Installation guide

Stepper Valve Driver

Type EKF 1A, EKF 2A

Introduction

Stepper Valve Driver EKF series is for use where stepper motor valves must be accurately controlled, typically in commercial air conditioning, heat pumps, commercial refrigeration and food retailing applications.

Technical specifications

Supply voltage	EKF 1A:24 V AC / DC (± 20%), 50 / 60 Hz, 30 VA / 15 W (preliminary) EKF 2A:24 V AC / DC (± 20%), 50 / 60 Hz, 50 VA / 25 W (preliminary)	
Power consumption	Idle operating: < 1W (preliminary)	
Analog inputs	EKF 1A: 1 input AI1	0-5V, 0-10V, 4-20mA, 0-20mA
	EKF 2A: 2 inputs AI1 and AI2	0-5V,0-10V, 4-20mA, 0-20mA
	Max. 15 V Analog input voltage. Do not connect voltage sources to unpowered units without limiting the current to analog inputs (overall 40 mA per input). Input Impedance: 50 kΩ (Voltage Input) 120 Ω (Current Input) (preliminary) Open circuit HW diagnostics is present.	
Digital outputs	1 output for EKF1A/ EKF 2A: D01 (open collector)	
Valve support	EKF 1A: 1 stepper motor valve output, EKF 2A: 2 stepper motor valve output STEPPER 1: A1S1, A2S1, B1S1, B2S1 STEPPER 2: A1S2, A2S2, B1S2, B2S2 Bipolar and unipolar stepper motor output: - Danfoss ETS / KVS / ETS C / KVS C / CCMT 2 – CCMT 42 / CTR / CCMT L Valves - ETS 6 / ETS 5M Valves	
Battery backup	1 input for EKF 1A/ EKF2A: Vbat BAT, GND: Nominal 18 – 24 V DC, Maximum 16-28 (24 V DC recommended) Max. battery current: 2A at 18 V (preliminary) Battery alarm will be activated below 16 V DC.	
Environment	Storage	-30 – 80 °C / -22 – 176 °F
	Operating	-20 – 60 °C / -4 – 140 °F
	Humidity	< 95% RH, non-condensing
DIN Mounting	4 DIN	

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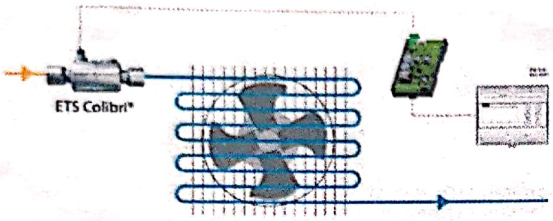
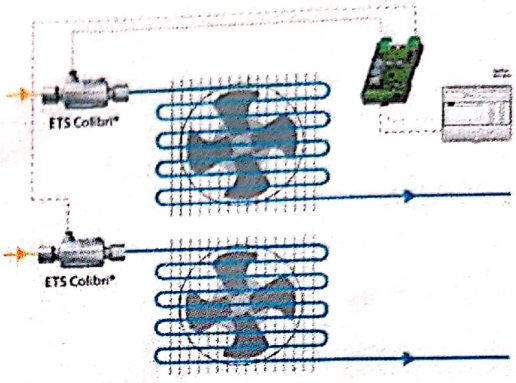
Application

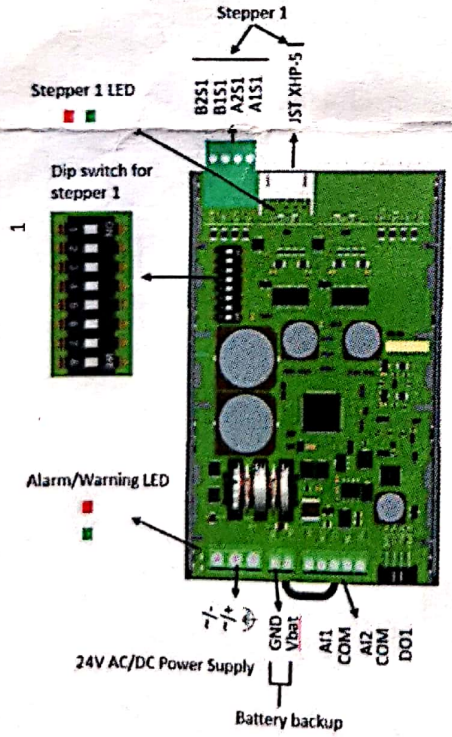
Valve Driver
EKF 1A



EKF 2A



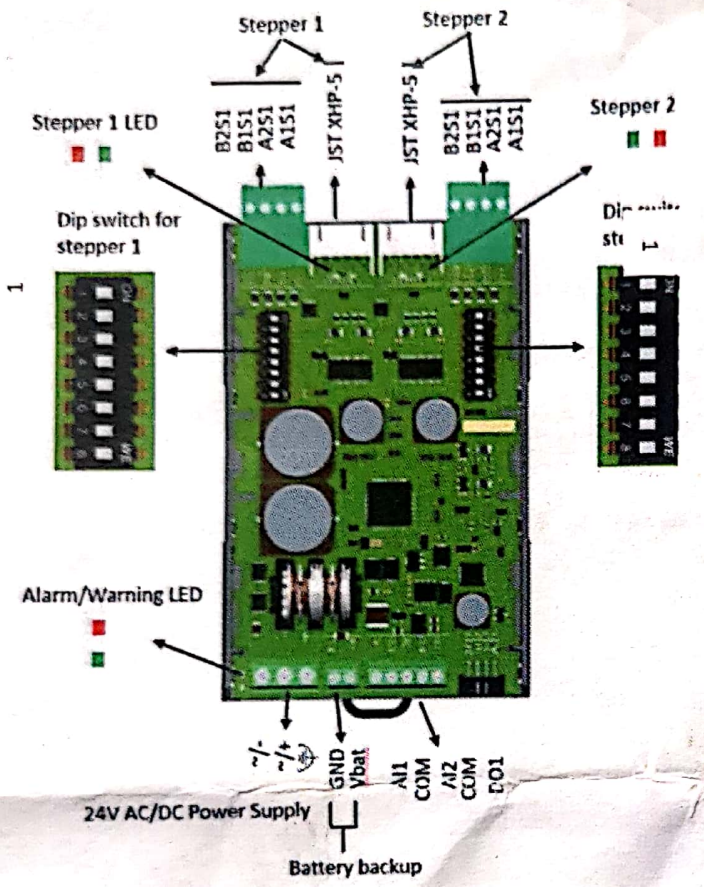
Connection overview
EKF 1A



- Supports both Bipolar and Unipolar motor.
- Only one connection can be used, either 4pole terminal block or JST XHP-5 pin connector.
- It is Possible to share battery voltage with other EKF when polarity of the power supply is maintained correct.
- Always connect PE either to the ⏚ or ~/- of power connector. If grounding is done in the transformer do not use EKF ⏚ .

AI1	Analog input 1
COM	Common
AI2	Not Used
COM	Common
DO1	Digital output 1

EKF 2A



- Supports both Bipolar and Unipolar motor.
- Only one connection can be used per stepper motor output, either 4 pole terminal block or JST XHP-5 pin connector.
- Possible to share battery voltage with other EKF when A/C power supply is not shared.
- It is Possible to share battery voltage with other EKF when polarity of the power supply is maintained correct.
- Always connect PE either to the ⏚ or ~/- of power connector. If grounding is done in the transformer do not use EKF ⏚ .

AI1	Analog input 1
COM	Common
AI2	Analog input 2
COM	Common
DO1	Digital output 1

Quick set up guide

1. Disconnect power to EKF.
2. Connect Valve and Analog signal to the dedicated terminals.
3. Select the Valve via DIP switch 1 to 5.
4. Select the required Analog signal voltage or current via DIP switch 7 and 8
   For EKF 2A, perform 3 and 4 for both DIP switches.
5. Connect EKF to power and the device is ready to use.

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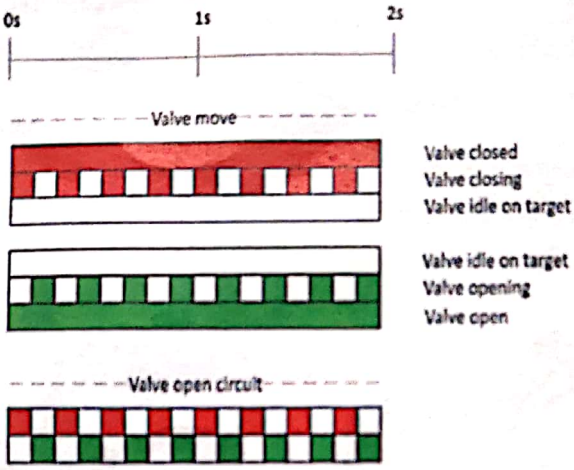
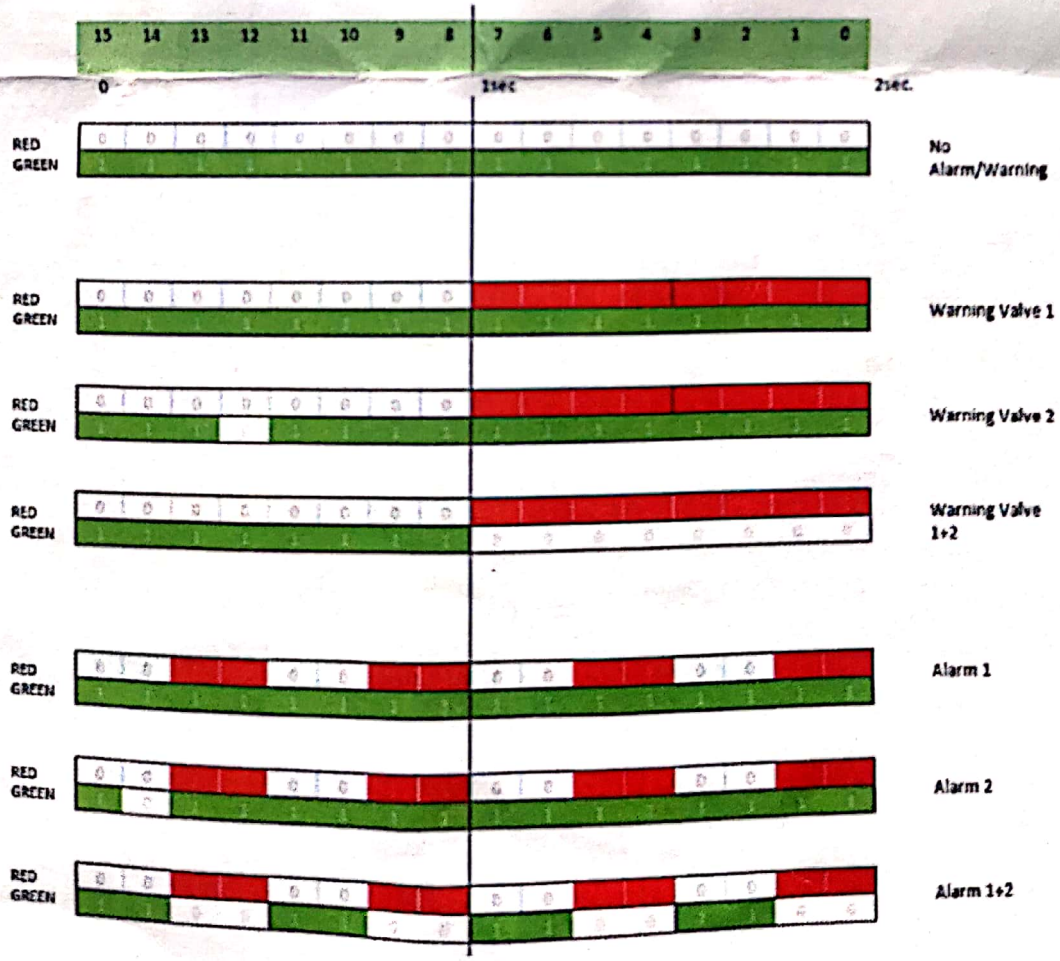
LED indication

Valve

Two status LED per valve output



Alarm



DIP switch

The driver has one 8-position DIP switch per stepper motor output.

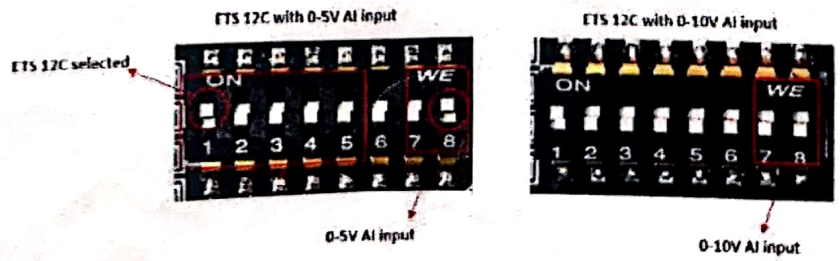
Note: DIP switch must be changed during POWER OFF only, Any change during power on will not take effect until driver switches off.

Valve selection

Configure Valve type by selecting DIP switch as shown in table below (green denotes ON).

	Valve	DIP Switch							
		1	2	3	4	5	6	7	8
A	No Valve (Default)								
B	ETS 12C, ETS 24C, ETS 25C, ETS 50C, ETS 100C, KVS 2C, KVS 3C, KVS 5C	■							
C	ETS 5M		■						
D	ETS 6, UKV, UKV-J	■	■						
E	ETS12.5, ETS 25, ETS 50, KVS15			■					
F	ETS 100	■		■					
G	ETS 250, ETS 400, KVS 42		■	■					
I	JKV				■				
J	CCMT 2, CCMT4, CCMT8	■			■				
K	CCMT 16		■		■				
L	CCMT 24	■	■		■				
M	CCMT30			■	■				
N	CCMT 42	■		■	■				
O	CCM 10, CCM 20, CCM 30		■	■	■				
P	CCM 40	■	■	■	■				
Q	CTR 20	■				■			
R	CCMT 3L, CCMT 5L, CCMT 8L					■			

See example image of Dip Switch setting



Analog input selection

Configure Analog signal type by selecting DIP switch as shown in table below (green denotes ON) .

Analog Input	DIP Switch							
	1	2	3	4	5	6	7	8
0 - 10V (Default)								
0 - 5V								
4 - 20mA								
0 - 20mA								

Analog input sharing

Configure analog input to be shared if needed as below (green denotes ON).

Stepper driver 1	DIP Switch							
	1	2	3	4	5	6	7	8
Analog Input AI1								
Analog input AI2								

Stepper driver 2	DIP Switch							
	1	2	3	4	5	6	7	8
Analog Input AI1								
Analog input AI2								

Digital output signal

One digital output is present in EKF and only alarm activates the output.

Output type	Similar to NPN, open collector
Load type	Resistive only
Maximum allowed current	10mA
Maximum Voltage	28V (allow 24Vdc + 15%)
Condition at alarm	No current

Stepper Motor Output

- The stepper motor is connected to the "Stepper Valve" terminals (see connection overview) with a standard M12 connection cable or JST XHP-5 connector.
- The default valve setting in EKF 1A/2A is: No Valve.
- The correct valve must be defined as per section DIP Switch – Valve.

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Valve Cable Connection

Danfoss recommends to use ETS 5M and ETS 6 valves to be connected to JST XHP-5 pin connectors instead of 4 pole terminal block, but it is possible to connect to terminal block, as shown in table below.

Stepper valve	ETS/KVS/CCM/ CCMT/CTR/ CCMT L	ETS 5M	ETS 6
B2S1	White	Orange	Yellow
B1S1	Black	Yellow	Orange
A2S1	Red	Black	Black
A1S1	Green	Brown	Brown