HIQUEL-MBUS-Converter

Hardware- user manual

CE

Maurer Helmut, Manuel Niederl, Herbert Weiß

HIQUEL-MBUS-Configurator– Software - User Manual

Version: 2.00

History

Datum	Author	Description
30.06.06	O. Reisky	First version
27.09.06	H.Weiß	Add-on of the function query pause
15.12.06	H.Weiß	Add-on of the tested counters
05.03.07	M. Niederl	Add-on of the tested counters
16.01. 08	M. Niederl	Discription of the system registers

Caution!

You are handling dangerous electrical current!

Disconnect the supply voltage before making any wiring modifications.

Ensure that the system cannot be switched on accidentally.

Ensure that the device and its surroundings are potential free.

Please refer to the specific installation and mounting instructions.

Qualified personal only should handle the device.

The device has to be mounted in such a way that no unintentional operation may occur.

All control and supply voltage wiring must be routed so that no inductive or capacitive interference or any other severe electrical noise disturbance may interfere with the device.

Supply voltage variation must not exceed the specifications in the technical details. If so, proper performance of the device cannot be guaranteed.

Emergency installations according to EN60204/IEC204 (VDE0113) must remain active in all modes of the automated installation. Activation of the emergency installation must not cause an uncontrolled or undefined start cycle.

The software engineer has to make sure, that no failure functions of the automated installation may occur when line faults or core faults arise.

Notwithstanding the above, local regulations must be observed in all installations.

Safety-related advice

Danger to life through electrical current!
Only skilled personal trained in electro-engineering should perform the described steps in the following chapters. Please observe the country specific rules and standards for the mini module installation. Do not perform any electrical work while the device is connected to power!

Please pay attention to the following rules:

- ❑ Activate the automated installation
- ❑ Disable any automatic restart system.
- ❑ Electrically isolate the installation
- ❑ Cover any non-isolated areas

Content

HISTORY 3

CONTENT 6

INTRODUCTION 7

BLOCK CONNECTION DIAGRAM 9

DESCRIPTION 9
CONNECTION BLOCK DIAGRAM 10

DESCRIPTION OF THE FUNCTIONS 12

TECHNICAL DATA 18

DIMENSIONS 18
ELECTRICAL DATA 19

APPENDIX 20

TESTED METERS 20

CONTACT 21

Introduction

Since the data from SLS-500-MBUS-MODBUS Converters can be read from any Modbus-Master (automated control, visualisation system etc...) a very broad range of applications becomes possible. For instance data from a heat meter can be easily represented on a mimic display. Each MBUSMODBUS Converter module can read the data from up to 8 Meter bus unit loads (1 unit load corresponds to 1,5 mA current consumption of one participant). Thus maximal 8 devices each one unit load can be connected to one MBUS-MODBUS Converter. The current consumption of a device can be seen from the respective data sheet.

The data to be read are freely configurable and are automatically actualised in selectable periods of time.

- meter-Bus ports for max. 8 unit loads (1,5 mA)
- meter-Bus interface: 300 to 38400 bps, 8 data bits, even parity, 1 stop bit
- meter-Bus and Modbus interfaces are galvanically isolated
- Modbus interface: RS232 or RS485, 9600 to 57600 bps, 8 data bits, no parity, 1 stop bit
- Modbus address and enquiry interval selectable
- Configuration of max. 100 Meter-Bus values
- 4 different data formats for the representation of the values in the modbus registers
- supply voltage 24 V DC

type	part number	supply	weight
SLS-500-MBUS-MODBUS-RS232	Meter-Bus to Modbus Converter with RS232 interface	24 V=	85 g
SLS-500-MBUS-MODBUS-RS485	Meter-Bus to Modbus Converter with RS2485 interface	24 V=	85 g

Specification			
supply voltage	24 V=	operating conditions	-40...85 °C
power consumption	1 VA	Tolerable humidity	10...90 % rH non condensing
		degree of protection	IP20 (EN 60529)
Modbus interface		protection class	IP20
protocol	Modbus/RTU		
type	RS232 or RS485	block connection diagram	Figure 4-1
	9600 to 57600 / 8 / N / 1	dimensions - graphic	Figure 6-1
		dimensions B x H x T	22,5 x 85 x 70
Meter-Bus interface			
max. unit loads	8		
	300 to 38400 / 8 / E / 1	factory settings	Modbus Address 255 Modbus baud rate: 19200 M-Bus baud rate: 300
ternimals			
max. terminal cross section	2,5 mm² rigid		
	1,5 mm² flexible	CE conformity	YES

Accessories	
SLS-500-MBUS-Configurator	configuration software tool for SLS-500-MBUS-MODBUS-converter

Block connection diagram

Description

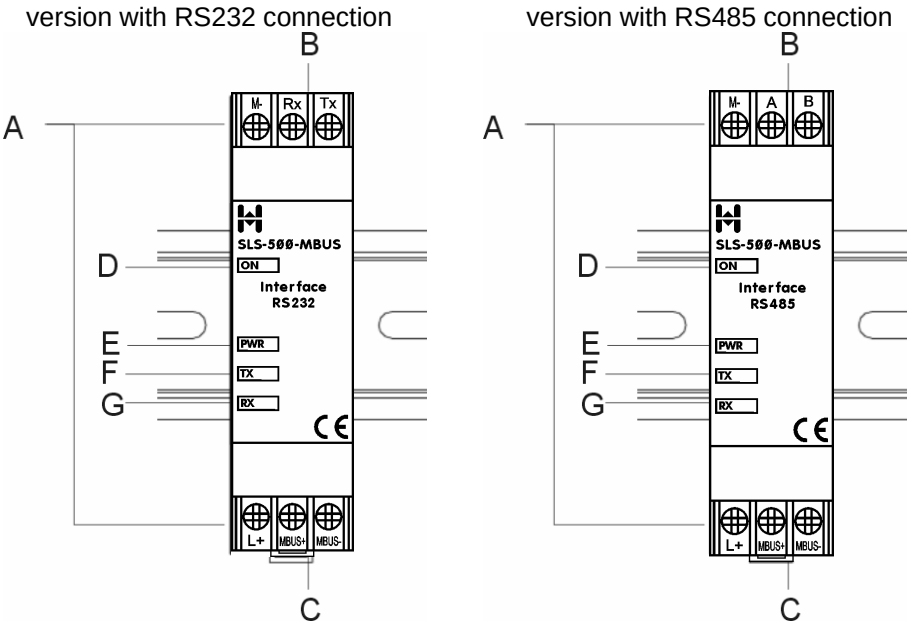
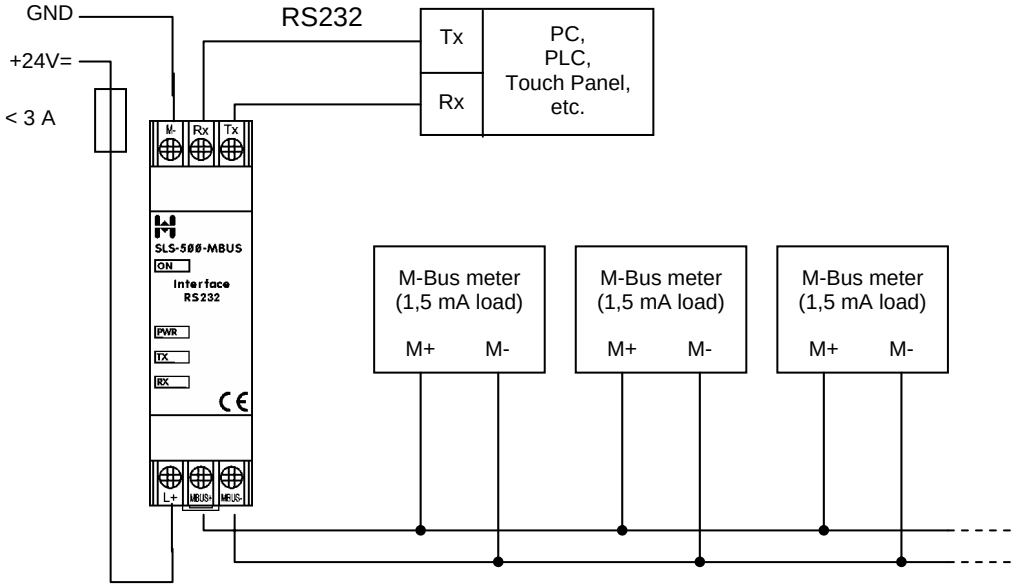


Figure 4-1: Description of terminals and indications.

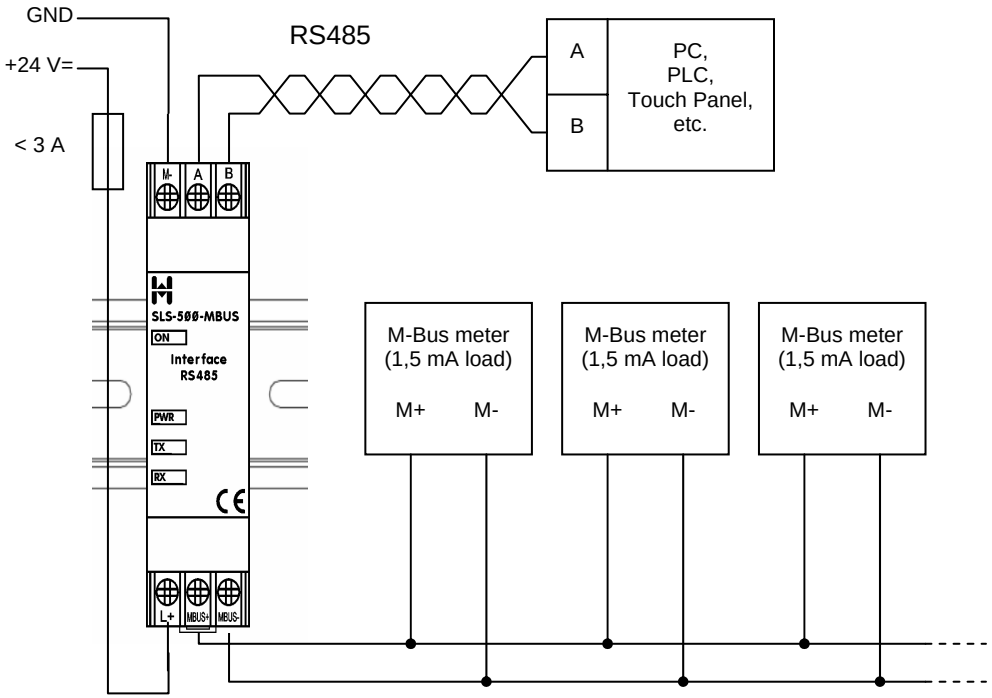
	SLS-500-MBUS-MODBUS-RS232	SLS-500-MBUS-MODBUS-RS485
A	supply voltage L+: 24 V=; M-: ground	supply voltage L+: 24 V=; M-: ground
B	RS232 Modbus interface Rx: receiving data Tx: sending data	RS485 interface A: positive data link B: negative data link
C	Meter-Bus interface MBus+; MBus-	Meter-Bus interface MBus+; MBus-
D	indication of the status of the converter	indication of the status of the converter
E	indication for supply voltage of the M-Bus interface	indication for supply voltage of the M-Bus interface
F	Indication for sending data on the M-Bus interface	Indication for sending data on the M-Bus interface
G	Indication for receiving data on the M-Bus interface	Indication for receiving data on the M-Bus interface

Table 4-1 Description of terminals and indications

Connection block diagram



Up to 8 separate M-Bus meters 1,5 mA each can be connected per HIQUEL-MBUS-MODBUS Converter



Up to 8 separate M-Bus meters 1,5 mA each can be connected per HIQUEL-MBUS-MODBUS Converter

Description of the functions

The SLS-500-MBUS-MODBUS converter automatically reads preconfigured values from MBUS meters and makes them available in Modbus holding registers. Up to 100 values can be read via Modbus.

On application of the supply voltage the converter verifies if a valid configuration is available or not. If so, the converter starts to initialise all MBUS meters. If no answer is received from an MBUS device within three consecutively initialising attempts it is skipped and the next meter is initialised. The initialising procedure is repeated every 5 query cycles. After a pause of 5 seconds the first query cycle begins.

The values of all initialised devices are read and depending on the configuration written into the respective Modbus registers. From now on the selectable pause time between two query cycles is activated.

If no answer is received from an initialised MBUS device within three consecutively reading attempts, this device is reinitialised within the following working cycle. After three failed initialising attempts, another attempt follows every 5 cycles. After successful initialisation the data are read in the following cycle.

Most of the MBUS slaves actualise their values only after a query has been performed. As the converter allows the definition of pauses between queries to up to 18 hours, the following mechanism avoids that ‘old’ values are read:

If pauses between queries are longer that 30 seconds, the converter requests all slaves 30 seconds before the real query to actualise their values.

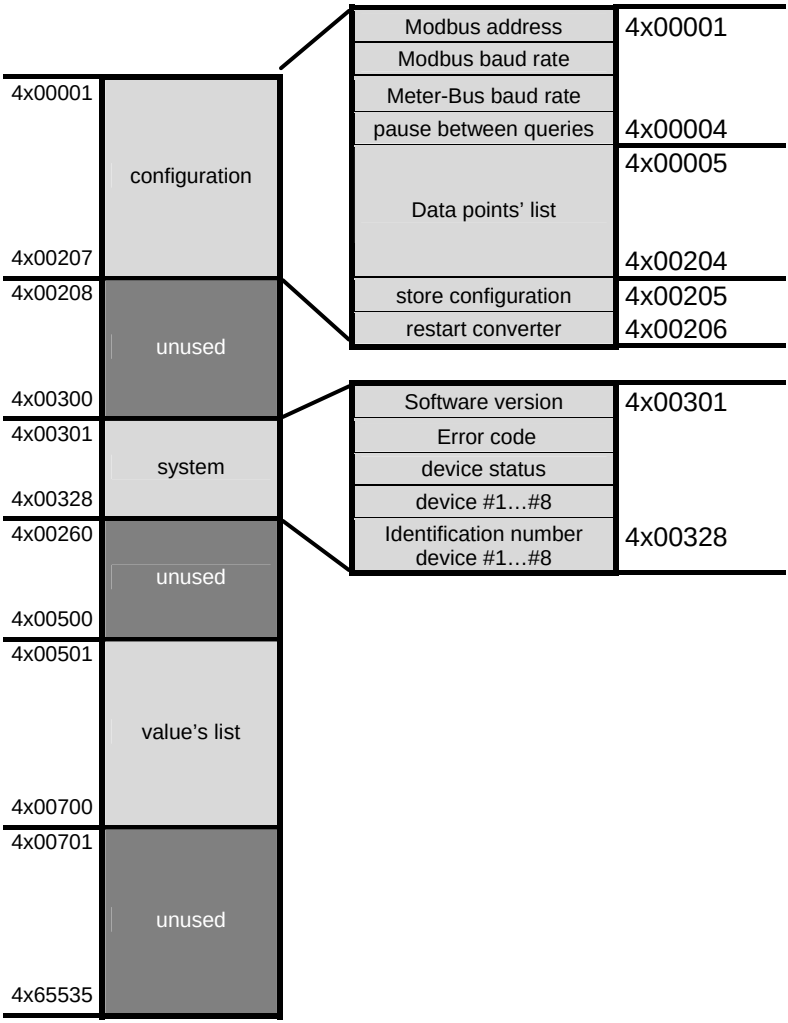
For communication via Modbus the following functions are available:

- READ HOLDING REGISTER (function code: 3)

- PRESET SINGLE REGISTER (function code: 6)
- PRESET MULTIPLE REGISTERS (function code: 16)

Note: The functions READ HOLDING REGISTER and PRESET MULTIPLE REGISTERS are limited to max. 50 register per query!

Overview of the registers:



All unused register read out the value 0.

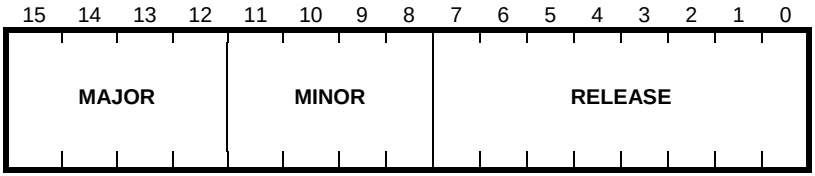
System registers:

Version of the converter software
Error code
Device status

Register	Short name	type	address	Start value
Software version	SWVERSION	read	4x00301	-
Error code	ERRCODE	read	4x00302	-
status device 1	SLAVESTATE1	read	4x00303	-
status device 2	SLAVESTATE2	read	4x00304	-
status device 3	SLAVESTATE3	read	4x00305	-
status device 4	SLAVESTATE4	read	4x00306	-
status device 5	SLAVESTATE5	read	4x00307	-
status device 6	SLAVESTATE6	read	4x00308	-
status device 7	SLAVESTATE7	read	4x00309	-
status device 8	SLAVESTATE8	read	4x00310	-
			4x00311 – 4x00312	0
ID device 1	SLAVEID1	read	4x00313	-1
ID device 2	SLAVEID2	read	4x00315	-1
ID device 3	SLAVEID3	read	4x00317	-1
ID device 4	SLAVEID4	read	4x00319	-1
ID device 5	SLAVEID5	read	4x00321	-1
ID device 6	SLAVEID6	read	4x00323	-1
ID device 7	SLAVEID7	read	4x00325	-1
ID device 8	SLAVEID8	read	4x00327	-1

Software version:

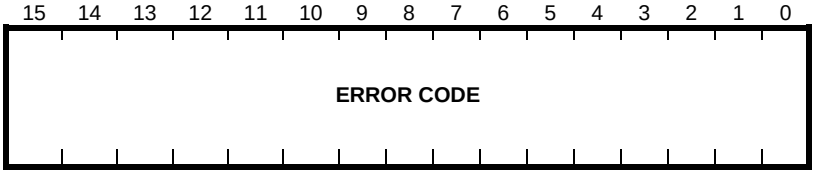
SWVERSION Holding Register (4x00301) factory setting: -



bit	description
MAJOR	**main version** range: 0 to 15
MINOR	**secondary version** range: 0 to 15
RELEASE	**issue** range: 0 to 255

Error code:

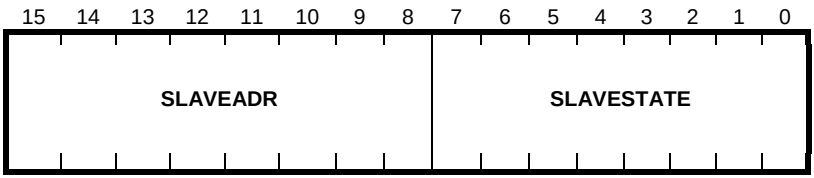
ERRCODE Holding Register (4x00302) factory setting: -



bit	description
ERROR CODE	**Error code** 0: no error 1: no valid configuration 2: error in configuration 3: system error

State device x:

SLAVESTATEx Holding Register (4x00303...4x00310) factory setting: -

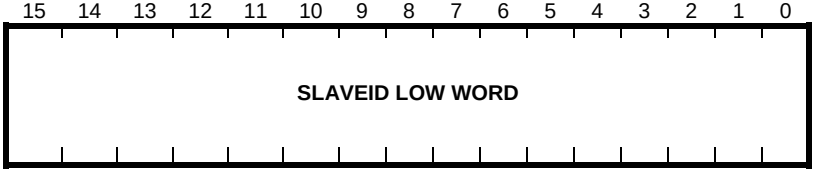


bit	description
SLAVEADR	**Meter-Bus address of the device** range: 0 to 255
SLAVESTATE	**device state** 0: not configured 1: ready for initialisation 2: send the initialisation 3: wait for answer 4: ready for data exchange 5: send the query 6: wait for answer

Identification number device x:

The identification number is derived from the M-Bus protocol header and is stored as a signed 32-bit binary number in 2 Modbus registers.

SLAVEIDx (1. Register) Holding Register (4x00313, 4x00315, ... , 4x00327) factory setting: -



SLAVEIDx (2. Register) Holding Register (4x00314, 4x00316, ... , 4x00328) factory setting: -

Technical Data

Dimensions

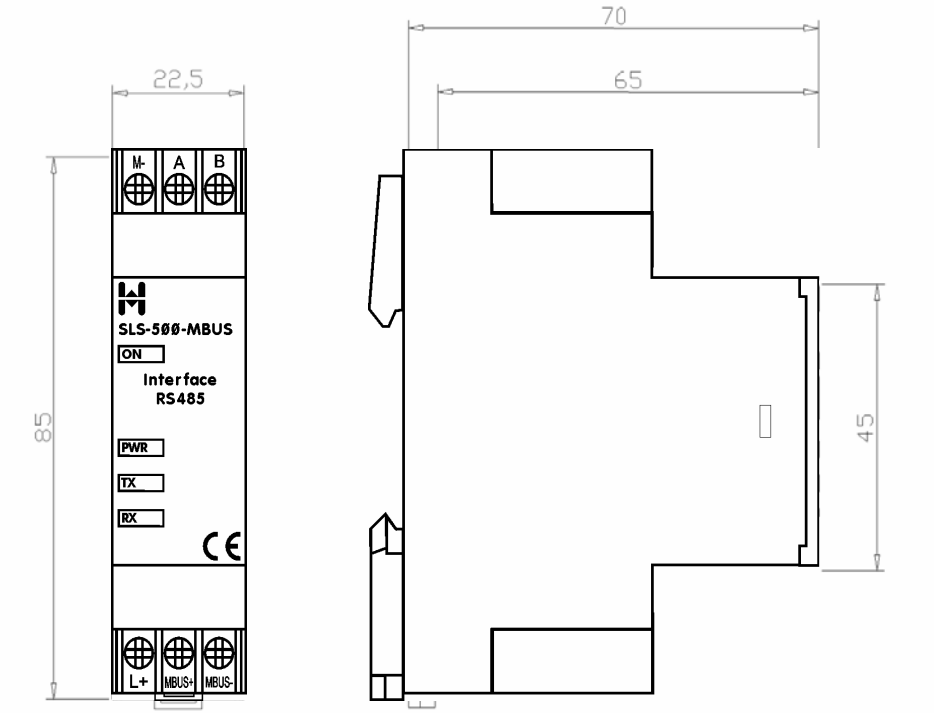


Figure 6-1 Housing type – dimensions in mm.

dimensions	
installation dimensions B x H x T (mm)	22,5 x 85 x 70
weight	85 g
colour	grey (RAL 7012)
material	Noryl® (housing) Wellamid® (terminals) Lexan® 940A (cover plate)
protection class	IP20 after DIN 40050/EN 60529

Table 6-1 Specification of the housing.

Electrical data

voltage, current, temperature	
supply voltage	
nominal voltage	24 V=
voltage range	18 V= to 30 V=
current drain	typically 36 mA= max. 55 mA=
max. switch-on current	100 mA= (20 ms)
operating conditions	0 °C to 60 °C
storage temperature	-20 °C to 85 °C
humidity in the air (non condensing)	10...90 % rH
protection class	IP20
CE conformity	YES

Table 6-2: General electrical data.

terminals	
clamp acquirement	1*
screw tightening torque	0,4. 0,8 Nm
screws	pozidrive 1,slot 3,5*0,6mm

Table 6-3: Specification of the terminals.

Modbus interface	
physics	RS232 / RS485
carrying out	terminals
electrical isolation	no
power supply for external devices	no
status indication	no
settings	9600 to 57600 baud, 8 data bits, no parity, 1 stop bit
protocol	Modbus / RTU

Table 6-4: Specification of the Modbus interface.

1*

1x0,25..2,5mm^2 with/without wire termination (cable end sleeves)

1x4mm^2 without wire termination

2x0,25..1,5mm^2 with/without wire termination

2x2,5mm^2 flexible without wire termination

Meter-Bus interface	
physics	Meter-Bus
carrying out	terminals
electrical isolation	to the supply voltage and the Modbus interface
power supply for external devices	max. 8 devices á 1,5 mA per participant
status indication	send and receive
settings	300 to 38400 baud, 8 data bits, even parity, 1 stop bit
protocol	Meter-Bus
cable (according to M-Bus standard)	YSLY-J n x 2 x 0,8 mm
max. cable length	350 m
max. cable capacity	180 nF

Table 6-5: Specification of the Meter bus interface.

Appendix

Tested meters

The following meters were tested in house for proper function in combination with our converter:

manufacturer	meter	from software version
Kamstrup	Multical® 401	1.0.0
Zenner Zähler	multidata S1	2.0.0
Engelmann	sensonic®	2.0.4
ista (viterra Energy Services)	Sensostar®	
Kamstrup	Multical® III	2.0.0
Schrack (EMH)	MG DIZ305	2.0.0
ABB	Deltaplus	2.0.4
Kamstrup	Multical®	2.0.4
Kamstrup	Multical®_Compakt	2.0.4
Actaris	Cyble MBus	

Table 6-6: List of tested MBUS meters.

Contact

HIQUEL GmbH
Bairisch Koelldorf, Gewerbepark 266
A-8344 Bad Gleichenberg
Tel: +43-(0) 3159-3001
Fax: +43-(0) 3159-3001-4
www.hiquel.com
e-mail: hiquel@hiquel.com