kamstrup

Datagram description

linkIQ®/wM-Bus inputs(In-A, In-B) outputs(Out-C, Out-D)

MULTICAL® 403
MULTICAL® 603
MULTICAL® 803

M-Bus wireless

Indhold

Introduction

This document describes the guidelines for how to use the data from a linkIQ® system. There will be given examples of datagrams together with an explanation of the individual registers and how to use them properly. It is intended that the reader understands the value of the datagrams and can choose the right datagram to use.

linkIQ® Basic

Our new linkIQ® system has been developed to optimize the performance of a fixed wireless network. This means that with a linkIQ® system, you get the following:

- Improved coverage compared to wM-Bus resulting in 3-5 times less concentrators
- Improved robustness to interference from other equipment
- Redundancy in transmission which provides a high service level agreement
- Precisely timestamped data

The data you receive is based on:

- Hourly logger
- Daily logger
- Monthly logger
- Yearly logger

Info codes are transmitted at the moment of their appearance (event-based transmission) and during the day (interval-based transmission).

Data on an hourly basis

Register	Product (m^3 °C)
E8	*V1 · t1*
E9	*V1 · t2*
E10	*V1 · t3*
E11	*V2 · t3*

For time-based average temperatures like average t1, average t2, average t3, the meter performs a sampling, for example, every second of t1, t2 or t3 regardless of the flow and the average temperatures are calculated from those samplings. This is inaccurate because the temperature of the system is correlated with the flow, which varies significantly throughout the day. Volume-based average temperatures are more representative of the heat exchanged with the consumer because the temperatures are calculated from samples based on the volume consumption measured by the meter. Therefore, the flow is accounted for in the calculation. The E8-E11 registers in Kamstrup heat meters allow you to calculate volume-based average temperatures in an easy and efficient way. This improves the quality of your data analyses and can serve as an accurate basis for motivational incentives directed at your customers.

The volume-based average temperature, ⟨t⟩, can be found using the following equation:

$$\langle t \rangle = \frac{\Delta E}{\Delta V \cdot Y}$$

Here, ΔE is the change in volume temperature, ΔV is the change in volume, and Y is a correction factor that depends on the display resolution. Therefore, it is necessary to collect the volume and the volume temperatures before the volume-based average temperatures can be calculated.

Example:

$$\langle \mathbf{t1} \rangle = \frac{\mathbf{\Delta E8}}{\mathbf{\Delta V1 \cdot Y}} = \frac{\mathbf{E8_{2018} - E8_{2017}}}{\mathbf{(V1_{2018} - V1_{2017}) \cdot Y}} = \frac{48236\ m^3\ °C - 20123\ m^3\ °C}{(5342.6\ m^3 - 2368.7\ m^3 \cdot 0.1} = \mathbf{94.53}\ °C$$

$$\langle \mathbf{t2} \rangle = \frac{\mathbf{\Delta E9}}{\mathbf{\Delta V1 \cdot Y}} = \frac{\mathbf{E9_{2018} - E9_{2017}}}{\mathbf{(V1_{2018} - V1_{2017}) \cdot Y}} = \frac{18654\ m^3\ °C - 7651\ m^3\ °C}{(5342.6\ m^3 - 2368.7\ m^3 \cdot 0.1} = \mathbf{36.99}\ °C$$

Temperatures: t1, t2

Relative to the volume-based average temperatures derived from E8/E9, the value of t1/t2 is limited. However, with low volumes (e.g. during summer), the weighted averages cannot always provide temperature estimations on an hourly basis. In this case, the temperature registers themselves may be able to further improve the insight into the inlet and outlet temperatures.

The MULTICAL® 403/603/803 meters provide a time average of t1 and t2, which is recommended instead of the momentary t1/t2 values if E8/E9 is to be supplemented. The average temperatures are preferred as the momentary temperatures may fluctuate over short periods of times in which case the average temperatures can give a more representative picture of the reality at the installation.

Considerations on flow/power

Momentarily sampled flow and power values, even at an hourly basis, provide very limited insights. Both flow and power generally have large fluctuations over time and change much faster than on an hourly basis, depending on the user behaviour. Momentary values of flow and power therefore have very limited value and the samples may be misleading. Instead the monthly maximum (and minimum) values are recommended since they provide a better insight into the usage.

Configuration recommendation

Based on above discussions, we generally recommend the configurations described below. These are made to fit the majority of our customers and their needs regarding billing as well as analytics. However, customers may have special requirements for which other configurations can be made.

ZZZ=501: linkIQ® standard datagram

This is the standard datagram that provides the energy registers **E1** and **E3** together with the volume temperatures **E8**, **E9** and Volume, all on an hourly basis. These are the basic registers that fulfil the requirement for the majority of installations. In addition, you will also have the **Flow max month** and **Power max month** together with their date of occurrence.

ZZZ=504: linkIQ® Extended, average values

This configuration provides the registers **E1**, **V1**, **E8**, **E9**, **avg. t1**, **avg. t2** on an hourly basis.

Here, the average temperatures are included to provide improved temperature insights on an hourly level in cases with low flow. On a montly basis, you will have **Flow max month** and **Power max month** together with their date of occurrence.

ZZZ=506: linkIQ® Extended, momentary values

This configuration provides the registers **E1**, **V1**, **E8**, **E9**, **t1**, **t2**.

Here, the momentary temperatures are included to provide more current insight into the grid. This is for customers who prefer the momentary ("current") values to the average values, even though they may introduce more fluctuations in the values. On a montly basis, you will have **Flow max month** and **Power max month** together with their date of occurrence.

ZZZ = 511 linkIQ® PDO II datagram

This configuration is for the permanent operation monitoring and is only applicable for MULTICAL® 603 and 803. The configuration is used to monitor the operation of the meter and thus minimse error messages. In this way, you avoid unnecessary field visits due to faulty installations. To read more about permanent operation monitoring, visit our website here:

https://www.kamstrup.com/da-dk/varmeloesninger/temaer/laekovervaagning/driftsovervaagning

Datagrams

All our linkIQ® datagrams are designed to provide 16 years of battery life with a D-cell battery and 8 years with 2xA cells. In the datagram description, you see the specified capacity, which means how many meters with this datagram can be handled by one READy Concentrator 1M. It is also stated which RR code we recommend for a meter with a module using the specific datagram.

32-50-501: linkIQ® Standard datagram

	RR = 52	Interval: 8-22 min	**MULTICAL® 403**
linkIQ® datagram	YY = 50	25 mW	**MULTICAL® 603**
	ZZZ = 501	Capacity = 10.000	**MULTICAL® 803**

No.	Register ID	Register name	Register origin	H	C	H/C	V
1	369	InfoBits	ActualMeterData	X	X	X	X
2	60	E1	HourLog	X		X	
3	63	E3	HourLog		X	X	
4	97	E8	HourLog	X	X	X	
5	110	E9	HourLog	X	X	X	
6	68	Volume V1	HourLog	X	X	X	X
7	1004	Operating hours	DayLog	X	X	X	X
8	175	Error hour counter	DayLog	X	X	X	X
9	369	Infobits	DayLog	X	X	X	X
10	139	Flow V1 max month	MonthLog	X	X	X	X
11	138	Flow V1 max month date	MonthLog	X	X	X	X
12	143	Power max month	MonthLog	X	X	X	
13	142	Power max month date	MonthLog	X	X	X	

32-50-502: E1/E3+T1+T2, E8+E9 day

	RR = 52	Interval: 8-22 min	**MULTICAL® 403**
linkIQ® datagram	YY = 50	25 mW	**MULTICAL® 603**
	ZZZ = 502	Capacity = 10.000	**MULTICAL® 803**

No.	Register ID	Register name	Register origin	H	C	H/C	V
1	369	InfoBits	ActualMeterData	X	X	X	X
2	60	E1	HourLog	X		X	
3	63	E3	HourLog		X	X	
4	68	Volume V1	HourLog	X	X	X	
5	86	T1 actual	HourLog	X	X	X	
6	87	T2 actual	HourLog	X	X	X	
7	97	E8	DayLog	X	X	X	
8	110	E9	DayLog	X	X	X	
9	1004	Operating hours	DayLog	X	X	X	X
10	175	Error hour counter	DayLog	X	X	X	X
11	369	InfoBits	DayLog	X	X	X	X
12	139	Flow V1 max month	MonthLog	X	X	X	X
13	138	Flow V1 max month date	MonthLog	X	X	X	X
14	143	Power max month	MonthLog	X	X	X	
15	142	Power max month date	MonthLog	X	X	X	

32-50-504: linkIQ® Extended, Average Temp

	RR = 52	Interval: 8-22 min	**MULTICAL® 403**
linkIQ® datagram	YY = 50	25 mW	**MULTICAL® 603**
	ZZZ = 504	Capacity = 7.500	**MULTICAL® 803**

No.	Register ID	Register name	Register origin	H	C	H/C	V
1	369	InfoBits	ActualMeterData	X	X	X	X
2	60	E1	HourLog	X		X	
3	63	E3	HourLog		X	X	
4	97	E8	HourLog	X	X	X	
5	110	E9	HourLog	X	X	X	
6	68	Volume V1	HourLog	X	X	X	X
7	381	T1 TimeAvegage Hour	HourLog	X	X	X	
8	382	T2 TimeAverage Hour	HourLog	X	X		
9	1004	Operating hours	DayLog	X	X	X	X
10	175	Error hour counter	DayLog	X	X	X	X
11	369	Infobits	DayLog	X	X	X	X
12	139	Flow V1 max month	MonthLog	X	X	X	X
13	138	Flow V1 max month date	MonthLog	X	X	X	X
14	143	Power max month	MonthLog	X	X	X	
15	142	Power max month date	MonthLog	X	X	X	

32-50-506: linkIQ® Extended, Momentary Temp

	RR = 52	Interval: 8-22 min	**MULTICAL® 403**
linkIQ® datagram	YY = 50	25 mW	**MULTICAL® 603**
	ZZZ = 506	Capacity = 7.500	**MULTICAL® 803**

No.	Register ID	Register name	Register origin	H	C	H/C	V
1	369	InfoBits	ActualMeterData	X	X	X	X
2	60	E1	HourLog	X		X	
3	63	E3	HourLog		X	X	
4	97	E8	HourLog	X	X	X	
5	110	E9	HourLog	X	X	X	
6	68	Volume V1	HourLog	X	X	X	X
7	86	T1	HourLog	X	X	X	
8	87	T2	HourLog	X	X		
9	1004	Operating hours	DayLog	X	X	X	X
10	175	Error hour counter	DayLog	X	X	X	X
11	369	Infobits	DayLog	X	X	X	X
12	139	Flow V1 max month	MonthLog	X	X	X	X
13	138	Flow V1 max month date	MonthLog	X	X	X	X
14	143	Power max month	MonthLog	X	X	X	
15	142	Power max month date	MonthLog	X	X	X	

32-50-507: linkIQ®, standard with monthly billing

	RR = 52	Interval: 8-22 min	**MULTICAL® 403**
linkIQ® datagram	YY = 50	25 mW	**MULTICAL® 603**
	ZZZ = 507	Capacity = 10.000	**MULTICAL® 803**

No.	Register ID	Register name	Register origin	H	C	H/C	V
1	369	InfoBits	ActualMeterData	X	X	X	X
2	60	E1	HourLog	X		X	
3	63	E3	HourLog		X	X	
4	97	E8	HourLog	X	X	X	
5	110	E9	HourLog	X	X	X	
6	68	Volume V1	HourLog	X	X	X	X
7	1004	Operating hours	DayLog	X	X	X	X
8	175	Error hour counter	DayLog	X	X	X	X
9	369	InfoBits	DayLog	X	X	X	X
10	60	E1	MonthLog	X		X	
11	63	E3	MonthLog		X	X	
12	143	Power max month	MonthLog	X	X	X	
13	142	Power max month date	MonthLog	X	X	X	
14	139	Flow V1 max month	MonthLog	X	X	X	X
15	138	Flow V1 max month date	MonthLog	X	X	X	X

32-50-508: linkIQ®, E1 day and hour

	RR = 52	Interval 8-22 min	**MULTICAL® 403**
linkIQ datagram	YY = 50	25 mW	**MULTICAL® 603**
	ZZZ = 508	Capacity = 10.000	**MULTICAL® 803**

No.	Register ID	Register name	Register origin	H	C	H/C	V
1	369	InfoBits	ActualMeterData	X	X	X	X
2	60	E1	HourLog	X		X	
3	68	Volume V1	HourLog	X	X	X	X
4	97	E8	HourLog	X	X	X	X
5	110	E9	HourLog	X	X	X	X
6	60	E1	DayLog	X	X	X	X
7	369	InfoBits	DayLog	X	X	X	X
8	175	Error hour counter	DayLog	X	X	X	X
9	138	Flow V1 max month	MonthLog	X	X	X	X
10	139	Flow V1 max month date	MonthLog	X	X	X	X
11	143	Power max month	MonthLog	X	X		
12	142	Power max month date	MonthLog	X	X		
13	138	Flow V1 max month date	MonthLog	X	X	X	X
14	143	Power max month	MonthLog	X	X	X	
15	142	Power max month date	MonthLog	X	X	X	

32-50-511: linkIQ® PDO II datagram

	RR = 53	Interval: 8-22 min	
linkIQ® datagram	YY = 50	25 mW	**MULTICAL® 603**
	ZZZ = 511	Capacity = 10.000	**MULTICAL® 803**

No.	Register ID	Register name	Register origin	H	C	H/C	V
1	369	InfoBits	ActualMeterData	X	X	X	X
2	60	E1	HourLog	X		X	
3	63	E3	HourLog		X	X	
4	68	Volume V1	HourLog	X	X	X	X
5	97	E8	HourLog	X	X	X	
6	110	E9	HourLog	X	X	X	
7	139	Flow V1 max month	MonthLog	X	X	X	X
8	138	Flow V1 max month date	MonthLog	X	X	X	X
9	143	Power max month	MonthLog	X	X	X	
10	142	Power max month date	MonthLog	X	X	X	
11	1004	Operating hours	DayLog	X	X	X	X
12	175	Error hour counter	DayLog	X	X	X	X
13	369	InfoBits	DayLog	X	X	X	X
14	72	Mass M1	DayLog	X	X	X	
15	73	Mass M2	DayLog	X	X	X	
16	86	T1	DayLog	X	X	X	
17	87	T2	DayLog	X	X	X	
18	88	T3	DayLog	X	X	X	
19	473	E10	DayLog	X	X	X	
20	69	Volume V2	DayLog	X	X	X	
21	74	Flow V1	DayLog	X	X	X	

32-50-512: linkIQ® leakage detection

	RR = 53	Interval: 8-22 min	
linkIQ® datagram	YY = 50	25 mW	**MULTICAL® 603**
	ZZZ = 512	Capacity = 7.500	**MULTICAL® 803**

No.	Register ID	Register name	Register origin	H	C	H/C	V
1	369	InfoBits	ActualMeterData	X	X	X	X
2	1004	Operating hours	DayLog	X	X	X	X
3	69	Volume V2	DayLog	X	X	X	
4	72	Mass M1	DayLog	X	X	X	
5	73	Mass M2	DayLog	X	X	X	
6	175	Error hour counter	DayLog	X	X	X	X
7	369	InfoBits	DayLog	X	X	X	X
8	60	E1	HourLog	X		X	
9	63	E3	HourLog		X	X	
10	68	Volume V1	HourLog	X	X	X	X
11	97	E8	HourLog	X	X	X	
12	110	E9	HourLog	X	X	X	
13	86	T1	HourLog	X	X	X	
14	87	T2	HourLog	X	X	X	X
15	138	Flow V1 max month date	MonthLog	X	X	X	X
16	139	Flow V1 max month	MonthLog	X	X	X	X
17	143	Power max month	MonthLog	X	X	X	
18	142	Power max month date	MonthLog	X	X	X	

32-50-515: Normal Reg. Sweden

	RR = 52	Interval: 8-22 min	**MULTICAL® 403**
linkIQ® datagram	YY = 50	25 mW	**MULTICAL® 603**
	ZZZ = 515	Capacity = 7.500	**MULTICAL® 803**

No.	Register ID	Register name	Register origin	H	C	H/C	V
1	369	InfoBits	ActualMeterData	X	X	X	X
2	60	E1	HourLog	X		X	
3	63	E3	HourLog		X	X	
4	86	T1	HourLog	X	X	X	
5	87	T2	HourLog	X	X	X	
6	68	Volume V1	HourLog	X	X	X	X
7	74	Flow V1	HourLog	X	X		
8	80	Power	HourLog	X	X	X	
9	1004	Operating hours	DayLog	X	X	X	X
10	175	Error hour counter	DayLog	X	X	X	X
11	369	Infobits	DayLog	X	X	X	X
12	87	E8	DayLog	X	X	X	
13	110	E9	DayLog	X	X	X	
14	139	Flow V1 max month	MonthLog	X	X	X	X
15	138	Flow V1 max month date	MonthLog	X	X	X	X
16	143	Power max month	MonthLog	X	X	X	
17	142	Power max month date	MonthLog	X	X	X	

How to create a new datagram

If none of our datagrams fits your needs, you can create a new linkIQ® datagram from the logger profile in the meter. We recommend to use the latest logger profile for linkIQ®. Here, you can pick maximum 6 registers from the hourly logger. Regarding daily/monthly/yearly registers, you can, as a general rule, choose up to 10 different registers in total.

Limitations on register

When increasing the number of registers on an hourly basis, it should be noted that the robustness of the system decreases, which is why the maximum capacity decreases. Note also that the wireless capacity includes all linkIQ® metering points within range, e.g. both heat and water meters, whether or not the infrastructure is shared.

Number of hourly registers (linkIQ®)	Maximum wireless network capacity
1	30.000 metering points
2	20.000 metering points
4	10.000 metering points
6	7.500 metering points