User guide

SH Controller kit

EKE 100 1VK

For cold room applications

Table of Contents

Introduction **3**
Overview 3
Ordering code **3**
Product code numbers 3
Accessories code numbers 3
Applications **4**
Installation **5**
Connections 5
Configuration **6**
Configuring the controller using display 6
Troubleshooting **8**
Alarms and troubleshooting 8
LED indication 8
LED alarm and warning 9
Alarm codes 10
Certificates, declarations and approvals **15**
Online support **16**

Introduction

Overview

The EKE 100 1VK is a comprehensive equipment package designed for controlling electronic expansion valves across various applications, including air conditioning, commercial
refrigeration, and food retail.

It is ideal for situations requiring precise superheat control, effectively regulating superheat to the lowest possible level in a short timeframe. By optimally managing the evaporator's
superheat, even amidst significant load variations, the EKE 100 1VK helps reduce energy consumption and operational costs.

Ordering code

Product code numbers

Type	Material Description	Code number
EKE 100 1VK	Kit EKE100 superheat controller	080G9100

Accessories code numbers

080G5555

Backup power module, EKE 2U

Supply voltage [V] AC: 24, Approval: UL; RoHS; CE, Max. current output/phase [A]: 2, Used for product: EKE 1A; EKD 316C; EIM 365; EKE 1D; MCX152V; EKE 1C; MCX061V; EKD 316; EKE 1B, Packing format: Multi pack

Related products

080G9100

080Z0059

Electron. control accessories, AK-PS 250 STEP3 Accessory Power Supply, Power Supply

AK-PS 250 STEP3 Accessory Power Supply, Used for product: Power Supply, Packing format: Single pack, Quantity per packing format: 1

Related products

080G9100

080N0020

Electron. control accessories, EKA 200 KoolKey, ERC, EET, AK-CC, EKE

EKA 200 KoolKey, Used for product: ERC, EET, AK-CC, EKE, Packing format: Single pack, Quantity per packing format: 1

Related products

080G9100

080Z0057

Electron. control accessories, AK-PS 063 STEP3 Accessory Power Supply, Power Supply

AK-PS 063 STEP3 Accessory Power Supply, Used for product: Power Supply, Packing format: Single pack, Quantity per packing format: 1

Related products

080G9100

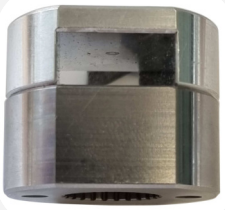
080Z0058

Electron. control accessories, AK-PS 130 STEP3 Accessory Power Supply, Power Supply

AK-PS 130 STEP3 Accessory Power Supply, Used for product: Power Supply, Packing format: Single pack, Quantity per packing format: 1

Related products

080G9100



034G3803

Spare part, ETS 5M, Manual coil

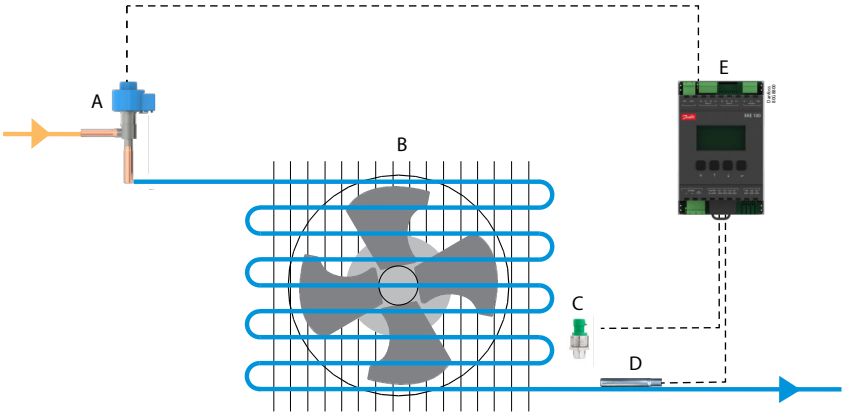
Product Type: Spare part, Used for product: ETS 5M, Type designation: Manual coil, Manual coil

Related products

080G9100

Applications

Figure: Basic application diagram



A	Electric expansion valve
B	Evaporator
C	Pressure transmitter
D	Temperature sensor
E	Electronic controller

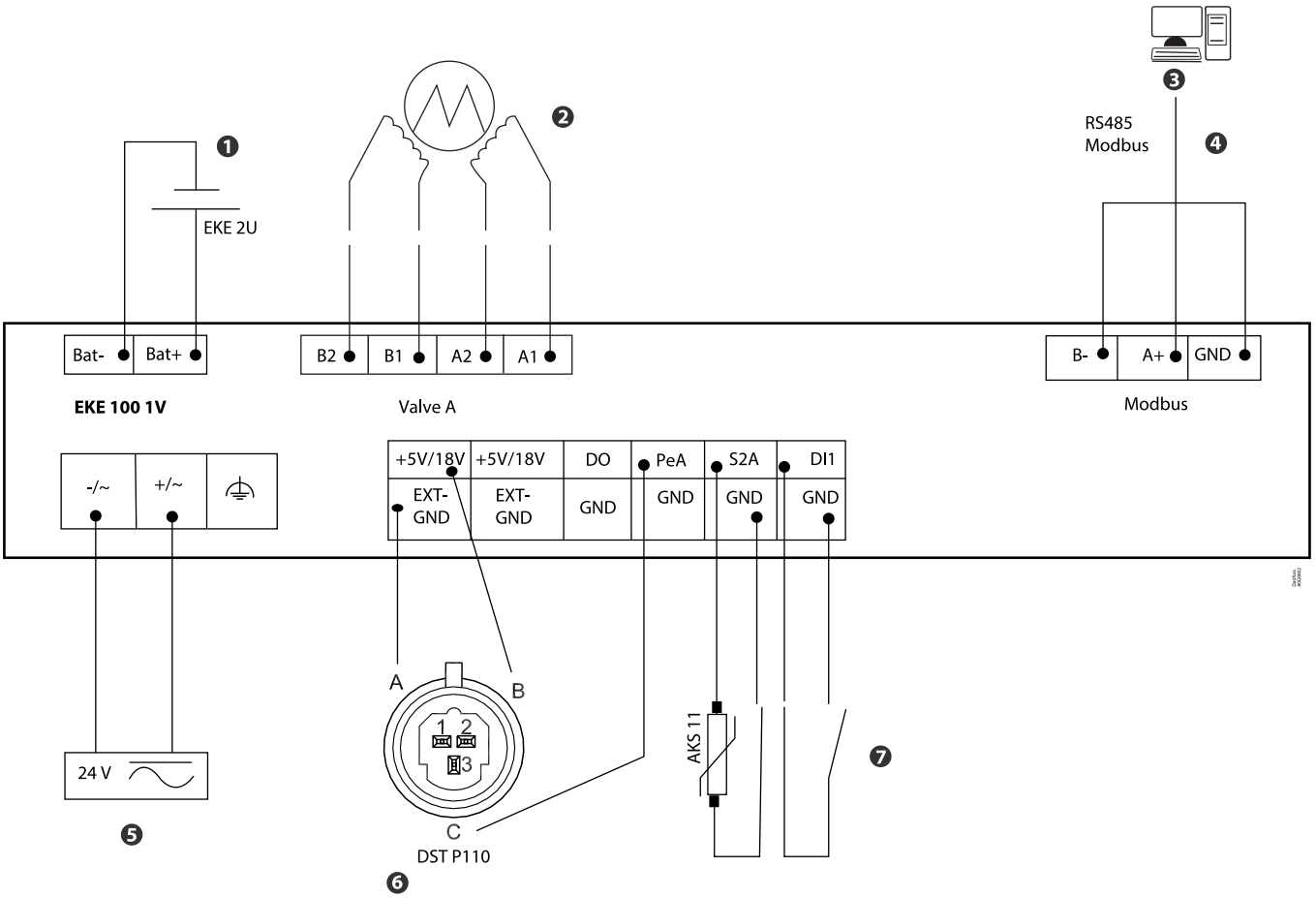
Installation

Connections

Basic connection diagram

Connect the controller to the components in kit as shown below.

Figure: Basic connection diagram



1	Optional Danfoss EKE 2U (sold seperately)
2	Danfoss ETS 5M Biploar
3	Supervisory network
4	Optional, can be connected to supervisory network via RS485
5	Power consumption for ETS 5M Bipolar: 10VA/5W
6	Screen wire of pressure transmitter (green) should be insulated or properly grounded externally
7	DI1: Use voltage free contact, used to start and stop controller. Do not connect relay or high voltage signals directly, this can damage the controller.

Note: ETS 5M valve and EKE 2U are sold separately.

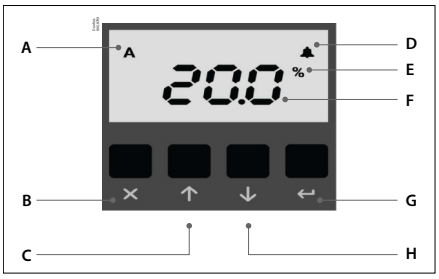
Configuration

The Danfoss superheat controller kit consists of:

1. Superheat controller EKE 100 1V
2. Pressure transmitter DST P110
3. Cable for pressure transmitter
4. Temperature sensor AKS 11
5. Bipolar coil for ETS 5M

Configuring the controller using display

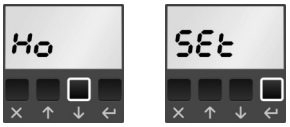
Figure: Controller display



A	Circuit
B	Exit
C	Arrow Up
D	Alarm
E	Unit
F	Text/value
G	Enter
H	Arrow Down

Step 1: Connect EKE 100 as shown in connection diagram and start 24 V supply. Now the display will turn on

Step 2: The screen will show Ho, press ↓ key navigate to Set press ↵



Step 3: Cr12 ↵ Off ↵ press ↓

Step 4: ACtr ↵ On ↵ press ↓

Step 5: ArFg ↵ (select desired refrigerant from list) ↵ press ↓

0 = Undef, 1= R12, 6 = R13, 7 = R13b1, 2 = R22, 8 = R23, 14 = R32, 11 = R114, 3 = R134a, 12 = R142b, 24 = R170, 15 = R227, 25 = R290, 16 = R401A, 18 = R402A, 19 = R404A, 21 = R407A, 22 = R407B, 20 = R407C, 37 = R407F, 49 = R407H, 23 = R410A, 32 = R413A, 30 = R417A, 31 = R422A, 33 = R422D, 34 = R427A, 35 = R438A, 40 = R448A, 41 = R449A, 48 = R449B, 43 = R450A, 42 = R452A, 44 = R452B, 50 = R454A, 45 = R454B, 51 = R454C, 52 = R455A, 9 = R500, 4 = R502, 10 = R503, 17 = R507, 36 = R513A, 53 = R516A, 26 = R600, 27 = R600a, 5 = R717, 28 = R744, 46 = R1233zdE, 39 = R1234yf, 38 = R1234ze, 47 = R1234zeZ, 29 = R1270, 13 = R_user

Step 6: ASLo ↵ (select desired Low SH value from list, value 4 works in most cases) ↵ press ↓

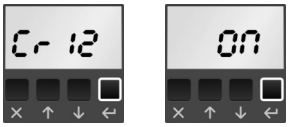
Step 7: ASHi ↵ (select desired Low SH value from list, value 9 works in most cases) ↵ press ↓

Step 8: AC50 ↵ Select 6 ↵ press ↓x3 times until AC59 shows

Step 9: AC59 ↵ Select 24 ↵ press ↓x2 times until AJ00 shows

Step 10: AJ00 ↵ Select 18 ↵ Press ↑x10 times until Cr12

Step 11: Cr12 ↵ On ↵



Note:

1. The controller can be configured using danfoss KoolProg PC tool. For more information, check out user manual available in Danfoss product store. Search for EKE 100 in products and view in documents section.
2. Danfoss KoolProg tool can be used for service and troubleshooting purposes, providing help guides and advanced configuration options.
3. Danfoss offers backup power module EKE 2U (sold separately). Read more about it in Danfoss Product Store.
4. Danfoss offers manual coil (034G3803) for manually moving the ETS 5M valve for troubleshooting and commissioning purposes.
5. Always reboot (power cycle) the controller after configuration.

Troubleshooting

Alarms and troubleshooting

Alarm management and readings:
While using display of EKE 100 press ↵ in Ho to show
AU12: Actual superheat reference (press ↵ to see value press X to go back to previous menu.)
A _TE: Saturated evaporator temperature
A _OD: Valve A opening degree
Cano: number of active alarms
StA, StC: controller status
ALA: active alarms (see alarm section below to see alarm definitions)
Alarms (create a table from data in below excel)

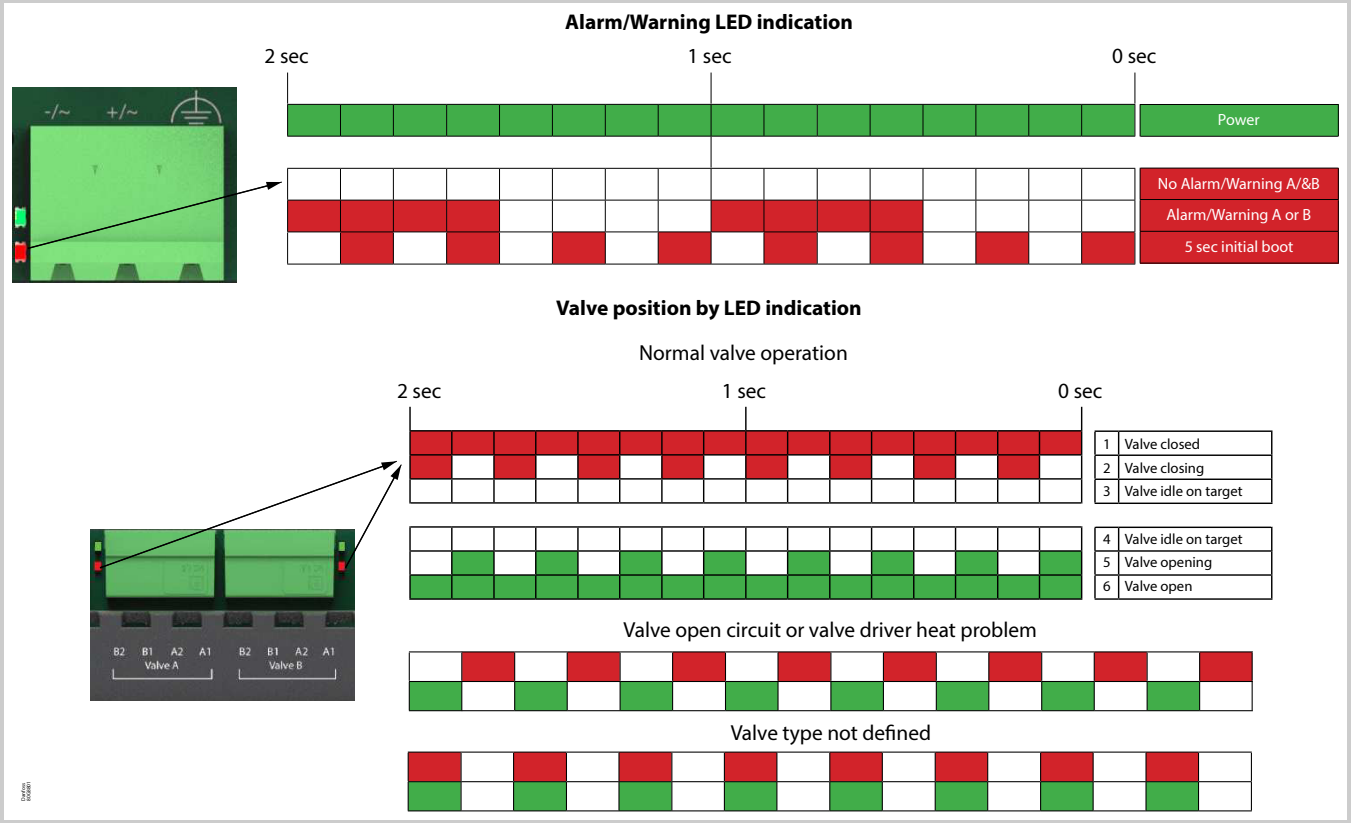
LED indication

Figure: LED indication

A	LED indicating valve position and movement
B	LED indicating alarms and warnings

LED alarm and warning

The below shown table describes the different LED indication the controller provides to user. User can identify the status of the controller using the LED blinking and comparing it with the table below:



Alarm codes

Table: Alarm list

Code	Description	ADU	Explanation
A00	Standby mode	1901.08	Main switch is set off. Troubleshoot: Turn on (Cr12) when appropriate.
A01	Replace PWR backup module	1901.09	EKE-2U reports time for replacement. Troubleshoot: Replace the EKE-2U.
A02	PWR backup module failure	1901.10	EKE-2U failure or battery failure. Troubleshoot: Replace backup unit.
A03	AI configuration conflict	1901.11	Digital input configuration problem. Troubleshoot: Check digital input configuration. Same input has been used more than once.
A04	DI configuration conflict	1901.12	Digital input configuration problem. Troubleshoot: Check digital input configuration. Same input has been used more than once.
A05	Low Input Voltage	1901.13	Too low supply voltage. Troubleshoot: Re-establish supply voltage with adequate power
A06	Overload on 5V supply	1901.14	5 V output is shorted. Troubleshoot: Check 5 V load.
A07	Degraded hardware	1901.15	EEPROM read error. Troubleshoot: Replace hardware
A10	Manual control A	1901.00	Controller section in manual mode. Troubleshoot: Move to Manual mode A to off when appropriate. Setpoint: (AU01)
A11	No valve configured A	1901.01	Valve configuration not made. Troubleshoot: Configure valve A Setpoint: (AJ00)
A12	No refrigerant selected A	1901.02	No refrigerant is selected, configure the correct refrigerant. Troubleshoot: Make a refrigerant A selection. Setpoint: (Arfg)
A13	No transmitter configured for Pe A	1901.03	Selection of pressure transmitter type is needed. Troubleshoot: Select Pressure input and transmitter type and measuring range. Setpoints: (AC00, AC50)
A14	No sensor configured for S2 A	1901.04	A temperature sensor type selection is missing. Troubleshoot: Select correct temperature sensor input and type. Setpoints: (AC01, AC59)
A15	No sensor configured for S3 A	1901.05	A temperature sensor type selection is missing. Troubleshoot: Select correct temperature sensor input and type. Setpoints: (AC02, AC60)
A16	No sensor configured for S4 A	1901.06	A temperature sensor type selection is missing. Troubleshoot: Select correct temperature sensor input and type (AC03, AC61).
A17	Pe evaporator transmitter error A	1901.07	Evaporator pressure transmitter signal is faulty or exceeds measuring range. Troubleshoot: Check transmitter.

A18	S2 suction pipe sensor error A	1902.08	Temperature sensor have shorted or open wires. Troubleshoot: Correct the cabling.
A19	S3 media inlet sensor error A	1902.09	Temperature sensor have shorted or open wires. Troubleshoot: Correct the cabling.
A20	No external reference configured A	1902.10	Missing configuration for external reference. Troubleshoot: Setup input for external reference. Setpoints: (AC06, AC71).
A21	External reference error A	1902.11	Driver signal out of range Troubleshoot: Ensure analog input signal is in range
A22	High evaporation pressure (MOP) A	1902.12	Pe / Te is higher than alarm limit and alarm delay has expired. Injection active and MOP active and Te higher than MOP set point + MOP alarm differential and MOP alarm delay expired. Troubleshoot: Injection not active or MOP disabled or Te below MOP set point + MOP alarm differential. Setpoints: (Au10, Au11) Alarm: (AA00, AA01)
A23	Low evaporation pressure (LOP) A	1902.13	Pe / Te is lower than alarm limit and alarm delay has expired. Injection active and LOP active and Te lower than LOP set point - LOP alarm differential. Troubleshoot: options to consider - Lack of refrigerant - Injection not active - LOP disabled Te above LOP set point + LOP alarm dierential. Pe / Te is lower than alarm limit and alarm delay has expired. Setpoints: (Au12, Au13, Au14, Au15) Alarm: (AA02, AA03)
A24	High superheat A	1902.14	Superheat is higher than alarm limit and alarm delay has expired. Troubleshoot: Options to consider: - Lack of refrigerant - Injection not active - SH below SH reference +High SH alarm differential. Setpoint: (ASHI) Alarm: (AA04, AA05)
A25	Low superheat A	1902.15	Superheat is below alarm limit and alarm delay has expired. Troubleshoot: Injection not active or SH above SH reference - low SH alarm differential. Setpoint: (ASLo) Alarm: (AA06, AA07)
A26	Lack of valve capacity A	1902.00	Valve is running close to full capacity for long time. Injection active and OD higher than max OD - 5% for more than 90% of Lack of capacity alarm delay time. Troubleshoot: Injection not active or OD higher OD - 5% in less than 88% or Lack of refrigerant capacity alarm delay time. Alarm: (AA08)
A27	SH control signal missing A	1902.01	Pe or S2 signal missing. Troubleshoot: Get valid signal on both Pe and S2.
A28	High temperature A	1902.02	Thermostat temperature exceed the upper limit, alarm delay has expired. Troubleshoot: options to consider - Defective compressor - Lack of refrigerant - Other issues: solve the control issue or adjust the temperature setpoint or the upper temperature alarm setpoint. Alarm delay might as well be adjusted. Setpoints: (AtSP, AA09, AA11)
A29	Low temperature A	1902.03	Thermostat temperature exceed the lower limit, alarm delay has expired. Troubleshoot: Solve the control issue or adjust the temperature setpoint or the upper temperature alarm setpoint. Alarm delay might as well be adjusted. Setpoints: (AtSP, AA10, AA11)

A30	Low S4 media outlet temperature A	1902.04	If S4 value is less than Min setpoint for a duration of time alarm will be activated. Troubleshoot: Solve the control issue or adjust the temperature setpoint or the upper temperature alarm setpoint. Alarm delay might as well be adjusted. Setpoints: (AtSP, AA10, AA11)
A34	SH reference too close to SH close setpoint A	1903.08	SH close is used and SH close set pint is too close the actual reference/ reference minimum. D241 Troubleshoot: Disable SH close or correct the actual SH reference / reference minimum to have 0.5 K difference to SH close set point. Setpoints: (Au00, Au01)
A35	LOP setpoint too close to MOP setpoint A	1903.09	If MOP or LOP is used, MOP set point must > 5K bigger than LOB setpoint. The set point for the 2 pressure functions LOP and MOP is to close. Troubleshoot: Adjust the difference MOP-LOP, must be: MOP-LOPt >= 5K. Setpoints: (Au11, Au13)
A36	S4 media outlet sensor error A	1903.10	Temperature sensor have shorted or open wires. Troubleshoot: Avoid application usage of S4 or get the local sensor inside signal range
A37	Shared signal timeout A	1903.11	One or more signals (S2, S3, S4, Po) are not updated within defined minimum update time. Troubleshoot: Signals must be updated within defined update interval defined by "Bus sharing minimum update interval". Setpoint: (C002)
A38	Thermostatic control signal missing A	1903.12	Error on thermostat sensor signal. Troubleshoot: Check the thermostat sensor
A39	Open coil valve A	1903.13	Open coil detected. Troubleshoot: Valve have an open circuit on stepper motor coils. Check valve wiring connection.
A40	Valve A error	1903.14	Valve driver thermal overload. Troubleshoot: Valve driver chip overloaded. Check valve and wiring connection.
A41	Dutycycle alarm valve A	1903.15	Actual valve duty cycle exceeds defined limits. Alarm autoresets after 60 sec. Troubleshoot: Minimize control instability
A50	Manual control B	1903.00	Controller section in manual mode. Troubleshoot: Move to Manual mode A to off when appropriate. Setpoint: (bU01)
A51	No valve configured B	1903.01	Valve configuration not made. Troubleshoot: Configure valve A. Setpoint: (bJ00)
A52	No refrigerant selected B	1903.02	No refrigerant is selected, configure the correct refrigerant. Troubleshoot: Make a refrigerant A selection. Setpoint: (brfg)
A53	No transmitter configured for Pe B	1903.03	Selection of pressure transmitter type is needed. Troubleshoot: Select Pressure input and transmitter type and measuring range. Setpoints: (bC00, bC50)
A54	No sensor configured for S2 B	1903.04	A temperature sensor type selection is missing. Troubleshoot: Select correct temperature sensor input and type. Setpoints: (bC01, bC59)
A55	No sensor configured for S3 B	1903.05	A temperature sensor type selection is missing. Troubleshoot: Select correct temperature sensor input and type. Setpoints: (bC02, bC60)

A56	No sensor configured for S4 B	1903.06	A temperature sensor type selection is missing. Troubleshoot: Select correct temperature sensor input and type (bC03, bC61)
A57	Pe evaporator transmitter error B	1903.07	Evaporator pressure transmitter signal is faulty or exceeds measuring range. Troubleshoot: Check transmitter.
A58	S2 suction pipe sensor error B	1904.08	Temperature sensor have shorted or open wires. Troubleshoot: Correct the cabling
A59	S3 media inlet sensor error B	1904.09	Temperature sensor have shorted or open wires. Troubleshoot: Correct the cabling.
A60	No external reference configured B	1904.10	Missing configuration for external reference. Troubleshoot: Setup input for external reference. Setpoints: (bC06, bC71)
A61	External reference error B	1904.11	Driver signal out of range Troubleshoot: Ensure analog input signal is in range
A62	High evaporation pressure (MOP) B	1904.12	Pe / Te is higher than alarm limit and alarm delay has expired. Injection active and MOP active and Te higher than MOP set point + MOP alarm differential and MOP alarm delay expired. Troubleshoot: Injection not active or MOP disabled or Te below MOP set point + MOP alarm differential. Setpoints: (bu10, bu11) Alarm: (bA00, bA01)
A63	Low evaporation pressure (LOP) B	1904.13	Pe / Te is lower than alarm limit and alarm delay has expired. Injection active and LOP active and Te lower than LOP set point. Troubleshoot: options to consider - Lack of refrigerant - Injection not active - LOP disabled Te above LOP set point + LOP alarm differential. Pe / Te is lower than alarm limit and alarm delay has expired. Setpoints: (Au12, Au13, Au14, Au15) Alarm: (AA02, AA03)
A64	High superheat B	1904.14	Superheat is higher than alarm limit and alarm delay has expired. Troubleshoot: options to consider - Lack of refrigerant - Injection not active - SH below SH reference + High SH alarm differential. Setpoint: (ASHI) Alarm: (AA04, AA05)
A65	Low superheat B	1904.15	Superheat is below alarm limit and alarm delay has expired. Troubleshoot: Injection not active or SH above SH reference - low SH alarm differential. Setpoint: (bSLo) Alarm: (bA06, bA07)
A66	Lack of valve capacity B	1904.00	Valve is running close to full capacity for long time. Injection active and OD higher than max OD - 5% for more than 90% of Lack of capacity alarm delay time. Troubleshoot: Injection not active or OD higher OD - 5% in less than 88% or Lack of refrigerant capacity alarm delay time. Alarm: (AA08)
A67	SH control signal missing B	1904.01	Pe or S2 signal missing. Troubleshoot: Get valid signal on both Pe and S2.
A68	High temperature B	1904.02	Thermostat temperature exceed the upper limit, alarm delay has expired. Troubleshoot: options to consider - Defective compressor - Lack of refrigerant - Other issues: solve the control issue or adjust the temperature setpoint or the upper temperature alarm setpoint. Alarm delay might as well be adjusted. Setpoints: (AtSP, AA09, AA11)

A69	Low temperature B	1904.03	Thermostat temperature exceed the lower limit, alarm delay has expired. Troubleshoot: Solve the control issue or adjust the temperature setpoint or the upper temperature alarm setpoint. Alarm delay might as well be adjusted. Setpoints: (btSP, bA10, bA11)
A70	Low S4 media outlet temperature B	1904.04	If S4 value is less than Min setpoint for a duration of time alarm will be activated. Troubleshoot: Solve the control issue or adjust the temperature setpoint or the upper temperature alarm setpoint. Alarm delay might as well be adjusted. Setpoints: (btSP, bA10, bA11)
A74	SH reference too close to SH close setpoint B	1905.08	SH close is used and SH close set pint is too close the actual reference/ reference minimum. Troubleshoot: Disable SH close or correct the actual SH reference / reference minimum to have 0.5 K difference to SH close set point. Setpoints: (bu00, bu01)
A75	LOP setpoint too close to MOP setpoint B	1905.09	If MOP or LOP is used, MOP set point must > 5 K bigger than LOP setpoint. The set point for the 2 pressure functions LOP and MOP is to close. Troubleshoot: Adjust the difference MOP-LOP, must be: MOP-LOP. t > = 5 K. Setpoints: (bu11, bu13)
A76	S4 media outlet sensor error B	1905.10	Temperature sensor have shorted or open wires. Troubleshoot: Avoid application usage of S4 or get the local sensor inside signal range.
A77	Shared signal timeout B	1905.11	One or more signals (S2, S3, S4, Po) are not updated within defined minimum update time. Troubleshoot: Signals must be updated within defined update interval defined by "Bus sharing minimum update interval". Setpoint: (C002)
A78	Thermostatic control signal missing B	1905.12	Error on thermostat sensor signal. Troubleshoot: Check the thermostat sensor.
A79	Open coil valve B	1905.13	Open coil detected. Troubleshoot: Valve have an open circuit on stepper motor coils. Check valve wiring connection.
A80	Valve B error	1905.14	Valve driver thermal overload. Troubleshoot: Valve driver chip overloaded. Check valve and wiring connection.
A81	Dutycycle alarm valve B	1905.15	Actual valve duty cycle exceeds defined limits. Alarm autoresets after 60 sec. Troubleshoot: Minimize control instability.

Certificates, declarations and approvals

Approval type	Title	Certification body	Approval topic
Export Control Declaration	Electronic Superheat Controller and Electronic Valve driver and injection controller	Danfoss	

Online support

Danfoss offers a wide range of support along with our products, including digital information, software, mobile apps and expert guidance. See the possibilities below.

The Danfoss Design center

Discover the Design Center, our advanced digital platform that streamlines product selection. With integrated tools and enhanced type pages, it's simpler than ever to access product information and documentation, and to select the right products. Check the availability of Danfoss products at partner locations and enjoy seamless transitions from selection to purchase with our basket-to-basket functionality. Whether you're buying from our distributors or directly from the Product Store, the Design Center simplifies your experience. Learn more at: designcenter.danfoss.com.

The Danfoss product store

The Danfoss Product Store is a one-stop shop available 24/7 for our customers, no matter where you are in the world or what area of industry you work in. Browse our catalog, check product details and documentation, view your prices and product availability, and quickly finalize your purchase. Start browsing at: store.danfoss.com.

Danfoss Partner Portal/Product Data tool

Designed to support you with easy access to product data extracts, essential resources, tools, and information. The Partner Portal provides a centralized hub for product documentation, training materials, marketing assets, and technical support, ensuring you have everything you need to succeed and grow your business with Danfoss. The Partner Portal is available 24/7 at: partner.danfoss.com and is ready to support your business.

Find technical documentation

Find technical documentation you need to get your project up running. Get direct access to our official collection of data sheets, certificates and declarations, manuals and guides, 3D models and drawings, case stories, brochures, and much more. Start searching now at: documentation.danfoss.com.

Danfoss Learning

Danfoss Learning is a free online learning platform. It features courses and materials specifically designed to help engineers, installers, service technicians, and wholesalers better understand the products, applications industry topics, and trends that will help you do your job better. Find your local Danfoss website here: learning.danfoss.com.

Get local information and support

Local Danfoss websites are the main sources for help and information about our company and products. Find product availability, get the latest reginal news, or connect with a nearby expert - all in your own language. Find your local Danfoss website here: danfoss.com.

Danfoss A/S

Climate Solutions . danfoss.com . +45 7488 2222

Any information, including, but not limited to information on selection of product, its application or use, product design, weight, dimensions, capacity or any other technical data in product manuals, catalogues description, advertisements, etc. and whether made available in writing, orally, electronically, online or via download, shall be considered informative, and is only binding if and to the extent, explicit reference is made in a quotation or order confirmation. Danfoss cannot accept any responsibility for possible errors in catalogues, brochures, videos and other material. Danfoss reserves the right to alter its products without notice. This also applies to products ordered but not delivered provided that such alterations can be made without changes to form, fit or function of the products. All trademarks in this material are property of Danfoss A/S or Danfoss group companies. Danfoss and the Danfoss logo are trademarks of Danfoss A/S. All rights reserved.