Technical brochure

Programmable controller MCX08M

Danfoss' range of universal MCX programmable controllers offers the functionality and reliability you need to get the best out of your heating, ventilation, air-conditioning and refrigeration (HVAC/R) equipment. With the MCX range, Danfoss is widening the concept of programmability and applying it to as many environments as possible

MCX08M is fitted with or without graphic LCD display. It is an electronic controller that holds all the typical functionalities of MCX controllers in the compact size of 8 DIN modules: programmability, connection to the CANbus local network, Modbus RS485 opto-insulated serial interface.
It is moreover available in the version with power supply 110-230 Vac or 24 Vac

Features MCX08M

- 8 analog and 8 digital inputs
- 4 analog and 8 digital outputs
- Power supply 24 Vac/20-60 Vdc and 110 V/230 Vac
- Remote access to data through CANbus connection for additional display (LCD available) and keyboard

- RTC clock for managing weekly time programs and data logging information
- Modbus RS485 opto-insulated serial interface
- Available with graphic LCD display and without display for showing the desired information
- Dimensions 8 DIN modules

Programmable	Protection degree	CAN bus	Graphic display	Multilanguage	MYK connection	Modbus RS485
PRG	IP40	CAN				485

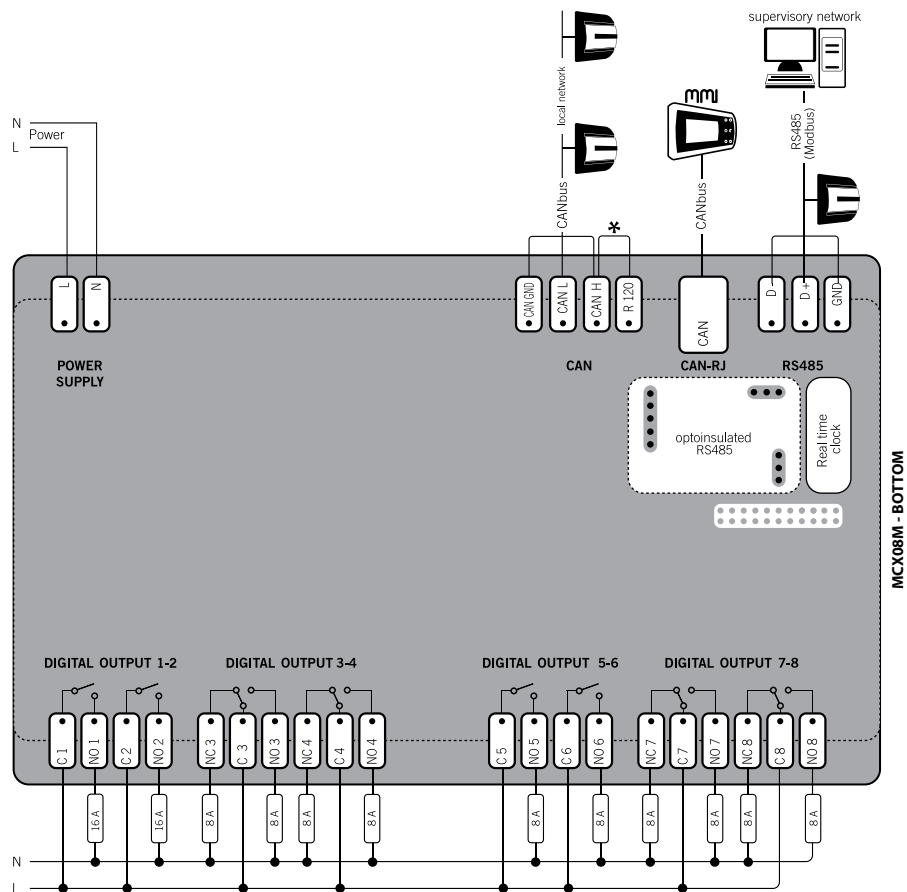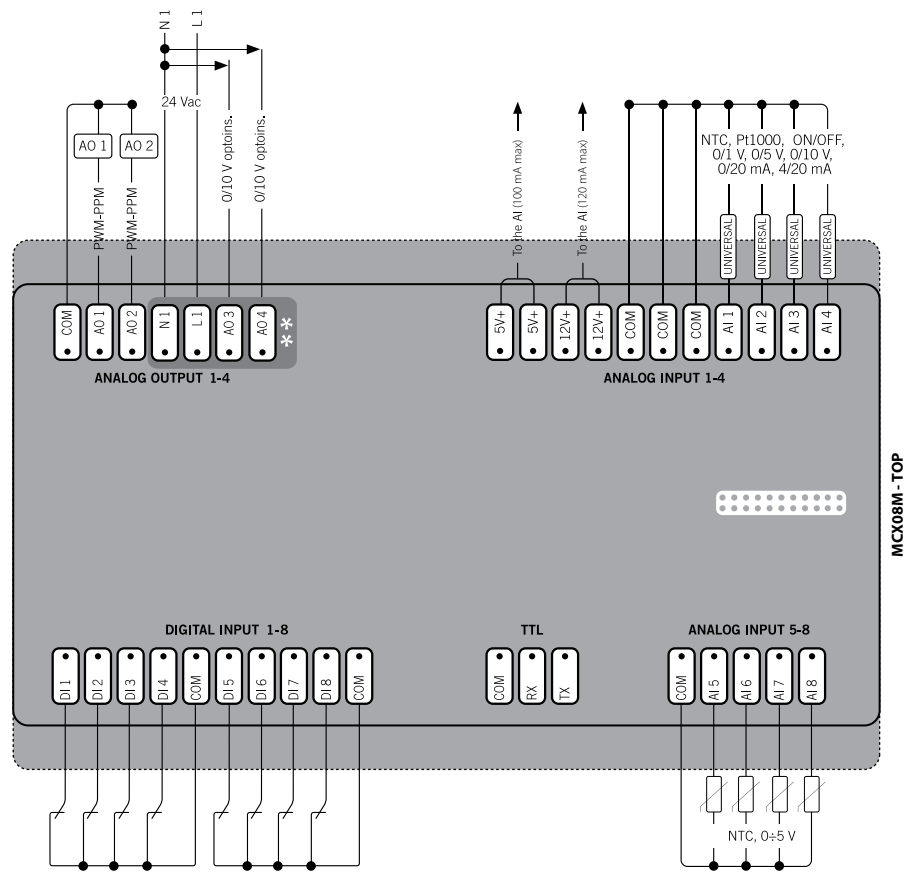**www.danfoss.com/mcx**

General features

FEATURES	DESCRIPTION
Power supply	85 Vac to 265 Vac, 50-60 Hz. Maximum power consumption: 20 VA. Insulation between power supply and the extra-low voltage: reinforced
	20 Vdc to 60 Vdc and 24 Vac ± 15% 50/60 Hz. Maximum power consumption: 10 W, 17 VA. Insulation between power supply and the extra-low voltage: functional
Plastic housing	DIN rail mounting complying with EN 60715
	Self extinguishing V0 according to IEC 60695-11-10 and glowing/hot wire test at 960 °C according to IEC 60695-2-12
Ball test	125 °C according to IEC 60730-1. Leakage current: ≥ 250 V according to IEC 60112
Operating conditions	CE: -20T60 / UL: 0T55, 90% RH non-condensing
Storage conditions	-30T80, 90% RH non-condensing
Integration	In Class I and/or II appliances
Index of protection	IP40 only on the front cover
Period of electric stress across insulating parts	Long
Resistance to heat and fire	Category D
Immunity against voltage surges	Category II
Software class and structure	Class A

Approvals	CE compliance:
	This product is designed to comply with the following EU standards:
	- Low voltage guideline: 73/23/EEC
	- Electromagnetic compatibility EMC: 89/336/EEC and with the following norms:
	  • EN61000-6-1, EN61000-6-3
	    (immunity for residential, commercial and light-industrial environments)
	  • EN61000-6-2, EN61000-6-4
	    (immunity and emission standard for industrial environments)
	  • EN60730 (Automatic electrical controls for household and similar use)

	UL approval: - UL file E31024

Inputs/outputs

| I/O	TYPE	NUM	SPECIFICATIONS
Analog inputs	NTC, 0/1 V, 0/5 V	4	AI5, AI6, AI7, AI8 Analog inputs selectable via software between: - NTC temperature probes, default: 10 kΩ at 25 °C - pressure transducers with 0/5 V output
	Universal	4	AI1, AI2, AI3, AI4 Universal analog inputs selectable via software between: - ON/OFF (current: 20 mA) - 0/1 V, 0/5 V, 0/10 V - 0/20 mA, 4/20 mA - NTC (10 kΩ at 25 °C) - Pt1000 12 V+ power supply 12 Vdc, 50 mA max for 4/20 mA transmitter (total on all outputs) 5 V+ power supply 5 Vdc, 80 mA max for 0/5 V transmitter (total on all outputs)
Digital input	Voltage free contact	8	DI1, DI2, DI3, DI4, DI5, DI6, DI7, DI8 Current consumption: 5 mA
Analog outputs	0/10 Vdc optoins.	2	AO3, AO4 - Analog outputs optoinsulated 0/10 Vdc 10 mA max for each output - External power supply 24 Vac/Vdc

	PWM, PPM	2	AO1, AO2
			Analog outputs selectable via software between:
			- pulsing output, synchronous with the line, at modulation of impulse position (PPM) or modulation of impulse width (PWM)
			- pulsing output, at modulation of impulse position (PPM) with range 20 Hz to 1 KHz:
			  • open circuit voltage: 6.8 V
			  • minimum load: 1 kΩ

Digital output	Relay	8	Insulation between relay: functional
			Insulation between relays and the extra-low voltage parts: reinforced
			Total current load limit: 32 A
			C1-NO1, C2-NO2
			High inrush current (80 A - 20 ms) normally open contact relays 16 A
			- characteristics of each relay:
			  • 10 A 250 Vac for resistive loads - 100.000 cycles
			  • 3.5 A 230 Vac for inductive loads - 230.000 cycles with cos(phi) = 0.5
			  • UL: 240 Vac - 10 A resistive - 8 FLA - 40 LRA - 640 VA pilot duty 30.000 cycles
			C5-NO5, C6-NO6
			Normally open contact relays 8 A
			- characteristics of each relay:
			  • 6 A 250 Vac for resistive loads - 100.000 cycles
			  • 4 A 250 Vac for inductive loads - 100.000 cycles with cos(phi) = 0.6
			  • UL: 240 Vac - 6 A resistive - 4.9 FLA - 29.4 LRA - 470 VA pilot duty 30.000 cycles
			C3-NO3-NC3, C4-NO4-NC4, C7-NO7-NC7, C8-NO8-NC8
			Changeover contacts relay 8 A
			- characteristics of each relay:
			  • 6 A 250 Vac for resistive loads - 100.000 cycles
			  • 4 A 250 Vac for inductive loads - 100.000 cycles with cos(phi) = 0.6
			  • UL: 240 Vac - 6 A resistive - 4.9 FLA - 29.4 LRA - 470 VA pilot duty 30.000 cycles

**Connection diagram:
top and bottom board**

MCX08M - TOP

N 1
L 1
24 Vac

AO 1   AO 2

COM   AO 1   AO 2   N 1   L 1   AO 3   AO 4   **

PWM-PPM   PWM-PPM   0/10 V optoins.   0/10 V optoins.

ANALOG OUTPUT 1-4

NTC, Pt1000, ON/OFF,
0/1 V, 0/5 V, 0/10 V,
0/20 mA, 4/20 mA

UNIVERSAL   UNIVERSAL   UNIVERSAL   UNIVERSAL

5V+   5V+   12V+   12V+   COM   COM   COM   AI 1   AI 2   AI 3   AI 4

To the AI (100 mA max)   To the AI (120 mA max)

ANALOG INPUT 1-4

DIGITAL INPUT 1-8

DI 1   DI 2   DI 3   DI 4   COM   DI 5   DI 6   DI 7   DI 8   COM

TTL

COM   RX   TX

ANALOG INPUT 5-8

COM   AI 5   AI 6   AI 7   AI 8

NTC, 0÷5 V

MCX08M - BOTTOM

supervisory network

local network

CANbus

CANbus

RS485 (Modbus)

N
L   Power

L   N

CAN GND   CAN L   CAN H   R 120   *   CAN   D -   D +   GND

**POWER
SUPPLY**

CAN   **CAN-RJ**   **RS485**

optoinsulated
RS485

Real time
clock

DIGITAL OUTPUT 1-2   **DIGITAL OUTPUT 3-4**

C 1   NO 1   C 2   NO 2   NC 3   C 3   NO 3   NC 4   C 4   NO 4

16 A   16 A   8 A   8 A   8 A   8 A

DIGITAL OUTPUT 5-6   **DIGITAL OUTPUT 7-8**

C 5   NO 5   C 6   NO 6   NC 7   C 7   NO 7   NC 8   C 8   NO 8

8 A   8 A   8 A   8 A   8 A   8 A

N
L

*NOTE: connection has to be made on the first and last local network units, make the connection as close as possible to the connector
**NOTE: optoinsulated analog outputs voltages are referenced to contact N1

Connection

CONNECTORS	TYPE	DIMENSIONS
TOP BOARD		
Analog output 1-4 connector	7 screw plug-in connector type	- pitch 5 mm - section cable 0.2-2.5 mm^2
Analog input 1-4 connector	11 way screw plug-in connector type	- pitch 5 mm - section cable 0.2-2.5 mm^2
Digital input 1-8 connector	10 way screw plug-in connector type	- pitch 5 mm - section cable 0.2-2.5 mm^2
TTL connector	3 way screw plug-in connector type	- pitch 5 mm - section cable 0.2-2.5 mm^2
Analog input 5-8 connector	5 way screw plug-in connector type	- pitch 5 mm - section cable 0.2-2.5 mm^2
BOTTOM BOARD		
Power supply connector	2 way screw plug-in connector type	- pitch 5 mm - section cable 0.2-2.5 mm^2
CAN connector	4 way screw plug-in connector type	- pitch 5 mm - section cable 0.2-2.5 mm^2
CAN-RJ connector	6/6 way telephone RJ11 plug type	
RS485 connector	3 way screw plug-in connector type	- pitch 5 mm - section cable 0.2-2.5 mm^2
Digital output 1-2 connector	4 way screw plug-in connector type	- pitch 5 mm - section cable 0.2-2.5 mm^2
Digital output 3-4 connector	6 way screw plug-in connector type	- pitch 5 mm - section cable 0.2-2.5 mm^2
Digital output 5-6 connector	4 way screw plug-in connector type	- pitch 5 mm - section cable 0.2-2.5 mm^2
Digital output 7-8 connector	6 way screw plug-in connector type	- pitch 5 mm - section cable 0.2-2.5 mm^2

Dimensions
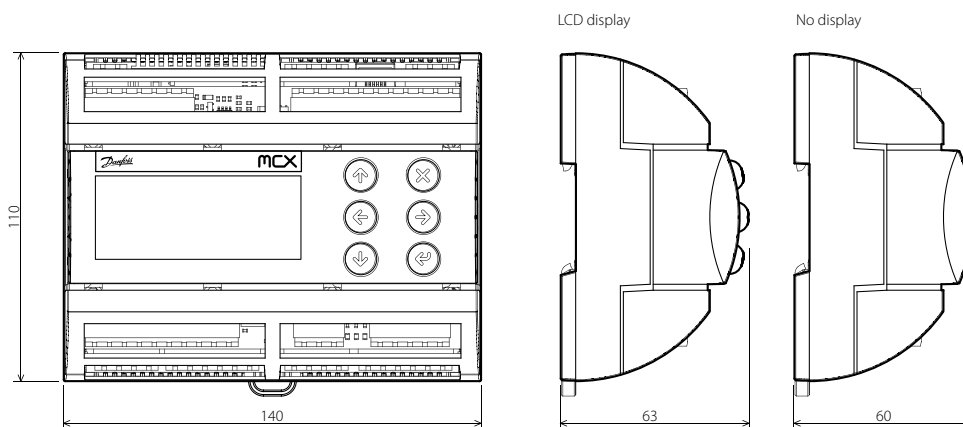
LCD display

No display

User interface

TYPE	FEATURES	DESCRIPTION
LCD display	Display	STN blue transmissive
	Backlight	White LED backlight adjustable via software
	Contrast	Adjustable via software
	Format	128x64 dots
	Active visible area	58x29 mm
Keyboard	Number of keys	6
	Keys function	Settled by the application software

Ordering

DESCRIPTION	CODE NR.
MCX08M, 24V, LCD, RTC, S	080G0084
MCX08M, 230V, LCD, RTC, S	080G0085
MCX08M, 24V, LCD, RS485, RTC, S	080G0028
MCX08M, 230V, LCD, RS485, RTC, S	080G0029

DESCRIPTION	CODE NR.
MCX08M, 24V, RTC, S	080G0086
MCX08M, 230V, RTC, S	080G0087
MCX08M, 24V, RS485, RTC, S	080G0034
MCX08M, 230V, RS485, RTC, S	080G0035

(S): Single Pack
Note: Single pack include standard kit connectors
Industrial pack codes are avaliable on request (these do not include standard kit connectors)

Accessory

DESCRIPTION	CODE NR.
MCX08M CONNECTORS KIT	080G0180