ENGINEERING
TOMORROW

Installation guide

Electronic superheat controller

Type EIM 316 / 336

089

Introduction

Superheat controller EIM series is for use where superheat must be accurately controlled, typically in commercial air conditioning, commercial and industrial heat pumps, commercial refrigeration and food retailing applications.

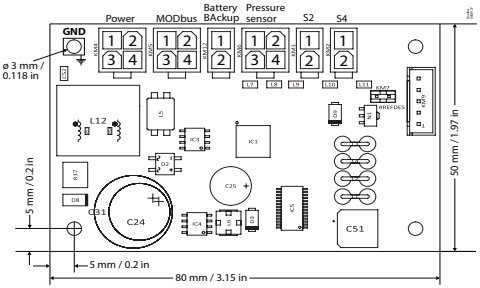
Reference: For details please see EIM data sheet.

More info

Technical specifications

Supply voltage	24 V AC / DC (± 15%), 50 / 60 Hz, 15 VA / 8 W, Class II isolation	
Power consumption	Idle	Max. 10 mA @ 24 V DC
	Operating	Max. 150 mA @ 24 V DC
Input signals *For the EMC compliance, sensor cable length must be < 3 m / 118 in. For longer sensor cable, a ferrite bead should be used.*	Po	0.5 - 4.5 Vdc ratiometric pressure sensor i.e AKS 32R
	S2	PT1000 (measuring range -60 – 120 °C / -76 – 248 °F)
	S4	PT1000 or digital input from external contact
Valve support	EIM 316 / 336: ETS 6	
Data communication	RS 485 – MODBUS RTU **(Not terminated internally)**	
Environment	Storage : -34 – 71 °C / -30 – 160 °F	
	Operating : -25 – 60 °C / -13 – 140 °F	
	Humidity : < 95% RH, non condensing	
Battery backup (Only for EIM 365)	18 - 28 V DC, > 49 VmAh	
Operation	Standalone or via MODBUS data communication	

EIM 316 / 336



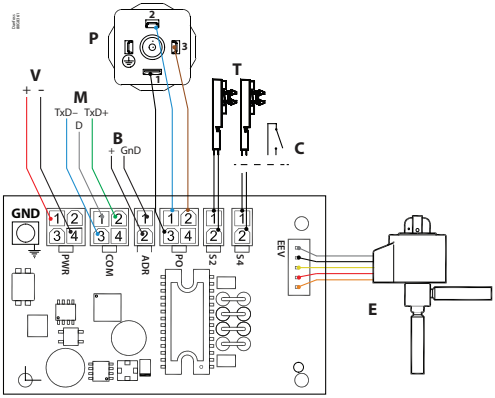
Note:
S2 - Temperature sensor
S4 - Temperature sensor or DI
Weight : 40 gm

EIM 336: Use metal pins to connect GND.

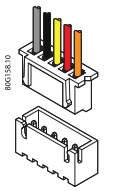
Installation warnings

- Recommended mounting position: vertical
- Installation must comply with local standards and legislation
- This product is not subject to the UK PSTI regulation, as it is for supply to and use only by professionals with the necessary expertise and qualifications. Any misuse or improper handling may result in unintended consequences. By purchasing or using this product, you acknowledge and accept the professional-use-only nature of its application. Danfoss does not assume any liability for damages, injuries, or adverse consequences ("damage") resulting from the incorrect or improper use of the product and you agree to indemnify Danfoss for any such damage resulting from your incorrect or improper use of the product.
- Before working on the electrical connections, disconnect the device from the main power supply
- Before carrying out any maintenance operations on the device, disconnect all electrical connections
- For safety reasons the appliance must be fitted inside an electrical panel with no live parts accessible
- Do not expose the device to continuous water sprays or to a relative humidity greater than 90%
- Avoid exposure to corrosive or pollutant gases, natural elements, environments where explosives or mixes of flammable gases are present, dust, strong vibrations or shock, large and rapid fluctuations in ambient temperature that might cause condensation in combination with high humidity, strong magnetic and/or radio interference (e.g. transmitting antennae).
- When connecting loads be aware of the maximum current for each relay and connector
- Use cable ends suitable for the corresponding connectors. After tightening connector screws, tug the cables gently to check their tightness.
- Use appropriate data communication cables. Refer to the EIM data sheet for the kind of cable to be used and setup recommendations.
- Minimize the length of probe and digital input cables as much as possible, and avoid spiral routes around power devices. Separate from inductive loads and power cables to avoid possible electromagnetic noises.
- Avoid touching or nearly touching the electronic components fitted on the board to avoid electrostatic discharges.
- EIM should be grounded and measures must be taken during installation to connect the board to a grounding point.

Connection overview



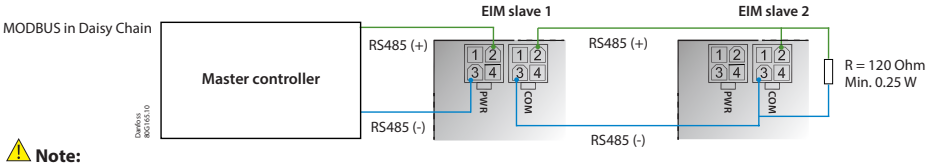
JST XHP-5 CONNECTOR



Connector on ETS 6 coil

Connector on EIM 336 controller

MODBUS connection overview

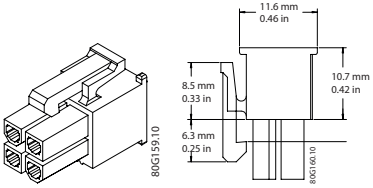


Note:

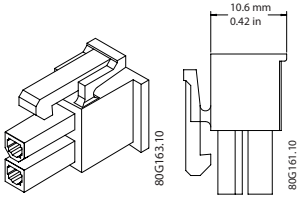
- If two EIMs are connected remember to remove the addressing jumper on one of the EIMs
- MODBUS transmission lines usually require termination resistors, especially for longer cable lengths

Mating connectors for EIM Controller
Type Molex Mini-Fit Jr.™

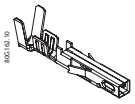
4 WAY MINI-FIT RECEPTACLE
Molex 39-01-2040 or similar



2 WAY MINI-FIT RECEPTACLE
Molex 39-01-2020 or similar



RECEPT CONTACT
24-18AWG Molex
39-00-0039 or similar



Connector kit for 5x EIM controller *080G1601*

Quick guide for parameter selection (EIM 365)

A. Setting controller in Superheat control mode

Make sure that r12 = 0 (OFF) (ADU 11) and change the settings. The setting will depend on the system requirement.

Enabling Regulation control ON / Off switch (optional)
HwMainSwitch = 1 (default is 0, i.e., S4 sensor). For standalone configuration it is recommended to enable Regulation control ON / Off switch to control start/stop regulation when needed, otherwise the controller will start regulating when controller is powered up.

Select Refrigerant
o30 = 1 – 49 (ADU 64)
If a refrigerant is not predefined in list you can select user defined ref and put Antoine constants for the refrigerant.

Select valve setting
For EIM 365, first select Danfoss valve type (ADU 110). If valve is not preset use user defined and set additional parameters for valve accordingly. See some examples of parameters below.
n37 = 384 x 10 micro step (3840 micro steps = 480 half steps) (ADU 76)
n38 = Max. steps / sec (ADU 77)

Define pressure sensor range in bar absolute (x10)
o20 = Min. Transducer pressure (ADU 62)
o21 = Max. Transducer pressure (ADU 63)

Define min/max superheat

Define SH control type:SH Mode: 1 = MSS, 2= LoadAP (ADU 118)
n10 = min. superheat reference (ADU 20)
n09 = max. superheat reference (ADU 19)
For fixed superheat define n09 = n10

Define MOP (optional)
n11 = maximum operating pressure (ADU 23)

Set Startup mode
For EIM 365, startup mode is always P control. By default this is set to a start up time of 15 secs.
Minimum startup time can be changed using ADU 64324.

To start the superheat control
Set r12= ON (ADU 11)

B. Setting controller in valve driver mode using MODBUS signal

Make sure that main switch = 0 (OFF) and change the settings so they fit to application:

Select Application mode
o18 (ADU 36) = 1
i.e., Manual control
First select Danfoss valve type (ADU 110).

Select manual opening degree
Select if control is in OD or steps (ADU 102), by default EIM 265 is set to OD.
Provide value to o45 Manual OD % (ADU 18)
0 = fully closed, 100 = fully open

If ADU 102 is selected to be in steps then use number of steps as input to ADU 18.

By changing parameter o45 Manual OD, the valve will move accordingly regardless of r12 parameter value.

EIM – Commonly used parameter identification

Group	ADU	Parameter	Symbolic name	Min.	Max.	Default	Units	e2	W	*10	Description
Regulation Control	11	r12	Main switch	0	1	0			✓		With this setting the regulation can be started and stopped. This can also be accomplished with the external hardware main switch.
	36	o18	Manl control	0	1	0			✓		0 = Superheat control, 1 = Manual control
	18	o45	Manual OD	0	100	0	%		✓		Manual opening degree for manual control. Used when the o18 Manual Control is set to 1 (fully closed = 0% , fully open = 100%).
Super Heat Control	108	n21	SH Mode	1	2	2		✓	✓		1: MSS, 2: Load AP
	19	n09	Max. superheat	20	200	90	K	✓	✓	✓	Maximum superheat reference setting
	20	n10	Min. superheat	10	200	40	K	✓	✓	✓	Minimum superheat reference setting
Valve FOR EIM 316 and 336 default is ETS 6)	76	n37	Max steps	100	8000 (1000)	240 (384)		✓	✓		Maximum number of steps (384 x 10 microsteps = 480 half steps) (Values in bracket is for EIM 316,336)
	77	n38	Max steps / sec	10	400	16		✓	✓		Steps per second
Refrigerant	64	o30	Refrigerant	1	49	23		✓	✓		0: None 1: R12 2: R22 3: R134a 4: R502 5: R717 6: R13 7: R13B1 8: R23 9: R500 10: R503 11: R114 12: R142b 13: User 14: R32 15:R227ea 16: R401A 17: R507A 18: R402A 19: R404A 20: R407C 21: R407A 22: R407B 23: R410A 24: R170 25: R290 26: R600 27: R600a 28: R744 29: R1270 30: R417A 31: R422A 32: R413A 33: R422D 34: R427A 35: R438A 36: R513A 37: R407F 38: R1234zeE 39: R1234yf 40: R448A 41: R449A 42: R452A 43: R450A 44: R452B 45: R454B 46: R1233zdE 47: R1234zeZ 48: R449B 49: R407H
Sensors	17	r09	Adjust S2	-100	100	0	K	✓	✓	✓	S2 Offset adjustment
	63	o21	Max. transducer pressure	10	600	160	bar (abs.)	✓	✓	✓	Maximum transducer pressure (in bar absolute * 10)
	62	o20	Min. transducer pressure	-10	0	0	bar (abs.)	✓	✓	✓	Minimum transducer pressure (in bar absolute * 10)

⚠ Note :

- "e2" is the value stored in EEPROM. "W" is writing to the register possible "*10" is scale of the parameter.
- For detail parameter list, refer to the EIM datasheet.
- Default Modbus setting 19200 8E1.

Related products

Pressure transducer AKS 32R, NSK BExx	Temperature sensor AKS 21, AKS 11, ACCPBT	Backup power module EKE 2U