kamstrup

Data Sheet

Encoded output/touch read module 41

For water meters flowIQ® 2200, flowIQ® 3200 and flowIQ® 4200

- Integrated Encoder and touch read
- Based on Sensus protocols
- Extended alarms
- flowIQ® 2100 and flowIQ® 3101 compatibility

Contents

Preface

Different communication options are available for Kamstrup water meters. These communication options refer to communication modules, defined by the capital letters XX in the type number:

02-x-XX-x-x-xx-x-xx (non-changeable)

The XX communication module cannot be changed after ordering. The communication configuration is changeable by the YY-ZZZ choice in the configuration number:

DDD-JJ-LLL-MMMM-N-P-S-U-RR-CCC-V-T-YY-ZZZ (changeable with SW METERTOOL, READy App or MeterToolX).

Furthermore, it is possible to force the meter to only communicate either by Encoded Output or TouchRead, this is available by means of METERTOOL.

Introduction

The Encoded Output communication interface is supported by the Kamstrup meter program, flowIQ® 2200, flowIQ® 3200 and flowIQ® 4200.

The support is implemented in module 41 and is specifically supported by the meters KWM2221, KWM3221 and KWM4220.

The Sensus Encoded Output and TouchRead are implemented based on Sensus specification UI-1203 and UI1204.

Module 41 supports Sensus Encoded Output systems and Sensus TouchRead systems.

In addition, Neptune ProRead, Neptune E-coder systems and others are supported.

For additional information contact Kamstrup.

Application overview

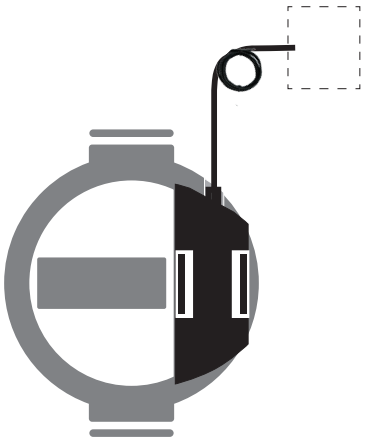
Kamstrup Encoded Output/TouchRead module 41 is compatible with several third-party AMR or AMI based reading systems. Note that third party reading systems for Encoded output and TouchRead are not offered by Kamstrup.

The meter auto detects touch read or encoded output communication.

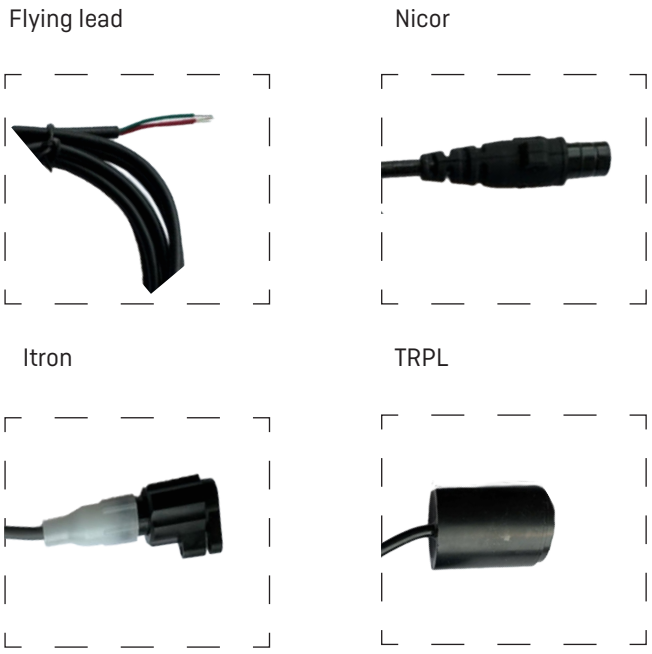
The module needs to be configured to the appropriate data package to ensure third-party system compatibility. This is done by means of the configuration number:

DDD-JJ-LLL-MMMM-N-P-S-U-RR-CCC-V-T-YY-ZZZ

Kamstrup supports cables for connecting the meter to remote touch pads in a TouchRead setup and for connecting the meter to third party endpoints. The figure below displays a flowIQ® with module 41 and the different connection possibilities offered by Kamstrup.



flowIQ® with module 41



Cable connections offered by Kamstrup

Module overview

XX-YY-ZZZ relations

Transmitted volume and resolution is defined by the YY-code, except for Neptune configurations.
Data package content setup is defined by the ZZZ-configuration.

XX	YY -	ZZZ	Description
41	40	800*	123456789, 9-digit, Sensus Standard
		801	123456789, 9-digit, Sensus Extended Alarm
		802	123456789, 9-digit, Sensus Extended Alarm Legacy
	41	800	12345678, 8-digit, Sensus Standard
		801	12345678, 8-digit, Sensus Extended Alarm
		802	12345678, 8-digit, Sensus Extended Alarm Legacy
	42	800	1234567, 7-digit, Sensus Standard
		801	1234567, 7-digit, Sensus Extended Alarm
		802	1234567, 7-digit, Sensus Extended Alarm Legacy
	43	800	123456, 6-digit, Sensus Standard
		801	123456, 6-digit, Sensus Extended Alarm
		802	123456, 6-digit, Sensus Extended Alarm Legacy
	44	804	Neptune Standard, Neptune 8-digit (E-coder)
		805	Neptune Standard, Neptune 6-digit (ProRead)
	45	800	12345, 5-digit, Sensus Standard
		801	12345, 5-digit, Sensus Extended Alarm
		802	12345, 5-digit, Sensus Extended Alarm Legacy
	46	800	*23456789 (-1), Sensus Standard
		801	*23456789 (-1), Sensus Extended Alarm
		802	*23456789 (-1), Sensus Extended Alarm Legacy
	47	800	*2345678* - (-1), 7-digit, Sensus Standard
		801	*2345678* - (-1), 7-digit, Sensus Extended Alarm
		802	*2345678* - (-1), 7-digit, Sensus Extended Alarm Legacy
	48	800	1234, 4-digit, Sensus Standard
		801	1234, 4-digit, Sensus Extended Alarm
		802	1234, 4-digit, Sensus Extended Alarm Legacy

*Default distributor configuration: 40-800

Note! The volume resolution, flow resolution, decimal position, billing unit and unit of measurement on the LCD are defined by the CCC-code. For further information see section “Display and data transmission behavior” and FILE100002712 for CCC-code options.

Data package setup and transmission output (ZZZ)

The following sections describe the content of the supported data packages selected with the ZZZ-code. Transmission output and data package setup are defined by the ZZZ-code.
For a data package example, please see "Package setup with extended alarms (ZZZ package 801) – Sensus Extended Alarm"

Note!
The meter interrogation must be completed within approximately 4 seconds from the first clock pulse, otherwise the meter will terminate the interrogation and enforce a delay of a few seconds before responding to a new interrogation.
Furthermore, the meter will not respond to interrogations with a clock frequency lower than 6Hz.

Sensus package setup without extended alarms (ZZZ package 800) - Sensus Standard:
Communication setup: ASCII based 7E1

Package setup	V;RBvvvvvvvvv;IBsssssssss<CR>
Meter reading (6-9 digits)	(vv..vv)
Meter serial number	(ss..ss)

Data package setup and transmission output (ZZZ)

Package setup with extended alarms (ZZZ package 801) - Sensus Extended Alarm:
ZZZ-package 801 supports Kamstrup flowIQ® 2100 and flowIQ® 3101 module 23.
Communication setup: ASCII based 7E1

Package setup	V;RBvvvvvvvvv;IBsssssssss;Jaaaaa;XTtttt<CR>
Meter reading (6-9 digits)	(vv..vv)
Meter serial number	(ss..ss)
ASCII coded alarm field	(aaaaa)
ASCII coded temperature	(tttt)

Sensus Extended alarm content:

Alarm bits

Bit position	Description
00(LSB)	Reverse flow - Actual
01	Reverse flow – Historic (last 30 days)
02	Dry – Actual
03	Dry – Historic (last 30 days)
04	Burst – Actual
05	Burst – Historic (last 30 days)
06	Encoder setup changed one or more times since production
07	Leak – Actual
08	Leak – Historic (last 30 days)
09, 10	Triggers for the minimum detected meter temp. since midnight: 0.0 – The temp has been >= 10°C (50°F) 1.0 – The temp has been between 6-9°C (42-49°F) 0.1 – The temp has been between 3-5°C (37-41°F) 11 – The temp has been <= 2°C (36°F)
11, 12	Triggers for the maximum detected meter temp. since midnight: 0.0 – The temp has been <= 35°C (95°F) 1.0 – The temp has been between 36-45°C (96-113°F) 0.1 – The temp has been between 46-52°C (114-125°F) 1.1 – The temp has been >= 53°C (126°F)
13	No usage detected on Volume1 for last 35 days
14	Tamper defect
15(MSB)	Low battery (six months left)

Data package setup and transmission output (ZZZ)

Example:

ASCII coded alarm field (aaaaa)	00129 = 0000 0000 1000 0001
ASCII coded temperature (tttt)*	-010 = -10 +050 = +50

*Temperature unit depends on meter configuration

In the above example the decimal value 129 is converted to a binary value. In this example the alarms “Reverse flow – Actual” (bit 00) and “Leak – Actual” (bit 07) are active. The following alarm content table describes the meaning of the bits.

Sensus package setup with extended alarms (ZZZ-package 802) - Sensus Extended Alarm Legacy

The package supports Kamstrup flowIQ® 2100 and flowIQ® 3101 module 22.

Communication setup: ASCII based 7E1

Package setup	V;RBvvvvvvvvv;IBsssssssss;Ann<CR>
Meter reading (6-9 digits)	(vv..vv)
Meter serial number	(ss..ss)
None-ASCII 7-bit binary coded alarm field	(nn)
None-ASCII 7-bit binary coded temperature field	(tttt)

Sensus Extended alarm content:

Alarm Byte 1

Bit position	Description
00(LSB)	Reverse - Actual
01	Reverse – Historic (last 30 days)
02	Dry – Actual
03	Dry – Historic (last 30 days)
04	Burst – Actual
05	Burst – Historic (last 30 days)
06	Encoder setup changed one or more times since production
07(MSB)	Unused

Data package setup and transmission output (ZZZ)

Alarm Byte 2

Bit position	Description
00(LSB)	Leak - Actual
01	Leak - Historic (last 30 days)
02, 03	Triggers for the minimum detected meter temp since midnight: 0/0 – The temp has been >= 10°C (50°F) 0/1 – The temp has been between 6-9°C (42-49°F) 1/0 – The temp has been between 3-5°C (37-41°F) 1/1 – The temp has been <= 2°C (36°F)
04, 05	Triggers for the maximum detected meter temp since midnight: 0/0 – The temp has been <= 35°C (95°F) 0/1 – The temp has been between 36-45°C (96-113°F) 1/0 – The temp has been between 46-52°C (114-125°F) 1/1 – The temp has been >= 53°C (126°F)
06	No usage detected on V1 for the last 35 days
07(MSB)	Unused

Neptune package setup with extended alarms (ZZZ package 804) - Neptune E-coder

ZZZ-package 804 with Neptune E-coder Encoded Output supports 8 digits.

This ZZZ-package includes Neptune alarms. These are provided by transmission of 2 bytes data via the wired connection.

Communication setup: ASCII based 7E2

Package setup	<STX>200SW<ETB>vvvvvv<ETB>sssssssss<ETB>f<ETB>wwg<ETB>cc<ETX>
Meter Reading Most significant digits	(vvvvvv)
Meter Reading Least significant digits	(ww)
Meter Serial Number	(sssssssss)
Non-ASCII, 7-bit Binary alarm byte 1	(f)
Non-ASCII, 7-bit Binary alarm byte 2	(g)
Checksum	(cc)

Data package setup and transmission output

Neptune alarm content:

Alarm Byte 1

Bit position	Description
00(LSB)	Reverse - Actual
01	Reverse - Historic (last 30 days)
02	No usage (last 15 days)
03	No usage (last 25 days)
04	No usage (last 35 days)
05	Not used
06 (MSB)	Not used

Alarm Byte 2

Bit position	Description
00(LSB)	Not used
01	Leak - Actual
02	Not used
03	Leak - Historic (last 30 days)
04	Not used
05	Not used
06 (MSB)	Not used

Neptune package setup with extended alarms (ZZZ package 805) - Neptune 6-digit (ProRead)

ZZZ-package 805 with Neptune 6-digit ProRead Encoded Output support 6 digits. This ZZZ-package do not Include alarms.

Communication setup: ASCII based 7E2

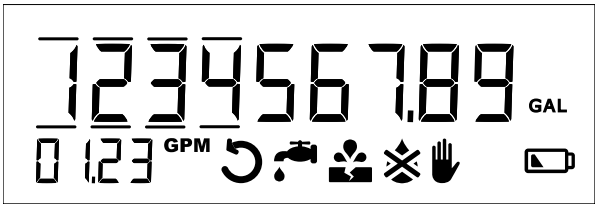
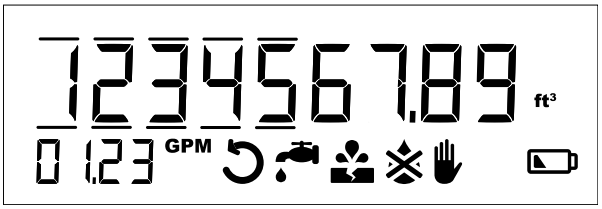
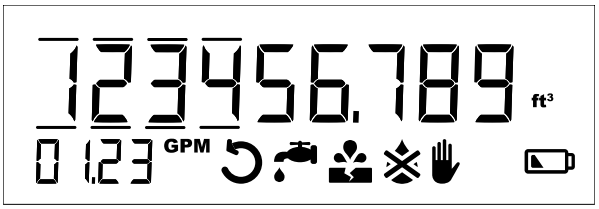
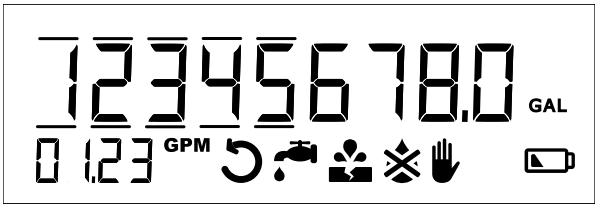
Package setup	<STX>100SW<ETB>vvvvvv<ETB>sssssssssss<ETB><SPC><ETB><SPC><SPC><SPC><ETB>cc<ETX>
Meter reading Most significant digits	(vvvvvv)
Meter reading Least significant digits	(sssssssssss)
Meter serial number	(cc)

Display and data transmission behavior

The resolution of the data transmission from the encoder or touch read is defined by the YY-code selection. The volume resolution, flow resolution decimal position, billing unit and unit of measurement on the LCD are defined by the CCC-code. See section “XX-YYY-ZZZ” for an overview.

The transmission behavior is independent of the decimal as the transmitted digits are counted starting from the leftmost (most significant) digit and counting to the right. The decimal point and unit of measurement is not transmitted with the encoder or touch read.

Display and data transmission behavior examples.

CCC-code	Volume resolution and unit, Flow resolution and unit, Billing units	flowIQ® display	YY-(ZZZ) code	Transmitted resolution	Transmitted data OUTCOME
220	0000000.00 USgal 00.01 GPM Billing in 1.000s		40	9-digits	123456789
120	0000000.00 ft³ 00.01 GPM Billing in 100s		42	7-digits	1234567
110	000000.000 ft³ 00.01 GPM Billing in 100s		43	6-digits	123456
230	00000000.0 USgal 00.01 GPM Billing in 1.000s		44-(804)	8-digits	12345678

Ordering details

NOTE!
The features included in the type number cannot be changed once the meter has been produced.
Applies for all meter variants.

flowIQ® 2200 EO	**Meter type 02-**	☐	☐☐	☐	☐	☐☐	☐	☐☐
Mechanical design								
Composite		K						
Communication module								
Encoded Output/TouchRead			41					
Power supply								
2 x A-cell				A				
Dynamic range								
AWWA C715-18					1			
Meter size								
⅝" x ½" (25 GPM); ¾" NPSM; 7½"						8A		
⅝" x ¾" (25 GPM); 1" NPSM; 7½"						8B		
⅝" x ¾" (25 GPM); 1" NPSM; 5.1"						8R		
¾" (32 GPM); 1" NPSM; 7½" or 9" (includes 1½" extension)						8C		
Meter type								
Cold water meter							8	
Country code								
								UB
								CA

Ordering details

flowIQ® 2200 & 3200 E0	Meter type 02-	☐	☐☐	☐	☐	☐☐	☐	☐☐
Mechanical design								
Stainless steel		L						
Communication module								
Encoded Output/TouchRead			41					
Power supply								
2 x A-cell				A				
Dynamic range								
AWWA C715-18					1			
Meter size								
¾" (35 GPM); 1" NPSM; 7½"						8N		
¾" (35 GPM); 1" NPSM; 9"						8L		
1" (55 GPM); 1¼" NPSM; 10¾"						8D		
1½" (120 GPM); 13"						8F		
2" (160 GPM); 17"						8H		
2" (160 GPM); 15¼"						8M		
3" (350 GPM); 12"						8K		
4" (700 GPM); 14"						8P		
Meter type								
Cold water meter							8	
Country code								
								UB
								CA

Ordering details

flowIQ® 4200 EO	Meter type 02-	☐	☐☐	☐	☐	☐☐	☐	☐☐
Mechanical design								
Stainless steel with iron split flanges		E						
Communication module								
Encoded Output/TouchRead			41					
Power supply								
2 x D-cell				G				
Dynamic range								
AWWA C715-18					1			
Meter size								
6" x 11.8" (1600 GPM)						FR		
8" x 13.8" (2800 GPM)						GA		
10" x 17.7" (4500 GPM)						GJ		
12" x 19.7" (5500 GPM)						GS		
Meter type								
Cold water meter							8	
Country code								
								UB
								CA

Configuration

The table shows the available configuration number dependencies related to the XX communication module. If a configuration parameter is not dependent on the communication module, it is shown in the table as not applicable (N/A).

For further information, see the meter documentation.

Config code	DDD	JJ	LLL	MMMM	N	P	S	U	RR	CCC	V	T	YY	ZZZ
	□□□	□□	□□□	□□□□	□	□	□	□	□□	□□□	□	□	□□	□□□
Display views														
Standard	810													
GMT offset – time zone														
-		N/A												
Target date														
Max values – average over time														
-			N/A											
Customer label				N/A										
Leakage message limit														
-					N/A									
Pipe burst limit (not for KWM4220)														
-						N/A								
Indicative ambient temperature low limit														
-							N/A							
Indicative ambient temperature high limit														
-								N/A						
Data logger profile														
KWM2221 / KWM3221 / KWM4220 E0									15					
Display resolution														
See the section 'Module overview'										YY				
Temperature units of measure														
See the section 'Module overview'											ZZZ			
Encryption level														
-												N/A		
Transmission behavior														
See the section 'Module overview'													YY	
Data packages														
See the section 'Module overview'														ZZZ

Battery lifetime

The estimated battery lifetime is stamped on the meter front plate. The battery lifetime depends on conditions such as battery supply type, ambient temperature, transmission interval, data package, etc.

For further information, see relevant meter data sheet.

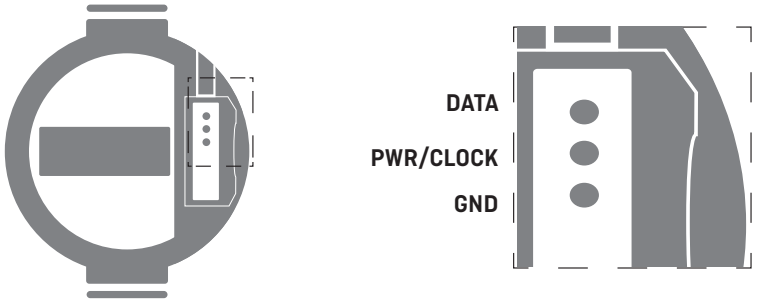
Encoded Output/TouchRead – wiring and pinouts

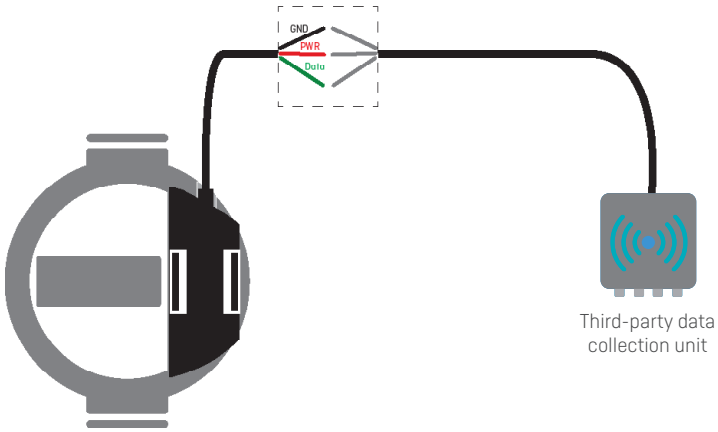
Kamstrup offer 5 ft and 25 ft cable variants supporting TRPL, Nicor, flying lead and Itron.

The 5 ft cable variants can be delivered as a spare part, in the meter packaging or mounted on the meter from factory. The 25 ft cable variants can only be ordered as a spare part.

See “Accessories” for cable variants and item numbers.

Kamstrup flowIQ® terminations





Kamstrup flowIQ® with module 41 and three wire open ended cable

Open ended cable compatibility table

Function	Kamstrup Flying Lead	Sensus	Neptune	Badger	Itron Integral	Itron Remote
DATA	Green	Green	Red	Green	Red	Brown
PWR/Clock	Red	Red	Black	Red	Black	Yellow
GND	Black	Black	Green	Black	White	Grey

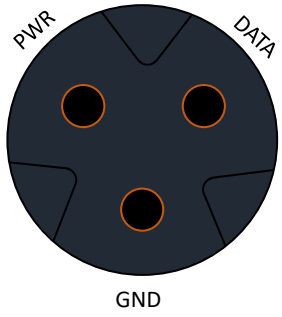
“Kamstrup” refers to color codes of Kamstrup flying lead cable variants.

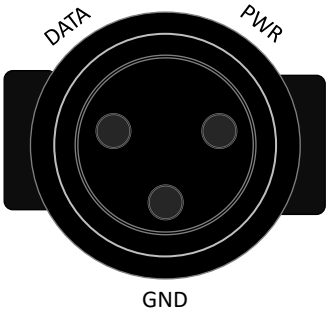
Third-party color coding refers to those of the data collection unit terminations.

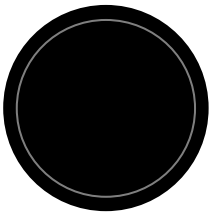
Accessories

Cable variant	Item number
5 ft. Flying lead - Sparepart	9000020
5 ft. Flying lead - Factory mounted	5000549.1
5 ft. Flying lead - Packed with meter	5000549.3
25 ft. Flying lead	9000019
5 ft. Nicor - Spare part	9000023
5 ft. Nicor - Factory mounted	5000558.1
5 ft. Nicor - Packed with meter	5000558.3
25 ft. Nicor	9000029
5 ft. Itron - Spare part	9000022
5 ft. Itron - Factory mounted	5000557.1
5 ft. Itron - Packed with meter	5000557.3
25 ft. Itron	9000028
5 ft. TRPL - Spare part	9000021
5 ft. TRPL - Factory mounted	5000556.1
5 ft. TRPL - Packed with meter	5000556.3
25 ft. TRPL	9000030

For additional accessories see "Accessories list for Water Meters": FILE100000644







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