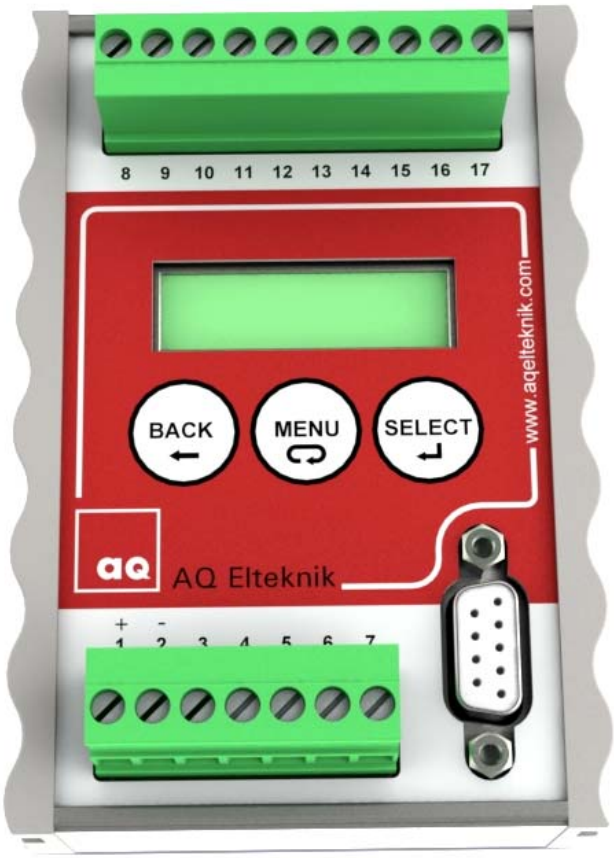
Motor Controller

MP72

Manual



AQ Elteknik AB

Motor Controller

MP72

- **Manual version: 1.2**
- **Program version: 1.1**
- **MP720C63.gsd (gsd-file) version: 1.0**

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AQ Elteknik AB

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1. Manufacturer information

AQ Elteknik AB operates a policy of on-going development and reserves the right to make changes and improvements to any of the products described in this manual without prior notice.

Under no circumstances shall AQ Elteknik be held responsible for any loss or indirect damage howsoever caused. The contents of this document are provided as it is. AQ Elteknik AB reserves the right to revise this document or withdraw it at any time without prior notice.

Version

It is important that the manual version and the gsd-file version agree with the software version of MP72. See page 2 for the versions. This manual and the gsd-file can be downloaded at www.aqelteknik.se

The software version of MP72 is shown briefly on the display when power is switched on.

Manufacturer Declaration of Conformity

Manufacturer: AQ Elteknik AB Sweden declares, that the product:

Motor Controller MP72 marked with CE-label conforms with the following standards: EN 61000-6-2:2001, EN 61000-6-4:2001, EN55011 (Group 1, Class B).

Motor Controller Model MP72 marked with  conforms to WEEE directive 2002/96/EC. The Motor Controller Model MP72 also conforms to RoHS directive 2002/95/EC. When the MP72 is to be discarded, send it back to AQ Elteknik AB for safe disposal.

Limited Warranty

AQ Elteknik AB warrants to the original end user that the Motor Controller MP72 is free from any defects in materials or workmanship for a period of one year from the date of purchase. During the warranty period, should the Motor Controller MP72 have indications of failure due to faulty workmanship or materials, AQ Elteknik AB will replace it with no charge. This warranty shall not apply if the Motor Controller MP72 is modified, misused or subjected to abnormal working conditions.

Replacement as provided under this warranty is the only remedy of the purchaser. The purchaser pays freight to AQ Elteknik AB. AQ Elteknik AB shall in no event be held liable for indirect or consequential damages of any kind or character to the purchaser. See “Manufacturer Information” for address.

Warning

The Motor Controller MP72 is intended to be used with brushless DC motors with Hall sensors and the Dynamic Mixer DM50 manufactured by AQ Elteknik AB. AQ Elteknik AB takes no responsibility for any possible damage that could happen if any other motor not confirming to the specifications is connected to the Motor Controller MP72.

Manufacturer Information

Manufacturer Address:

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Website:	**www.aqelteknik.com**	E-mail:	You can find it on the website

Certificate of Quality and Function

AQ Elteknik AB guaranties that the Motor Controller MP72 has passed function tests and quality tests.

2. Introduction

Motor Controller MP72

Motor Controller MP72 is used to control the Dynamic Mixer DM50 or other BLDC motors.

Installing the Motor ControllerMP72

The Motor Controller MP72 should be installed where it is protected from dust and water. It is made to be attached to a DIN-rail, to which it snaps easily and can be removed by pushing up and bending the top out. The connector terminals 1-7 and 8-17 can be removed by pulling the connector out. Profibus is connected to the Profibus DP (D-sub) connector, see chapter 8: Connecting Profibus.

The Motor Controller MP72 should be installed in accordance with national regulations. A person with the required knowledge should perform the installation.

Minus of the power source (24V MINUS) should be connected to the system ground if possible. Voltage on the power inputs should not exceed 35V relative ground.

MP72 Connector Terminal	Connections to terminal	
1	+ power PLUS	24VDC
2	– power MINUS	Ground
3		
4		
5		
6		
7		

Using the Motor ControllerMP72

Use the BACK button to go back to previous menu-level or To cancel a Selected operation 	Use the MENU button to scroll trough the menu or Scroll trough a list of parameter-values 	Use the SELECT button to select a menu-item or Confirm the selection of a parameter-value 

Keep MENU pressed to scroll continuous trough parameter values. Press BACK while pressing MENU to scroll backwards.

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3. Mixer

Motor Controller MP72 contains an inverter controlling the speed of the BLDC motor in the mixer. The motor winding and hall sensors must be connected correctly in order for the motor to function correctly. If wrongly connected the motor will draw high current, vibrate or not run at all. The cables to hall sensors A, B and C are sensitive and should not be adjacent to any of the cables to the motor windings.

The ActualSpeed (rpm) of the mixer is shown in the display.

MP72 Connector Terminal	Colour of DM50 mixer cables connected to MP72 Terminal	Colour of motor-cables inside the DM50 mixer	Connections to the motor inside the DM50 mixer
8	White	Yellow	Motor winding A
9	Brown	Red	Motor winding B
10	Green	Black	Motor winding C
11	Yellow	Black	Hall sensor -0V
12	Grey	Blue	Hall sensor A
13	Pink	Green	Hall sensor B
14	Blue	White	Hall sensor C
15	Red	Red	Hall sensor +5V
16	Screen		Screen
17			

Mixer control

In **"MIXER Run-Stop"** menu the Mixer can be started and stopped. At power off "MIXER Run-Stop" will be reset to Stop. If Profibus is enabled it will take control.

Mixer speed

In **"MIXER SPEED"** menu the Mixer SetSpeed can be set. But if Profibus is enabled it will take control.

Maximum speed is 1000rpm. (Profibus parameter Maximum Speed is ignored). Lowest speed is 100rpm. If speed is set lower than 100rpm it will stop.

SHOW DATA

In **"SHOW DATA"** menu some data can be viewed.

4. Profibus DP

The Motor ControllerMP72 supports Profibus DP-V0 with communication speeds up to 12 Mbit/s.

Connecting Profibus

The Profibus cable connects to MP72 via a 9-pin D-sub connector see table.

If you use resistors to terminate the Profibus cable, put 390Ω between pin6 and pin8, 220Ω between pin6 and pin5, 390Ω between pin3 and pin5.

The Profibus-interface in MP72 is not isolated from ground.

The gsd-file: MP720B0E.gsd is needed for configuration of the Profibus master. It can be downloaded at www.aqelteknik.se. The version of the gsd-file is written in the beginning of the gsd-file (the gsd-file can be viewed with a text editor). It must be the correct version. See page 2 for correct version.

MP72 Profibus (D-sub) Connector pin	Profibus cable
1	Cable screen
2	
3	Profibus Cable B Green (-)
4	
5	- 0V (for terminating resistor)
6	+ 5V (for terminating resistor)
7	
8	Profibus Cable A Red (+)
9	

PROFIBUS Parameters

In **"SETTINGS"** menu:

Select **"PROFIBUS ADDRESS":** to set the address (0-126). It must be a unique address.

Select **"PROFIBUS CONTROL"**: to enable or disable Profibus communication.

Profibus Status-symbol

The current status of the Profibus communication is shown with a Profibus status-symbol on the start screen at the bottom right corner of the display:

Blank	=	Profibus is not enabled.
□	=	Bitrate has not been detected.
▉	=	Profibus communication has been detected and bitrate has been set.
P	=	Parameter or configuration telegram has been received.
e	=	Parameter or configuration telegram error.
> <	=	(alternating) Data exchange telegrams are received and responded to.
X	=	Ready for data exchange but no telegram is received.
C	=	Has been ready for data exchange but is not ready anymore.

Request Data and Response Data

The master sends 3 byte Request Data to Motor Controller MP72 which respond with 6 bytes Response Data (1-6). See table.

When Profibus is enabled SetSpeed is only controlled by Profibus. By disabling Profibus, SetSpeed can be controlled via the menu.

Request Data table

Request Data	
1	**Control bits** bit0: 1 = Run 0 = Stop bit1: bit2: bit3: bit4: bit5: bit6: bit7:
2	**SetSpeed High byte (rpm)**
3	**SetSpeed Low byte (rpm)**

Response Data table

Response Data	
1	**Error bits** bit0: 1= Mixer should rotate but it does not. bit1: 1= ActualSpeed is not within SetSpeed ± 25% bit2: 1= bit3: 1= Motor encoder error bit4: 1= Motor current has been limited. bit5: 1= bit6: bit7:
2	**ActualSpeed High byte (rpm)**
3	**ActualSpeed Low byte (rpm)**
4	**Motor current (1/10 A)**
5	**Power Supply Voltage (V)**
6	**Power Consumption (W)**

TROUBLESHOOTING

If the Profibus status-symbol shows ☐ all the time: There is no communication detected. Profibus cable is not connected or has wrong polarity or Profibus Master is inactive.

If the Profibus status-symbol shows ▉ all the time: Maybe address is wrong.

If the Profibus status-symbol shows **P** and **e** continuously it means the Profibus master repeatedly sends parameter or configuration telegrams but MP72 do not accept them. Something is wrong with the parameter or configuration telegram.

If the Profibus status-symbol shows **C** it means MP72 has been ready for data exchange but is not ready anymore. A reason can be communication error or wrong length of the data exchange request telegram.

If no Profibus status-symbol is shown at all: Profibus is not enabled.

5. Technical specifications MP72

Weight	200g
Operating temperature	0°C to 50°C
Supply voltage	24V ± 6V DC
Current consumption max	4 A
Max output current	20 A
Max output power	100W
Digital input	
mA input	
Connects to	Brushless DC motors with Hall sensors e.g. Dynamic Mixer DM50
Protection class	IP20
Ambient Humidity	0% - 90%
Material	Aluminium, polyamide, polycarbonate
Profibus DP	DP-V0, Max bitrate 12 Mbit/s