LQT40F

DIN rail, fully programmable, high accuracy, Tillquist's LQT40F Fast multi-transducer, can measure all electrical quantities with a very fast response time continuously available on Profibus or Profinet. This transducer can be used with a wide range of AC and DC auxiliary supply and can easily be programmed through its USB micro standard port and Tillquist's ConfigLQT free configuration software.

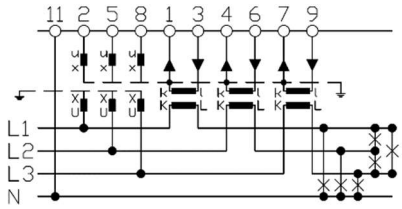
Technical Data		Details
Input	Voltage range (Un)	100 – 400 V (L-L) main voltage (nominal)
	Measuring range	1 – 520 V TRMS L-L 50/60 Hz 1 - 520 V TRMS L-L 16⅔ Hz
	Frequency	50/60 Hz (10…40….70…120 Hz)
	Overload voltage	1.5 x Un – continuously 2 x Un – 10 s
	Consumption	≤U² / 1.32 MΩ
	Impedance	1.32 MΩ per phase
	Current (In)	1 – 5 A
	Measuring range	5 mA – 10 A TRMS
	Overload current	2 x In continuously, 10 x In 15 s, 40 x In 1 s
	Consumption	<0.05 VA / phase
	Auxiliary power supply	24 – 230 VDC / 90 – 230 V AC ±10 %
	Burden	max 4W / 9 VA
Output	Communication	Profibus DP-V1 or Profinet
	Programmable data sets	3 options (see data set mapping on page 3)
	Accuracy U, I, P, Q (40…70mHz) F	0.2 10 mHz or 5 mHz with test certificate
	Response time	<20 msec
Measured Quantities	F, U12, U23, U31, U, I, P, Q, LF and PA (see data set mapping on page 4)	
General Data		
	Galvanic isolation	Supply, in- and output are galvanically isolated
	Connection terminals/Torque	Input & auxiliary: 6 mm² / 0.8 Nm Output: 2.5 mm² / 0.5 Nm
	Humidity	95% non-condensing
	USB	USB Micro-B, port for configuration
	Temperature	-10…+55 °C (operation) -40…+70 °C (storage) Temperature coefficient < 0.1 % / 10 °C
	Inputs	overvoltage cat. III
	Pollution degree	2
	Dimension (W x H x D)	70 x 132 x 101 mm
	Weight	330 gr
	Protection	IP40 (housing), IP20 (terminals)
	Standards	SS-EN IEC 60688:2021 Transducers SS-EN 61010-1 Safety EN 61000-6-2 / -6-4 / -6-5

Publishing date: 20240613

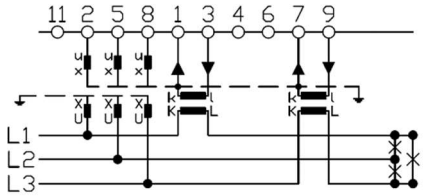
Tillquist Group AB
Box 1120, SE-164 22 Kista, Sweden
Finlandsgatan 16, Kista
Tel. Int +46 8 594 632 00
www.tillquist.com

Configurable System Connection

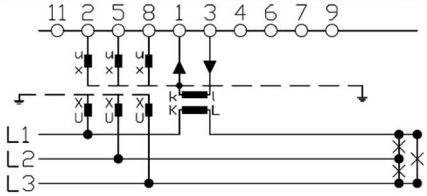
Code	Application	I1	I2	I3	N	U1	U2	U3	U12	U23	U31
00	4wire, 3 phase symmetric load	X	-	-	X	X	-	-	-	-	-
01	1-wire, 1 phase	X	-	-	X	X	-	-	-	-	-
02	3-wire, 3 phase symmetric load	X	-	-	-	-	-	-	X	-	-
03	3-wire, 3 phase symmetric load	X	-	-	-	-	-	-	-	X	-
04	3-wire, 3 phase symmetric load	X	-	-	-	-	-	-	-	-	X
05	3-wire, 3 phase symmetric load	X	-	-	-	X	X	X	X	X	X
09	3-wire, 3 phase asymmetric load	X	-	X	-	X	X	X	X	X	X
11	4-wire, 3 phase asymmetric load	X	X	X	X	X	X	X	X	X	X
11	4-wire, 3 phase asymmetric load Open Delta	X	X	X	-	X	X	X	X	X	X



Connection -11



Connection -09



Connection -05

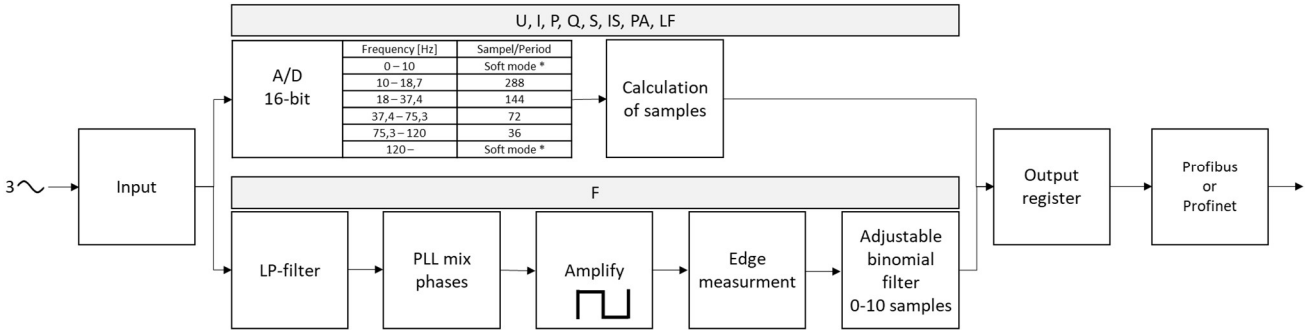
Measuring Process

PLL 10 to 120Hz The measuring system uses a phase-locked loop (PLL) between 10-120Hz where all quantities are System measured. The number of samples per period depends on the frequency.

Soft Mode outer range A fixed sample rate of 1800 samples/second (soft mode) is used when the frequency is lower than 10Hz or higher than 120Hz. Measured quantities in soft mode are voltage (U), current (I) and frequency (F).

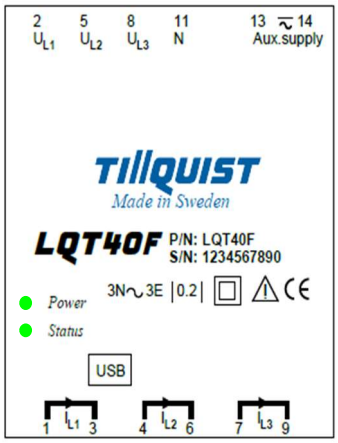
Frequency Filter The frequency is binomial low-pass filtered. The filter's length is determined by the period of the measured frequency that can be selected between 0 and 10. The shorter the lengths the faster the measurements, while longer ones are more stable.

Measuring Process Diagram

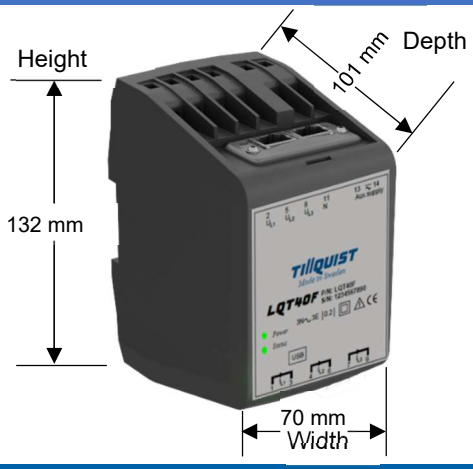


Connections

LQT40F



Dimensions



Publishing date: 20240613

Tillquist Group AB
Box 1120, SE-164 22 Kista, Sweden
Finlandsgatan 16, Kista
Tel. Int +46 8 594 632 00
www.tillquist.com

Data Set A (Basic) and B (Basic with High resolution Frequency

Parameter	Range	Unit	Description	Measured	Value	Bus Value	Type	Byte	A Basic	B Basic + High Resolution F
Bus Inc	-	-	Bus Increment	-	-	0-65535	Unsigned Word	1-2	X	X
Data Inc	-	-	Data Increment	-	-	0-65535	Unsigned Word	3-4	X	X
I_RMS	0-12	A	Phase Current	System	I = (I1+I2+I3)/3	0-65535	Unsigned Word	5-6	X	X
U_RMS	0-300	V	Voltage	System	U= (U1+U2+U3)/3	0-65535	Unsigned Word	7-8	X	X
P_RMS	±10800	W	Active Power	System	P= (P1+P2+P3)/3	±10800000	Signed Double Word	9-12	X	X
Q_RMS	±10800	Var	Reactive Power	System	Q= (Q1+Q2+Q3)/3	±10800000	Signed Double Word	13-16	X	X
F	0-300	Hz	System Frequency	System	F	0-65535	Unsigned Word	17-18	X	X
F_Hires	0-300	Hz	High Resolution F	System	F	0-300000	Unsigned Double Word	19-22	-	X

Data set C (Extended)

Paramete	Range	Unit	Description	Measured	Value	Bus Value	Type	Byte	C Extended
Bus Inc	-	-	Bus Increment	-	-	0-65535	Unsigned Word	1-2	X
Data Inc	-	-	Data Increment	-	-	0-65535	Unsigned Word	3-4	X
I_RMS	0-12	A	Phase Current	System	I = (I1+I2+I3)/3	0-12000	Unsigned Double Word	5-8	X
U_RMS	0-300	V	Voltage	System	U= (U1+U2+U3)/3	0-300000	Unsigned Double Word	9-12	X
P_RMS	±10800	W	Active Power	System	P= (P1+P2+P3)/3	±10800000	Signed Double Word	13-16	X
Q_RMS	±10800	Var	Reactive Power	System	Q= (Q1+Q2+Q3)/3	±10800000	Signed Double Word	17-20	X
F	0-300	Hz	High Resolution F	System	F	0-300000	Unsigned Double Word	21-24	X
I1	0-12	A	Phase Current	L1	I1	0-12000	Unsigned Double Word	25-28	X
I2	0-12	A	Phase Current	L2	I2	0-12000	Unsigned Double Word	29-32	X
I3	0-12	A	Phase Current	L3	I3	0-12000	Unsigned Double Word	33-36	X
U1	0-300	V	Phase Voltage	L1-N	U1	0-300000	Unsigned Double Word	37-40	X
U2	0-300	V	Phase Voltage	L2-N	U2	0-300000	Unsigned Double Word	41-44	X
U3	0-300	V	Phase Voltage	L3-N	U3	0-300000	Unsigned Double Word	45-48	X
U12	0-520	V	Phase-Phase Voltage	L1-L2	U12	0-520000	Unsigned Double Word	49-52	X
U23	0-520	V	Phase-Phase Voltage	L2-L3	U23	0-520000	Unsigned Double Word	53-56	X
U31	0-520	V	Phase-Phase Voltage	L3-L1	U31	0-520000	Unsigned Double Word	57-60	X
P1	±3600	W	Active Power	L1	P1	±3600000	Signed Double Word	61-64	X
P2	±3600	W	Active Power	L2	P2	±3600000	Signed Double Word	65-68	X
P3	±3600	W	Active Power	L3	P3	±3600000	Signed Double Word	69-72	X
Q1	±3600	Var	Reactive Power	L1	Q1	±3600000	Signed Double Word	73-76	X
Q2	±3600	Var	Reactive Power	L2	Q2	±3600000	Signed Double Word	77-80	X
Q3	±3600	Var	Reactive Power	L3	Q3	±3600000	Signed Double Word	81-84	X
LF	±1	-	LF Factor	System	LF=sign(Q) x (1-|PF|)	±1000	Signed Double Word	85-88	X
PA	±180	Deg	Phase Angle ϕ	System	PA= (1+2+3)/3	±180000	Signed Double Word	89-92	X

Data set mapping selection options

A: Basic
B: Basic + High Resolution F
C: Extended

Bus Increment Number increases with every new message
Data Increment Number increases with every new measurement

The Profibus DP address is set via ConfigLQT
The Profinet address parameters are set via the free software HMS IPconfig, that is downloadable from Tillquist homepage
The Profinet has a built-in webserver that can be accessed by entering the IP-address in a web browser

Publishing date: 20240613

Sample Test Certificate

A high precision routine test certificate can be issued for the special products LQT40F-10201 and LQT40F-20201 guaranteeing a measurement accuracy better than 5 mHz within 45-65 Hz range. Other type of certificates can be requested, customized, and issued according to the client's needs on request.

FREQUENCY ROUTINE TEST CERTIFICATE

Produkt / Product LQT40F-20201	Serial No. 2240010029	
Tillverkare / Manufacturer Tillquist Group AB	Calibration Date: 19-10-22	

Input: 0...300 V L-N / 0...5 A
System connection: -11, 3-phase, 4-wire system
Output: Profinet (M40)
Aux supply: 24-230 VDC / 90-230 VAC

FW LQT40 V1.0

Frequency filter length 1 period (binomial)

	Input				Output							Deviation value (10 readings)	
	V (L-N)	A	el°	Hz	Read ConfigLQT			exp. Profinet		Out Profinet		Min	Max
1	63.5	0.000	0	45.000	F	45.000	Hz	45000	UDW	45000	UDW	45000	45000
2	63.5	0.000	0	49.000	F	49.000	Hz	49000	UDW	49000	UDW	49000	49000
3	63.5	0.000	0	49.500	F	49.500	Hz	49500	UDW	49500	UDW	49500	49500
4	63.5	0.000	0	49.503	F	49.503	Hz	49503	UDW	49503	UDW	49503	49503
5	63.5	0.000	0	49.899	F	49.899	Hz	49899	UDW	49899	UDW	49899	49899
6	63.5	0.000	0	49.900	F	49.900	Hz	49900	UDW	49900	UDW	49900	49900
7	63.5	0.000	0	49.901	F	49.901	Hz	49901	UDW	49901	UDW	49901	49901
8	63.5	0.000	0	49.999	F	49.999	Hz	49999	UDW	49999	UDW	49999	49999
9	63.5	0.000	0	50.000	F	50.000	Hz	50000	UDW	50000	UDW	50000	50000
10	63.5	0.000	0	50.001	F	50.001	Hz	50001	UDW	50001	UDW	50001	50001
11	63.5	0.000	0	50.099	F	50.099	Hz	50099	UDW	50099	UDW	50099	50099
12	63.5	0.000	0	50.100	F	50.100	Hz	50100	UDW	50100	UDW	50100	50100
13	63.5	0.000	0	50.101	F	50.101	Hz	50101	UDW	50101	UDW	50101	50101
14	63.5	0.000	0	50.497	F	50.497	Hz	50497	UDW	50497	UDW	50497	50497
15	63.5	0.000	0	50.500	F	50.500	Hz	50500	UDW	50500	UDW	50500	50500
16	63.5	0.000	0	51.000	F	51.000	Hz	51000	UDW	51000	UDW	51000	51001
17	63.5	0.000	0	55.000	F	55.000	Hz	55000	UDW	55000	UDW	55000	55001
18	63.5	0.000	0	65.000	F	65.000	Hz	65000	UDW	65000	UDW	65000	65001

Output Frequency High Resolution 0-300 Hz - Unsigned double word, byte 19-22

Provutrustning / Test Equipment
Generator: Omicron CMC256-6, S/N: BJ630F/100096594
ConfigLQT ver. 2.0.2.121

The unit has a measurement accuracy better than 5 mHz within the frequency range 45-65 Hz

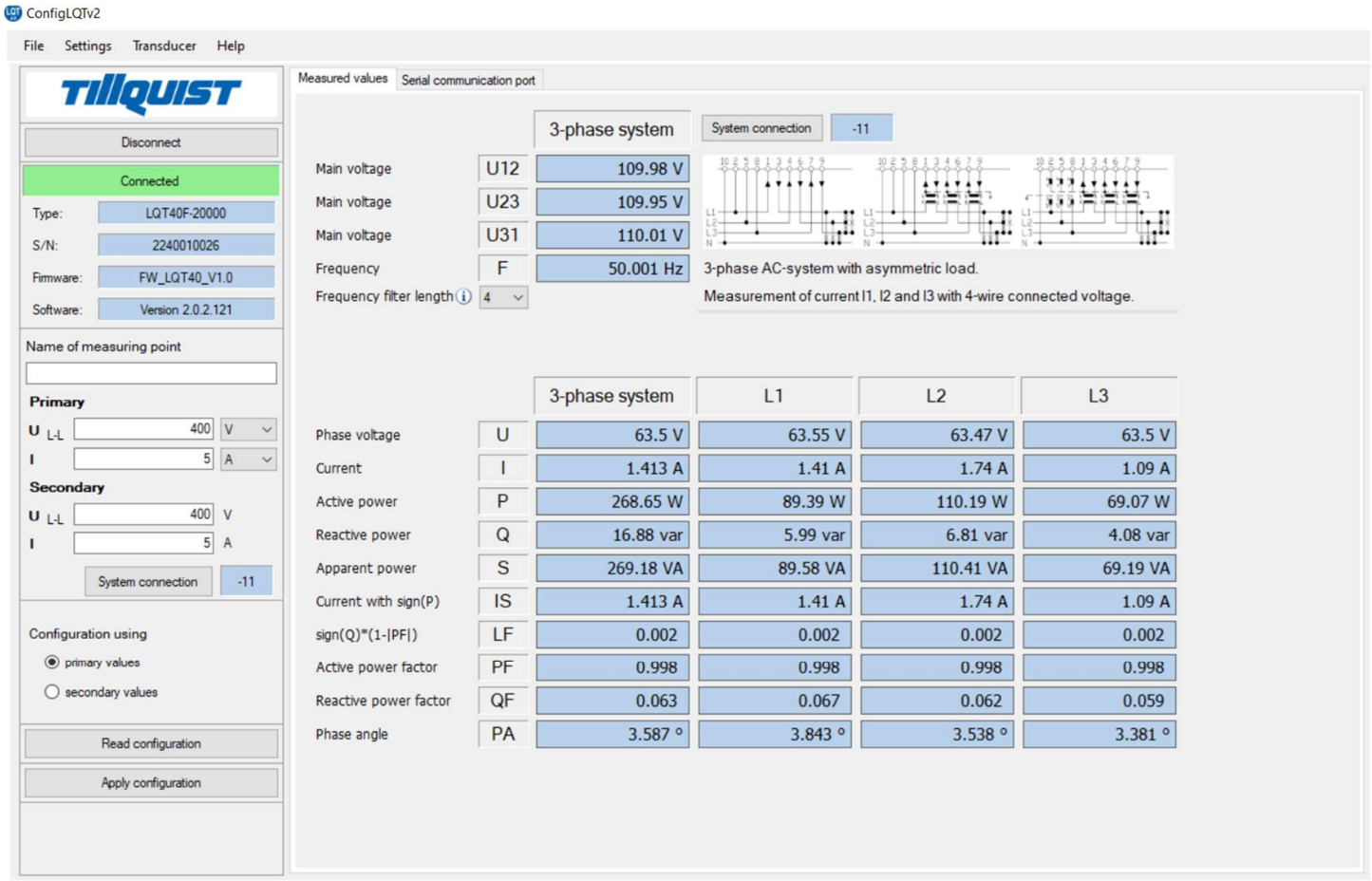
Ort /place, Test executors' signature Kista 2022-10-19	Authorization / Company, Institute etc. **TILLQUIST GROUP AB** **Box 1120** **SE-164 22 KISTA**

Publishing date: 20240613

Tillquist Group AB
Box 1120, SE-164 22 Kista, Sweden
Finlandsgatan 16, Kista
Tel. Int +46 8 594 632 00
www.tillquist.com

Configuration Software - ConfigLQT

ConfigLQT, free configuration software, downloadable from our webpage, www.tillquist.com, configures all Tillquist's programmable transducers. The software connects to live transducers, changes the configuration, and visualizes live readings.



Ordering Codes

LQT40F Ordering Codes

	LQT40F-	X	X	XXX
Communication				
M40 Profibus		1		
M40 Profinet		2		
Frequency				
50/60 Hz			0	
16⅔ Hz			1	
Special Requirements				
Standard configuration				000
Customer configuration (to provide ERF)				001
High precision with frequency test certificate				201

Standard Ordering Codes

LQT40F-10000: LQT40F Profibus standard 50/60 Hz
LQT40F-11000: LQT40F Profibus standard 16⅔ Hz
LQT40F-20000: LQT40F Profinet standard 50/60Hz
LQT40F-21000: LQT40F Profinet standard 16⅔ Hz
LQT40F-10201: LQT40F Profibus High precision with frequency test certificate
LQT40F-20201: LQT40F Profinet High precision with frequency test certificate

Other protocols and certificates are available on request.

Publishing date: 20240613

Tillquist Group AB
Box 1120, SE-164 22 Kista, Sweden
Finlandsgatan 16, Kista
Tel. Int +46 8 594 632 00
www.tillquist.com