ENGINEERING
TOMORROW

Data Sheet

Programmable controller, 15 relays
Type **MCX152V**

Electronic controller suitable for all HVAC/R software application needs.

MCX152V is a standard MCX electronic controller that stands on the top of MCX range thanks to its large number of input and output and two integrated electronic expansion valves drivers. It is available in the version with or without graphic LCD display, and 110 / 230 V AC or 24 V AC power supply.

It holds all the typical functionalities of MCX controllers:
- programmability
- connection to the CANbus local network
- up to two Modbus RS485 serial communication interfaces

The memory card assures SW and bios download; the ethernet port allows the monitoring with the web pages, the SW and bios download, the data logging and the warning for the alarms.

Features:
- 14 analog and 18 digital inputs
- 6 analog and 15 digital outputs
- Power supply 24 V AC and 110 V / 230 V AC
- Up to two drives bipolar and unipolar electronic expansion valves
- SD / MMC card slot for easy software upload and datalogging
- Remote access to data through CANbus connection for additional display and keyboard
- RTC clock for managing weekly time programs and data logging information
- Ethernet / WebServer option
- Two Modbus RS485 opto-insulated serial interface
- Available with graphic LCD display and without display for showing the desired information
- Dimensions 16 DIN modules

Portfolio overview

Table 1: Portfolio overview

MCX family	MCX06C	MCX06D	MCX061V	MCX08M2	MCX152V	MCX15B2	MCX20B2
Product image							
Power supply	24 V	24 V	24 V or 110/230 V	24 V or 110/230 V	24 V or 110/230 V	24/110/230 V	24/110/230 V
Built-in display (optional)	LED	LCD	LCD	LCD	LCD	LCD	LCD
Analog Inputs	4	4	7	8	14	10	16
Digital Inputs	6	8	8	8	18	22	22
Analog Outputs	2	3	3	4	6	6	6
Digital Outputs	6	6	6	8	15	15	20
EXV driver embedded			1		2		
RS485	1	1	1	1	2	1	2
CANbus	•	•	•	•	•	•	•
Ethernet / Web server			optional		optional	•	•
USB/Memory Card			•		•	•	•
Dimensions (1 DIN module = 17,5 mm)	33 x 75 mm	4 DIN	8 DIN	8 DIN	16 DIN	16 DIN	16 DIN

Product specification

General features

Table 2: General features

Features	Description
Power supply	85 – 265 V AC, 50/60 Hz Maximum power consumption: 30 W, 51 V A Insulation between power supply and the extra-low voltage: reinforced
	24 V AC ± 15% 50/60 Hz SELV Maximum power consumption: 30 W, 47 V A 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

Input/Output

Table 3: Analog inputs

Type	Num	Specifications
		Max 15 V input voltage Do not connect voltage sources without current limitation (overall 80 mA) to analog inputs while unit is not powered Open circuit HW diagnostics available for all analog inputs
0 / 1 V 0 / 5 V 0 / 10 V	14	**AI1, AI2, AI3, AI4, AI5, AI6, AI7, AI8, AI9, AI10, AI11, AI12, AI13, AI14** Impedance is 33 kΩ (by software can be set greater than 1M Ω)
NTC	14	**AI1, AI2, AI3, AI4, AI5, AI6, AI7, AI8, AI9, AI10, AI11, AI12, AI13, AI14** NTC temperature probes, default: 10 kΩ at 25 °C
0 / 20 mA 4 / 20 mA	8	**AI1, AI2, AI3, AI5, AI8, AI9, AI10, AI12** 0 / 20 mA; 4 / 20 mA
Pt1000	8	**AI1, AI2, AI3, AI7, AI8, AI9, AI10, AI14**
Differential input	2	**AI5(-), AI6(+);** **AI12(-), AI13(+)** Differential input, DM Voltage 0...300 mV; CM voltage max 14 V
Auxiliary Supplies	2	15 V+ and 5 V+ 5 V+ max: 140 mA (total on all outputs) 15 V+ max: 200 mA (total on all outputs)

Table 4: Digital inputs

Type	Num	Specifications
Voltage free contacts	16	**DI1, DI2** Frequency input: 200 Hz Max (pulse time about 2.5 ms) **DI3, DI4, DI5, DI6, DI7, DI8, DI9, DI10, DI11, DI12, DI13, DI14, DI15, DI16** Frequency input: 20 Hz Max (pulse time about 25 ms)
24 V optoins	2	**DI17, DI18** Digital Inputs optoinsulated 24 V AC / 50/60 Hz o 24 V DC Rated current: 5 mA
230 V AC optoins	2	**DI17, DI18** Inputs optoinsulated, 230 V AC / 50/60 Hz Basic insulation Rated current: 2 mA at 230 V AC; 1 mA at 110 V AC **NOTE:** When the 230 V AC DI17H input is used, the corresponding 24 V DI17 input is not available anymore; the same for the couple of inputs DI18H and DI18.

Table 5: Analog outputs

Type	Num	Specifications
0 / 10 V DC	6	**AO1, AO2, AO3, AO4, AO5, AO6** Minimum load 1 kΩ (10 mA)
PWM, PPM	2	**AO3, AO6** • pulse output, synchronous with mains, at modulation of impulse position (PPM)or modulation of impulse width (PWM): 6.8 V open circuit • pulse output, PWM with range from 20 Hz to 1 kHz: 6.8 V open circuit

Table 6: Digital outputs

Type	Num	Specifications
Relay	15	Concerning the insulation distance there are three groups of relays: • group 1: relays 1 to 8 • group 2: relays 9 to 12 • group 3: relays 13 to 15 Insulation between relays: functional Insulation between relays of group 1 and 2 and 3: reinforced Insulation between relays and the extra-low voltage parts: reinforced **C1-NO1 to C12-NO12** Normally open contact relays 5 A Characteristics of each relay: • 5 A 250 V AC for resistive loads - 100.000 cycles • 3 A 250 V AC for inductive load - 100.000 cycles with cos(phi) = 0.4 • UL: 1/8 hp, C300 pilot duty, 125 / 250 V AC, 30.000 cycles **C13-NO13 to C15-NO15** Normally open contact relays 16 A Characteristics of each relay: • 7 A 250 V AC for resistive loads - 100.000 cycles • 3.5 A 250 V AC for inductive load - 230.000 cycles with cos(phi) = 0.4 • UL: 6 A resistive, 240 V A, 30.000 cycles, 1/2 hp, 470 V A pilot duty, 240 V AC, 30.000 cycles **C1-NO1 to C3-NO3, C13-NO13 to C15-NO15** Optionally they can be solid state relays Characteristics of each relay: • 15-280 Vrms, 1 A • UL: 1 A resistive, 240 V AC, 30.000 cycles

Table 7: Stepper motor

Type	Num	Specifications
Bipolar and unipolar stepper driver	2	**ST1, ST2, ST3, ST4** Bipolar and unipolar stepper motor output: Danfoss ETS / KVS / ETSC Valves (green, red, black, white) Saginomyia UKV / SKV / VKV / PKV (black, red, yellow, orange) **Other valves:** • drive mode 1/8 microstep • peak phase current: 650 mA (RMS 460 mA) • max drive voltage 30 V • max output power 6.5 W • max speed 200 steps/sec Max distance between valve and MCX: 30 m (suggested: 10 m)

Table 8: Battery backup

Type	Num	Specifications
	1	**BATT** 18 – 24 V DC: • leakage current max 12 µA • max battery current: 0.85 A at 18 V

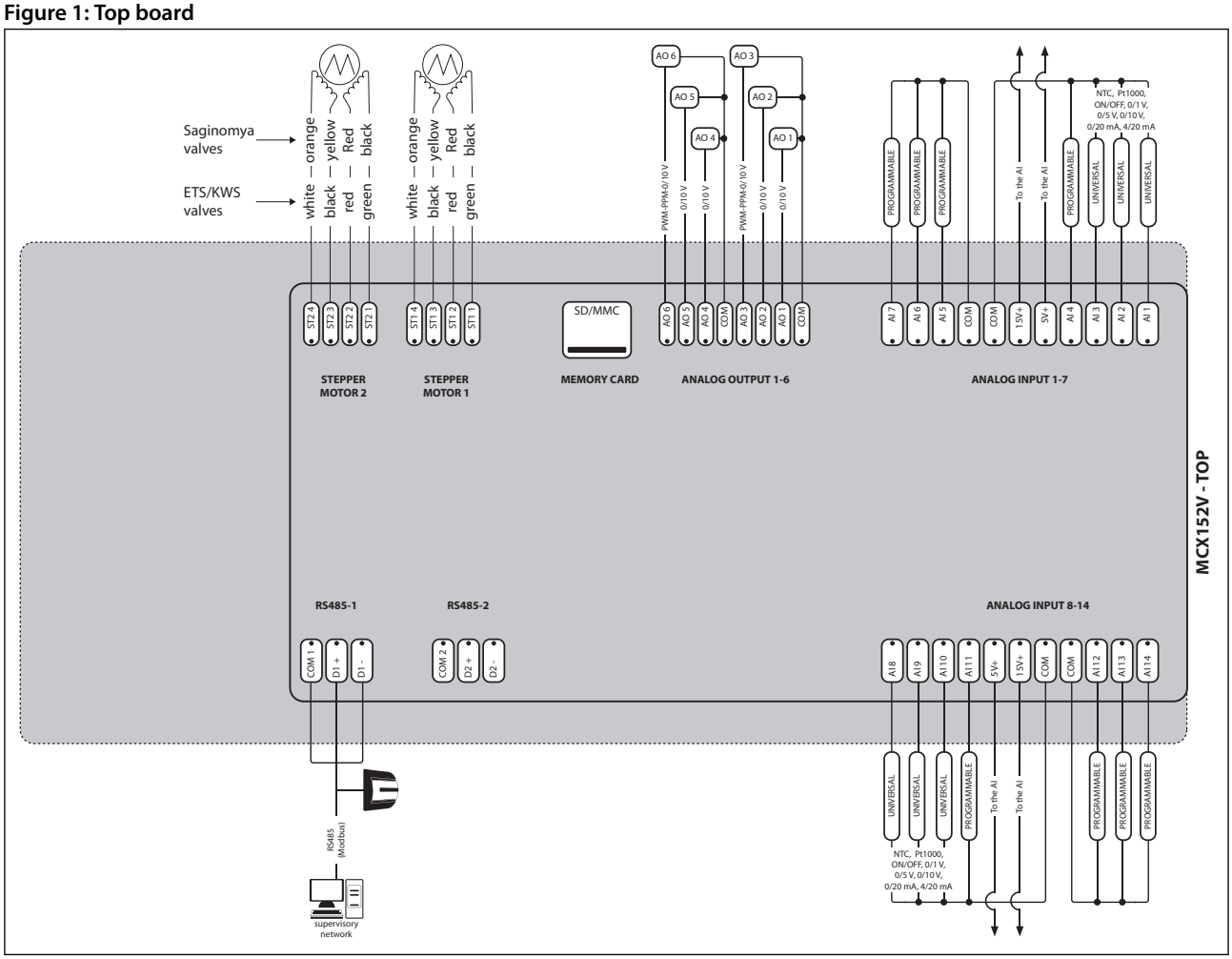
Table 9: Memory card

Type	Num	Specifications
SD/MMC	1	**SD/MMC** • for data logging make sure that the memory card is firm in place • avoid installations with vibrations

Connection diagram

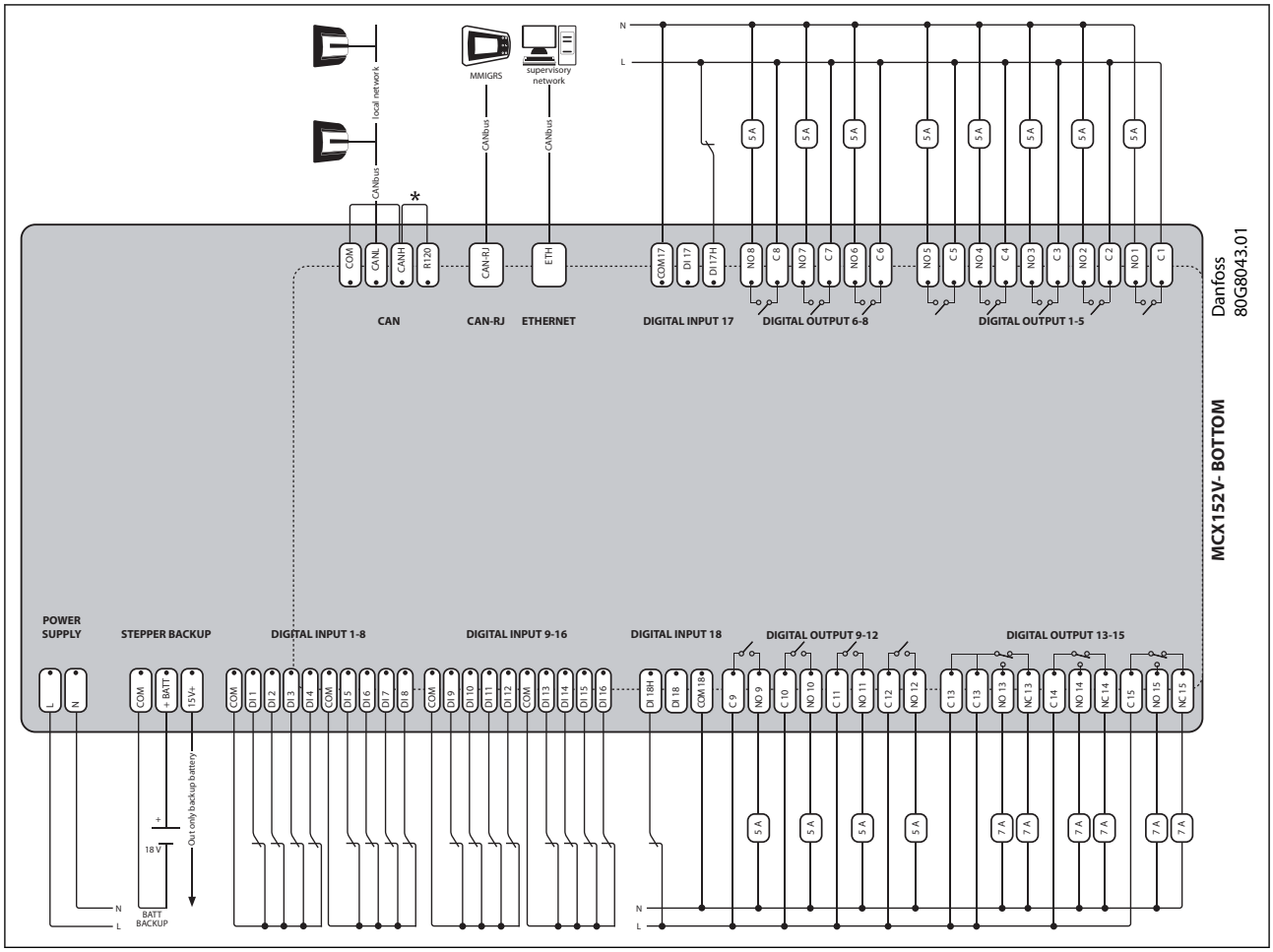
Top board

Figure 1: Top board



Bottom board

Figure 2: Bottom board



NOTE:

*Connection has to be made on the first and last local network units, make the connection as close as possible to the connector.

Connection

Table 10: Top Board

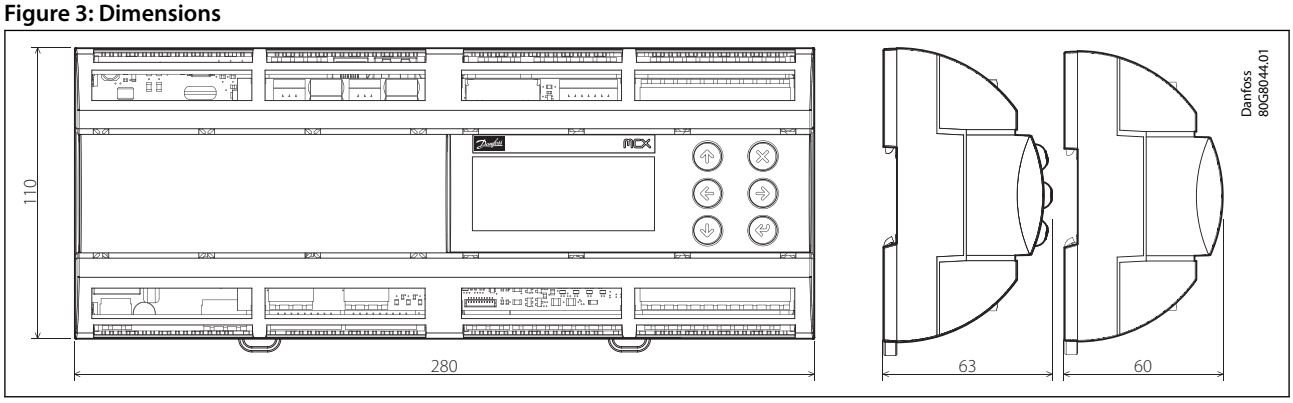
Connectors	Type	Dimensions
Stepper motor connector 2	4 way spring-cage plug-in connector type	• pitch 2.5 mm • section cable 0.2 – 0.5 mm²
Stepper motor connector 1	4 way spring-cage plug-in connector type	• pitch 5 mm • section cable 0.2 – 2.5 mm²
Memory card connector	SD / MMC card slot	
Analog output 1-6 connector	8 way screw plug-in connector type	• pitch 5 mm • section cable 0.2 – 2.5 mm²
Analog input 1-7 connector	11 way screw plug-in connector type	• pitch 5 mm • section cable 0.2 – 2.5 mm²
RS485 connector	3 way screw plug-in connector type	• pitch 5 mm • section cable 0.2 – 2.5 mm²
RS485-2 connector	3 way screw plug-in connector type	• pitch 5 mm • section cable 0.2 – 2.5 mm²
Analog input 8-14 connector	11 way screw plug-in connector type	• pitch 5 mm • section cable 0.2 – 2.5 mm²

Table 11: Bottom Board

Connectors	Type	Dimensions
CAN connector	4 way screw plug-in connector type	• pitch 5 mm • section cable 0.2 – 2.5 mm²
CAN-RJ connector	6/6 way telephone RJ12 plug type	
Ethernet connector	8/8 way RJ45 plug type	
Digital input 17 connector	3 way screw plug-in connector type	• pitch 5 mm • section cable 0.2 – 2.5 mm²
Digital output 6-8 connector	6 way screw plug-in connector type	• pitch 5 mm • section cable 0.2 – 2.5 mm²
Digital output 1-5 connector	10 way screw plug-in connector type	• pitch 5 mm • section cable 0.2 – 2.5 mm²
Power supply connector	2 way screw plug-in connector type	• pitch 5 mm • section cable 0.2 – 2.5 mm²
Stepper backup connector	3 way screw plug-in connector type	• pitch 5 mm • section cable 0.2 – 2.5 mm²
Digital input 1-8 connector	10 way spring-cage screw plug-in connector type	• pitch 2.5 mm • section cable 0.2 – 0.5 mm²
Digital input 9-16 connector	10 way spring-cage screw plug-in connector type	• pitch 2.5 mm • section cable 0.2 – 0.5 mm²
Digital input 18 connector	3 way screw plug-in connector type	• pitch 5 mm • section cable 0.2 – 2.5 mm²
Digital input 9-12 connector	8 way screw plug-in connector type	• pitch 5 mm • section cable 0.2 – 2.5 mm²
Digital input 13-15 connector	10 way screw plug-in connector type	• pitch 5 mm • section cable 0.2 – 2.5 mm²

Dimensions

Figure 3: Dimensions



User interface

Table 12: User interface

Type	Features	Description
LCD display	Display	STN blue transmissive
	Backlight	White LED backlight adjustable via software
	Contrast	Adjustable via software
	Format	128 x 64 dots
	Active visible area	58 x 29 mm
Keyboard	Number of keys	6
	Keys function	Set by the application software

Ordering

Product part numbers

Table 13: Product part numbers

Description	Code No.
MCX152V, 24 V, LCD, 2XRS485, ETH, S	080G0284
MCX152V, 230 V, LCD, 2XRS485, ETH, S	080G0285
MCX152V, 24 V, 2XRS485, S	080G0313

NOTE:
Single pack codes (S) include standard kit connectors.

Certificates, declarations, and approvals

The list contains all certificates, declarations, and approvals for this product type. Individual code number may have some or all of these approvals, and certain local approvals may not appear on the list.

Some approvals may change over time. You can check the most current status at danfoss.com or contact your local Danfoss representative if you have any questions.

Table 14: Certificates, declarations, and approvals

File name	Document type	Document topic	Approval authority
080R2087.02	EU Declaration of conformity	**EMC directive 2014/30/EU:** EN61000-6-4: 2007 +A1: 2011 EN61000-6-2: 2005 **LVD directive 2014/35/EU:** EN60730-1: 2011 EN60730-2-9: 2010 **RoHS directive 2011/65/EU and 2015/863/EU:** EN 50581: 2012	Danfoss
UL E31024	Electrical - Safety Certificate	–	UL

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