

Brunata Futura Signal⁺

Installation Guide

Edition 2.0

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Brunata is a 100% Danish owned company. We have more than 90 years of experience within developing and producing heat cost allocators, heating accounts and meter service. Our quality system meets DS/EN ISO 9001 and 14001. Read more at www.brunata.dk or contact us at +45 77 77 70 00

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1.0 Introduction

1.1 General description

Brunata Futura Signal⁺ (Signal⁺), which is built into a Signal⁺ cabinet, is used to collect measurement data from up to four pulse-providing meters. The meters do not need to be the same type (see item 1.2). The meters are connected to individual input channels on Signal⁺ which can be supplied with or without transmitter.

If Signal⁺ output data are required for WebBill, the meters connected to Signal⁺ must be located in the same user unit. Alternatively, they will be located under the same Brunata no. ("flat") for accounts purposes, irrespective of their physical location, i.e. two meters can be connected to the same Signal⁺ even though they belong to different flats.

1.2 Meter types and choice of Signal⁺ model

As it is presumed that the intention is to count pulses from both energy and flow, a Signal⁺ with min. two S01 inputs are used, e.g. product no. 45-3102-A with transmitter. **S01 inputs are always prioritised above reed inputs.** Thus S01 always has the lowest channel numbers (**S01 before reed**). The two S01 inputs will be on channel 1 and 2.

Signal⁺ is available in five versions with different combinations of channels with S01 and reed inputs. The models are designated "x/y", where x indicates the number of S01 inputs and y the number of reed inputs.

4 channels are available, but 3 optional channels can be active at the same time.

The models are:

FS model	Product no. Version2	Channel 1	Channel 2	Channel 3
	With transmitter			
0/3	45-3100-A	Reed	Reed	Reed
1/2	45-3101-A	S01	Reed	Reed
2/1	45-3102-A	S01	S01	Reed

For the given task, the suitable combination of reed/S01 inputs should be chosen. As a given channel, as mentioned above, is “hard coded” for either reed or S01, it is necessary to know the meters’ output type before ordering Signal⁺.

Currently, the following meter type numbers are relevant Signal⁺:

Meter type no.	Type	Possible registration units	Basic physical unit
80	Cold water meter	Litres, m ³	Litre
80	Hot water meter	Litres, m ³	Litre
85	Hour counter	Hours	Hour
90	Electricity meter	Wh, kWh, MWh, GWh	Wh
95	Gas meter	M ³	M ³
63	Energy meter/energy	Wh, kWh, MWh, GWh MJ, GJ	Wh
80	Energy meter/flow	Litres, m ³	Litre

Note that these type numbers generally correspond to the numbers used in WebBill. The Signal⁺ type numbers combine application and meter type in one designation.

When transferring data from hand terminal to WebBill, the basic physical units are always used - provided the relevant input channel is correctly programmed (see item 4.0).

1.3 Prioritisation of meters

When meters are allocated to the Signal⁺ channels, the meters must be prioritised in such a way that **S01 inputs come before reed inputs**:

Priority	Meter type	Meter
1	63	Energy meter, energy
2	80	Energy meter m ³
3	90	Electricity meter
4	95	Gas meter
5	85	Hour counter
6	80	M ³ meter cold
7	80	M ³ meter warm
8	Available	Available

If e.g. the flat has a hot water meter (reed), an electricity meter (S01) and a cold water meter (reed), they must be connected as follows in a 1/3 FS:

Channel	Input	Meter type
1	S01	90
2	Reed	80
3	Reed	80
4	Reed	Available

If it has a gas meter (reed), a heat cost allocator (S01) and an electricity meter (S01), they must be connected to the 3/1 Signal⁺ as follows:

Channel	Input	Meter type
1	S01	63
2	S01	90
3	Reed	95
4	Reed	Available

NB! Note the number of S01 channels used.

1.4 Display

The Signal⁺ display shows data for the input channels used in the following cycle:

channel 1/id no. → channel 1/total consumption → channel 2/id no. → channel 2/total consumption → channel n/id no. → channel n/total consumption (for id no., see item 5.0)

The display can show up to two decimals, but the comma may be difficult to see. Only the active channels are shown on the Signal⁺ display. In other words, if three meters are connected, the display will only alternate between showings for the three meters.

2.0 Installation of Signal⁺ and casing

2.1 Materials

- Signal⁺ (product no. see item 1.2) with 3 m eight-conductor cable
- Spacer ring (25-1750c)
- Cabinet (product no. 44-0520-b)
- Two sticky pads (product no. 05-6050-c)
- Round-headed screws (product no. 05-1033-c) for mounting Signal⁺ and cabinet

In addition, we recommend ordering a label for sticking on the front of Signal⁺. The label tells the user what is shown on the display and which channels are connected to which metres. Labels are available from Marketing.

2.2 Tools

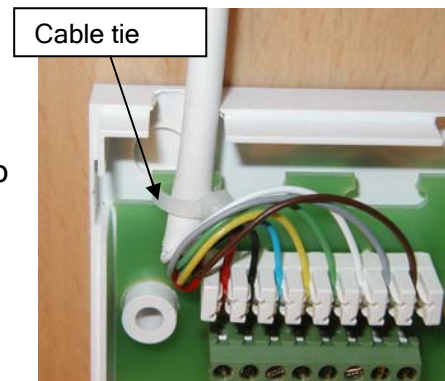
- Krone LSA pulse (product no. 06-140-C)
- Cable stripper (product no. 06-1045-C)
- Drill
- Drill bit corresponding to the screw size used and relevant surface



Exposure to water: Neither Signal⁺ nor cabinet may be exposed to water. Therefore they must always be installed outside wet zones in the bathroom.

Signal⁺ is mounted with two sticky pads and one round-headed screw. Remember the spacer ring. The screw head must have a flat underside and not be intended for countersinking.

The cabinet contains a board with a white and a green terminal row. Connecting conductors to the white terminal row requires the use of the special tool “Krone LSA pulse”. Depending on the surface, the box is mounted with either two sticky pads or two round-headed screws.



The sticky pads only reach full adhesive effect after approx. 24 hours.

- The lead inputs in the cabinet are adjusted with cutting nippers. The board is turned and fixed to the bottom of the box.
- The Signal⁺ cable is shortened to a length corresponding to the distance between FS and cabinet. The white cover is removed from the last 70 mm or so of the cable (e.g. with a cable stripper - product no. 06-1045-C). The cable is fixed to the cabinet by the lead input with a cable tie (enclosed) to a protruding board edge.
- The Signal⁺ cable and meter leads are connected to the terminal rows in the cabinet according to the following chart:

FS cable, WHITE terminal row							
Red	Black	Blue	Yellow	Green	White	Grey	Brown
Channel 1		Channel 2		Channel 3		Channel 4	
-	+	-	+	-	+	-	+
Meter leads, GREEN terminal row							

The darkest Signal⁺ lead without polarity is connected to - and the palest to +.

- The Signal⁺ cable leads must not be stripped before installation. They are pushed into the terminal row with the “Krone LSA pulse” tool, which can be set to cut off excess lead automatically.
- The meter leads are stripped and connected to the green terminal row. Ensure that + and - are turned correctly in the S01 inputs - if the poles are reversed, there will be no registrations for the channel in question!
- Signal⁺ is sealed with the Futura lid seal and the cabinet with two sticky seals.

3.0 Calculation of set-up values for the individual channels

The values are calculated in a spreadsheet, FuturaSignalConfiguration.xls, which is supplied and updated by the Technical Service Department.

For each pulse provider (meter), the two following parameters must be known before the values are calculated:

1: Number of pulses per meter unit for the relevant meter, i.e. pulses per kWh, litres per pulse, etc. This should be stated on the meter itself or in its documentation.

2: Required resolution per count (0.01, 0.1, etc.). Normally the same resolution is used as on the meter itself, but as described in item 3.3, it may be necessary to deviate from this to achieve usable programming values.

3.1 Entry in spreadsheet

At the top, *meter no.*, *address* and possibly *service technician* are entered.

In the spreadsheet, fields with a small red triangle in the top right corner are accompanied by an explanatory text, which appears when the cursor is placed on the text line of the field.

The user must enter/select:

- Meter type
- Display (how many decimals does the meter display - or how many decimals are required on the pulse collector)
- Meter unit
- Meter start value (if correspondence between the displays on meter and pulse collector is required - otherwise it should be set to 0)
- Pulses per unit or units per pulse (e.g. 1,000 pulses per m³, 25 litres per pulse, etc.)
- The unit to which the pulse value is related (not necessarily the same as the meter's display unit!)

It is important to consider all six parameters, as the pulse collector will otherwise be incorrectly programmed!

In particular, it should be noted in connection with the choice of decimals that the pulse collector display can show max. two decimals marked by comma. Although a third decimal will not show on the display, it will be transferred to the terminal/network.

3.2 Output data in spreadsheet

Output data are shown in the field "Pulse collector set-up". They cannot be changed directly, only by changing the input data:

- *Meter type* (cf. above item 1.3)
- PreScaler ("pre-divisor")

The value indicates the number of pulses in the meter's resolution, i.e. the number of pulses in one pulse collector counter step (e.g. 1 pulse per 25 litres at a resolution of 0.01 m³ corresponds to PreScaler = 4). PreScaler values must always be integers and must never exceed 255.

- *LogScaler* ("sum divisor")
The value is as standard 25 and indicates the figure by which the annual calculation is divided before it is saved in the register TerminsLog. The value can be adjusted if necessary (see item 3.3)
- SumContribution
Indicates the value added to the annual calculation and total counter for one counter step.

SumContribution is normally 1 and must be an integer.

- *Exponents.*

The value decides the placing of the comma in the saved registrations from the meter:

- 0.3 and 6 ~ no decimals
- 1.4 and 7 ~ 2 decimals
- 2.5 and 8 ~ 1 decimal

The exponent is transferred to hand terminal/via network when the pulse collector transmits data, so that the decimal structure is available, e.g. when preparing accounts.

- *Standard counter*

The value is an integer. Note that a value of more than five digits can be entered, even though the pulse collector display only shows five digits - the other digits will be included in the pulse collector register.

At the end of the calculation, the spreadsheet can be printed in landscape format. Remember to note the meter number and/or address at the top of the print-out if this was not entered before!

3.3 Adjustment of output data

Input data can be contradictory or cause problems which are either adjusted by the spreadsheet itself (see example) or have to be considered by the user.

Example: An energy meter with registration in MWh, a resolution of 0.1 MWh, 4,000 pulses per MWh and a start value of 789.3 MWh.

If the same resolution is required on the pulse collector display (1 decimal), the above-mentioned values will produce a PreScaler value of 400 - but as mentioned above, PreScaler must be max. 255. The spreadsheet automatically adjusts the value to 40 by changing the reading to 2 decimals, producing a *start counter figure* of 78930 instead of 7893.

In other cases, the spreadsheet will indicate PreScaler "error". Usable output data can typically be created by changing the meter resolution (number of decimals), but it is best to check first whether the other entered parameters "make sense", especially whether the pulse frequency (number of pulses per unit) is correct. In addition, attention should be paid to the following two parameters, which may result in the programming having to be adjusted:

- Very high or low annual consumption may require the *LogScaler* standard value to be changed. If a high annual consumption is expected, overrun in the pulse collector settlement period register can be prevented by increasing the LogScaler value. Correspondingly, the register resolution can be increased by reducing the LogScaler value in cases where low annual consumption is expected.
- The maximum pulse frequency of 16.67 Hz may be exceeded at peak loads. This might occur for certain central meters (e.g. an electricity meter covering an entire property), but is unlikely when measuring individual consumption. If it is expected to be a problem, contact the Technical Department for advice.

4.0 Programming of pulse collector

The programming of the channels is the same on pulse collectors with or without transmitter. The pulse collector is programmed with Psion WorkAbout with reader head.

4.1 Entering set-up values via hand terminal

To ensure correct interpretation of pulse collector data, it is important that:

- the individual input channels are correctly configured in relation to the output data required for the relevant meter
- the input channels for identical meters (type and usage) in different user units are configured identically - otherwise the output data will not be directly comparable when preparing accounts.

The channels are configured as follows:

- Select *RME95*[Enter]/ set clock in WorkAbout [Enter]/ select closing date [Enter]/ Enter buliding ID no.) [Enter] / *configuration* [Enter] *Pulse Counter/Make Configuration* [Enter]
- It is now possible to select A, B or C for saving the generated configuration. Select using the arrow key [Enter].
- Edit Display type IKON or TEKST [Enter]
- An overview of the four channels with id no. and status is shown *Free//In use*). Select the channel to be programmed and hit [Tab] (not [Enter]!).

- The first three parameters are shown and must be allocated the values: *Type*, *Display* and *Units*. Enter these values using the arrow keys and hit [Enter].
- The next three parameters are shown and must be allocated the values: *Pulse input*, *Number* and *Units*. Enter these values using the arrow keys and hit [Enter].
- This brings back the channel overview. If more channels need to be configured, move down in the list and enter the values as described above.
- When all relevant channels have been configured, the data are saved in WorkAbout by hitting [Enter].
- Hit the menu key to return to the pulse collector menu.
- Data are sent to the pulse collector by selecting Hit [Enter]. After a while, the WorkAbout display will show data for all four channels. Leave the picture by hitting [Esc] and [Menu]. Any start values can now be entered as follows:
- Select *Set meter registration*.
- On the picture which appears, the channel(s) whose start value need changing can be selected. Hit [Enter] to send the value to the pulse collector.
- When the start value has been received, the WA display will show data for all four channels. Return to the *pulse collector menu* by hitting [Enter].

4.2 Further programming and test of pulse collector with transmitter

Connection of the pulse collector in a wireless network presupposes that radio receivers, etc. have already been installed and tested.

After programming the channels, select menu item
Radio transmitter is set to ON when the pulse collector has been configured.

To test whether the radio telegram is received in the radio receiver, the transmitter can be forced to send "*Pseudo RF*"
RME95/Meter/Configuration hit [Enter]
Misc/Pseudo RF. hit [Enter]

- Choose how many test signals to send - hit [Enter].
- A test signal is sent. Check whether it has been received by sending a text message to the GPRS box (dokfaw meters) or by checking whether data have been received in WebMon.
- A helper visually checks the radio monitor to see if the signal is received. Alternatively, you have time to check yourself if you have send enough test

signals. The receiver's light diode flashes green if the signal is correctly received. If it flashes red, it is busy with other communication and the test has to be repeated. See below for other error possibilities.

- There are several possible sources of error if the signal is not received, e.g. it may be obstructed by building parts, etc. This can be checked by taking down the pulse collector and standing with it elsewhere in the room. If reception is improved, the pulse collector has to be moved permanently to another location. Alternatively, the receiver can be moved. The distance between pulse collector and receiver is too great.

4.3 Registration of data from pulse collectors

Note the pulse collector's normal location in the reading order on the installation list, QB 50.1003. Use 2-5 lines, depending on the number of pulse collector channels, and record the data as shown in the form below:

	Recorded in the column:	Other
Pulse collector qualities (recorded in line 1 of the pulse collector section)		
Pulse collector number	Meter number	The number must be read <u>at the hand terminal</u> , not the pulse collector!
Pulse collector usage	Usage	The usage is P
Pulse collector meter type	Meter types	The meter type is 99
Pulse provider qualities (physical meter), 1 line per quarter		
Pulse channel	Meter number	1,2,3 or 4
Pulse provider meter usage	Usage	WebBill designation
Pulse provider meter type	Meter type	WebBill meter type
Pulse provider pulse frequency	Measuring unit	E.g. 1 per 10 l, 1,000 per MWh etc.
Meter number	Comments	I.e. <u>not</u> in the column "Meter number"
Initial reading on pulse provider	Reading	Only if the pulse provider is accessible

5.0 Supplementary information about the pulse collector

The type of a given input on the pulse collector is either reed or S01. Reeds are in principle simple on/off switches, which are influenced by magnetic fields and thereby connects and disconnects externally supplied power. By contrast, S01 pulses are produced by an actual circuit in the pulse provider and the qualities are described in detail in international standards.

The individual pulses from the meters must be min. 28 ms, with a maximum frequency of 16.67 Hz (-30 ms pause).

When produced, the pulse inputs are each allocated an eight-digit identification number (channel id no.):

Example:

Brunata Futura Signal⁺ no. 10104

Channel 1:	$10104 * 4 = 40416$
Channel 2:	$10104 * 4+1 = 40417$
Channel 3:	$10104 * 4+2 = 40418$
Channel 4:	$10104 * 4 +3 = 40419$

The channel id number can be seen on the pulse collector (five digits) and the hand terminal (six digits).

6.0 Revision log

This is the first edition of the guide and there are therefore no changes.