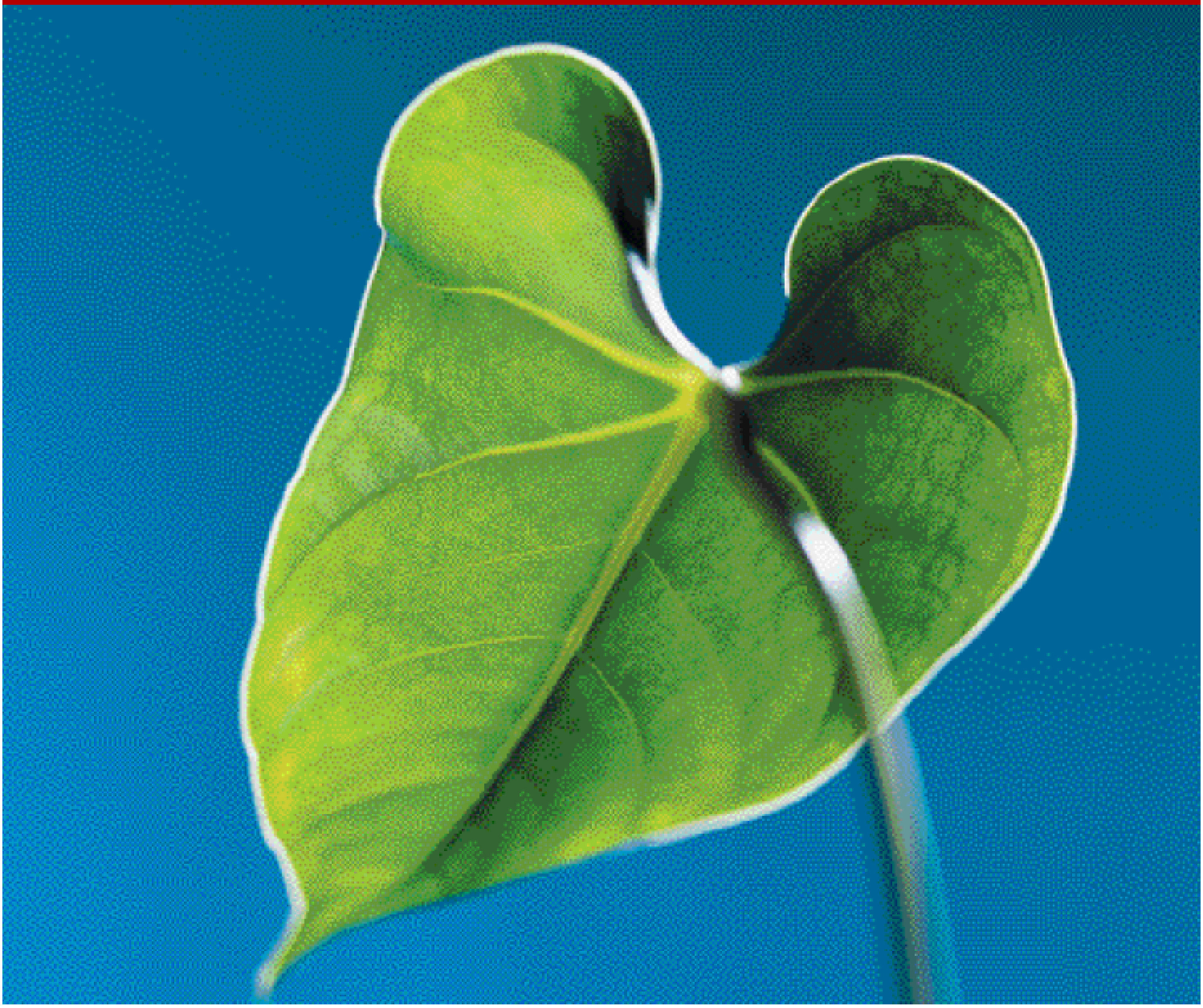
Commissioning 2007-01

System e.r.i.c.



ENERGIZING INDOOR CLIMATE

Commissioning 2007-01

Content		Sid.

Revision History:
Nov. 1, 2005: The first issue was based on commissioning and functional control. The RTC and KOP documents was added. The KCW additional text for thermo actuator and blocked CO_2 -function.
Feb. 2006: Transferred documents to web base. The RTC text was adjusted. New commissioning charts for the ACK, ACL, AFK and AKY was added.
2006-07: New text inserted in Variable 8 in the table entitled: "All SNVT Variables for the KRF".
2006-09: Rev. in Variable 10 in the table entitled: "All SNVT Variables for the KRF".
2006-09: Rev. in Variable 8 in the table entitled: "All SNVT Variables for the KCD".
2006-11: RTCa upgraded to RTCb.
2007-02: New product: ASDa - Active terminal. K-factor table availible for the following products: ACK, AKY, ACL, ARP, AFK and ASD.

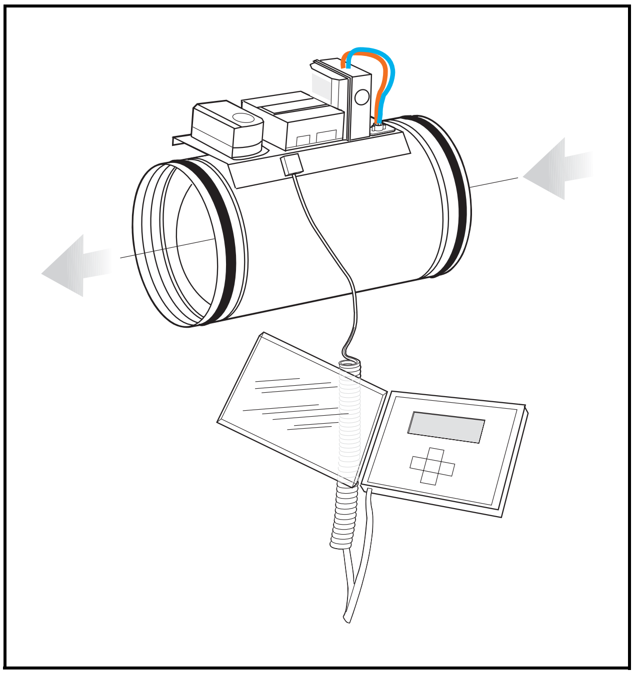


Figure 1. *Connection of the hand terminal KOP to duct the products KZP, KZM, KSA and KRF.*

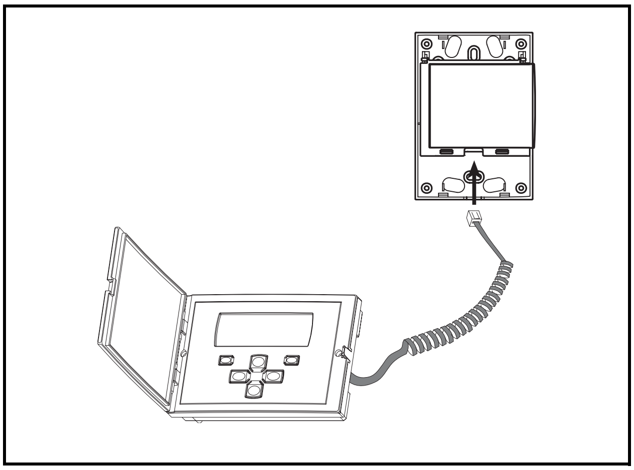


Figure 2. *Connection ot the terminal KOP to products with room unit KRF, KCD and KCW. KOP connects to on the inside (KSTb). The older KSTa connects to on the underside. In some executions on the side of the regulator casing.*

INTRODUCTION
This publication describes the actual work involved in commissioning an e.r.i.c. System. Besides this publication there are additional documents which contain further information about different components and functions of the e.r.i.c. System.

- The Regulator Manual, Edition 3
- The Electric Wiring Planning Instructions
- Assembly Instructions
- Instructions for Use
- Bindings for the e.r.i.c. System
- Functional Control Forms

Preparations
It is always advantageous to calculate theoretical settings for the active regulators of the air terminals. In certain cases this may already be pre-programmed from factory. The sales office in question can inform you if this has been done.
All factory settings are documented in the "SNVT" configuration document, which is supplied with the product and may also be ordered as a PDF document from the sales office.

Unit
To prevent fluctuations and changes in pressure from disturbing the commissioning work, it is important to lock the pressure regulation settings of the supply and extract air fans to a preliminary project-design value. If your system includes the KSM system manager, you can lock the fan pressures manually via the KOP hand-held micro terminal.

Continuous operation after the commissioning
In systems without the KSM system manager, select the pressure set point of the unit in such a way that the pre-defined target specified in the commissioning documents (usually between 70-100%) will, for the sake of simultaneity, provide the project-design max airflow. In systems with the KSM system manager, the max. and min. pressure set points can be set in the KOP hand-held micro terminal.

Zone dampers
In e.r.i.c. Systems with KZP/KZM for keeping the pressure constant in the branch ducts, these controls should be set to a suitable duct pressure, the default value is 50 Pa. It is very time consuming to calculate the optimal pressure if you do not have access to a CAD system that quickly and easily computes pressure settings for the whole system. As guidance, it is advisable to select a duct pressure that is as low as possible, but not lower than a value that provides a pressure of 20 Pa measured at the supply terminal connection. If the duct system is sized with little margin for change, the pressure must instead be selected with the max. airflow rate as reference. Select 80% as the max. permissible position in the supply terminals to seek out which pressure is needed in the duct system. Then increase or decrease the setting in the KZP/KZM until the correct airflow is obtained.

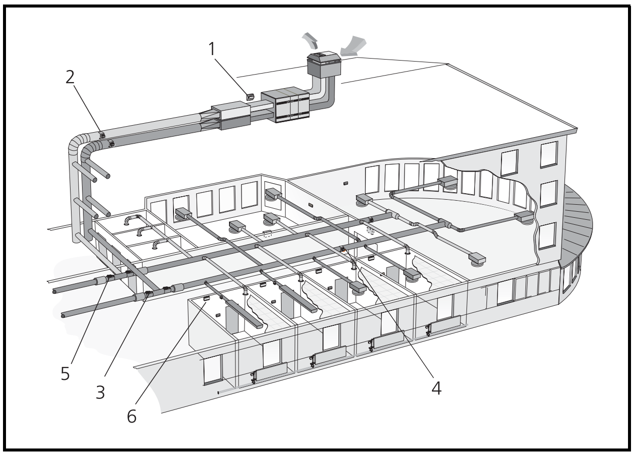


Figure 3.

Legend for the figure.
1. System manager KSM.
2. Supply and exhaust pressure sensor the the air handling unit.
3. The pressure regulators KZP or KZM for the supply systems.
4. Pressure sensor får the branch duct.
5. The pressure regulators KZP, KZM or slave regulator KSA for the exhaust systems.
6. Room regualtor KCD or KCW.

COMMISSIONING SEQUENCE

1. The unit
Check and set the operation of the unit to a constant pressure. A suitable approximate value will be between 150-300 Pa depending on the size and character of the ventilation system.
The pressure should be high enough to enable the unit manage operation at the max. airflow according to project design specifications. If the KSM system manager is included in the system, the unit pressures can be locked by means of the KOP hand-held micro terminal. This can be connected anywhere in the network and then makes it possible to simply increase the pressure if the zone dampers are fully open. Manual operation is described on page 33.

2. The zone dampers
Set the pressure set point of the zone damper to a value between 30-50 Pa. Force at least 70% of all air terminals on the same branch duct to their max. positions (80% is the default). Check that the zone damper is controlled to the preset set point, read the airflow through the damper and compare the total flow with the current forcing airflow of the supply terminals. If the airflow deviates increase or decrease the pressure set point. Do not forget to change the dead zone for pressure regulation when the pressure set point is changed. This should be 10% of the pressure set point.
In smaller systems, it is not common to use zone dampers. The air handling unit's pressure regulation mode is instead used for keeping the pressure constant in the branch ducts. It is important that the pressure transducer of the unit be placed far out in the duct system at a representative place; see the Project Design Instructions for the e.r.i.c. System.

3. The air terminals
Use the Coefficient of Performance (K-factor) Graph in these instructions for commissioning the supply terminals. Begin commissioning as soon as the zone damper (KZP or KZM) has reached its pressure set point, not sooner. Commissioning is done by setting the min/max positions of the motor-driven "damper". No airflow measurement is carried out in the control process; instead it is assumed that the pressure in the duct system is regulated. This provides very stable control that does not have to compensate for pressure variations in the duct system. All the active supply terminals are equipped with measurement tappings and have a "floating" coefficient of performance (K-factor). Set the min./max. positions in each type KCD, KCW or RTC room regulator.

4. KRF Room regulator
This room regulator normally has totally pre-set values and does not have to be adjusted!

5. The slave airflow of the zone dampers
The slave airflow values can be checked when you've finished adjusting the supply air. Normally, no adjustment should be made; the airflow setting is transferred from the master to the slave. If there are any offset airflow values, they can be set in the master if it has digital communication to the slave; and in the slave if it has an analogue connection from the master. A simple way to check whether transmission is digital or analogue is to see if a cord is connected to terminal 8 (Z1) on the KSA slave regulator, if this is the case, it has an analogue connection.

6. Documentation
Record all the regulator setting changes on the "Configuration data" form supplied with the product. If these forms are missing, you can order them from your nearest sales representative in the form of a PDF document.

7. Finishing Off
Do not forget to reset all the temporary settings in each regulator. Settings of a temporary nature made in so-called "nvi" variables can be automatically set to 0 by briefly disconnecting the power supply. This could be a good alternative instead of going around having to adjust the regulator in every room.

FUNCTIONAL CONTROL
Separate functional control forms can be downloaded from our homepage on the Internet. The performance of each product should be tested individually and the findings should be recorded on the relevant page of the functional control document.

SYSTEM VARIANTS

KZP is intended for pressure regulation of branch ducts. For a detailed description of the regulators function see the regulator KCP in the handbook that describes all the e.r.i.c. regulators and their functions, which is available to download as pdf-file from our website.

PUT INTO OPERATION

KZP is always factory set with data for its functions. As soon as the 24 VAC is connected the KZP is in operation, and no additional work is called for.

COMMISSIONING

Setting of the pressure set point is done with the variable no **23 nciSetptPress**. Set the value which you require between 10-300 Pa. The value for the dead zone **30 nciPressDzone** should be set to 10% of the pressure setting, a lower value might make the control instable. If the regulator is acting hysteric and does not stabilise the pressure, the actuator is moving back and fourth, you could try with halving the gain factor in **28 nciPressGain.**

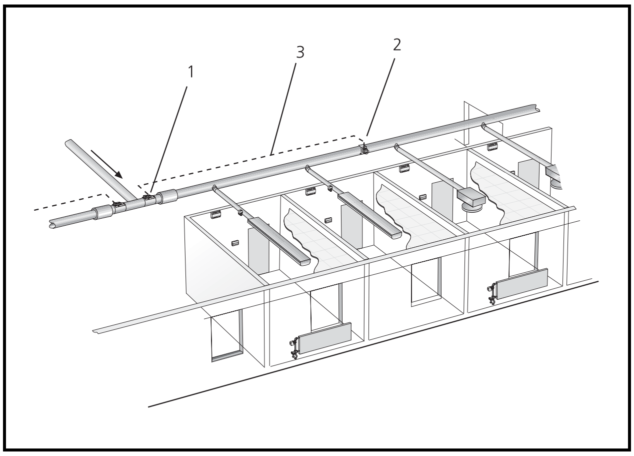


Figure 1.

Legend for the figure.

1. Pressure regualtor KZP
2. Pressure sensor KST
3. Connection between KZP - KSP for pressure control.

FUNCTIONAL CONTROL

Use the handheld terminal KOP to read the status of the regulator in the form of alarm codes and current pressure values. If **2 nvoAlarmStatus** bit 1 = 1 then KZP cannot maintain the pressure set point value as set in **23 nciSetptPress**. The reason for this can be that the fan pressure is not sufficient; the variable **7 nvoDampPressVal** shall in this situation should show 100%.

Always check **7 nvoDampPressVal** if the setpoint pressure value cannot be reached. This will indicate whether there is something else in the system that is not working, a fully open damper indicates that the fan pressure is not sufficient, or the reverse, a virtually fully closed damper means that the fan pressure has been set unnecessarily high. In some cases the integrated PI regulator works too quickly bringing about large fluctuations in the pressure, which do not seem to stabilise. In order to correct this problem you can adjust the gain factor **28 nciPressGain** to a lower value, try with values between 0.3 - 0.1. Even the **29 nciPressItime** can be reduced to achieve a faster control; lowest recommended value is 20 sec.

Great differences in the measured pressure values and read values can be due to the incorrect installation of the pressure sensor KSP, see the installation instruction for KSP.

AlarmStatus bit no 1, can not achieve pressure set point value 01000000 00000000 ^	AlarmStatus bit no 2, pressure sensor faulty or wrongly connected 00100000 00000000 ^

21 nciAppOptions 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

(B0) Pressure control = 0

(B1) Is not used

(B2) System erimix E1 & E2 = 1

(B3) System erimix E3 = 1

KZPb

All SNVT-variables for KZP, also see Appendix A in the handbook.
Highlighted variables are the signification for KZP with the regulator KCP.

No	Description	Normal value	Explanation with reference to KCP-KCF-KCD-KCW Handbook
0	nciLocation		Any marking max 32 characters entered on the regulator usin e.g. LoneMaker for Windows.
1	**nvoUnitStatus**	Auto..........	Current operating mode for the regulator, has no significance for KZP
2	**nvoAlarmStatus**	00000000 00000000	
3	nvoSpaceTemp	-10.00 °C	Does not apply to KZP
4	**nvoPressValue**	X.xxxx pasc	Measured pressure value in the branch duct
5	nvoSetpFlowSlave	Invalid	Does not apply to KZP
6	nvoBoxFlow	Invalid	Does not apply to KZP
7	**nvoDampPressVal**	XX.XX %	Output data KZPa damper position 100%=Open 0%=Closed
8	**nvoDampFlowVa**l	XX.XX %	Output data to mixing damper in system erimix, 0%=Heat 100%=Cooling
9	**nviApplicMode**	Auto	Possibility to positively drive the damper, has no significance on KZP
10	**nviSpaceTemp**	Invalid	Input data from exhaust temperature in system ***erimix E2.***
11	nviSetpoint	Invalid	Does not apply to KZP
12	**nviPressValue**	Invalid	Input data if measured pressure value via the Lon Network
13	**nviPressOffse**t	0 pasc	Input data if the pressures deviation value via the Lon Network
14	nviFlowOffset	0.0000 l/s	Does not apply to KZP
15	nviSptFlowSlave	0 l/s	Does not apply to KZP
16	**nviEmergCmd**	Normal	Positively driven operation of the regulator from a master system
17	**nviManOverride**	Off 0.00 %	Possibility of manual positively drive of the damper/diffuser position 0-100%, only the function position has an effect on this regulator
18	nviOfstSlaveState	Off	Does not apply to KZP
19	nviOfstSlavePerc	0.00 %	Does not apply to KZP
20	nviOfstSlaveFlow	0.00 l/s	Does not apply to KZP
21	**nciAppOptions**	00000000 00000000	Setting the regualtor´s function. For KZPa the normal value applies
22	nciSetpoints	no significance	Does not apply to KZP
23	**nciSetptPress**	50.0000 pasc	The set point value for the branch duct pressure
24	**nciPressMin**	10.0000 pasc	Minimum setting for the set point value on the regulator
25	**nciPressMax**	300.0000 pasc	Maximum setting for the set point value on the regulator
26	nciMinFlow	0 l/s	Does not apply to KZP
27	nciMaxFlow	0 l/s	Does not apply to KZP
28	**nciPressGain**	0.5000	Gain factor in the PI-regulator for pressure regulation
29	**nciPresstime**	60	Integration time in the PI-regulator for pressure regulation
30	**nciPressDzone**	4 pasc	The dead zone for the PI-regulator (ought to be 10% of **nciSetptPress**)
31	nciFlowGain	0.5000	Does not apply to KZP
32	nciFlowtime	60.0	Does not apply to KZP
33	nciFlowDzone	5.0 %	Does not apply to KZP
34	nciFlowConst	104.0	Does not apply to KZP
35	nciInstallType		Used by software
36	nciSndHrtBt	0.0	May not be changed! Must be 0 sec.
37	nciRcvHrtBt	0.0	Can be set to 60 sec if KZM is bound in a network
38	nviRequest		Used by software
39	nvoStatus		Used by software
40	nviFileReq		Used by software

No	Description	Normal value	**Explanation** with reference to KCP-KCF-KCD-KCW Handbook
41	nvoFileStat		Used by software
42	**nciFlowPressOfst**	0.0 Pa	0-calibration parameter for airflow pressure sensor
43	**nciNumCoolcase**	1	number of rooms to be controlling the change of cooling/heating mode in the system **erimix**
44	**nciDuctTempMin**	13.00 °C	Lower control limit for duct temperature system **erimix,** compare with no 22 oc
45	**nciDuctTempMax**	28.00 °C	Higher control limit for duct temperature system erimix, compare with no 22 oh
46	nviSptFlowSlave2	Invalid	Slave airflow from unit 2, does not apply for KZP
47	nviSptFlowSlavee	Invalid	Slave airflow from unit 3, does not apply for KZP
48	nviSptFlowSlave4	Invalid	Slave airflow from unit 4, does not apply for KZP
49	nviSptFlowSlave5	Invalid	Slave airflow from unit 5, does not apply for KZP
50	**nviDampPosCool**	95%	limit value for reposition to cooling mode in ***erimix system E1***
51	**nviDampPosHeat**	95%	limit value for reposition to heating mode in ***erimix system E1***
52	**nviDampPos1**	0% OFF	Input data from room regulator 1 (KCD) in system ***erimix system E1***
53	**nviDampPos2**	0% OFF	Input data from room regulator 2 (KCD) in ***erimix system E1***
54	**nviDampPos3**	0% OFF	Input data from room regulator 3 (KCD) in ***erimix system E1***
55	**nviDampPos4**	0% OFF	Input data from room regulator 4 (KCD) in ***erimix system E1***
56	**nviDampPos5**	0% OFF	Input data from room regulator 5 (KCD) in ***erimix system E1***
57	**nviDampPos6**	0% OFF	Input data from room regulator 6 (KCD) in ***erimix system E1***
58	**nviDampPos7**	0% OFF	Input data from room regulator 7 (KCD) in ***erimix system E1***
59	**nviDampPos8**	0% OFF	Input data from room regulator 8 (KCD) in ***erimix system E1***
60	**nviDampPos9**	0% OFF	Input data from room regulator 9 (KCD) in ***erimix system E1***
61	**nvoDuctSetpnt**	0.00 °C	Set point value for duct temperature in ***erimix system E1 and E3***

SYSTEM VARIANTS

KZM is intended for pressure regulation of branch ducts and equipped with flow measuring to slave control the KSA in the exhaust duct. For a detailed description of the regulatrs function see the regulator KCP in the handbook that describes all the e.r.i.c. regulators and their functions, which is available to download as pdf-file from our website.

PUT INTO OPERATION

KZM is always factory set with data for its functions. As soon as the 24 VAC is connected the KZM is in operation, and no additional work is called for. For the slave control to be working the products must be "bound" to each other if the LonNetwork is used for communication (if this is done in the factory it will be stated on the product label), or be connected analogue to the slave regulator KSA. The analogue connection is detected by two wires are connected to the plinth 6 (Z2).

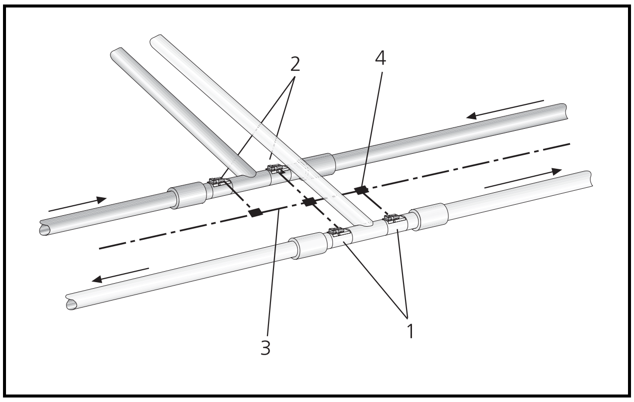


Figure 1.
Legend for the figure.
1. Pressure regulator KZM
2. Slave controler KSA
3. Network cable LonTalk
4. Connection box for network cable

COMMISSIONING

If the regulator is factory set, no additional settings are required. Below you can see alternative settings of the nciAppOptions for system erimix. The normal configuration for KZM always starts with a 1. Setting of the pressure set point is done with the variable no **23 nciSetptPress**. Set the value which you require between 10-300 Pa. The value for the dead zone **30 nciPressDzone** shall be set to 10% of the pressure setting, a lower value might make the control instable. Setting of **nciFlowConst** (k-factor) is needed for measuring the airflow, this is normally done in the factory.
If the regulator is acting hysteric and does not stabilise the pressure, the actuator is moving back and fourth, you could try with halving the gain factor in **28 nciPressGain**.

AlarmStatus bit no 1,can not achieve pressure set point value 01000000 00000000 ^	AlarmStatus bit no 2, pressure sensor faulty or wrongly connected 00100000 00000000 ^

All other alarm codes can be ignored!

21 nciAppOptions	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

(B0) Pressure control master = 1
(B1) Is not used
(B2) System erimix E1 & E2 = 1
(B3) System erimix E3 = 1

SLAVE CONTROL

There are two methodes to slave control, analogue and digital. Setting the values for digital slave control of the KZMa is done with the variables, **18 nviOfsSlaveState** which describse how the slave control shall be preformed, **19 nviOfstSlavePerc** or **20 nviOfstSlaveFlow**, were you can choose between an offset value from the supply/exhaust in l/s or %.

Data setting for, **18 nviOfsSlaveState**

High = offset in l/s

Low = offset in %

For digital transfer one of these values has to be set even if the offset should not be calculated. Setting of the set point pressure value is done with the variable no **23 nciSetptPress**. Set the value which you require between 10-300 Pa. The value for the dead zone **30 nciPressDzone** shall be set to 10% of the pressure setting, a lower value might make the control instable. If the regulator is acting hysteric and does not stabilise the pressure, the actuator is moving back and fourth, you could try with halving the gain factor in **28 nciPressGain**.

FUNCTIONAL CONTROL

Use the handheld terminal KOP to read the status of the regulator in the form of alarm codes and current pressure values. If **2 nvoAlarmStatus** bit 1 = 1 then KZM cannot maintain the pressure set point value as set in 23 nciSetptPress. The reason for this can be that the fan pressure is not sufficient; the variable **7 nvoDampPressVal** shall in this situation should show 100%.

Always check **7 nvoDampPressVal** if the setpoint pressure value cannot be reached. This will indicate whether there is something else in the system that is not working, a fully open damper indicates that the fan pressure is not sufficient, or the reverse, a virtually fully closed damper means that the fan pressure has been set unnecessarily high.

In some cases the integrated PI regulator works too quickly bringing about large fluctuations in the pressure, which do not seem to stabilise. In order to correct this problem you can adjust the gain factor **28 nciPressGain** to a lower value, try with values between 0.3 - 0.1. Even the **29 nciPressItime** can be reduced to achieve a faster control; lowest recommended value is 20 sec.

Great differences in the measured pressure values and read values can be due to the incorrect installation of the pressure sensor KSP, see the installation instruction for KSP.

Other variables that has significance and which can be checked on the KZM is:

6 nvoBoxFlow (Measured airflow value in l/s) and **5 nvoSetptFlowSlave** the setpoint value with the offset which is sent to the slave regulator KSA when the digital LonTalk communication is used. With analogue connection, all the settings are made in the slave regulator KSA. The variables in the KSA are **15 nviSetptFlowSlave** (l/s). Make sure **33 nciFlowDzone** is not less then 5% of the set point value.

All SNVT-variables for KZM, also see Appendix A in the handbook.
Highlighted variables are the signification for KZM with the regulator KCP.

No	Description	Normal value	**Explanation** with reference to regulator KCP-KCF-KCD-KCW Handbook
0	nciLocation		Any marking max 32 characters entered on the regulator using e.g. LoneMaker for Windows
1	**nvoUnitStatus**	Auto..........	Current operating mode for the regulator, has no significance for KZM
2	**nvoAlarmStatus**	00000000 00000000	
3	**nvoSpaceTemp**	-10.00 °C	Displays duct temperature in system erimix
4	**nvoPressValue**	X.xxxx pasc	Measured pressure value in the branch duct
5	**nvoSetpFlowSlave**	XXX l/s	Measured value sent to the slave regulator KSA
6	**nvoBoxFlow**	XXX l/s	Measure airflow value through KZM
7	**nvoDampPressVal**	XX.XX %	Output data KZM damper position 100%=Open 0%=Closed
8	**nvoDampFlowVal**	XX.XX %	Output data to mixing damper in system erimix, 0%=Heat 100%=Cooling
9	**nviApplicMode**	Auto	Possibility to positively drive the damper, has no significance on KZM
10	**nviSpaceTemp**	Invalid	Input data from exhaust temperature in system ***erimix E2.***
11	nviSetpoint	Invalid	Does not apply to KZM
12	**nviPressValue**	Invalid	Input data if measured pressure value via the LonNetwork
13	**nviPressOffse**t	0 pasc	Input data if the pressures deviation value via the LonNetwork
14	nviFlowOffset	0.0000 l/s	Does not apply to KZM
15	nviSptFlowSlave	0 l/s	Does not apply to KZM
16	**nviEmergCmd**	Normal	Positively driven operation of the regulator from a master system
17	**nviManOverride**	Off 0.00 %	Possibility of manual positively drive of the damper/diffuser position 0-100%, only the function position has an effect on this regulator
18	**nviOfstSlaveState**	Off	Setting if the slave flow shall be offset from the BoxFlow. High=l/s, Low= %, Off=no offset
19	**nviOfstSlavePerc**	0 %	Offset in % can be possitve or negative
20	**nviOfstSlaveFlow**	0 l/s	Offset in l/s can be possitve or negative
21	**nciAppOptions**	00000000 00000000	Setting the regualtor´s function. For KZM the normal value applies
22	**nciSetpoints**	oc=18 oh=26	Control parameter for upper duct cooling temp and lower duct heating temp. in *sys-tem* ***erimix***.
23	**nciSetptPress**	50.0000 pasc	The set point value for the branch duct pressure
24	**nciPressMin**	10.0000 pasc	Minimum setting for the set point value on the regulator
25	**nciPressMax**	300.0000 pasc	Maximum setting for the set point value on the regulator
26	nciMinFlow	0 l/s	Does not apply to KZM
27	nciMaxFlow	0 l/s	Does not apply to KZM
28	**nciPressGain**	0.5000	Gain factor in the PI-regulator for pressure controlling
29	**nciPresstime**	60	Integration time in the PI-regulator for pressure controlling
30	**nciPressDzone**	5 pasc	The dead zone for the PI-regulator (ought to be 10% of **23 nciSetptPress**)
31	**nciFlowGain**	0.5000	Mixing control in system ***erimix***, value is set to 1.0
32	**nciFlowtime**	60.0	Integration time in the PI-regulator for mixing control for ***erimix***
33	nciFlowDzone	5.0 %	Does not apply to KZM
34	**nciFlowConst**	104.0	k-factor for current size, se tabel in commissioning guide
35	nciInstallType		Used by software
36	nciSndHrtBt	0.0	Used by software
37	nciRcvHrtBt	0.0	Used by software
38	nviRequest		Used by software
39	nvoStatus		Used by software
40	nviFileReq		Used by software

No	Description	Normal value	**Explanation** with reference to regulator KCP-KCF-KCD-KCW Handbook
41	nvoFileStat		Used by software
42	**nciFlowPressOfst**	0.0 Pa	0-calibration parameter for flow pressure sensor
43	**nciNumCoolcase**	1	number of rooms to be controlling the change of cooling/heating mode in the system ***erimix***
44	**nciDuctTempMin**	13.00 °C	Lower control limit for duct temperature system ***erimix,*** compare with no 22 oc.
45	**nciDuctTempMax**	28.00 °C	Higher control limit for duct temperature system erimix, compare with no 22 oh.
46	nviSptFlowSlave2	Invalid	Slave air flow from unit 2, does not apply for KZM.
47	nviSptFlowSlavee	Invalid	Slave airflow from unit 3, does not apply for KZM.
48	nviSptFlowSlave4	Invalid	Slave airflow from unit 4, does not apply for KZM.
49	nviSptFlowSlave5	Invalid	Slave airflow from unit 5, does not apply for KZM.
50	**nviDampPosCool**	95%	Limit value for reposition to cooling mode in ***erimix system E1***
51	**nviDampPosHeat**	95%	Limit value for reposition to heating mode in ***erimix system E1***
52	**nviDampPos1**	0% OFF	Input data from room regulator 1 (KCD) in ***erimix system E1***
53	**nviDampPos2**	0% OFF	Input data from room regulator 2 (KCD) in ***erimix system E1***
54	**nviDampPos3**	0% OFF	Input data from room regulator 3 (KCD) in ***erimix system E1***
55	**nviDampPos4**	0% OFF	Input data from room regulator 4 (KCD) in ***erimix system E1***
56	**nviDampPos5**	0% OFF	Input data from room regulator 5 (KCD) in ***erimix system E1***
57	**nviDampPos6**	0% OFF	Input data from room regulator 6 (KCD) in ***erimix system E1***
58	**nviDampPos7**	0% OFF	Input data from room regulator 7 (KCD) in ***erimix system E1***
59	**nviDampPos8**	0% OFF	Input data from room regulator 8 (KCD) in ***erimix system E1***
60	**nviDampPos9**	0% OFF	Input data from room regulator 9 (KCD) in ***erimix system E1***
61	**nvoDuctSetpnt**	0.00 °C	Set point value for duct temperature in ***erimix system E1 and E3***

SYSTEM VARIANTS

KRF is intended for airflow control (VAV) with temperature - presence - CO_2 level etc as control parameters. KRF can also control reheat battery in the duct or radiator in the room. For a detailed description of the regulators function see the regulator KCF in the handbook that describes all the e.r.i.c. regulators and their functions, which is available to download as pdf-file from our website.

PUT INTO OPERATION

KRF is always factory set with data for its functions, as airƒPow constants and min/max air volumes. As soon as the 24 VAC is connected the KRF is in operation, and no additional work is called for. In most cases even the **27 nciAppOptions** set in the factory. The regulators operation is determined by the setting in the variable **27 nciAppOptions** (00000000 00000000) 16 bit, se below. Variables that needs to be set is as follows:

39 nciMinFlow (min airflow l/s in normal mode)
40 nciMaxFlow (max airflow l/s in normal mode)
41 nciMinFlowHeat (only when heat control)
42 nciMinFlowStand (only when presence control)

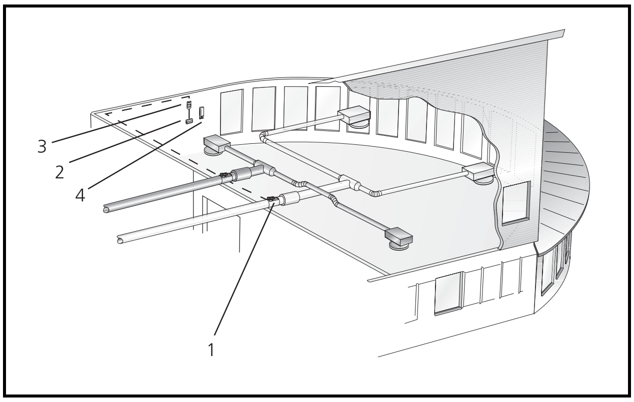


Figure 1. *Legend for the figure.*
1. Airflow regulator KRF
2. Room unit KST 2 (0, 2 or 4)
3. Presence sensor KSO
4. $C0_2$ -sensor KSC

Controlling

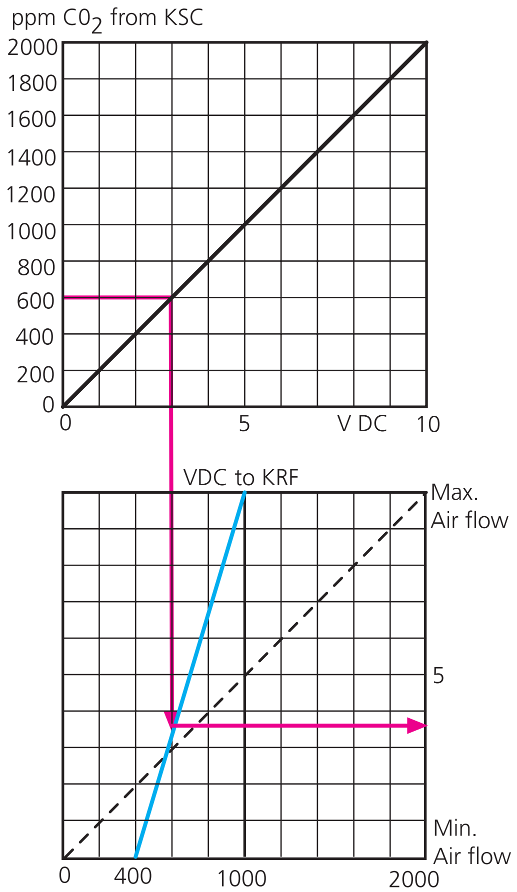
If the regulator controls the damper actuator in to big steps with the result of unstable airflow, the following adjustments is required:
33 nciFlowGain reduced in steps, this will slow down the controls and the steps, try by halving the current factor. Interval 0.1 - 0.5 is recommended, where low values are for big duct sizes. The new KRFc regulator calculates the mean airflow signal value, thus FlowGain normally has a higher value than the older KRFa and KRFc models (0.005 – 0.1).
34 nciFlowItime is factory preset and should not be altered; the value should be 30 sec.

27 nciAppOptions	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
(B0) Presence sensor connected = 1	
(B1) Window switch with power limitation = 1	
(B2) Cooling & heating control = 0 (B2) Only cooling control with air = 1	
(B3) Airflow control without slave control = 0 (B3) Airflow control with slave control of KSA = 1	
(B4) Reheat bettery type Coils in the duct = 0 B4) Heating with radiator in the room = 1	
(B5) CO_2 control = 1	
(B6) Thermo actuator power less closed = 1	
(B7) Control of BLB mixing box = 1	
(B8) Presence sensor with closed switch when presence = 0	
(B10) Extra cooling regulation step = 1	
(B12) Save some nvi'er = 1	

NOTE! B4, B7 and B10 cannot be selected at the same time; only one should have the value 1.

PUT INTO OPERATION CONTINUED

For the slave control of KSA must work the products must be either digital "bound" or analogue connected
to each other. The analogue connection is detected by two wires are connected to the plinth 6 (Z2) and the offset slave airflow (Ofst) is then set in the KSA.
23 nciSetptPress, low=% offset of the exhaust airflow, high= offset of the exhaust airflow in l/s.
24 nviOfstSlavePerc give offset +/- in %
25 nviOfstSlaveFlow give offset in +/- in l/s.
When CO_2 controlling it might be necessary to change the values for the P-band regulation that handles the airflow control. See diagram below for the relation between CO_2 - Current - Airflow.
47 nciSpaceCO_2Low shall normally represent the outdoor level, this value is normally between 340-500 ppm depending on location.
48 nciSpaceCO_2High is the value where the regulator will put out max airflow.



CHECKING THE CO2 -SENSOR

Is simplest done by breathing on the sensor and read of the result in **9 nvoSpaceCO_2**. The regulator should at the same time increase the airflow. Normal values for fresh outdoor air is dependent on the location of the building, in the country side it can be as low as 340 ppm and in cities 500 ppm. Also check **46 nciCO2PerVolt**, which normally shall be 200 when connected with Swegons sensor KSC.
If the combined output OUT1(temperature + CO_2-value) is used, **46 nciCo2PerVolt** should be set on 100, **47 nciSpaceCO_2Low=0** and **48 nciSpaceCO_2High=1000**.

FUNCTIONAL CONTROL

Use the hand terminal KOP to read the status of the regulator in the form of alarm codes and current values.

Bit	Value	Problem
0	0	Non
	1	Deviating room temperature
1	0	Non
	1	Low room temperature
2	0	Non
	1	Window switch alarm
3	0	Non
	1	Too high CO_2 level
4	0	Non
	1	Airflow deviation from set point
5	0	Non
	1	Faulty airflow sensor

You can read more about alarm codes and their values in the handbook page 33. Note that alarm code automatically resets to the value 0 as soon as the reason for the alarm has been corrected, there is no possibility to through the operation panel see a activity log over previous problems.
If the regulator controls the damper actuator in to big steps with the result of unstable airflow, the following adjustments is requiered:
33 nciFlowGain reduced in steps by halving, this will slow down the control with smaller steps, interval 0,01 - 0.5 is recommended.
34 nciFlowItime can be reduced to get a quicker control, lowest recommended is 20 sec.

CHECKING THE AIRFLOW

First check the airflow data to ensure that these are within reasonable limits, remember that the hand terminal only updates the values every 16th second.

To positively drive the regulator towards max or min airflow is easiest done with the variable **16 nviSpace Temp**, this value can be set to -327.19 to check min airflow and +327.17 to check the max airflow. Do not forget to reset the value to INVALID.

7 nvoBoxFlow (Measure airflow l/s) and **5 nvoSetptFlowSlave** is the set point value with the offset that is sent to the slave regulator KSA when the digital LonTalk communication is used. With analogue connection is used all settings are made in the KSA. Equivalent settings in the KSA are **15 nviSetptFlowSlave** (l/s).

If the airflow data is outside the min or max airflow settings, check the damper positions. **11 nvoDampFlowVal**, if this value is 30 - 80% this is indicating that the duct pressure is too low or too high. Corrected by reducing/increasing the duct pressure in the KZP or air handling unit.

CHECKING THE CONTROL OF RADIATOR VALVE

Check that **27 nciAppOptions** is set for heating control. There is only one method of checking the valve control. First by setting **16 nviSpaceTemp** to -327.19 to make sure the valve is opening and then +327.17 to check that the valve is closing. Do not forget to reset to INVALID.

To check that the regulator has changed the outputs can be displayed in **2 nvoUnitStatus** where hp shall show 100.00 at the same time as **56 nvoHeatOutput** shall show 100%.

The output Y1-M shall put out 10V DC, output V1-M shall put out 24 VAC.

CHECK MIXING AIR REGULATION OR EXTRA COOLING STEP

Check that **27 nciAppOptions** is set for every function. Check in the same way as you do the radiator valve as described above. Use the same output.

CHECKING THE PRESENCE CONTROL

Connected analogue presence sensor is checked by reading the variable **13 nvoOccSensor** which shall show Occupied when it is activated. If the function is not correct, check **27 nciAppOptions** bit 0 (=1) and 8 (=0). If the function still is incorrect you can check the regulator by connection the input X2 and M. If **13 nvoOccSensor** still shows Unoccupied the KCF regulator is faulty. The variable **1 nvoEffectOccup** has a delayed disconnection of 20 min, this is adjustable with **58 nciBypassTime**. The variable **13 nvoOccSensor** changes the mode between Occupied and Unoccupied, while **1 nvoEffectOccup** changes between Occupied and StandBye. In standby mode the regulator is operating with other set points for temperature, see more in the manual for the KOP.

CHECKING THE WINDOW SWITCH

Connected window switch blocks the function by closing heating and the airflow is set to 0 l/s. Check is done with the variable **2 nvoUnitStatus**, which shows off when window is open or open switch. When controlling radiator there is a frost protection that will open the radiator valve when room temp go below 10 °C.

All SNVT-variables for KRF, also see Appendix A in the handbook.

No	Description	Normal value	**Explanation** with reference to regulator KCP-KCF-KCD-KCW Handbook
0	nciLocation		Any marking max 32 characters entered on the regulator using e.g. LoneMaker for Windows.
1	nvoEffectOccup	Occupied	Current operating mode; occupied, standbye eller unoccupied
2	nvoUniStatus		Current operating mode; cooling/heating etc. compare with nviApplicMode
3	nvoAlarmStatus	00000000 00000000	Alarm codes if the regulator can not achieve set points
4	nvoEffectSetpt	XX.XX °C	Set point from the room sensor KST on temperature control
5	nvoSpaceTemp	XX.XX °C	Measured room temperature
6	nvoFlowControlPt	l/s	By the regulator calculated airflow set point
7	nvoBoxFlow	l/s	Measure airflow value
8	nvoTerminalLoad	XX.XX %	Shows the controller's airflow set point in relation to nominal airflow (Variable 6/43). Controlled cooling capacity is shown as a percentage in the function with extra cooling step (%)
9	nvoSpaceCO_2	XX ppm	Measured CO_2 level in the room
10	nvoEnergyHoldOff	100 % On	Position of the window switch, Off=closed window, On=open window
11	nvoDampFlowVal	XX.XX %	Displays damper position 0-100%, 100%=open
12	nvoSetptFlowSlave	l/s	Calculated slave airflow including offset
13	nvoOccSensor	Occupied	Displays presence sensor status
14	nviManOccCmd	Invalid	Possibility to manually set the operation mode
15	nviApplicmode	Auto	Possibility to manually set the regulators function or from the BMS
16	nviSpaceTemp	Invalid	Input data for room temperature via LonNetwork
17	nviSetpoint	Invalid	Input data via network, room temp set point offset
18	nviSetpntOffset	0.00 °C	Input data via network, or set increase decrease of room temp set point
19	nviSpaceCO_2	Invalid	Input data via network from CO_2 sensor with LON communication.
20	nviEnergyHoldOff	0 % Off	Input data via network from window switch
21	nviManOverride	0.00 % Off	Possibility of manual positively drive of the damper/diffuser position 0-100%, only the function position has an effect on this regulator
22	nviEmergCmd	Normal	Positively driven operation of the regulator from a master system
23	nviOfstSlaveState	Invalid	Setting if the slave flow shall be offset from the BoxFlow. High=l/s, Low=%, Off= no offset
24	nviOfstSlavePerc	0 %	Offset in %, can be possitve or negative
25	nviOfstSlaveFlow	0 l/s	Offset in l/s, can be possitve or negative
26	nviOccSensor	Invalid	Input data via network from presence sensor
27	nciAppOptions	00000000 00000000	Setting the regualtor´s function
28	nciSetpoints	23,25,28,21,19,16	Set point temperature for the different modes. OC=cooling set point occupied, OH=heating set point at occupied etc.
29	nciSpaceTempDev	2 °C	Max deviation of room temp before alarm is given in (3)
30	nciSpaceTempLow	10 °C	Min room temp before alarm is given in (3)
31	nciVavGain	25.000	Gain factor for cooling control
32	nciVavItime	900 sec.	Integration time in the PI-regulator for cooling control
33	nciFlowGain	0.5	Gain factor for airflow control
34	nciFlowItime	30 sec.	Intergration time in the PI-regulator for airflow control
35	nciFlowDzone	1 %	Dead zone for airflow deviation
36	nciGainHeat	25.000	Gain factor for the heating control
37	nciItimeHeat	900 sec.	Intergration time in the PI-regulator for the heating control
38	nciSpaceTempOfst	0.00 °C	Offset value form measured room temp to real room temp.
39	nciMinFlow	50 l/s	Min airflow in l/s at normal cooling mode
40	nciMaxFlow	300 l/s	Max airflow in l/s at normal cooling mode

No Description	Normal value	**Explanation** with reference to regulator KCP-KCF-KCD-KCW Handbook
41 nciMinFlowHeat	100 l/s	Min airflow in l/s at normal heating mode
42 nciMinFlowStand	25 l/s	Min airflow in l/s at normal standby mode
43 nciNomFlow	1.107 l/s	Nominel airflow in l/s, see table in commissioning guide
44 nciFlowConst	64.0	K-factor for the current size, see table in commissioning guide
45 nciMinHeatValve	0 %	Min position for heating valve
46 nciCO_2PerVolt	200 ppm	CO_2 sensors output at 10V DC divided with 10
47 nciSpaceCO_2Low	400 ppm	Start flow when CO_2 controlled airflow
48 nciSpaceCO_2High	1000 ppm	Max flow when CO_2 controlled airflow
49 nciInstallType	CfgExtern	Used by sofware, does not apply for KRF
50 nciSndHrtBt	0.0 sec	Used by sofware, does not apply for KRF
51 nciRcvHrtBt	0.0 sec	Used by sofware, does not apply for KRF
52 nviRequest	obj id 00000	Used by sofware, does not apply for KRF
53 nvoStatus	00 00 00 00 00 00	Used by sofware, does not apply for KRF
54 nviFileReq	00 00 00 00 00 00	Used by sofware, does not apply for KRF
55 nvoFileStat	000000000000000	Used by sofware, does not apply for KRF
56 nvoHeatOutput	0 %	Gives output signal through LON network to radiator valve
57 nvoSetpntOffset	0.00 °C	Displays offset set in room sensor KST
58 nciBypassTime	20 min.	Active time when put in occupied mode by pressing the over time button or activation of the presence sensor
59 nciFlowPressOfst	0.0 Pa	Zero point calibration of the airflow measuring sensor

KRFc

SYSTEM VARIANTS

KSA is used for airflow control in branch ducts, as slave regulator to KZM or KRF and also as independent constant airflow regulator. For detailed description of the regulators functions, see regulator KCP in the handbook which describes all e.r.i.c. regulators and their functions, available as downloadable pdf-file on our website.

PUT INTO OPERATION

KSA is always configured from factory with the data for its function. As soon as 24 VAC has been connected the KSA is in operation, some bindings may have to be made if using digital data transfer.

21 nciAppOptions shall always be 01000000 000001000. For slave control of the KSA to work, it has to be either bound digitally to the KZM/KRF (if this is done in the factory it will be stated on the product label), or analogue connected to the master KZM/KRF. The analogue connection is noted by wires connected to plinth 8 (Z1).

COMMISSIONING

Changing or checking the variable settings (SNVT) on site is easiest with the operations panel KOP. KOP is connected to KSA, see figure 1.

The operation of the regulator is determined by the settings in the variable nciAppOptins (00000000 00000000) 16 bit, according to the table. KSA only has one setting though, but with different functionalities.

1. **Digital transmitted of the slave airflow setting or constant airflow function**
   When operating as constant flow regulator the variable **15 nviSetptFlowSlave** shall be given the airflow set point in l/s.
   NB! The 13th character in **nciAppOptions** has to be entered after the set point has been entered.
   21 nciAppOptions = 01000000 00001000.
   When the slave airflow set point is digital transmitted via the LON-network, the set point in the variable **15 nviSetptFlowSlave** is automatically set and changes as the master airflow changes.
2. Analogue transmitting the slave airflow set point from the KZM/KRF.
   15 nviSetptFlowSlave shall always be set **INVALID**.
   21 nciAppOptions = 01000000 00001000.
   When transmitted analogue and having different size on slave and master, **nviOfstSlavePerc** must be set as follows:
   Master k-factor / Slave k-factor calculated to %
   Example: Master size 250 slave size 200 gives k-factors 40,0 / 26,5 = 1,51 set the offset to +51%.
   The regulators **nviOfstSLaveState** must in this case be set to **Low**.

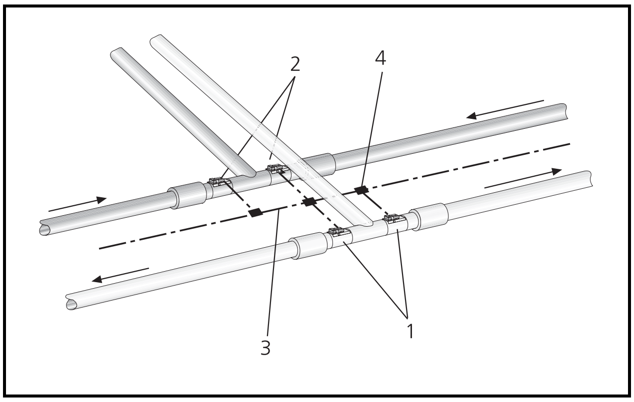


Figure 1. *The components normal location within the duct system.*

1. Pressure regulator KZM
2. Slave regulator KSA
3. LonTalk network cable
4. Connection box for network kable

Regulation by means of the KCP regulator Version 1.16

If the regulator controls the actuator in to big steps, with the result of an instable airflow, the following
variables can be adjusted:

31 nciFlowGain reduced in steps by halving the current value, this slows down the controls by smaller steps. Interval 0,005 – 0,5 is recommended. The larger sizes have a lower value.

32 nciFlowItime is factory preset and should not be altered; the value should be 30 sec.

Regulation by means of the KCP regulator Version 1.17 or later

This type of regulator calculates the mean flow signal value for 6 sec and therefore offers smoother regulation which requires other values than those presented above:

31 nciFlowGain is decreased step by step by halving the current value, this provides slower regulation in smaller steps, an interval of 0.01 – 0.7 is recommended. The larger sizes have a lower value.

32 nciFlowItime is factory set and should not be altered; the value should be 30 sec.

FUNCTIONAL CONTROL

Control of the controlling airflow is done through the variable **15 nviSetptFlowSlave:**

1. With digital airflow control from the master unit, this variable changes to whatever the master is transmitting.
2. With analogue airflow control, this setting shall be set to INVALID. Checking the airflow can only be done in **6 nvoBoxFlow**.

All SNVT-variables for KSA, also see the Appendix A in the handbook
Highlighted variables are the active once for KSA with the regulator KCP.

No Description	**Normal value**	**Explanation** with reference to regulator KCP-KCF-KCD-KCW Handbook
0 nciLocation		Any marking max 32 characters entered on the regulator using e.g. LoneMaker for Windows.
1 nvoUnitStatus	Auto..........	Current operating mode, does not apply for KSA
2 nvoAlarmStatus	00000000 00000000	
3 nvoSpaceTemp	-10.00 °C	Output data exhaust temperature in ***erimix system E2-E3.***
4 nvoPressValue	X.xxxx pasc	Does not apply for KSA
5 nvoSetpFlowSlave	Invalid	Does not apply for KSA
6 nvoBoxFlow	XXX l/s	The present value for current flow through the KSA
7 nvoDampPressVal	Invalid	Does not apply for KSA
8 nvoDampFlowVal	XX.XX %	Output KSA damper position 100%=Open 0%=Closed
9 nviApplicMode	Auto	Possible force control, Does not apply for KSA
10 nviSpaceTemp	Invalid	Does not apply for KSA
11 nviSetpoint	Invalid	Does not apply for KSA
12 nviPressValue	Invalid	Does not apply for KSA
13 nviPressOffset	0 pasc	Does not apply for KSA
14 nviFlowOffset	0.0000 l/s	Does not apply for KSA
15 nviSptFlowSlave	0 l/s	Input data measure airflow, fixed or from master via LON network
16 nviEmergCmd	Normal	Possible forced control from BMS system
17 nviManOverride	Off 0.00 %	Possible forced controlav of damper/diffuser position 0-100%,only the position function apply in this regulator.
18 nviOfstSlaveState	Off	Used only for analogue signal transmission from the master.
19 nviOfstSlavePerc	0 %	Used only for analogue signal transmission from the master.
20 nviOfstSlaveFlow	0 l/s	Used only for analogue signal transmission from the master.
21 nciAppOptions	00000000 00000000	Setting of the regulator function
22 nciSetpoints	18, 26	Applicable to the ***erimix*** System only***.***
23 nciSetptPress	50.0000 pasc	Does not apply for KSA
24 nciPressMin	10.0000 pasc	Does not apply for KSA
25 nciPressMax	300.0000 pasc	Does not apply for KSA
26 nciMinFlow	0 l/s	Does not apply for KSA
27 nciMaxFlow	0 l/s	Does not apply for KSA
28 nciPressGain	0.5	Does not apply for KSA
29 nciPresstime	60	Does not apply for KSA
30 nciPressDzone	5	Does not apply for KSA
31 nciFlowGain	0.5000	Gain factor for airflow control
32 nciFlowtime	60.0	Integration factor for airflow control
33 nciFlowDzone	5.0 %	Dead zone for airflow control
34 nciFlowConst	16.0	K-factor for the current size, see tabel in the commissioning guide
35 nciInstallType		Used by sofware
36 nciSndHrtBt		Used by sofware
37 nciRcvHrtBt		Used by sofware
38 nviRequest		Used by sofware
39 nvoStatus		Used by sofware
40 nviFileReq		Used by sofware

No	Description	Normal value	**Explanation** with reference to regulator KCP-KCF-KCD-KCW Handbook
41	nvoFileStat		Used by software
42	**nciFlowPressOfst**	0.0 Pa	Zero point calibration of the airflow measuring sensor
43	nciNumCoolcase	1	number of rooms to be controlling the change of cooling/heating mode in the system *erimix*
44	nciDuctTempMin	14.00 °C	Lower control limit for duct temperature system erimix, compare with no 22 oc.
45	nciDuctTempMax	30.00 °C	Higher control limit for duct temperature system erimix, compare with no 22 oh
46	**nviSptFlowSlave2**	Invalid	Slave airflow from unit 2
47	**nviSptFlowSlavee**	Invalid	Slave airflow from unit 3
48	**nviSptFlowSlave4**	Invalid	Slave airflow from unit 4
49	**nviSptFlowSlave5**	Invalid	Slave airflow from unit 5
50	nviDampPosCool	95%	Limit value for reposition to cooling mode in system *erimix system E1*
51	nviDampPosHeat	95%	Limit value for reposition to heating mode in system *erimix system E1*
52	nviDampPos1	0% OFF	Input data from room regulator 1 (KCD) in system *erimix system E1*
53	nviDampPos2	0% OFF	Input data from room regulator 2 (KCD) in*erimix system E1*
54	nviDampPos3	0% OFF	Input data from room regulator 3 (KCD) in *erimix system E1*
55	nviDampPos4	0% OFF	Input data from room regulator 4 (KCD) in *erimix system E1*
56	nviDampPos5	0% OFF	Input data from room regulator 5 (KCD) in *erimix system E1*
57	nviDampPos6	0% OFF	Input data from room regulator 6 (KCD) in *erimix system E1*
58	nviDampPos7	0% OFF	Input data from room regulator 7 (KCD) ini *erimix system E1*
59	nviDampPos8	0% OFF	Input data from room regulator 8 (KCD) in *erimix system E1*
60	nviDampPos9	0% OFF	Input data from room regulator 9 (KCD) in *erimix system E1*
61	nvoDuctSetpnt	0.00 °C	Set point value for duct temperature in *erimix system E1* and *E3.*

SYSTEM VARIANTS

KCD regulator can control active diffusers, traditional motorised dampers and radiator valves or reheat coils. For detailed description of the regulators functions, see regulator KCD in the handbook which describes all e.r.i.c. regulators and their functions, available as downloadable pdf file on our website.

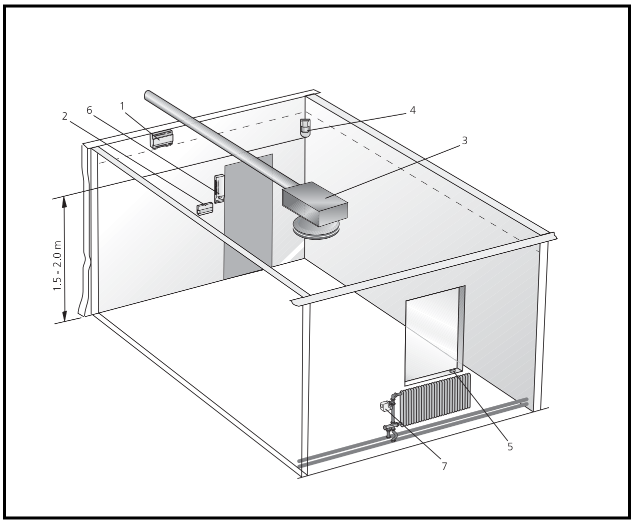


Figure. *The components normal location.*

1. Diffuser regulator KCD
2. Room unit KST 2 (0, 2 or 4)
3. Active diffuser with controller card
4. Presence sensor KSO
5. Window / Door switch
6. CO_2 sensor KSC
7. Radiator valve or Exhaust diffuser

21 nciAppOptions	0 0 0 0 0 0 1 0 0 0 0 0 1 0 0 0
(B0) Occupancy sensor connected = 1	
(B1) Energy hold off device (Window switch) enabled = 1	
(B2) Both cooling and heating control allowed = 0 (B2) Only cooling allowed = 1	
(B3) Heating control with 0-10V = 0 (B3 Demand controlled ventilation with active diffusers = 1	
(B4) System erimix = 1	
(B5) CO_2 control enabled = 1	
(B6) Thermo actuator closed when de-energised = 1	
(B8) Occupancy sensor with closed contact for presence = 0	
(B12) Save some nvi'er = 1	

PUT INTO OPERATION

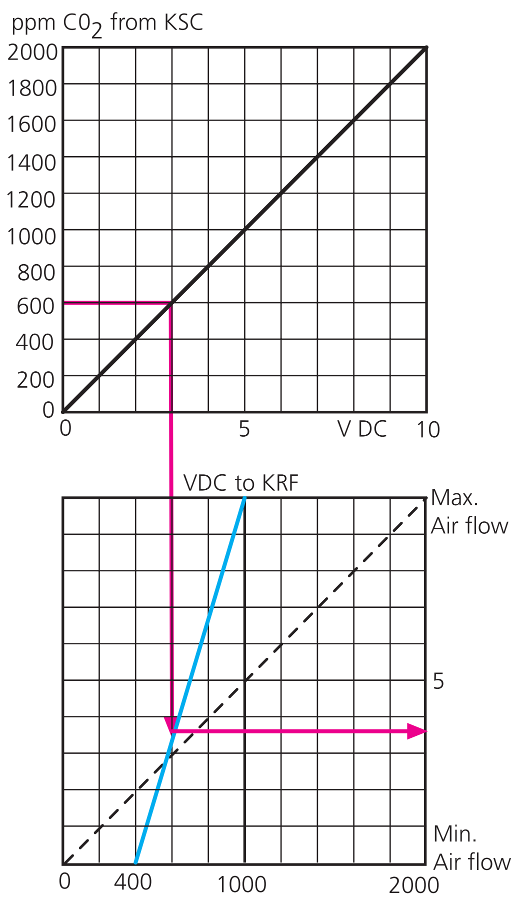
KCD is normally configured from factory with the data for its function. As soon as 24 VAC has been connected the KSA is in operation. A settings document is supplied with the KCD containing the customer specified variable settings in one column and the default values in another column. If the KCD is not configured the document will only contain the default settings.

The regulators operation is determined by the setting in the variable **nciAppOptions** (00000000 00000000) 16 bits, as follows bellow. Controllermunctions as SNVT received by LonTalk does not require definition in **nciAppOptions**.

During CO_2 control you may need to adjust the setting for the P band of the airflow control. See the diagram with the relation CO_2 ¡V Voltage - Airflow.

39 nciSpaceCO$_2$Low shall normally correspond with the level in the supply air, this value should be 340-500 ppm for full fresh air systems depending on the outdoor conditions.

40 nciSpaceCO$_2$High is the level where the regulator gives max airflow rate.



COMMISSIONING

The customer specified factory settings are found on the settings document (SNVT). For additional information of how the variables operates under different operation modes, see the regulators handbook.

Setting of "Airflows" diffuser/damper positions

Setting the airflow can not be done just by entering the airflow as l/s. It must be done by damper position in proportion with the duct pressure. The following values can be set in the regulator:

32 nciMinPosn min supply airflow during occupied mode
33 nciMaxPosn max supply airflow during occupied mode
34 nciMinPosnHeat min supply airflow during heating mode
35 nciMinPosnStand min supply airflow during heating mode
48 nciMinPosnExh min exhaust airflow during occupied mode
49 nciMaxPosnExh max exhaust airflow during occupied mode
50 nciMinPosnStdExh min exhaust airflow during unoccupied mode

With the commissioning graph and the measured pressure on the active diffusers measuring point the airflow is found in the graph or calculated.

Checking the C02 -SENSOR

Is simply done by breathing on the sensor and read of the result in **7 nvoSpaceCO$_2$**. The regulator should at the same time increase the airflow. Normal values for fresh outdoor air is dependent on the location of the building, in the country side it can be as low as 340 ppm and in cities 500 ppm. Also check **38 nciCO2PerVolt,** which normally shall be 200 when connected with Swegons sensor KSC.

If the combined output OUT1 (temperature+CO_2 -value) is used **38 nciCo2PerVolt** should be set on 100, **39 nciSpaceCO$_2$Low=0** and **40 nciSpaceCO$_2$High=1000**.

FUNCTIONAL CONTROL

Use the hand terminal KOP to read the status of the regulator in the form of alarm codes and current values.

Table

Bit	Value	Problem
0	0 1	Non Deviating room temperature
1	0 1	Non Low room temperature
2	0 1	Non Window switch alarm
3	0 1	Non Too high $C0_2$ -level

Whether or not the value is 1 in other positions (4-11) is of no importance for the regulation function of the regulator. There is more to read about the alarm codes and their limit values in the handbook. Take into consideration that the alarm codes are automatically reset to the 0 value as soon as the cause of the alarm has been remedied. It is therefore not possible to directly see any log of events disclosing earlier problems via the operator panel.

CHECKING THE AIRFLOW

Checks can only be carried out by forcing the regulator to the max. and min. positions respectively and in these positions check the pressure in the supply air terminal. See the Commissioning Instructions for each type of supply air terminal.
Forced control of the regulator towards max. or min. airflow is best done with the variable **13 nviSpaceTemp**, this value can be set to -327.19 to check min. airflow and +327.17 to check the max. airflow. Do not forget to reset the value to **INVALID**.

CHECKING THE RADIATOR VALVE CONTROL

Check that **21 nciAppOptions** is set for heating control, bit 2 and 3. There are two outputs for radiator valves, one is 0-10V for actuator control (Y1) which only can be used when the regulator is configured with bit 3=0 and one for thermo actuator (V1) which is used when bit 3=1.
There is only one method of checking the valve control. First by setting **13 nviSpaceTemp** to -327.19 to make sure the valve is opening and then +327.17 to check that the valve is closing. Do not forget to reset to **INVALID.**
To check that the regulator has changed the outputs can be displayed in **2 nvoUnitStatus** where hp shall show 100.00 at the same time as 51 nvoHeatOutput shall show 100%.
The output Y1-M shall put out 10V DC and output V1-M shall put out 24 VAC. If and how different makes of actuators respond differs. For Siemens I=closed and 0=open valve.

CHECKING THE WINDOW SWITCH

Connected window switch blocks the function by closing heating and the airflow is set to 0 l/s. Check is done with the variable **2 nvoUnitStatus**, which shows off when window is open or the switch is open. When controlling radiator there is a frost protection function that will open the radiator valve when the room temperature goes below 10 °C.

CHECKING THE PRESENCE CONTROL

Connected analogue presence sensor is checked by reading the variable **10 nvoOccSensor** which shall show Occupied when it is activated. If the function is not correct, check **21 nciAppOptions** bit 0 (=1) and 8 (=0). If the function still is incorrect you can check the regulator by connection the input X2 and M. If **10 nvoOccSensor** still shows Unoccupied the KCF regulator is faulty. The variable **1 nvoEffectOccup** has a delayed disconnection of 20 min, this is adjustable with **36 nciBypassTime**. The variable **10 nvoOccSensor** changes the mode between Occupied and Unoccupied, while **1 nvoEffectOccup** changes between Occupied and StandBye. In standby mode the regulator is operating with other set points for the temperature control, see more in the manual for the KOP.

All SNVT-variables for KCD, also see the Appendix A in the handbook.

No	Description	Normal value	**Explanation** with reference to regulator KCP-KCF-KCD-KCW Handbook
0	nciLocation		Any marking max 32 characters entered on the regulator using e.g. LoneMaker for Windows.
1	nvoEffectOccup	Occupied	Current operating mode; occupied, standby or unoccupied
2	nvoUniStatus		Current operating mode; cooling/heating etc, compare with nviApplicMode
3	nvoAlarmStatus	00000000 00000000	Alarm codes if the regulator can not achieve set points
4	nvoEffectSetpt	XX.XX °C	Set point from the room sensor KST on temperature control
5	nvoSpaceTemp	XX.XX °C	Measured room temperature
6	nvoTerminalLoad	XX.XX %	Displays the regulators control mode cooling/heating in -100 to +100%. Positive value for cooling, negative value for heating.
7	nvoSpaceCO_2	XX ppm	Measured CO_2 level in the room
8	nvoEnergyHold-Off	0 %	Position of the window switch, Off=closed, On=open
9	nvoDampFlowVal	XX.XX %	Displays the set damper position (Y2) 0-100%, 100%=open
10	nvoOccSensor	Invalid	Displays presence sensor status
11	nviManOccCmd	Invalid	Possibility to manually set the operation mode
12	nviApplicmode	Auto	Possibility to manually set the regulators function or from the BMS
13	nviSpaceTemp	Invalid	Input data for room temperature via LonNetwork
14	nviSetpoint	Invalid	Input data via network, room temp set point offset
15	nviSetpntOffset	0.00 °C	Input data via network, or set increase decrease of room temp set point
16	nviSpaceCO_2	Invalid	Input data via network from CO_2 sensor with LON communication
17	nviEnergyHoldOff	0 %	Input data via network from window switch
18	nviManOverride	Off	Possibility of manual positively drive of the damper/diffuser position 0-100%, only the function position has an effect on this regulator
19	nviEmergCmd	Normal	Positively driven operation of the regulator from a master system
20	nviOccSensor	Invalid	Input data via network from presence sensor
21	nciAppOptions	00000000 00000000	Setting the regulators function
22	nciSetpoints	23,25,28,21,19,16	Set point temperature for the different modes. OC=cooling set point occupied, OH=heating set point at occupied etc.
23	nciSpaceTempDev	2 °C	Max deviation of room temp before alarm is given in (3)
24	nciSpaceTem-pLow	10 °C	Min room temp before alarm is given in (3)
25	nciVavGain	25.000	Gain factor for cooling control
26	nciVavItime	900 sec.	Integration time in the PI-regulator for cooling control
27	nciGainHeat	25.000	Gain factor for the heating control
28	nciItimeHeat	900 sec.	Intergration time in the PI-regulator for the heating control
29	nciSpaceTem-pOfst	0.00 °C	Offset value form measured room temp to real room temp.
30	nciMinFlow	Invalid	Does not apply for KCD
31	nciMaxFlow	Invalid	Does not apply for KCD
32	nciMinPosn	20 %	Damper/diffuser position (Y2) at min flow during cooling 0-100% .(see graph in commissioning guide)
33	nciMaxPosn	80 %	Damper/diffuser position (Y2) at max flow during cooling 0-100% . (see graph in commissioning guide)
34	nciMinPosnHeat	20 %	Damper/diffuser position at min flow during heating 0-100%. (see graph in commissioning guide)
35	nciMinPosnStand	20 %	Damper/diffuser position (Y2) at min flow during standby. (see graph in commissioning guide)
36	nciBypassTime	20 min	Activation time for occupied mode by pressing the over time button or activation of the presence sensor
37	nciMinHeatValve	0 %	Min position for heating valve
38	nciCO2PerVolt	200 ppm	CO_2 sensors output at 10V DC divided with 10
39	nciSpaceCO_2Low	400 ppm	Start flow when CO_2 controlled airflow
40	nciSpaceCO_2High	1000 ppm	Max flow when CO_2 controlled airflow

No	Description	Normal value	**Explanation** with reference to regulator KCP-KCF-KCD-KCW Handbook
41	nciInstallType	CfgExtern	Used by software, do not change!
42	nciSndHrtBt	0.0 sec	Used by software, do not change!
43	nciRcvHrtBt	0.0 sec	Used by software, do not change!
44	nviRequest	obj id 00000	Used by software, do not change!
45	nvoStatus	00 00 00 00 00 00	Used by software, do not change!
46	nviFileReq	00 00 00 00 00 00	Used by software, do not change!
47	nvoFileStat	000000000000000	Used by software, do not change!
48	nciMinPosnExh	20 %	Exhaust terminals damper position (Y1) at min flow, comp. nciMinPosn
49	nciMaxPosnExh	80 %	Exhaust terminals damper position (Y1) at max flow, comp.nciMaxPosn
50	nciMinPosnStdExh	10 %	Exhaust terminals damper position at min flow and standby
51	nvoHeatOutput	0.00 %	Displays heat output position 0%=closed 100%=open (max)
52	nvoSpaceTempDev	0.00 %	Displays between measured and pet point value room temp
53	nvoDamPos	0 % OFF	Output diffuser position 0-100% and cooling (ON), heating (OFF) mode for the room with ***erimix system E1***
54	nvoSetpntOffset	0.00 °C	Displays the set point offset of the room sensor KST
55	nviDuctTemp	0.00 °C	Duct temp input data from KZM or KZP with ***erimix system E1-E3***

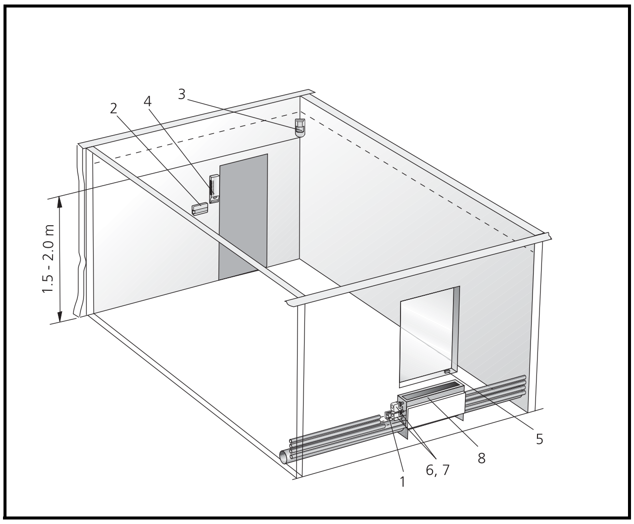


Figure 1.
Legend to the figure.

1. Room regulator KCW
2. Room unit KST 2 (0, 2 eller 4)
3. Occupancy sensor KSO
4. $C0_2$ -sensor KSC
5. Window / Door switch
6. Actuator for radiator valve RWB ST
7. Actuator for radiator valve RWB ST

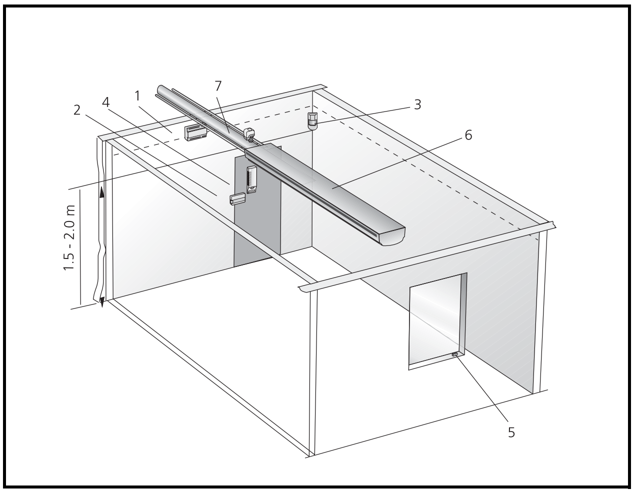


Figure 2.
Legend to the figure.

1. Room regulator KCW
2. Room unit KST 2 (0, 2 or 4)
3. Occupancy sensor KSO
4. $C0_2$ -sensor KSC
5. Window / Door switch
6. Ceiling unit with actuator for radiator valve RWB ST
7. Actuator for forcing the airflow

SYSTEM VARIANTS

The KCW regulator can control perimeter units, chilled beams and active diffusers or duct dampers type ARE. For detailed description of the regulators functions, see regulator KCW in the handbook, which describes all e.r.i.c. regulators and their functions, available as downloadable pdf-file on our website.

PUT INTO OPERATION

The regulators are normally factory preset. An Adjustments document, in which all factory set variables are specified, is then supplied with the product. If the regulator has not been preset at the factory, no values will be specified in the Adjustments document, other than in the column for Default values.

25 nciAppOptions	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
(B0) Occupancy sensor = 1	
(B1) Window switch = 1	
(B2) Heating control enabled = 1	
(B3) Cooling control enabled = 1	
((B4) Air flow control = 1	
(B5) Cooling with water before air = 1 (B5) Cooling with air before water = 0	
(B6) $C0_2$ -control = 1	
(B7) Heating coil in supply air duct = 0 (B7) Radiators/Perimeter unit = 1	
(B8) Occupancy sensor closed contact when presence = 0	
B10) Night cooling with air=0, with water = 1	
(B11) Valve actuators increase/decrese = 0, thermo actuators = 1	
(B12) Save some nvi'er = 1	

NOTE! (B7) and (B11) should be set to 1 when configuring for thermo actuators.

PUT INTO OPERATION Connection

The regulators operation is determined by the setting in the variable **25 nciAppOptions** (00000000 00000000) 16 bits, as follows bellow.

COMMISSIONING

Setting of "airflows" diffuser/damper positions

Setting the airflow cannot be done just by entering the airflow in l/s. It must be done by damper position in proportion with the duct pressure.

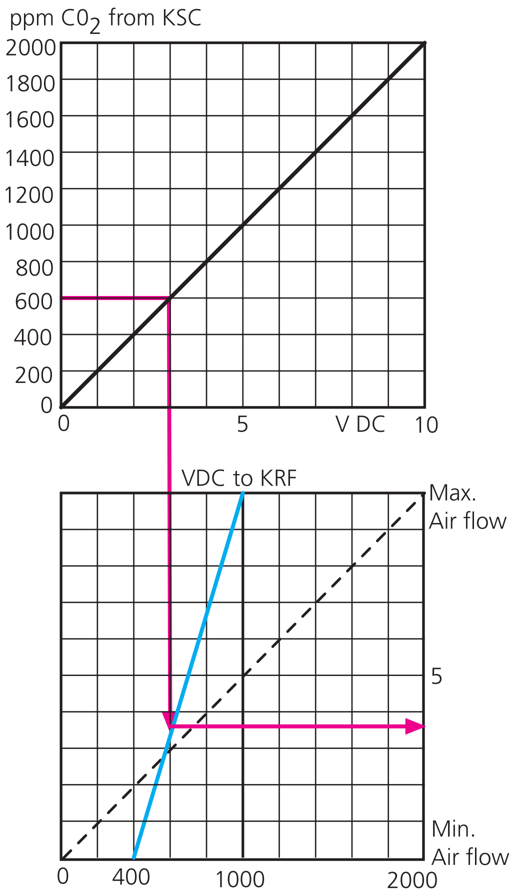
The following values can be set in the regulator:

38 nciMinPosn min. supply airflow during occupied mode
39 nciMaxPosn max. supply airflow during occupied mode
40 nciMinPosnHeat min. supply airflow during heating mode
41 nciMinPosnStand min. supply airflow during heating mode

With CO_2 control you might have to change the setting for the P band controlling the airflow. See graph for the relation between CO_2 – Current - Airflow.

43 nciSpaceCO_2Low shall normally represent outdoor conditions; this value is normally 340-500 ppm depending on the location.

44 nciSpaceCO_2High is the value where the regulator shall give max airflow.



The function of the valve actuator outputs

When the regulator is configured for increase/ decrease valve control, V1 opens and V2 closes the cooling valve and V3 opens and V4 closes the heating valve.

When the regulator is configured for thermo actuators the current on the outputs V1-V4 are according to the table, which shows how the thermo actuators opens and closes during different modes. The heating valve must be of the type powerless closed, and the cooling valve can be either type but the wiring is dependent on the function.

nciValve Override	V1	V2	V3	V4
	Cooling valve		Heating valve	
Open	24VAC	0	24VAC	24VAC
Close	0	24VAC	0	0

FUNCTIONAL CONTROL

Use the hand terminal KOP to read off the status of the regulator in forms of alarm codes and current values.

Bit	Value	Problem
0	0	Non
	1	Deviationg room temperature
1	0	Non
	1	Low room temperature
2	0	Non
	1	Window switch alarm
3	0	Non
	1	Too high $C0_2$ -level

SIMPLE FUNCTIONAL CONTROL

The simple control is used to verify that all actuators are operation in the correct direction and that they are operational. By setting the variable **21 nciManOverride** to Position and the value to 100%, the damper should open fully. Do not forget to reset the variable to position Off.

The valve actuators are checked by setting **24 nciValveOverride** to position Open and Close, to test the actuators directions. Do not forget to reset the variable to position Off.

CHECKING THE COOLING SEQUENCE

To force control the regulator towards max or min airflow is done with the variable **16 nviSpaceTemp**, it is set to +327,17 to check the max airflow for cooling. Do not forget to reset the variable to **INVALID**.

The cooling valve should open first, can be checked by monitoring the variable **9 nvoCoolOutput** which shall display 100%, then, if active diffusers are used, shall the damper open to the value set in the variable **39 nviMaxPosn**, which is checked through **11 nvoDampFlowVal**. If the actuator does not move it could be faulty wiring, cut wires or defect actuator/valve.

The cooling sequence could be reversed so that the diffuser opens first and then the cooling valve.

Reset **13 nviSpaceTemp** to **INVALID** after check.

CHECKING THE HEATING SEQUENCE

Force the regulator by changing **13 nviSpaceTemp** to -327,19 to check the min airflow and heating mode. First the heating valve shall open, which can be check through variable **8 nvoHeatOutput**, which shall display 100%. If the actuator does not move it could be faulty wiring, cut wires or defect actuator/valve.

Reset **13 nviSpaceTemp** to **INVALID** after check.

CHECKING THE C02 -SENSOR

The CO_2 function is only active when the regulator is in the cooling mode. Check the function simply by exhaling air towards the sensor and reading the result in the **7 nvoSpaceCO$_2$**. variable. The regulator should now increase the airflow at the same time. The normal value for fresh outdoor air depends on where the plant is geographically situated. A value for fresh air in the countryside is 340 ppm, whereas a city air can contain 500 ppm. Also check **42 nciCo2PerVolt**, which normally should be 200 connected to Swegon's KSC sensor.

If the combined output, OUT1 (temperature + CO_2 value) is used, the **42 nciCo2PerVolt** should be set to 100, **43 nciSpaceCO$_2$Low=0** and **44 nciSpaceCO$_2$High=1000**.

CHECKING THE OCCUPANCY SENSOR

The occupancy sensor KSO has a red diode that is light behind the front when activated. On the room unit

KST, the red diode shall be lit when the occupancy sensor activates operation mode Occupied. The system disconnect after 20 minutes, which is a fixed setting in the KCW regulator. In the KSO there is possibilities to set the disconnection time for both on and off.

All SNVT-variables for KCW, also see the Appendix A in the handbook

No	Description	Normal value	**Explanation** with reference to regulator KCP-KCF-KCD-KCW Handbook
0	nciLocation		Any marking max 32 characters entered on the regulator using e.g. LoneMaker for Windows.
1	nvoEffectOccup	Occupied	Current operating mode; occupied, standby or unoccupied
2	nvoUniStatus		Current operating mode; cooling/heating etc. compare with nviApplicMode
3	nvoAlarmStatus	00000000 00000000	Alarm codes if the regulator can not achive set points
4	nvoEffectSetpt	XX.XX °C	Set point from the room sensor KST on temperatur control
5	nvoSpaceTemp	XX.XX °C	Measured room temperature
6	nvoTerminalLoad	XX.XX %	Displays the regulators control mode cooling/heating in -100 to +100%. Positive val-ue for cooling, negative value for heating.
7	nvoSpaceCO_2	XX ppm	Measured CO_2 level in the room
8	nvoHeatOutput		Measured value on the heating output 0-100%
9	nvoCoolOutput		Measured value on the cooling output 0-100%
10	nvoEnergyHoldOff	100 %	Position of the window switch, Off = closed On = open
11	nvoDampFlowVal	XX.XX %	Displays the set damper position 0-100%, 100%=open
12	nvoOccSensor	Occupied	Displays presence sensor status
13	nvoAuxTemp		Measured value from additional temperature sensor
14	nviManOccCmd	Invalid	Possibility to manually set the operation mode
15	nviApplicmode	Auto	Possibility to manually set the regulators function or from the BMS
16	nviSpaceTemp	Invalid	Input data for room temperature via LonNetwork
17	nviSetpoint	Invalid	Input data via network, room temp set point offset
18	nviSetpntOffset	0.00 °C	Input data via network, or set increase decrease of room temp set point
19	nviSpaceCO_2	Invalid	Input data via network from CO_2 -sensor with LON communication.
20	nviEnergyHoldOff	0 %	Input data via network from window switch
21	nviManOverride	Off	Possibility of manual positively drive of the damper/diffuser position 0-100%, only the function position has an effect on this regulator
22	nviEmergCmd	Normal	Positively driven operation of the regulator from a master system
23	nviOccSensor	Invalid	Input data via network from presence sensor
24	nviValveOverride	Off	Force driving of the valve actuator **open** or **close**
25	nciAppOptions	00110000 00000000	Setting the regualtor´s function
26	nciSetpoints	23,25,28,21,19,16	Set point temperature for the different modes. OC=cooling set point occupied, OH=heating set point at occupied etc.
27	nciSpaceTempDev	2 °C	Max deviation of room temp before alarm is given in (3)
28	nciSpaceTempLow	10 °C	Min room temp before alarm is given in (3)
29	nciVavGain	25.000	Gain factor for cooling control
30	nciVavItime	900 sec.	Integration time in the PI-regulator for cooling control
31	nciGainHeat	25.000	Gain factor for the heating control
32	nciItimeHeat	900 sec.	Intergration time in the PI-regulator for the heating control
33	nciHeatActStTime	150 sec.	Operation time for the heating valve actuator (def=150 sec)
34	nciGainCool	25.000	Gain factor in the PI-regulator for cooling valve control
35	nciItimeCool	900 sec.	Integration time in the PI-regulator for the cooling valve control.
36	nciCoolActStTime	150 sec.	Operation time for the cooling valve actuator (def=150 sec)
37	nciSpaceTempOfst	0.00 °C	Offset value form measured room temp to real room temp
38	nciMinPosn	20 %	Damper/diffuser position at min flow during cooling 0-100%. (See graph in commissioning guide)
39	nciMaxPosn	80 %	Damper/diffuser position at max flow during cooling 0-100%. (See graph in commissioning guide)
40	nciMinPosnHeat	20 %	Damper/diffuser position at min flow during heating 0-100%. (See graph in commissioning guide)

No	Description	Normal value	**Explanation** with reference to regulator KCP-KCF-KCD-KCW Handbook
41	nciMinPosnStand	20 %	Damper/diffuser position at min flow during standby. (See graph in commissioning guide)
42	nciCO_2PerVolt	200 ppm	CO_2 sensors output at 10V DC divided with 10
43	nciSpaceCO_2Low	400 ppm	Start flow when CO_2 controlled airflow.
44	nciSpaceCO_2High	1000 ppm	Max flow when CO_2 controlled airflow.
45	nciInstallType	CfgExtern	Used by software, do not change!
46	nciSndHrtBt	0.0 sec	Used by software
47	nciRcvHrtBt	0.0 sec	Used by software
48	nviRequest	obj id 00000	Used by software
49	nvoStatus	00 00 00 00 00 0	Used by software
50	nviFileReq	00 00 00 00 00 0	Used by software
51	nvoFileStat	000000000000000	Used by software
52	nciCalcFlow	0 l/s	Input data to calculate damper position (l/s)
53	nciCalcPress	0.0 pasc	Input data to calculate damper position (Pa)
54	nvoCalcResult	0.0000	Calculation constant, does not apply for KCW
55	nciCalcConstC1	0.0000	Calculation constant, does not apply for KCW
56	nciCalcConstC2	0.0000	Calculation constant, does not apply for KCW
57	nciCalcConstC3	0.0000	Calculation constant, does not apply for KCW
58	nciCalcConstC4	0.0000	Calculation constant, does not apply for KCW
59	nciCalcConstC5	0.0000	Calculation constant, does not apply for KCW
60	nciCalcConstC6	0.0000	Calculation constant, does not apply for KCW

SYSTEM VARIANTS

The RTC is a room thermostat that can be used for regulating cooling and heating in a room. When used in the e.r.i.c. System, the output for heating can be reprogrammed to become an output for cooling with separate min./max. settings for an extract air terminal, for example. If the need arises to alter settings, this must be done via the LUNAb T-CU hand terminal. To save on energy, an occupant detection sensor can be connected to the RTC, which then will have a larger dead zone between heating and cooling. RTC be in used to BLB mixing box.

PUT INTO OPERATION

On delivery, the RTC is fitted with jumpers for a 0-10V DC signal on the outputs for heating and cooling. It may become necessary to refit the jumpers for on/off switching, if that type radiator actuator is used. See the jumper positions in Figures 2 and 3.
When the jumpers for the output for heating are refitted, the function of the output has to also be changed using the hand-held micro terminal to convert the regulator to an on/off-regulator. Read more below Commissioning.

The RTC has one LED that indicates the current operational status:

1. Green: Cooling load
2. Red: Heating load
3. Not lit: Neutral position - no output signal

The function of the LED can be checked by turning on the set-point knob.
The RTC has a function key on the circuit card that should **not** be used for applications with the e.r.i.c. System and VAR.

The positions of the hand-held micro terminal

The LUNAb T-CU hand terminal can have 3 different operating modes, ROOM (LOKAL), READ (LÄS) and WRITE (SKRIV). More information about these is available in a separate manual for the LUNA T-CU.

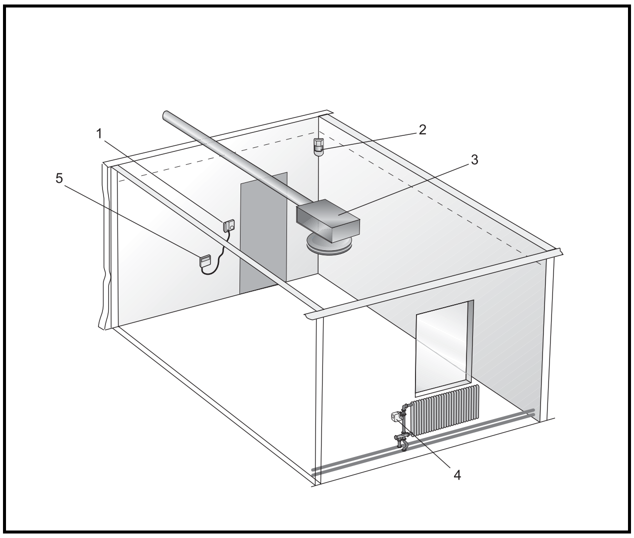


Figure 1.

Legend to the figure.

1. Room regulator RTC
2. Occupancy sensor KSO
3. Active air terminal with control circuit card
4. Radiator valve or exhaust air terminal
5. LUNAb T-CU hand terminal

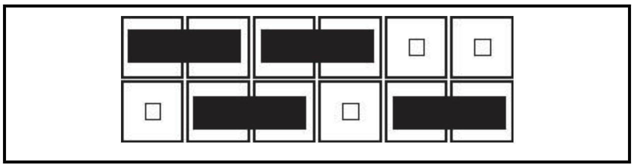


Figure 2. *Shows the standard jumper positions for use in the e.r.i.c. System and for the VAR.*

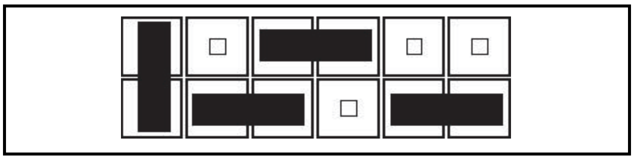


Figure 3*. Shows the jumper positions for on/off control of the heating on output 4.*

COMMISSIONING

The min./max. positions for the active air terminals in the e.r.i.c. System can be programmed with the LUNAb T-CU hand terminal. The output values to be set are the voltage limits: ***LIMH V*** (upper limit) and ***LIML V*** (lower limit).
The menu structure is built-up into several levels, where you move to the next level by pressing SELECT and with SET select the sublevel where you advance and go back with the BLUE and RED arrow keys respectively.
Start by reading the settings already in the RTC. Press "READ" (LÄS), set the new values and finally press "WRITE" (SKRIV) for approx. 3 sec. All set values remain in the hand terminal and can be written into the next regulator, simply by using "WRITE" (SKRIV).

Set min/max positions for the active air terminals

To change the min. and max. settings, press SELECT until OUTP.(UTG) is shown. Press SET and select OUTP. (UTG) 4 with the BLUE arrow, acknowledge with SET. Then select the output to be altered with the blue arrow: A1 (normal supply air) or A2 (normal extract air). Then press the BLUE arrow to the desired limit: ***LIML*** and ***LIMH***. To alter the voltage value, press SET and alter with the BLUE/RED arrow. This output must be reset to cooling (the output for heating is the default) if output A2 is used for extract air terminals. Select OUT.no. A2 (UT. Nr A2), press the blue arrow to VK:HHEAT and change to COOL. Press the blue arrow and change the type On/Off to 0-10V. See Figure 4. Save the settings in the room regulator by pressing WRITE (SKRIV) until the display shows PRO!...0.

To change output A2 to on/off regulation for heating

Change the position of the jumpers as shown in the figure on the preceding page. Advance to OUTP. (UTG.) Menu 4, select OUT. no. A2 (UT. Nr A2), press the blue arrow to TYPE (TYP), press SET and alter the type to On/Off with the blue arrow, confirm with SET.

To set the delay for the presence function

Normally the parameters of the regulator do not need to be changed if an occupant detection sensor is connected. The occupant detection sensor should be connected via the NC contact function (NC= no occupants). Set the switch-in delay directly in the KSO; set the switch-out delay in the RTC. The default is 60 min. To alter the switch-out delay, press SELECT until OUTP. (UTG) is shown. Then press SET and select PRESENCE 6 (NÄRVARO 6) with the BLUE arrow, acknowledge with SET. Then select TIME 0 (TID 0), press SET and change with the blue/red arrow and acknowledge with SET. The switch-in delay can also be set at the TIME 1 (TID 1) parameter.

For more detailed information about all the functions, see the separate manual: 3 LUNAb T-CU Hand terminal.

Set point knob

The factory-preset set points are as followings: The intermediate setting corresponds to 22°C with a tolerance of ±3 degrees.

Function key

The RTC has a function key which should **not** be used for applications with the e.r.i.c. System. If you should inadvertently press on the key, you can recover all the default values by briefly isolating the power supply and then hold the key down for 5 seconds after the power is restored.
The functions of the key:

1. Calibration of internal and external temperature sensors
2. Resetting the memory of the regulator
3. Inverting the output signals on all the heating steps.

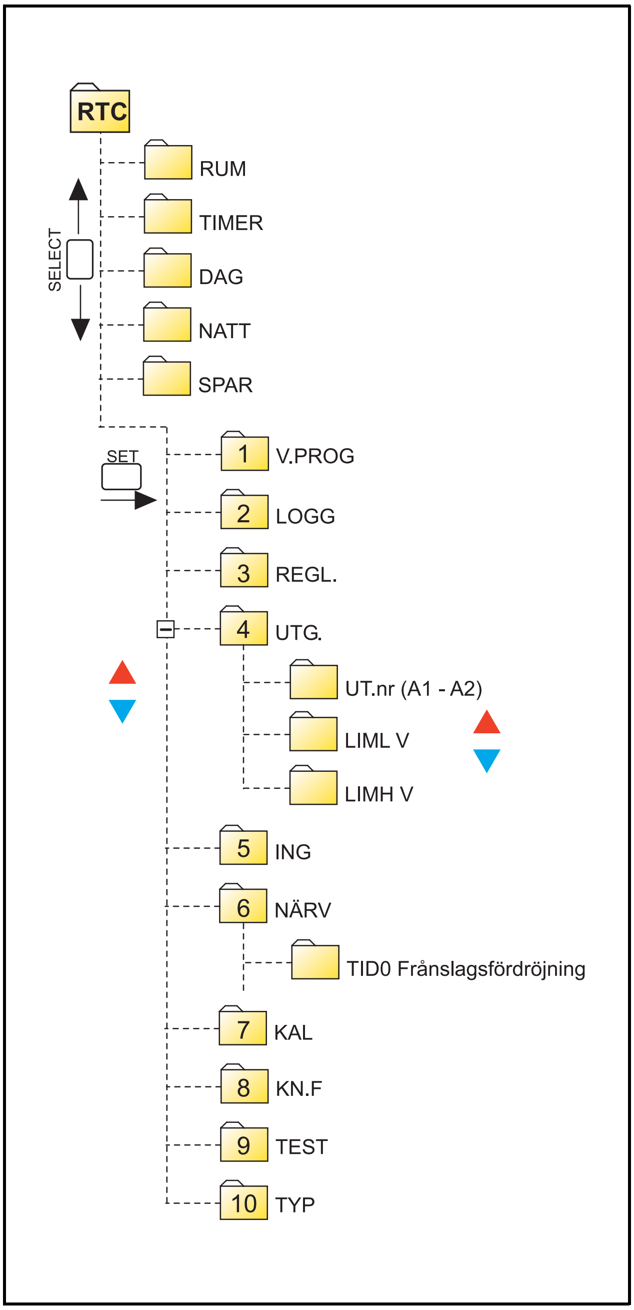


Figure 4. *Menu Structure.*

SYSTEM VARIANTS

The system manager KSM is only available in one execution for optimising the fan operation. The control of the air handling unit's pressure control is done through LonTalk communication between the KSM and the AHU's Lon module.

PREPARATION WORK

The system manager has default values which make the start up procedure fast, only a limited number of variables has to be set for the customised operation. Additional information can be found in the commissioning guide.

FUNCTIONAL CONTROL

The control s preformed with the help of the hand terminal KOP. It connects onto the system manager. If a Lon network is present connecting all units you can access the system manager from the room unit KST. In this case you may have to reset the Lon address, menu 4, to connect with the same **1byte-ID = 11** as the network was setup with. Normally this value shall be 11. The settings in menu 10 shall be: ***Xenta100:ON*** and **MOD:MAN**. These values are set once for all e.r.i.c. components.

OPERATIONAL STATUS

Operating mode – applicable to output data only (u)

Unit operation: If =1 is shown, the unit is operating. Control is permissible, delayed: 1 = control is permissible. This value becomes 1 after the period which is preset in the starting delay.

Sum alarm TF (Supply fan)

Max achieved SF: 1 = achieved max pressure value supply fan.

Sum alarm FF (Exhaust fan)

Max achieved EF: 1 = achieved max pressure value exhaust fan.

Control signal FF

Set point value out: Pressure set point to AHU in % and Pa.
Adjusted set point: in Pa.
Stop start SetPt: Restart control. 1 or 0, at 1 the KSM restarts on start set point.

Damper alarm TF/FF

Indicates whether any damper has reached 100% longer than the preset alarm limit period.

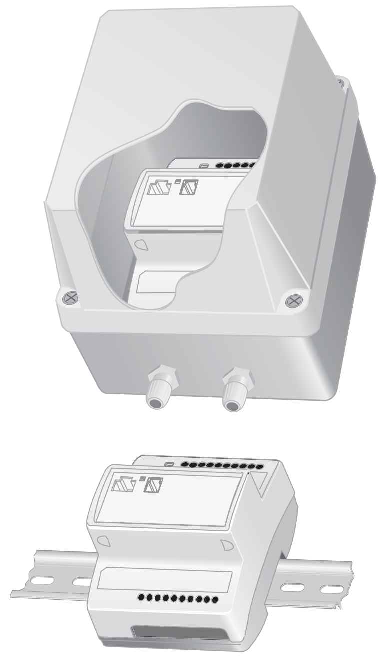


Figure 1.

MEASURED VALUES

Measured values TF/FF

Pressure readings in the unit as well as the positions of the dampers connected (0-100%, 100%=fully open) are indicated as percentages and in Pa. Check the positions of the dampers; they should be within the preset limits. It may happen that one of the dampers becomes controlling because it needs more pressure than all the others. This directs the controls to prevent the dampers from being fully open. If any dampers need to be fully open, the appropriate setting in the controls must be changed to allow higher pressure. If any damper indicates 0%, no link has been established or else the damper has been forced to close at 0%. Keep in mind that there are values for dampers which are not bound! If a damper value shows 166% this indicates that the regulator in question is in a default state. Check the relevant regulator for remedial measures.

Alarm

Here you can see if any control parameters has not achieved their values within the time set in the alarm delay. Alarms are reset using the ENTER key on KOP.
You can also find alarm from connected dampers. A 1 indicate an alarm, the damper has not achieved its max value within the time set in the alarm delay.

Operation time

Number of hours KSM has been operating (can also be reset here).

COMMISSIONING

For optimal operation of the system manager a few parameters must be set, those are marked with * . The system manager optimises the operation of the AHU even if these parameters are not set, but then only towards four dampers. The figure on the right shows the menu structure in the system manager. To change parameters the KSM has to be bound with LonMaker to the branch duct dampers and the AHUs Lon-module. Then connect the hand terminal KOP to the socket on the front of the KSM, do not press OK when the question is displayed, and wait for the direct connection with KSM. KOP must in the OP-menu 10 be set to Xenta 100 : ON and Mode : MAN. In menu 4, the 1byte-ID must be set to the same value as the network was setup with, normally 11.
A commissioning protocol for KSM as an excel-file is available on our website.

Parameter settings

1. Check the pressure range on the AHUs pressure sensors.
2. Set the min, max and start pressure in % under SET POINT VALUES/ SetPt Pressure TFand SetPt Pressure FF.
3. Check how many supply and exhaust dampers that are bound to the KSM. Set these values under CONTROL FUNCTION: Control TF: Number ducts: Control FF: Number ducts.
4. Set the pressure sensor range in Pa under CONTROL FUNCTIONS Pressure range
5. Set time delay before KSM start to control in seconds under OP-menu CONTROL FUNCTIONS Start delay. delay before controlling of the AHU begins KSM

OPERATIONAL STATUS

Operating mode – applicable to output data only (u)
Unit operation: If = 1 is shown, the unit is operating. Control is permissible, delayed: 1 = control is permissible. This value will become 1 after the period preset in the starting delay has elapsed.

Group alarm TF
Max. achieved TF=1 Supply air fan has achieved max. pressure value.

Group alarm FF
Max. achieved FF=1 Exhaust air fan has achieved max. pressure value.

control signals TF and FF
Set point out: The pressure set point to unit in % and Pa.
Regulated set point: in Pa
Stop start Bv (i): Restart regulation. 1 or 0, at 1 the KSM restarts at the start set point.

Operating period
The number of hours the KSM has been in operation (can also be set to zero here).

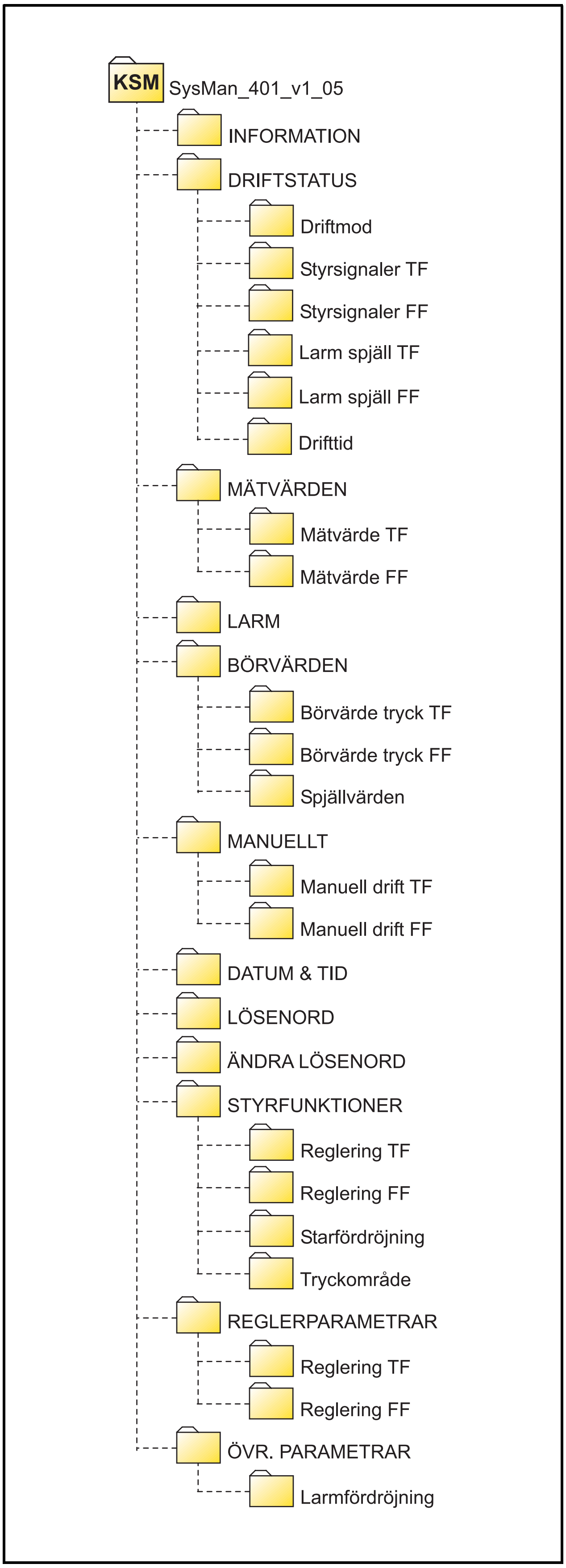


Figure 2. *Menu Structure in the System Manager.*

MEASURED VALUES

Measured values TF/FF

The pressure after the AHU in % and Pa is presented and all connected dampers positions (0-100%, 100%=fully open).

ALARM

Here you can see if any control parameters has not achieved their values within the time set in the alarm delay. Alarms are reset using the ENTER key on KOP.

SET POINT VALUES

These values do normally not require changes.

SetPt Pressure TF/FF

- SetPt Pressure Start: Satart set point in % (default 30%)
- SetPt Pressure Min.: Lowest allowed pressure in % (defalut 10%)
- SetPt Pressure Max.: Highest allowed pressure in % (default 90%)

Damper values

- Increase SetPt TF/FF: At this damper position (85%) KSM increases the pressure set point on the AHUs supply fan.
- Increase SetPt TF/FF: At this damper position (70%) KSM decreases the pressure set point on the AHUs supply fan.

MANUAL

Manual operation TF/FF. This function is only used during the commissioning phase if you wish to fix the duct pressure.
Manual 1=%. 2=Pa: Setting if input data shall be in Pa or %.
SetPt TF %: If previous value is set to 1 this is the manual value in %.
SetPt TF Pa: If first value is 2 this is the manual value in Pa.

DATE AND TIME

Set or change the built in clock. The time is only used for register when an alarm occured.

PASSWORD

State a password to be able to procced (1919).

CONTROL FUNCTIONS

Controlling TF/FF

- Delay next package: KSM controls the pressure by sending out “pressure packages”. The time between these packages is set here (default is 1200 sec). High values gives slow control. Lowest recommended value is 300 sec.
- Package size: Setting of the package size in %. The size is dependent of the interval of the pressure sensor (0-100%) that KSM shall work within. Example: If the pressure sensor range is 0-3000 Pa, then maybe the KSM shall work within the interval 0-20% that means the package size should be smal (0.5%). Default value is 10%.
- Number ducts: Number of ducts/dampers which are bound to the KSM on supply and exhaust side, default value is 4.
- Pressure response from AHU: KSM always wait to send out the next pressure set point until the AHU has achieved the current set point. % allowed offset from set point value, before a new set point value may be sent from the KSM, default value is 2%.

Start delay

- Control delay on start: Setting of the time (sec) before KSM start to control after sending the start pressure set points. Default is 1800 sec, can be reduced but not less then 600 sec.

Pressure range

- Pressure range Pa: Setting of what max output signal from the pressure sensor (10V or 100%) represents in Pa. This value is only used to be able to present real values in the KOP, default value is 500.

CONTROL PARAMETERS

These values are adapted to the unit control parameters.
Control 1time*:* *Default=120 sec.*
This value should be set equal to the I-time set in the AHU pressure control.
Velocity constant: *Default=1.0*
This value is a gain factor depending on the numer of branch duct dampers connected. Value can be adjusted between 0.1-2.
RampVelocity: *Default=2%/min.*
This value effects the speed of how fast the KSM reduces the pressure set point value so that the dampers opens more. Value 1-20 %/minute. If the reduction is slow, dubble the current value, if it is too quick the system can start to hunt.

OTHER PARAMETERS

Alarm delay TF / FF

MaxAchieved TF (FF): Time in seconds until an alarm shall be sent that KSM has achieved its highest allowed pressure set point for the supply fan.
Pressure response TF(FF): Time in seconds until an alarm shall be sent that KSM has achieved its highest allowed pressure set point for the exhaust fan.

BASIC PRINCIPLES

Erimix system E1

The KZP or KZM set with **nciAppOptions** B2=1 and B3=0 provides the complete erimix operation with the KCD room regulators controlling the mixing air temperature. The KCD is bound via the network to the KZP/KZM regulator. Here, the KZP or KZM controls the mixing box BLB.

Important settings for the E1 System:

In the KZP/KZM that controls the mixing air temperature, set the parameter **43 nciNumCoolCase** to the number of room regulators that shall dominate the switch between cooling mode/heating mode. An appropriate number could be 70% of the number of KCD units bound to the KZP/KZM.

ERIMIX system E2.

The KZM set with **nciAppOptions** B2=0 and B3=1 provides the complete erimix operation with the KCD room regulators controlling the mixing air temperature, and the KSA controlling on the extract airflow. The KCD is bound via the network to the KZP/KZM regulator. Here, the KZP or KZM controls the BLB mixing box. The KSA is a slave controlled by the KZM.

Important settings for the E2 System:

In the KZP/KZM that controls the mixing air temperature, set the parameter **43 nciNumCoolCase** to the number of room regulators that shall dominate the switch between cooling mode/heating mode. An appropriate number could be 70% of the number of KCD units bound to the KZP/KZM.

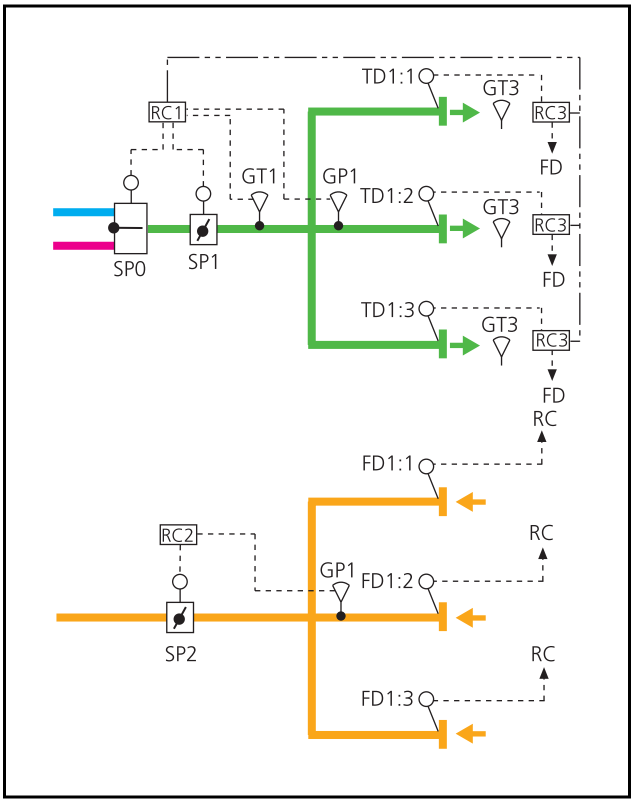


Figure 1. *Flow chart for the E1 Erimix System.*

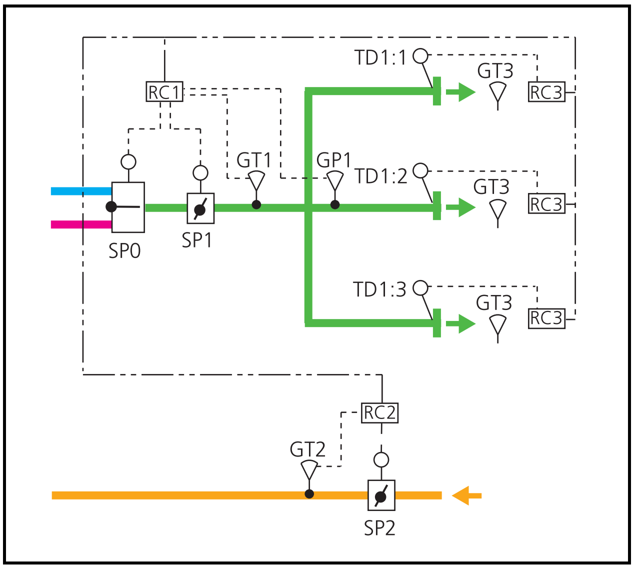


Figure 2. *Flow chart for the E2 Erimix System.*

ERIMIX

CERTAIN BASIC PRINCIPLES

ERIMIX System E3

The KZM set with nciAppOptions B2=1 and B3=1 provides extract air temperature controlled mixing temperature, based on a room temperature set point preset in the regulator in nviSetpoint. Here, the KZM controls the BLB mixing box. The KSA as a slave controls the extract airflow to the KZM; the KSA in turn transmits the extract air temperature to the KZM.

Temperature settings for Systems E1-E3

The supply air temperature is set in the variables in accordance with the following: The heat level in 21 nciSetpoints and the upper limit in 45 nciDuctTempMax; the cooling level in 21 nciSetpoints and the lower limit in 44 nciDuctTempMin. Default values for the regulation ranges are 13-19 °C cooling temperature and 24- 28 °C heating temperature. The dead zone will then be 5 °C.

ERIMIX System E4

Refers to the KRF room regulator that in this case controls the BLB mixing box. The position of the mixing box is read via variable 8, nvoTerminalLoad, where -100% denotes the max. heating level and 100% denotes the max. cooling level. 0% is then the intermediate level. Observe that the damper motor of the mixing box must be set to a 0-10V operating range. For more information about other functions, see the KRF.

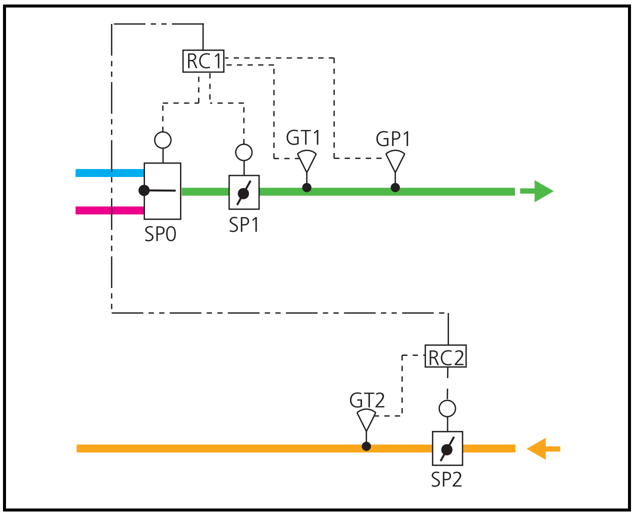


Figure 3. *Flow chart for the Erimix System E3.*

ERIMIX

KOPa Hand Terminal

KOPa HAND TERMINAL

The KOP is supplied with power when it is connected to each unit. Once the KOP has been connected to the relevant unit, the Enter key must be pressed to establish communication with the connected regulator. To view/alter the **nci, nvi** or **nvo** setting values, select the first or the exact value required by pressing the + key and then press Enter. Only the **nci- and nvi-values** can be altered. This is done by pressing the +/- key to increase or decrease the value and by pressing Enter to confirm the change.
If the power supply is too weak, the display will flash. You will then have to switch off the backlight. This can only be done if the terminal is connected at another place where the voltage is sufficient. Only the older KOP terminals have this problem.

Basic settings

If none of the e.r.i.c. system regulators can be reached, this may be due to incorrect settings in the KOP. This can be checked in the OP Service Menu. Connect the KOP, but do **not** press Enter. When WAIT appears on the screen, press keys 2 and 3 at the same time for approx. 3 seconds. Go to Menu 10 and change to the following data:

XENTA100 = ON
MODE = MAN

Finish by returning to the first menu point: EXIT.. and press Enter.

Network number

If the e.r.i.c. regulators are connected to a network, the network page number should be adjusted in the KOP if no contact with any regulator can be established. There is only one possibility to find out which ID-number the network has, and that is by the person who has linked the units to the network. Adjust the ID-number in OP Service Menu no. 4 LONADDRESS (LONADRESS). The following values serve as defaults:

1byte-ID: 11
Subnet: 255
Nod: 70 (Nod 70)

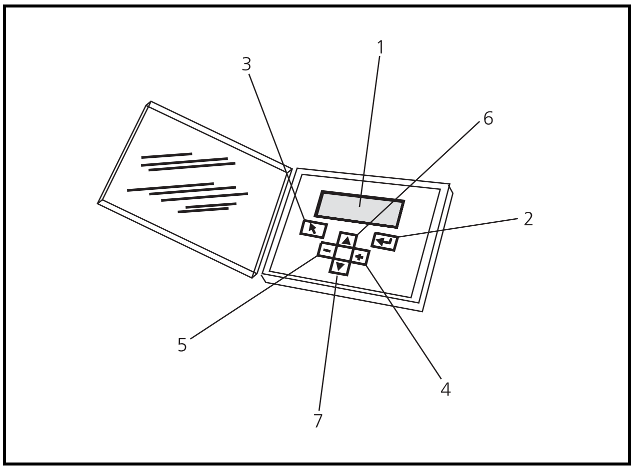


Figure 1. *KOP Hand-held micro terminal.*

1 = Information screen
2 = Enter key
3 = Return to the first SNVT
4 = Increase the setting
5 = Decrease the setting
6 = Return to the preceding SNVT
7 = Advance to the next SNVT

The first display information when the KOP is connected. After a few seconds, press ENTER to continue.

```
XENTA OP V3.31
Swegon AB
```

The second display information after contact is established with the regulator. If the unit is presented as **Unconfigured,** change the setting to **Configured.** Do this by pressing + or - to change the setting.

```
XENTA 100 is:
Configured
PRess <DOWN> to
Continue
```

The third display information indicates which regulator is connected and its version data. Here you can directly select the desired variable.

```
XENTA KCPa v1.00-b1
KCPa-V1-04
Units as SI (^)
NV index? 000
```

Example of how to change a value in the list line-by-line. Use the Enter key to move the cursor to the position to be altered. Alter the value by pressing + or -. Confirm by pressing Enter again.

```
27 nciAppOptions
00000000  00000000
```

Example of how to change a value in the multi-line list. Use the Enter key to move the cursor to the position to be altered. The rectangular blip is in front of the line to be altered. Alter the value by pressing + or -. Confirm by pressing Enter again.

```
28 nciSetpoints
oc23.00      oh21.00
sc25.00      sh19.00
uc28.00      uh16.00
```

Background lighting

To switch on / switch off the backlight. Connect the KOP, but do **not** press on Enter. Press keys 2 and 3 at the same time for approx. 3 seconds when the display shows Wait (Avvakta). Go to Menu 8 and alter the setting by pressing the +/- key. Return to the first menu point: EXIT.. and press Enter.

```
Display backlight
MODE : ON
```

COMMISSIONING

ACK and ALE 1 is normally preset at the factory through the room regulator KCD or KCW. Before taking measurements, make sure that the branch duct regulator is stable and that the pressure set point is achieved.
There is a measuring point on the air terminal to manually measure the current airflow, see picture. Connect the manometer and read of the pressure. Use the k-factor graph to read off which k-factor to be used for the specific damper position (% open).
The Coefficient of Performance (K-factor) Graph is also available as tabulated data.
Use the hand terminal KOP to force the regulator to min and max position by setting the variable 13 nviSpaceTemp to -327,19 and +327,19. Do not forget to reset to INVALID when measuring is completed.
When using the RTC room regulator, it should be set with min and max values stored in the variables LIML V and LIMH V. The values are given in Volts. More information can be found in the RTC section in this document.

The k-factor is used in the formula q = k x √Pi (l/s).

Where q = airflow in l/s
k = k-factor, see graph
Pi = measure air terminal pressure in Pa.

The damper position is adjusted when needed according to the following list:
32 nciMinPosn min supply airflow during occupied
33 nciMaxPosn max supply airflow during occupied
34 nciMinPosnHeat min supply airflow during heating
35 nciMinPosnStand min supply airflow during standby

K-factor table ACKc with ALEa 1

Setting	Volt DC	160	200	250
10%	1,0	0,63	0,77	1,00
15%	1,5	1,77	2,08	2,20
20%	2,0	2,90	3,40	3,40
25%	2,5	4,01	4,88	5,13
30%	3,0	5,12	6,37	6,85
35%	3,5	6,23	7,85	8,58
40%	4,0	7,33	9,33	10,3
45%	4,5	8,37	10,7	12,1
50%	5,0	9,41	12,1	13,8
55%	5,5	10,5	13,5	15,6
60%	6,0	11,5	14,9	17,3
65%	6,5	12,5	16,3	19,1
70%	7,0	13,6	17,6	20,8
75%	7,5	14,2	18,6	22,4
80%	8,0	14,8	19,5	23,9
85%	8,5	15,4	20,5	25,5
90%	9,0	16,0	21,4	27,0
95%	9,5	16,6	22,4	28,6
100%	10,0	17,2	23,3	30,1

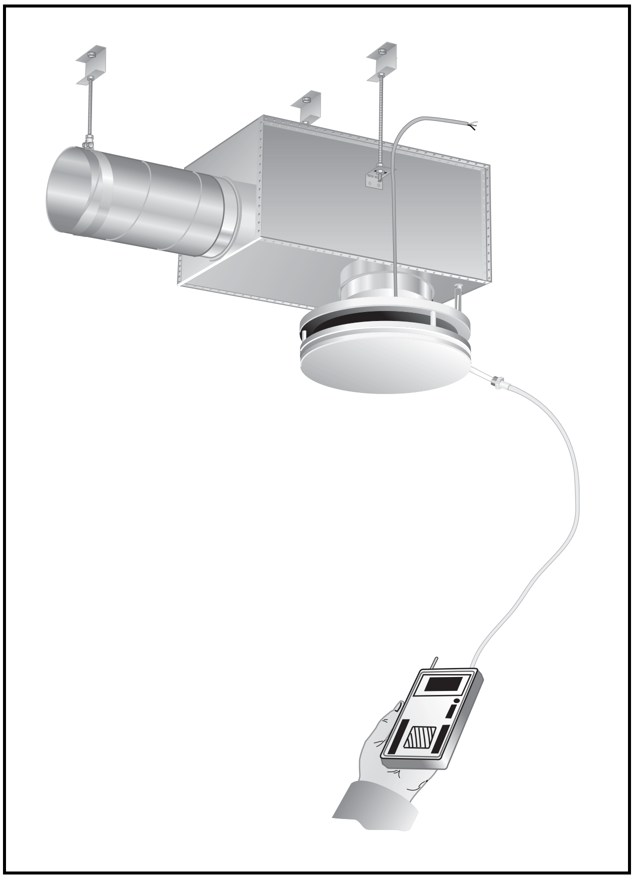
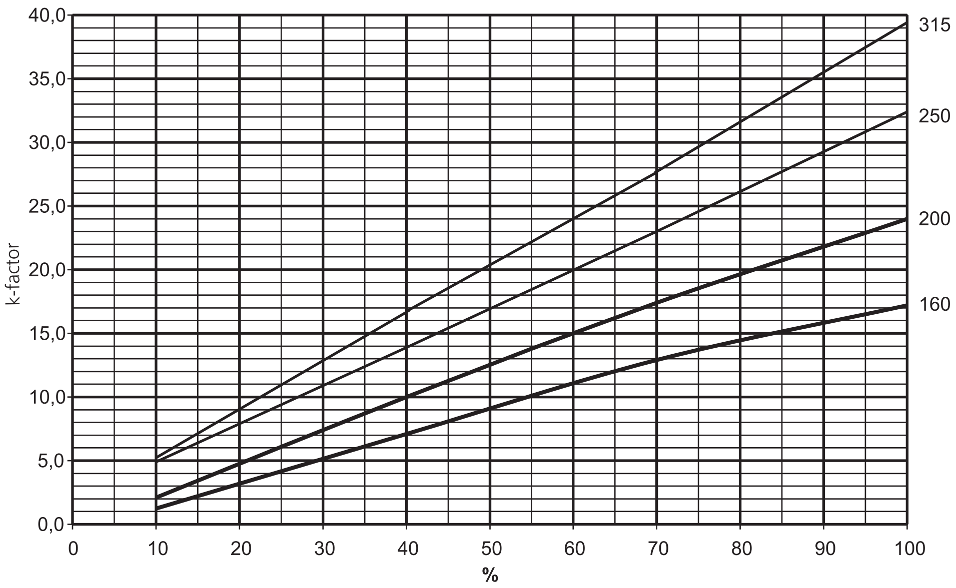


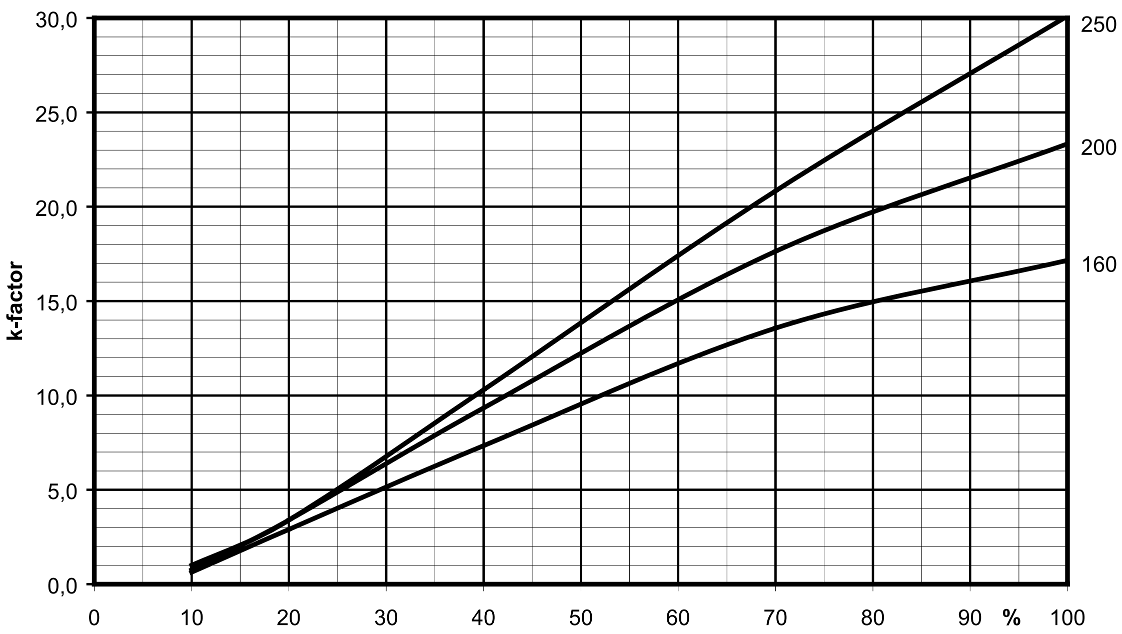
Figure 1. *Commissioning.*

ACKb + ALEa 1



Graph 1. *k-factor graph ACKb (before 31 Dec. 2005). k-factor for the diffekent sizes of terminals and damper position in %.*

ACKc + ALEa 1



Graph 2. *k-factor graph ACKc (as from 1 January, 2006). k-factor for the diffekent sizes of terminals and damper position in %.*

ACK

COMMISSIONING

AKY and ALE 3 is normally preset at the factory through the room regulator KCD or KCW. Before taking measurements, make sure that the branch duct regulator is stable and that the pressure set point is achieved.
There is a measuring point on the air terminal to manually measure the current airflow, see picture. Connect the manometer and read of the pressure. Use the k-factor graph to read off which k-factor to be used for the specific damper position (% open).
The Coefficient of Performance (K-factor) Graph is also available as tabulated data.
Use the hand terminal KOP to force the regulator to min and max position by setting the variable 13 nviSpaceTemp to -327,19 and +327,19. Do not forget to reset to INVALID when measuring is completed.
When using the RTC room regulator, it should be set with min and max values stored in the variables LIML V and LIMH V. The values are given in Volts. More information can be found in the RTC section in this document.

The k-factor is used in the formula $q = k \times \sqrt{Pi}$ (l/s).

Where q = airflow in l/s
k = k-factor, see graph
Pi = measure air terminal pressure in Pa.

The damper position is adjusted when needed according to the following list:
32 nciMinPosn min supply airflow during occupied
33 nciMaxPosn max supply airflow during occupied
34 nciMinPosnHeat min supply airflow during heating
35 nciMinPosnStand min supply airflow during standby

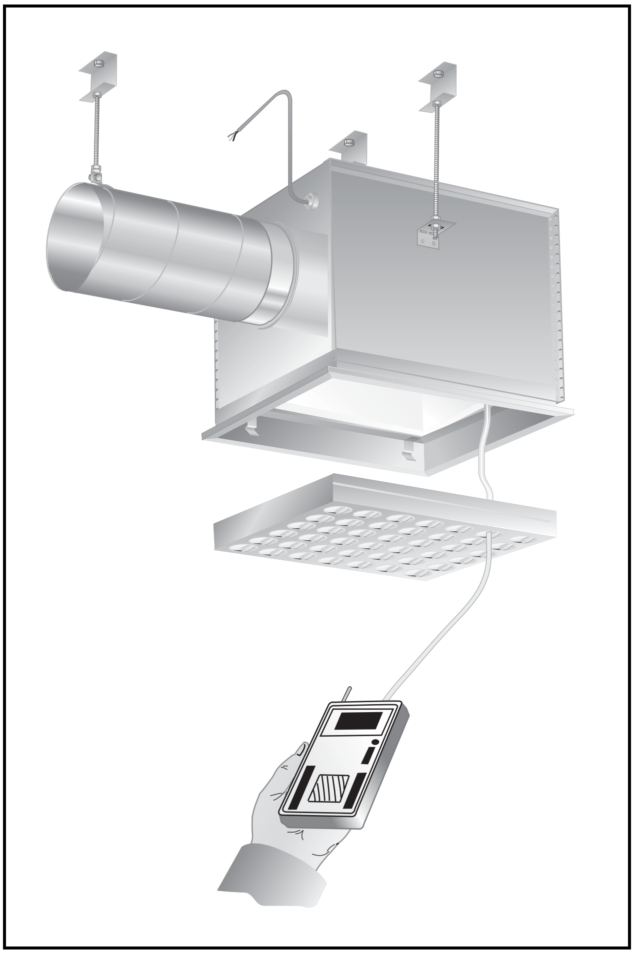
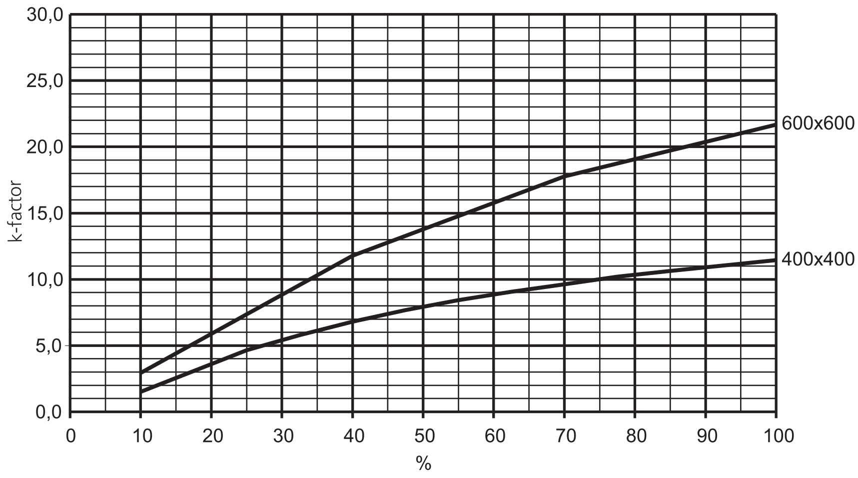


Figure 1. *Commissioning.*

K-factor table AKYb with the new

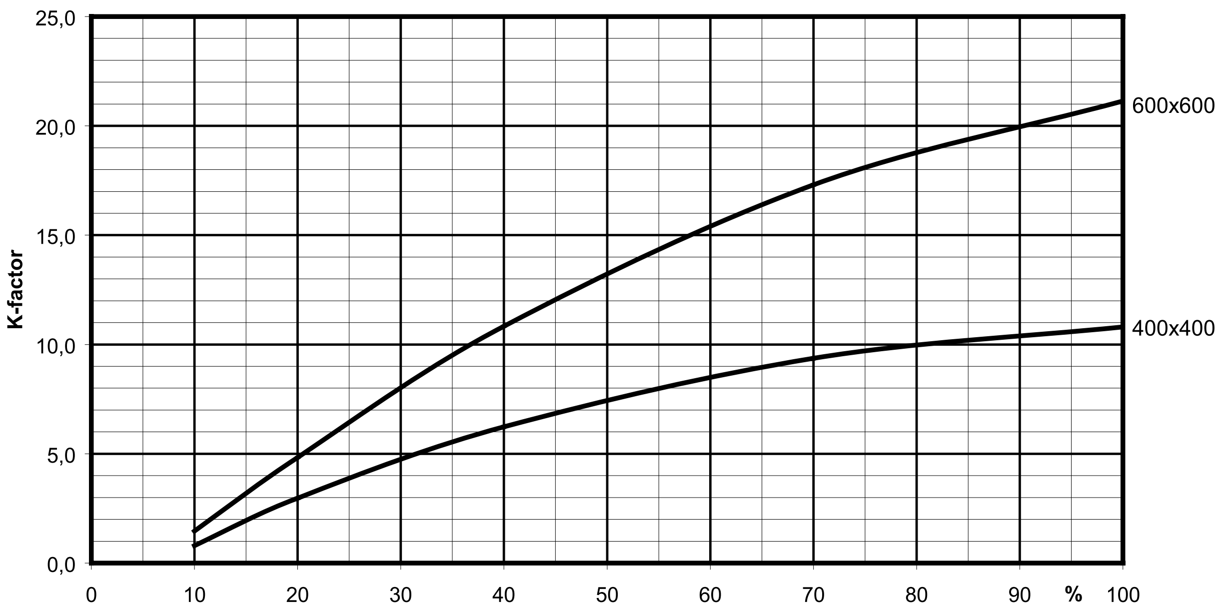
Setting	Volt DC	400-400	600-600
10%	1,0	0,80	1,47
15%	1,5	1,88	3,15
20%	2,0	2,97	4,83
25%	2,5	3,78	6,33
30%	3,0	4,60	7,83
35%	3,5	5,42	9,33
40%	4,0	6,23	10,8
45%	4,5	6,76	11,9
50%	5,0	7,28	13,0
55%	5,5	7,80	14,1
60%	6,0	8,32	15,1
65%	6,5	8,84	16,2
70%	7,0	9,37	17,3
75%	7,5	9,61	17,9
80%	8,0	9,84	18,6
85%	8,5	10,0	19,2
90%	9,0	10,3	19,9
95%	9,5	10,6	20,5
100%	10,0	10,8	21,1

AKYb + ALEb 3



Graph 1. *k-factor graph AKYb (before 31 Dec. 2005). k-factor for the diffekent sizes of terminals and damper position in %.*

AKYb + ALEc 3



Graph 2. *k-factor graph AKYb (as from 1 January, 2006). k-factor for the diffekent sizes of terminals and damper position in %.*

COMMISSIONING

ACL is normally preset at the factory through the room regulator KCD or KCW. Before taking measurements, make sure that the branch duct regulator is stable and that the pressure set point is achieved.

There is a measuring point on the air terminal to manually measure the current airflow, see picture. Connect the manometer and read of the pressure. Use the k-factor graph to read off which k-factor to be used for the specific damper position (% open).

The Coefficient of Performance (K-factor) Graph is also available as tabulated data.

Use the hand terminal KOP to force the regulator to min and max position by setting the variable 13 nviSpaceTemp to -327,19 and +327,19. Do not forget to reset to INVALID when measuring is completed.

When using the RTC room regulator, it should be set with min and max values stored in the variables LIML V and LIMH V. The values are given in Volts. More information can be found in the RTC section in this document.

The k-factor is used in the formula $q = k \times \sqrt{Pi}$ (l/s).

Where q = airflow in l/s
k = k-factor, see graph
Pi = measure air terminal pressure in Pa.

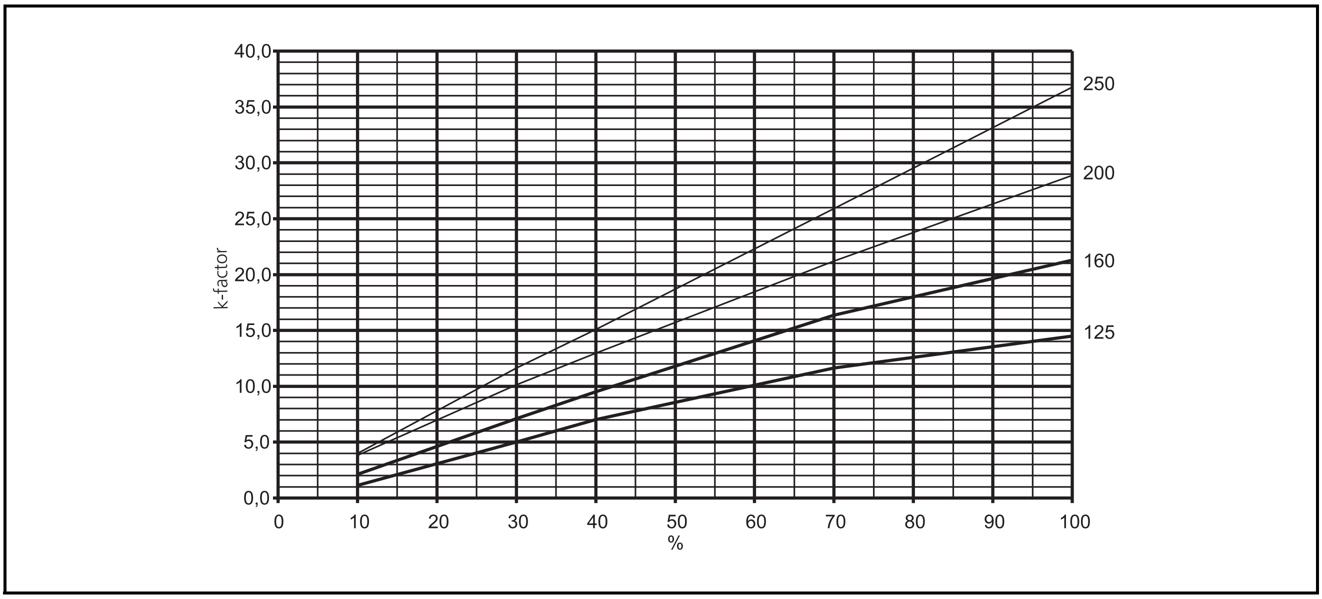
The damper position is adjusted when needed according to the following list:
32 nciMinPosn min supply airflow during occupied
33 nciMaxPosn max supply airflow during occupied
34 nciMinPosnHeat min supplý airflow during heating
35 nciMinPosnStand min supply airflow during standby

K-factor table ALCb

Setting	Volt DC	125	160	200
10%	1,0	0,80	1,13	0,83
15%	1,5	2,28	2,52	2,37
20%	2,0	2,97	3,90	3,90
25%	2,5	4,03	5,28	5,65
30%	3,0	5,08	6,67	7,40
35%	3,5	6,14	8,05	9,15
40%	4,0	7,20	9,43	10,9
45%	4,5	8,04	10,7	12,5
50%	5,0	8,88	11,9	14,2
55%	5,5	9,72	13,2	15,8
60%	6,0	10,6	14,4	17,4
65%	6,5	11,4	15,7	19,1
70%	7,0	12,2	16,9	20,7
75%	7,5	12,6	17,6	21,9
80%	8,0	13,0	18,3	23,0
85%	8,5	13,4	19,0	24,2
90%	9,0	13,7	19,6	25,3
95%	9,5	14,1	20,3	26,5
100%	10,0	14,5	21,0	27,6

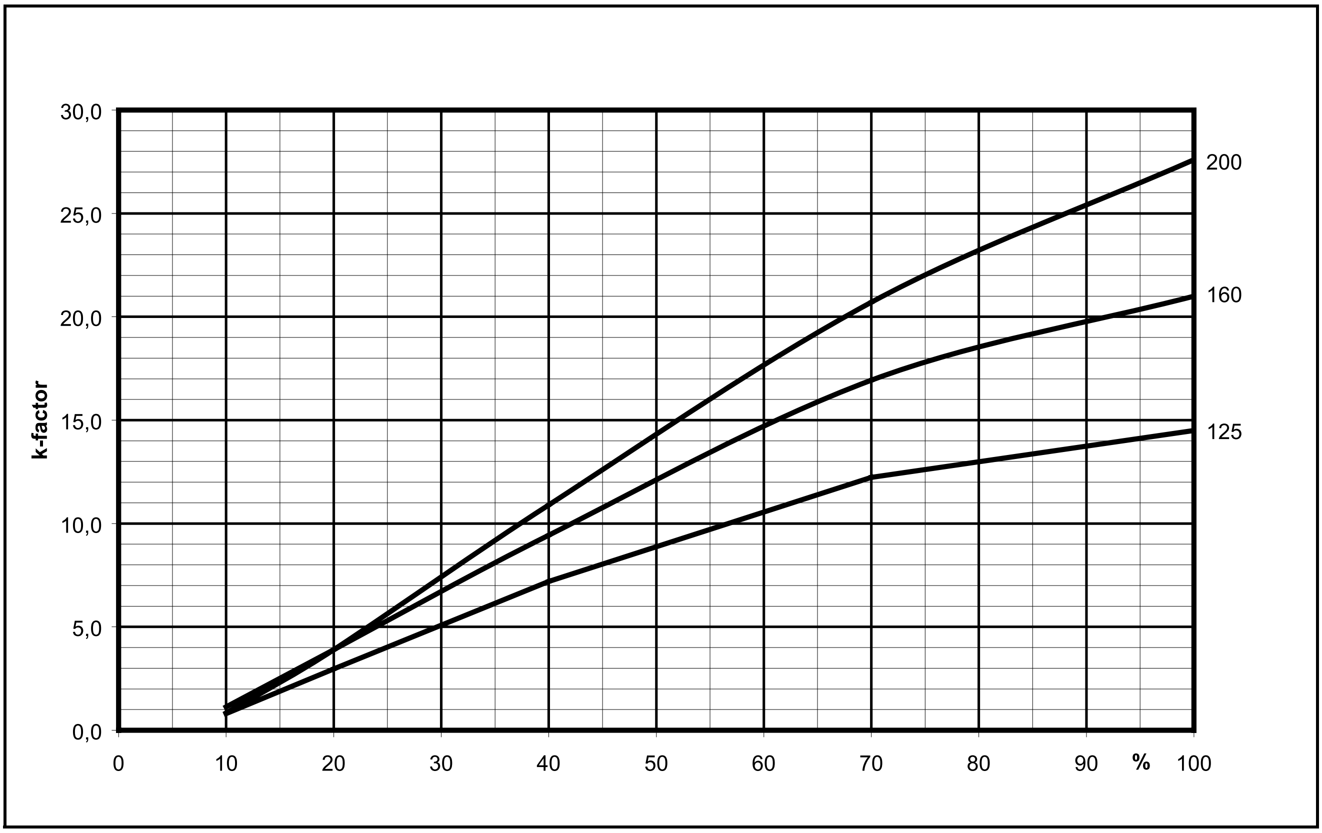
Figure 1. *Commissioning.*

ACLa



Graph 1. *k-factor graph ACLa (before 31 Dec. 2005). k-factor for the diffekent sizes of terminals and damper position in %.*

ACLb



Graph 2. *k-factor graph ACLb (as from 1 January 2006). k-factor for the diffekent sizes of terminals and damper position in %.*

ACL

COMMISSIONING

ARP and AVE is normally preset at the factory through the room regulator KCD or KCW. Before taking measurements, make sure that the branch duct regulator is stable and that the pressure set point is achieved.
There is a measuring point on the air terminal to manually measure the current airflow, see picture. Connect the manometer and read of the pressure. Use the k-factor graph to read off which k-factor to be used for the specific damper position (% open).
The Coefficient of Performance (K-factor) Graph is also available as tabulated data.
Use the hand terminal KOP to force the regulator to min and max position by setting the variable 13 nviSpaceTemp to -327,19 and +327,19. Do not forget to reset to INVALID when measuring is completed.
When using the RTC room regulator, it should be set with min and max values stored in the variables LIML V and LIMH V. The values are given in Volts. More information can be found in the RTC section in this document.

The k-factor is used in the formula $q = k \times \sqrt{Pi}$ (l/s).
Where q = airflow in l/s
k = k-factor, see graph
Pi = measure air terminal pressure in Pa.

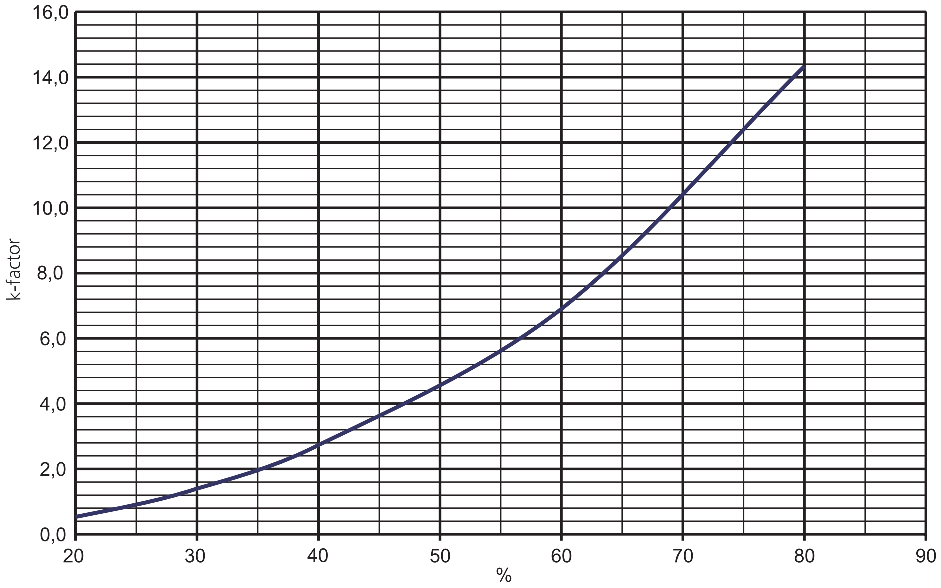
The damper position is adjusted when needed according to the following list:
32 nciMinPosn min supply airflow during occupied
33 nciMaxPosn max supply airflow during occupied
34 nciMinPosnHeat min supply airflow during heating
35 nciMinPosnStand min supply airflow during standby

Figure 1. *Commissioning.*

K-factor table ARPb

Setting	Volt DC	160
25%	2,50	0,90
30%	3,00	1,40
35%	3,50	2,05
40%	4,00	2,70
45%	4,50	3,75
50%	5,00	4,80
55%	5,50	5,85
60%	6,00	6,90
65%	6,50	8,75
70%	7,00	10,60
75%	7,50	12,45
80%	8,00	14,30
85%	8,50	18,45
90%	9,00	22,60
95%	9,50	26,75
100%	10,00	30,90

ARPb



Graph 1. *k-factor graph. k-factor for the diffekent sizes of terminals and damper position in %.*

COMMISSIONING

ARP and AVE is normally preset at the factory through the room regulator KCD or KCW. Before taking measurements, make sure that the branch duct regulator is stable and that the pressure set point is achieved.

There is a measuring point on the air terminal to manually measure the current airflow, see picture. Connect the manometer and read of the pressure. Use the k-factor graph to read off which k-factor to be used for the specific damper position (% open).

The Coefficient of Performance (K-factor) Graph is also available as tabulated data.

Use the hand terminal KOP to force the regulator to min and max position by setting the variable 13 nviSpaceTemp to -327,19 and +327,19. Do not forget to reset to INVALID when measuring is completed.

When using the RTC room regulator, it should be set with min and max values stored in the variables LIML V and LIMH V. The values are given in Volts. More information can be found in the RTC section in this document.

The k-factor is used in the formula q = k x √Pi (l/s).

Where q = airflow in l/s
k = k-factor, see graph
Pi = measure air terminal pressure in Pa.

The damper position is adjusted when needed according to the following list:

48 nciMinPosnExh min exhaust airflow during occupied
49 nciMaxPosnExh max exhaust airflow during occupied
50 nciMinPosnStdExh min exhaust airflow during standby

K-factor table AFKb with ALEc 2

Setting	Volt DC	160	200	250	315
10%	1,0	0,47	0,60	0,57	1,00
15%	1,5	1,03	1,70	2,03	2,78
20%	2,0	1,60	2,80	3,50	4,57
25%	2,5	2,04	3,78	4,67	6,32
30%	3,0	2,48	4,75	5,83	8,07
35%	3,5	2,93	5,73	7,00	9,60
40%	4,0	3,37	6,70	8,17	11,1
45%	4,5	3,76	7,40	9,00	12,3
50%	5,0	4,14	8,10	9,83	13,4
55%	5,5	4,53	8,80	10,7	14,5
60%	6,0	4,92	9,50	11,5	15,6
65%	6,5	5,31	10,2	12,3	16,7
70%	7,0	5,70	10,9	13,2	17,8
75%	7,5	5,89	11,1	13,7	18,4
80%	8,0	6,08	11,3	14,2	19,0
85%	8,5	6,27	11,5	14,8	19,5
90%	9,0	6,46	11,7	15,3	20,1
95%	9,5	6,64	12,0	15,/8	20,6
100%	10,0	6,83	12,2	16,3	21,2

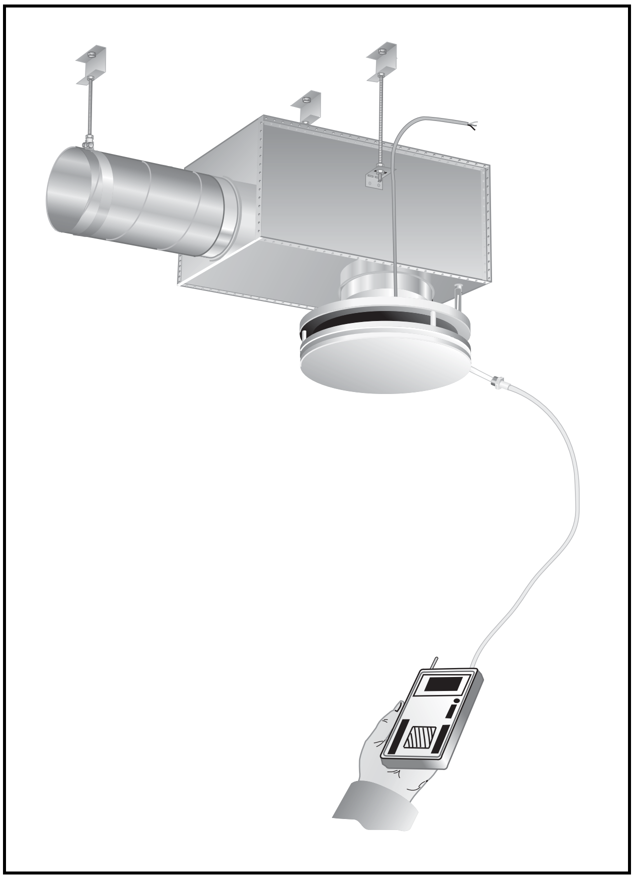
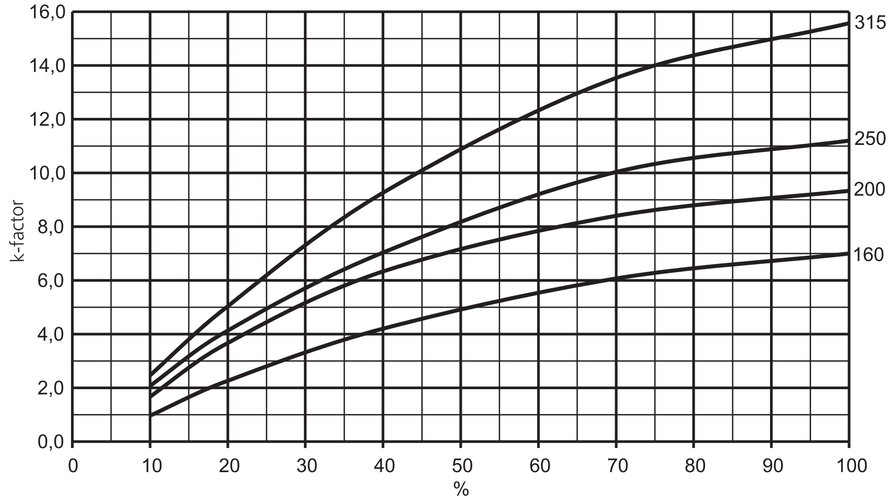


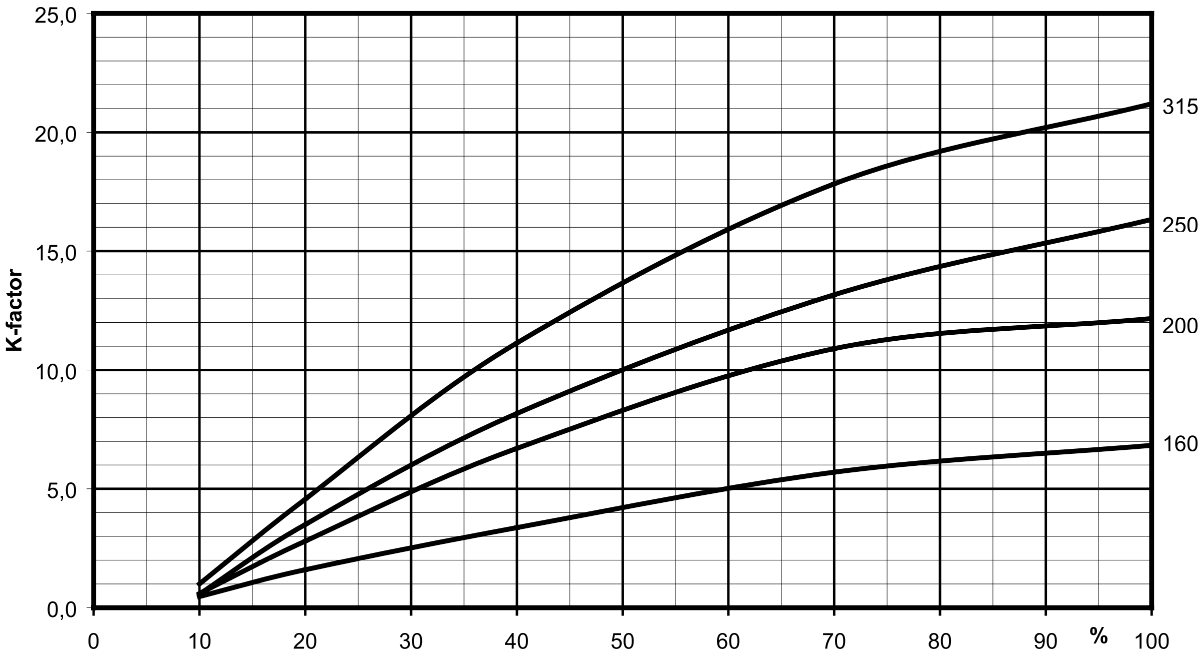
Figure 1. *Commissioning.*

AFKb + ALEb 2



***Graph 1**. k-factor graph AFKb (before 31 Dec. 2005). k-factor for the diffekent sizes of terminals and damper position in %.*

AFKb + ALEc 2



***Graph 2.** k-factor graph AFKb (as from 1 January 2006). k-factor for the diffekent sizes of terminals and damper position in %.*

AFK

COMMISSIONING

ASD and ALE 1 is normally preset at the factory through the room regulator KCD or KCW. Before taking measurements, make sure that the branch duct regulator is stable and that the pressure set point is achieved.
There is a measuring point on the air terminal to manually measure the current airflow, see picture. Connect the manometer and read of the pressure. Use the k-factor graph to read off which k-factor to be used for the specific damper position (% open).
The Coefficient of Performance (K-factor) Graph is also available as tabulated data.
Use the hand terminal KOP to force the regulator to min and max position by setting the variable **13 nviSpaceTemp** to **-327,19** and **+327,19**. Do not forget to reset to **INVALID** when measuring is completed.
When using the RTC room regulator, it should be set with min and max values stored in the variables LIML V and LIMH V. The values are given in Volts. More information can be found in the RTC section in this document.

The k-factor is used in the formula $q = k \times \sqrt{Pi}$ (l/s).

Where q = airflow in l/s
k = k-factor, see graph
Pi = measure air terminal pressure in Pa.

The damper position is adjusted when needed according to the following list:
32 nciMinPosn min supply airflow during occupied
33 nciMaxPosn max supply airflow during occupied
34 nciMinPosnHeat min supply airflow during heating
35 nciMinPosnStand min supply airflow during standby

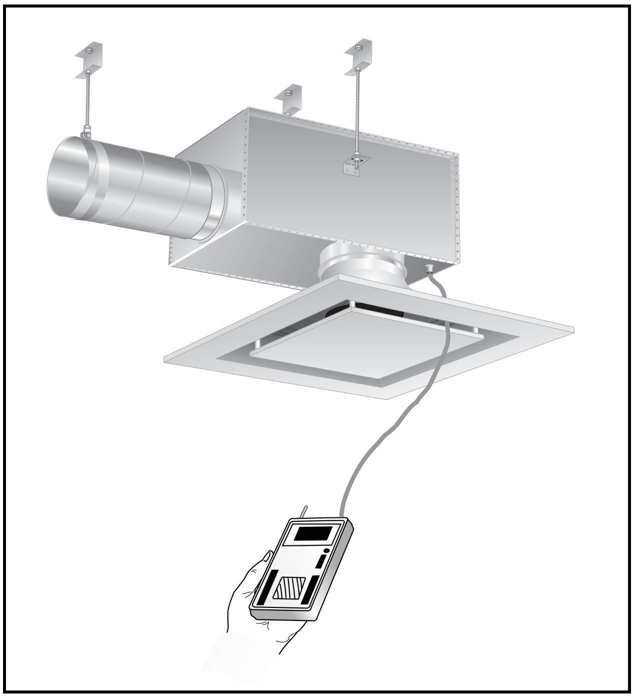
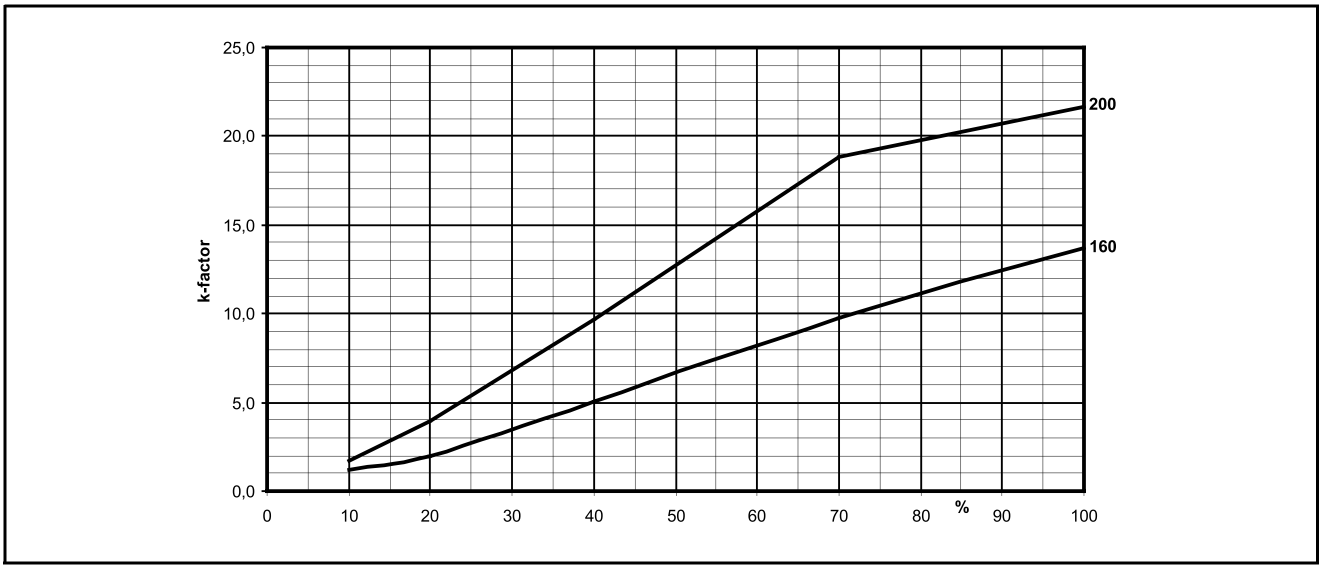


Figure 1. *Commissioning.*

K-factor table ASDa xxx-600-4 with ALEa 1

Setting	Volt DC	160	200
10%	1,0	1,23	
15%	1,5	1,62	
20%	2,0	2,00	
25%	2,5	2,76	
30%	3,0	3,52	
35%	3,5	4,28	
40%	4,0	5,03	
45%	4,5	5,82	
50%	5,0	6,61	
55%	5,5	7,40	
60%	6,0	8,19	
65%	6,5	8,98	
70%	7,0	9,77	
75%	7,5	10,4	
80%	8,0	11,1	
85%	8,5	11,7	
90%	9,0	12,4	
95%	9,5	13,0	
100%	10,0	13,7	

ASDa + ALEa 1



Graph 1. *k-factor graph ASDa. k-factor for the diffekent sizes of terminals and damper position in %.*

ASD