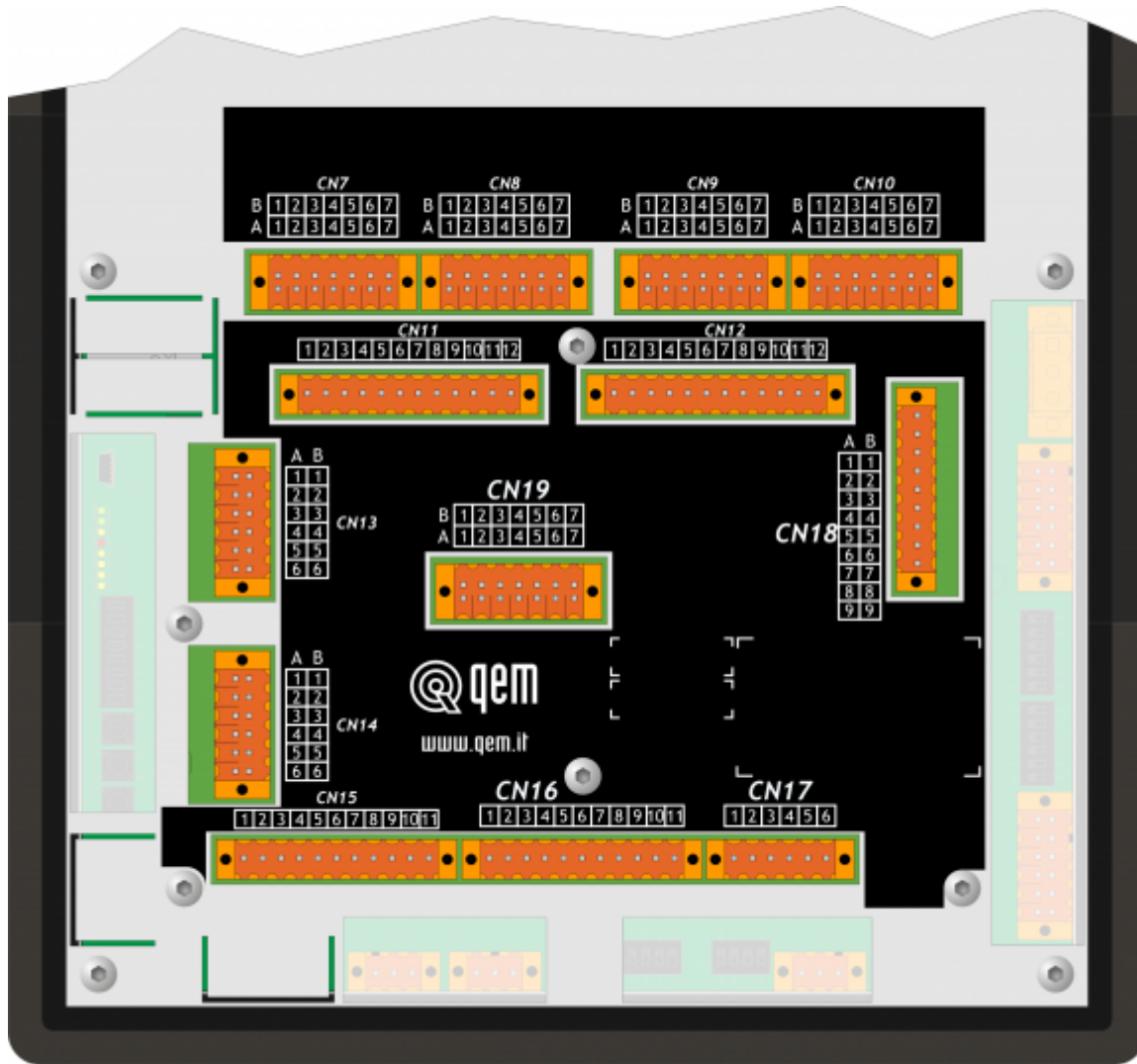


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Specialization card 1MG3F rel.02



Informations



Document:	MIM1MG3F02			
Description:	Installation and maintenance manual			
Editor:	Riccardo Furlato			
Approver	Gabriele Bazzi			
Link:	http://www.qem.eu/doku/doku.php/en/strumenti/qmoveplus/mim1mg3f02			
Language:	English			
Document Release	Hardware Release	Description	Note	Date
01	01	New manual		27/11/2014
02	02	New card	See the document http://www.qem.eu/doku/doku.php/en/strumenti/qmoveplus/1mg3f01_1mg3f02 , to check the differences between the two hardware releases	11/03/2015

1. Description

The **1MG3F** is a specialization card for Qmove+ series.

1.1 Equipment

	16 standard digital inputs (+8 alternative inputs to 4 counters)
	2 rapid digital inputs
	4 bidirectional counters
	2 analog inputs
	8 digital outputs
	4 analog outputs
	4 step-direction outputs

2. Connections

2.1 Digital inputs

2.1.1 16 standard digital inputs + 2 rapid inputs



The electrical features are given in paragraph [Electrical features](#).
The wiring examples are given in paragraph [Connection examples](#)

CN11	Terminal	Symbol	Description	Address	
	1	I01(PNP)	PNP type rapid input I01	Externally configurable terminals ¹⁾	1.INT05 FREQ1 ²⁾
	2	I01(NPN)	Rapid input I01 type NPN		
	3	0V	Common digital inputs		
	4	I1	Input I1		3.INP01
	5	I2	Input I2		3.INP02
	6	I3	Input I3		3.INP03
	7	I4	Input I4		3.INP04
	8	I5	Input I5		3.INP05
	9	I6	Input I6		3.INP06
	10	I7	Input I7		3.INP07
	11	I8	Input I8		3.INP08
	12	0V	Common for digital inputs		

¹⁾ **NPN rapid input configuration:**

Terminal 1: connect to 12÷24Vdc of the power supply

Terminal 2: input

PNP rapid input configuration:

Terminal 1: input

Terminal 2: connect to 0V (terminal 3)

²⁾ Can be used as a frequency input to FREQ device, indicating 1 in the device declaration

can be used as a frequency input to a REQ device, indicating 1 in the device declaration

CN12	Terminal	Symbol	Description		Address	
 1 2 3 4 5 6 7 8 9 10 11 12	1	I02(PNP)	PNP type rapid input I02	Externally configurable terminals ¹⁾	1.INT06 FREQ2 ²⁾	
	2	I02(NPN)	NPN type rapid input I02			
	3	0V	Common for digital inputs			
	4	I9	Input I9			3.INP09
	5	I10	Input I10			3.INP10
	6	I11	Input I11			3.INP11
	7	I12	Input I12			3.INP12
	8	I13	Input I13			3.INP13
	9	I14	Input I14			3.INP14
	10	I15	Input I15			3.INP15
	11	I16	Input I16			3.INP16
	12	0V	Common for digital inputs			

¹⁾ **NPN rapid input configuration:**

Terminal 1: connect to 12÷24Vdc of the power supply

Terminal 2: input

PNP rapid input configuration:

Terminal 1: input

Terminal 2: connect to 0V (terminal 3)

²⁾ Can be used as a frequency input to FREQ device, indicating 2 in the device declaration

2.1.2 4 bidirectional counter inputs 200KHz



The electrical features are given in paragraph [Electrical features](#).
The wiring examples are given in paragraph [Connection examples](#)

CN7	Terminal	Symbol	Description	Address
	1A		Internal bridge 1A -1B	
	2A	PHA1	Phase A count 1	3.INP17 3.CNT01
	3A	PHB1 Phase B count 1		
	4A	Z1	Z count 1	3.INP18 1.INT01
	5A	0V		
	6A	0V	Common for count inputs	
	7A	0V		
	1B		Internal bridge 1A -1B	
	2B	PHA1+	+ PHA count 1	3.INP17 3.CNT01
	3B	PHB1+	+ PHB count 1	
	4B	Z1+	+ Z count 1	Line Driver 1.INT01
	5B	PHA1-	- PHA count 1	
	6B	PHB1-	- PHB count 1	
	7B	Z1-	- Z count 1	

¹⁾ PNP/Push-Pull type count configuration:

Terminal 5B: connect to terminal 5A

Terminal 6B: connect to terminal 6A

Terminal 7B: connect to terminal 7A

CN8	Terminal	Symbol	Description	Address
	1A		Internal bridge 1A -1B	
	2A	PHA2	Phase A count 2	3.INP19 3.CNT02
	3A	PHB2	Phase B count 2	
	4A	Z2	Z count 2	3.INP20 1.INT02
	5A	0V		
	6A	0V	Common for count inputs	
	7A	0V		
	1B		Internal bridge 1A -1B	
	2B	PHA2+	+ PHA count 2	3.INP19 3.CNT02
	3B	PHB2+	+ PHB count 2	
	4B	Z2+	+ Z count 2	Line Driver 1.INT02
	5B	PHA2-	- PHA count 2	
	6B	PHB2-	- PHB count 2	
	7B	Z2-	- Z count 2	

¹⁾ PNP/Push-Pull type count configuration:

Terminal 5B: connect to terminal 5A

Terminal 6B: connect to terminal 6A

Terminal 7B: connect to terminal 7A

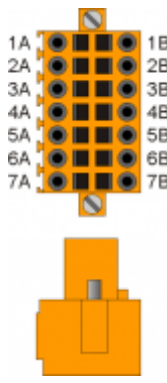
CN9	Terminal	Symbol	Description	Address
	1A		Internal bridge 1A -1B	
	2A	PHA3	Phase A count 3	3.INP21 3.CNT03
	3A	PHB3	Phase B count 3	
	4A	Z3	Z count 3	3.INP22 1.INT03
	5A	0V		
	6A	0V	Common for count inputs	
	7A	0V		
	1B		Internal bridge 1A -1B	
	2B	PHA3+	+ PHA count 3	3.INP21 3.CNT03
	3B	PHB3+	+ PHB count 3	
	4B	Z3+	+ Z count 3	Line Driver 1.INT03
	5B	PHA3-	- PHA count 3	
	6B	PHB3-	- PHB count 3	
	7B	Z3-	- Z count 3	

¹⁾ PNP/Push-Pull type count configuration:

Terminal 5B: connect to terminal 5A

Terminal 6B: connect to terminal 6A

Terminal 7B: connect to terminal 7A

CN10	Terminal	Symbol	Description	Address			
	1A		Internal bridge 1A -1B				
	2A	PHA4	Phase A count 4	PNP Push-Pull ¹⁾	3.INP23	3.CNT04	
	3A	PHB4	Phase B count 4		3.INP24		
	4A	Z4	Z count 4		1.INT04		
	5A	0V	Common for count inputs				
	6A	0V					
	7A	0V					
	1B		Internal bridge 1A -1B				
	2B	PHA4+	+ PHA count 4	Line Driver	3.INP23	3.CNT04	
	3B	PHB4+	+ PHB count 4		3.INP24		
	4B	Z4+	+ Z count 4		1.INT04		
	5B	PHA4-	- PHA count 4				
	6B	PHB4-	- PHB count 4				
	7B	Z4-	- Z count 4				

¹⁾ PNP/Push-Pull type count configuration:

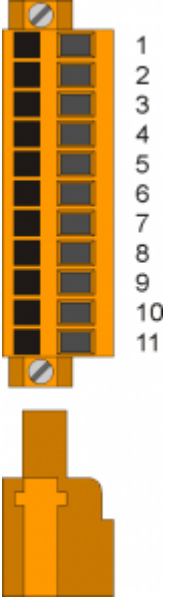
Terminal 5B: connect to terminal 5A

Terminal 6B: connect to terminal 6A

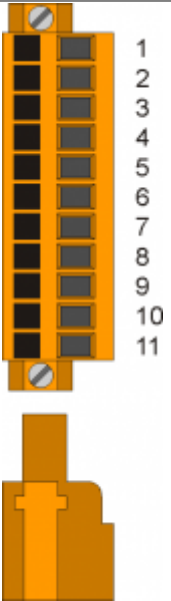
Terminal 7B: connect to terminal 7A

2.2 Analog inputs

2.2.1 4 potentiometric, voltmetric and amperometric analog inputs 12bit

 The electrical features are given in section Electrical features. The connection examples are provided in section Electrical features				
CN7	Terminal	Simbol	Description	Address
	1	V1+	Outputs power input O1÷O8 (12÷28V dc)	
	2	O1	Digital output 1	3.OUT01
	3	O2	Digital output 2	3.OUT02
	4	V1-	Outputs power input O1÷O8 (0V dc)	
	5	O3	Digital output 3	3.OUT03
	6	O4	Digital output 4	3.OUT04
	7	V1-	Outputs power input O1÷O8 (0V dc)	
	8	O5	Digital output 5	3.OUT05
	9	O6	Digital output 6	3.OUT06
	10	O7	Digital output 7	3.OUT07
	11	O8	Digital output 8	3.OUT08

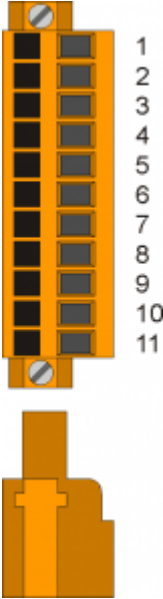
CN8	Terminal	Simbol	Description	Address
	1	V2+	Outputs power input O9÷O16 (12÷28V dc)	
	2	O9	Digital output 9	3.OUT09
	3	O10	Digital output 10	3.OUT10
	4	V2-	Outputs power input O9÷O16 (0V dc)	
	5	O11	Digital output 11	3.OUT11
	6	O12	Digital output 12	3.OUT12
	7	V2-	Outputs power input O9÷O16 (0V dc)	
	8	O13	Digital output 13	3.OUT13
	9	O14	Digital output 14	3.OUT14
	10	O15	Digital output 15	3.OUT15
	11	O16	Digital output 16	3.OUT16

CN9	Terminal	Simbol	Description	Address
	1	V3+	Outputs power input O17÷O32 (12÷28V dc)	
	2	O17	Digital output 17	3.OUT17
	3	O18	Digital output 18	3.OUT18
	4	V3-	Outputs power input O17÷O32 (0V dc)	
	5	O19	Digital output 19	3.OUT19
	6	O20	Digital output 20	3.OUT20
	7	V3-	Outputs power input O17÷O32 (0V dc)	
	8	O21	Digital output 21	3.OUT21
	9	O22	Digital output 22	3.OUT22
	10	O23	Digital output 23	3.OUT23
	11	O24	Digital output 24	3.OUT24

CN10	Terminal	Simbol	Description	Address
	1		N.C.	
	2	O25	Digital output 25	3.OUT25
	3	O26	Digital output 26	3.OUT26
	4	V3-	Outputs power input O17÷O32 (0V dc)	
	5	O27	Digital output 27	3.OUT27
	6	O28	Digital output 28	3.OUT28
	7	V3-	Outputs power input O17÷O32 (0V dc)	
	8	O29	Digital output 29	3.OUT29
	9	O30	Digital output 30	3.OUT30
	10	O31	Digital output 31	3.OUT31
	11	O32	Digital output 32	3.OUT32

2.3 Digital outputs

2.3.1 8 protected digital outputs

CN15	Terminal	Symbol	Description	Address
	1	V+	Outputs power in (12-28Vdc)	
	2	O1	Digital output 1	3.OUT01
	3	O2	Digital output 2	3.OUT02
	4		N.C.	
	5	O3	Digital output 3	3.OUT03
	6	O4	Digital output 4	3.OUT04
	7	V-	Outputs power in (12-28Vdc)	
	8	O5	Digital output 5	3.OUT05
	9	O6	Digital output 6	3.OUT06
	10	O7	Digital output 7	3.OUT07
	11	O8	Digital output 8	3.OUT08

2.3.2 4 STEP-DIRECTION outputs



The electrical features are given in paragraph [Electrical features](#).
The wiring examples are given in paragraph [Connection examples](#)

CN13	Terminal	Symbol	Description	Address
	1A	VD1	n.c.	
	2A	DIR1+	DIRECTION output 1	3.PULSE01
	3A	STEP1+	STEP output 1	
	4A	DIR2+	DIRECTION output 2	
	5A	STEP2+	STEP output 2	3.PULSE02
	6A	0V	Common for stepper outputs	
	1B	VD1	n.c.	
	2B	DIR1-	Complementary DIRECTION output 1	Complementary outputs for use in drives with Line-Driver inputs
	3B	STEP1-	Complementary output STEP 1	
	4B	DIR2-	Complementary output DIRECTION 2	
	5B	STEP2-	Complementary output STEP 2	
	6B	0V	Common for stepper outputs	
CN14	Terminal	Symbol	Description	Address
	1A	VD1	n.c.	
	2A	DIR1+	DIRECTION output 3	3.PULSE03
	3A	STEP1+	STEP output 3	
	4A	DIR2+	DIRECTION output 4	
	5A	STEP2+	STEP output 4	3.PULSE04
	6A	0V	Common for stepper outputs	
	1B	VD1	n.c.	
	2B	DIR1-	Complementary output DIRECTION 3	Complementary outputs for use in drives with Line-Driver inputs
	3B	STEP1-	Uscita complementare STEP 3	
	4B	DIR2-	Complementary output DIRECTION 4	
	5B	STEP2-	Complementary output STEP 4	
	6B	0V	Common for stepper outputs	

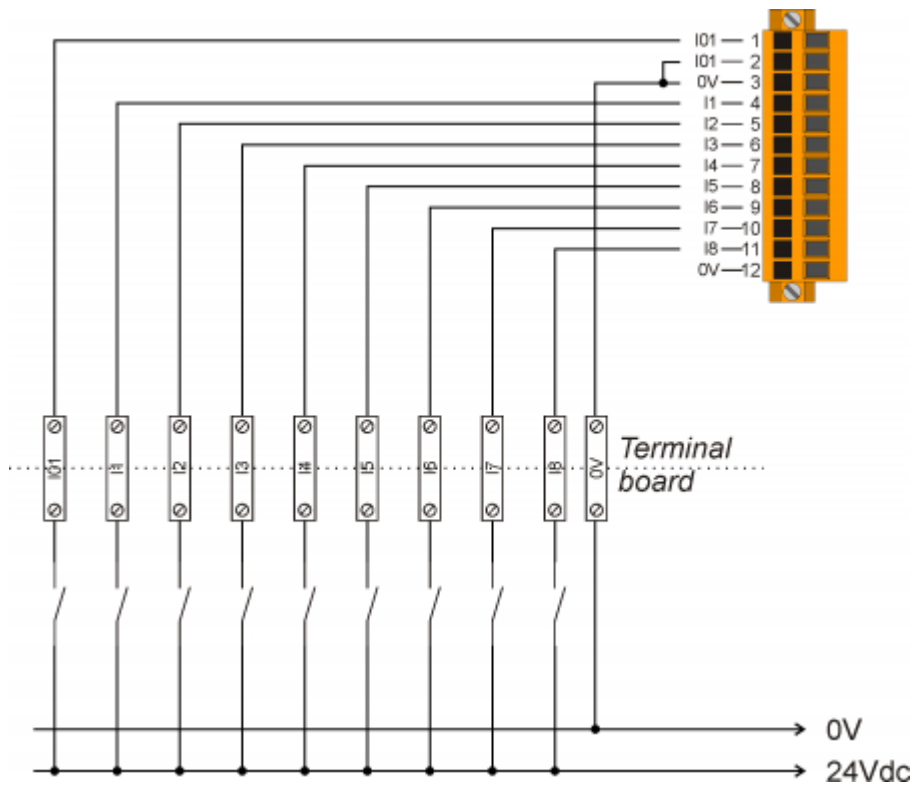
2.4 Analog outputs

2.4.1 4 analog outputs +/-10V, 16bit

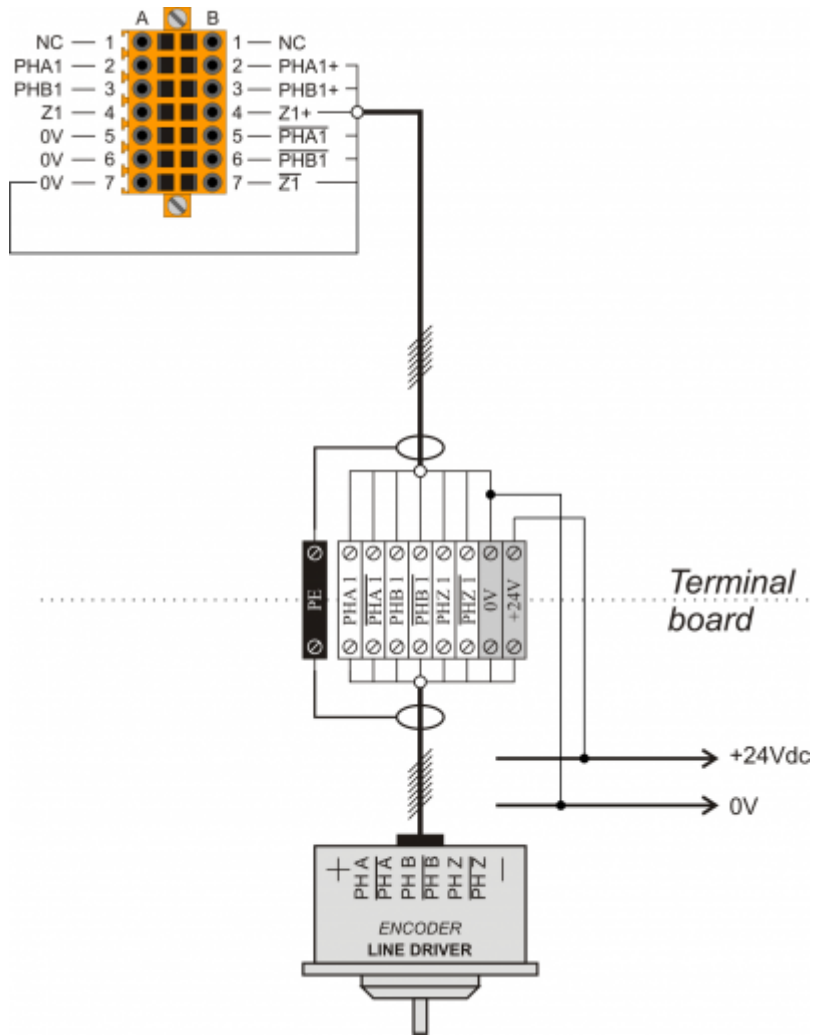
 The electrical features are given in paragraph Electrical features. The wiring examples are given in paragraph Connection examples				
CN16	Terminal	Symbol	Description	Address
	1	GAO	Common for analog outputs	
	2	A01	Analog output 1	3.AN01
	3	A02	Analog output 2	3.AN02
	4	GAO	Common for analog outputs	
	5	A03	Analog output 3	3.AN03
	6	A04	Analog output 4	3.AN04

3. Connection examples

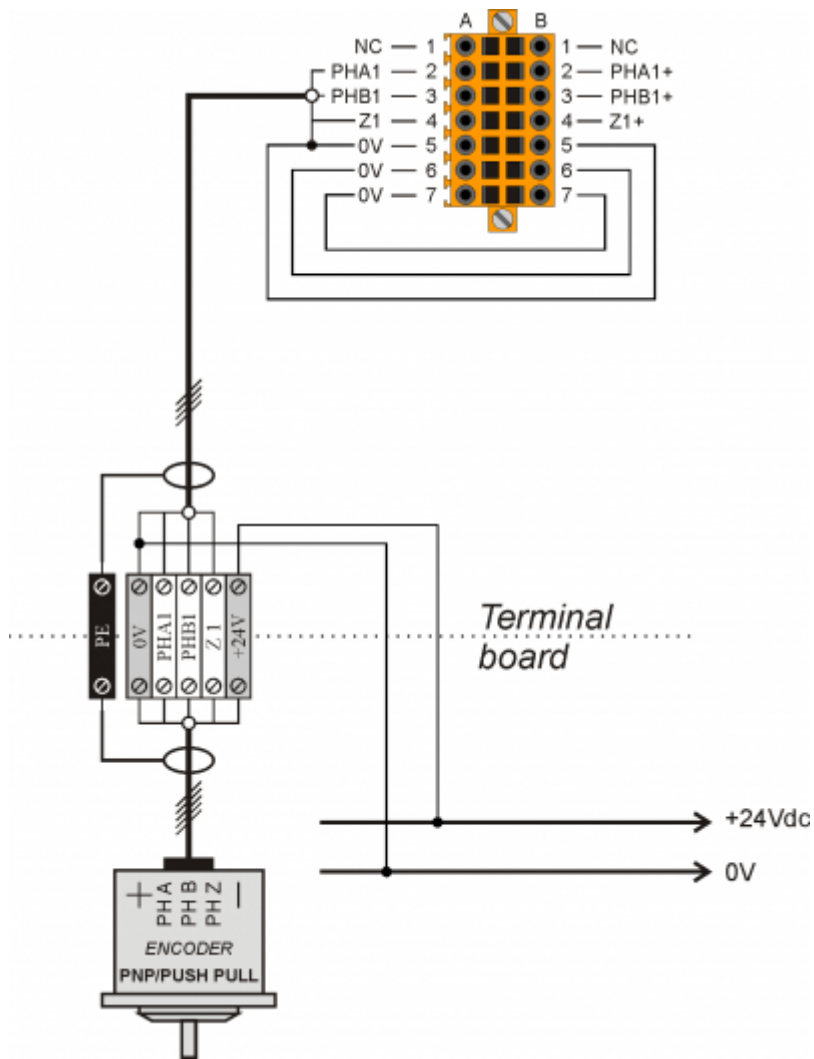
3.1 Digital inputs



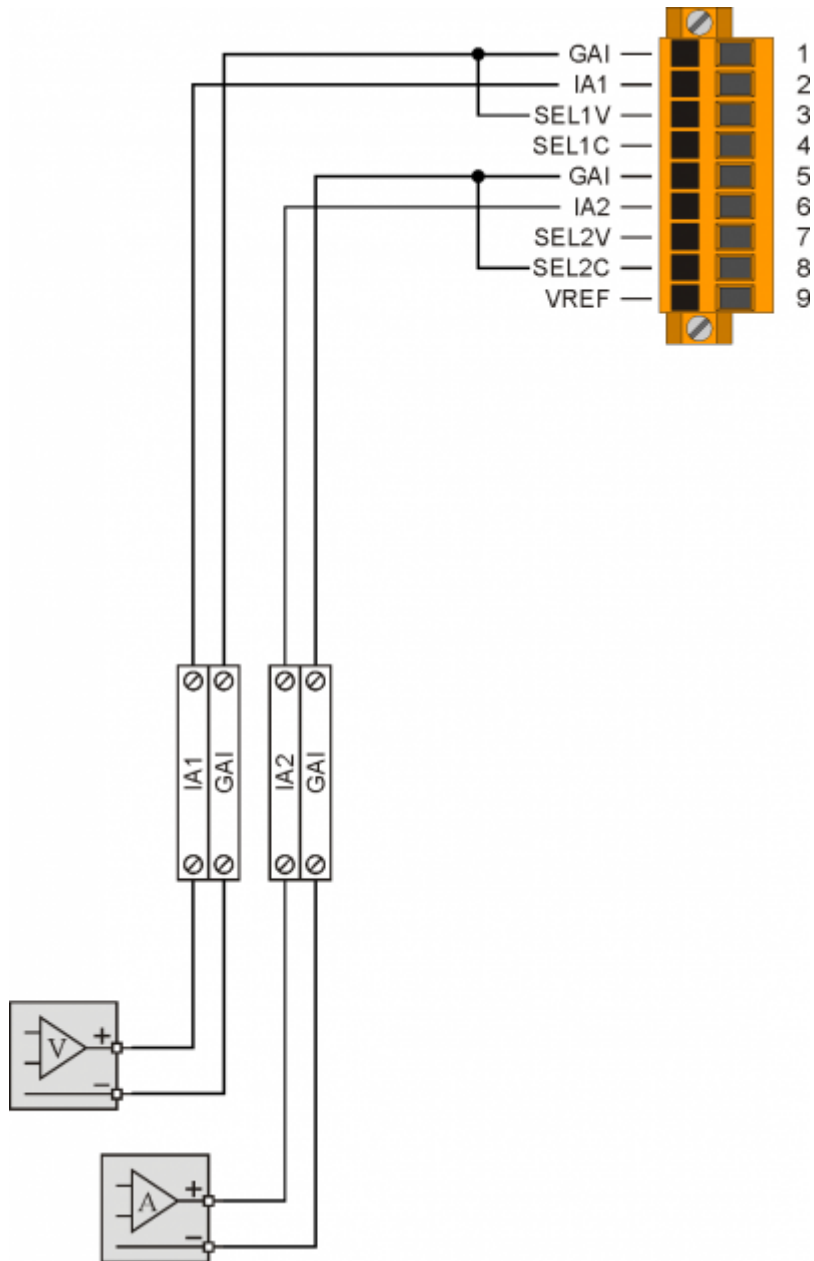
3.2 Line Driver counter inputs



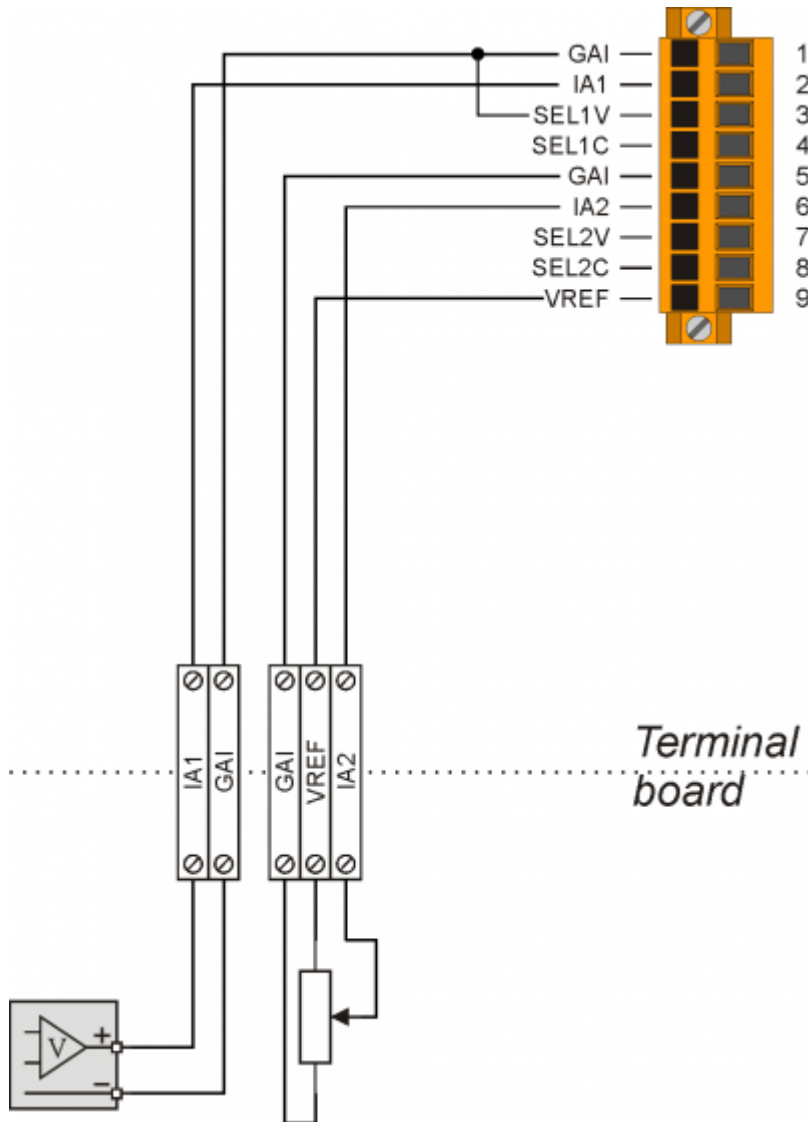
3.3 PNP / Push Pull counter inputs



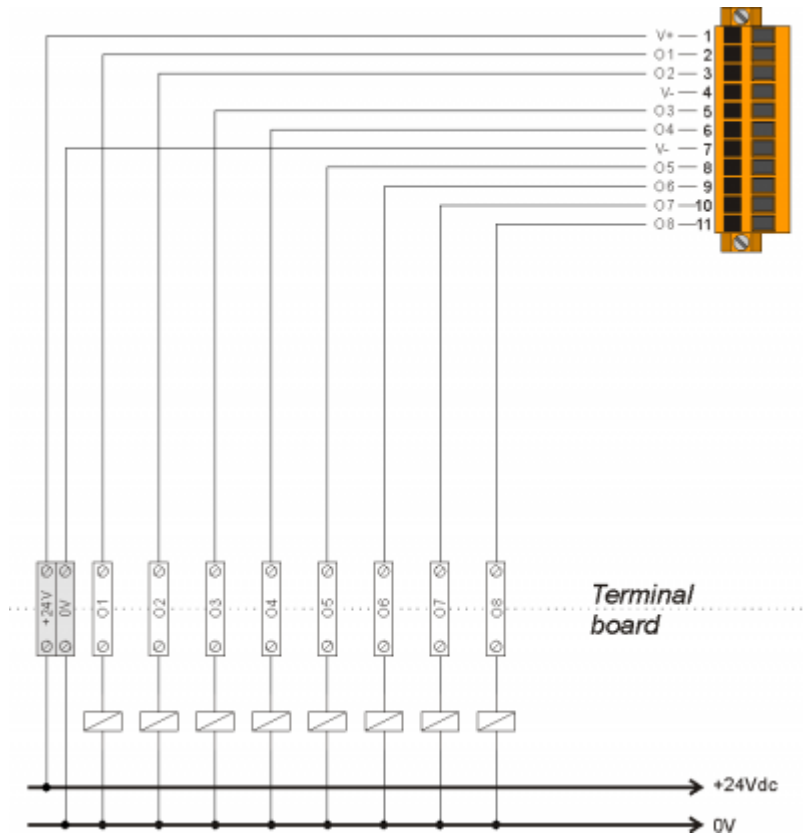
3.4 Voltmetric and amperometric analog inputs



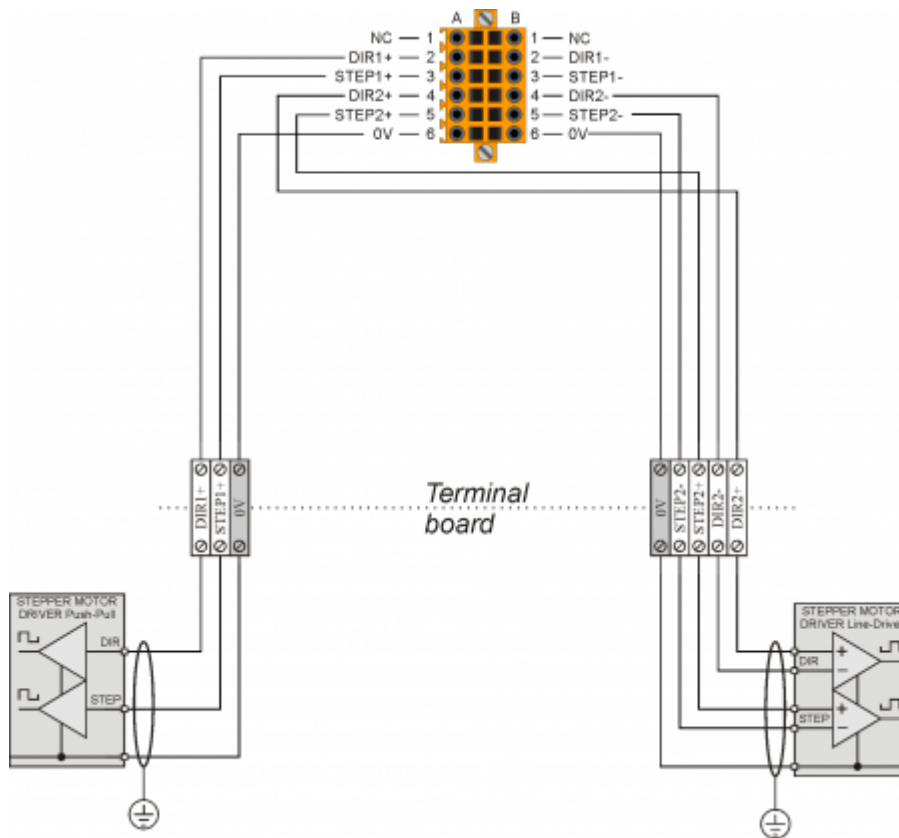
3.5 Voltmetric and potentiometric analog inputs



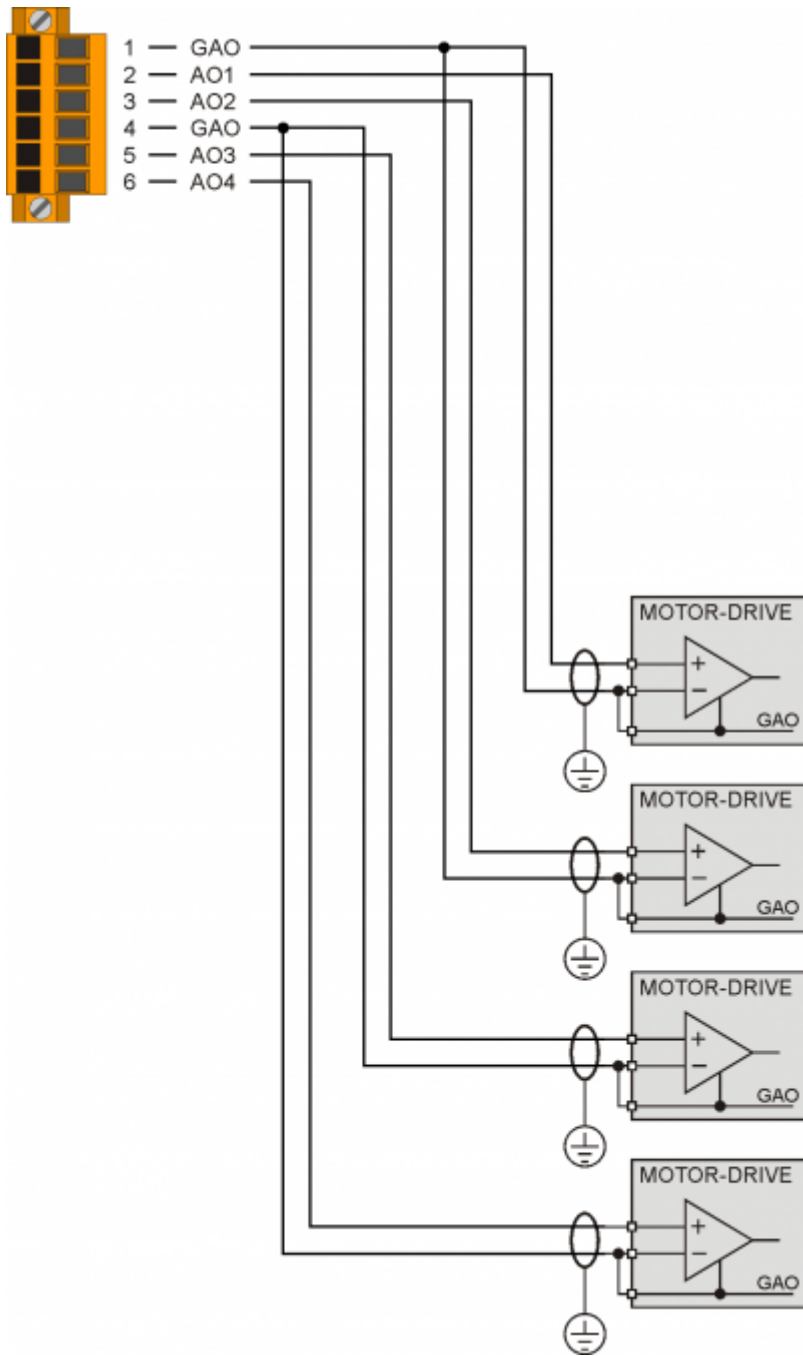
3.6 Protected digital outputs



3.7 Uscite STEP - DIRECTION



3.8 Analog outputs



4. Electrical features

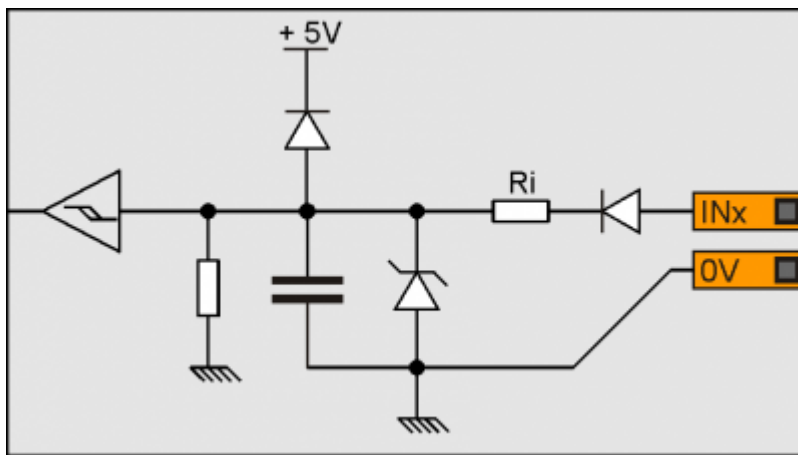
The following are the electrical hardware features.

The maximum and minimum frequency values and actual acquisition times, can still depend on any additional software filters, see the system variable "QMOVE:sys004".

4.0.1 Standard digital inputs

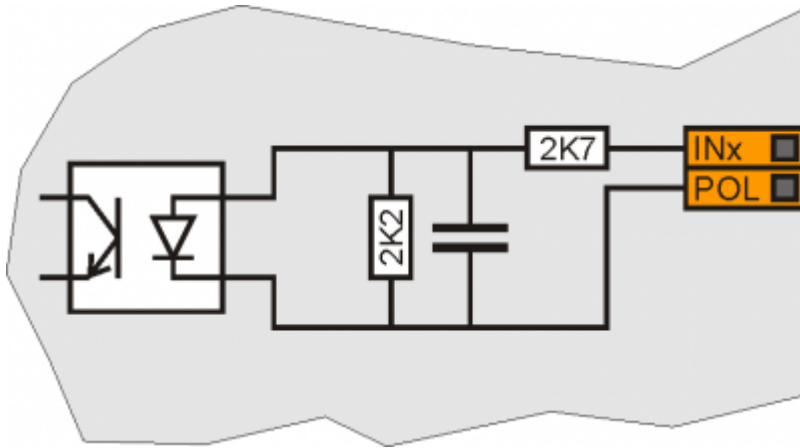
Type of polarisation	PNP
Min. acquisition time (hardware)	3ms
Isolation	1000Vrms
Rated operating voltage	24Vdc
Voltage of logic state 0	0-2 V
Voltage of logic state 1	10.5 - 26.5 V
Internal voltage drop	5V
Input resistance (Ri)	2700Ω
Sink current	2mA ÷ 8mA ¹⁾

¹⁾ CAUTION: If the device connected to the inputs needs a higher minimum current, inputs may not work properly.



4.0.2 Rapid digital inputs

Type of polarisation	NPN / PNP
Max. frequency	200KHz
Min. acquisition time (hardware)	5 μ s
Insulation	1000Vrms
Rated operating voltage	24Vdc
Voltage of logic status 0	0-2 V
Voltage of logic status 1	10.5 - 26.5 V
Internal voltage drop	1.2 V
Input resistance	2700 Ω



4.0.3 Bidirectional digital inputs 200KHz

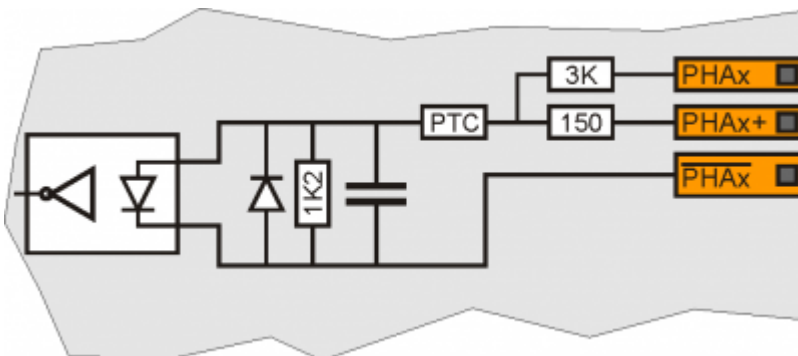


The values given in the table refer to input signals A, B and Z.
The max. frequency given in the table refers to A and B phase signals with a DutyCycle = 50%
With count frequencies over 50KHz the use of Line-Driver type encoders is recommended.

Type of polarisation	PNP/PP
Max frequency	200KHz
Min. acquisition time	5µs
Insulation	1000Vrms
Rated operating voltage	24Vdc
Voltage of logic status 0	0 - 2 V
Voltage of logic status 1	10.5 - 26.5 V
Internal voltage drop	1.2V
Input resistance	3100Ω

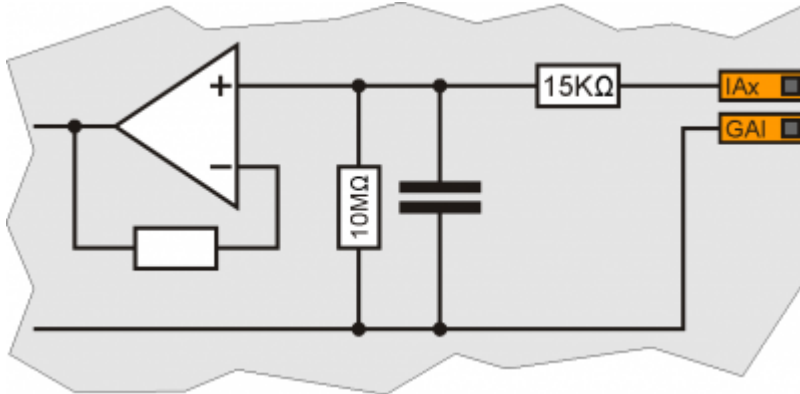
Line-Driver

Type of polarisation	Line-Driver
Max. frequency	200KHz
Min. acquisition time	5µs
Insulation	1000Vrms
Rated operating voltage (PHx+ ? PHx-)	5Vdc
Voltage of logic status 0 (PHx+ ? PHx-)	0-1.5 V
Voltage of logic status 1 (PHx+ ? PHx-)	2-5 V
Internal voltage drop	1.2V
Input resistance	150Ω



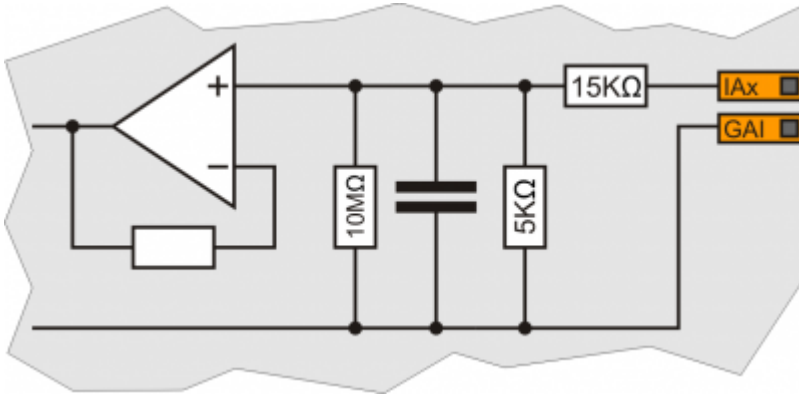
4.0.4 Potentiometric analog inputs

Type of connection	Potentiometric 1K Ω -20K Ω
Resolution	12bit/16bit
Reference voltage output	2.5Vdc
Max output current from reference	10mA
Input resistance	10M Ω
Max. linearity error	$\pm 0,1\%$ Vfs
Max. offset error	$\pm 0,1\%$ Vfs
S.n.	71 dB
Update speed	1ms
Insulation	1000 Vrms



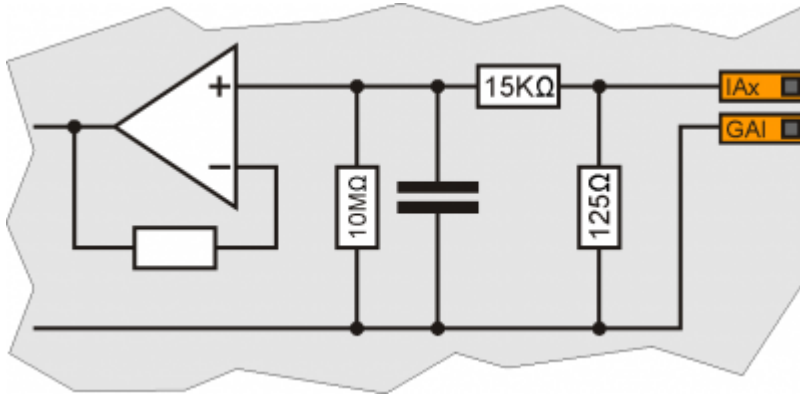
4.0.5 Voltmetric analog inputs

Type of connection	Voltmetric 0-10V
Resolution	12bit/16bit
Input resistance (R _{in})	20K Ω
Damage value	20V
Max. linearity error	$\pm 0.1\%$ Vfs
Max. offset error	$\pm 0.1\%$ Vfs
S.n.	71 dB
Update speed	1ms
Insulation	1000 Vrms



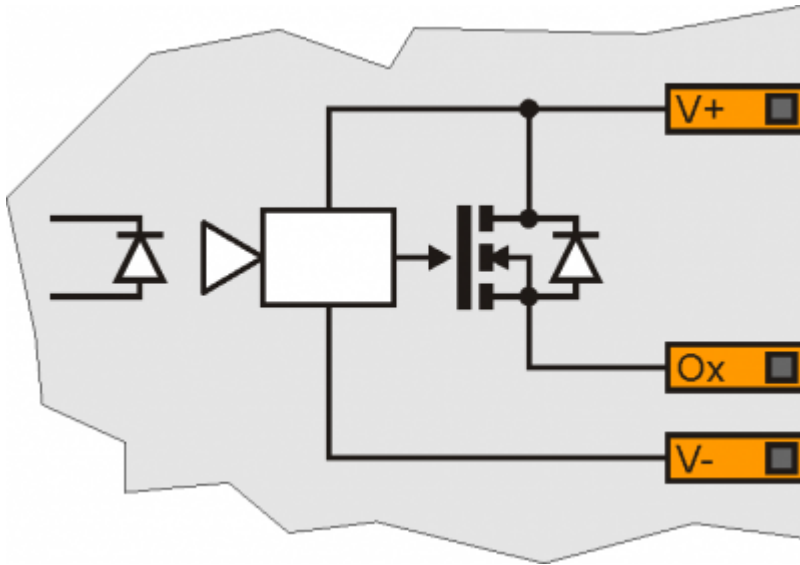
4.0.6 Amperometric analog inputs

Type of connection	Amperometric (0-20 mA)
Resolution	12bit/16bit
Input resistance	125Ω
Damage value	25 mA
Max. linearity error	± 0,1% Vfs
Max. offset error	± 0,1% Vfs
S.n.	71 dB
Update speed	1ms
Insulation	1000 Vrms



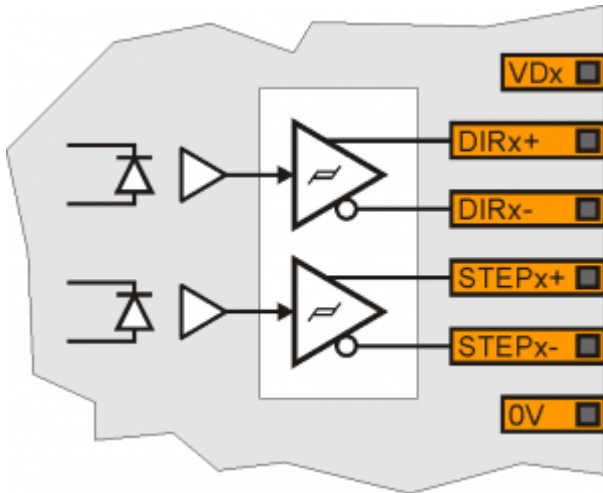
4.0.7 Protected digital outputs

Switchable load	Dc (PNP)
Max. operating voltage	28V
Insulation	1000Vpp
Max. internal voltage drop	600mV
Max internal resistance @ON	90mΩ
Max. protection current	12A
Max. operating current	2A
Max. current @OFF	5μA
Max switching time from ON to OFF	270μs
Max switching time from OFF to ON	250μs



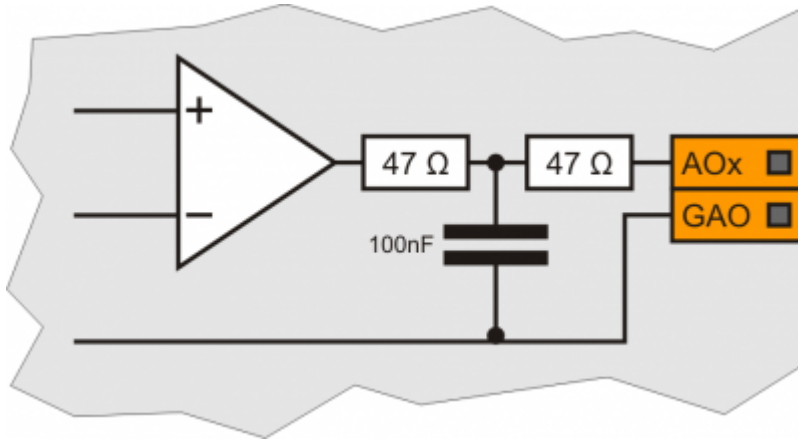
4.0.8 Stepper outputs

Type of polarisation	Push-Pull / Line-Driver
Max output frequency	50KHz
Insulation	1000Vpp
Max. operating current	20mA



4.0.9 Analog outputs

Type of connection	Common mode
Insulation	1000Vrms
Voltage range (minimum no load)	-9.8V - +9.8V
Max. offset variation depending on temperature*	+/- 5mV
Resolution	16bit
Max. current	1mA
Output variation depending on load	100 μ V/mA
Output resistance	249 Ω



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