ENGINEERING
TOMORROW

Operating Guide

Control of stepper motor valves
with AK-CC55 Single Coil, EKE 1P and EKE 2U

Wiring and controller set-up

Introduction

AK-CC55 Single Coil can be set up to control stepper motor valves.

This document will describe how the wiring is done and how the controller can be set up.

The stepper motor valve is controlling the injection of refrigerant into the evaporator, hence replacing the AKV valve. The AKV valve output can then be used to control a solenoid valve in the liquid line. The solenoid valve will close in case of power failure.

A stepper motor driver is needed to convert the analogue output that the AK-CC55 controller can deliver to a stepper motor output. The stepper motor driver used here is the EKE 1P.

There is no bus communication between the AK-CC55 controller and the EKE 1P, but the controller can receive a "--- Driver alarm" in case of an alarm on the EKE 1P.

A back-up power module can be installed to secure closure of the stepper motor valve in case of power failure. The power module used here is the EKE 2U.

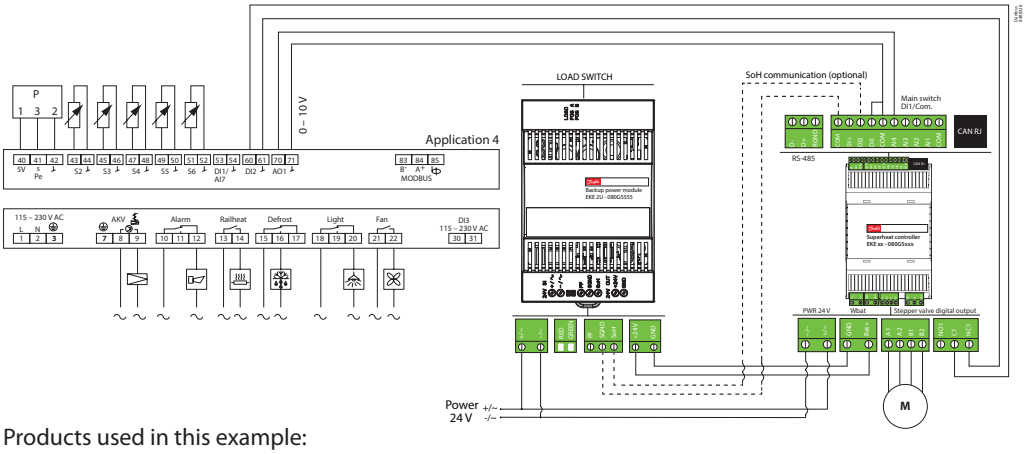
This stepper driver feature is implemented in software version 1.53 of the AK-CC55 Single Coil controller.

Wiring example

The sketch below is showing how the analogue output on the AK-CC55 controller is connected to the EKE 1P stepper motor driver where the stepper motor valve is connected.

The sketch also shows how the back-up power module is integrated.

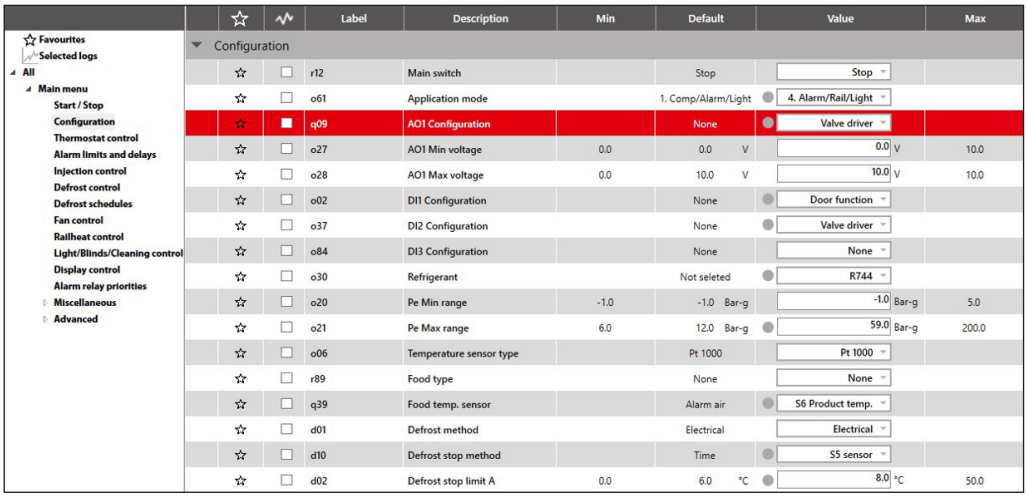
When the wiring is done, the controller and the two modules can be powered up.



Products used in this example:
AK-CC55 Single Coil, 084B4082, SW version 1.53
EKE 1P, 080G0325, SW version 2.10
EKE 2U, 080G5555, PV00

Setting up AK-CC55 Single Coil using KoolProg

KoolProg is a PC software which can be downloaded from the KoolProg download site where the User Guide can also be found. Please notice that the User Guide describes the need for an MMIMYK interface (Code No. 080G0073), a Mini USB cable and an RJ11 cable (Code No. 080G0075) for connection with AK-CC55 controller. The controller can also be set up using the AK-CC55 Connect App (a mobile phone application) via the AK-UI55 Bluetooth display and it can be set up via the AK-SM 800A type System Manager.



The picture on the previous page shows an example of how the AK-CC55 Single Coil controller can be set up.

- Application mode (q61) is set to "4" (as an example)
- AO1 Configuration (q09) on the analogue output is set to "Valve driver"
- AO1 Minimum voltage (o27) on the analogue output is set to "0" V
- AO1 Maximum voltage (o28) on the analogue output is set to "10" V
- DI2 Configuration (o37) on the digital input 2 is set to "Valve driver"

With this setting the analogue output will send a signal in the range of 0 to 10 V to the stepper driver module and should an alarm situation be raised on the stepper driver, the AK-CC55 controller will receive the alarm message "Valve driver", which can be seen in the alarm list on the controller and hence on the system manager.

Setting up EKE 1P using the MMIGRS2 display

The set-up requires the use of the MMIGRS2 display (Code No. 080G0294) and the RJ11 cable (Code No. 080G0075). But, this EKE module cannot be set up via KoolProg PC software.

The MMIGRS2 display has to be connected to the EKE 1P stepper motor driver via the RJ11 cable before the set-up can start.

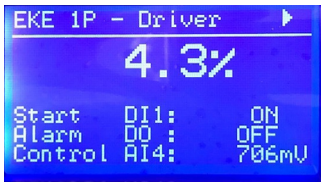
The settings shown here sets up the driver:

- Press "Enter" to activate display.
- Press "Enter" and hold "Enter" a couple of seconds to activate "Setup & service" (an access code might have to be set)
- START/STOP
  - Main switch is already ON (by default with Application 1) so it has to be switched OFF to allow changes to Application Mode.
  - Main switch: OFF
  - Application Mode: 2
- Device config.
  - Mode settings: AI HP/Rec., HP exp, Rec. exp., AI valve
  - Mode set to: AI valve
- AI valve in…
  - AI valve input scale: 0 – 10 V
- I/O
  - Output → Relay control: Auto
  - Configure:
  - DI1 Active: ON
  - DI2 Active: ON
- Alarm config.
  - Battery Alarm options: NO, EKE 2U, Bat.
  - Battery alarm: EKE2U
- Valve config.
  - Valve configuration: e.g. CCMT-3L

EKE 2U alarm and status on EKE 1P

The following screenshots are captured from an MMIGRS2 display.

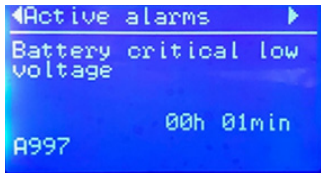
Alarm signalling from EKE 2U (SoH) can trigger a "Driver alarm" on AK-CC55 via EKE 1P / DO



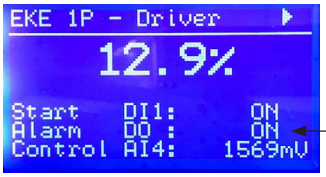
EKE 1P: No alarm on EKE 2U (DO = OFF)

EKE 1P: Battery charging on EKE 2U

EKE 1P: Battery Fault on EKE 2U because the Power supply is interrupted (low battery voltage)



EKE 1P: Alarm for Battery Critical Low voltage



DO = ON (DI2 alarm on AK-CC55 Single Coil)

Note: The alarm is ON because of "Battery critical low voltage".

EKE 2U alarm and status on EKE 1P (KoolProg & Service Tool)

The following screenshots are captured from KoolProg and AK-ST 500 Service Tool.

- "--- Driver alarm" on AK-CC55 Single Coil, so, the alarm chain works!
- However, NO bus communication between EKE 1P and AK-CC55

Code numbers

AK-CC55 Single Coil	084B4082
AK-CC55 Single Coil UI	084B4083
EKE 1P	080G0325
EKE 2U	080G5555
MMIGRS2	080G0294
Wire for display 1.5 m	080G0075
Wire for display 3 m	080G0076

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