS485) or remote network"*



[1] If you have selected "local or remote network of instruments" in the first page of "Communication setup", you have to enter also the address of the PQT (as shown in the figure above) from which you want to download the data; carry out this operation using the arrows in the numeric box named "Network address" (from 1 to 255). For the selections with only one instrument, this box will not be active.

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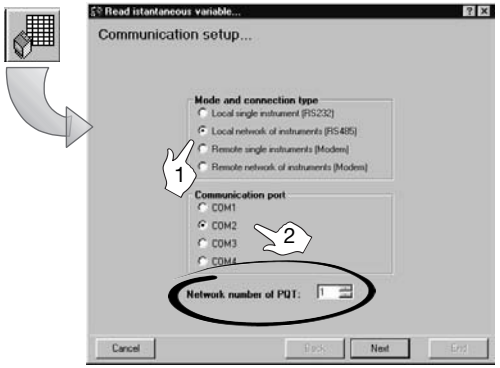
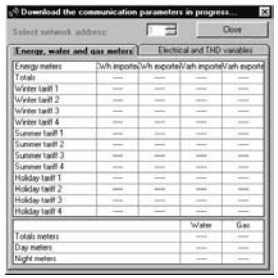
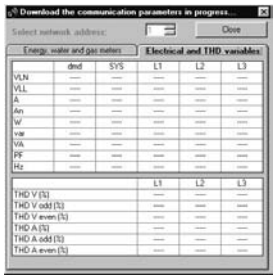
■ *Reading of instantaneous variables*

This function allows the reading of all the variables and meters in real time divided into two pages.



After clicking the “function” button on the main menu’s tool bar, set the communication type [1] and then the communication port with the PC [2]. Clicking the “end” button, the relevant dialog box (see below) will be opened.





If you have selected “local network of instruments (RS485), it is necessary to enter the number of PQTs installed in the network (see figure on page 82) moving the arrows on the right of the number up and down.

❑ *If “Modem” has been selected in the “Communication setup”*

If you have selected “modem” in the “Communication setup...” dialog box, the user will have to choose which telephone number is to be dialled among those in the “contact” list.

[1] Click the contact to select it. To proceed, press the “Next” button.

[2] For further information on the management of the contacts and the dialling properties see page 87.

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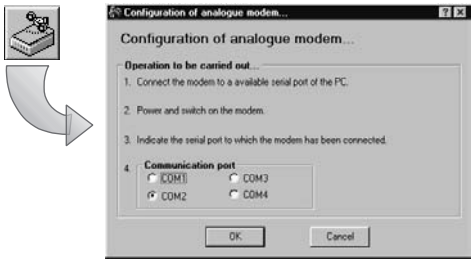
■ *Configuration of analogue modem and GSM*



Automatic configuration of analogue modem: it allows the automatic configuration of the analogue modem. Follow the instructions given in the dialogue box, then verify that the connections related to the communication between modem and PC are ok and finally click the “OK” button.

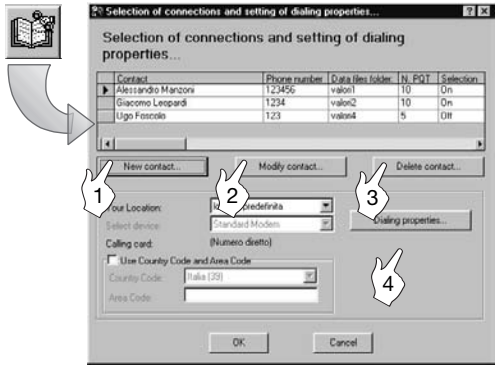
Automatic configuration of GSM modem: it allows the

automatic configuration of the GSM modem. Follow the instructions given in the dialog box, then verify that the connections related to the communication between modem and PC are ok and finally click the “OK” button.

■ *Contact management*

❑ *Selection of connections and setting of dialling properties*

This function allows the management of the contact list: cre-



ate new contacts, modify them or delete them from the contact list, easily clicking the related buttons.
[1]: enter a new contact in the list.
[2]: modify the data of the selected contact.
[3]: delete the selected contact.
[4]: Set the dialling properties in detail and decide whether to use them or not when dialling the phone numbers (see dialling properties on the following page).
The set properties relate to the dialling of all numbers present in the list.

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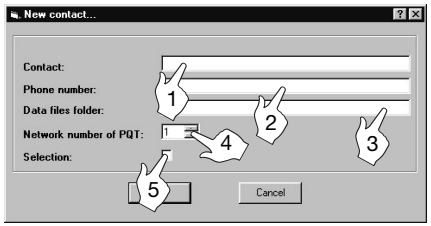
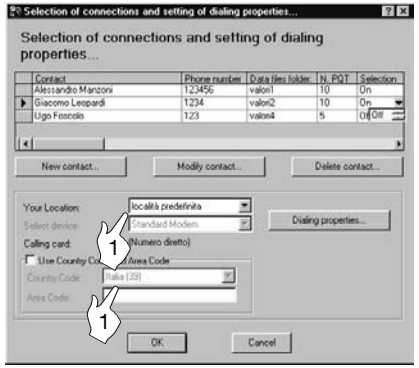
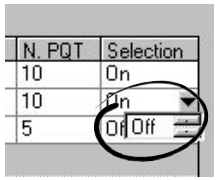


[1] Enter the name of the contact
[2] Enter the telephone number referred to the contact.
[3] Enter the name of the folder where all the files of the data downloaded by PQT will be saved.
[4] Enter the number of PQTs located on the network.
[5] If selected, PQTSoft will dial this contact when the operating mode “automatic data download” will be enabled.



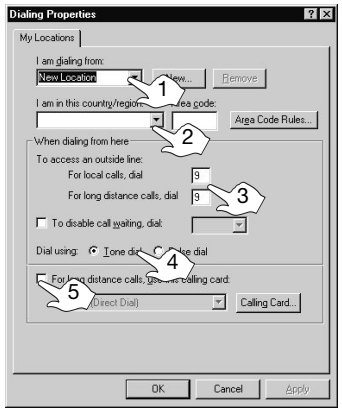
[1] Select the location chosen in the dialling properties.



It is possible to enable or disable the contacts to be dialled by PQTSoft also directly on the list clicking the “Selection” column on the line corresponding to the contact to be enabled/disabled. A drop-down menu will appear: double click “On” to enable or “Off” to disable.

❑ *Dialling properties*

[1] List the currently selected locations. To select a new



location click “New”.
[2] On the left box select the country from the list of the drop-down menu, on the right box type the area code (e.g. 0039 for Italy).
[3] In the first box type the number/s to be dialled to access an external line for local calls (e.g. “0” or “9”). In the second box type the number/s to be dialled to access an external line for trunk calls (e.g. “8”). If no number is needed to access an external line, leave the boxes empty.

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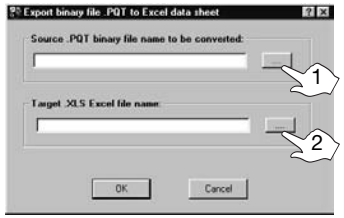
[4] Specify the dialling type to be used. Choose the pulse dialling only if it is the only one available.
[5] If it is selected, the phone card will be used every time the user is calling from this location (specified in the box “I am dialling from”) and with any software installed in the computer.

■ *PQT-90 data conversion into Excel format*

This software is supplied with a converter able to convert the data file of PQT-90 into XLS (Microsoft Excel) files.
[1] Select the directory of the Source PQT data file to be converted.



[2] Select the target directory of the converted file. Start the procedure with “OK” or cancel it with “Cancel”.

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