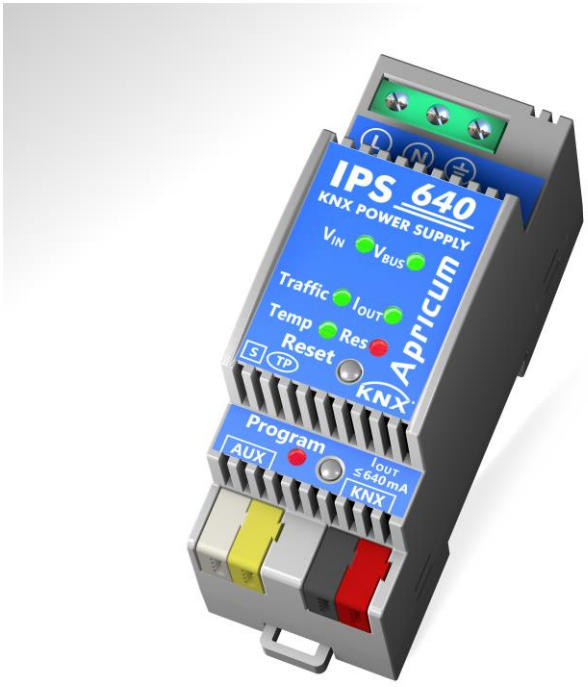
Apricum

DOCUMENTATION

IPS640



TECHNICAL AND APPLICATION DESCRIPTION

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2. **IPS*640*** PRODUCT DESCRIPTION

With a very small footprint of only 2 units (36mm) the Apricum **IPS*640*** KNX PSU with diagnostics is highly efficient and features an additional auxiliary power output (e.g. to support individual components). The device has one choked and one non-choked output. The outputs are overload and short circuit protected. The **IPS*640*** generates a stable KNX system voltage of 30 V DC and the integrated choke decouples the bus line from the 30 V DC output. Any desired load distribution on the outputs is possible. The LED display indicates the state of the power supply unit and the bus line. The device reset can be triggered over the bus by a communication object or directly at the device by a single button press. All internal parts are designed to work at high temperature and ensure an expected working life of at least 10 years.

All configurations can be done with the ETS software. For diagnostic purposes bus voltage, output current, device temperature and several times of operation are monitored. Additionally all details (number, duration) on events like short-circuit, overload, load disconnection, device startup and KNX bus restart are easily accessible. The info data can be read out via the KNX bus. It can be sent on demand, periodically and after a certain change in value. It can also be sent after a faulty behaviour event and on crossing a pre-set threshold value. Number and duration of these over threshold events are available information. When the device returns to normal working condition (after KNX bus restart, device startup, short circuit) info readouts are sent automatically. Extensive alarm and maximum tracking functionalities are available.

2.1. DIAGNOSTIC FEATURES

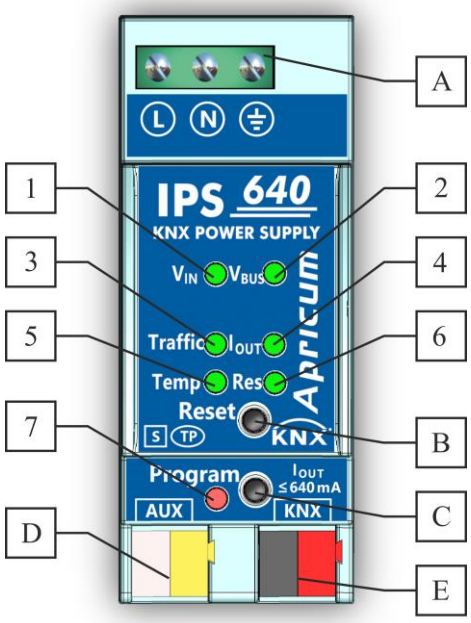
The above mentioned features can be activated and deactivated by the user. When activated the device monitors the values of all important parameters.

The bus voltage, bus current and internal device temperature are measured constantly. The extent of the bus traffic load is determined additionally. For each of these measurement sources a threshold value can be set. After setting this threshold value the threshold type can be selected (limit undercut/limit exceeded) and the behavior on alarm activation/deactivation can be configured. A maximum value tracking feature with configurable tracking period is also available.

Faulty behavior diagnostics provides number and durations of overloads. When there is a short circuit on the bus the load is disconnected from the output internally. The number of short circuits and the duration of a load detachment are available details. The same applies for the number of KNX bus restarts, device startups and operating times. The additional alarms provide the total number of a value being over threshold and also the duration of such event.

	Overload	Short Circuit	Load Detached	Bus Restart	Threshold Range	Operating Time (total/startup)	Device Startup
Number counter	X	X		X	X		X
Duration counter	X		X		X	X	

2.2. FRONT PANEL AND CONNECTIONS



Picture 1: Front panel

A	Supply voltage terminals
B	Reset button
C	Program button
D	Auxiliary output connector
E	KNX TP connector
1	LED: Input voltage V_{IN}
2	LED: Bus voltage V_{BUS}
3	LED: Telegram traffic
4	LED: Output current I_{OUT}
5	LED: Internal temperature
6	LED: KNX reset
7	LED: Programming

2.3. EXPLANATION OF LED STATUS

Number	LED	Color	Explanation / Range
1	**Input voltage V_{IN}**	<off>	Input voltage is 195…265 V AC
		red	Input voltage is out of this range
2	**Bus voltage V_{BUS}**	green	KNX bus voltage is 28…31 V DC
		red	KNX bus voltage is out of this range
3	**Telegram traffic***	green	Telegram traffic < 80 %, indicated by blinking
		red	Telegram traffic > 80 %
4	**Output current I_{OUT}**	green	Output current < 640 mA
		orange	Output current is 640…900 mA
		red	Output current > 900 mA (Overload)
5	**Internal Temperature**	green	Temperature is 0…75 °C
		red	Temperature is out of this range
6	**KNX reset**	red	Device induces a KNX bus restart
7	**Programming**	red	Device in Program mode

* The telegram traffic LED (3) is valid provided that the bus voltage LED (2) lights green

3. COMMISSIONING

3.1. IMPORTANT NOTES BEFORE STARTING

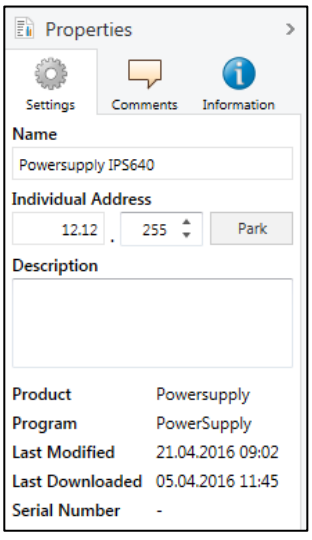
The device working temperature can be higher than usually expected. All internal parts are designed and declared to work reliably at high temperature.The application program and the communication objects are pre-installed. Only the group addresses and the ETS parameters must be set during commissioning. The device needs no maintenance. Please note:

- The **IPS*640*** PSU must be mounted and commissioned only by an authorized person
- The appropriate norms, specifications, guidelines and regulations in force of the respective country have to be complied
- The mains power supply must be fused with a 16A fuse
- The device is suitable for 35mm mounting rails (TH35)
- Connect the KNX TP bus line, screwless as for common KNX TP connections, with single core cables (2x2x0.6…0.8mm) stripped and plugged into a KNX connector
- Take care of the electric insulations when connecting
- The device is designed for use in distribution boards and enclosed housings
- Install the device only in dry locations
- Protect the device from moisture, dirt and damage
- The accessibility of the device for operation and visual inspection must be provided
- All terminals and connections under current must be completely covered against touching
- For commissioning the Engineering Tool Software (ETS) should be used
- Only operate the device within the specified technical data

3.2. PHYSICAL ADDRESS ASSIGNMENT

To commission the device a PC with ETS, an interface connection to the KNX bus and a mains voltage of 230 V AC at the input connector is required. The device is supplied with the physical address 15.15.255. The ETS product database (available for ETS4 and higher) can be downloaded from our website or obtained by the ETS App “Online KNX Product Catalog”.

To assign the physical address of the device set the desired address in the properties window of the ETS, download it to the device and press the programming button.



Picture 2: Properties window

4. OPERATIONAL DESCRIPTION

4.1. BASICS INFORMATION

Communication objects are used to request device status and measurement values. The measured values can be sent after request, after a certain change (measured value, device status) and periodically. Here a certain change of the measured value means the difference between actual value and last sent value. Number and duration of overloads are stored. The same applies for the number of short circuits, device startups, bus resets and for the duration of load detachments. The total working time of the device and its operating time since last startup are stored, too. Threshold values can be set for the bus voltage (only in the additional alarms), total current, bus load traffic and internal device temperature. Concerning the maximum current and the maximum device temperature a tracking period can be set. At the end of every tracking period the maximum measured value can be sent on the bus or just be set as value of the appropriate object. Four different Alarm tabs (see section 5.7) can be used to send an info telegram about over/under threshold events and to switch other devices. After assignment of the measurement source (“Output current”, “Device temperature”, “Output Voltage”) each alarm can be configured individually.

4.2. DEVICE RESET FUNCTION

A reset of the device disconnects the bus line from the supplying output and induces a short circuit for 20 seconds. During this period the **KNX Bus reset LED** lights up red and goes off after the reset process is done. All other LEDs are off. The devices connected to the bus line restart during the reset process.

- **Push-button**: Press the push-button on the front panel to reset the KNX TP bus
- **Object**: The remote reset can be triggered by communication object no. 16
- **Mains outage**: Removing the KNX bus terminals disconnects the entire bus line
- **ETS programming**: After ETS programming the device induces a startup

4.3. COUNTER RESET

All event number counters and event time counters except the total working time counter are together set to zero by writing “1” to the communication object no.33 “Clear data”. The event number and event duration counters of one individual alarm are set to zero by writing “0” to the related communication object “Duration” (object no. 21, 24, 27, 30).

5. ETS PARAMETERS

In the “General settings” tab the heartbeat interval, the remote reset type (reset with “0” or with “1”) and the delay of messages after startup/recovery can be configured.

All data sources included in the remaining tabs can either be set to <disable> or to <enable>.

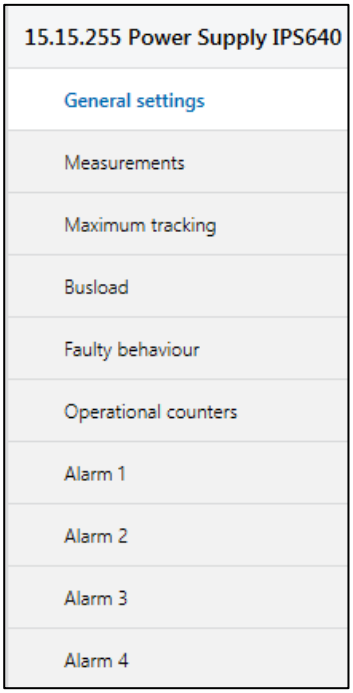
In the “Measurements” tab the output measurement and the temperature measurement can be activated.

The “Maximum tracking” tab contains the additional option to detect the maximum current value and the maximum temperature value of an expired “Tracking Period” interval.

In the “Busload” tab the measurement of the telegram traffic extent can be activated.

In the tabs “Faulty behavior” and “Operational counters” the event counters and the time counters can be activated.

Within the “Alarm 1 to 4” tabs the tracking of the power supply output and of the device temperature can be configured. The tracking includes event counters for number and duration.



Picture 3: Parameter tabs

Parameter	**Explication**
Object type	Selection of the data point type
Sending difference	The actual value is sent when the difference between last sent value and actual value reaches the pre-set difference
Cyclic sending	The actual value is sent at regular intervals of time
Alarm settings	Enables/disables the threshold functionality and following options
Threshold	Crossing this limiting value executes the “Behaviour on alarm activation” function
Hysteresis	Passing the “Threshold”-“Hysteresis” value executes the “Behaviour on alarm deactivation” function
Behaviour on alarm activation	Set action on activation: Send a telegram or set the internal object value
Behaviour on alarm deactivation	Set action on activation : Send a telegram or set the internal object value

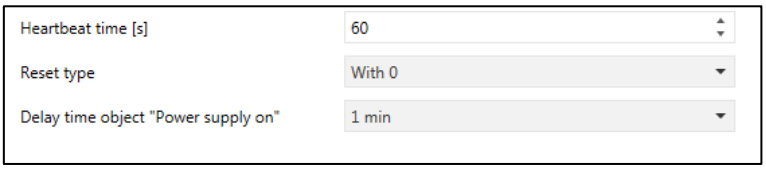
On enabling a measurement source in the tab “Measurements”, the above shown parameter structure is available (exception: counters). An actual value can be sent over the bus after a certain value change (“Sending difference”) or after a pre-set time has elapsed (“Cyclic sending”). A value reaching the excess threshold range can be used to switch other devices (“Behaviour on alarm activation”). Leaving this excess threshold range activates the “Behaviour on alarm deactivation”. The additional alarms have an extended adjustment.

5.1. GENERAL SETTINGS

The “General settings” tab contains the parameters related to the power supply presence message sending and the reset by communication object no.16 (“Reset output”). With use of the communication object no.37 “Heart beat - Info” the device periodically sends out a telegram with “1”. With use of the communication object no.36 “Power supply on” the device sends out a telegram with “1” after a KNX bus restart, device startup and a short circuit. After returning to normal working condition during the time delay period no telegrams are sent. The “Power supply on” telegram is the first one that is sent before other telegrams.

	KNX bus restart	**Device startup**	**Short circuit**
	Reset by button press Reset by object	Mains power outage ETS programming	Short circuits
CO no.36 “Power supply on”	X	X	X
CO no.17 “Number of restarts”	X		
CO no.20 “Number of startups”		X	

- A “KNX bus restart” is triggered after a reset by button press or after a reset by communication object.
- A “Startup” of the device takes place when there was a mains power outage or after programming the device.
- After a “Short circuit” the communication object no.36 “Power supply on” executes sending an info telegram on the bus.



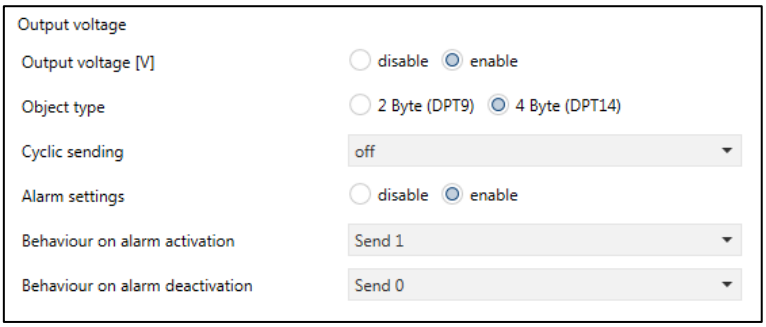
Picture 4: General settings

ETS-Parameter	**Selection, (bold: Factory Default)**	**Comment**
Heartbeat time [s]	10…32.000[s] (**60[s]**)	Info telegram (with “1”) is regularly sent after every cyclic time interval
Reset type	With 0; **With 1**; With 0 and 1	Set type of telegram to trigger a remote reset (KNX bus restart)
Delay period for communication object 36: “Power supply on”	off; **1min**; 2min; …5min; 10min; 15min; …30min; 1h; 2h; …8h	After return to normal working condition the info telegram (with “1”) is sent after this time delay

5.2. MEASUREMENTS

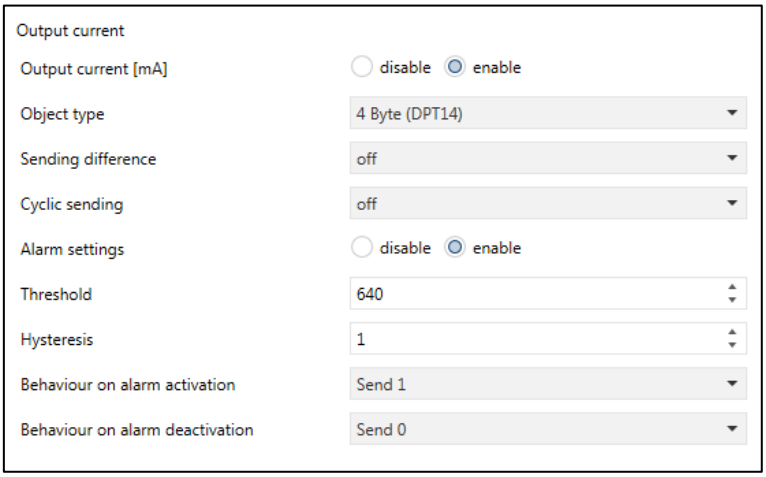
The “Measurements” tab contains the parameters related to “Output voltage”, “Output current” and “Device temperature”. The excess threshold range of the “Output voltage” is fixed and located outside the working range (28V to 31V). With no hysteresis for the “Output voltage” the “Behaviour on alarm deactivation” function is executed on just entering the normal working range. The excess threshold range of the “Output current” and the “Device temperature” both are located above their corresponding working range.

- Using the “Sending difference” function with the “Output voltage” is possible only within the “Alarm 1,2,3,4” tabs like described in section 5.7
- The “Output voltage” value is valid only if most of the load is on the KNX bus output
- If the “Output current” value is <10mA, for calculations, the input voltage is assumed to be at 230 V AC



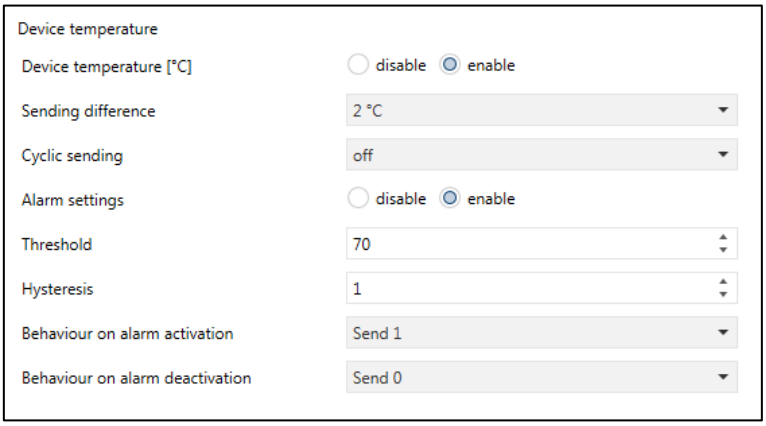
Picture 4: Output voltage

ETS-Parameter	**Selection,** **(bold: Factory Default)**	**Comment**
Output voltage [V]	**disable**; enable	Enable/disable group associations, measurement and following settings
Object type	2Byte(DPT9); **4Byte(DPT14)**	Select data point type
Cyclic sending	**off**; 1min; 2min; …5min; 10min; 15min; …30min; 1h; 2h; …8h	Info telegram is sent regularly
Alarm settings	**disable**; enable	Enable/disable the alarm function
Behaviour on alarm activation	Do nothing; Send 0; **Send 1**; Set 0; Set 1	Leaving the working range
Behaviour on alarm deactivation	Do nothing; **Send 0**; Send 1; Set 0; Set 1	Entering the working range



Picture 5: Output current

ETS-Parameter	**Selection,** **(bold: Factory Default)**	**Comment**
Output current [mA]	**disable**; enable	Enable/disable group associations, measurement and following settings
Object type	2Byte(DPT7, integer); 2Byte (DPT9, float), **4Byte(DPT14)**	Select data point type
Sending difference	**off**; 5mA;10mA, …25mA; 50mA	Difference between actual and last sent value which triggers the sending
Cyclic sending	**off**; 1min; 2min; …5min; 10min; 15min; …30min; 1h; 2h; …8h	Info telegram is sent regularly
Alarm settings	**disable**; enable	Enable/disable the alarm function
Threshold	0…800[mA] (**640[mA]**)	Select threshold value to execute the "Behaviour on alarm activation"
Hysteresis	0…640[mA] (**1[mA]**)	Select hysteresis interval value to execute the "Behaviour on alarm deactivation"
Behaviour on alarm activation	Do nothing; Send 0; **Send 1**; Set 0; Set 1	Select action on entering the threshold range
Behaviour on alarm deactivation	Do nothing; **Send 0**; Send 1; Set 0; Set 1	Select action on leaving the threshold (+hysteresis) range

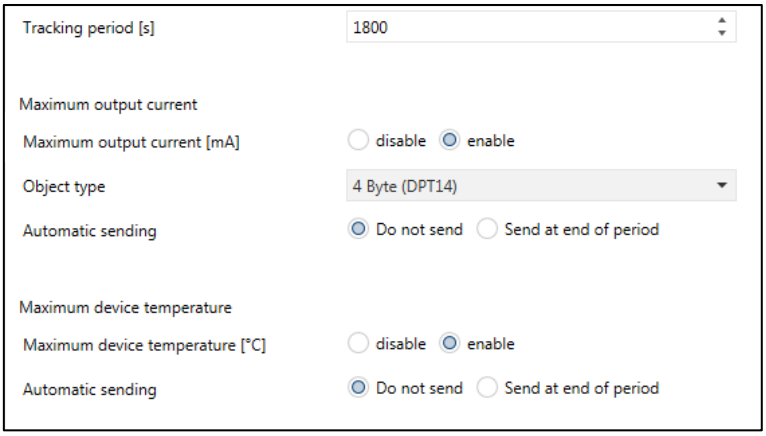


Picture 6: Device temperature

ETS-Parameter	**Selection,** **(bold: Factory Default)**	**Comment**
Device temperature [°C]	**disable**; enable	Enable/disable group associations, measurement and following settings
Sending difference	off; **2°C**; 3°C; …10°C	Difference between actual and last sent value which triggers the sending
Cyclic sending	**off**; 1min; 2min; …5min; 10min; 15min; …30min; 1h; 2h; …8h	Info telegram is sent regularly
Alarm settings	**disable**; enable	Enable/disable the alarm function
Threshold	0…110[°C] (**70[°C]**)	Select threshold value to execute the "Behaviour on alarm activation"
Hysteresis	**1**…40[°C]	Select hysteresis interval value to execute the "Behaviour on alarm deactivation"
Behaviour on alarm activation	Do nothing; Send 0; **Send 1**; Set 0; Set 1	Select action on entering the threshold range
Behaviour on alarm deactivation	Do nothing; **Send 0**; Send 1; Set 0; Set 1	Select action on leaving the threshold (+hysteresis) range

5.3. MAXIMUM TRACKING

With setting the "Tracking period" a certain period of time is tracked in order to find the maximum observed value. After each expired period this value can be sent over the bus. The maximum tracking function is available for the measurement sources "Output current" and "Device Temperature".

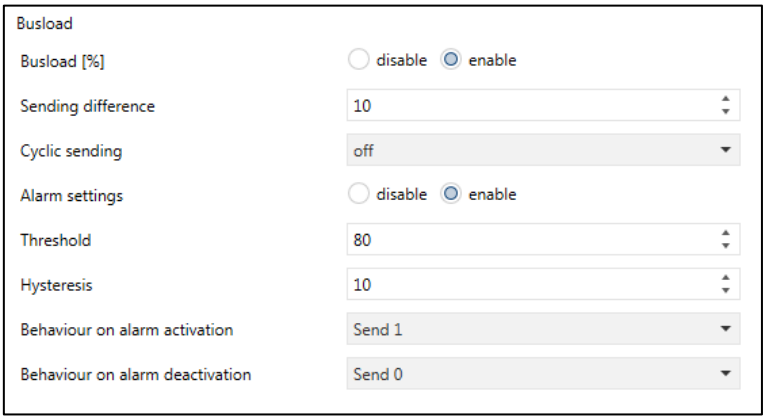


Picture 7: Maximum tracking

ETS-Parameter	**Selection, (bold: Factory Default)**	**Comment**
Tracking period [s]	10…32,000[s] (**1,800[s]**)	Determination of the time period for tracking
Maximum output current [mA]	**disable**; enable	Enable/disable group associations, measurement and following settings
Object type	2Byte(DPT7, integer); 2Byte (DPT9, float), **4Byte(DPT14)**	Select data point type
Automatic sending	**Do not send**; Send at end of period	Info telegram containing the maximum measured output current value is sent after an expired tracking period
Maximum device temperature [°C]	**disable**; enable	Enable/disable group associations, measurement and following setting
Automatic sending	**Do not send**; Send at end of period	Info telegram containing the maximum measured device temperature value is sent after an expired tracking period

5.4. BUSLOAD

The “Busload” measurement is similar to those of the measurement sources in the ETS tab “Measurements”. The excess threshold range of the “Busload” is located above its corresponding working range.

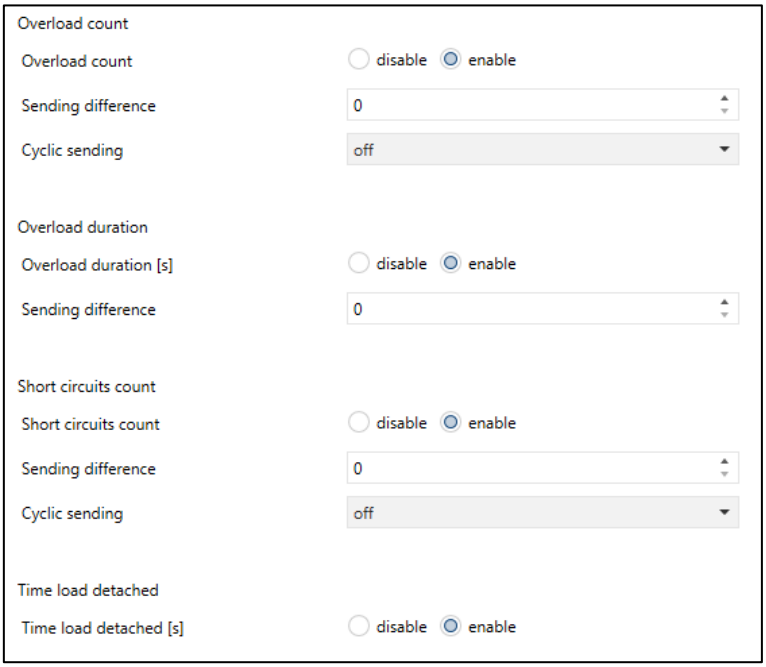


Picture 8: Busload

ETS-Parameter	**Selection, (bold: Factory Default)**	**Comment**
Busload [%]	**disable**; enable	Enable/disable group associations, measurement and following settings
Sending difference	0…100[%] (**10[%]**)	Difference between actual and last sent value which triggers the sending
Cyclic sending	**off**; 1min; 2min; …5min; 10min; 15min; …30min; 1h; 2h; …8h	Info telegram is sent regularly
Alarm settings	**disable**; enable	Enable/disable the alarm function
Threshold	0…100[%] (**80[%]**)	Select threshold value to execute the “Behaviour on alarm activation”
Hysteresis	0…70[%] (**10[%]**)	Select hysteresis interval value to execute the “Behaviour on alarm deactivation”
Behaviour on alarm activation	Do nothing; Send 0; **Send 1**; Set 0; Set 1	Select action on entering the threshold range
Behaviour on alarm deactivation	Do nothing; **Send 0**; Send 1; Set 0; Set 1	Select action on leaving the threshold (+hysteresis) range

5.5. FAULTY BEHAVIOUR

The “Faulty behaviour” tab contains the menus related to “Overload count”, “Overload duration”, “Short circuits count” and “Time load detached”. Activation of the parameters also activates the related communication objects. Info telegrams containing the actual value can be sent regularly or according to the preset difference in value. The counters can be set to zero by writing “1” to the communication object no.33 “Clear data”.

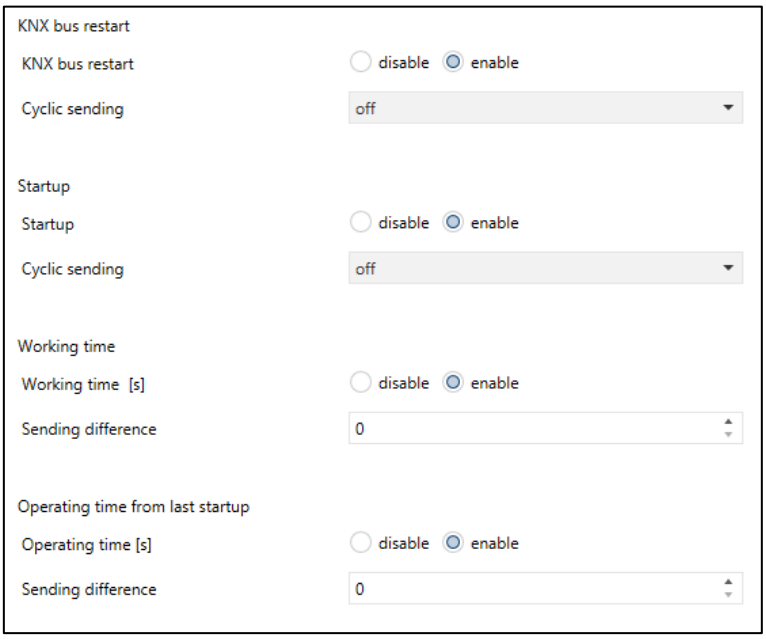


Picture 9: Faulty behaviour

ETS-Parameter	Selection, (bold: Factory Default)	Comment
Overload count	**disable**; enable	Enable/disable group associations, number counter and following settings
Sending difference	**0**…1,000 (0 = off)	Info telegram is sent regularly after this number of overloads
Cyclic sending	**off**; 1min; 2min; …5min; 10min; 15min; …30min; 1h; 2h; …8h	Info telegram is sent regularly
Overload duration	**disable**; enable	Enable/disable group associations, time counter and following setting
Sending difference	**0**…32,000[s] (0 = off)	Difference between actual and last sent value which triggers the sending
Short circuits count	**disable**; enable	Enable/disable group associations, number counter and following setting
Sending difference	**0**…500 (0 = off)	Difference between actual and last sent value which triggers the sending
Cyclic sending	**off**; 1min; 2min; …5min; 10min; 15min; …30min; 1h; 2h; …8h	Info telegram is sent regularly
Time load detached	**disable**; enable	Enable/disable group associations and time counter

5.6. OPERATIONAL COUNTERS

The “Operational counters” tab contains the menus related to “KNX-Bus restart”, “Startup”, “Working time” and “Operating time from last startup”. Activation of the “KNX bus restart” and “Startup” parameters also activates the related communication objects. Info telegrams containing the actual number counter value can be sent regularly. Info telegrams containing the actual time counter value can be sent according to the preset difference in value. The counters can be set to zero by writing “1” to the communication object no.33 “Clear data”.

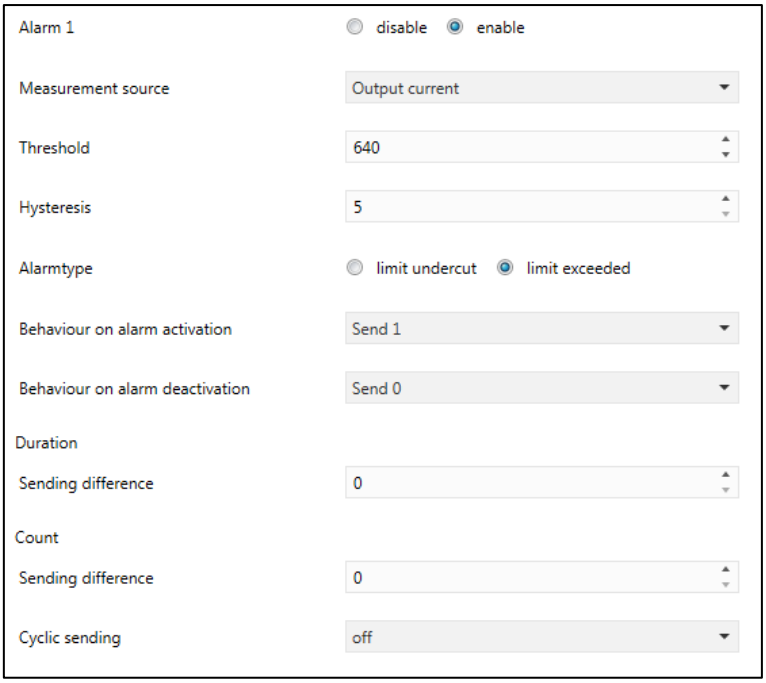


Picture 16: Operational counters

ETS-Parameter	Selection, (bold: Factory Default)	Comment
KNX bus restart	**disable**; enable	Enable/disable group associations, measurement and following setting
Cyclic sending	**off**; 1min; 2min; …5min; 10min; 15min; …30min; 1h; 2h; …8h	Info telegram is sent regularly
Startup	**disable**; enable	Enable/disable group associations, measurement and following setting
Cyclic sending	**off**; 1min; 2min; …5min; 10min; 15min; …30min; 1h; 2h; …8h	Info telegram is sent regularly
Working time	**disable**; enable	Enable/disable group associations, measurement and following setting
Sending difference	0…2,600,000[s] (0 = off) *(1 Monat ≈ 2.600.000s)*	Difference between actual and last sent value which triggers the sending
Operating time from last startup	**disable**; enable	Enable/disable group associations, measurement and following setting
Sending difference	0…2,600,000[s] (0 = off) *(1 Tag ≈ 86.000s)*	Difference between actual and last sent value which triggers the sending

5.7. ALARM 1,2,3,4

After enabling the alarm function the measurement source can be chosen. With the additional menu item "Alarmtype" the threshold range is set. The alarm activation/deactivation can be used to switch other devices. With the additional alarms 1-4 durations and numbers of threshold events can be sent on the bus. After changing the measurement source of the alarm both number counter and time counter are reset to zero automatically. The counters can be set to zero by writing "1" to the communication object no.33 "Clear data" or by writing "0" to the related communication object "Duration 1,2,3,4"(object no. 21, 24, 27, 30).



Picture 17: Alarm 1,2,3,4

ETS-Parameter	Selection	Comment
Alarm 1 (the same applies to Alarm 2, 3, 4)	**disable**; enable	Enable/disable group associations, measurement and following settings
Measurement source	**Output current**; Temperature; Output voltage	Selection of the measurement source
Threshold	10…800 (**640**)	Select threshold value to execute the "Behaviour on alarm activation"
Hysteresis	**5**…500	Select hysteresis interval value
Alarmtype	limit undercut; **limit exceeded**	Select threshold region either to lie above (limit exceeded) or to lie below (limit undercut) the threshold value
Behaviour on alarm activation	Do nothing; Send 0; **Send 1**; Set 0; Set 1	Select action on entering the threshold region
Behaviour on alarm deactivation	Do nothing; **Send 0**; Send 1; Set 0; Set 1	Select action on leaving the threshold (+hysteresis) range

Duration		
Sending difference	**0**…2,600,000[s]	Info telegram is sent regularly when the time counter of threshold exceedance(s) reaches the preset value
Count		
Sending difference	**0**…500	Info telegram is sent regularly when the number counter of threshold exceedance(s) reaches the preset value
Cyclic sending	**off**; 1min; 2min; …5min; 10min; 15min; …30min; 1h; 2h; …8h	Info telegram is sent regularly

6. COMMUNICATION OBJECTS

No.	Name	Function	Description	Length	DPT	C	R	W	T	U
0	Output voltage measured	Send measured value	With "Cyclic sending" the device sends the measured output voltage value in V (or mV).	2 bytes 4 bytes	DPT9, DPT14	X	X		X	
1	Output voltage alarm	Send threshold status	With the measured value located in the threshold range a telegram with value 0 or 1 is sent. When the measurement values return to the normal working range a telegram with value 0 or 1 is sent.	1 bit		X	X		X	
2	Output current measured	Send measured value	With "Sending difference" and "Cyclic sending" the device sends the measured output current value in A (or mA).	2 bytes 4 bytes	DPT7, DPT9, DPT14	X	X		X	
3	Output current alarm	Send threshold status	With the measured value located in the threshold range a telegram with value 0 or 1 is sent. When the measurement values return to the normal working range (after passing hysteresis) a telegram with value 0 or 1 is sent.	1 bit		X	X		X	
4	Maximum output current measured	Send measured value	After the expired tracking period with "Automatic sending" the device sends the measured output current value in A (or mA).	2 bytes 4 bytes	DPT7, DPT9, DPT14	X	X		X	
5	Device temperature measured	Send measured value	With "Sending difference" and "Cyclic sending" the device sends the measured internal temperature value in °C.	2 bytes		X	X		X	
6	Temperature alarm	Send threshold status	With the measured value located in the threshold range a telegram with value 0 or 1 is sent. When the measurement values return to the normal working range (after passing hysteresis) a telegram with value 0 or 1 is sent.	1 bit		X	X		X	
7	Maximum device temperature measured	Send measured value	After the expired tracking period with "Automatic sending" the device sends the measured internal temperature value in °C.	2 bytes		X	X		X	
10	Bus load measured	Send measured value	With "Sending difference" and "Cyclic sending" the device sends the measured bus load value in %.	1 byte		X	X		X	
11	Bus load alarm	Send threshold status	With the measured value located in the threshold range a telegram with value 0 or 1 is sent. When the measurement values return to the normal working range (after passing hysteresis) a telegram with value 0 or 1 is sent.	1 bit		X	X		X	
12	Number of overloads	Send number counter value	With "Sending difference" and "Cyclic sending" the device sends the number counter value of overloads.	2 bytes		X	X		X	

No.	Name	Function	Description	Length	DPT	C	R	W	T	U
13	Overload duration	Send time counter value	With "Sending difference" the device sends the time counter value of overloads in s.	4 bytes		X	X		X	
14	Number of short circuits	Send number counter value	With "Sending difference" and "Cyclic sending" the device sends the number counter value of short circuits.	2 bytes		X	X		X	
15	Time load detached	Send time counter value	On activation the device sends the time counter value of load detachments (due to short circuit, device startup and KNX bus restart).	4 bytes		X	X		X	
16	Reset output	Bus reset	Triggered by a telegram with value 0 or 1 the device starts a reset process.	1 bit		X		X	X	X
17	Number of restarts	Send number counter value	With "Cyclic sending" the device sends the number counter value of KNX bus restarts.	2 bytes		X	X		X	
18	Total working time	Send time counter value	With "Sending difference" the device sends the time counter value of the total working time in s.	4 bytes		X	X		X	
19	Time from last start	Send time counter value	With "Sending difference" the device sends the time counter value of the time elapsed since last device startup in s.	4 bytes		X	X		X	
20	Number of startups	Send number counter value	With "Cyclic sending" the device sends the number counter value of device startups.	2 bytes		X	X		X	
21	Duration 1	Send time counter value	With "Sending difference" the device sends the time counter value (in s) of a pre-selected variable (output current, output voltage, temperature) being in the threshold range.	4 bytes		X	X		X	
22	Count 1	Send number counter value	With "Sending difference" and "Cyclic sending" the device sends the number counter value (in s) indicating the number of threshold events (for output current, output voltage, temperature).	2 bytes		X	X		X	
23	Threshold 1	Send threshold status	With the measured value located in the threshold range a telegram with value 0 or 1 is sent. When the measurement values return to the normal working range (after passing hysteresis) a telegram with value 0 or 1 is sent.	1 bit		X	X		X	
24	Duration 2	Send time counter value	With "Sending difference" the device sends the time counter value (in s) of a pre-selected variable (output current, output voltage, temperature) being in the threshold range.	4 bytes		X	X		X	
25	Count 2	Send number counter value	With "Sending difference" and "Cyclic sending" the device sends the number counter value (in s) indicating the number of threshold events (for output current, output voltage, temperature).	2 bytes		X	X		X	

No.	Name	Function	Description	Length	DPT	C	R	W	T	U
26	Threshold 2	Send threshold status	With the measured value located in the threshold range a telegram with value 0 or 1 is sent. When the measurement values return to the normal working range (after passing hysteresis) a telegram with value 0 or 1 is sent.	1 bit		X	X		X	
27	Duration 3	Send time counter value	With "Sending difference" the device sends the time counter value (in s) of a pre-selected variable (output current, output voltage, temperature) being in the threshold range.	4 bytes		X	X		X	
28	Count 3	Send number counter value	With "Sending difference" and "Cyclic sending" the device sends the number counter value (in s) indicating the number of threshold events (for output current, output voltage, temperature).	2 bytes		X	X		X	
29	Threshold 3	Send threshold status	With the measured value located in the threshold range a telegram with value 0 or 1 is sent. When the measurement values return to the normal working range (after passing hysteresis) a telegram with value 0 or 1 is sent.	1 bit		X	X		X	
30	Duration 4	Send time counter value	With "Sending difference" the device sends the time counter value (in s) of a pre-selected variable (output current, output voltage, temperature) being in the threshold range.	4 bytes		X	X		X	
31	Count 4	Send number counter value	With "Sending difference" and "Cyclic sending" the device sends the number counter value (in s) indicating the number of threshold events (for output current, output voltage, temperature).	2 bytes		X	X		X	
32	Threshold 4	Send threshold status	With the measured value located in the threshold range a telegram with value 0 or 1 is sent. When the measurement values return to the normal working range (after passing hysteresis) a telegram with value 0 or 1 is sent.	1 bit		X	X		X	
33	Clear data	Counter reset	All number counter values and time counter values except the working time counter are set to zero by a telegram with “1”.	1 bit		X		X	X	
34	Send data	Request	All actually measured values (output current, output voltage, temperature, busload) are sent as response to a telegram with “1”.	1 bit		X		X	X	
35	Send calculations	Request	All actual number counter values and time counter values (overload count, overload duration, short circuits count, time load detached, KNX bus restart, device startup, working time, operating time since last startup, alarm duration 1-4, alarm count 1-4) are sent as response to a telegram with “1”.	1 bit		X		X	X	
36	Power supply on	Send info	After a preset delay period after startup and after recovery from output failure the device sends an info telegram with value “1” to announce that it is on the bus.	1 bit		X	X		X	
37	Heart beat	Send info	Depending on the preset heartbeat time the device regularly sends out a telegram with value 1	1 bit		X	X		X	

7. TECHNICAL DATA

7.1. SPECIFICATIONS

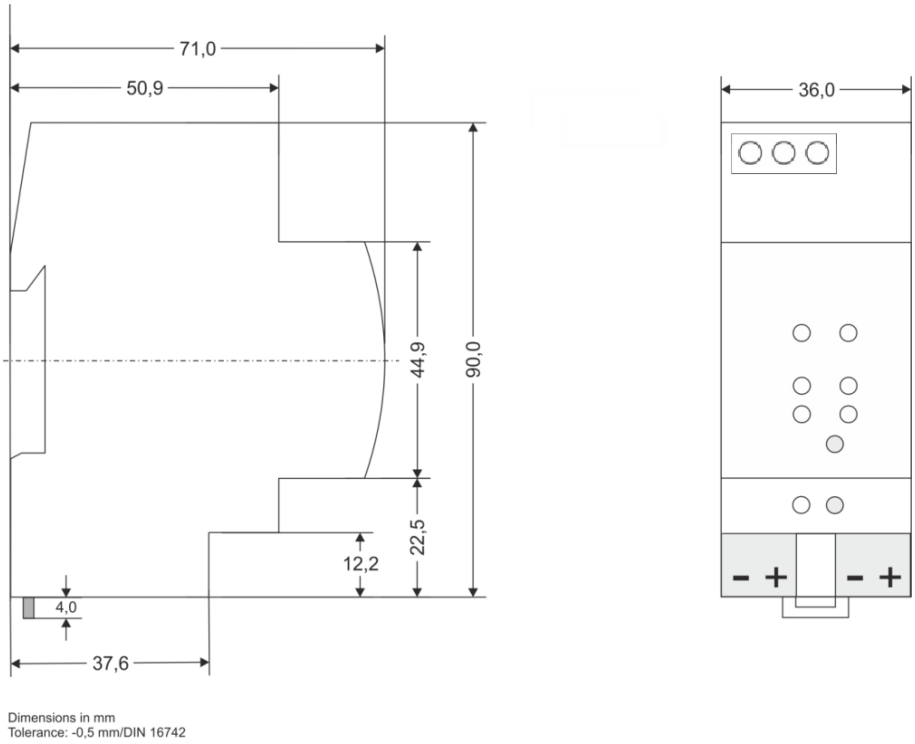
Power input	
Mains voltage	230V AC ±10% @ 50 Hz
Leakage loss (open-circuited)	1.2 W
Leakage loss (normal operation)	4.7 W
Power consumption (normal operation)	23 W
Power consumption (max., overload)	42 W
Mains failure bridging time	> 100 ms
Power output	
KNX output voltage	28…31 V DC (SELV)
Auxiliary output voltage	28…31 V DC (SELV)
Rated current	640 mA
Maximum current (total output)	1.2 A
Efficiency at nominal load	82 %
Disconnection time after failure	10 s
Electrical safety	
Pollution degree (IEC60664-1)	2
Protection type (IEC60529)	IP20
Protection class (IEC61140)	II
Overvoltage category (IEC60664-1)	III
Approbation (ISO/IEC14543-3)	KNX-certified
Compliance:	EN50491-5, EN50581, EN60950-1, EN61000-6
Housing	
Dimensions (HxWxD)	94 x 36 x 71 mm
Mounting (IEC60715)	35 mm top-hat rail (TH35)
Width in space units	2 modules at 18 mm
Supply voltage connection	Screw terminal
KNX bus connection	KNX TP bus connector (red/black)
Auxiliary output connection	KNX TP bus connector (white/yellow)
Weight	180 g
Environmental conditions	
Working temperature	-5…45 °C
Storage temperature	-20…70 °C
Ambient humidity (non-condensing)	5…93 %
CE Marking	
According to low voltage and EMC guidelines (residential and commercial buildings)	

7.2. CONNECTION SCHEMATIC

Picture 18: Connection schematic

7.3. DIMENSION DRAWING

All dimensions shown here are specified in mm. The device width is 2 modules at 18 mm.



Picture 19: Dimension drawing