

GeckoR2-Manual

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1. Summary

The GeckoR2 user manual includes information about

- installation and setup
- common use
- instrument details

2. Terms and definitions

Term/ Abbreviation	Beschreibung
MBW	Mutter & Bless Wettingen

3. Revisions

Version	Modification	Date/ Editor
0.1	Initial revision	28.02.2019 M. Russ

4. Installation and setup

4.1. Download

Official download page: <http://www.mbw.ch/downloads/GeckoR2.zip>

4.2. Installation

4.3. Setup

5. Common use

5.1.1. Instrument connection

5.1.1.1. Serial communication

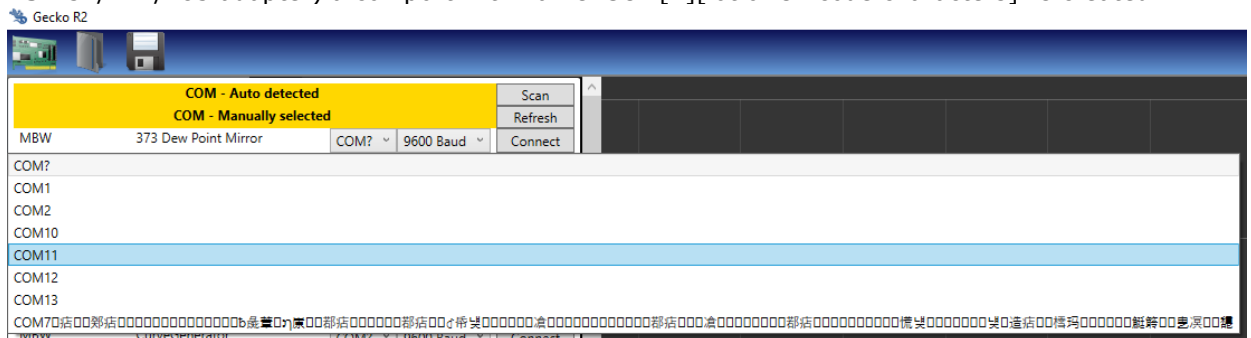
Scanner

To scan automatically all the serial ports at startup set `.\settings\GeckoFeatureSettings.xml` - parameter(s)

```
<EnableScanAtStartup>true</EnableScanAtStartup>
<EnableSerialComScan>true</EnableSerialComScan>
```

Known issues

- If an instrument is connected with an USB cable using RS232 communication a COM port is created (see windows → system → device manager). The name of the COM port is defined by the installed USB to RS232 driver. Some erroneous drivers (like Silicon Labs CP210x which is used for ADAM-4561 RS-232/422/485 adapter) a comport with name 'COM[n][lot of Unicode characters]' is created



The name of the comport could be corrected by changing the registry
Computer\HKEY_LOCAL_MACHINE\HARDWARE\DEVICEMAP\SERIALCOMM

→ Change COM7[invisible characters] to COM7 and store entry

But after a reconnect of the instrument cable the erroneous portname is back again. Because of this do the following workaround:

Make sure the `.\settings\GeckoFeatureSettings.xml` parameters are set:

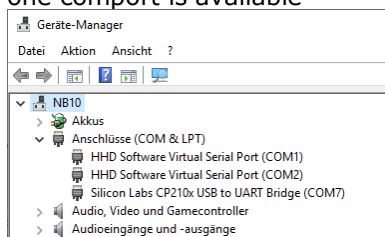
```
<SerialPortCommon>
  <!-- Default: true (remove every char after: \0) -->
  <PortNamesSimpleCleaning>true</PortNamesSimpleCleaning>
  <!-- Default: "" / For COM[n] use: "(COM\d*)" -->
  <PortNamesRegexCleaning></PortNamesRegexCleaning>
</SerialPortCommon>
```

PortNamesSimpleCleaning: If the portname looks like "COM[n]\0..." the Gecko software removes all the invalid characters after COM[n]

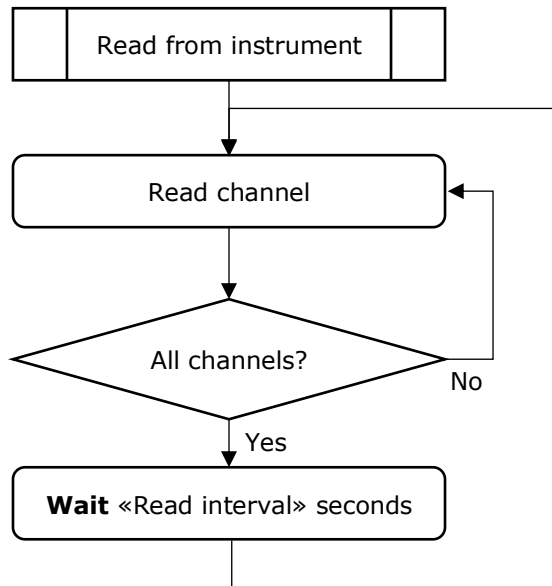
PortNamesRegexCleaning: If the portname looks like "COM[n]abcde..." the Gecko software uses the string which matches the given regex. For example:

Portname: COM7eim,cpaoihfal.kwe'
Regex: (COM\d*)
Cleaned portname: COM7

- Older versions of Gecko (later than 28.02.2019) crash if no comport is installed. Make sure at least one comport is available



5.2. Instrument "reading interval"



Use the parameter "Read interval" (Gecko main settings) to change the sampling interval. A higher value of "Read interval" means a decrease of the communication traffic as well.

Caution

Please consider the absolute sampling duration is the calculation of:

$$\text{Duration} = \text{Duration}_{\text{ReadAllChannels}} + \text{ReadInterval}$$

- a) For an instrument reading with latency ≈ 0 seconds:
Duration \approx ReadInterval
- b) For an instrument reading with latency $\gg 0$ seconds:
Duration = Duration_{ReadAllChannels} + ReadInterval

Example with the combination of two different instruments:

- Temperature measurement MBW T12 (reading latency of approx. 4.5s)
- Dewpoint mirror MBW 473 (low latency)

If the average and deviation calculation mode is "num of samples = 200" and "ReadInterval = 1s" the:

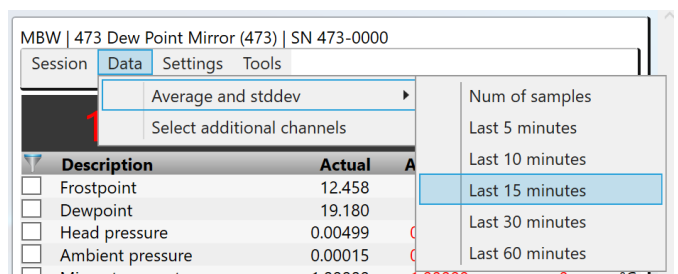
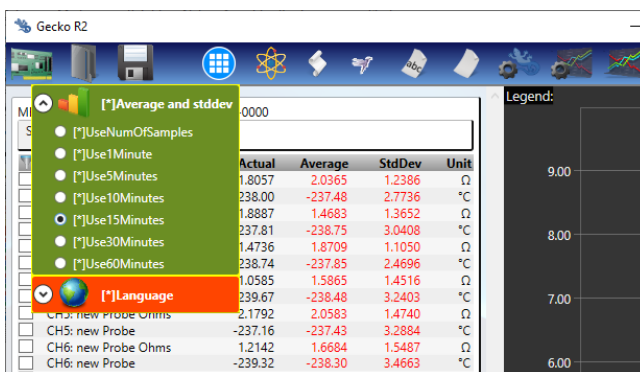
- T12 uses data over $200 * (4.5s + 1s) = 1100s = 18.3min$
- 473 uses data over $200 * (0.5 + 1s) = 300s = 5min$

Conclusion:

A reasonable comparison of the average and deviation values can only been done if the data of the two instruments were stable during a period of min 18.3 minutes

Better solution:

Instead of using the average calculation mode "num of samples" use the option "Last [x] minutes"



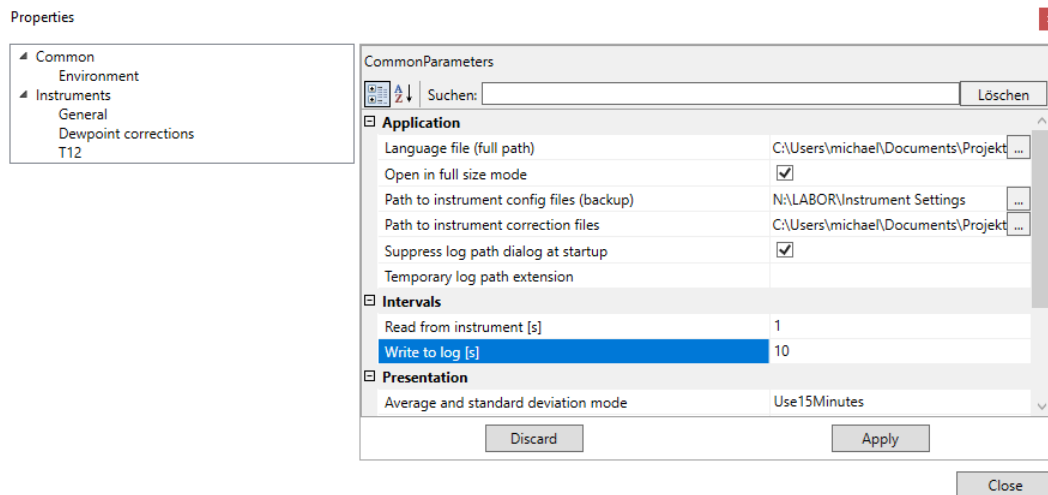
5.3. Datalog

All the log files are written into the folder
 .\datalog\GeckoR2_[yyyymmdd]-[hhmmss] → Timestamp of Gecko start

SteadyState.txt
 [TODO]

5.4. Standard log

The standard log is written time based (Example: Every 10 seconds)



AllInstruments.txt

The data of all the connected instruments is written into this file. Format:

Common ; Instrument1-Channel1 ; Instrument1-Channel[n] ; ... ; Instrument[x]-Channel[1] ; Instrument[x]-Channel[n]

T12-0000.txt

The data of one connected instrument is written into this file. Format:

Common ; Instrument1-Channel1 ; Instrument1-Channel[n]

5.4.1. Fast log

Fast log means a log line is written as soon as all channel data is read from the instrument.

The log files are written into the folder

.\datalog\GeckoR2_[yyyymmdd]-[hhmmss]\ EveryFullRecord → Timestamp of Gecko start

[Model]_[SerialNumber].txt

Common ; Instrument1-Channel1 ; Instrument1-Channel[n]

To activate fast log set the following parameter in .\settings\GeckoFeatureSettings.xml:

```
<ExtendedSettings>
  <Logging>
    <!-- ... -->
    <DataLogEveryFullRecord>true</DataLogEveryFullRecord>
  </Logging>
</ExtendedSettings>
```

This parameter has an effect for every connected instrument. For example if 3 instruments are connected 3 log files are written.

5.5. Error codes

Error	Part(s)	Description
-994	Several instruments	Instrument disconnected
-995	Several instruments	Probe disconnected
-996	Several instruments	Invalid measurement value detected (out of range or corrupt)
-997	Several instruments	Instrument correction: Exception in polynomial calculation
-998	Several instruments	Read from instrument error or calculation error cause of invalid value(s)
-999	Several instruments	Read from instrument error or calculation error cause of invalid value(s)

6. Instrument details

6.1. Bronkhorst

6.1.1. ELFlow

6.1.1.1. Communication

By default the Bronkhorst ELFlow uses:

- 38400 baud
- No parity
- 8 databits
- 1 stopbit

The following commands have been tested...

Notes

- For param types 'float' use the [online hexstring to float converter](#)
- Command termination '[\r\n]' is not needed if GeckoR2 MiniTerm is used

Sensor type ProcessNr 0x1 (= d1) ParamType 0x0 (= char) ParamIndex 0 ParamNumber (FBnr) 0xE (= d14) TX :0680040100010E[\r\n] Examples: RX :05800201 0083	Serial ProcessNr 0x71 (= d113) ParamType string ParamIndex 0 ParamNumber (FBnr) 3 TX :0780047163716300[\r\n] Examples: RX :108002716300 4D31373230303830314300 -> ...
bhtmodel number ProcessNr 0x71 (= d113) ParamType string ParamIndex 0 ParamNumber (FBnr) 2 TX :0703047162716200[\r\n] Examples: RX :190302716200462D313131422D... ...324B302D4141442D30302D5600	Capacity ProcessNr 0x1 (= d1) ParamType 0x40 (= long = float) ParamIndex 0 ParamNumber (FBnr) 0xD (= d13) TX :0680040140014D[\r\n] Examples: RX :0880020140 40000000 -> 2 l/min RX :0880020140 40A00000 -> 5 l/min RX :0880020140 41200000 -> 10 l/min
Capacity unit ProcessNr 0x1 (= d1) ParamType string[7] ParamIndex 0 ParamNumber (FBnr): d31 TX :078004017F017F07[\r\n] Examples: RX :0C8002017F07 6C6E2F6D696E20 -> l/min	Temperature ProcessNr 0x21 (= d33) ParamType 0x40 (= long = float) ParamIndex 0 ParamNumber (FBnr) 7 TX :06800421402147[\r\n] Examples: RX :0880022140 41C9E627 -> 2.52373790740966796875E1
fmeasure (l/min: @ 0°C and 1.013bar = 1 atm = 14.69 psi) ProcessNr 0x21 (= d33) ParamType 0x40 (= long = float) ParamIndex 0 ParamNumber (FBnr) 0 TX :06800421402140[\r\n] Examples: RX :0880022140 3F7A55B9 -> 9.77870523929595947265625E-1 RX :0880022140 3F56118A -> 8.3620512485504150390625E-1 RX :0880022140 3F146039 -> 5.79593241214752197265625E-1 RX :0880022140 3EB6499A -> 3.56030285358428955078125E-1	Measure (result in percent, value max: 32000) ProcessNr 0x1 (= d1) ParamType 0x20 (= integer) ParamIndex 1 ParamNumber (FBnr) 1 TX :06800401200120[\r\n] Examples: (0x7D00 = 32000 = 100%) RX :0680020120 0734 -> 1844 -> 5.7625 % RX :0680020120 04DE -> 1246 -> 3.89375 %

6.2. Fluke

6.2.1. 7011 – Temperature bath

6.2.1.1. Setup

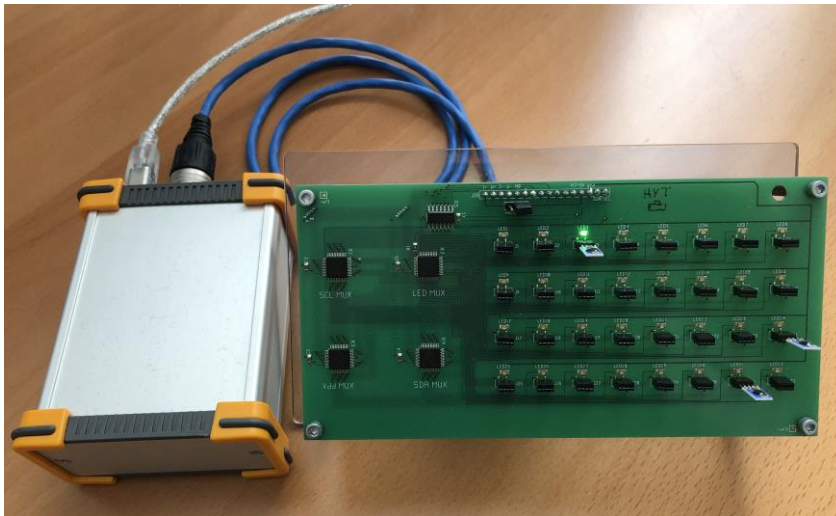
The temperature bath is only working with a max baudrate of 2400. If the Gecko instrument scanner cannot detect the bath try to connect the bath manually with baudrate 2400.

Some default bath parameters don't work in combination with the Gecko communication. If you work with a new version of Gecko the software sets these parameters automatically. Otherwise please make sure the the following parameters are set correctly:

Command	Options	Command to set	Command to request
Sample (send measure interval in seconds)	0 polling 1 – 4000	sa=0	sa
Duplex (echoes the command)	h half f full	du=h	du
Unit (physical unit)	c Celsius f Fahrenheit	u=c	u

6.3. IST

6.3.1. HYT – Digital Humidity and temperature module



The Gecko software supports communication with the 32 channel HYT adapter.

6.3.1.1. Communication

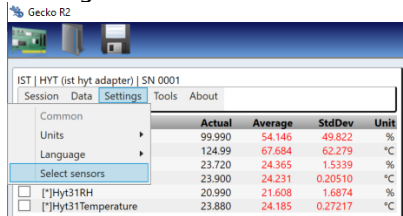
Configuration Baudrate: 9600/ Databits: 8/ Stopbit: 1/ Parity: None/ **FlowControl: DTR/DSR**

Command	Description	Example(s)	
i	Get module identification	TX: i	RX: id: ist hyt adapter
s	Get serial number	TX: s	RX: sn: 0001
c[address]	Select a channel. First address is 33 ("!") Last address is 65 ("@"). Use ASCII symbol for address!	TX: c! TX: c5 TX: c@	RX: - RX: - RX: -
m	Get measure value of selected channel	TX: m	RX: 30.86%rH - Temperature: 23.49

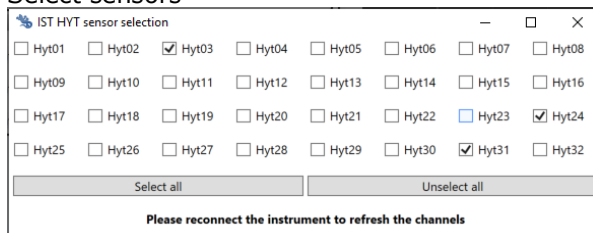
6.3.1.1.1. Setup

To select the connected sensors:

- 1) Settings → Select sensors



- 2) Select sensors



- 3) Reconnect the IST HYT adapter instrument in Gecko

6.3.1.1.2. Firmware update

- 1) Download [Arduino IDE](#)
- 2) ...todo...

Tools:

Use Arduino IDE Tools → Serial Monitor for RS232 terminal

6.4. Keller

6.4.1. PAA-33X – Pressure sensor

6.4.1.1. Setup



Because PAA pressure sensors are connected by Modbus (RS232/RS485) every sensor within one bus system needs a unit address. The (current version of) Gecko software does not support address setting.

To change the address of a sensor please download [Keller – ControlCenterSeries30 Manual](#)

To connect PAA sensors with the Gecko software please use the 'manual connect' mode (it is recommended to stop a running scan before connecting an instrument). The software checks (only!) the addresses 0 – 10 for accessible sensors. If any sensor has been found the instrument shows the pressure of the detected sensor.

If no sensor has been found please

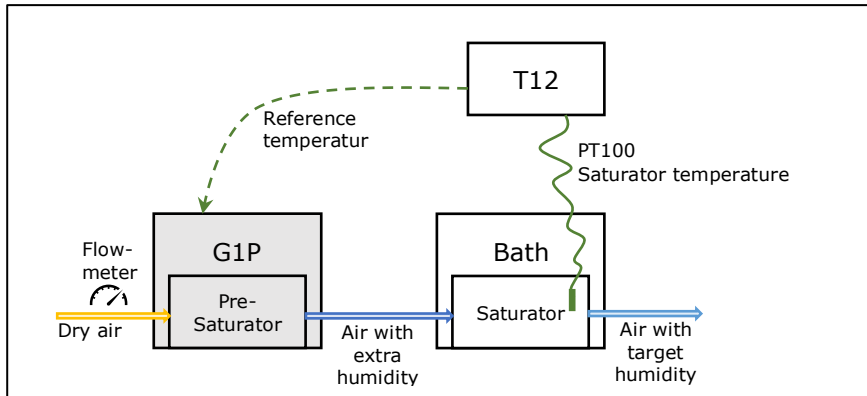
- Check the COM port (device manager)
- Address(es) of the sensor(s). Only addresses between 0 and 10 are supported
- Reconnect the instrument (Gecko connection dialog)

6.5. MBW

6.5.1. G1P - Humidity Generator

6.5.1.1. Characteristics

- Reduced G1: No internal saturator
- Instead of internal saturator an external saturator is needed



6.5.1.2. Setup

For full functionality

- select the reference channel to the external saturation temperatur (menu: Data → Select temperature reference)

6.5.1.3. Options

Flow correction																																
Parameters																																
	UseFlowCorrected	SET	0/1	Enable/Disable in menu: Data → "Use flow correction" Flow correction is enabled if the channel "UseFlowCorrected" is set to 1. If "UseFlowCorrected" is enabled the value of setpoint channel "FlowCorrected" is sent to the G1P else the value of the setpoint channel "Flow".																												
	FlowCorrected	CALC		Calculated flow (see Explanation)																												
Restrictions																																
	<ul style="list-style-type: none">- Flow correction works only if a (saturator) temperature reference is defined (this temperature is used as DP)- If reference temperature less than 0°C a correction factor of 1 is taken (approximation)																															
Explanation																																
<p>A flow set by the user controls a valve positioned before the presaturator. The flow of the output air (after presaturator and saturator) is higher than the flow of the dry air because of the additional humidity. To get the output air with the flow set by the user a correction has to be done.</p> <p>The following curve shows the flow error as function of the dewpoint.</p>																																
<div><p>FlowError=f(Dewpoint) @ flow 1l/min</p><table><caption>Data points for FlowError=f(Dewpoint) @ flow 1l/min</caption><thead><tr><th>Dewpoint [°C]</th><th>Flow error [l/min]</th></tr></thead><tbody><tr><td>0</td><td>0.00</td></tr><tr><td>10</td><td>0.01</td></tr><tr><td>20</td><td>0.02</td></tr><tr><td>30</td><td>0.03</td></tr><tr><td>40</td><td>0.05</td></tr><tr><td>50</td><td>0.08</td></tr><tr><td>60</td><td>0.12</td></tr><tr><td>70</td><td>0.18</td></tr><tr><td>80</td><td>0.28</td></tr><tr><td>90</td><td>0.45</td></tr><tr><td>95</td><td>0.65</td></tr><tr><td>98</td><td>0.80</td></tr><tr><td>100</td><td>0.95</td></tr></tbody></table></div>					Dewpoint [°C]	Flow error [l/min]	0	0.00	10	0.01	20	0.02	30	0.03	40	0.05	50	0.08	60	0.12	70	0.18	80	0.28	90	0.45	95	0.65	98	0.80	100	0.95
Dewpoint [°C]	Flow error [l/min]																															
0	0.00																															
10	0.01																															
20	0.02																															
30	0.03																															
40	0.05																															
50	0.08																															
60	0.12																															
70	0.18																															
80	0.28																															
90	0.45																															
95	0.65																															
98	0.80																															
100	0.95																															
<div><div>FlowNominal</div><div>Pressure normal</div></div> <div><div>1.0 l/min</div><div>1.013 bar</div></div>																																

DP [°C]	SVP [bar]	SVP / Pnormal	Wet output air [l/min]	Corrected flow setpoint to get wet output air 1l/min [l/min]
0	0.006	0.006	1.006	0.994
10	0.012	0.012	1.012	0.988
20	0.023	0.023	1.023	0.977
30	0.042	0.042	1.042	0.958
40	0.074	0.073	1.073	0.927
50	0.124	0.122	1.122	0.878
60	0.199	0.197	1.197	0.803
70	0.312	0.308	1.308	0.692
80	0.474	0.468	1.468	0.532
90	0.702	0.693	1.693	0.307
95	0.846	0.835	1.835	0.165
99	0.979	0.966	1.966	0.054

SVP (Saturation Vapour Pressure)