



USER MANUAL ConfigLQT



HUGO TILLQUIST AB
Box 1120
SE-164 22 KISTA
Sweden
Tel: +46 8 594 632 00
info@tillquist.com
www.tillquist.com

Thank you for choosing a transducer from Hugo Tillquist AB!

ConfigLQT is the software used for the configuration of our transducers via their USB port in a simple and convenient way. It is free and can be downloaded from our website: www.tillquist.com.

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1 General information

1.1 Introduction

This manual provides the information necessary for the proper use of ConfigLQT and some examples of configuration for our transducers. The information in the manual is intended for use by technically qualified personnel.

The ConfigLQT software is free and can be downloaded from our website: www.tillquist.com . We always recommend the use of the latest version of ConfigLQT.

1.2 Marking – Symbols

Our transducers are marked with the following symbols.



Double insulated device.



Warning for life-threatening or hazardous for properties situations.

1.3 Contact info

You can always contact Hugo Tillquist AB for questions about ConfigLQT. Contact info of all our colleagues is available on our website: www.tillquist.com .

1.4 Copyrights

The copyrights for this manual are reserved.

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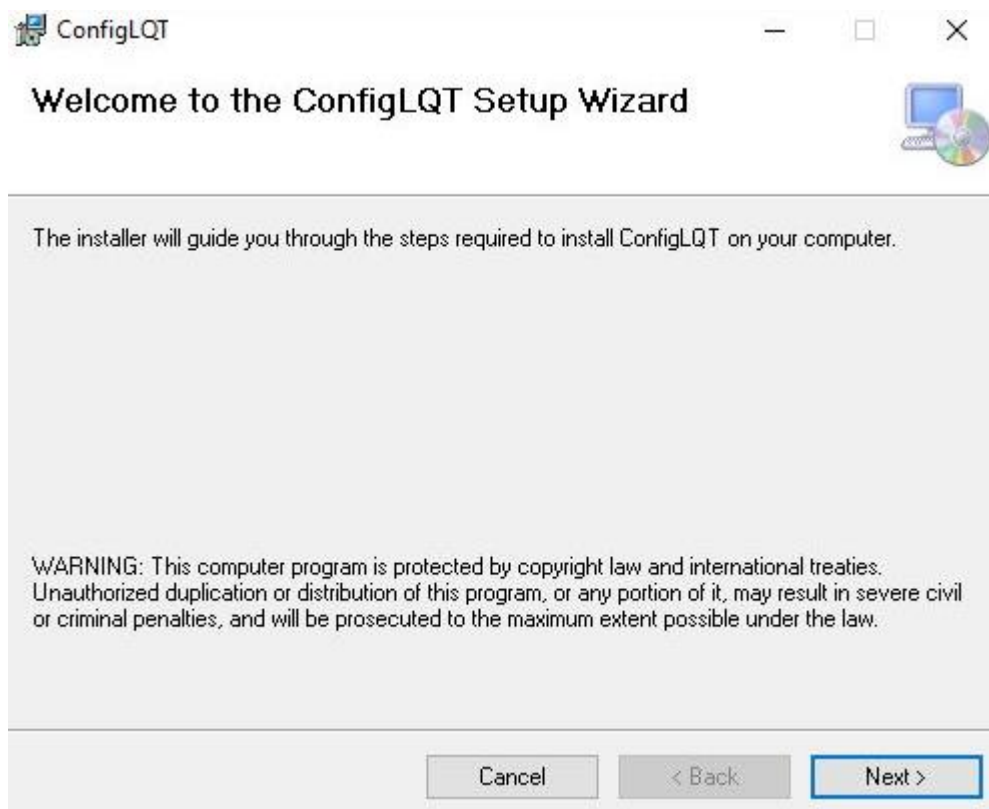
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2 Instructions

2.1 Installation of ConfigLQT

The installation kit consists of the configuration software and a driver for the USB connection. ".NET Framework" version 4.0 is a software from Microsoft, usually installed by default, that is necessary for the proper operation of ConfigLQT. If not already installed, it can be downloaded by the following link: <http://www.microsoft.com/net/>.

Download ConfigLQT from www.tillquist.com, unzip the files and install it by running the setup.



3 Configuration

3.1 Connection to computer

Connect a USB-cable between the USB-port on the device and the computer. No safety action is required while connecting the USB cable to the device.

Start ConfigLQT and click Connect.

The connection status will change to **Connected** with a green background and information about the transducer will be displayed once the connection is established.

Depending on the type of the connected transducer, various basic parameters as well as all the possible connections for 1-phase or 3-phase networks are displayed. The measured values are displayed on the screen when the transducer is connected to a measuring object. The measured values can be shown as Primary or Secondary values.

The connection and configuration process for the LQT60 transducer is following for informative purposes. Read always the respective product manual for actual specifications and different requirements.

The screenshot displays the ConfigLQTV2 software interface. The main window is titled "ConfigLQTV2" and has a menu bar with "File", "Settings", "Transducer", and "Help". Below the menu bar, there are tabs for "Measured values", "Analog outputs", "Binary outputs", and "Serial communication port". The "Measured values" tab is active.

On the left side, there is a sidebar with the "TILQUIST" logo and a "Disconnect" button. Below this, the status is "Connected" in a green box. The sidebar also displays device information: Type: LQT60-512100, S/N: 1942010003, Firmware: FWLQTV_V2.16, and Software: Version 2.0.2.113. There is a field for "Name of measuring point" and configuration options for "Primary" and "Secondary" values, including voltage (U_{L-L}) and current (I) settings. A "System connection" dropdown is set to "-11". At the bottom of the sidebar are "Read configuration" and "Apply configuration" buttons.

The main area shows a "3-phase system" configuration. It includes a "System connection" dropdown set to "-11" and a schematic diagram of a 3-phase AC system with asymmetric load. The measured values are displayed in a table:

3-phase system		L1	L2	L3
Main voltage	U12	0.00 V	0.00 V	0.00 V
Main voltage	U23	0.00 V	0.00 V	0.00 V
Main voltage	U31	0.00 V	0.00 V	0.00 V
Frequency	F	0.000 Hz	0.000 Hz	0.000 Hz

Below the table, there is a "3-phase AC-system with asymmetric load" section with the text "Measurement of current I1, I2 and I3 with 4-wire connected voltage." and a diagram showing the connection of the transducer to the 3-phase system.

3.1.1 Monitored parameters

These are the parameters that our transducers can measure.

P Power $P=S*\cos(\varphi)$ [W]	IS System current with sign
Q Reactive power $Q=S*\sin(\varphi)$ [var]	PF Power factor $PF=P/S$
S Apparent power $S=rot(3)*U_h*I_h$ [VA]	QF Reactive power factor $QF=Q/S$
U Voltage	LF = sign(Q)*(1- PF)
I Current	PA Phase angle
	F Frequency

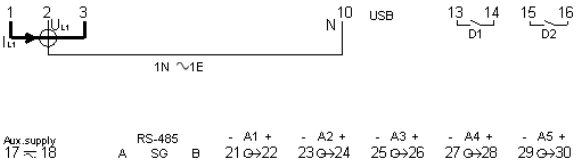
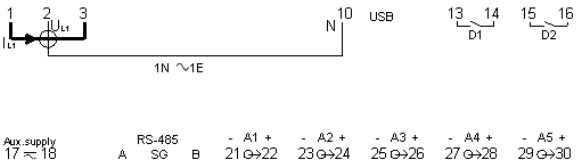
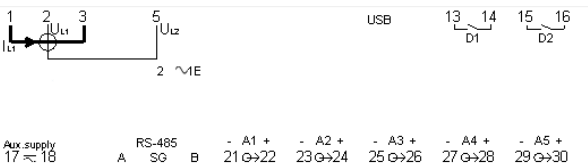

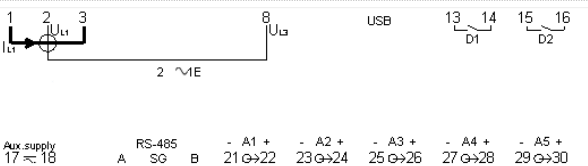
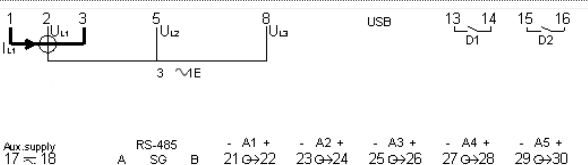
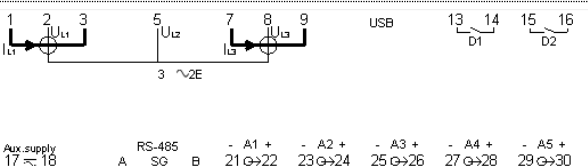
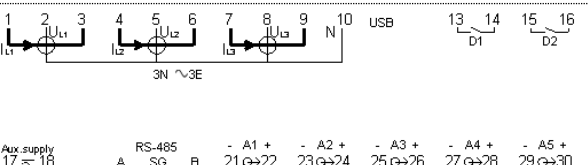
3.2 Input settings

The screenshot shows a configuration window for a measuring point. It includes a text field for the name, primary and secondary voltage and current inputs, a transformer ratio field, a system connection dropdown, and configuration options for primary or secondary values. Callout boxes provide detailed explanations for each of these elements.

- Name of measuring point:** Free text – 20 characters
- Primary:** U: V, kV, MV; I: A, kA
- Transformer ratio:** (points to the secondary voltage and current inputs)
- System connection:** For more information see page 5.
- Configuration using:** choose which values will be shown.
 - Primary values – values based on primary data.
 - Secondary values – values based on secondary values.
- Read configuration:** Read present settings from the transducer to ConfigLQT.
- Apply configuration:** Save the data to the transducer.

3.2.1 System connection

Select the appropriate diagram for the used network.

<p>-00 3-phase 1 system 4 wires 3-phase symmetrical load</p>	
<p>-01 1-phase 1 system</p>	
<p>-02 3-phase 1 system 4 wires 3-phase symmetrical load</p>	
<p>-03 3-phase 1 system 4 wires 3-phase symmetrical load</p>	
<p>-04 3-phase 1 system 4 wires 3-phase symmetrical load</p>	
<p>-05 3-phase 1 system 3 wires 3 faser symmetrisk last</p>	
<p>-09 3-fas 2 system 3-ledare 3-phase asymmetrical load</p>	
<p>-11 3-phase 3 system 4 wires 3-phase asymmetrical load</p>	

System connection	Application	I1	I2	I3	N	U1	U2	U3	U12	U23	U31	U =	I =	P =	Q =	S =
-00	4 wires 3-phase symmetrical load	X	-	-	X	X	-	-	-	-	-	U1	I1	P1*3	Q1*3	S1*3
-01	1 wire 1 phase	X	-	-	X	X	-	-	-	-	-	U1	I1	P1	Q1	S1
-02	3 wires 3-phase symmetrical load	X	-	-	-	-	-	-	X	-	-	-	-	P1U12	Q1U12	I1*U12*√3
-03	3 wires 3-phase symmetrical load	X	-	-	-	-	-	-	-	X	-	-	-	P1U23	Q1U23	I1*U23*√3
-04	3 wires 3-phase symmetrical load	X	-	-	-	-	-	-	-	-	X	-	-	P1U31	Q1U32	I1*U31*√3
-05	3 wires 3-phase symmetrical load	X	-	-	-	X	X	X	X	X	X	-	I1	P1*3	Q1*3	S1*3
-09	3 wires 3-phase asymmetrical load	X	-	X	-	X	X	X	X	X	X	-	(I1+I3)*3/2	(P1+P3)*3/2	(Q1+Q3)*3/2	(S1+S3)*3/2
-11	4 wires 3-phase asymmetrical load	X	X	X	X	X	X	X	X	X	X	(U1+U2+U3)/3	(I1+I2+I3)/3	P1+P2+P3	Q1+Q2+Q3	S1+S2+S3
-11	4 wires 3-phase asymmetrical load Open Delta	X	X	X	-	X	X	X	X	X	X	(U1+U2+U3)/3	(I1+I2+I3)/3	P1+P2+P3	Q1+Q2+Q3	S1+S2+S3

3.3 Analogue outputs

Click **Analogue Outputs** tab to configure the analogue outputs.

The screenshot displays the 'Analogue outputs' configuration window. It features five panels, each for an analogue output channel. Each panel includes a status selector (On, Fixed output, Off), a 'Measured value' dropdown menu, a 'Rows' spinner, and an 'Input Secondary' table with columns for 'Input Secondary' and 'Output value'. At the bottom of each panel is a summary table showing the current 'Measured value' and 'Output value'.

Output	Measured value	Rows	Output value
Analog output 1	P	3	0.000 [mA]
Analog output 2	Q	3	0.000 [mA]
Analog output 3	U12	2	4.000 [mA]
Analog output 4	U23	2	4.000 [mA]
Analog output 5	U31	2	4.000 [mA]

The analogue outputs can be freely configured to the desired measured quantity within the allowed measuring range. Select the quantity you want to measure using the drop-down list. In the **Input Secondary** field, the start values are to be written in the first space, any breakpoints afterwards and the end value at last. Under **Output Value** the corresponding values of the output signal shall be indicated.

Click *Apply configuration* to transfer and save the new settings in the transducer.

To simulate the outputs for testing purposes, choose Fixed Output, fill in the desired value and click *Apply configuration*.

3.3.1 Measured quantities

Prefix	Quantity	Calculation	System / Phase
I	Input current	$(I1+I2+I3)/3$	System
I1	Phase current L1		L1
I2	Phase current L2		L2
I3	Phase current L3		L3
U	Input voltage	$(U1+U2+U3)/3$	System
U1	L1 Phase voltage		L1
U2	L2 Phase voltage		L2
U3	L3 Phase voltage		L3
P	Active power	$P1+P2+P3$	System
P1	Active power L1		L1
P2	Active power L2		L2
P3	Active power L3		L3
Q	Reactive power	$Q1+Q2+Q3$	System
Q1	Reactive power L1		L1
Q2	Reactive power L2		L2
Q3	Reactive power L3		L3
S	Apparent power	$S1+S2+S3$	System
S1	Apparent power L1		L1
S2	Apparent power L2		L2
S3	Apparent power L3		L3
U12	Main voltage L1-L2		L1 - L2
U23	Main voltage L2-L3		L2 - L3
U31	Main voltage L3-L1		L3 - L1
PF	Active power factor	P/S	System
PF1	Active power factor	$\cos(\phi1)=P1/S1$	L1
PF2	Active power factor	$\cos(\phi2)=P2/S2$	L2
PF3	Active power factor	$\cos(\phi3)=P3/S3$	L3
QF	Reactive power factor	Q/S	System
QF1	Reactive power factor	$\sin(\phi1)=Q1/S1$	L1
QF2	Reactive power factor	$\sin(\phi2)=Q2/S2$	L2
QF3	Reactive power factor	$\sin(\phi3)=Q3/S3$	L3
LF	LF factor	$\text{sign}(Q)*(1- PF)$	System
LF1	LF factor	$\text{sign}(Q1)*(1- PF1)$	L1
LF2	LF factor	$\text{sign}(Q2)*(1- PF2)$	L2
LF3	LF factor	$\text{sign}(Q3)*(1- PF3)$	L3
PA	Phase angel	$PA=(PA1+PA2+PA3)/3$	System
PA1	Phase angel	$\phi1=\arccos(P1/S1)/PI*180*\text{sign}(P1)$	L1
PA2	Phase angel	$\phi2=\arccos(P2/S2)/PI*180*\text{sign}(P2)$	L2
PA3	Phase angel	$\phi3=\arccos(P3/S3)/PI*180*\text{sign}(P3)$	L3
IS	Input current with sign	$(IS1+IS2+IS3)/3$	System
IS1	Phase current with sign	$I1*\text{sign}(P1)$	L1
IS2	Phase current with sign	$I2*\text{sign}(P2)$	L2
IS3	Phase current with sign	$I3*\text{sign}(P3)$	L3
P_I1_U12	Active power, System connection-02		System
P_I1_U23	Active power, System connection -03		System
P_I1_U31	Active power, System connection -04		System
Q_I1_U12	Reactive power, System connection -02		System
Q_I1_U23	Active power, System connection -03		System
Q_I1_U31	Active power, System connection -04		System
F	Frequency		System
Fixed Output	Fixed output		

3.3.2 Example of settings for the analogue outputs

U12	Measuring main voltage	Secondary	Output	
	L1-L2	0	4	
	IN: 0 – 137,5 V	137,5	20	
	OUT: 4 – 20 mA			
I1	Measuring current I1	Secondary	Output	
	IN: 0 – 5 A	0	0	
	OUT: 0 – 20 mA	5	20	
P	Measuring total power	Primary	Output	
	IN: ±50 MW	-50	-20	
	OUT: ±20 mA	50	20	
Q	Measuring total power	Primary	Output	
	IN: ±28 MVar	-28	-20	
	OUT: ±20 mA	28	20	
U12	Measuring main voltage	Secondary	Output	
	L1-L2 with voltlug.	0	4	
	IN: 0-90-137,5 V	90	8	
	OUT: 4-8-20 mA	137,5	20	
F	Measuring frequency	Secondary	Output	
	45 – 55 Hz	45	4	
	IN: 45 – 55 Hz	55	20	
	OUT: 4 – 20 mA			

3.4 Other outputs

3.4.1 Energy pulses

Under the **Binary outputs** tab, you can change the settings for the output mode, type of energy and direction of measurement. You just need to fill in the pulse frequency and all other quantities are calculated automatically.

The screenshot shows the 'Binary outputs' configuration page with two columns for 'Binary output 1' and 'Binary output 2'. Each column has a 'Hardware limits' section below the main settings.

Binary output 1 settings:

- Output mode: Pulse mode
- Energy of P or Q: Active energy P
- Direction: Exported
- Pulse frequency: 500 imp/kWh Secondary
- Pulse frequency: 476.3 imp/h
- Pulse value: 0.025 imp/kWh Primary
- Pulse value: 40 kWh/imp Primary
- Pulse length: 50 ms

Binary output 2 settings:

- Output mode: Pulse mode
- Energy of P or Q: Active energy P
- Direction: Imported
- Pulse frequency: 500 imp/kWh Secondary
- Pulse frequency: 476.3 imp/h
- Pulse value: 0.025 imp/kWh Primary
- Pulse value: 40 kWh/imp Primary
- Pulse length: 50 ms

Hardware limits of Binary output 1:

- Max pulse frequency: 10000 imp/h
- Min pulse length: 50 ms
- Max voltage: 110 V
- Max current: 0.1 A
- Binary output type: Solid State Relay

Hardware limits of Binary output 2:

- Max pulse frequency: 10000 imp/h
- Min pulse length: 50 ms
- Max voltage: 110 V
- Max current: 0.1 A
- Binary output type: Solid State Relay

3.4.2 Modbus

Choosing the **Serial communication port** tab you can change the modbus settings. There are different mapping profiles to choose from. You can also find all necessary information about RS-485 settings under the **Modbus** tab.

The screenshot shows the 'Modbus' configuration page. On the left, there are 'Modbus Protocol Settings' and 'RS-485 Settings'. On the right, there is a 'Mapping' section with a table titled 'Modbus Mapping 1'.

Modbus Protocol Settings:

- Slave ID: 247
- Mapping: Modbus map 001
- Mode: RTU

RS-485 Settings:

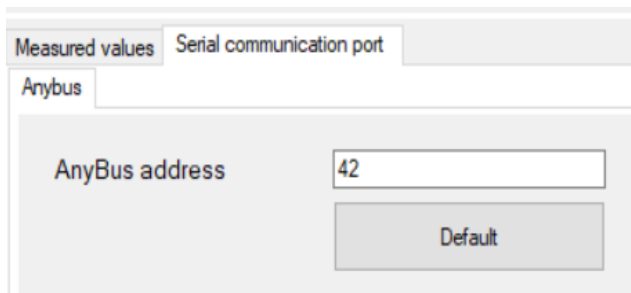
- Baud Rate: 19200
- Parity: Even parity
- Stop Bits: One stop bit

Modbus Mapping 1 Table:

adr	format	parameter	explanation
0	binary32	F Hz	Frequency system
2	binary32	I A	Input current system $I = (I1+I2+I3)/3$
4	binary32	I1 A	Phase current L1
6	binary32	I2 A	Phase current L2
8	binary32	I3 A	Phase current L3
10	binary32	U V	Input voltage system $U = (U1+U2+U3)/3$
12	binary32	U1 V	Phase voltage L1-N
14	binary32	U2 V	Phase voltage L2-N
16	binary32	U3 V	Phase voltage L3-N
18	binary32	U12 V	Main voltage L1-L2

3.4.3 Profibus / Profinet

Here you can set the address for the anybus or choose **default**. The GSD file is available to download from our webpage: www.tillquist.com .



Measured values Serial communication port

Anybus

AnyBus address 42

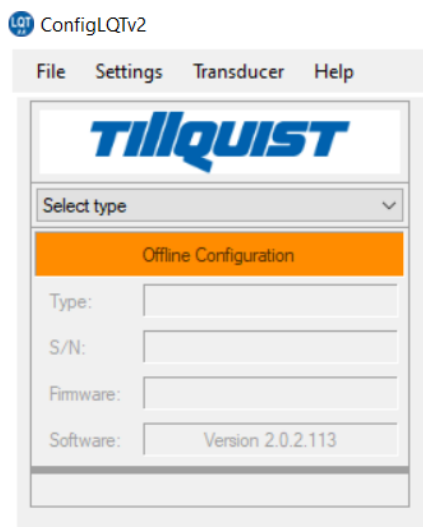
Default

3.5 Offline configuration

Follow the next steps to make a configuration in offline mode.

1. Select *Transducer* menu -> Configuration Mode -> Offline Configuration.
2. Choose the desired type of transducer from the drop-down list.

You can now see the text 'Offline Configuration' with orange background at **Connection status** field.



3.6 Save / Open a saved configuration

The configured parameters of a transducer can be saved to a file which can easily be downloaded to other transducers.

3.6.1 Save a configuration to a file

1. Select *File* menu and click *Save as*.
2. Write a file name and choose a desired folder.
3. Click *Save*.

3.6.2 Open a configuration from a saved file

1. Select *File* menu and click *Open file*.
2. Choose the desired configuration file (XML-dokument).
3. Click *Open*.

4 Firmware upgrade

The firmware of our transducers can be upgraded with the ConfigLQT software. To do so, connect the transducer to the computer with a USB cable.

1. Start ConfigLQT.
2. Select *Firmware Upgrade* from *Transducer* menu.
3. Choose the file with the new firmware and click *Upgrade*.
4. When the upgrade is done, the auxiliary voltage must be disconnected so that the transducer restarts, allowing the new firmware to take effect.
5. Check that the right firmware version is displayed among the transducer's data.