

Installation guide

# Electronic superheat controller

## Type EIM 316 / 336



More info

### Introduction

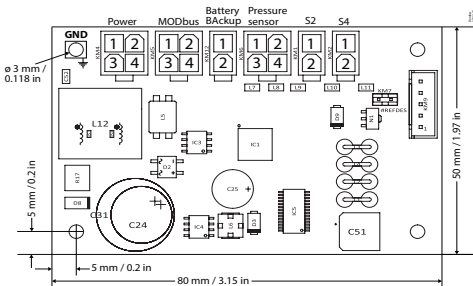
Superheat controller EIM series is for use where superheat must be accurately controlled, typically in commercial air conditioning, commercial and industrial heat pumps, commercial refrigeration and food retailing applications.

Reference: For details please see EIM data sheet.

### Technical specifications

Supply voltage	24 V AC / DC ( $\pm 15\%$ ), 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 <i>For the EMC compliance, sensor cable length must be &lt; 3 m / 118 in. For longer sensor cable, a ferrite bead should be used.</i>	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 ( <b>Not terminated internally</b> )	
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.

Імпортёр: ТОВ з іі "Данфосс ТОВ" 04080, Київ 80, п/с 168, Україна

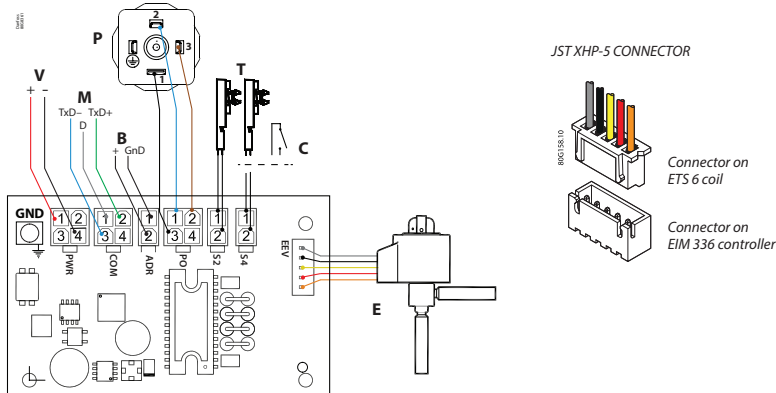
Info for UK customers only: Danfoss Ltd., 22 Wycombe End, HP9 1NB, GB

### Installation warnings

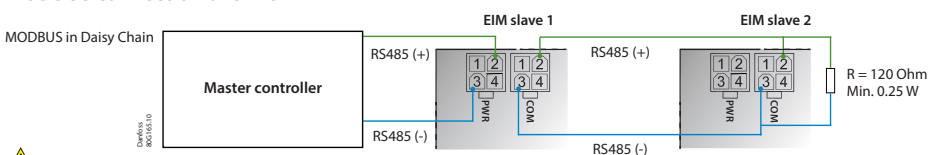
- Recommended mounting position: vertical
- Installation must comply with local standards and legislation
- This product is not subject to the UK PSTI regulation, as it is for supply to and use only by professionals with the necessary expertise and qualifications. Any misuse or improper handling may 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



### MODBUS connection overview

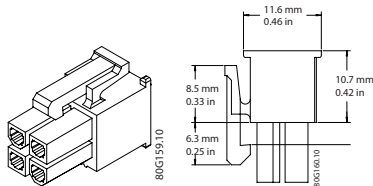


#### ⚠ Note:

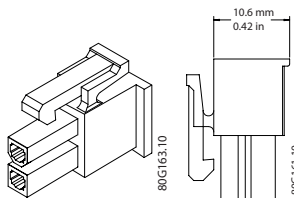
- If two EIMs are connected remember to remove the addressing jumper on one of the EIMs
- MODBUS transmission lines usually require termination resistors, especially for longer cable lengths

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

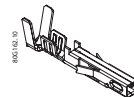
**4 WAY MINI-FIT RECEPTACLE**  
Molex 39-01-2040 or similar



**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	ManI 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			✓	✓	<table border="0"> <tr> <td>0: None</td> <td>17: R507A</td> <td>34: R427A</td> </tr> <tr> <td>1: R12</td> <td>18: R402A</td> <td>35: R438A</td> </tr> <tr> <td>2: R22</td> <td>19: R404A</td> <td>36: R513A</td> </tr> <tr> <td>3: R134a</td> <td>20: R407C</td> <td>37: R407F</td> </tr> <tr> <td>4: R502</td> <td>21: R407A</td> <td>38: R1234zeE</td> </tr> <tr> <td>5: R717</td> <td>22: R407B</td> <td>39: R1234yf</td> </tr> <tr> <td>6: R13</td> <td>23: R410A</td> <td>40: R448A</td> </tr> <tr> <td>7: R13B1</td> <td>24: R170</td> <td>41: R449A</td> </tr> <tr> <td>8: R23</td> <td>25: R290</td> <td>42: R452A</td> </tr> <tr> <td>9: R500</td> <td>26: R600</td> <td>43: R450A</td> </tr> <tr> <td>10: R503</td> <td>27: R600a</td> <td>44: R452B</td> </tr> <tr> <td>11: R114</td> <td>28: R744</td> <td>45: R454B</td> </tr> <tr> <td>12: R142b</td> <td>29: R1270</td> <td>46: R1233zdE</td> </tr> <tr> <td>13: User</td> <td>30: R417A</td> <td>47: R1234zeZ</td> </tr> <tr> <td>14: R32</td> <td>31: R422A</td> <td>48: R449B</td> </tr> <tr> <td>15: R227ea</td> <td>32: R413A</td> <td>49: R407H</td> </tr> <tr> <td>16: R401A</td> <td>33: R422D</td> <td></td> </tr> </table>	0: None	17: R507A	34: R427A	1: R12	18: R402A	35: R438A	2: R22	19: R404A	36: R513A	3: R134a	20: R407C	37: R407F	4: R502	21: R407A	38: R1234zeE	5: R717	22: R407B	39: R1234yf	6: R13	23: R410A	40: R448A	7: R13B1	24: R170	41: R449A	8: R23	25: R290	42: R452A	9: R500	26: R600	43: R450A	10: R503	27: R600a	44: R452B	11: R114	28: R744	45: R454B	12: R142b	29: R1270	46: R1233zdE	13: User	30: R417A	47: R1234zeZ	14: R32	31: R422A	48: R449B	15: R227ea	32: R413A	49: R407H	16: R401A	33: R422D	
0: None	17: R507A	34: R427A																																																												
1: R12	18: R402A	35: R438A																																																												
2: R22	19: R404A	36: R513A																																																												
3: R134a	20: R407C	37: R407F																																																												
4: R502	21: R407A	38: R1234zeE																																																												
5: R717	22: R407B	39: R1234yf																																																												
6: R13	23: R410A	40: R448A																																																												
7: R13B1	24: R170	41: R449A																																																												
8: R23	25: R290	42: R452A																																																												
9: R500	26: R600	43: R450A																																																												
10: R503	27: R600a	44: R452B																																																												
11: R114	28: R744	45: R454B																																																												
12: R142b	29: R1270	46: R1233zdE																																																												
13: User	30: R417A	47: R1234zeZ																																																												
14: R32	31: R422A	48: R449B																																																												
15: R227ea	32: R413A	49: R407H																																																												
16: R401A	33: R422D																																																													
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

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 descriptions, 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 product.

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.