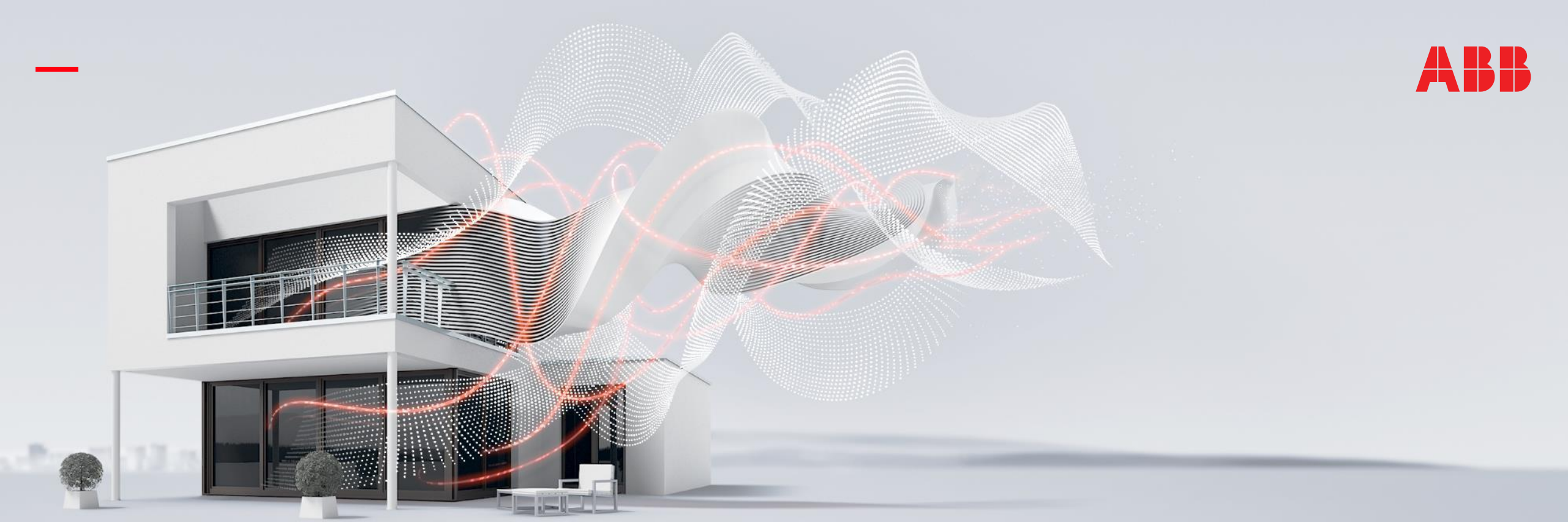

NOVEMBER 2020

ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

Online Learning Session – Competence Center Europe – Smart Buildings

Thorsten Reibel, Jürgen Schilder, Stefan Grosse, Martin Wichary & Olaf Stutzenberger

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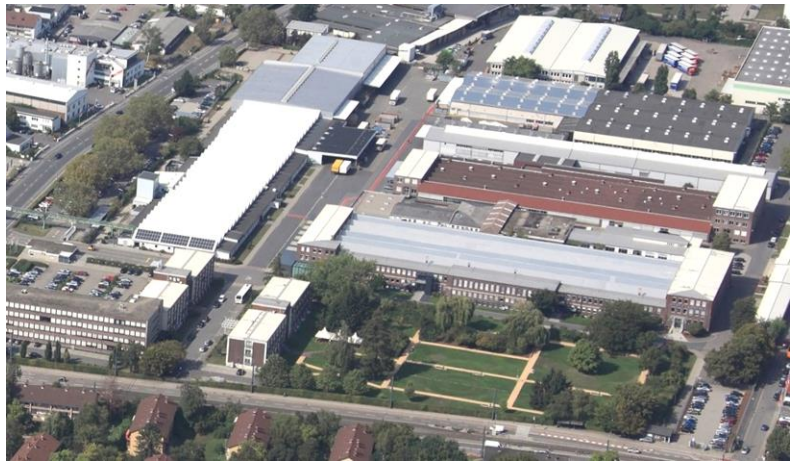
Webinar – Competence Center Europe - Smart Buildings



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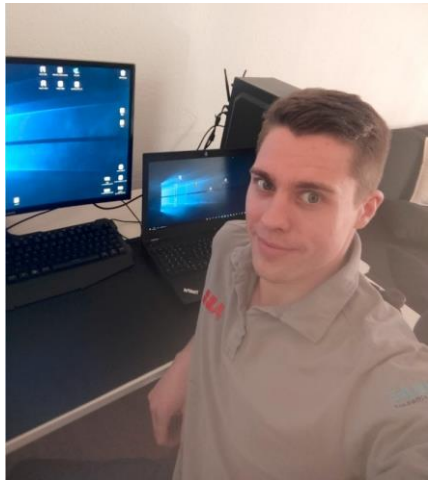


Agenda

Energy Consumption

Load Monitoring

Contact Status Supervision

ABB EQmatic Energy Analyzer QA/S – Introduction

Meter Values

Load Control

Practical demonstration

ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

Energy Consumption

ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

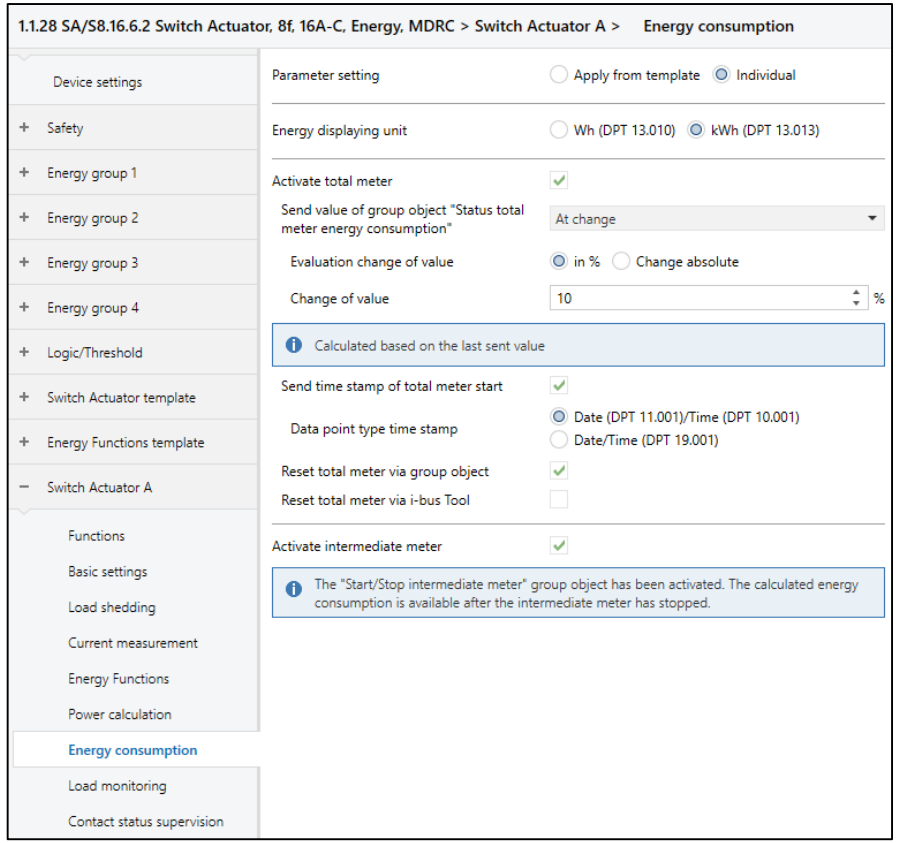
ETS Programming

Energy Consumption

Energy consumption is counted based on start/stop settings

Calculation of energy consumption out of power multiplied with time

- Total meter value on KNX bus in Wh or kWh
- Sending value in case of change, cyclically or on request or combinations
- Intermediate meter, start/stop via 1 bit telegram with own object for consumption value
- Start time of energy consumption 3 byte or 8byte (date and time together)



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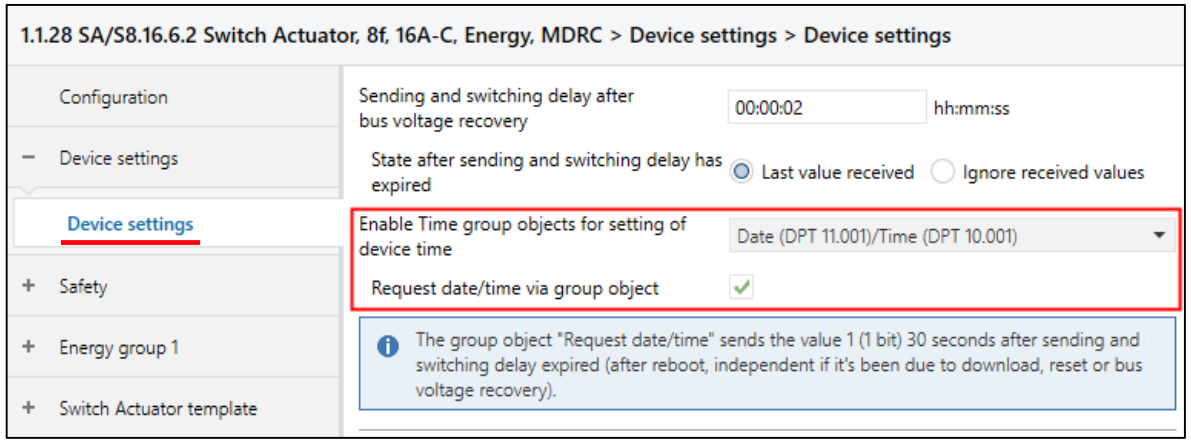
ETS Programming

Energy Consumption

- For sending date and time the actuator must be synchronized with external clock
  It is recommended to synchronize the time every hour
- Enable time group object either 2 x 3 byte or 1 x 8 byte (combined date and time), e.g. sent from weather station
- Alternatively it is possible to use request date/time via group object
  - Note: SA/S sends the request to an assigned device (e.g. touch panel or weather station) only 30s after device start (see hint)
  - Assigned component transmits date and time to the group object ‘Set time’ and ‘Set date’



8	Central: Date/Time	Request date/time	1 bit	5/1/1
6	Central: Date/Time	Set time	3 bytes	5/1/2
7	Central: Date/Time	Set date	3 bytes	5/1/3

6	Central: Date/Time	Set date/time	8 bytes

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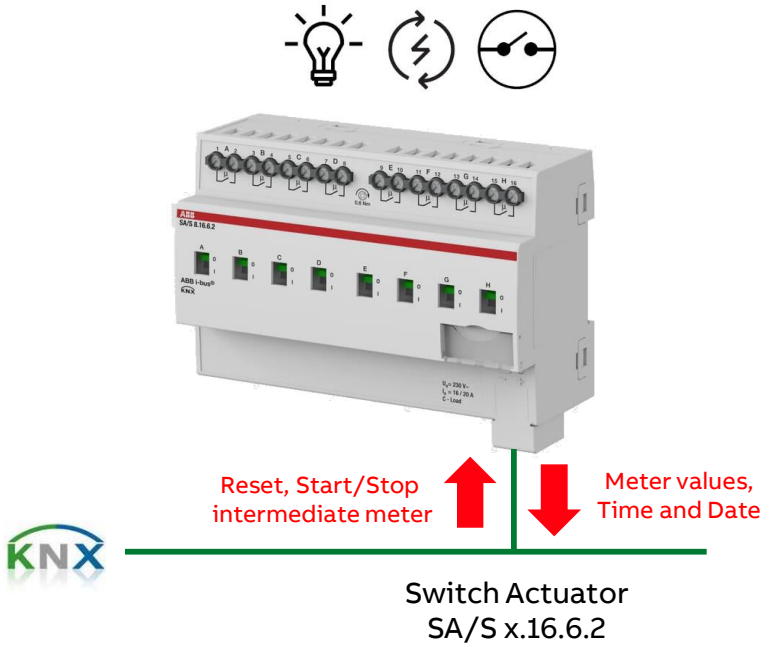
ETS Programming

Energy Consumption

Energy consumption values will be transmitted depending on parameters (on request, cyclically, in case of change)

- Total meter energy consumption starting from initial device operation (bus connection), no override by further download
- Date and time of metering start to be read out via read request
- Reset total meter → counting starts again with 0, time and date of metering start will be sent
- Intermediate meter can be started and stopped at any time via 1 bit telegram
- After stop telegram the calculated energy consumption is available on object 'Status intermediate meter energy consumption'

Channel A: Energy consumption	Status total meter energy consumption	4 bytes	6/0/1
Channel A: Energy consumption	Start total meter date	3 bytes	5/1/12
Channel A: Energy consumption	Start total meter time	3 bytes	5/1/13
Channel A: Energy consumption	Reset total meter	1 bit	6/0/2
Channel A: Energy consumption	Start/Stop intermediate meter	1 bit	6/0/3
Channel A: Energy consumption	Status intermediate meter energy consumption	4 bytes	6/0/4



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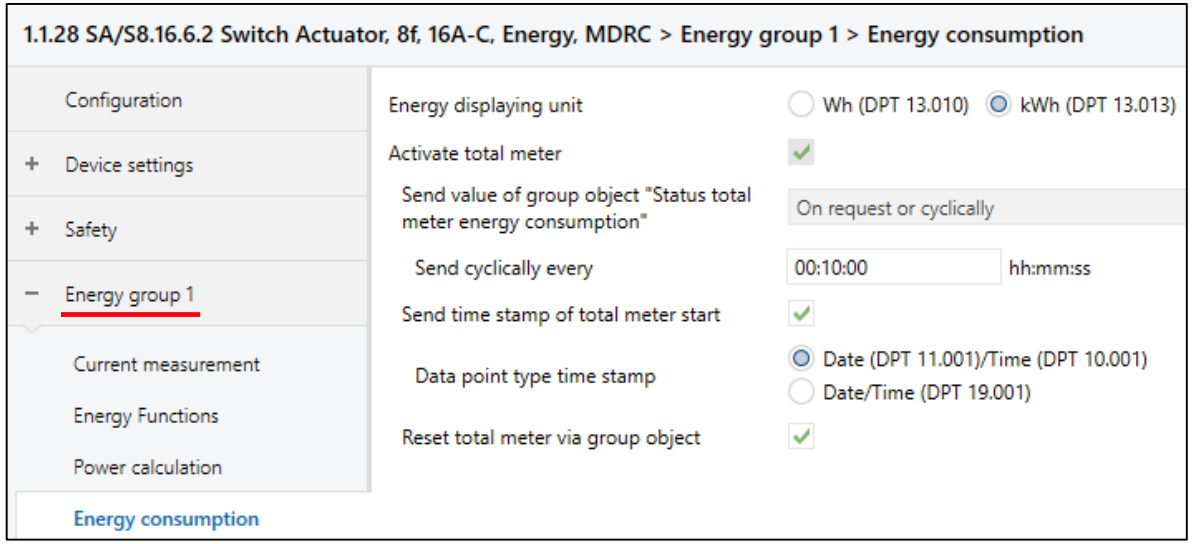
ETS Programming

Energy Consumption per Energy Group

Energy consumption per energy group (created with any of the channels of a device, maximum 4 groups) is available with all functions except intermediate meter

Energy group 1: Energy consumption	Status total meter energy consumption	4 bytes	6/1/1
Energy group 1: Energy consumption	Start total meter date	3 bytes	6/1/12
Energy group 1: Energy consumption	Start total meter time	3 bytes	6/1/13
Energy group 1: Energy consumption	Reset total meter	1 bit	6/1/2



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Load Monitoring

ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

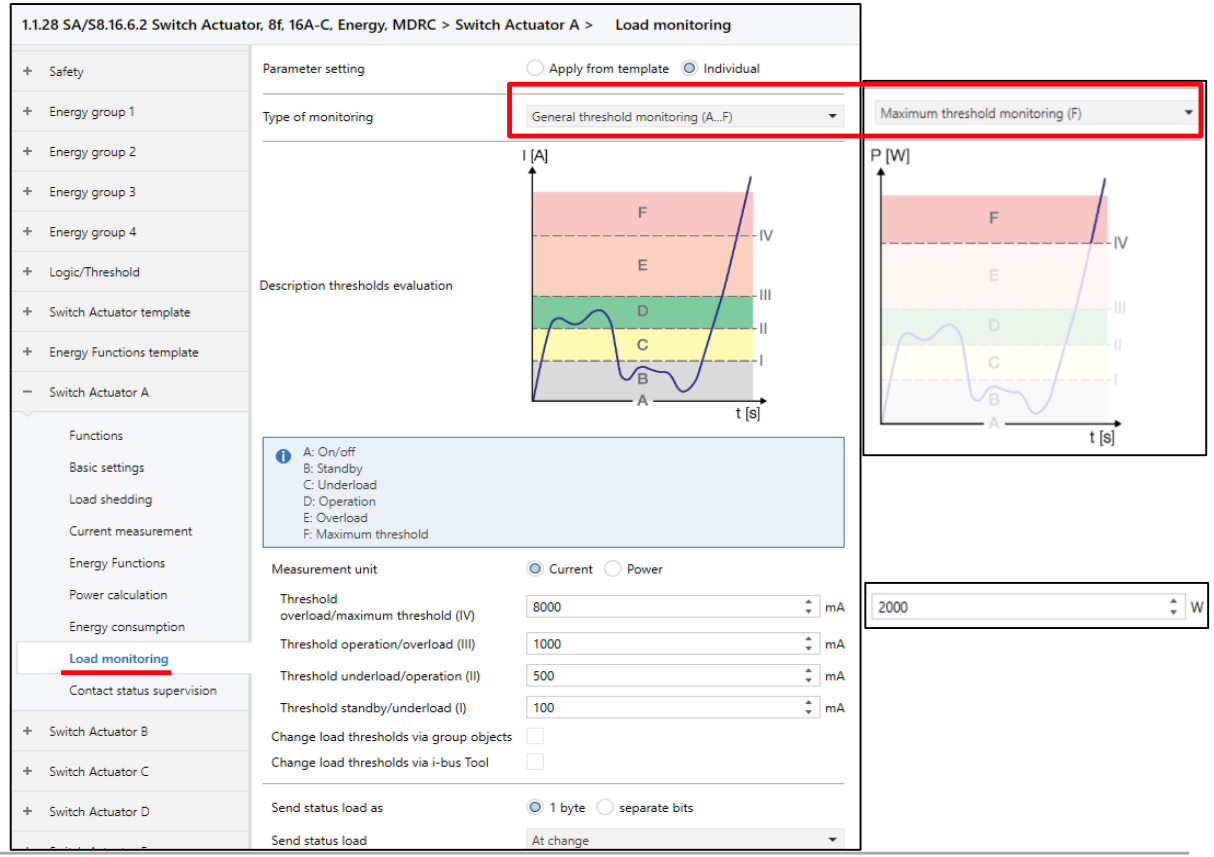
ETS Programming

Load Monitoring

The status of the load can be supervised in an easy and application-oriented way

Evaluation of load regarding thresholds, up to 6 or single ranges can be enabled:

- F: Maximum threshold exceeded
- E: Overload
- D: Operation
- C: Underload
- B: Standby
- A: ON/OFF



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ETS Programming

Load Monitoring

- Measurement unit is either current or power
- Up to 4 thresholds: Standby/underload, underload/operation, operation/overload, overload/max. threshold
  - Threshold off/Standby not changeable as it is fixed (value > 0)
  - Thresholds changeable via bus or ABB i-bus® Tool (in future)
- Send status in case of change or request
- Status as separate bits or 1 byte ('0' → off … '5' → max. thresh.)

Channel A: Load monitoring	Set threshold overload/maximum threshold	4 bytes	7/1/10
Channel A: Load monitoring	Set threshold operation/overload	4 bytes	7/1/11
Channel A: Load monitoring	Set threshold underload/operation	4 bytes	7/1/12
Channel A: Load monitoring	Set threshold standby/underload	4 bytes	7/1/13
Channel A: Load monitoring	Status load maximum threshold exceeded	1 bit	7/1/7
Channel A: Load monitoring	Status load in overload	1 bit	7/1/6
Channel A: Load monitoring	Status load in operation	1 bit	7/1/5
Channel A: Load monitoring	Status load in underload	1 bit	7/1/4
Channel A: Load monitoring	Status load in standby	1 bit	7/1/3
Channel A: Load monitoring	Status load on/off	1 bit	7/1/2

Channel A: Load monitoring	Status load	1 byte	7/1/1

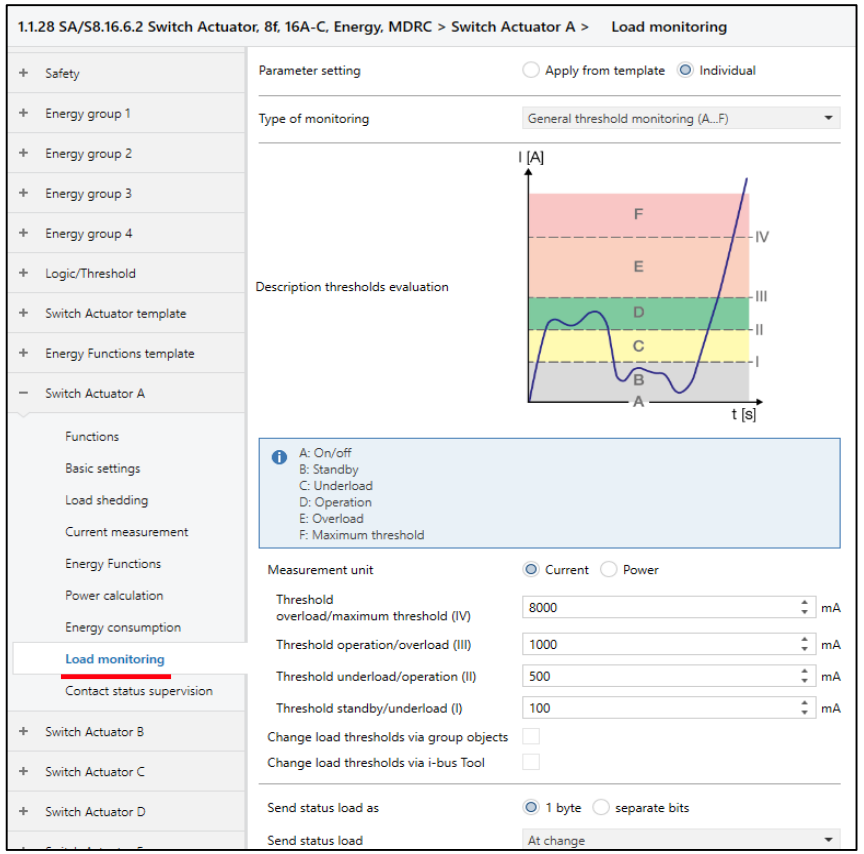
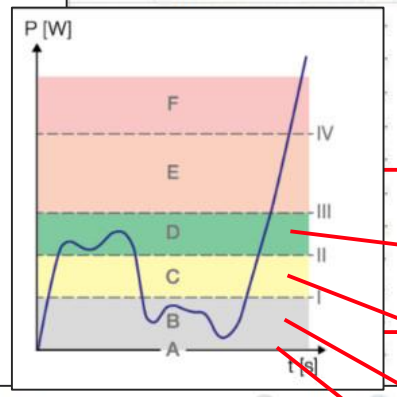


ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

ETS Programming

Load Monitoring: 75W → 50 W → 25W → 0W load – Telegram recording with 1 bit status telegrams



#	Time	Se	Fla	Prio	Source Adc	Source Name	Sou	Destinatio	Destination Name	Type	Rout	DPT	Info
				Low	9.2.13	Contr. elem. SA/S		27/1/31	SA/S A: Switch	GroupValueWrite	6	1.001 switch	$00 | Off
				Low	9.2.13	Switch Actuator Energy SA/S8.16....		27/1/32	SA/S A: Status Switch	GroupValueWrite	6	1.001 switch	$00 | Off
				Low	9.2.13	Switch Actuator Energy SA/S8.16....		27/1/154	SA/S A: Power calculation - status power	GroupValueWrite	6	14.056 power (W)	00 00 00 00 | 0 W
				Low	9.2.13	Switch Actuator Energy SA/S8.16....		27/1/243	SA/S A: Load monitoring in operation	GroupValueWrite	6	1.002 boolean	$00 | False
				Low	9.2.13	Switch Actuator Energy SA/S8.16....		27/1/246	SA/S A: Load monitoring load on/off	GroupValueWrite	6	1.002 boolean	$00 | False
				Low	9.2.13	Contr. elem. SA/S		27/1/31	SA/S A: Switch	GroupValueWrite	6	1.001 switch	$01 | On
				Low	9.2.13	Switch Actuator Energy SA/S8.16....		27/1/32	SA/S A: Status Switch	GroupValueWrite	6	1.001 switch	$01 | On
				Low	9.2.13	Switch Actuator Energy SA/S8.16....		27/1/154	SA/S A: Power calculation - status power	GroupValueWrite	6	14.056 power (W)	42 95 F5 C3 | 74.98 W
				Low	9.2.13	Switch Actuator Energy SA/S8.16....		27/1/243	SA/S A: Load monitoring in operation	GroupValueWrite	6	1.002 boolean	$01 | True
				Low	9.2.13	Switch Actuator Energy SA/S8.16....		27/1/246	SA/S A: Load monitoring load on/off	GroupValueWrite	6	1.002 boolean	$01 | True
				Low	9.2.13	Switch Actuator Energy SA/S8.16....		27/1/154	SA/S A: Power calculation - status power	GroupValueWrite	6	14.056 power (W)	42 4A 66 66 | 50.6 W
				Low	9.2.13	Switch Actuator Energy SA/S8.16....		27/1/243	SA/S A: Load monitoring in operation	GroupValueWrite	6	1.002 boolean	$00 | False
					9.2.13	Switch Actuator Energy SA/S8.16....		27/1/244	SA/S A: Load monitoring underload	GroupValueWrite	6	1.002 boolean	$01 | True
					9.2.13	Switch Actuator Energy SA/S8.16....		27/1/154	SA/S A: Power calculation - status power	GroupValueWrite	6	14.056 power (W)	41 CF EB 85 | 25.99 W
					9.2.13	Switch Actuator Energy SA/S8.16....		27/1/244	SA/S A: Load monitoring underload	GroupValueWrite	6	1.002 boolean	$00 | False
					9.2.13	Switch Actuator Energy SA/S8.16....		27/1/245	SA/S A: Load monitoring standby	GroupValueWrite	6	1.002 boolean	$01 | True
					9.2.13	Switch Actuator Energy SA/S8.16....		27/1/154	SA/S A: Power calculation - status power	GroupValueWrite	6	14.056 power (W)	00 00 00 00 | 0 W
					9.2.13	Switch Actuator Energy SA/S8.16....		27/1/245	SA/S A: Load monitoring standby	GroupValueWrite	6	1.002 boolean	$00 | False
					9.2.13	Switch Actuator Energy SA/S8.16....		27/1/246	SA/S A: Load monitoring load on/off	GroupValueWrite	6	1.002 boolean	$00 | False

Measurement unit: Current / Power

Threshold overload/maximum threshold (IV)	110	W
Threshold operation/overload (III)	90	W
Threshold underload/operation (II)	60	W
Threshold standby/underload (I)	30	W

Off

D: Operation 3x25W

C: Underload 2x25W

B: Standby 1x25W

A: ON/OFF 0x25W

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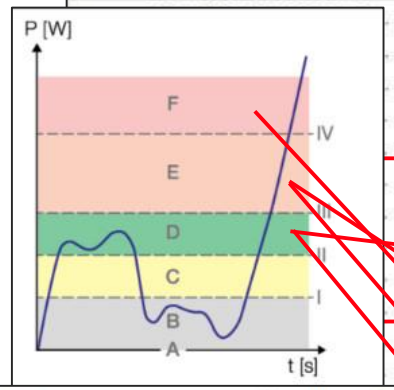
ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

ETS Programming

Load Monitoring: 75W → 100 W → 125W load – Telegram recording with 1 bit status telegrams



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				Low	9.2.13	Switch Actuator Energy SA/S8.16....		27/1/154	SA/S A: Power calculation - status power	GroupValueWrite	6	14.056 power (W)	00 00 00 00 | 0 W
				Low	9.2.13	Switch Actuator Energy SA/S8.16....		27/1/243	SA/S A: Load monitoring in operation	GroupValueWrite	6	1.002 boolean	$00 | False
				Low	9.2.13	Switch Actuator Energy SA/S8.16....		27/1/246	SA/S A: Load monitoring load on/off	GroupValueWrite	6	1.002 boolean	$00 | False
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				Low	9.2.13	Switch Actuator Energy SA/S8.16....		27/1/154	SA/S A: Power calculation - status power	GroupValueWrite	6	14.056 power (W)	42 CA 66 66 | 101.2 W
				Low	9.2.13	Switch Actuator Energy SA/S8.16....		27/1/242	SA/S A: Load monitoring overload	GroupValueWrite	6	1.002 boolean	$01 | True
					9.2.13	Switch Actuator Energy SA/S8.16....		27/1/243	SA/S A: Load monitoring in operation	GroupValueWrite	6	1.002 boolean	$00 | False
					9.2.13	Switch Actuator Energy SA/S8.16....		27/1/154	SA/S A: Power calculation - status power	GroupValueWrite	6	14.056 power (W)	42 FB 28 F6 | 125.5 W
					9.2.13	Switch Actuator Energy SA/S8.16....		27/1/241	SA/S A: Load monitoring maximum threshold	GroupValueWrite	6	1.002 boolean	$01 | True
					9.2.13	Switch Actuator Energy SA/S8.16....		27/1/154	SA/S A: Power calculation - status power	GroupValueWrite	6	14.056 power (W)	42 CA 66 66 | 101.2 W
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					9.2.13	Switch Actuator Energy SA/S8.16....		27/1/243	SA/S A: Load monitoring in operation	GroupValueWrite	6	1.002 boolean	$01 | True

Off

D: Operation 3x25W

E: Overload 4x25W

F: Maximum threshold

E: Overload 4x25W

D: Operation 3x25W

ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

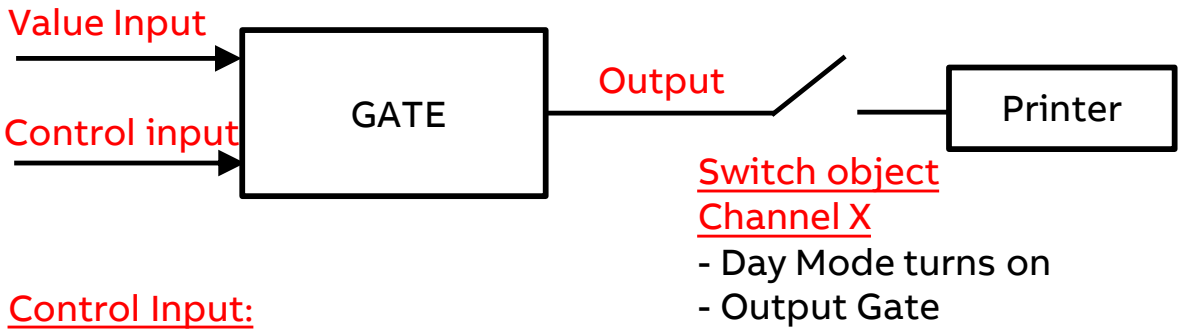
ETS Programming

Load Monitoring – Practical Example

With the load monitoring thanks to current measurement not only on/off status available anymore but clear information about the typical operating conditions:

- Load e.g. printer is not turned off but in energy saving mode during the night, therefore it can be turned off completely to avoid unnecessary energy consumption and costs
  - Solution: Logic function Gate in SA/S to combine night mode and standby
- Load is in overload more than one hour, harming the device, therefore turned off automatically
- Load is running in underload or max. value exceeded, therefore turned off immediately

Value Input:
Standby (value 0)



Control Input:
Day mode/working hours
(value 1) → disabled
Night mode
(value 0) → enabled

Day Mode (value 1) and Night mode (value 0) from external clock

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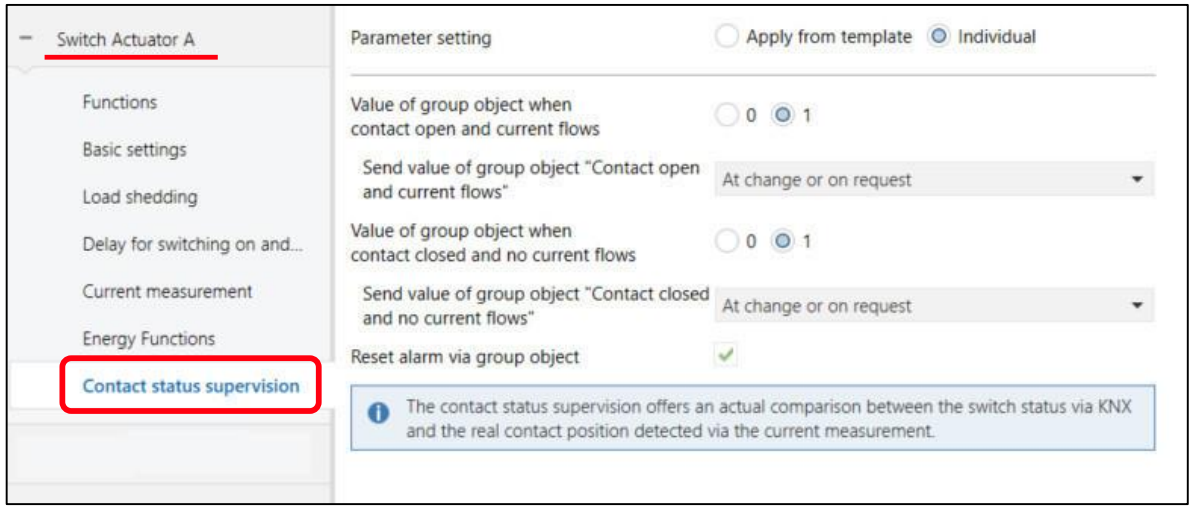
Contact Status Supervision

ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

ETS Programming

Contact Status Supervision

- Supervision of relay contact and the installation behind (cabling and circuit breaker)
- The function “Contact Status Supervision” compares the output “Switching status” and real contact position via current measurement → faults can be reported (e.g. push notification)
- 1 bit status objects



Num	Name	Object Function	Length	Data Type	C	R	W	T
232	Channel A: Contact supervision	Reset alarm	1 bit	acknowledge	C	-	W	-
233	Channel A: Contact supervision	Contact open and current flows	1 bit	alarm	C	R	-	T
234	Channel A: Contact supervision	Contact closed and no current flows	1 bit	alarm	C	R	-	T

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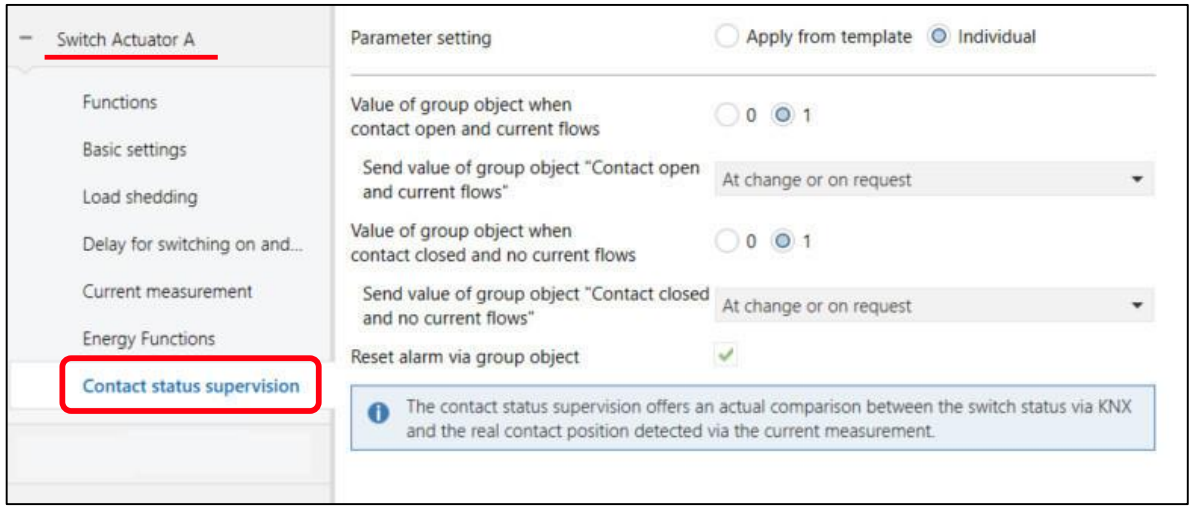
  - “Contact closed and no current flows”
    → cable interruption, circuit breaker tripped, device not connected or damaged, lamp failure, phase failure, …



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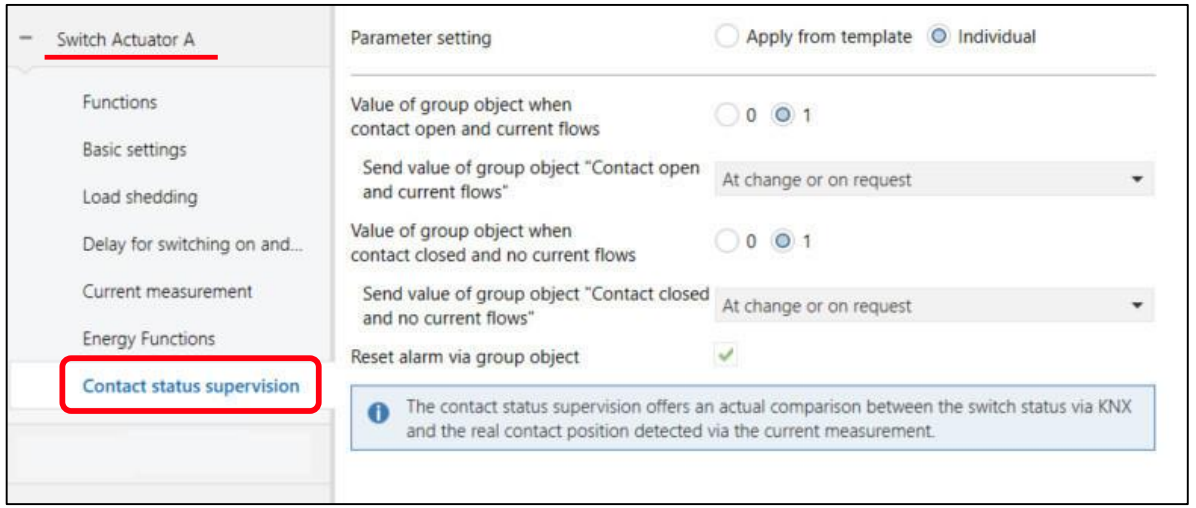
  - “Contact open and current flows”
    → manual operation or relay contact damaged (welded)



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- The function “Contact Status Supervision” compares the output “Switching status” and real contact position via current measurement → faults can be reported (e.g. push notification)
- 1 bit status objects
  - “Contact closed and no current flows”
    → cable interruption, circuit breaker tripped, device not connected or damaged, lamp failure, phase failure, …
  - “Contact open and current flows”
    → manual operation or relay contact damaged (welded)
- 1 bit object “Reset alarm” via KNX telegram (parameter option)

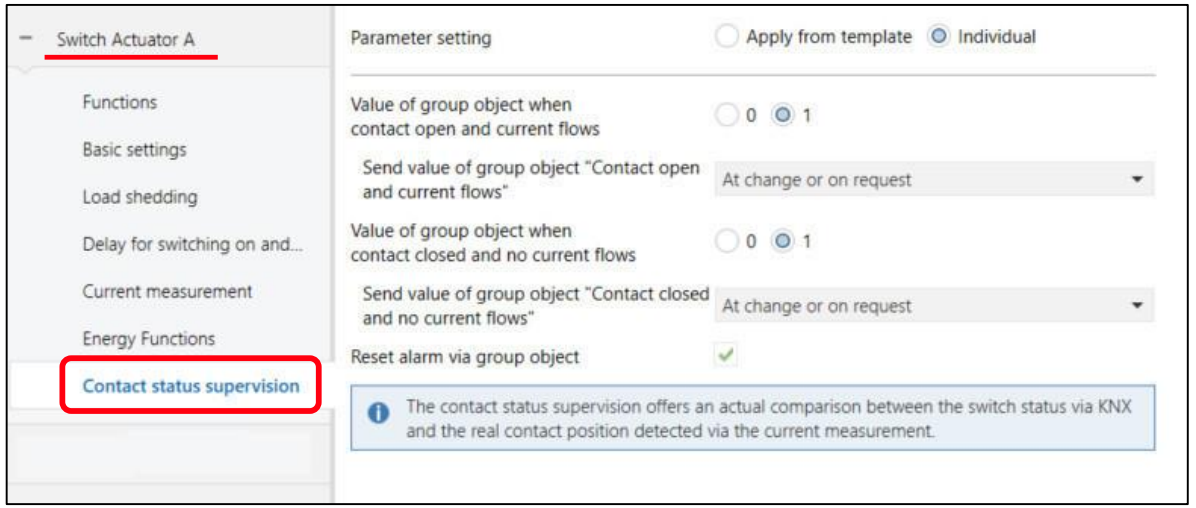

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ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

Introduction ABB EQmatic Energy Analyzer QA/S

ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

Introduction ABB EQmatic Energy Analyzer QA/S

Device overview

ABB EQmatic Energy Analyzer are compact, web-based standalone devices for energy management applications

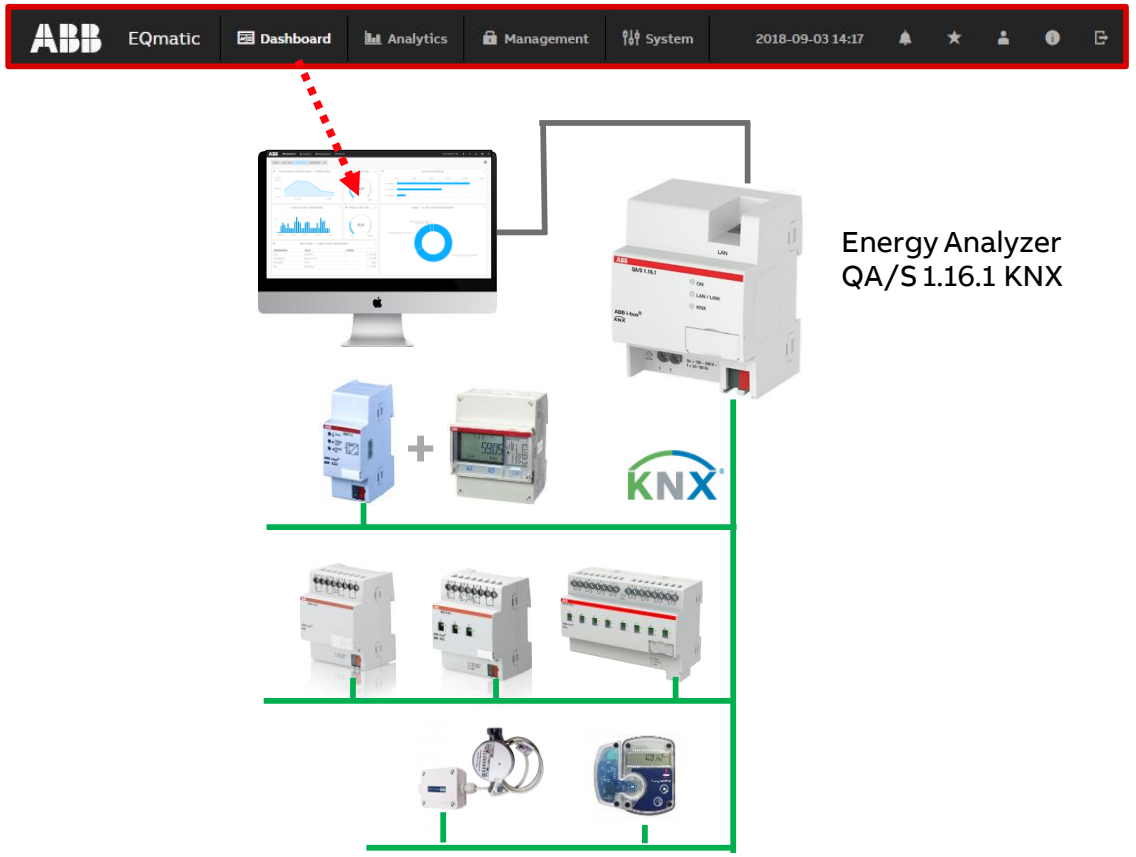
- Energy Analyzer QA/S 1.16.1 KNX
- Energy Analyzer QA/S 3.xx.1 M-Bus
- Energy Analyzer QA/S 4.xx.1 Modbus

They log, store, display and analyze consumption data for up to 16 (KNX, M-Bus, Modbus) or 64 (M-Bus, Modbus) electricity, gas, water or heat meters

Device access is via web browser (integrated web server)

They automatically detect ABB A and B Series Energy Meters and Modbus Network Analyzer during commissioning

Other meters (water, gas,…) or pulse adapters must be manually configured and added to the system



Energy Analyzer QA/S 1.16.1 KNX

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ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

Introduction ABB EQmatic Energy Analyzer QA/S

User interface via integrated Web Server

The dashboard provides a rapid overview of costs and consumers

In the dashboard you can configure user-defined views using widgets (graphical display elements) and alarms

Further functions:

- Analysis and display of historical measured data
- Displays of instantaneous values of a data point in real time
- Benchmark period to compare a consumer or node referred to two time intervals (e.g. current month and previous month)
- Benchmark consumers to compare up to five consumers or nodes
- Report can be sent as analyzes and evaluations to different recipients, either by email or to an FTP server
- Alarm ranges can be configured for any data point, in case of exceeding value notification is sent to e-mail recipients and to the alarm log

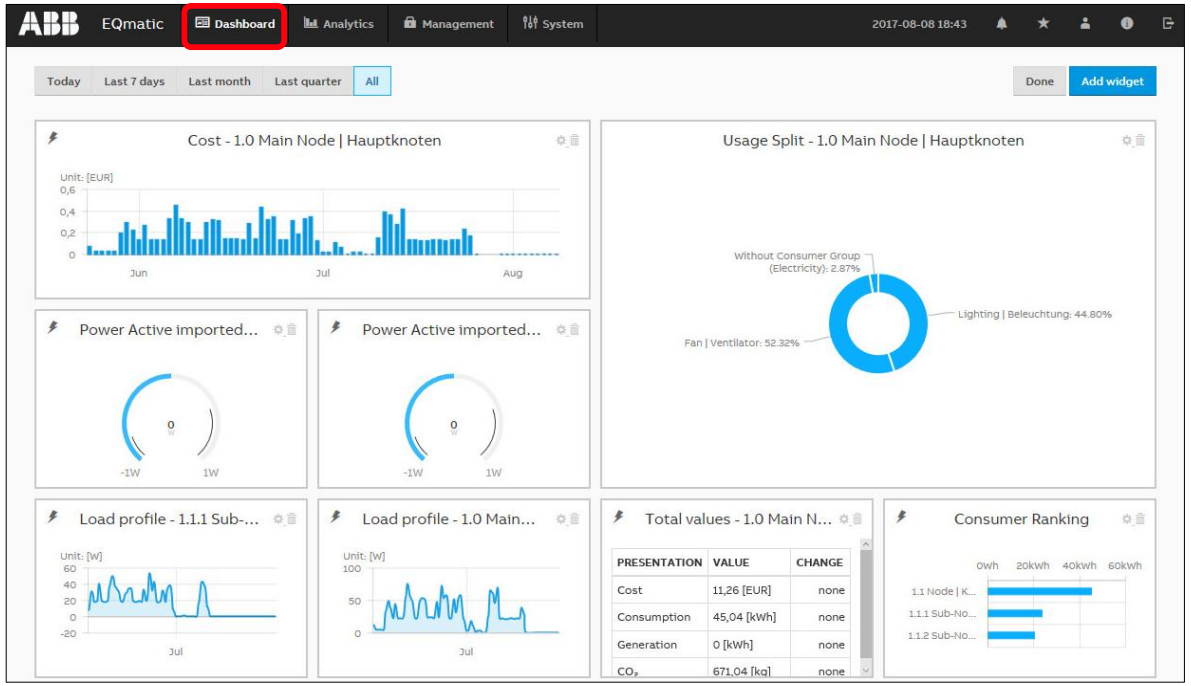


ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

Introduction ABB EQmatic Energy Analyzer QA/S

Energy Analyzer QA/S 1.16.1 KNX

To display and process the QA/S values of KNX meters, both the QA/S and the KNX meters must first be configured and parametrized in ETS

- Add the QA/S and KNX meters to the project
- Set the parameters of the QA/S and KNX meters, e.g.
  - Date and time source (KNX, User Interface or time server)
  - Meter settings: Meter Interface Module ZS/S, Energy Actuator SE/S, Energy Module EM/S, Electricity (generic), Gas (generic), Water (generic), Heat (generic)
  - Load control
- Assign group addresses
- Download individual address and application programs

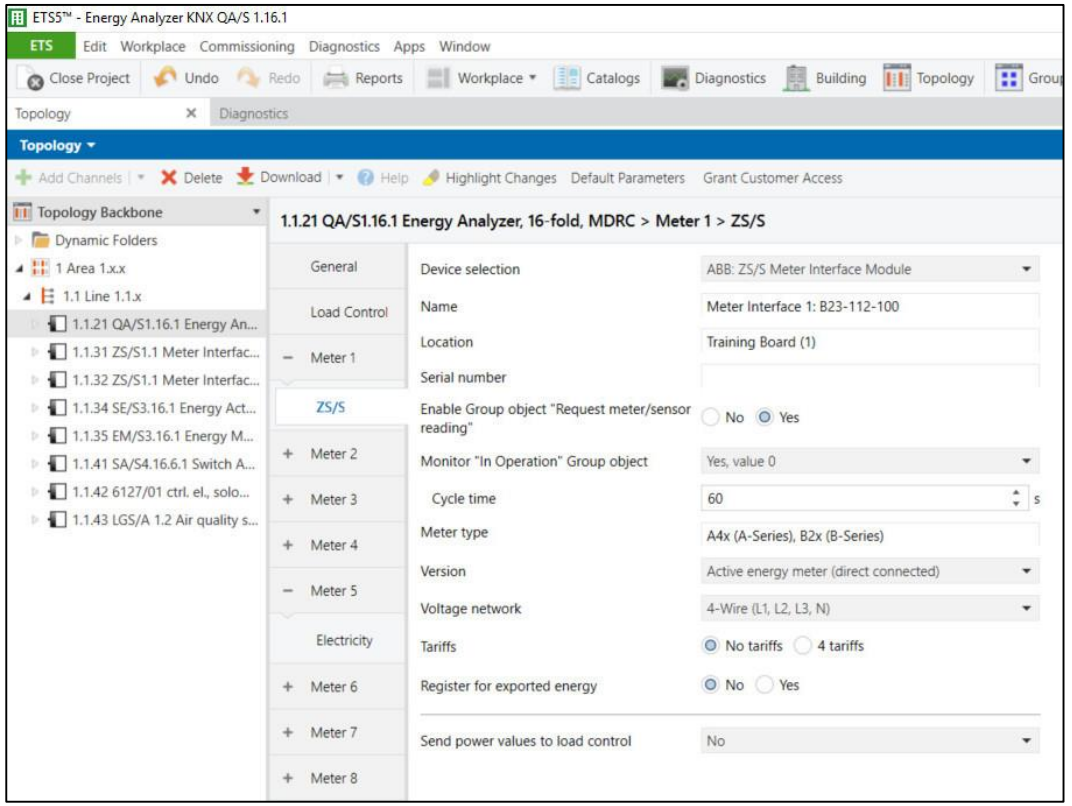


ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

Introduction ABB EQmatic Energy Analyzer QA/S

Load Control (QA/S 1.16.1 KNX)

With the Load Control Management function, load shedding sequences can be prioritized based on the electrical power values received from electricity meters or KNX actuators

The load control parameter must be activated in the ETS so that the load control can be displayed and operated via the user interface

Webinar “ABB EQmatic Energy Analyzer QA/S KNX” (January 2020)

- Presentation → Link
- Video recording → Link

Product is now available!

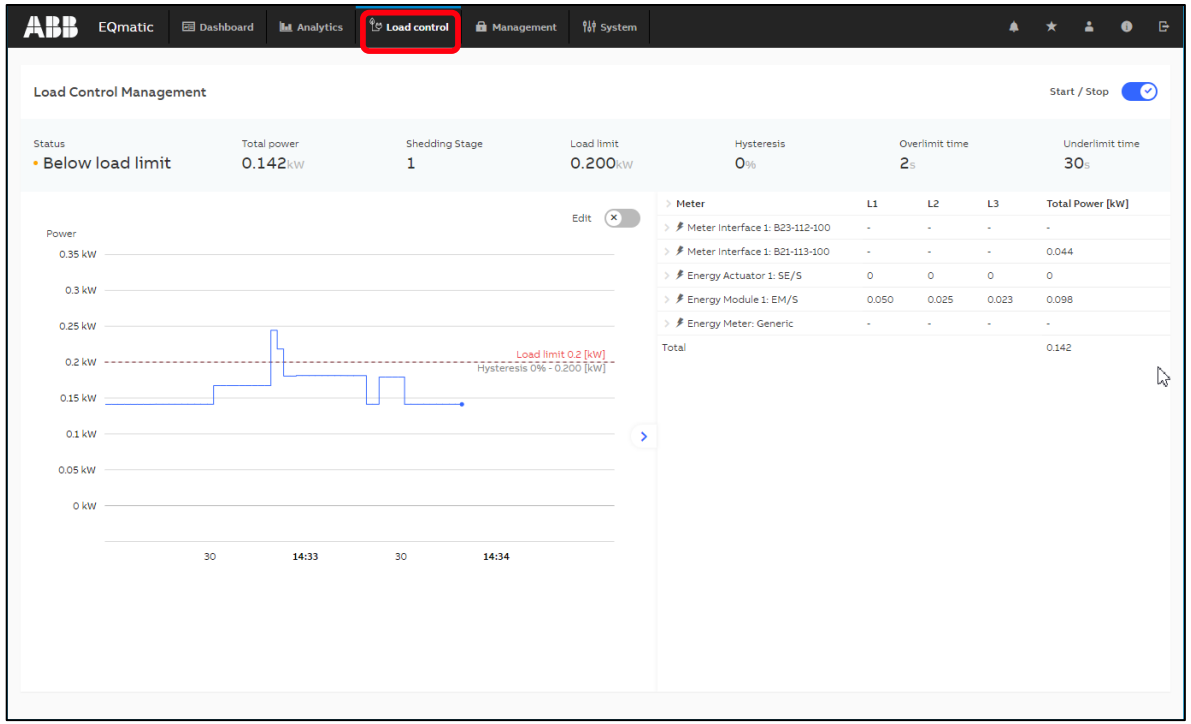
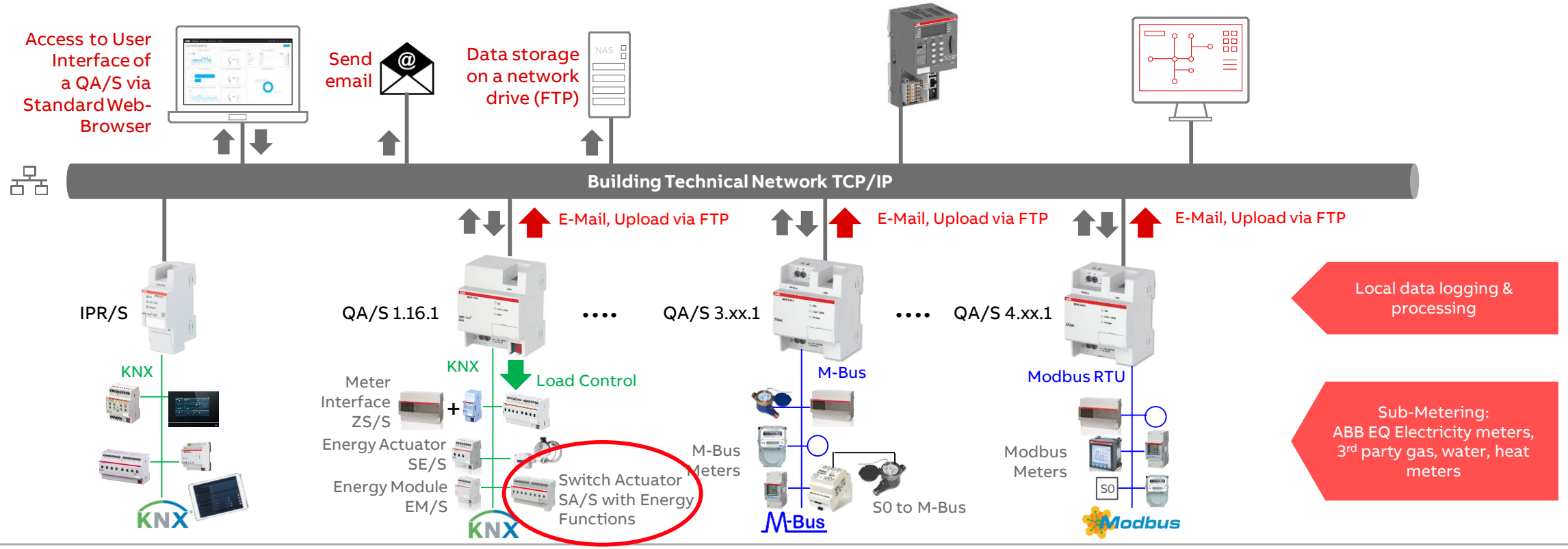


ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

Introduction ABB EQmatic Energy Analyzer QA/S

Switch Actuator with energy functions – Part of ABB's Building Automation world



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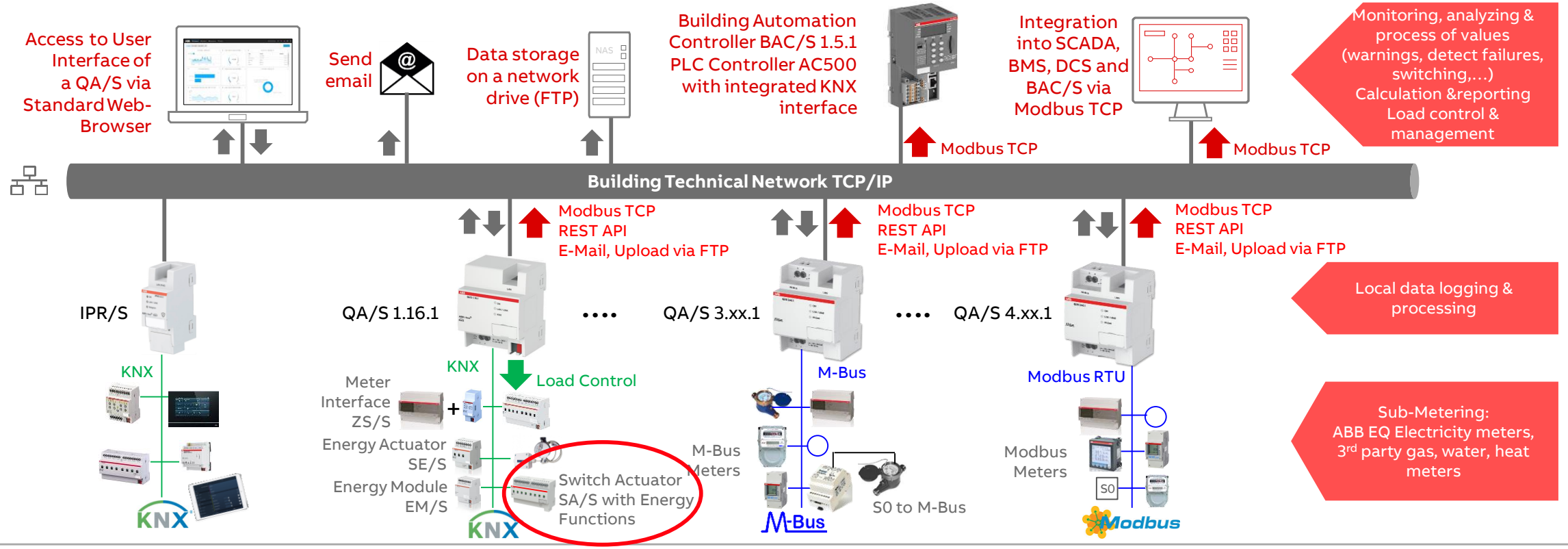
Introduction ABB EQmatic Energy Analyzer QA/S

Switch Actuator with energy functions – Part of ABB's Building Automation world



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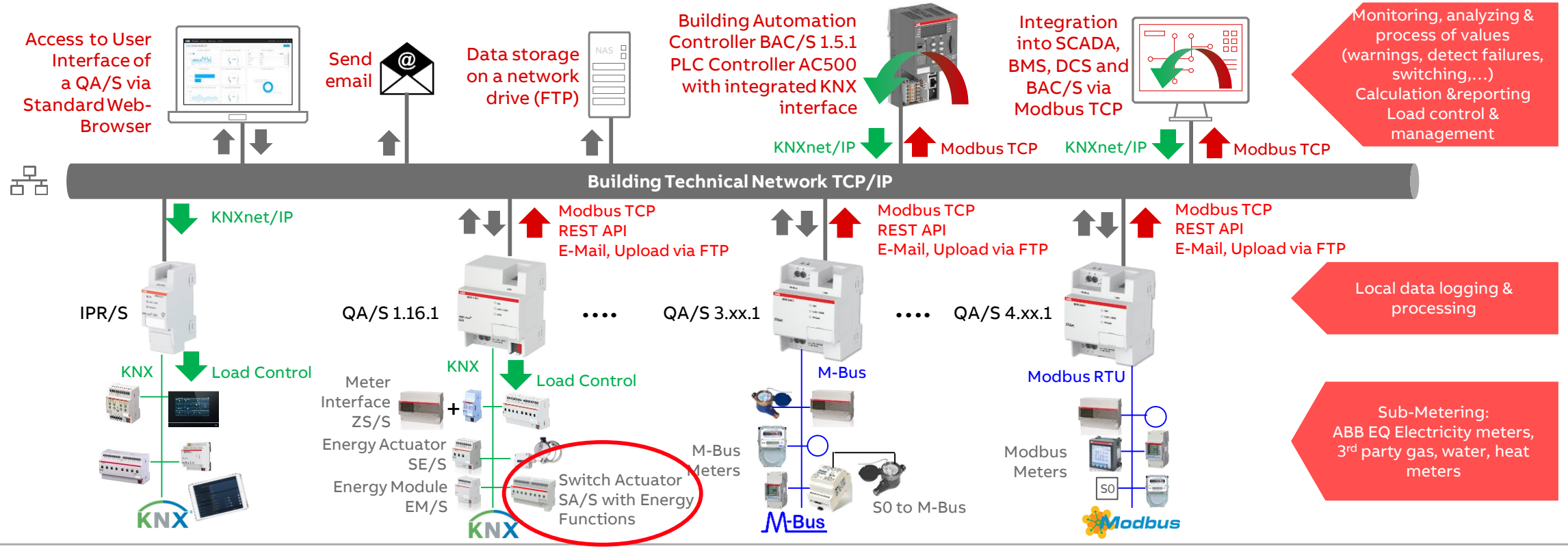
Introduction ABB EQmatic Energy Analyzer QA/S

Switch Actuator with energy functions – Part of ABB's Building Automation world



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Energy Analyzer QA/S 1.16.1 KNX and KNX Meters – Meter Values

ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

Energy Analyzer QA/S 1.16.1 KNX and KNX Meters

Overview Energy Analyzer QA/S 1.16.1 KNX and KNX Meters – Meter Values

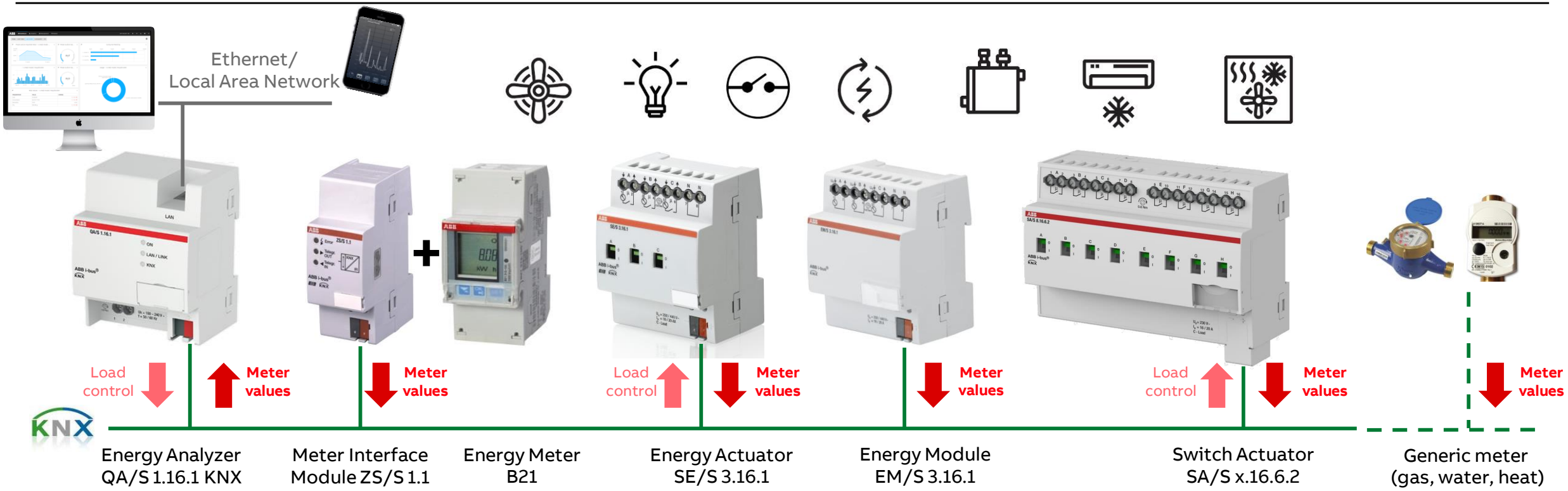
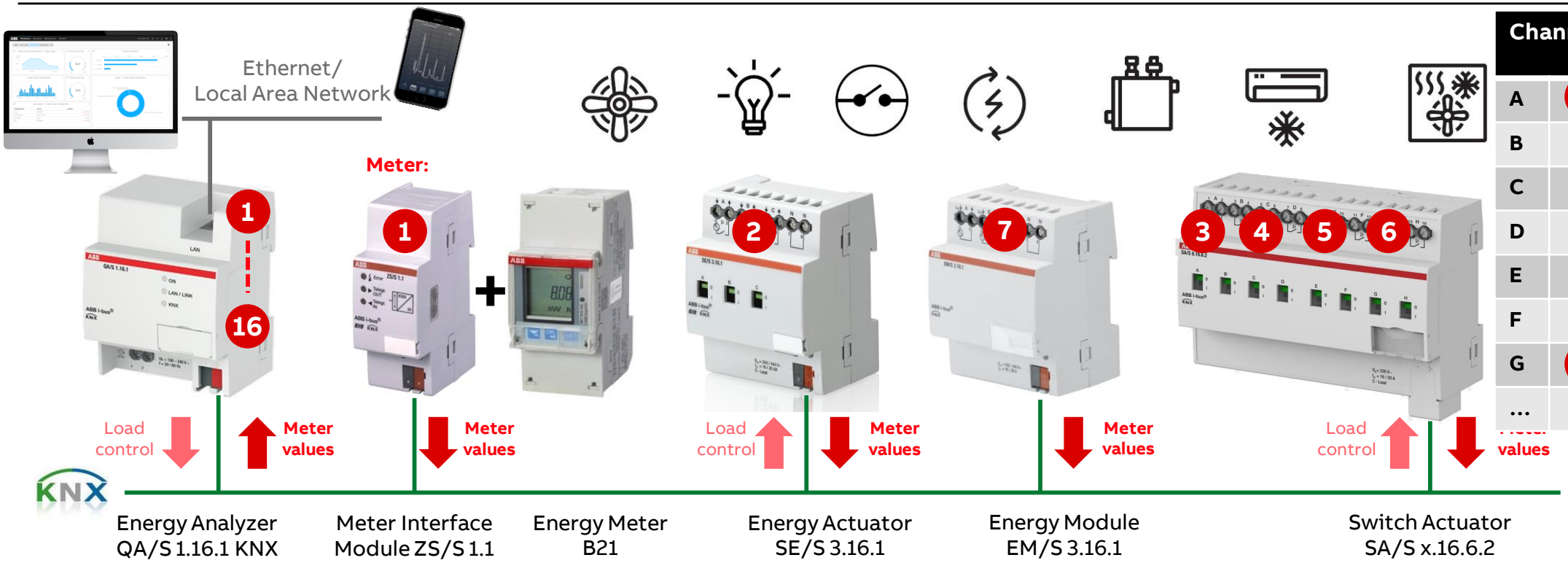


ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

Energy Analyzer QA/S 1.16.1 KNX and KNX Meters

Overview Energy Analyzer QA/S 1.16.1 KNX and KNX Meters – Meter Values



Channel		Energy group 1	2	3	4
A	3	4	6	-	-
B	-	4	6	-	-
C	-	4	6	-	-
D	-	4	6	-	-
E	-	-	6	-	-
F	-	-	6	-	-
G	5	-	6	-	-
…	-	-	6	-	-

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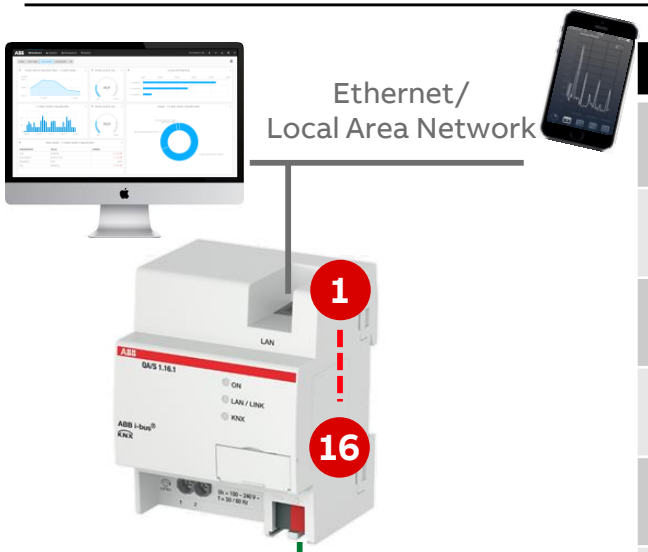
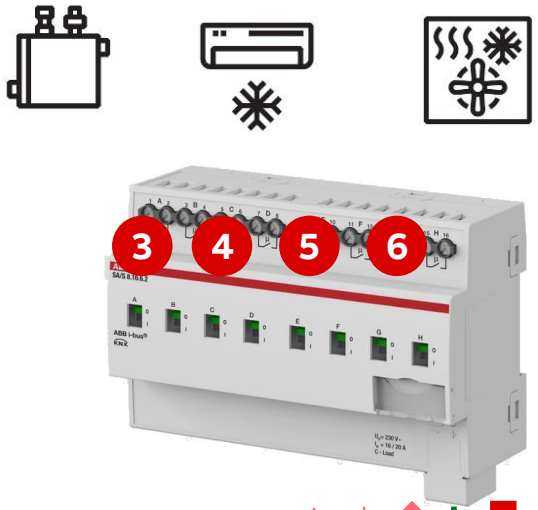
ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

Energy Analyzer QA/S 1.16.1 KNX and KNX Meters

Overview Energy Analyzer QA/S 1.16.1 KNX and KNX Meters – Meter Values



Meter	Device	Channel
1	Meter Interface Module ZS/S 1.1	
2	Energy Actuator SE/S 3.16.1	A, B, C and total
3	Switch Actuator SA/S 8.16.6.2	A
4	Switch Actuator SA/S 8.16.6.2	Total: A, B, C, D
5	Switch Actuator SA/S 8.16.6.2	G
6	Switch Actuator SA/S 8.16.6.2	Total: A, B, C, D, E, F, G, H



Channel		Energy group 1	2	3	4
A	3	4	6	-	-
B	-	4	6	-	-
C	-	4	6	-	-
D	-	4	6	-	-
E	-	-	6	-	-
F	-	-	6	-	-
G	5	-	6	-	-
…	-	-	6	-	-

Energy Analyzer
QA/S 1.16.1 KNX

Switch Actuator
SA/S x.16.6.2

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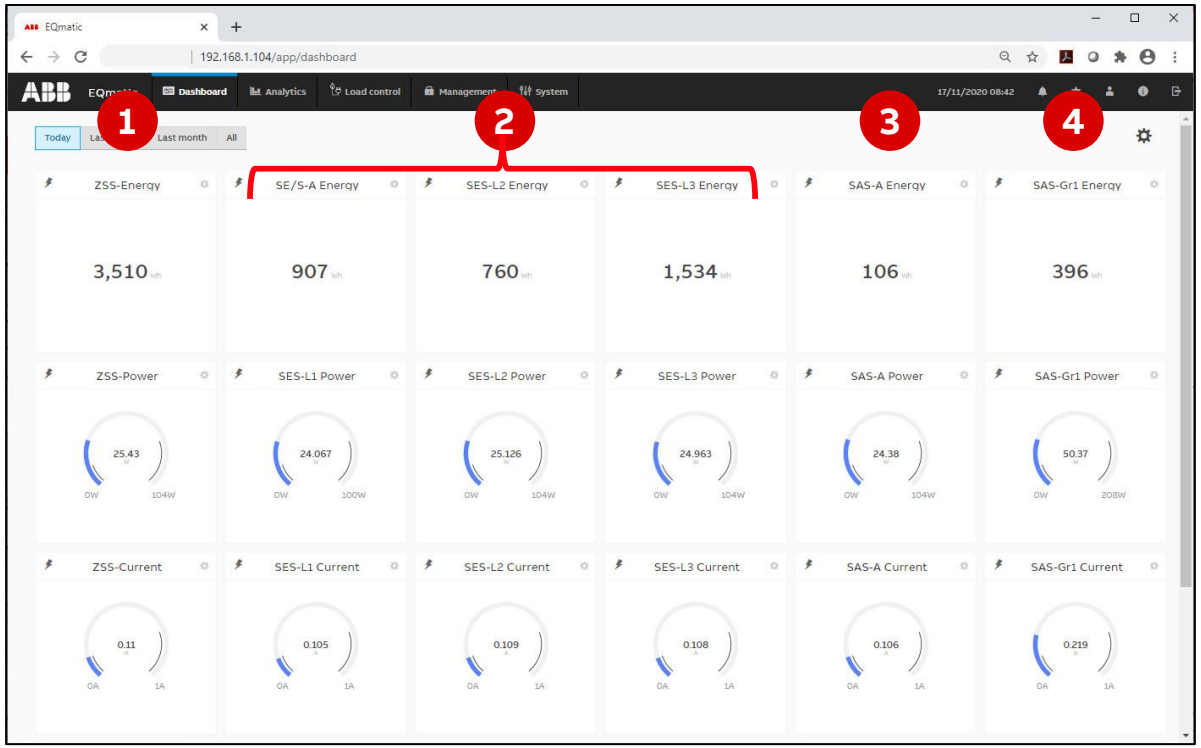
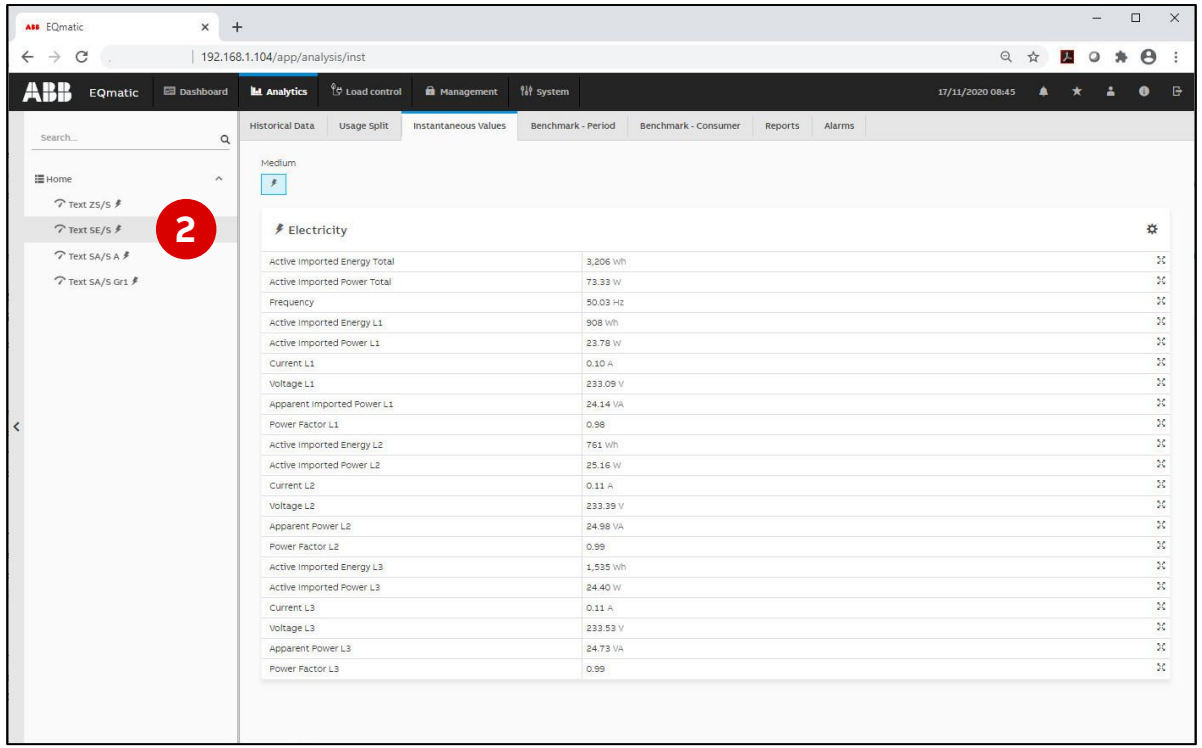
Energy Analyzer QA/S 1.16.1 KNX and KNX Meters

Energy Analyzer QA/S KNX – Dashboard and Instantaneous Values (Meter 1 …4)





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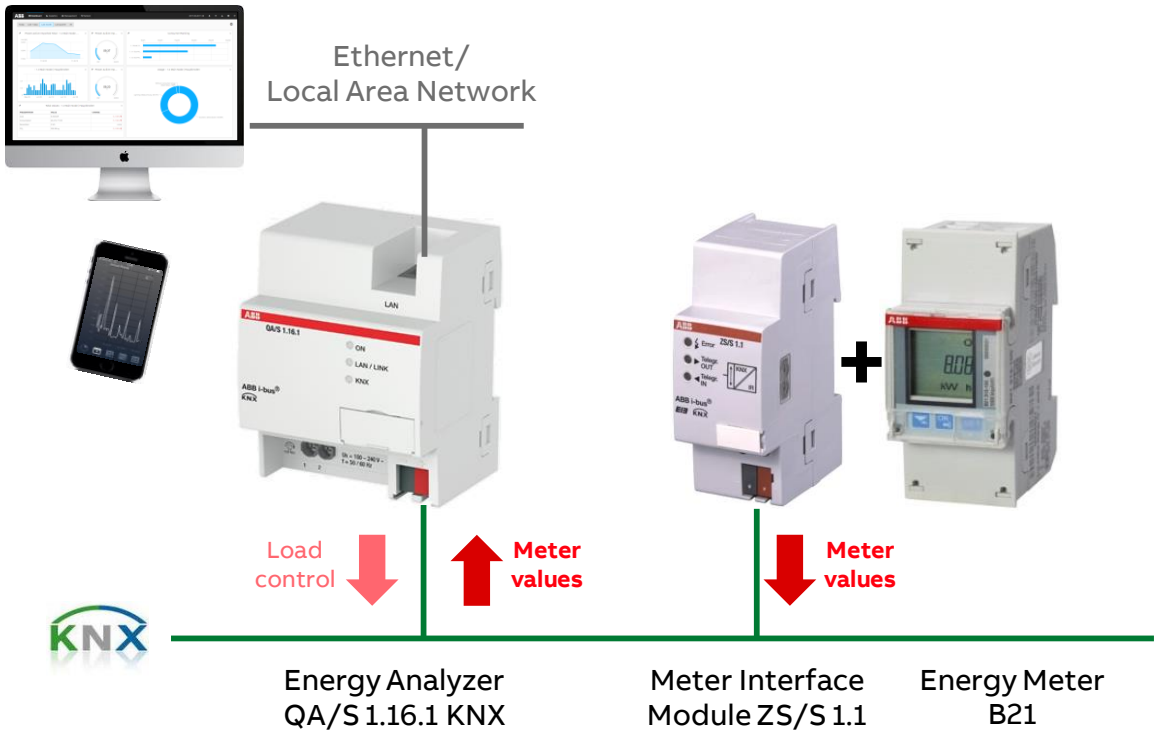
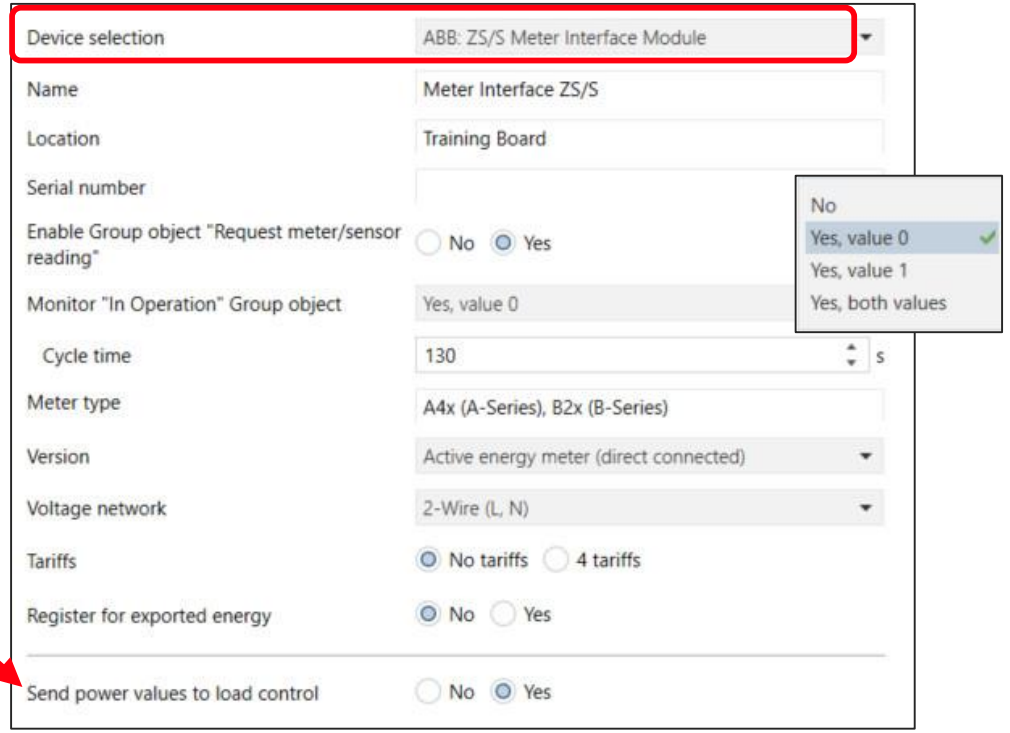
Energy Analyzer QA/S 1.16.1 KNX and KNX Meters

Energy Analyzer QA/S 1.16.1 KNX and Meter Interface Module ZS/S 1.1 – Meter Values



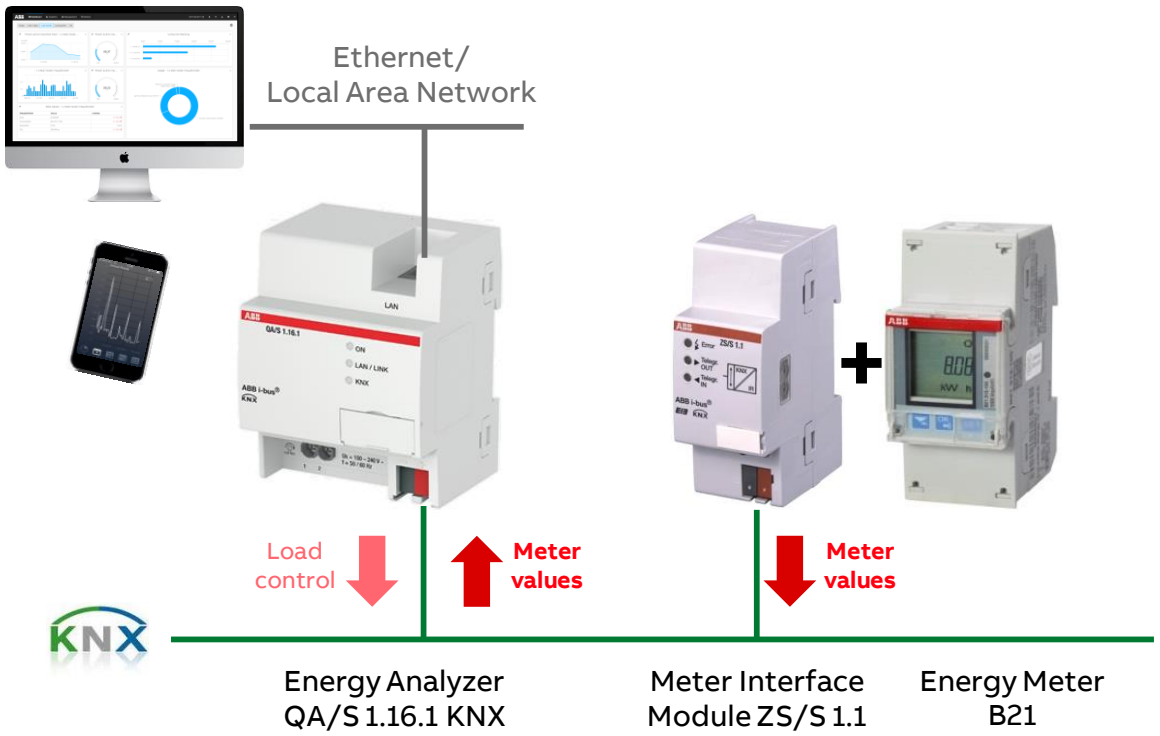


ETS parameter QA/S 1.16.1 → "ZS/S"

ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

Energy Analyzer QA/S 1.16.1 KNX and KNX Meters

Energy Analyzer QA/S 1.16.1 KNX and Meter Interface Module ZS/S 1.1 – Meter Values



Num	Name	Object Function	Length	Data Type
31	Meter 1: ZS/S	In operation	1 bit	switch
32	Meter 1: ZS/S	Request meter/sensor reading	1 bit	trigger
35	Meter 1: ZS/S	Request status values	1 bit	trigger
36	Meter 1: ZS/S	Status byte	1 byte	
37	Meter 1: ZS/S	Meter type	1 byte	
38	Meter 1: ZS/S	False meter type	1 bit	alarm
39	Meter 1: ZS/S	Send power failures	1 byte	counter pulses (0..255)
40	Meter 1: ZS/S	Reset power failures	1 bit	trigger
42	Meter 1: ZS/S	Active energy	4 bytes	active energy (Wh)
62	Meter 1: ZS/S	Active Power	4 bytes	power (W)
78	Meter 1: ZS/S	Power factor	4 bytes	power factor (cos Φ)
82	Meter 1: ZS/S	Current	4 bytes	electric current (A)
86	Meter 1: ZS/S	Voltage	4 bytes	electric potential (V)
92	Meter 1: ZS/S	Frequency	4 bytes	frequency (Hz)

Group objects QA/S 1.16.1 → "ZS/S"

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ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

Energy Analyzer QA/S 1.16.1 KNX and KNX Meters

Example: Energy Analyzer QA/S 1.16.1 KNX and Meter Interface Module ZS/S 1.1 – Assignment of Group Addresses

Energy Analyzer QA/S1.16.1

…
Meter x: ZS/S – In operation
Meter x: ZS/S – Request meter reading
Meter x: ZS/S – Request status values
Meter x: ZS/S – Status byte
Meter x: ZS/S – Meter type
Meter x: ZS/S – False meter type
Meter x: ZS/S – Send power failures
Meter x: ZS/S – Reset power failures
Meter x: ZS/S – Active energy
Meter x: ZS/S – Active Power
Meter x: ZS/S – Power factor
Meter x: ZS/S – Current
Meter x: ZS/S – Voltage
Meter x: ZS/S – Frequency
…

Meter Interface ZS/S 1.1

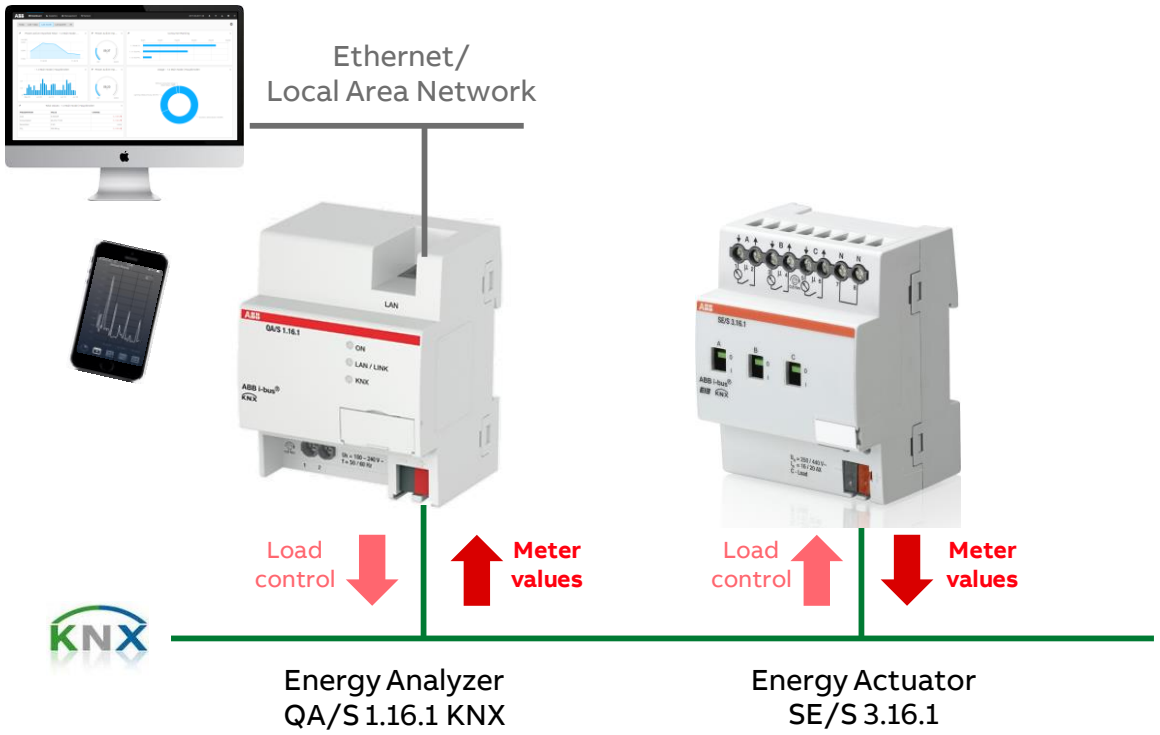
…
General – Request status values
General – In operation
General – Status byte
General – Error report
General – Meter type
General – False meter type
General – Send power fail counter
General – Reset power fail counter
Meter reading – Request meter reading
Meter reading – Active energy
Power values – Request power values
Power value – Active power
Power value – Power factor
Instrument values – Request values
Instrument value – Current
Instrument value – Voltage
Instrument value – Frequency

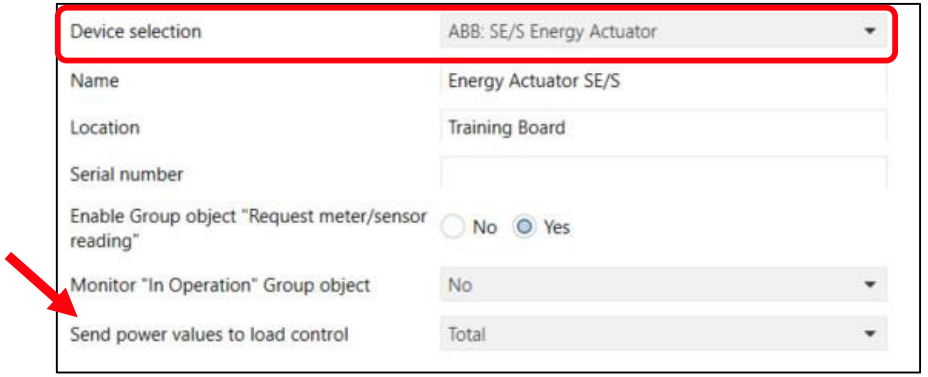
Example of a ZS/S parameterization:
EQmeter "B21 113 100"
Meter type "A/B-series
Active energy meter (direct)
Voltage network 2-wire (N,L), No tariffs
Send object "In operation" cyclically
Send values (meter, power and instrument) on request

ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

Energy Analyzer QA/S 1.16.1 KNX and KNX Meters

Energy Analyzer QA/S 1.16.1 KNX and Energy Actuator SE/S 3.16.1 – Meter Values





Device selection	ABB: SE/S Energy Actuator
Name	Energy Actuator SE/S
Location	Training Board
Serial number	
Enable Group object "Request meter/sensor reading"	No Yes
Monitor "In Operation" Group object	No
Send power values to load control	Total

ETS parameter QA/S 1.16.1 → "SE/S"

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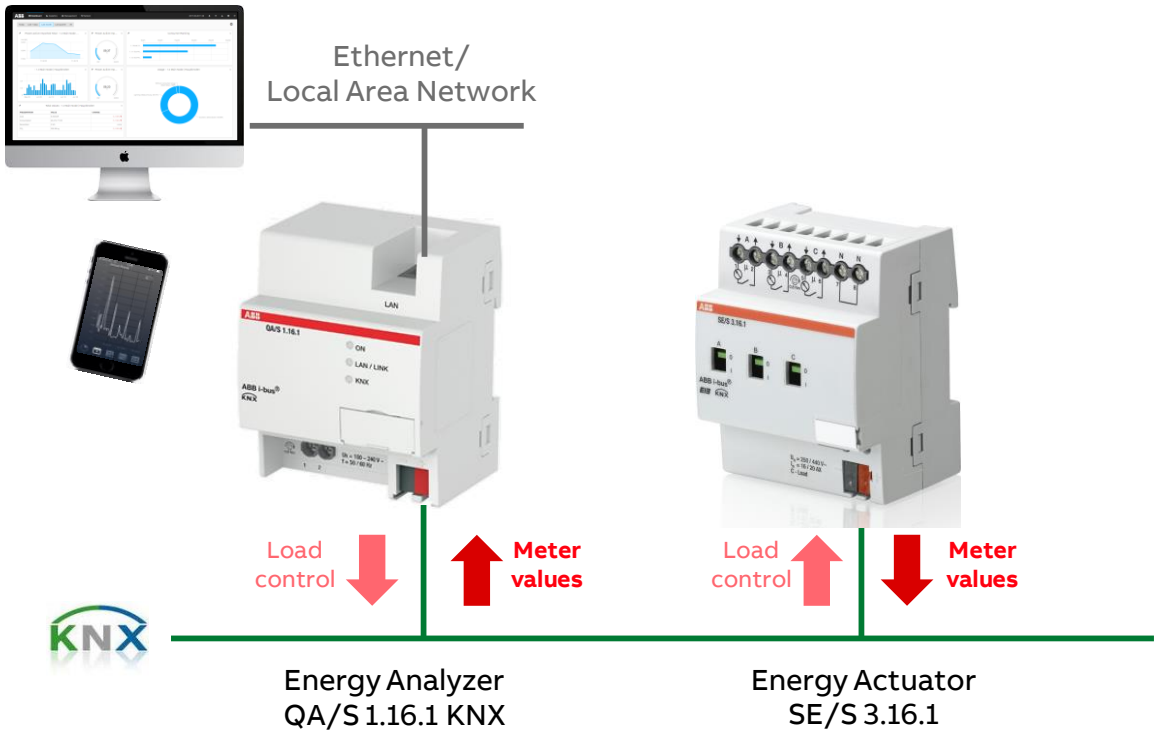
Energy Analyzer QA/S 1.16.1 KNX and KNX Meters

Energy Analyzer QA/S 1.16.1 KNX and Energy Actuator SE/S 3.16.1 – Meter Values



Num	Name	Object Function	Length	Data Type
131	Meter 2: SE/S	In operation	1 bit	switch
132	Meter 2: SE/S	Request meter/sensor reading	1 bit	trigger
135	Meter 2: SE/S	Request status values	1 bit	trigger
136	Meter 2: SE/S	Measurement circuit active	1 bit	state
141	Meter 2: SE/S	Meter reading	4 bytes	active energy (Wh)
142	Meter 2: SE/S	Active power	4 bytes	power (W)
143	Meter 2: SE/S	Frequency	4 bytes	frequency (Hz)
151	Meter 2: SE/S	A: Meter reading	4 bytes	active energy (Wh)
152	Meter 2: SE/S	A: Active power	4 bytes	power (W)
153	Meter 2: SE/S	A: Current	4 bytes	electric current (A)
154	Meter 2: SE/S	A: Voltage	4 bytes	electric potential (V)
155	Meter 2: SE/S	A: Apparent power	4 bytes	power (W)
156	Meter 2: SE/S	A: Power factor	4 bytes	power factor (cos Φ)
161	Meter 2: SE/S	B: Meter reading	4 bytes	active energy (Wh)
162	Meter 2: SE/S	B: Active power	4 bytes	power (W)
163	Meter 2: SE/S	B: Current	4 bytes	electric current (A)
164	Meter 2: SE/S	B: Voltage	4 bytes	electric potential (V)
165	Meter 2: SE/S	B: Apparent power	4 bytes	power (W)

Group objects QA/S 1.16.1 → "SE/S"

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Energy Analyzer QA/S 1.16.1 KNX and KNX Meters

Example: Energy Analyzer QA/S 1.16.1 KNX and Energy Actuator SE/S 3.16.1 – Assignment of Group Addresses

Energy Analyzer QA/S1.16.1

Meter x: SE/S – In operation	System – In operation
Meter x: SE/S – Request meter reading	General – Request status values
Meter x: SE/S – Request status values	General – Request meter readings
Meter x: SE/S – Measurement circuit active	Diagnostics – Measurement circuit active
Meter x: SE/S – Meter reading	Meter total – Meter reading
Meter x: SE/S – Active power	Active power total – Active power
Meter x: SE/S – Frequency	Frequency – Frequency
Meter x: SE/S – A: Meter reading	A: Meter – Meter reading
Meter x: SE/S – A: Active power	A: Active power – Active power
Meter x: SE/S – A: Current	A: Current – Current value
Meter x: SE/S – A: Voltage	A: Voltage – Voltage
Meter x: SE/S – A: Apparent power	A: Apparent power – Apparent power
Meter x: SE/S – A: Power factor	A: Power factor – Power factor
Meter x: SE/S – B: Meter reading	B: Meter – Meter reading
Meter x: SE/S – B: Active power	B: Active power – Active power
Meter x: SE/S – B: Current	B: Current – Current value
Meter x: SE/S – B: Voltage	B: Voltage – Voltage
Meter x: SE/S – B: Apparent power	B: Apparent power – Apparent power
Meter x: SE/S – …	B: …

Energy Actuator SE/S3.16.1

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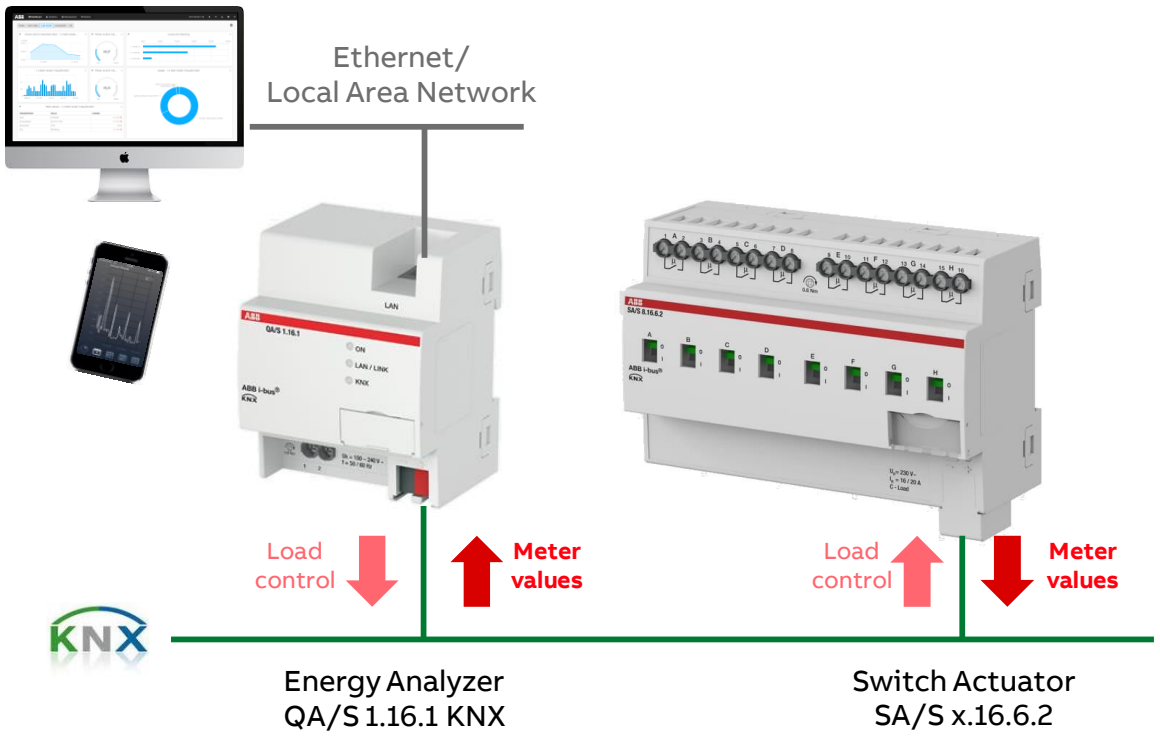
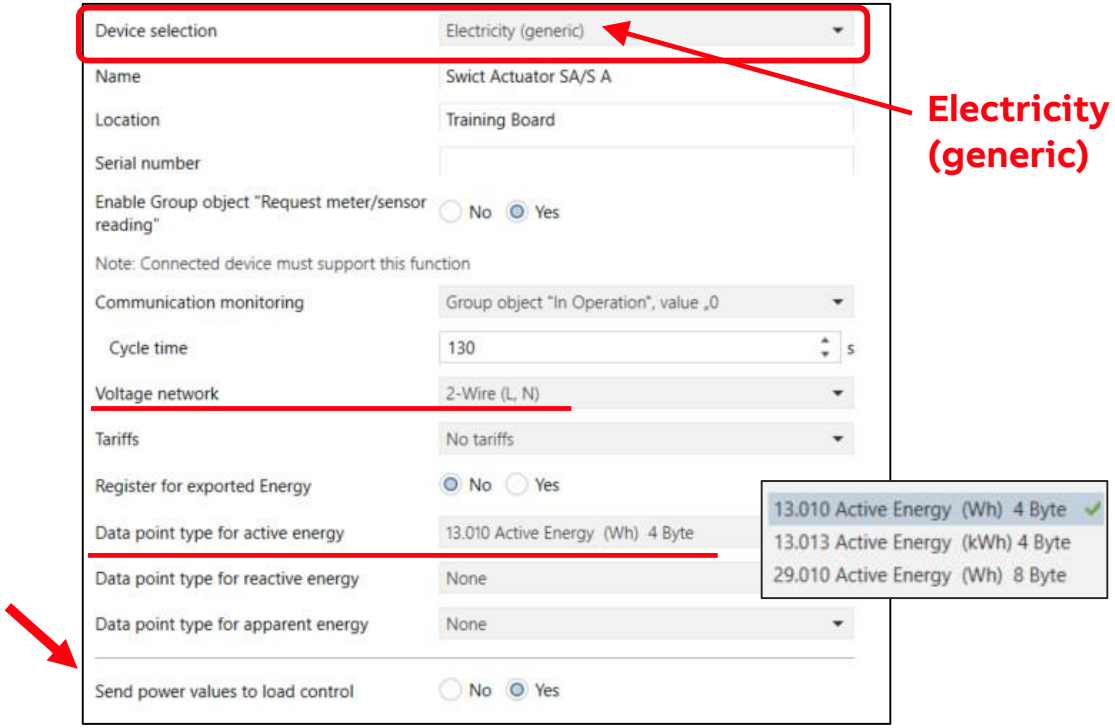
Energy Analyzer QA/S 1.16.1 KNX and KNX Meters

Energy Analyzer QA/S 1.16.1 KNX and Switch Actuator SA/S x.16.6.2 with Energy Functions – Meter Values





ETS parameter QA/S 1.16.1 → "SA/S x.16.6.2"

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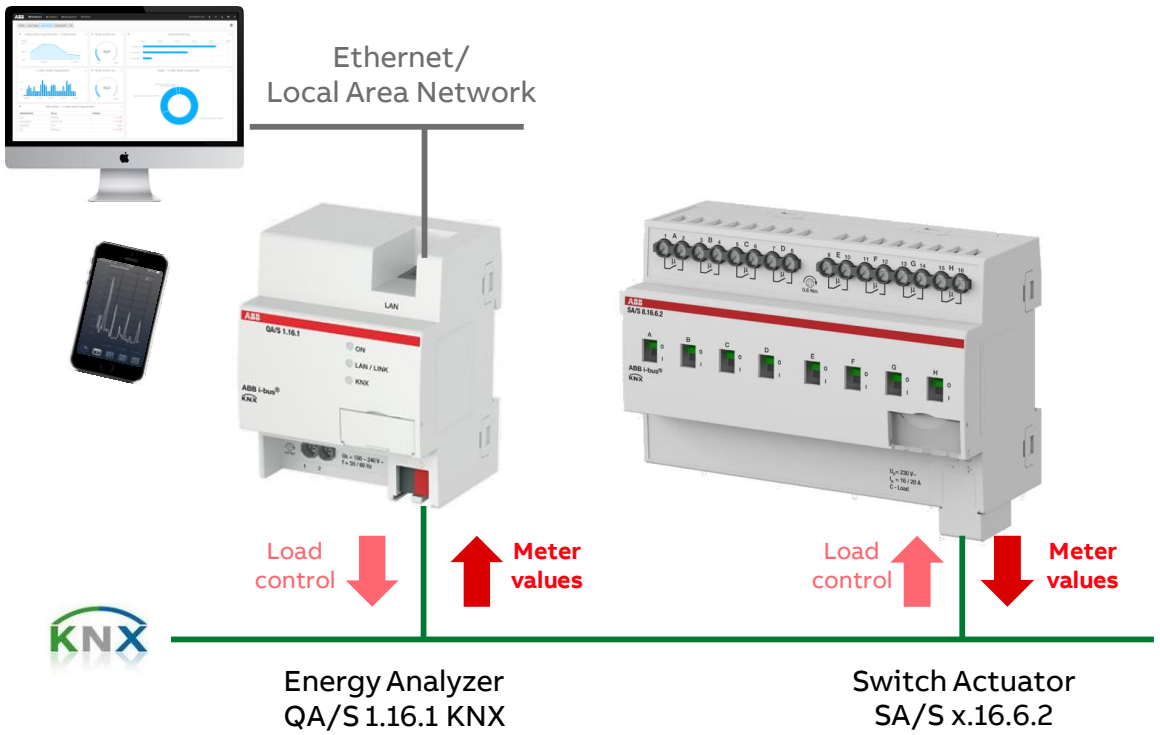
Energy Analyzer QA/S 1.16.1 KNX and KNX Meters

Energy Analyzer QA/S 1.16.1 KNX and Switch Actuator SA/S x.16.6.2 with Energy Functions – Meter Values



231	Meter 3: Gen.El.	In operation
232	Meter 3: Gen.El.	Request meter/sensor reading
242	Meter 3: Gen.El.	Active energy
272	Meter 3: Gen.El.	Active Power
284	Meter 3: Gen.El.	Phase angle power
288	Meter 3: Gen.El.	Power factor
292	Meter 3: Gen.El.	Current
296	Meter 3: Gen.El.	Voltage
302	Meter 3: Gen.El.	Frequency
303	Meter 3: Gen.El.	Phase angle current
306	Meter 3: Gen.El.	Phase angle voltage
309	Meter 3: Gen.El.	Quadrant

Group objects QA/S 1.16.1 → "SA/S x.16.6.2"

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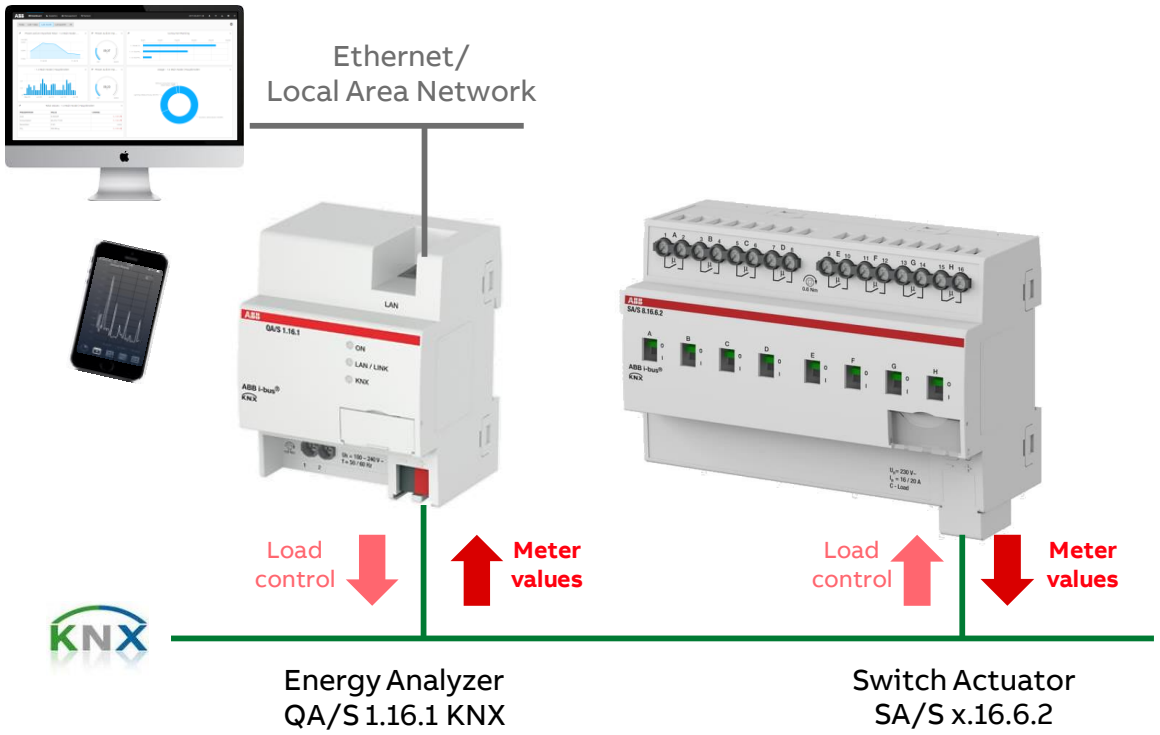
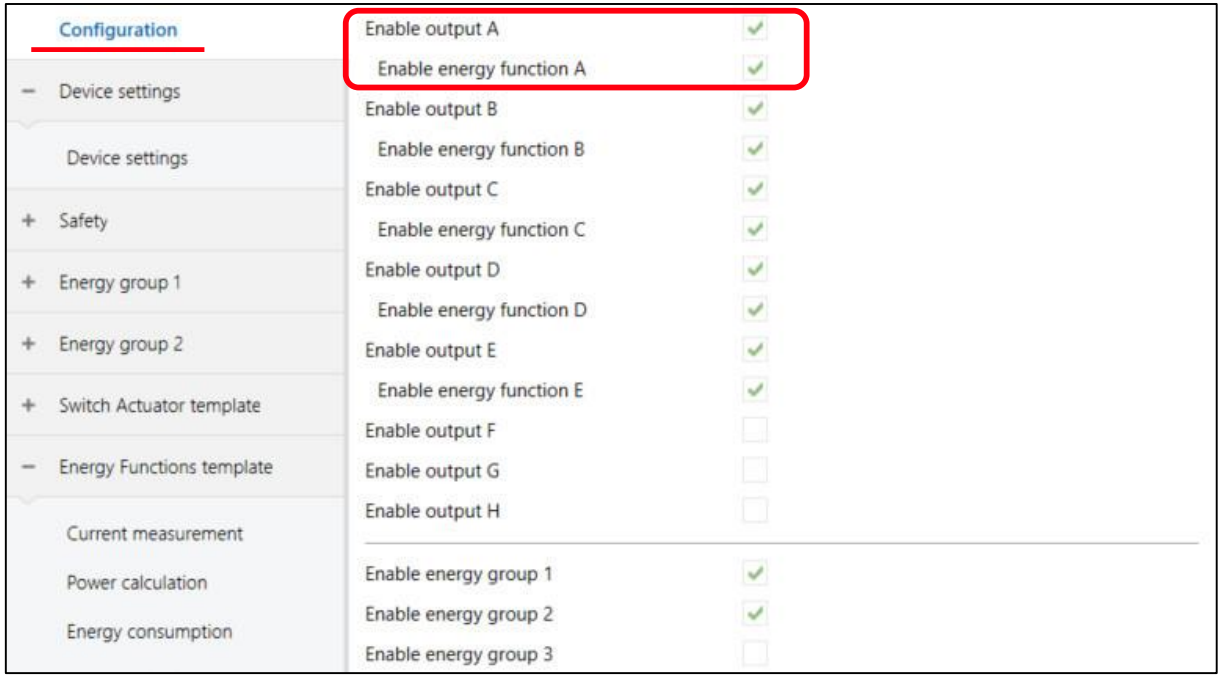
Energy Analyzer QA/S 1.16.1 KNX and KNX Meters

Energy Analyzer QA/S 1.16.1 KNX and Switch Actuator SA/S x.16.6.2 with Energy Functions – Meter Values



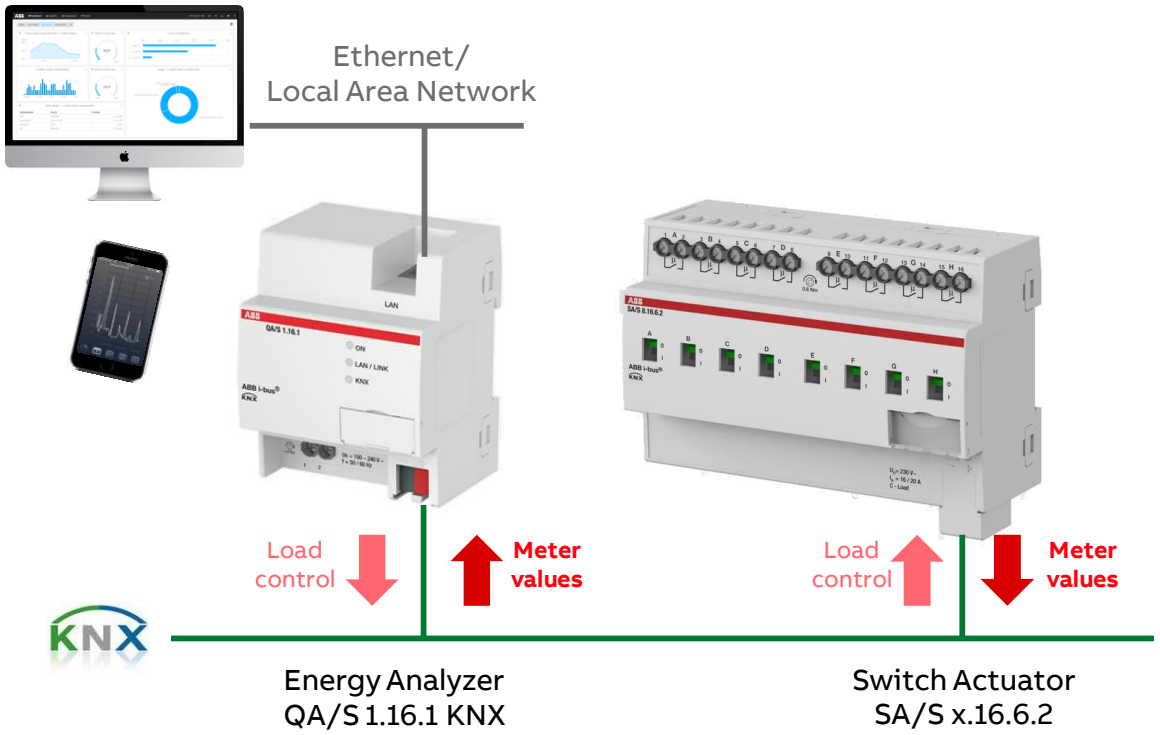


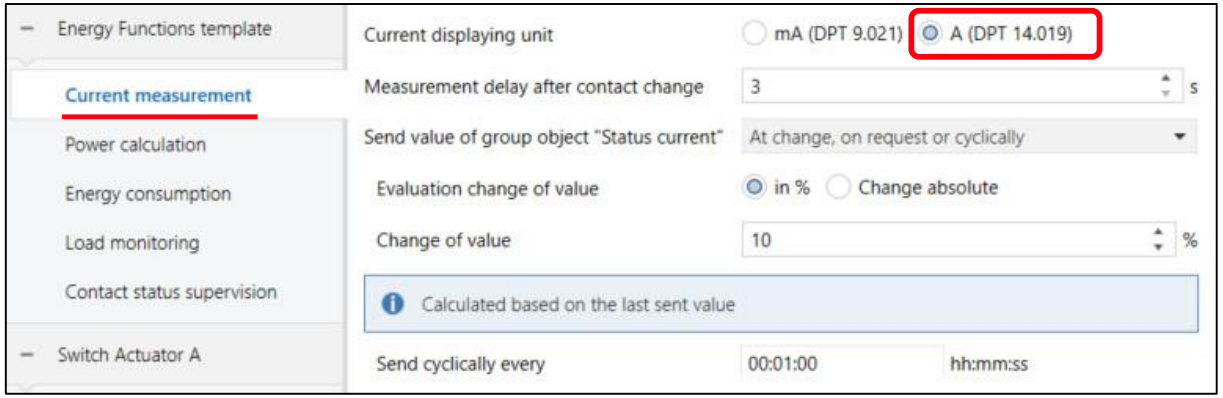
ETS parameter SA/S x.16.6.2 "Configuration"

ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

Energy Analyzer QA/S 1.16.1 KNX and KNX Meters

Energy Analyzer QA/S 1.16.1 KNX and Switch Actuator SA/S x.16.6.2 with Energy Functions – Meter Values





ETS parameter SA/S x.16.6.2 "Current Measurement"
(template or channel/energy group individual)

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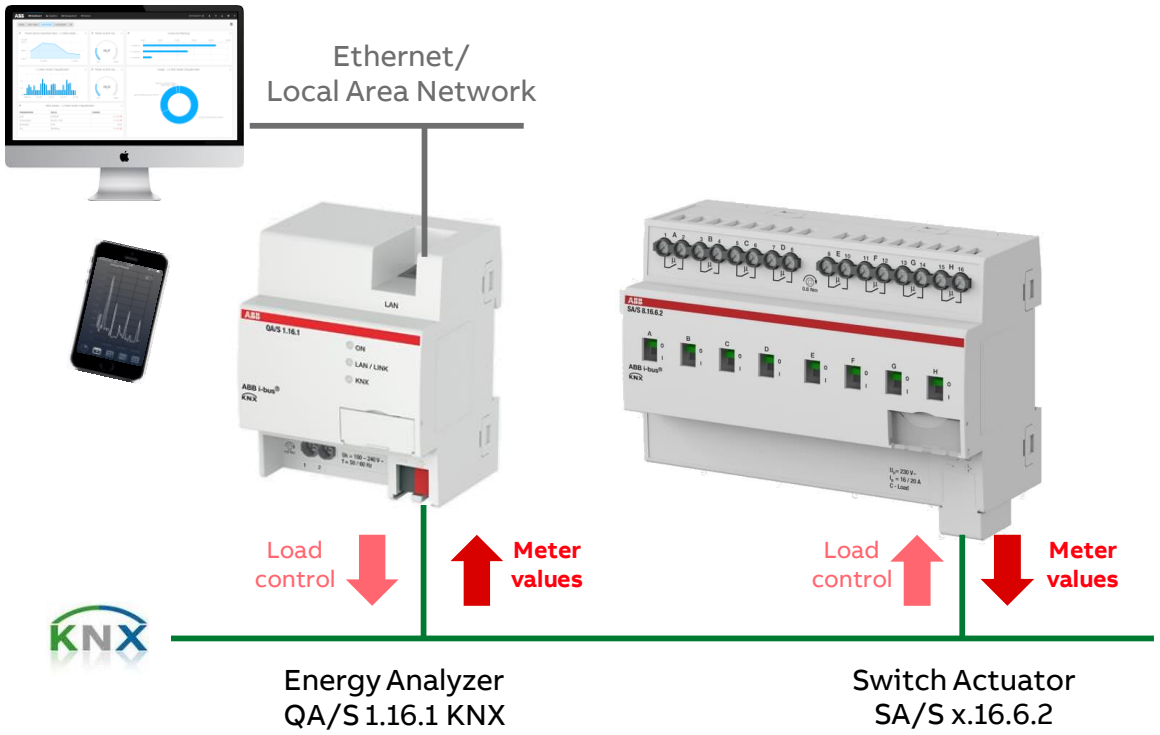
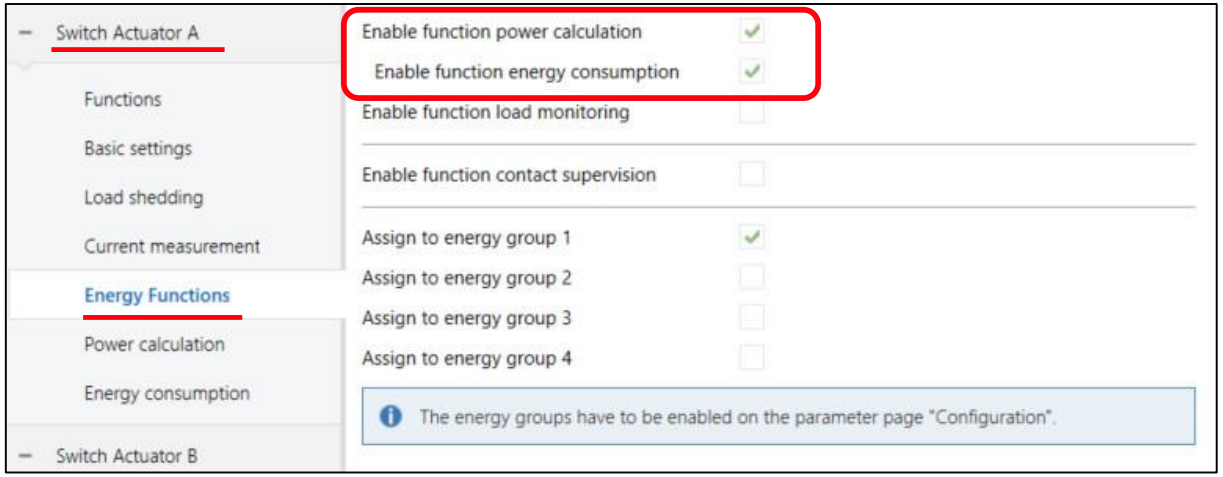
Energy Analyzer QA/S 1.16.1 KNX and KNX Meters

Energy Analyzer QA/S 1.16.1 KNX and Switch Actuator SA/S x.16.6.2 with Energy Functions – Meter Values



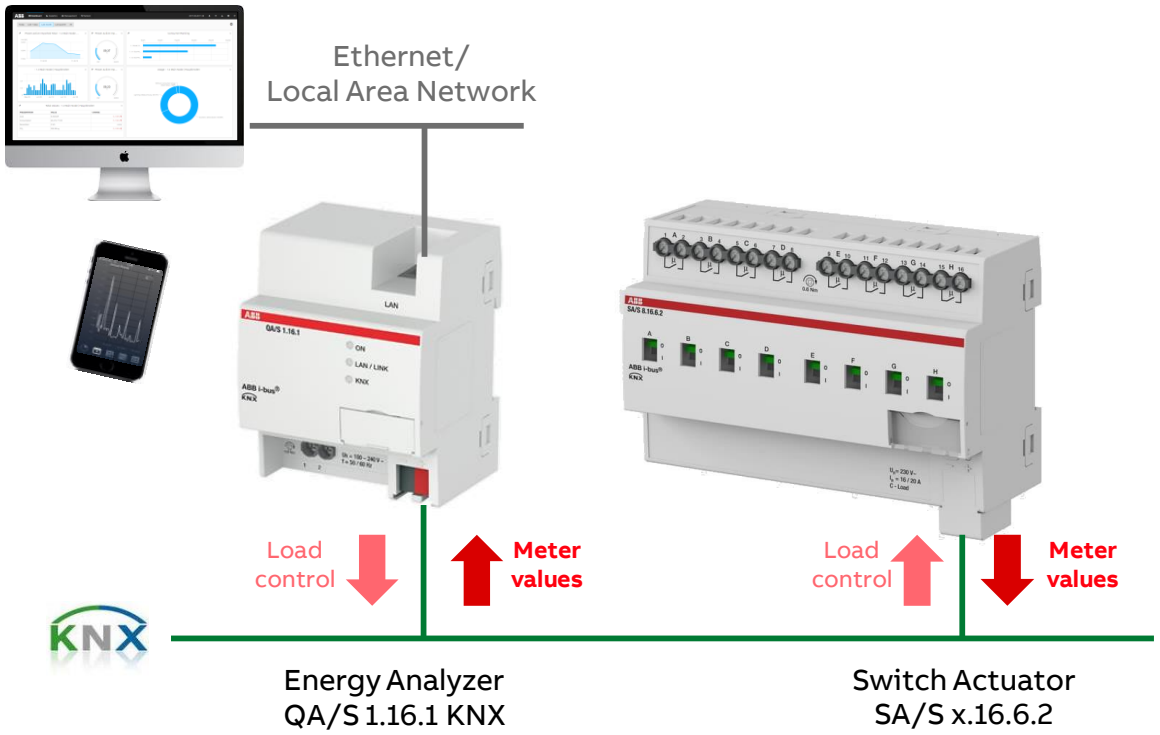


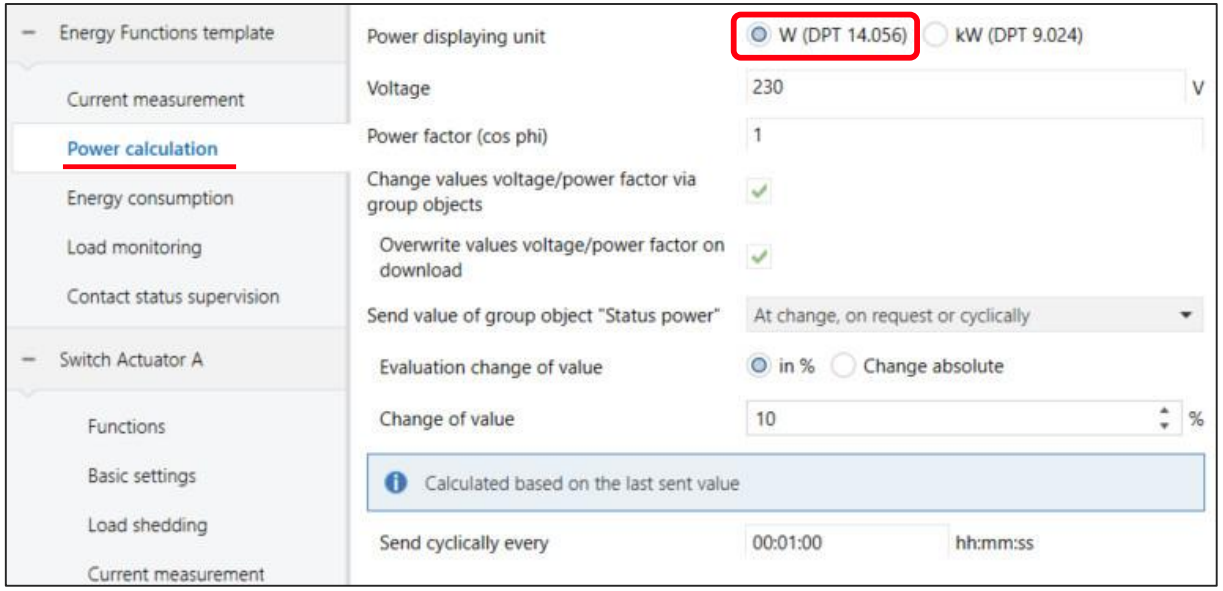
ETS parameter SA/S x.16.6.2 "Energy Functions" (template or channel)

ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

Energy Analyzer QA/S 1.16.1 KNX and KNX Meters

Energy Analyzer QA/S 1.16.1 KNX and Switch Actuator SA/S x.16.6.2 with Energy Functions – Meter Values



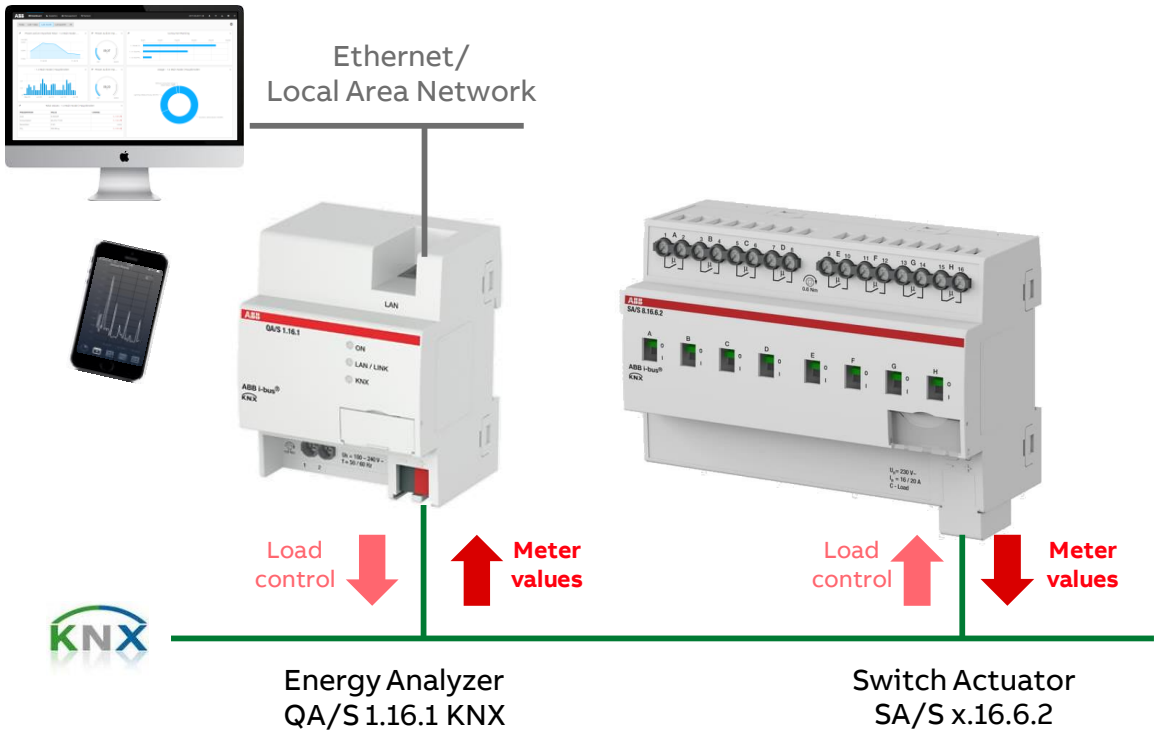


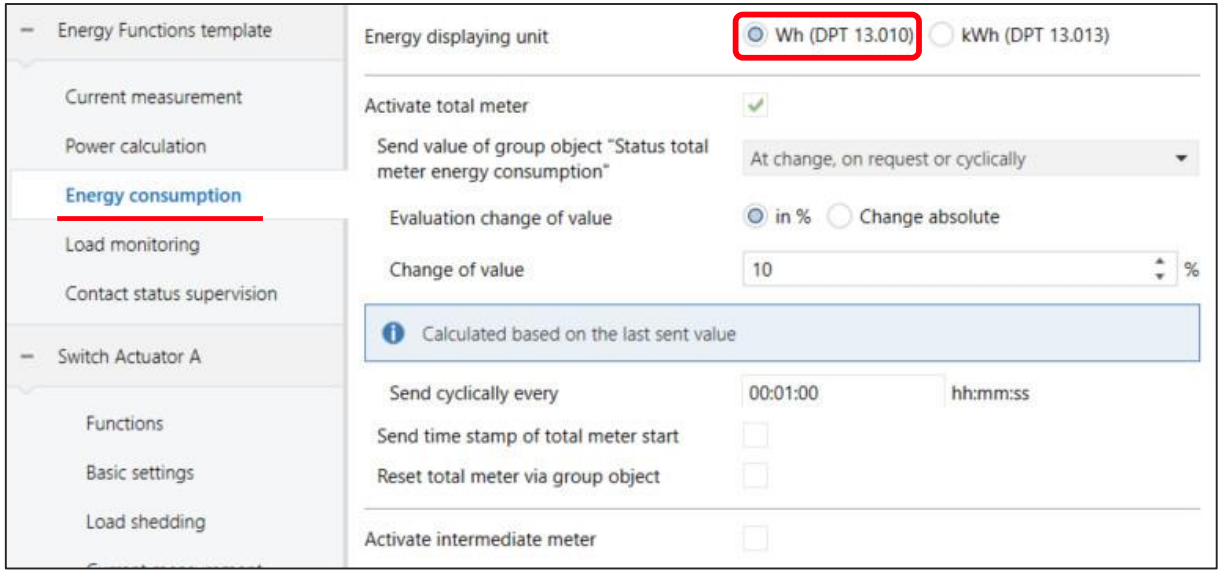
ETS parameter SA/S x.16.6.2 "Power Calculation" (template or channel/energy group individual)

ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

Energy Analyzer QA/S 1.16.1 KNX and KNX Meters

Energy Analyzer QA/S 1.16.1 KNX and Switch Actuator SA/S x.16.6.2 with Energy Functions – Meter Values



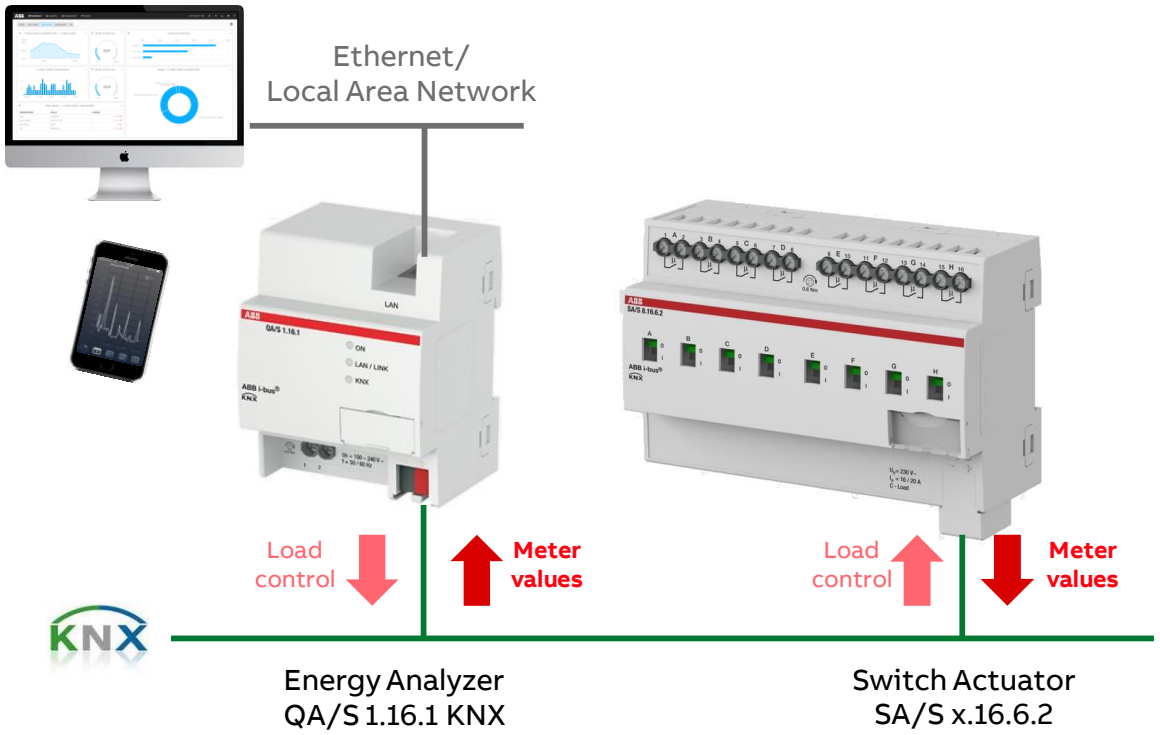


ETS parameter SA/S x.16.6.2 "Energy Consumption"
(template or channel/energy group individual)
<u>Please note:</u> Date and time in SA/S to be synchronized

ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

Energy Analyzer QA/S 1.16.1 KNX and KNX Meters

Energy Analyzer QA/S 1.16.1 KNX and Switch Actuator SA/S x.16.6.2 with Energy Functions – Meter Values



Num	Name	Object Function	Length	Data Type	C	R	W	T
197	Channel A: Switch	Status switch	1 bit	state	C	R	-	T
200	Channel A: Load shedding	Set load shedding stage	1 byte	priority control	C	-	W	-
212	Channel A: Current measurement	Status current	4 bytes	electric current (A)	C	R	-	T
213	Channel A: Power calculation	Voltage value	4 bytes	electric potential (V)	C	-	W	-
214	Channel A: Power calculation	Power factor (cos phi)	4 bytes	power factor (cos Φ)	C	-	W	-
215	Channel A: Power calculation	Status power	4 bytes	power (W)	C	R	-	T
216	Channel A: Energy consumption	Status total meter energy consumption	4 bytes	active energy (Wh)	C	R	-	T

Group objects SA/S x.16.6.2 "Channel X"

Num	Name	Object Function	Length	Data Type	C	R	W	T
12	Energy group 1: Current measurement	Status current	4 bytes	electric current (A)	C	R	-	T
13	Energy group 1: Power calculation	Status power	4 bytes	power (W)	C	R	-	T
14	Energy group 1: Energy consumption	Status total meter energy consumption	4 bytes	active energy (Wh)	C	R	-	T

Group objects SA/S x.16.6.2 "Energy group X"

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ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

Energy Analyzer QA/S 1.16.1 KNX and KNX Meters

Example: QA/S and Switch Actuator SA/S x.16.6.2 with EnergyFun. – Assignment of Group Addresses “Channel A…X”

Energy Analyzer QA/S 1.16.1 KNX

Meter: Electricity (generic)

In Operation
Request meter/sensor reading
Active energy
Active power
Phase angle power
Power factor
Current
Voltage
Frequency
Phase angle current
Phase angle voltage
Quadrant

Channel X

…
General – In operation
General – Request status values
…
Switch
Status Switch
Current measurement – Status current
Power calculation – Status Power
Energy consumption – Status total meter energy
…

Switch Actuator SA/S with Energy Functions

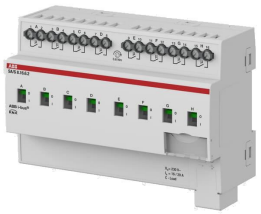

ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

Energy Analyzer QA/S 1.16.1 KNX and KNX Meters

Example: QA/S and Switch Actuator SA/S x.16.6.2 with EnergyFun. – Assignment of Group Addresses “Channel A…X”

Energy Analyzer QA/S 1.16.1 KNX

Meter: Electricity (generic)

In Operation
Request meter/sensor reading
Active energy
Active power
Phase angle power
Power factor
Current
Voltage
Frequency
Phase angle current
Phase angle voltage
Quadrant

Channel X

Switch Actuator SA/S with Energy Functions

…
General – In operation
General – Request status values
…
→ Switch
← Status Switch
Current measurement – Status current
Power calculation – Status Power
Energy consumption – Status total meter energy
…

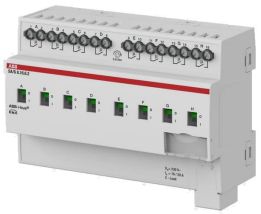

ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

Energy Analyzer QA/S 1.16.1 KNX and KNX Meters

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In Operation
Request meter/sensor reading
Active energy
Active power
Phase angle power
Power factor
Current
Voltage
Frequency
Phase angle current
Phase angle voltage
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Channel X

Switch Actuator SA/S with Energy Functions

…
General – In operation
General – Request status values
…
Switch
Status Switch
Current measurement – Status current
Power calculation – Status Power
Energy consumption – Status total meter energy
…

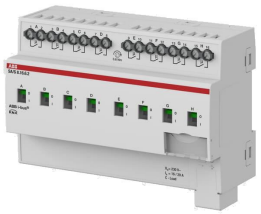

ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

Energy Analyzer QA/S 1.16.1 KNX and KNX Meters

Example: QA/S and Switch Actuator SA/S x.16.6.2 with EnergyFun. – Assignment of Group Addresses “Channel A…X”

Energy Analyzer QA/S 1.16.1 KNX

Meter: Electricity (generic)

- In Operation
- Request meter/sensor reading
- Active energy
- Active power
- Phase angle power
- Power factor
- Current
- Voltage
- Frequency
- Phase angle current
- Phase angle voltage
- Quadrant

Channel X

Switch Actuator SA/S with Energy Functions

- …
- General – In operation
- General – Request status values
- …
- Switch
- Status Switch
- Current measurement – Status current
- Power calculation – Status Power
- Energy consumption – Status total meter energy
- …

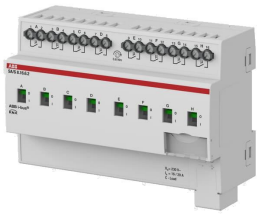

ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

Energy Analyzer QA/S 1.16.1 KNX and KNX Meters

Example: QA/S and Switch Actuator SA/S x.16.6.2 with EnergyFun. – Assignment of Group Addresses “Channel A…X”

Energy Analyzer QA/S 1.16.1 KNX

Meter: Electricity (generic)

- In Operation
- Request meter/sensor reading
- Active energy
- Active power
- Phase angle power
- Power factor
- Current
- Voltage
- Frequency
- Phase angle current
- Phase angle voltage
- Quadrant

Channel X

Switch Actuator SA/S with Energy Functions

- …
- General – In operation
- General – Request status values
- …
- Switch
- Status Switch
- Current measurement – Status current
- Power calculation – Status Power
- Energy consumption – Status total meter energy
- …

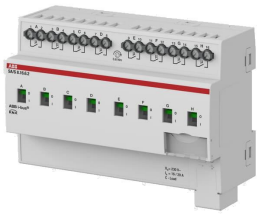

ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

Energy Analyzer QA/S 1.16.1 KNX and KNX Meters

Example: QA/S and Switch Actuator SA/S x.16.6.2 with EnergyFun. – Assignment of Group Addresses “Ener. group 1…4”

Energy Analyzer QA/S 1.16.1 KNX

Meter: Electricity (generic)

In Operation
Request meter/sensor reading
Active energy
Active power
Phase angle power
Power factor
Current
Voltage
Frequency
Phase angle current
Phase angle voltage
Quadrant

Energy group X

…
General – In operation
General – Request status values
…
…
…
Energy group X: Current measurement
Energy group X: Power calculation
Energy group X: Energy consumption
…

Switch Actuator SA/S with Energy Functions

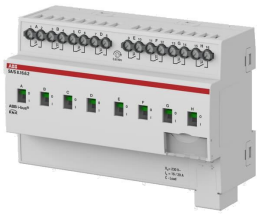

ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

Energy Analyzer QA/S 1.16.1 KNX and KNX Meters

Example: QA/S and Switch Actuator SA/S x.16.6.2 with EnergyFun. – Assignment of Group Addresses “Ener. group 1…4”

Energy Analyzer QA/S 1.16.1 KNX

Meter: Electricity (generic)

In Operation
Request meter/sensor reading
Active energy
Active power
Phase angle power
Power factor
Current
Voltage
Frequency
Phase angle current
Phase angle voltage
Quadrant

Switch Actuator SA/S with Energy Functions

Energy group X

…
General – In operation
General – Request status values
…
…
…
Energy group X: Current measurement
Energy group X: Power calculation
Energy group X: Energy consumption
…

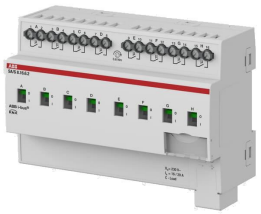

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ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

Energy Analyzer QA/S 1.16.1 KNX and KNX Meters

Example: QA/S and Switch Actuator SA/S x.16.6.2 with EnergyFun. – Assignment of Group Addresses “Ener. group 1…4”

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- Active power
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- Power factor
- Current
- Voltage
- Frequency
- Phase angle current
- Phase angle voltage
- Quadrant

Energy group X

- …
- General – In operation
- General – Request status values
- …
- …
- …
- Energy group X: Current measurement
- Energy group X: Power calculation
- Energy group X: Energy consumption
- …

Switch Actuator SA/S with Energy Functions

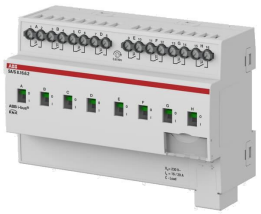

ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

Energy Analyzer QA/S 1.16.1 KNX and KNX Meters

Example: QA/S and Switch Actuator SA/S x.16.6.2 with EnergyFun. – Assignment of Group Addresses “Ener. group 1…4”

Energy Analyzer QA/S 1.16.1 KNX

Meter: Electricity (generic)

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- Active power
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- Current
- Voltage
- Frequency
- Phase angle current
- Phase angle voltage
- Quadrant

Energy group X

- …
- General – In operation
- General – Request status values
- …
- …
- …
- Energy group X: Current measurement
- Energy group X: Power calculation
- Energy group X: Energy consumption
- …

Switch Actuator SA/S with Energy Functions

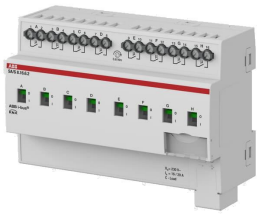

ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

Energy Analyzer QA/S 1.16.1 KNX and KNX Meters

Practical demonstration

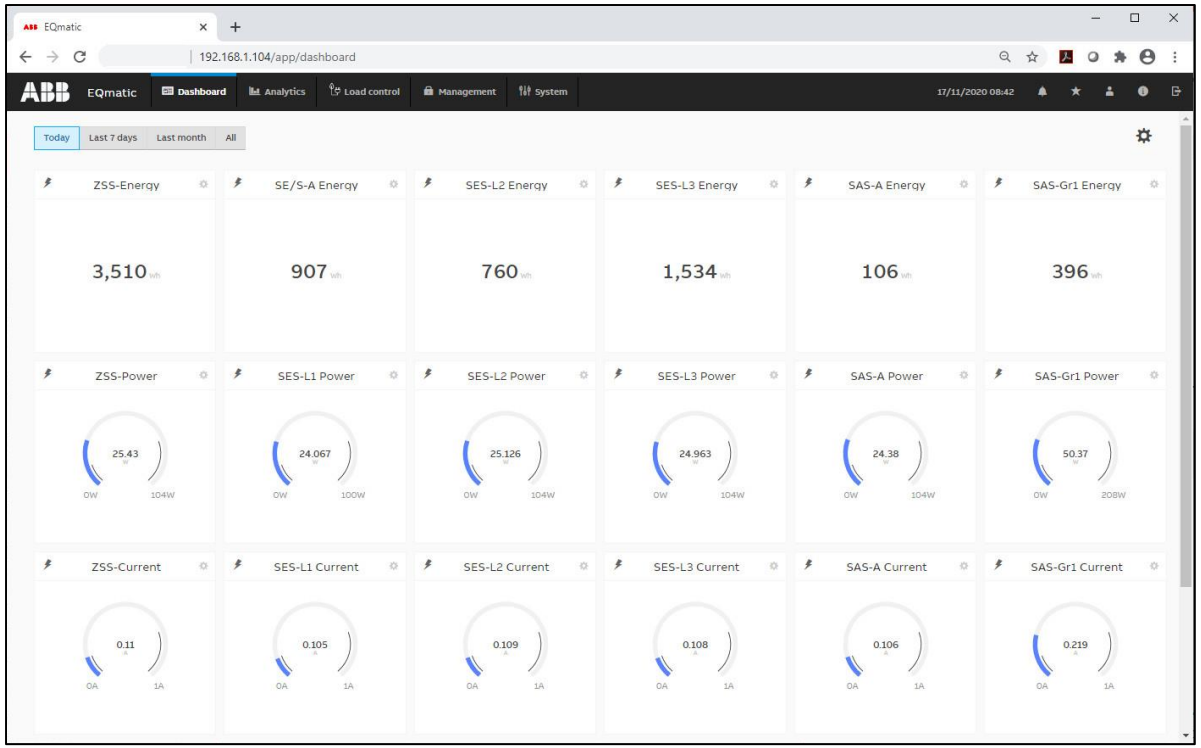

ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

Energy Analyzer QA/S 1.16.1 KNX and KNX Meters – Load Control

ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

Energy Analyzer QA/S 1.16.1 KNX and KNX Meters

Overview Energy Analyzer QA/S 1.16.1 KNX and KNX Meters – Load Control

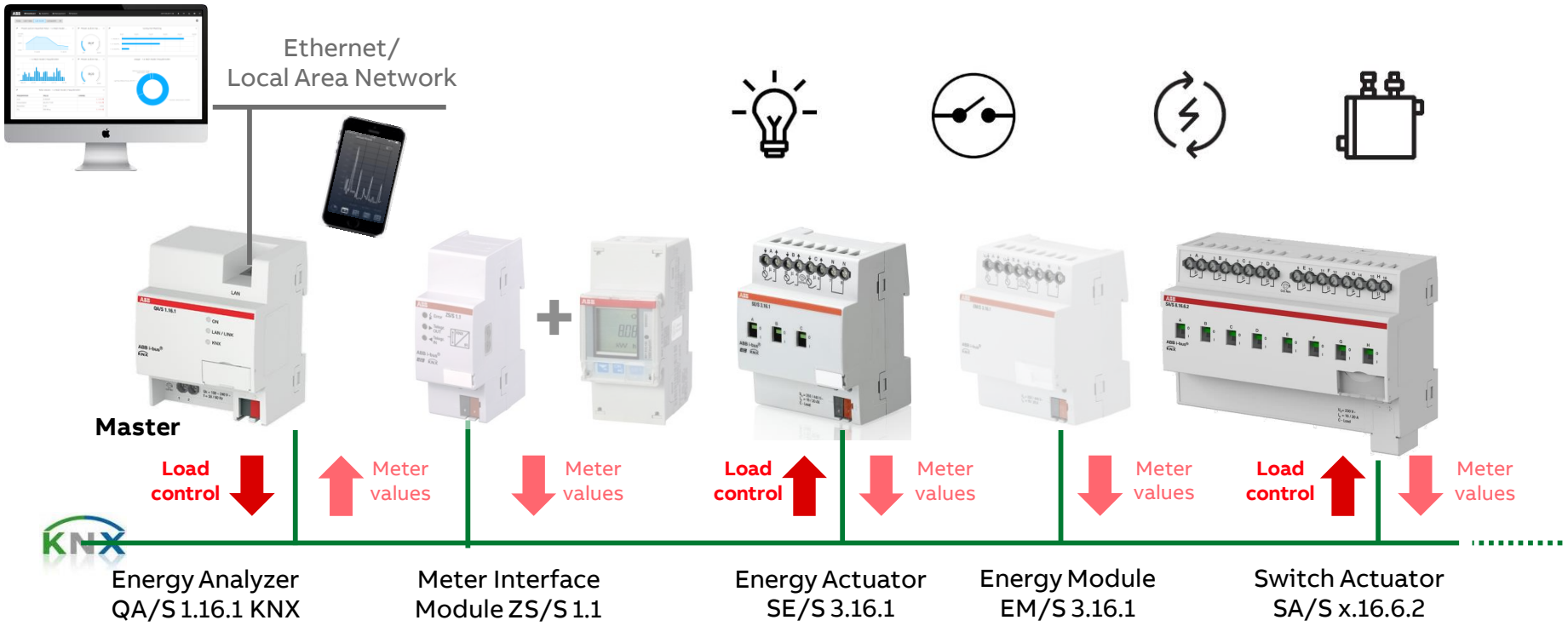

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ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

Energy Analyzer QA/S 1.16.1 KNX and KNX Meters

Overview Energy Analyzer QA/S 1.16.1 KNX and KNX Meters – Load Control

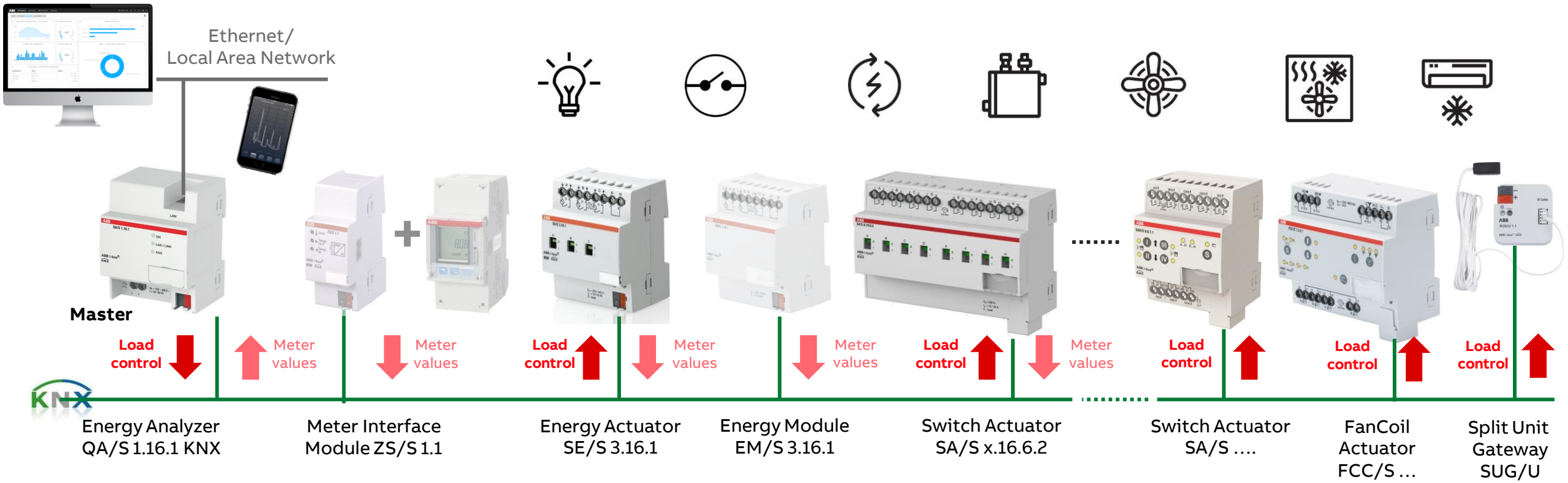

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ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

Energy Analyzer QA/S 1.16.1 KNX and KNX Meters

Energy Analyzer QA/S 1.16.1 KNX – Load Control

Load control status:
Total power (126W) is above the load limit (100) and a shedding stage (3) is active → reduced total power (50W)

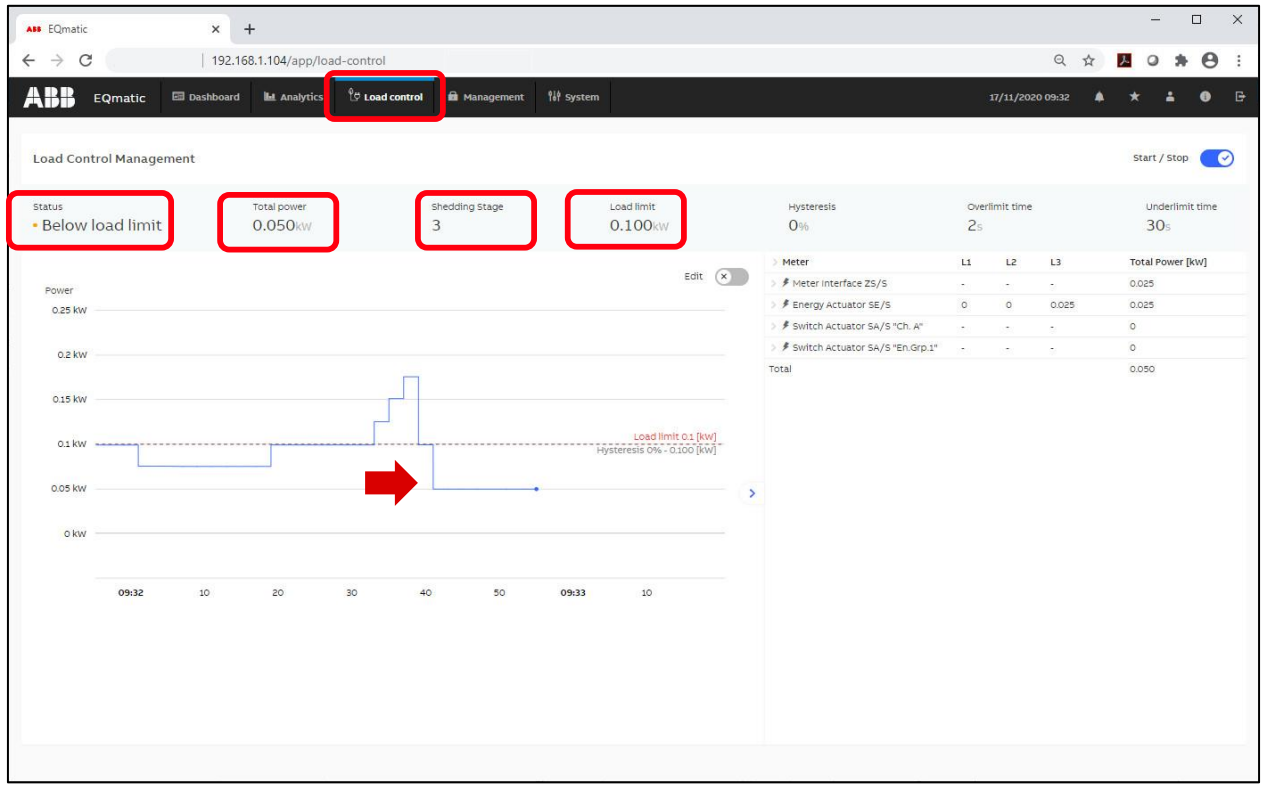
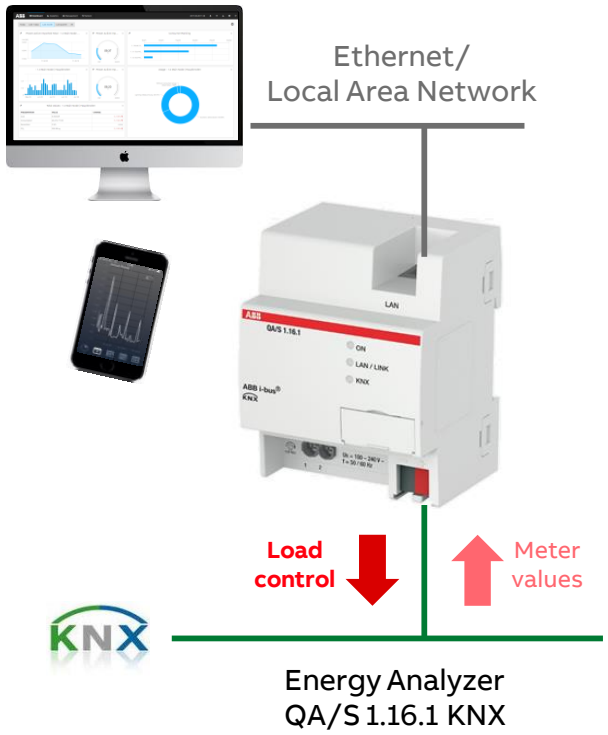
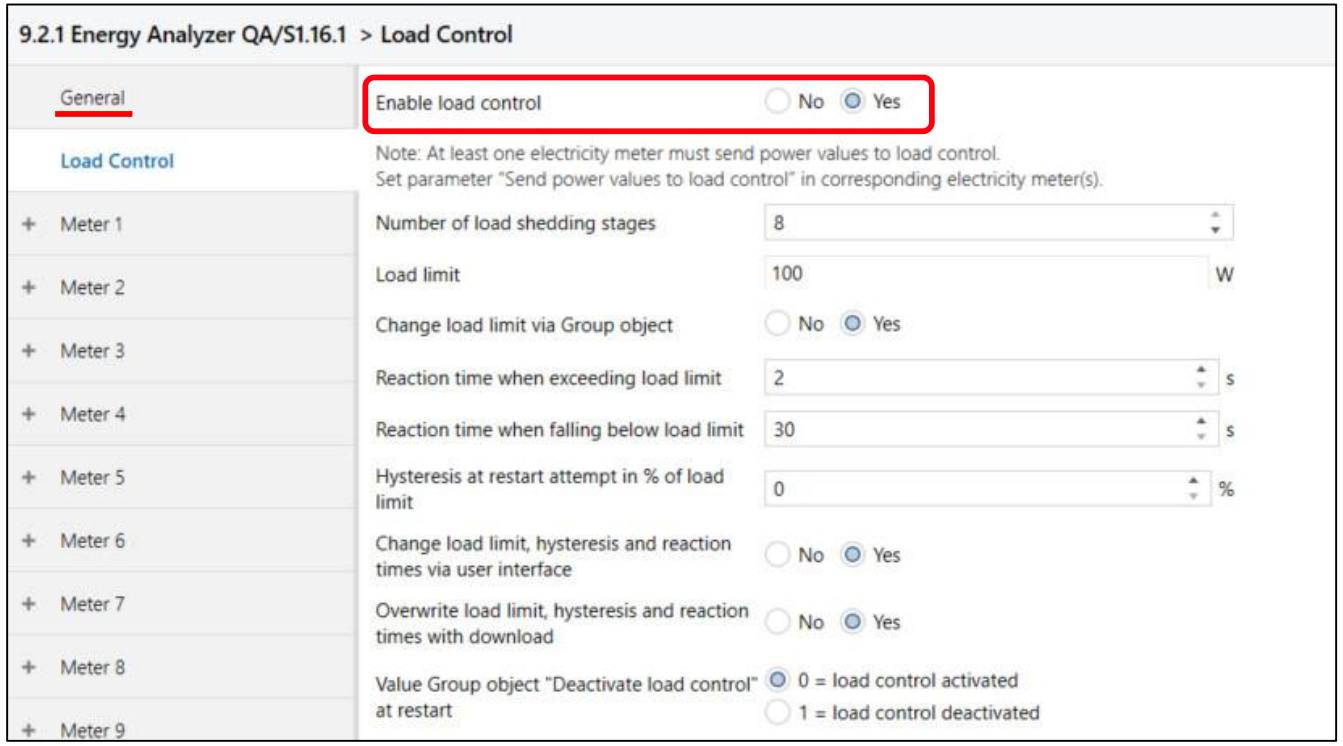


ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

Energy Analyzer QA/S 1.16.1 KNX and KNX Meters

Energy Analyzer QA/S 1.16.1 KNX – Load Control



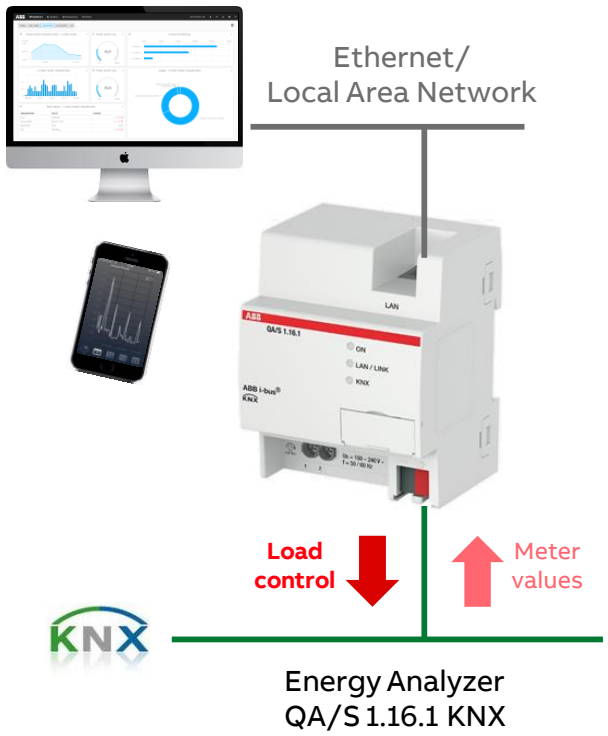


ETS parameter QA/S 1.16.1: "Load Control"

ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

Energy Analyzer QA/S 1.16.1 KNX and KNX Meters

Energy Analyzer QA/S 1.16.1 KNX – Load Control



6	Device clock	Date	3 bytes	date
7	Device clock	Time	3 bytes	time of day
8	Device clock	Date/Time	8 bytes	date time
11	Load control	Deactivate load control	1 bit	enable
12	Load control	Load limit exceeded	1 bit	alarm
13	Load control	Send sum power values	4 bytes	power (W)
15	Load control	Send/receive load limit	4 bytes	power (W)
16	Load control	Send load shedding stage	1 byte	priority control
17	Load control	Send load shedding stage 1	1 bit	switch
18	Load control	Send load shedding stage 2	1 bit	switch
19	Load control	Send load shedding stage 3	1 bit	switch
20	Load control	Send load shedding stage 4	1 bit	switch
21	Load control	Send load shedding stage 5	1 bit	switch
22	Load control	Send load shedding stage 6	1 bit	switch
23	Load control	Send load shedding stage 7	1 bit	switch
24	Load control	Send load shedding stage 8	1 bit	switch

Group objects QA/S 1.16.1: "Load Control"

Group object 1 byte:
"Priority Control"
DPT 236.001
0 – level 0
1 – level 1
…
15 – level 15
→ QA/S: 1…8

8 Group objects 1 bit:
Shedding stage 1
Shedding stage 2
Shedding stage …
Shedding stage 8
- "0" – activated
- "1" - deactivated

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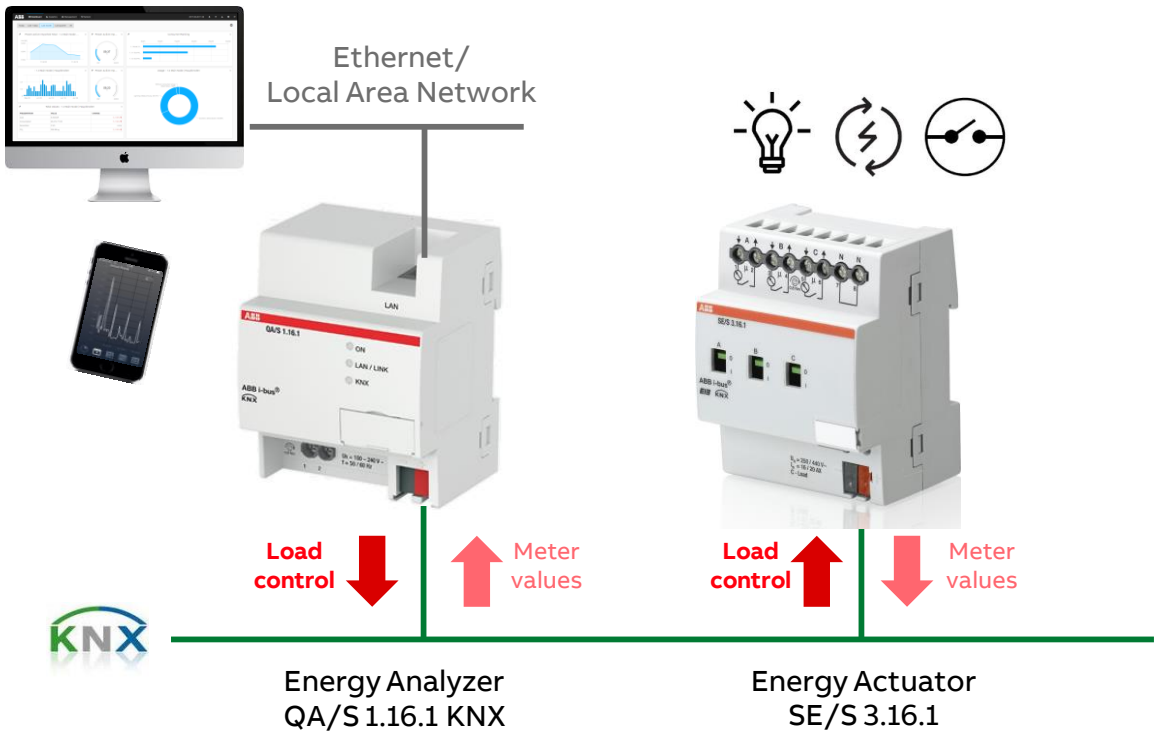
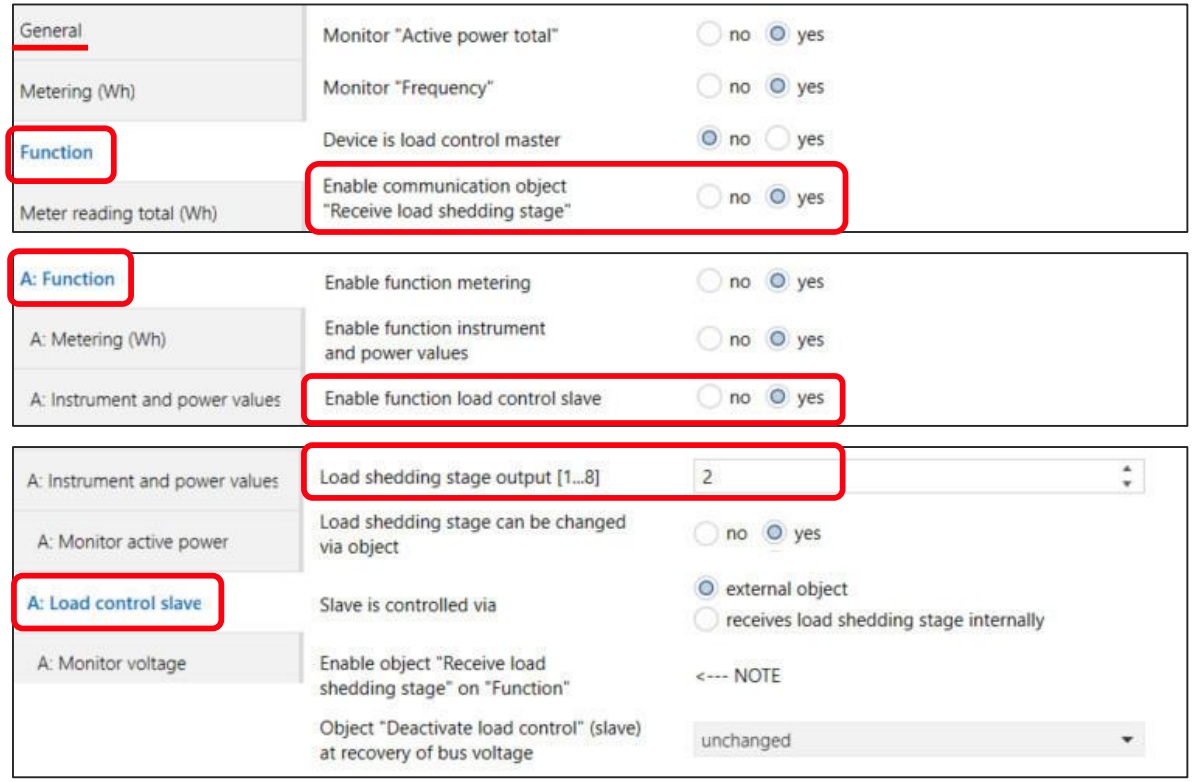
ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

Energy Analyzer QA/S 1.16.1 KNX and KNX Meters

Energy Analyzer QA/S 1.16.1 KNX and Energy Actuator SE/S 3.16.1 – Load Control



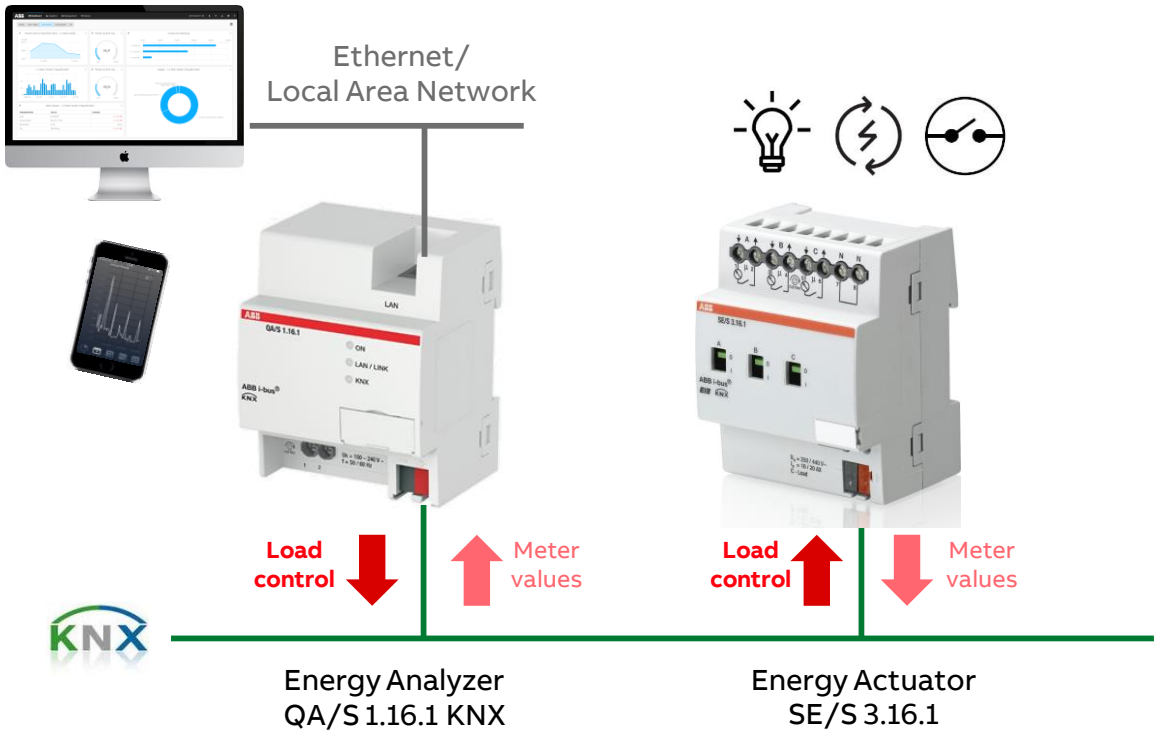


ETS parameter SE/S: "Load control slave"

ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

Energy Analyzer QA/S 1.16.1 KNX and KNX Meters

Energy Analyzer QA/S 1.16.1 KNX and Energy Actuator SE/S 3.16.1 – Load Control



Num	Name	Object Function	Length	Data Type
10	Load control	Receive load shedding stage	1 byte	priority control
80	A: Load control slave	Deactivate load control	1 bit	enable
81	A: Load control slave	Load shedding stage output	1 byte	counter pulses (0..255)
140	B: Load control slave	Deactivate load control	1 bit	enable
141	B: Load control slave	Load shedding stage output	1 byte	counter pulses (0..255)
200	C: Load control slave	Deactivate load control	1 bit	enable
201	C: Load control slave	Load shedding stage output	1 byte	counter pulses (0..255)

Group object SE/S: “Load control slave”

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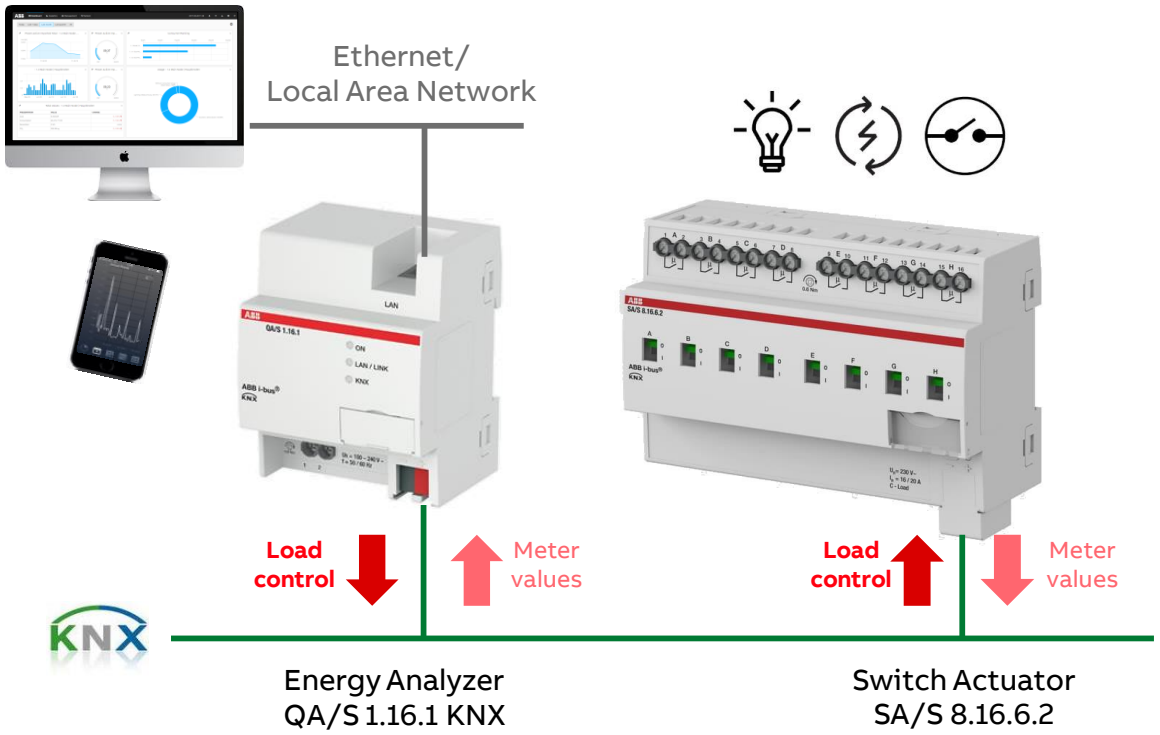
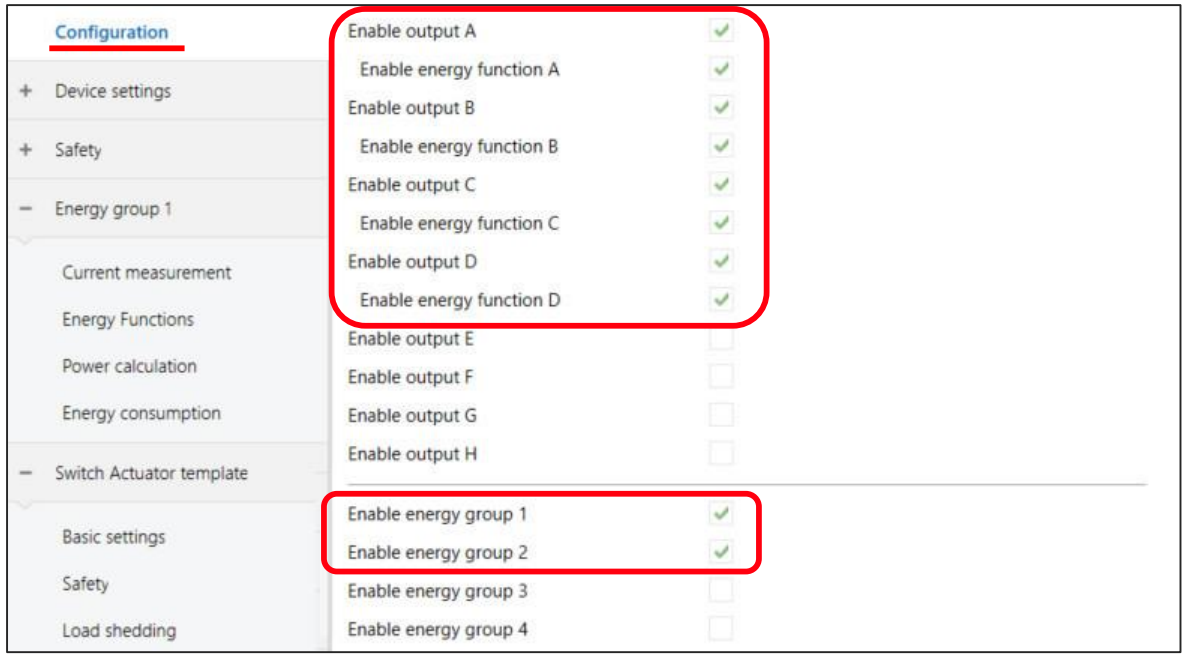
ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

Energy Analyzer QA/S 1.16.1 KNX and KNX Meters

Energy Analyzer QA/S 1.16.1 KNX and Switch Actuator SA/S x.16.6.2 with Energy Functions – “Channel A…X” – Load Cont.



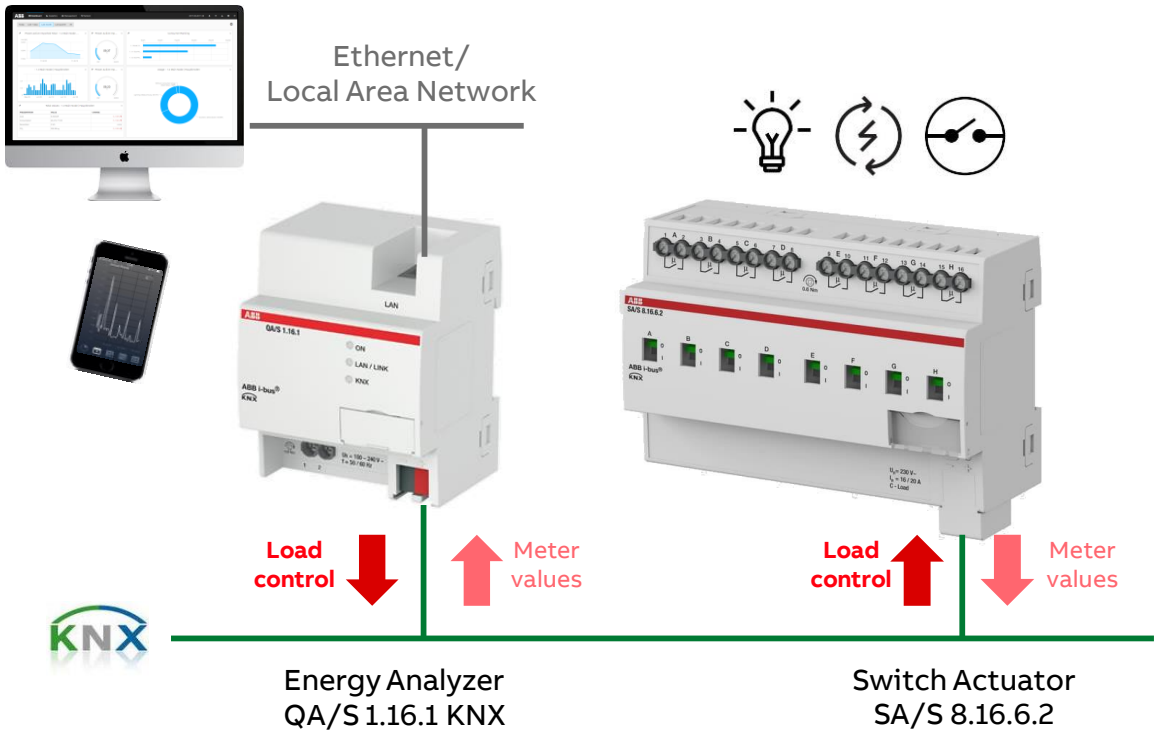


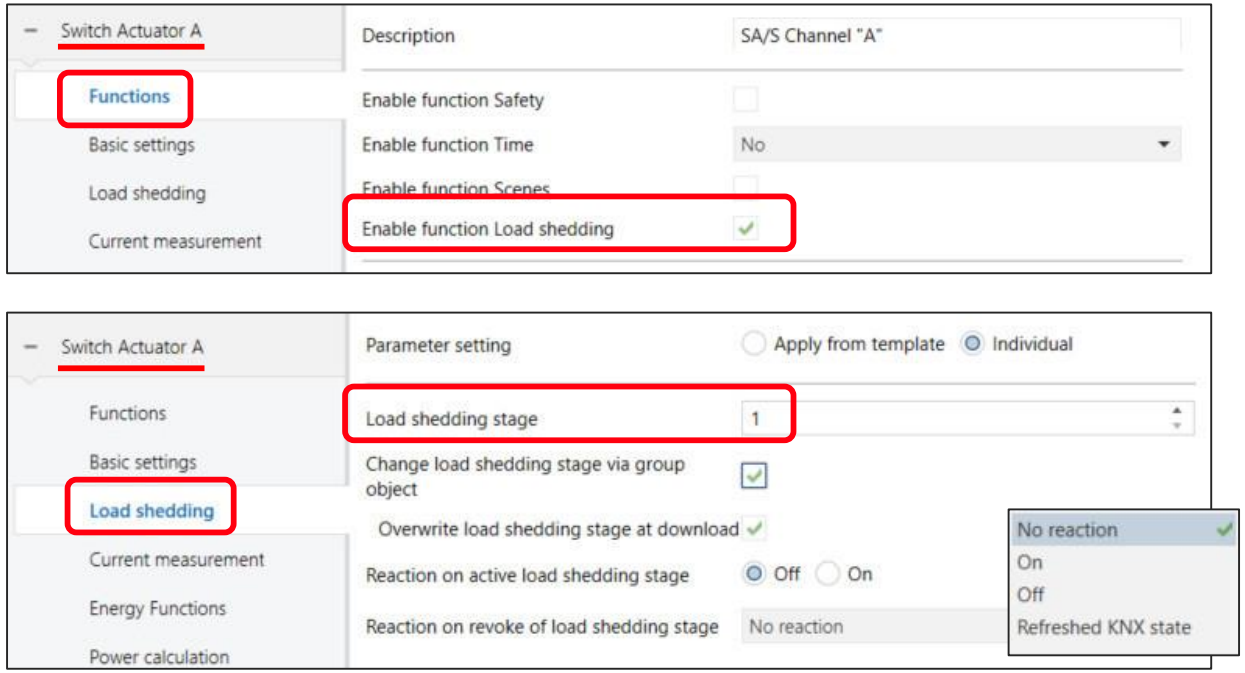
ETS parameter SA/S x.16.6.2: “Configuration”

ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

Energy Analyzer QA/S 1.16.1 KNX and KNX Meters

Energy Analyzer QA/S 1.16.1 KNX and Switch Actuator SA/S x.16.6.2 with Energy Functions – “Channel A…X” – Load Cont.



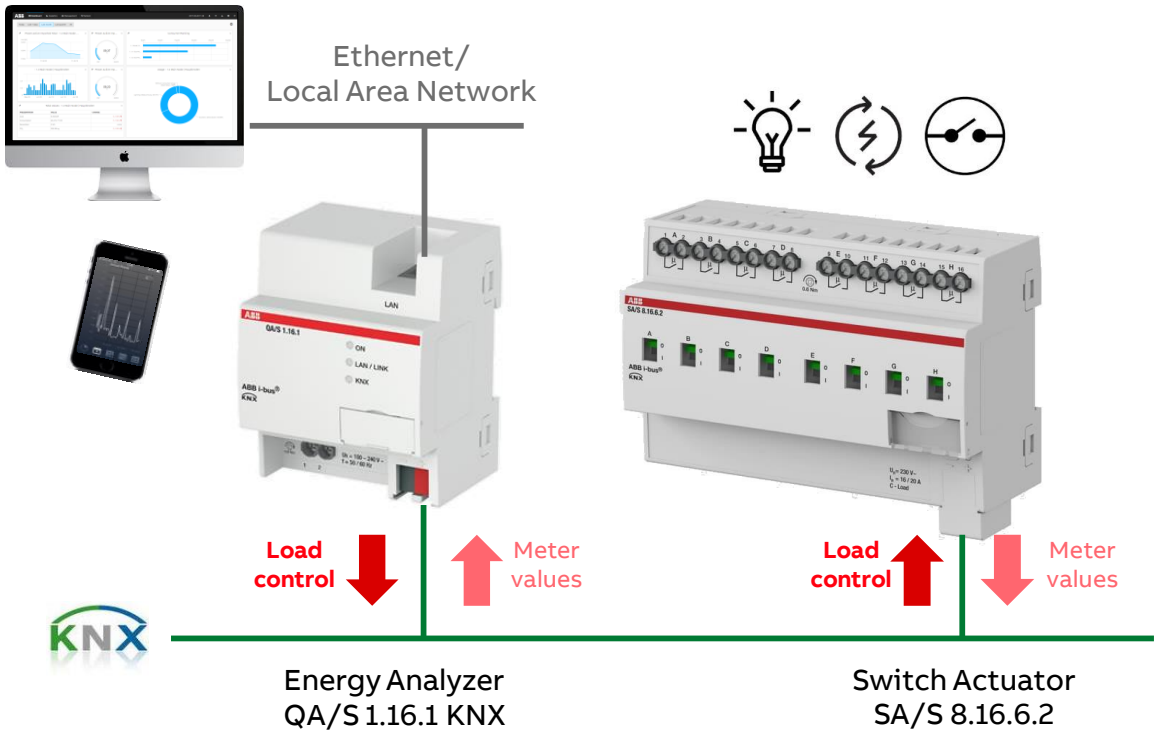


ETS parameter SA/S x.16.6.2: “Load shedding”

ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

Energy Analyzer QA/S 1.16.1 KNX and KNX Meters

Energy Analyzer QA/S 1.16.1 KNX and Switch Actuator SA/S x.16.6.2 with Energy Functions – “Channel A…X” – Load Cont.



Num	Name	Object Function	Length	Data Type
6	Central: Date/Time	Set time	3 bytes	time of day
7	Central: Date/Time	Set date	3 bytes	date
1	Central: General	In operation	1 bit	boolean
2	Central: General	Request status values	1 bit	trigger
4	Central: Load shedding	Receive load shedding stage	1 byte	priority control
212	Channel A: Current measurement	Status current	4 bytes	electric current (A)
216	Channel A: Energy consumption	Status total meter energy consum...	4 bytes	active energy (kWh)
200	Channel A: Load shedding	Set load shedding stage	1 byte	priority control
215	Channel A: Power calculation	Status power	4 bytes	power (W)
196	Channel A: Switch	Switch	1 bit	switch
197	Channel A: Switch	Status switch	1 bit	state

Group objects SA/S x.16.6.2: “Load shedding”

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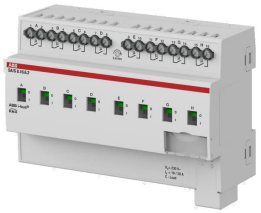
ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

Energy Analyzer QA/S 1.16.1 KNX and KNX Meters

Example: QA/S and Switch Actuator SA/S with Energy Func. x.16.6.2 – Assignment of Group Addresses “Load Control”

Energy Analyzer QA/S 1.16.1 KNX	Load control	Device clock request
		Device clock date
		Device clock time
		Device clock date/time
		Deactivate load control
		Load limit exceeded
		Send sum power values
		Send/receive load limit
		Send load shedding stage
		Send load shedding stage 1
		Send load shedding stage …
		Send load shedding stage 8

Central: Receive load shedding stage	SA/S x.16.6.2
…	
Channel X: Switch	
Channel X: Status switch	
Channel X: Set load shedding stage	



Receive load shedding stage	SE/S 3.16.1
…	
Channel X: Switch	
Channel X: Status switch	
X: Load control – deactivate	
X: Load control – shedding stage	

ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

Energy Analyzer QA/S 1.16.1 KNX and KNX Meters

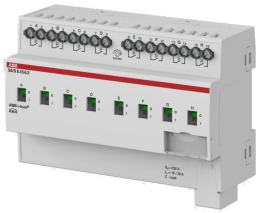
Example: QA/S and Switch Actuator SA/S with Energy Func. x.16.6.2 – Assignment of Group Addresses “Load Control”

Energy Analyzer QA/S 1.16.1 KNX – **Load control**

Device clock request	→
Device clock date	←
Device clock time	←
Device clock date/time	←
Deactivate load control	
Load limit exceeded	
Send sum power values	
Send/receive load limit	
Send load shedding stage	
Send load shedding stage 1	
Send load shedding stage …	
Send load shedding stage 8	

SA/S x.16.6.2

→	Central: Receive load shedding stage
	…
→	Channel X: Switch
←	Channel X: Status switch
→	Channel X: Set load shedding stage



SE/S 3.16.1

	Receive load shedding stage
	…
→	Channel X: Switch
←	Channel X: Status switch
→	X: Load control – deactivate
→	X: Load control – shedding stage

ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

Energy Analyzer QA/S 1.16.1 KNX and KNX Meters

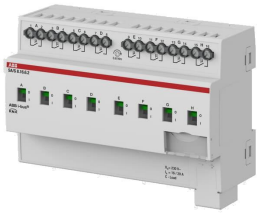
Example: QA/S and Switch Actuator SA/S with Energy Func. x.16.6.2 – Assignment of Group Addresses “Load Control”

Energy Analyzer QA/S 1.16.1 KNX – **Load control**

- Device clock request →
- Device clock date ←
- Device clock time ←
- Device clock date/time ←
- Deactivate load control ↔
- Load limit exceeded →
- Send sum power values →
- Send/receive load limit ↔
- Send load shedding stage →
- Send load shedding stage 1 →
- Send load shedding stage … →
- Send load shedding stage 8 →

SA/S x.16.6.2

- Central: Receive load shedding stage
- …
- → Channel X: Switch
- ← Channel X: Status switch
- → Channel X: Set load shedding stage



SE/S 3.16.1

- Receive load shedding stage
- …
- → Channel X: Switch
- ← Channel X: Status switch
- → X: Load control – deactivate
- → X: Load control – shedding stage

ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

Energy Analyzer QA/S 1.16.1 KNX and KNX Meters

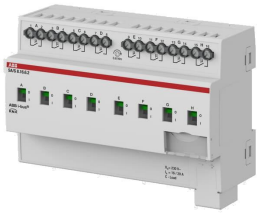
Example: QA/S and Switch Actuator SA/S with Energy Func. x.16.6.2 – Assignment of Group Addresses “Load Control”

Energy Analyzer QA/S 1.16.1 KNX – **Load control**

- Device clock request →
- Device clock date ←
- Device clock time ←
- Device clock date/time ←
- Deactivate load control ↔
- Load limit exceeded →
- Send sum power values →
- Send/receive load limit ↔
- Send load shedding stage →
- Send load shedding stage 1 →
- Send load shedding stage … →
- Send load shedding stage 8 →

SA/S x.16.6.2

- Central: Receive load shedding stage
- …
- Channel X: Switch →
- Channel X: Status switch ←
- Channel X: Set load shedding stage →



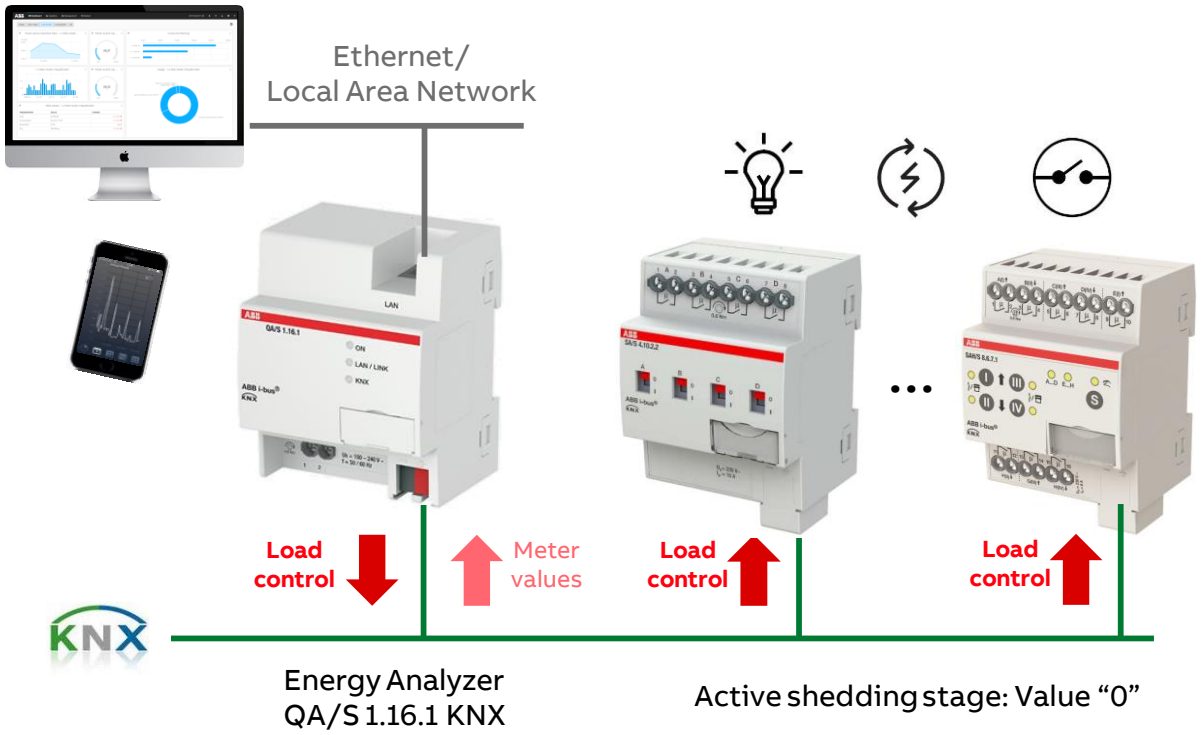
SE/S 3.16.1

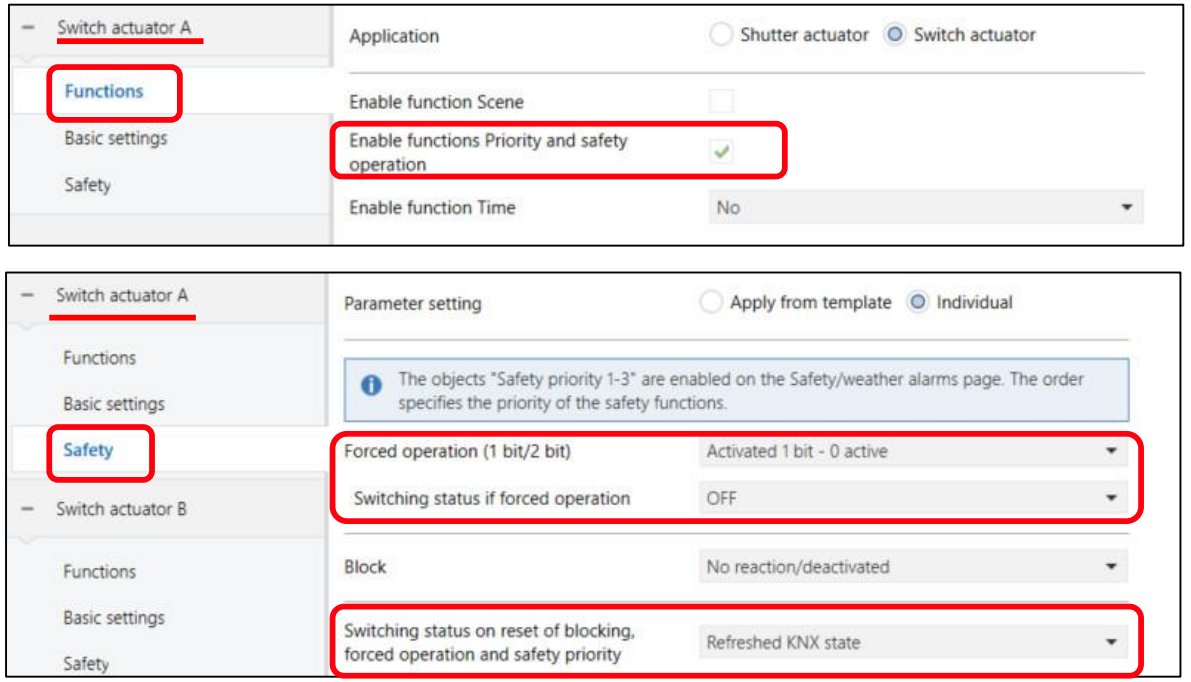
- Receive load shedding stage
- …
- Channel X: Switch →
- Channel X: Status switch ←
- X: Load control – deactivate →
- X: Load control – shedding stage →

ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

Energy Analyzer QA/S 1.16.1 KNX and KNX Meters

Energy Analyzer QA/S 1.16.1 KNX and Switch Actuator SA/S without Energy Functions (Combi, Standard, …) – Load Cont.



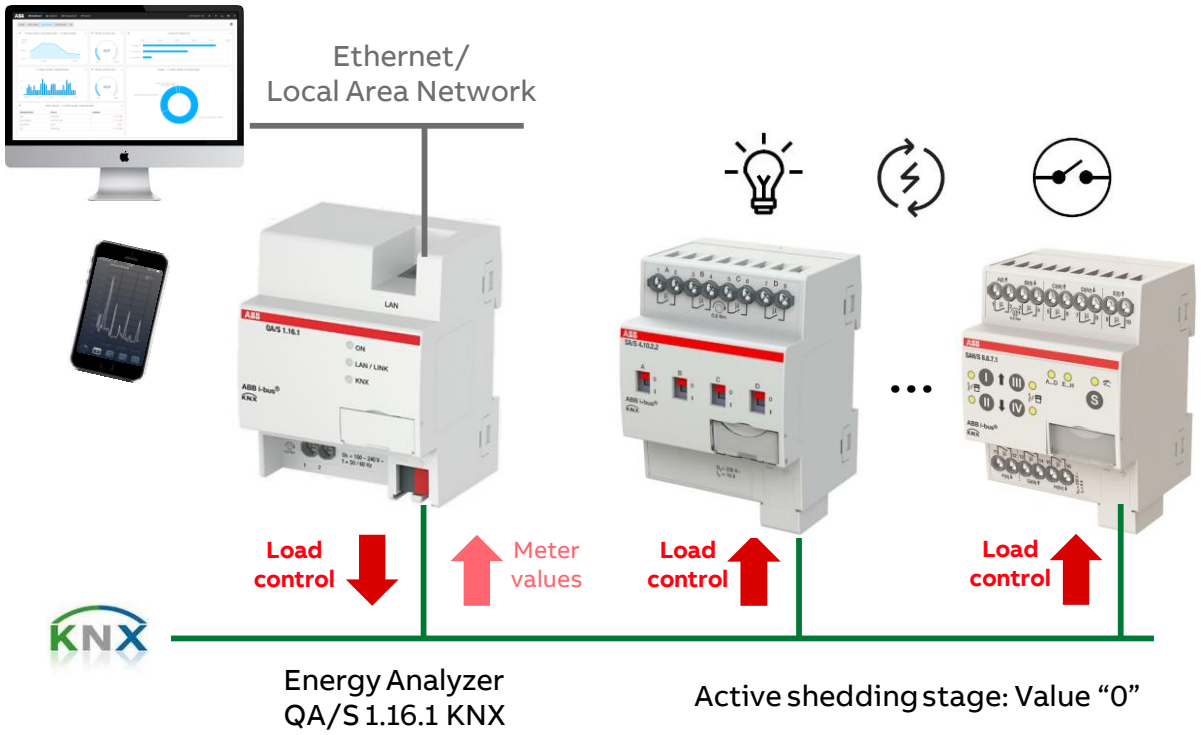


ETS parameter SA/S… : "Forced operation"
→ "0" - active

ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

Energy Analyzer QA/S 1.16.1 KNX and KNX Meters

Energy Analyzer QA/S 1.16.1 KNX and Switch Actuator SA/S without Energy Functions (Combi, Standard, …) – Load Cont.



	Num	Name	Object Function
	119	Channel A: Switch	Switch
	120	Channel A: Switch	Status Switch
	122	Channel A: Switch	Forced operation, 1 bit
	145	Channel B: Switch	Switch
	146	Channel B: Switch	Status Switch
	148	Channel B: Switch	Forced operation, 1 bit
	160	Channel C: Switch	Switch
	161	Channel C: Switch	Status Switch

Group objects SA/S … : “Forced operation”

ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

Energy Analyzer QA/S 1.16.1 KNX and KNX Meters

Example: QA/S and Switch Actuator SA/S without Energy Functions – Assignment of Group Addresses “Load Control”

Energy Analyzer QA/S 1.16.1 KNX

Load control
Device clock request
Device clock date
Device clock time
Device clock date/time
Deactivate load control
Load limit exceeded
Send sum power values
Send/receive load limit
Send load shedding stage
Send load shedding stage 1
Send load shedding stage 2
Send load shedding stage …

Active shedding stage: Group objects sends value “0”

SAH/S Combi
SA/S Standard/Professional/…

Channel A: Switch
Channel A: Status switch
Channel A: Forced operation, 1-bit
…
Channel B: Switch
Channel B: Status switch
Channel B: Forced operation, 1-bit
…
Channel X: Switch
Channel X: Status switch
Channel X: Forced operation, 1-bit
…

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ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

Energy Analyzer QA/S 1.16.1 KNX and KNX Meters

Example: QA/S and Switch Actuator SA/S without Energy Functions – Assignment of Group Addresses “Load Control”

Energy Analyzer QA/S 1.16.1 KNX

Load control

Device clock request	→
Device clock date	←
Device clock time	←
Device clock date/time	←
Deactivate load control	
Load limit exceeded	
Send sum power values	
Send/receive load limit	
Send load shedding stage	
Send load shedding stage 1	
Send load shedding stage 2	
Send load shedding stage …	

Active shedding stage: Group objects sends value “0”

SAH/S Combi
SA/S Standard/Professional/…

→	Channel A: Switch
←	Channel A: Status switch
	Channel A: Forced operation, 1-bit
	…
→	Channel B: Switch
←	Channel B: Status switch
	Channel B: Forced operation, 1-bit
	…
→	Channel X: Switch
←	Channel X: Status switch
	Channel X: Forced operation, 1-bit
	…

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ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

Energy Analyzer QA/S 1.16.1 KNX and KNX Meters

Example: QA/S and Switch Actuator SA/S without Energy Functions – Assignment of Group Addresses “Load Control”

Energy Analyzer QA/S 1.16.1 KNX

Load control

- Device clock request
- Device clock date
- Device clock time
- Device clock date/time
- Deactivate load control
- Load limit exceeded
- Send sum power values
- Send/receive load limit
- Send load shedding stage
- Send load shedding stage 1
- Send load shedding stage 2
- Send load shedding stage …

SAH/S Combi
SA/S Standard/Professional/…

- Channel A: Switch
- Channel A: Status switch
- Channel A: Forced operation, 1-bit
- …
- Channel B: Switch
- Channel B: Status switch
- Channel B: Forced operation, 1-bit
- …
- Channel X: Switch
- Channel X: Status switch
- Channel X: Forced operation, 1-bit
- …

Active shedding stage: Group objects sends value “0”

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ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

Energy Analyzer QA/S 1.16.1 KNX and KNX Meters

Example: QA/S and Switch Actuator SA/S without Energy Functions – Assignment of Group Addresses “Load Control”

Energy Analyzer QA/S 1.16.1 KNX

Load control

- Device clock request
- Device clock date
- Device clock time
- Device clock date/time
- Deactivate load control
- Load limit exceeded
- Send sum power values
- Send/receive load limit
- Send load shedding stage
- Send load shedding stage 1
- Send load shedding stage 2
- Send load shedding stage …

SAH/S Combi
SA/S Standard/Professional/…

- Channel A: Switch
- Channel A: Status switch
- Channel A: Forced operation, 1-bit
- …
- Channel B: Switch
- Channel B: Status switch
- Channel B: Forced operation, 1-bit
- …
- Channel X: Switch
- Channel X: Status switch
- Channel X: Forced operation, 1-bit
- …

Active shedding stage: Group objects sends value “0”

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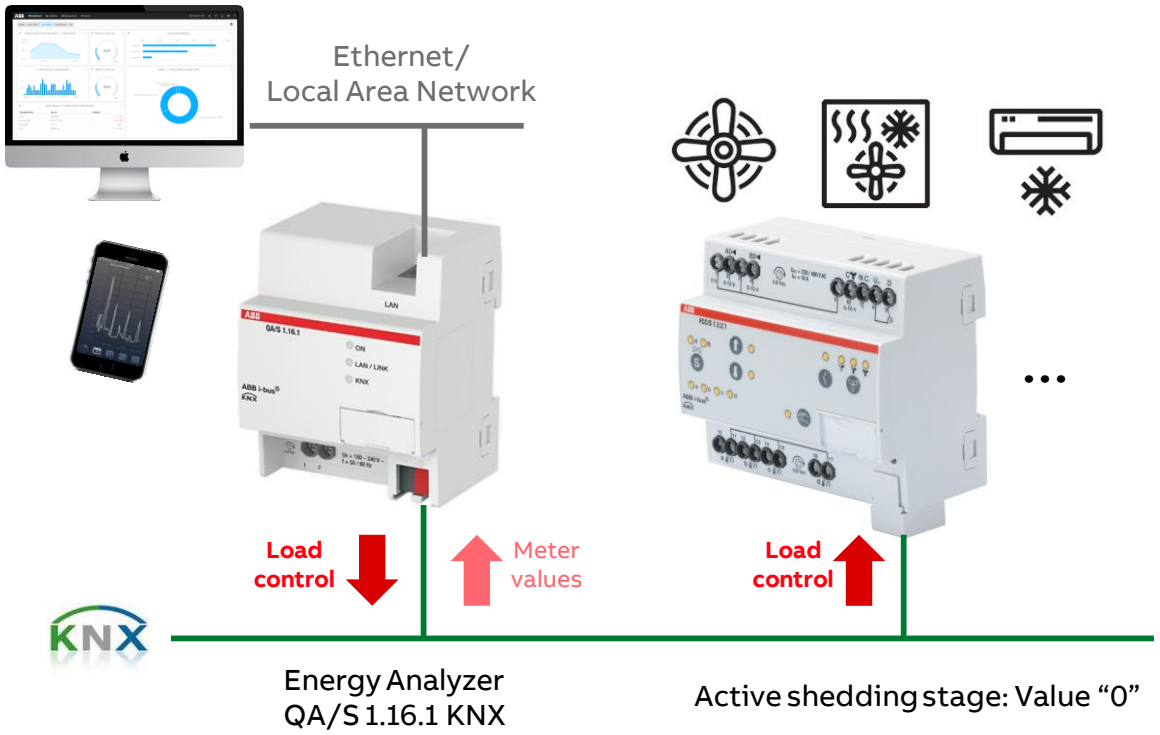
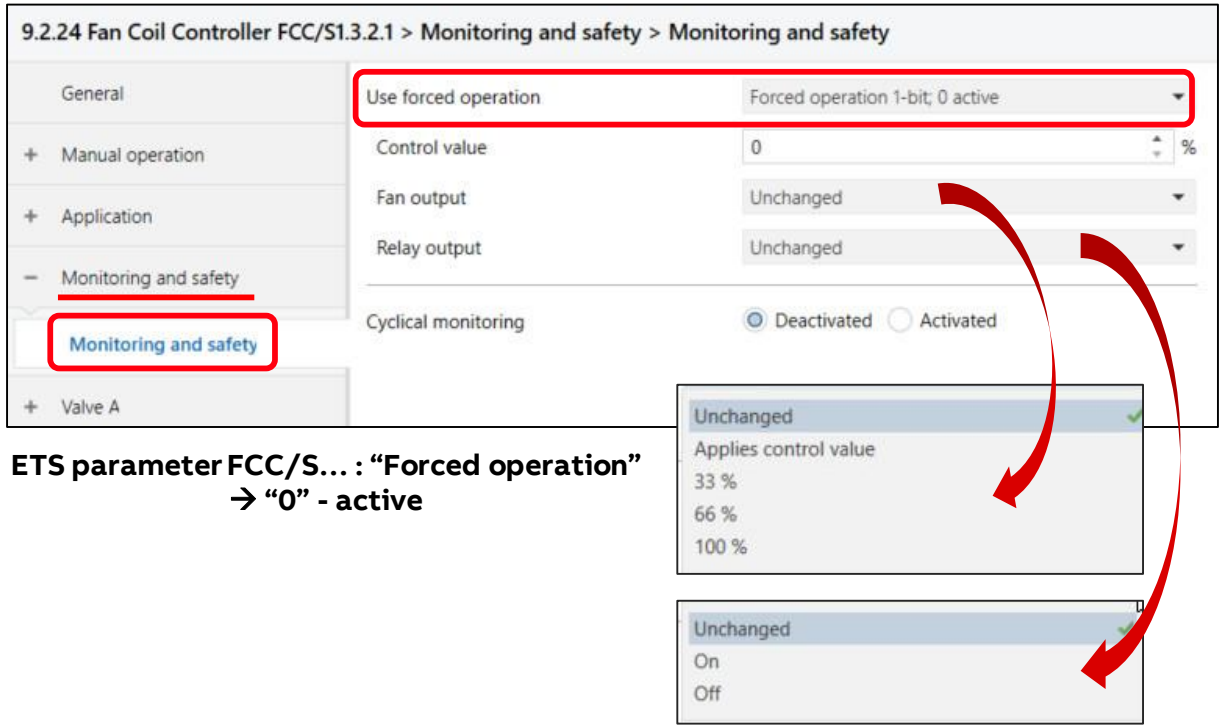
ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

Energy Analyzer QA/S 1.16.1 KNX and KNX Meters

Energy Analyzer QA/S 1.16.1 KNX and Fan Coil Controller FCC/S – Load Control



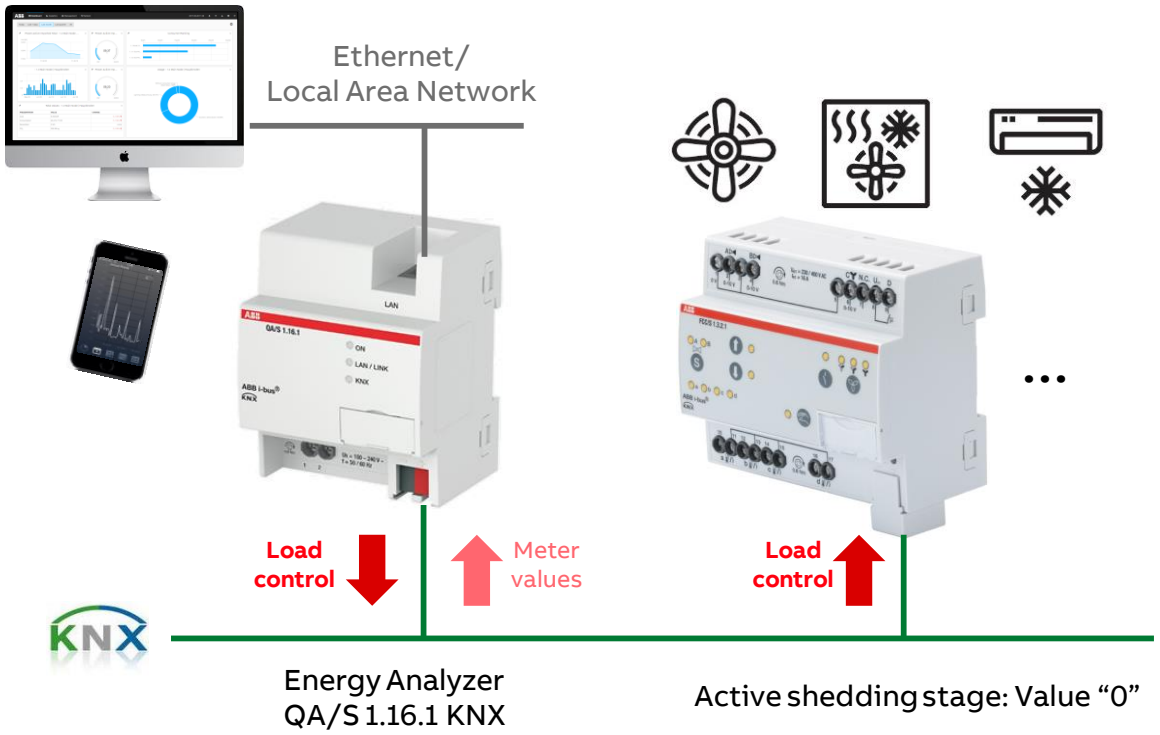


ETS parameter FCC/S… : “Forced operation”
→ “0” - active

ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

Energy Analyzer QA/S 1.16.1 KNX and KNX Meters

Energy Analyzer QA/S 1.16.1 KNX and Fan Coil Controller FCC/S – Load Control



Num	Name	Object Function	Length	Data Type
21	Channel - Fan	Switch fan speed	1 byte	percentage (0..100%)
22	Channel - Fan	Increase/decrease fan speed	1 bit	step
44	Channel - Relay	Status Relay	1 bit	open/close
45	Channel - Relay	Switch relay	1 bit	switch
47	Channel - General	Forced operation 1-bit	1 bit	boolean
69	Channel - Controller	Status Heating/Cooling	1 bit	cooling/heating
70	Channel - Controller	Status Control Value Basic-stage...	1 byte	percentage (0..100%)

Group object FCC/S... : “Forced operation”

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ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

Energy Analyzer QA/S 1.16.1 KNX and KNX Meters

Example: QA/S and Fan Coil Controller FCC/S – Assignment of Group Addresses “Load Control”

Energy Analyzer QA/S 1.16.1 KNX – **Load control**

Device clock request
Device clock date
Device clock time
Device clock date/time
Deactivate load control
Load limit exceeded
Send sum power values
Send/receive load limit
Send load shedding stage 1
Send load shedding stage x
Send load shedding stage …

Fan Coil Controller FCC/S

…
Channel Fan
Channel Relais
…
Channel General - Forced operation
…
Channel Controller
…

Active shedding stage: Group objects sends value “0”

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ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

Energy Analyzer QA/S 1.16.1 KNX and KNX Meters

Example: QA/S and Fan Coil Controller FCC/S – Assignment of Group Addresses “Load Control”

Energy Analyzer QA/S 1.16.1 KNX – **Load control**

- Device clock request →
- Device clock date ←
- Device clock time ←
- Device clock date/time ←
- Deactivate load control
- Load limit exceeded
- Send sum power values
- Send/receive load limit
- Send load shedding stage 1
- Send load shedding stage x
- Send load shedding stage …

Fan Coil Controller FCC/S

- …
- → Channel Fan
- → Channel Relais
- …
- Channel General - Forced operation
- …
- → Channel Controller
- …

Active shedding stage: Group objects sends value “0”

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ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

Energy Analyzer QA/S 1.16.1 KNX and KNX Meters

Example: QA/S and Fan Coil Controller FCC/S – Assignment of Group Addresses “Load Control”

Energy Analyzer QA/S 1.16.1 KNX – **Load control**

- Device clock request
- Device clock date
- Device clock time
- Device clock date/time
- Deactivate load control
- Load limit exceeded
- Send sum power values
- Send/receive load limit
- Send load shedding stage 1
- Send load shedding stage x
- Send load shedding stage …

Fan Coil Controller FCC/S

- …
- Channel Fan
- Channel Relais
- …
- Channel General - Forced operation
- …
- Channel Controller
- …

Active shedding stage: Group objects sends value “0”

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ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

Energy Analyzer QA/S 1.16.1 KNX and KNX Meters

Example: QA/S and Fan Coil Controller FCC/S – Assignment of Group Addresses “Load Control”

Energy Analyzer QA/S 1.16.1 KNX – **Load control**

- Device clock request →
- Device clock date ←
- Device clock time ←
- Device clock date/time ←
- Deactivate load control ↔
- Load limit exceeded →
- Send sum power values →
- Send/receive load limit ↔
- Send load shedding stage 1 →
- Send load shedding stage x →
- Send load shedding stage …

Fan Coil Controller FCC/S

- …
- Channel Fan ←
- Channel Relais ←
- …
- Channel General - Forced operation ←
- …
- Channel Controller ←
- …

Active shedding stage: Group objects sends value “0”

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ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

Energy Analyzer QA/S 1.16.1 KNX and KNX Meters

Practical demonstration – Load Control

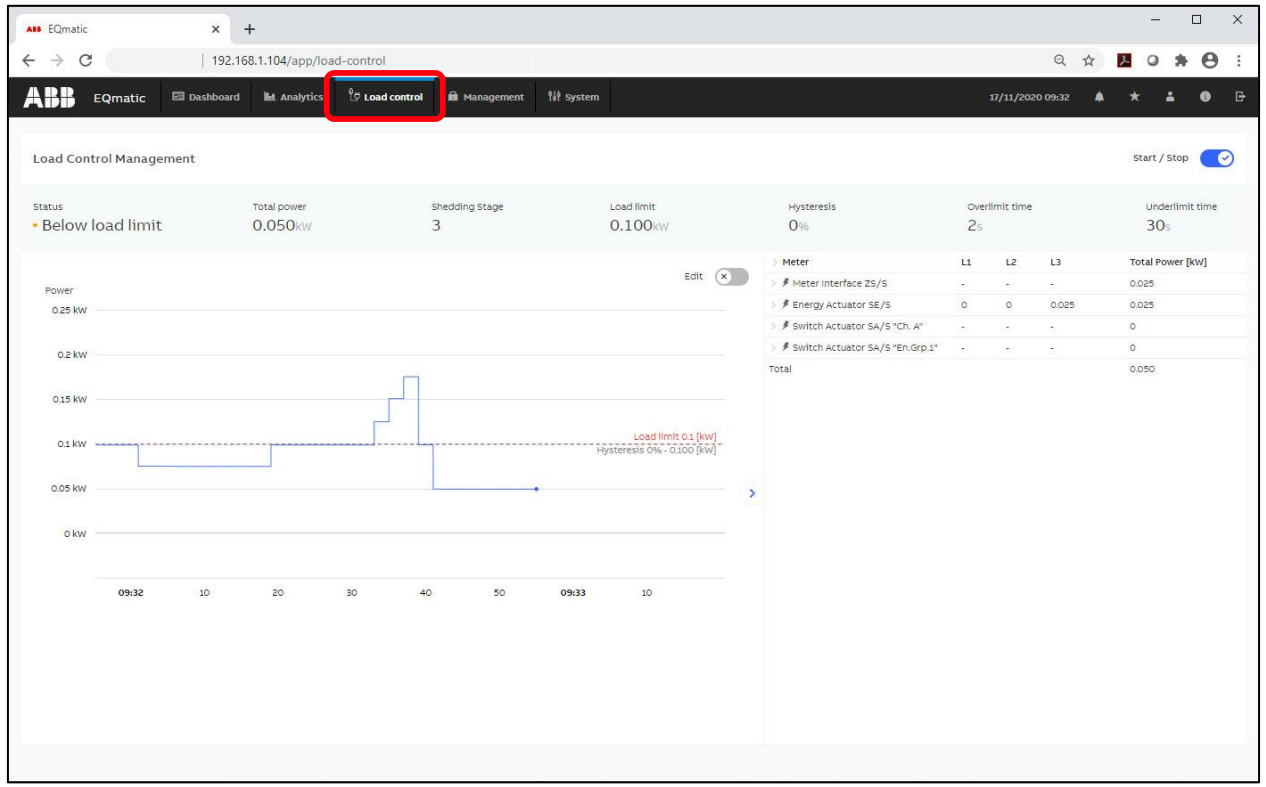


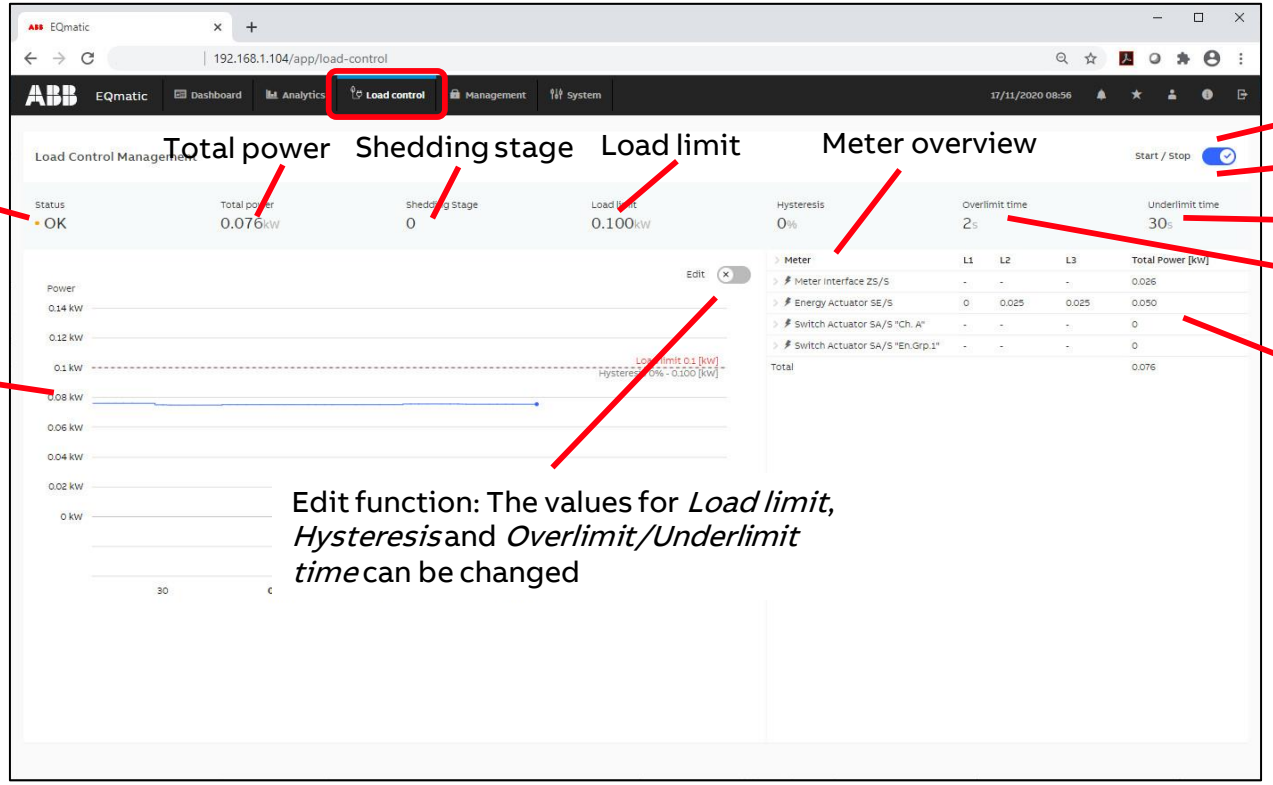
ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

Energy Analyzer QA/S 1.16.1 KNX and KNX Meters

Energy Analyzer QA/S 1.16.1 KNX: Load Control – Overview

Load control status:
Total power is within the load limit, stopped, over or under limit …

Chart of current power



Total power
Shedding stage
Load limit
Meter overview

Edit function: The values for *Load limit*, *Hysteresis* and *Overlimit/Underlimit time* can be changed

Load control is active

Slider for activating load control

Underlimit time

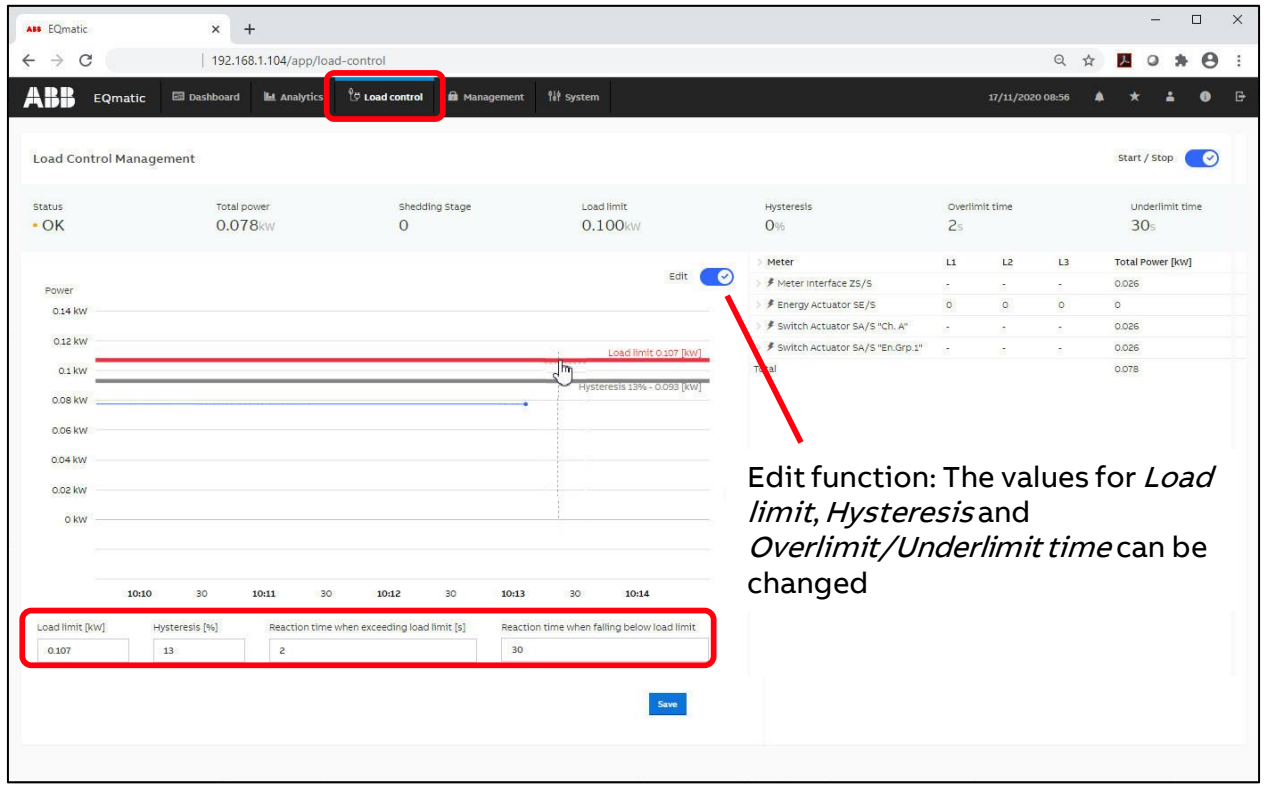
Overlimit time

Total power values

ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

Energy Analyzer QA/S 1.16.1 KNX and KNX Meters

Energy Analyzer QA/S 1.16.1 KNX: Load Control – Function “Edit”



Edit function: The values for *Load limit*, *Hysteresis* and *Overlimit/Underlimit time* can be changed

ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

Energy Analyzer QA/S 1.16.1 KNX and KNX Meters

Energy Analyzer QA/S 1.16.1 KNX: Load Control – Status “OK”

Load control status:
Total power (76W) is within the load limit (100) and no shedding stage (0) is active

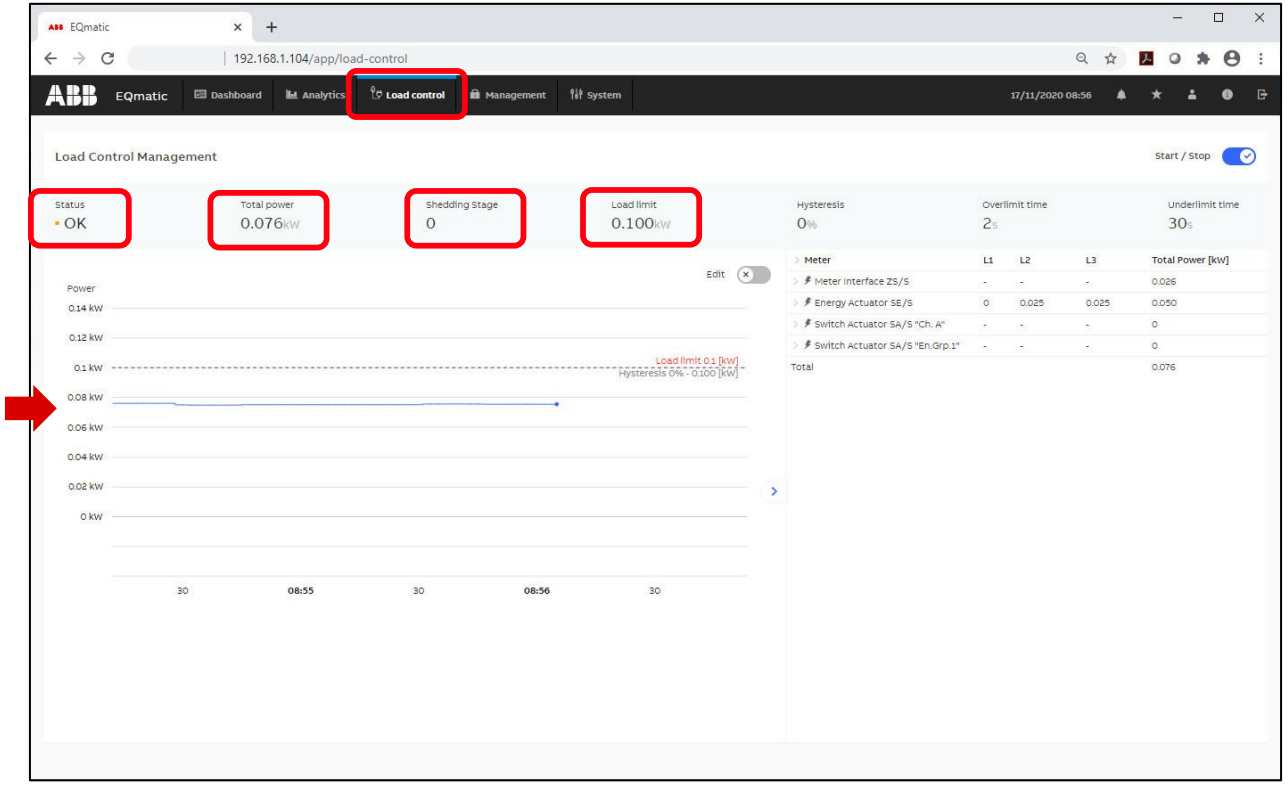


ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

Energy Analyzer QA/S 1.16.1 KNX and KNX Meters

Energy Analyzer QA/S 1.16.1 KNX: Load Control – Status “Above Load Limit”

Load control status:
Total power (126W) is above the load limit (100) and no shedding stage (0) is active

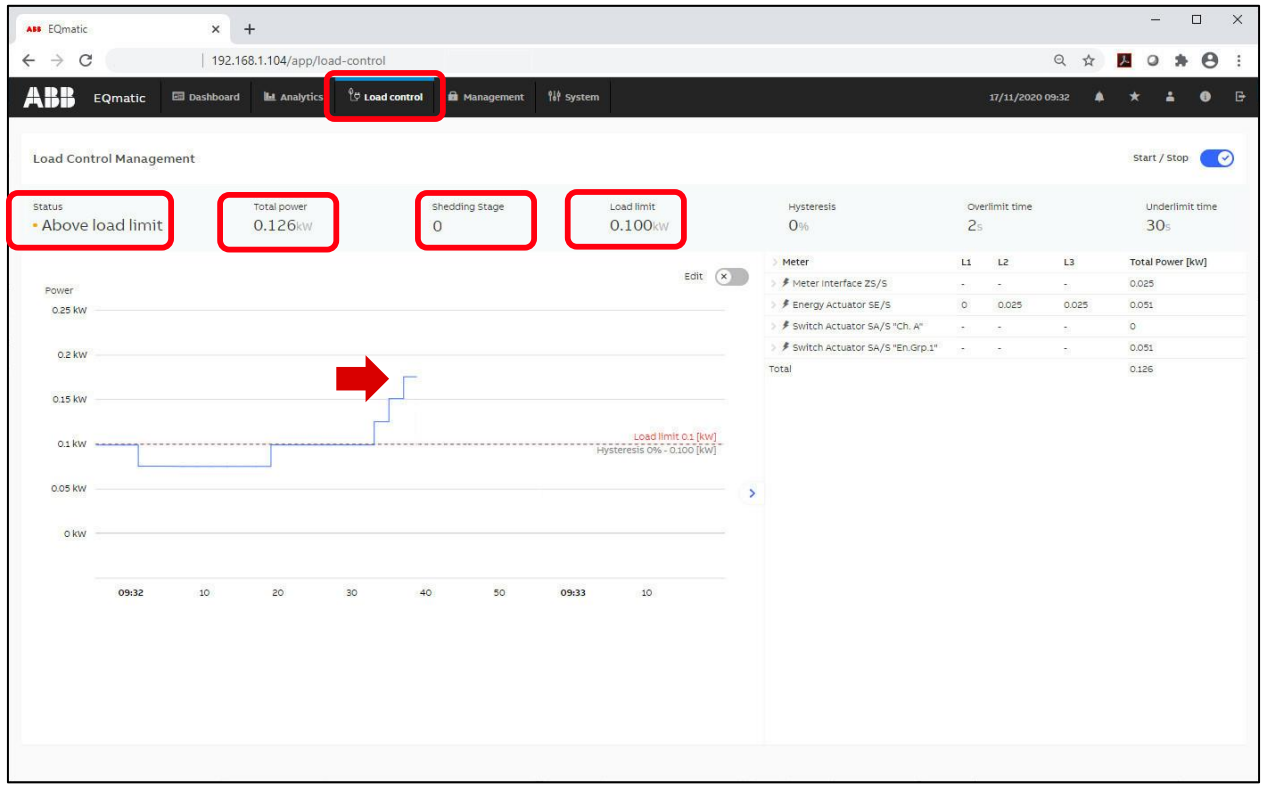
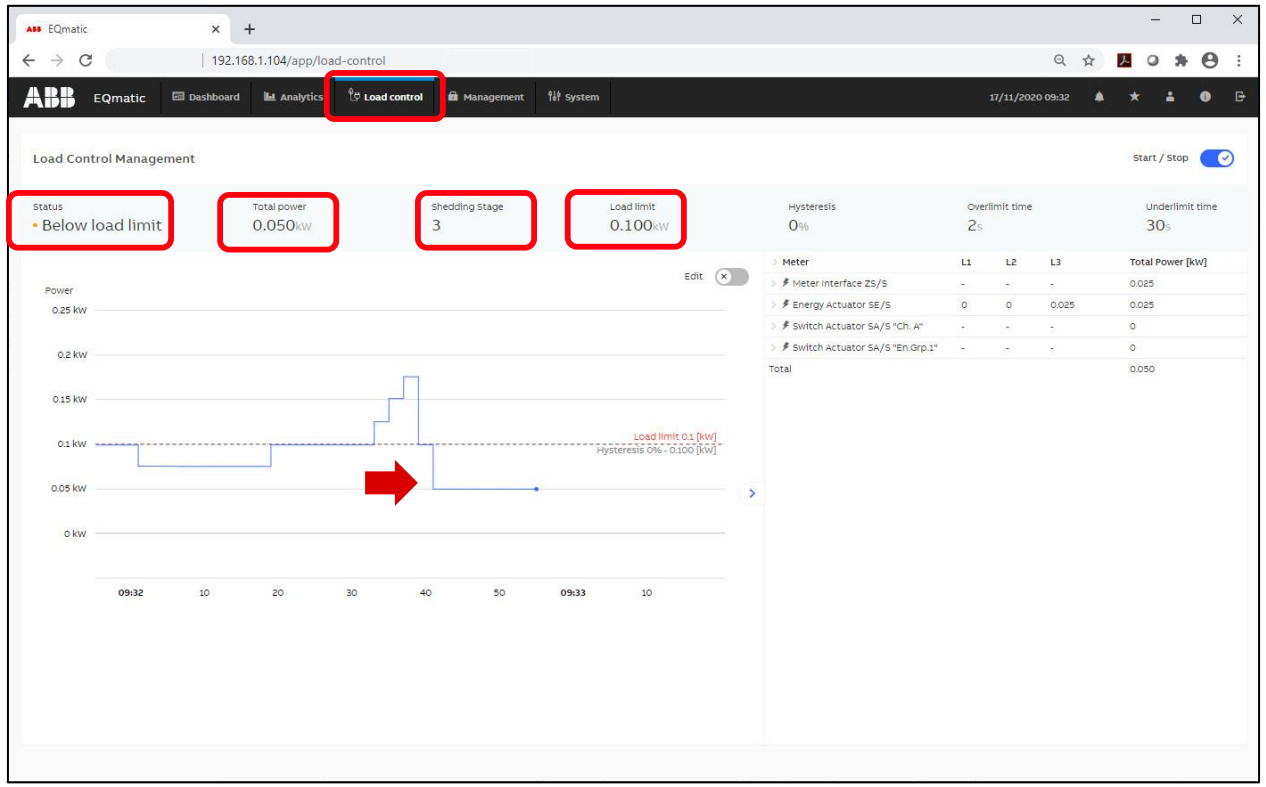


ABB i-bus® KNX Switch Actuators – Energy Functions in Detail

Energy Analyzer QA/S 1.16.1 KNX and KNX Meters

Energy Analyzer QA/S 1.16.1 KNX: Load Control – Status “Below Load Limit”

Load control status:
Total power (126W) is below the load limit (100) and a shedding stage (3) is active → reduced total power (50W)



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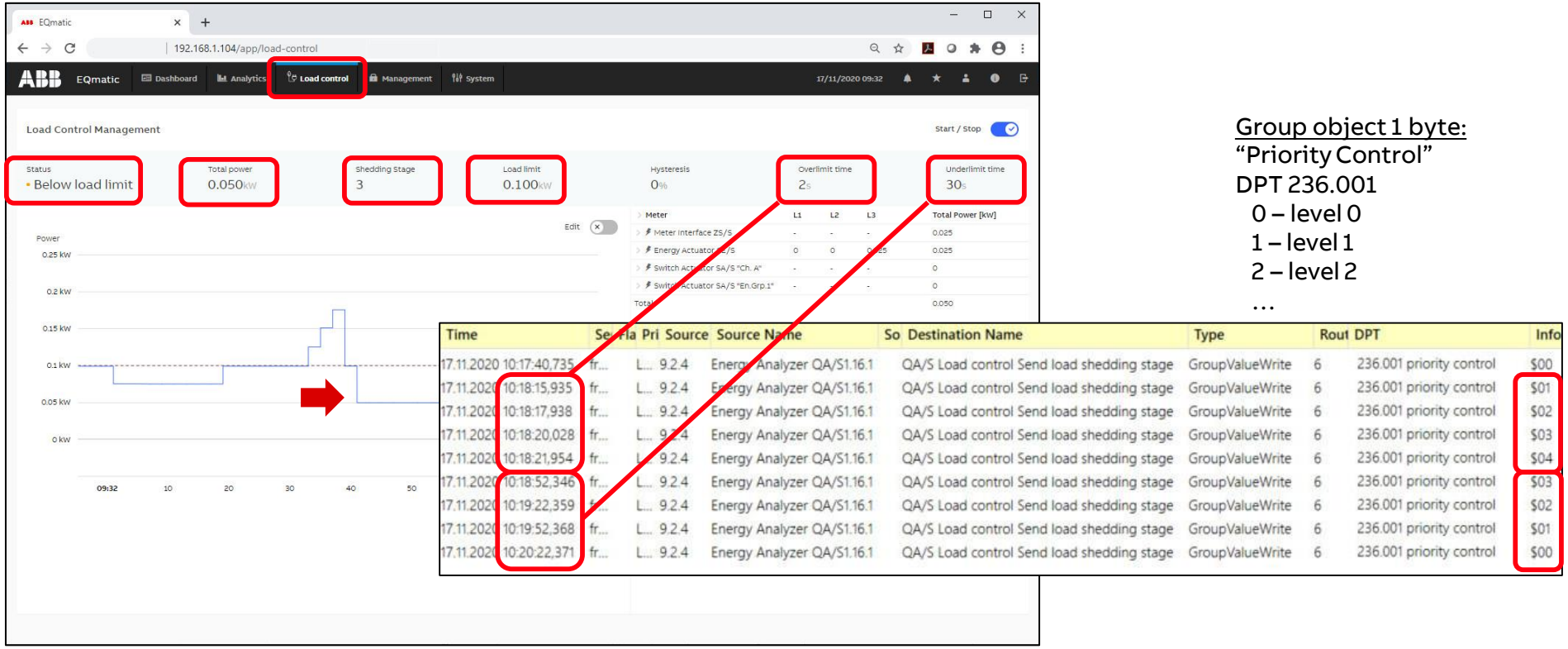
Energy Analyzer QA/S 1.16.1 KNX and KNX Meters

Energy Analyzer QA/S 1.16.1 KNX: Load Control – Status “Below Load Limit”

Load control status:
Total power (126W) is below the load limit (100) and a shedding stage (3) is active → reduced total power (50W)



Group object 1 byte:
“Priority Control”
DPT 236.001
0 – level 0
1 – level 1
2 – level 2
…

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Energy Analyzer QA/S 1.16.1 KNX and KNX Meters

Energy Analyzer QA/S 1.16.1 KNX: Load Control – Status “Below Load Limit”

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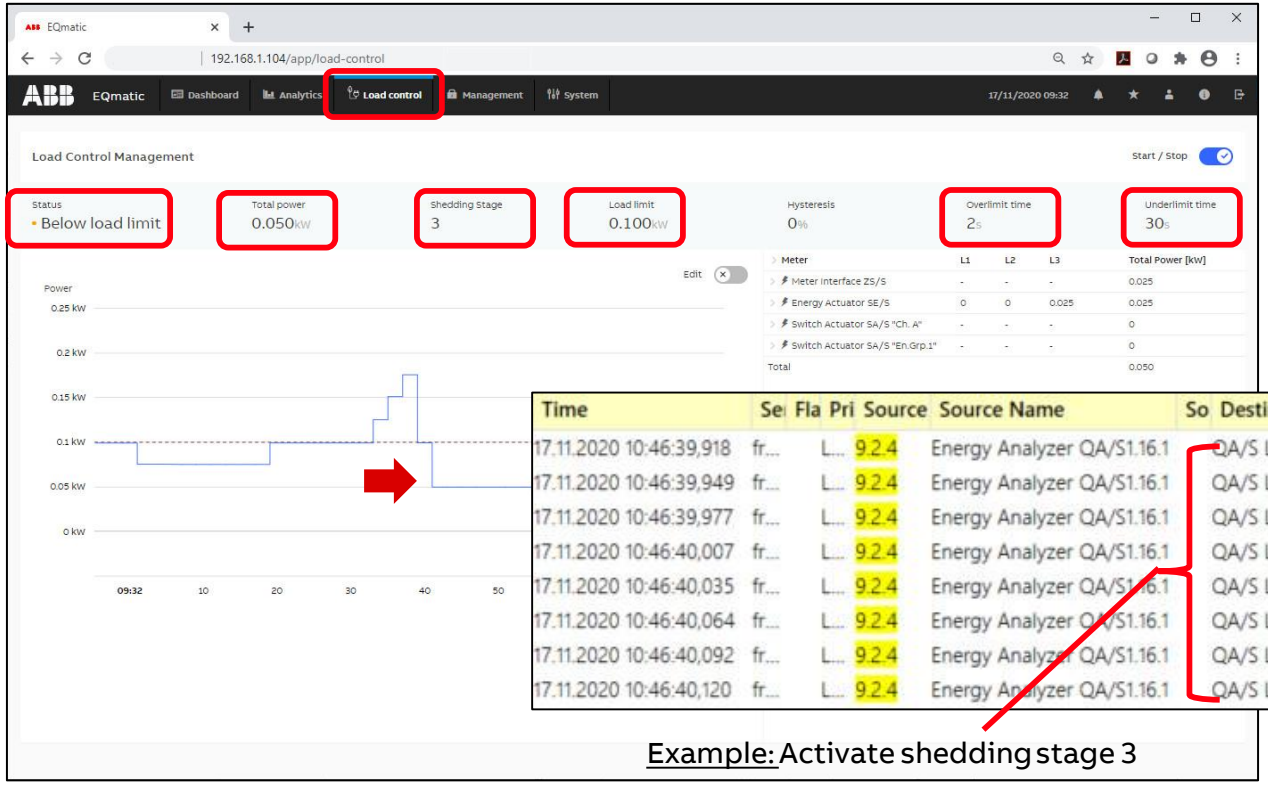

Time	Se	Fla	Pri	Source	Source Name	So	Destination Name	Type	Info
17.11.2020 10:46:39,918	fr...	L...	9.2.4		Energy Analyzer QA/S1.16.1		QA/S Load control Send load shedding stage 1	GroupValueWrite	$00 Off
17.11.2020 10:46:39,949	fr...	L...	9.2.4		Energy Analyzer QA/S1.16.1		QA/S Load control Send load shedding stage 2	GroupValueWrite	$00 Off
17.11.2020 10:46:39,977	fr...	L...	9.2.4		Energy Analyzer QA/S1.16.1		QA/S Load control Send load shedding stage 3	GroupValueWrite	$00 Off
17.11.2020 10:46:40,007	fr...	L...	9.2.4		Energy Analyzer QA/S1.16.1		QA/S Load control Send load shedding stage 4	GroupValueWrite	$01 On
17.11.2020 10:46:40,035	fr...	L...	9.2.4		Energy Analyzer QA/S1.16.1		QA/S Load control Send load shedding stage 5	GroupValueWrite	$01 On
17.11.2020 10:46:40,064	fr...	L...	9.2.4		Energy Analyzer QA/S1.16.1		QA/S Load control Send load shedding stage 6	GroupValueWrite	$01 On
17.11.2020 10:46:40,092	fr...	L...	9.2.4		Energy Analyzer QA/S1.16.1		QA/S Load control Send load shedding stage 7	GroupValueWrite	$01 On
17.11.2020 10:46:40,120	fr...	L...	9.2.4		Energy Analyzer QA/S1.16.1		QA/S Load control Send load shedding stage 8	GroupValueWrite	$01 On

Example: Activate shedding stage 3

8 Group objects 1 bit:
Shedding stage 1 on/off
Shedding stage 2 on/off
Shedding stage … on/off

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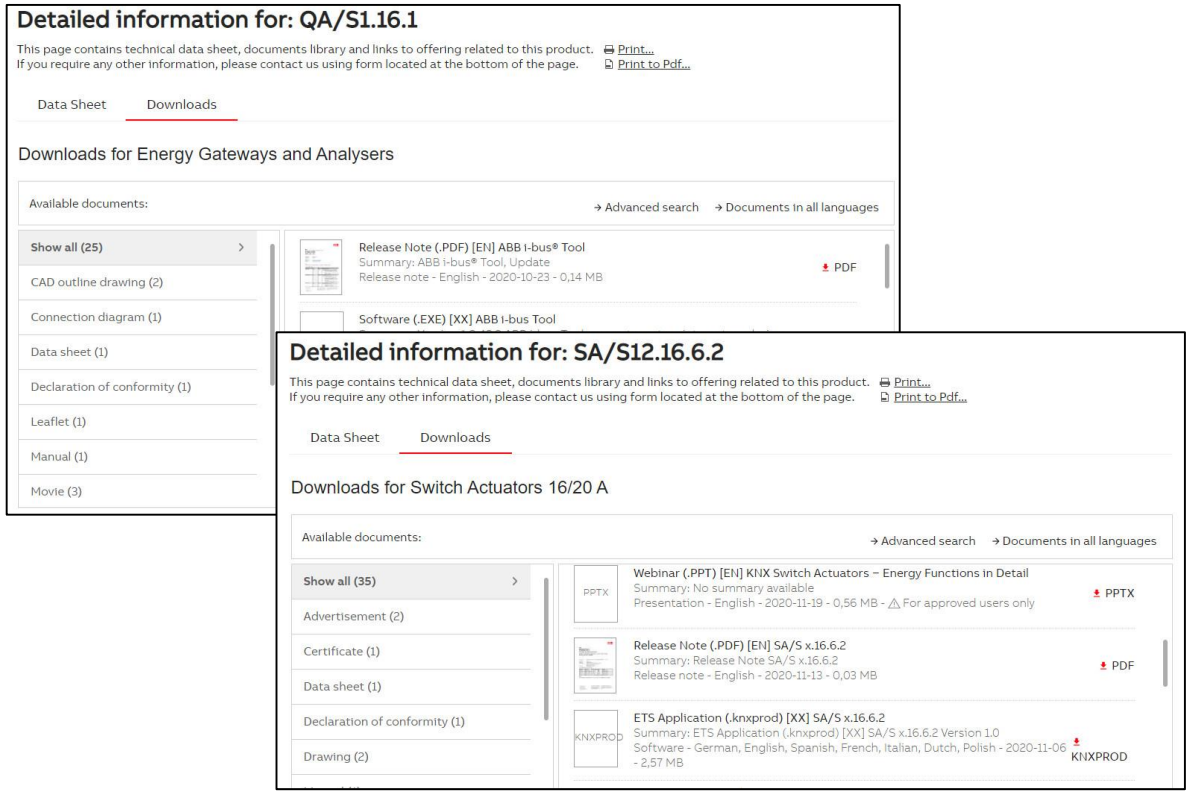
Homepage

www. www.abb.com/KNX

→ Products and Downloads
  → Outputs → Switch Actuator
  → Energy Management → Energy Gateways and Analysers

- Product Manual
- Installation and Operating Instructions
- ETS Application (*.knxprod)
- ETS App ABB Touch DCA (*.etsapp)
- Webinar recordings and presentations
- • • •



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Training Material

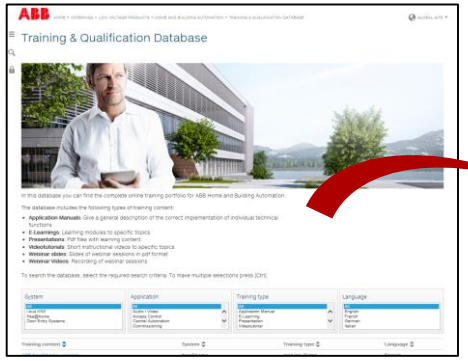
Training & Qualification Database

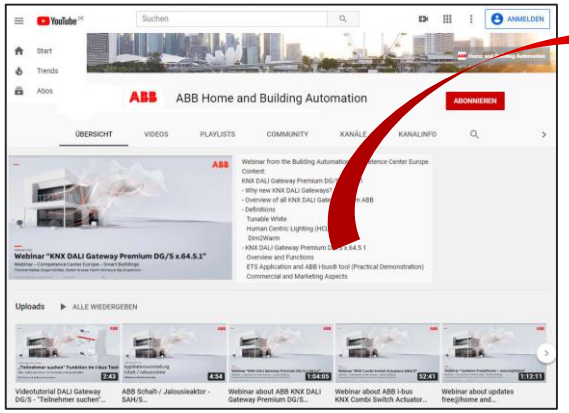
– The database contains extensive training content
  - Presentations
  - Video tutorials
  - Webinar slides and videos
  - and more …
  - https://go.abb/ba-training
  - ww.abb.com/knx (→ Services & Tools → Training and Qualification → Training Database)

Training and Qualification

YouTube

– Channel “ABB Home and Building Automation”
  - https://www.youtube.com/user/ABBibusKNX





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Training & Qualification Calendar

In addition to the online modules and the traditional training programs offered by your local ABB sales team, we offer a variety of on-site trainings conducted by our specialists at different ABB training facilities

In this Training & Qualification Calendar you can find the educational events that are taking place during 2020

If you are interested in a training please click the training und you will be forwarded to register in “ABB MyLearning”

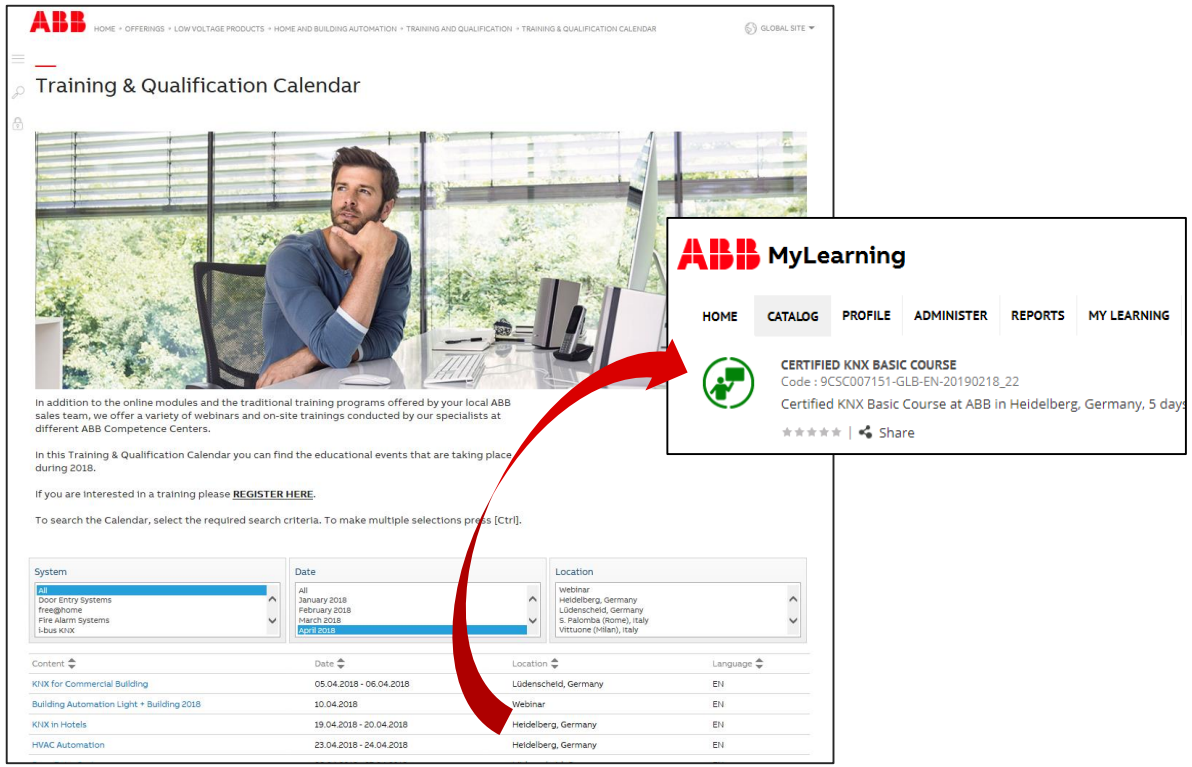
www.abb.com/knx or https://go.abb/ba-training

→ Services & Tools

→ Training and Qualification

→ Training Calendar

Training and Qualification



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KNX Certified Trainings 2020

Certified KNX Courses in Heidelberg

- Advanced Course: 13th to 17th Jul.
- Tutor Course: 19th to 23rd Oct.
- Basic Course : 16th to 20th Nov.
- Followed by two day application training

And many more training courses in the calendar "International Training Dates 2020"

www.abb.com/knx or https://go.abb/ba-training

has to be postponed …

Information will follow

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