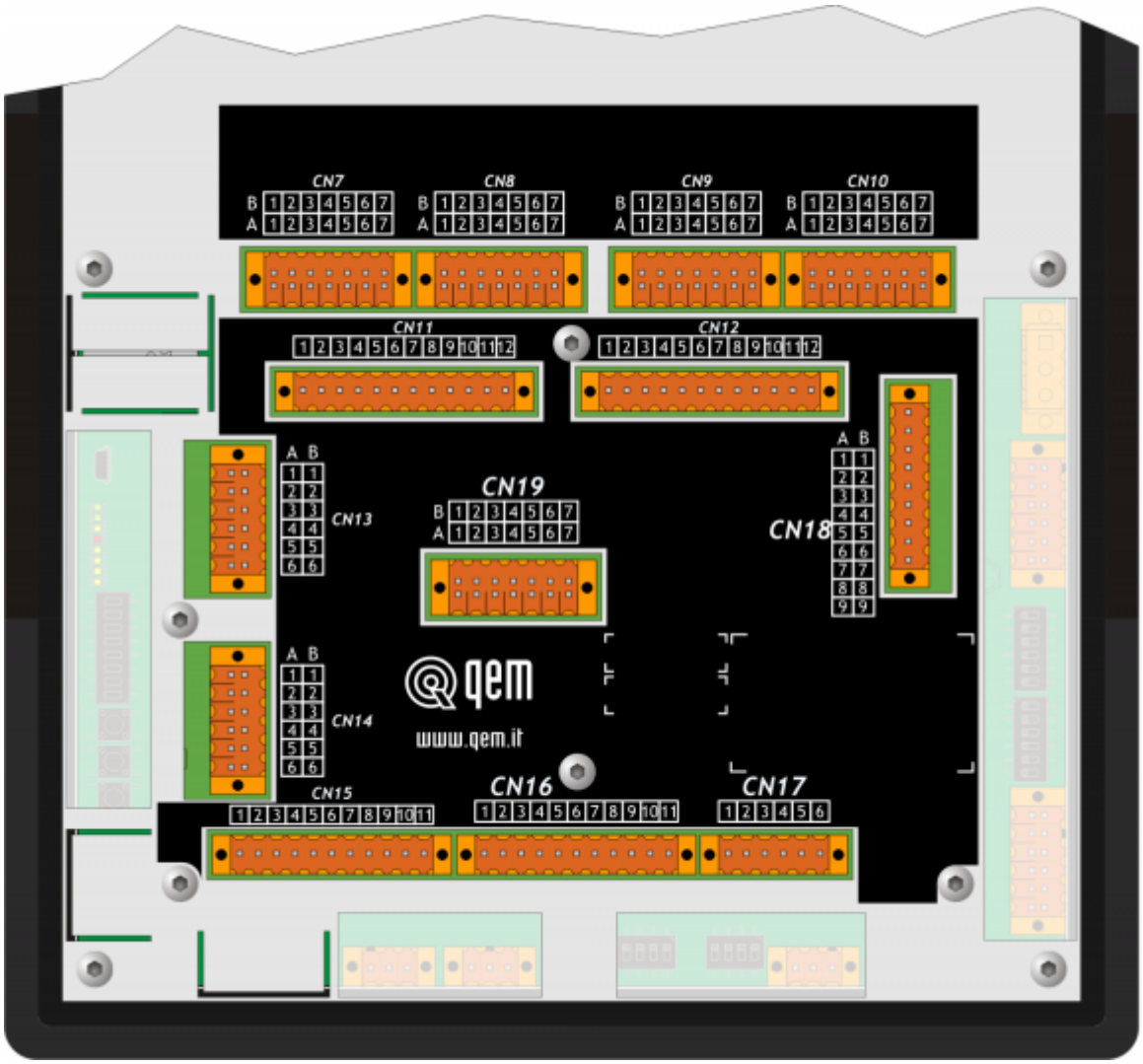
Sommario

Specialization card 1MG5F rel.01



Informations

Document:	**MIM1MG5F01**
Description:	Manuale di installazione e manutenzione
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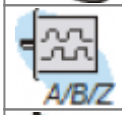
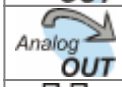
Language:	English

Document release	Hardware release	Description	Note	Date
01	01	New manual		10/12/2014

1. Description

The **1MG5F** specialization card for the Qmove+ series.

1.1 Equipment

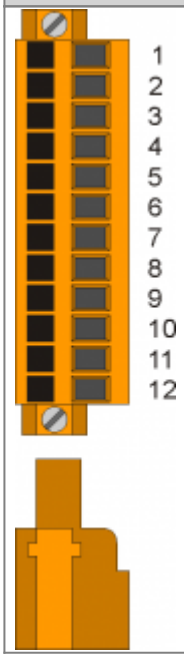
	16 standard digital inputs (+8 alternative inputs to 4 counters)
	2 rapid digital inputs
	4 bidirectional counters
	2 SSI absolute counters
	4 analog inputs
	16 digital outputs
	4 analog outputs
	4 step-direction outputs

2. Connectors

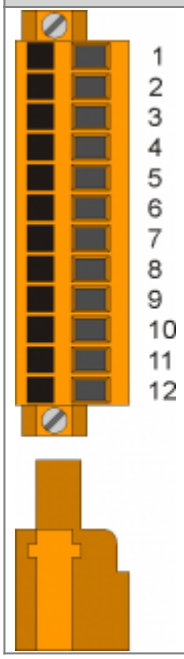
2.1 Digital inputs

2.1.1 16 standard digital inputs + 2 rapid digital inputs

The electriccal 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		

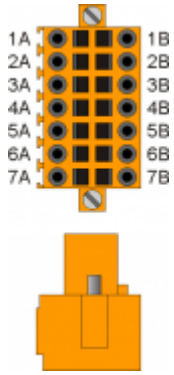
[1)] **NPN rapid input configuration**:
Terminal 1: connect to 12÷24Vdc of the power supply
Terminal 2: input
PNP rapid input configuration:
Terminal 1: input
Terminal 2: connect to 0V (terminal 3)
[2)] Can be used as a frequency input to FREQ device, indicating 1 in the device declaration

CN12	Terminal	Symbol	Description		Address
	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		

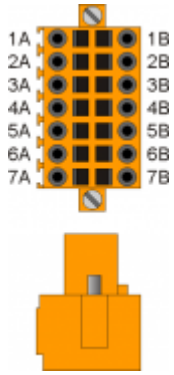
[1)] **NPN rapid input configuration**:
Terminal 1: connect to 12÷24Vdc of the power supply
Terminal 2: input
PNP rapid input configuration:
Terminal 1: input
Terminal 2: connect to 0V (terminal 3)
[2)] Can be used as a frequency input to FREQ device, indicating 2 in the device declaration

2.1.2 4 bidirectional counter inputs 200KHz

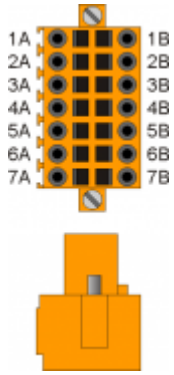
The electrical features are given in paragraph Electrical features.
The wiring examples are given in paragraph Connection examples

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

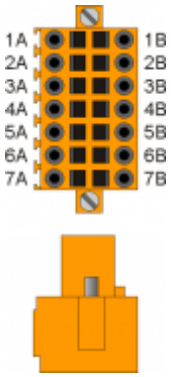
[1] **PNP/Push-Pull type count configuration**:
Terminal 5B: connect to terminal 5A
Terminal 6B: connect to terminal 6A
Terminal 7B: connect to terminal 7A

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

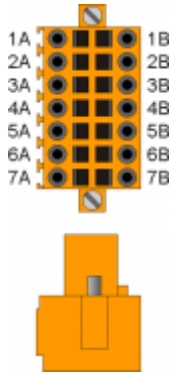
CN9	Terminal	Symbol	Description		Address	
	1A		Internal bridge 1A -1B			
	2A	PHA3	Phase A count 3	PNP Push-Pull[1]	3.INP21	3.CNT03
	3A	PHB3	Phase B count 3		3.INP22	
	4A	Z3	Z count 3		1.INT03	
	5A	0V	Common for count inputs			
	6A	0V				
	7A	0V				
	1B		Internal bridge 1A -1B			
	2B	PHA3+	+ PHA count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

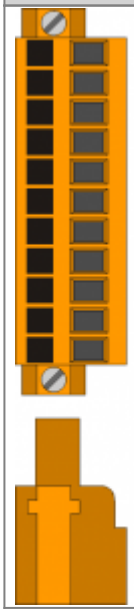
2.1.3 2 SSI absolute counter

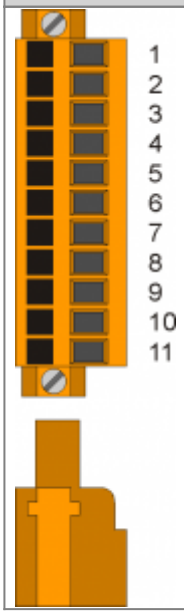
CN19	Terminal	Simbol	Description	Address
	1A		Internal bridge 1A-2A-1B-2B	
	2A			
	3A	DATA1+	SSI1 data input	1
	4A	DATA1-		
	5A	CLOCK1+	SSI1 clock output	
	6A	CLOCK1-		
	7A	0V	Inputs counter common	
	1B		Internal bridge 1A-2A-1B-2B	
	2B			
	3B	DATA2+	SSI2 data input	2
	4B	DATA2-		
	5B	CLOCK2+	SSI1 clock output	
	6B	CLOCK2-		
	7B	0V	Inputs counter common	

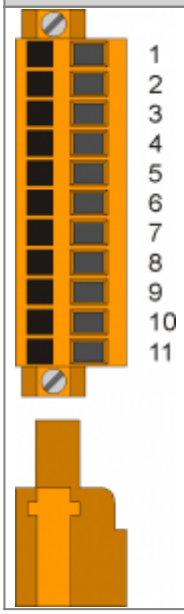
2.2 Ingressi analogici

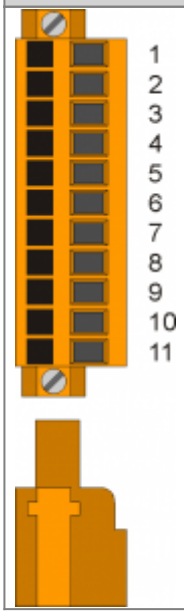
2.2.1 4 potentiometric, voltmetric and amperometric analog inputs 12bit

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 16 protected digital outputs

The electric features are reported in the section Electric features.
The connection examples are provided in section Electric features

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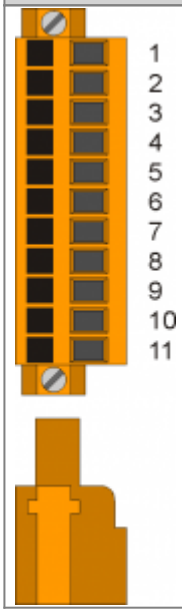
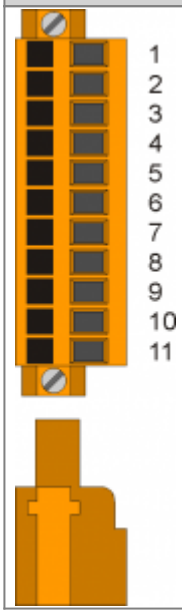
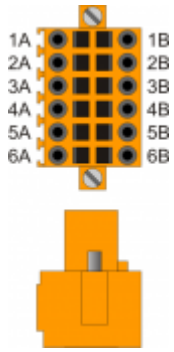
CN15	Terminal	Simbol	Description	Address
	1	V+	Output power input (12÷28Vdc)	
	2	O1	Digital output 1	3.OUT01
	3	O2	Digital output 2	3.OUT02
	4	V-	Output power common	
	5	O3	Digital output 3	3.OUT03
	6	O4	Digital output 4	3.OUT04
	7	V-	Output power common	
	8	O5	Digital output 5	3.OUT05
	9	O6	Digital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

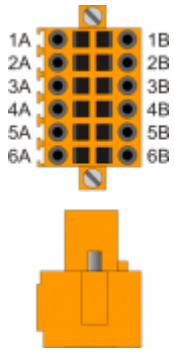
.

CN16	Terminal	Simbol	Description	Address
	1	V+	Output power input (12÷28Vdc)	
	2	O9	Digital output 9	3.OUT09
	3	O10	Digital output 10	3.OUT10
	4	V-	Output power common	
	5	O11	Digital output 11	3.OUT11
	6	O12	Digital output 12	3.OUT12
	7	V-	Output power common	
	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

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

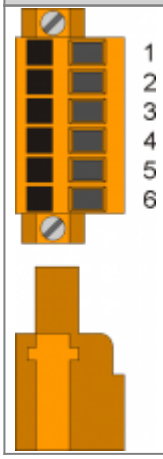
CN13	Terminal	Symbol	Description		Address
	1A	VD1	n.c.		
	2A	DIR1+	DIRECTION output 1	**Push-Pull Line Driver**	3.PULSE01
	3A	STEP1+	STEP output 1		
	4A	DIR2+	DIRECTION output 2		3.PULSE02
	5A	STEP2+	STEP output 2		
	6A	0V	Common for stepper outputs		
	1B	VD1	n.c.		
	2B	DIR1-	Complementary DIRECTION 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	**Push-Pull Line Driver**	3.PULSE03
	3A	STEP1+	STEP output 3		
	4A	DIR2+	DIRECTION output 4		3.PULSE04
	5A	STEP2+	STEP output 4		
	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 Uscite analogiche

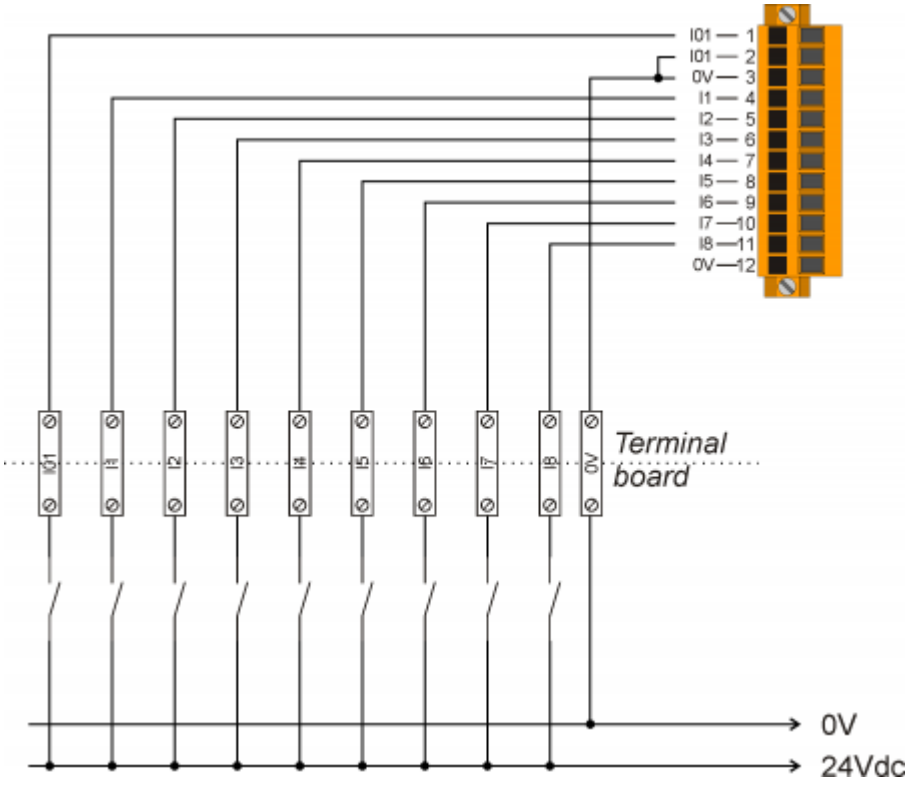
2.4.1 4 analog outputs +/-10V, 16bit

	**The electrical features are given in paragraph Electrical features.** **The wiring examples are given in paragraph Connection examples**

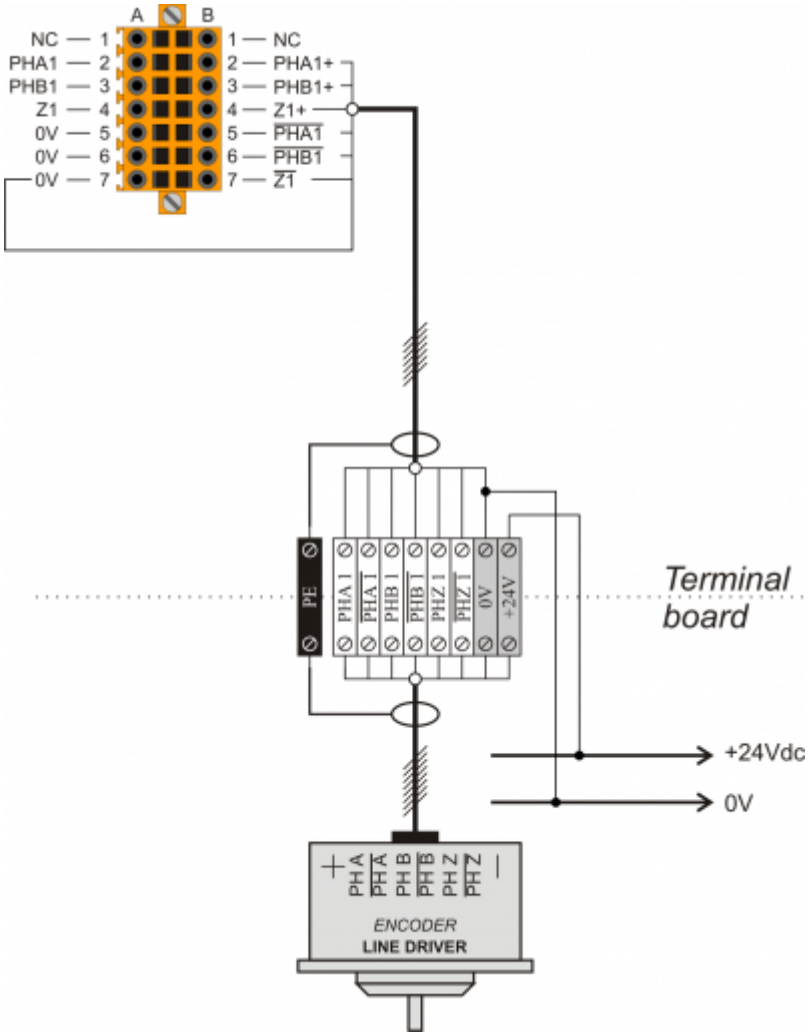
CN16	Terminal	Symbol	Description	Address
	1	GAO	Common for analog outputs	
	2	AO1	Analog output 1	3.AN01
	3	AO2	Analog output 2	3.AN02
	4	GAO	Common for analog outputs	
	5	AO3	Analog output 3	3.AN03
	6	AO4	Analog output 4	3.AN04

3. Connection examples

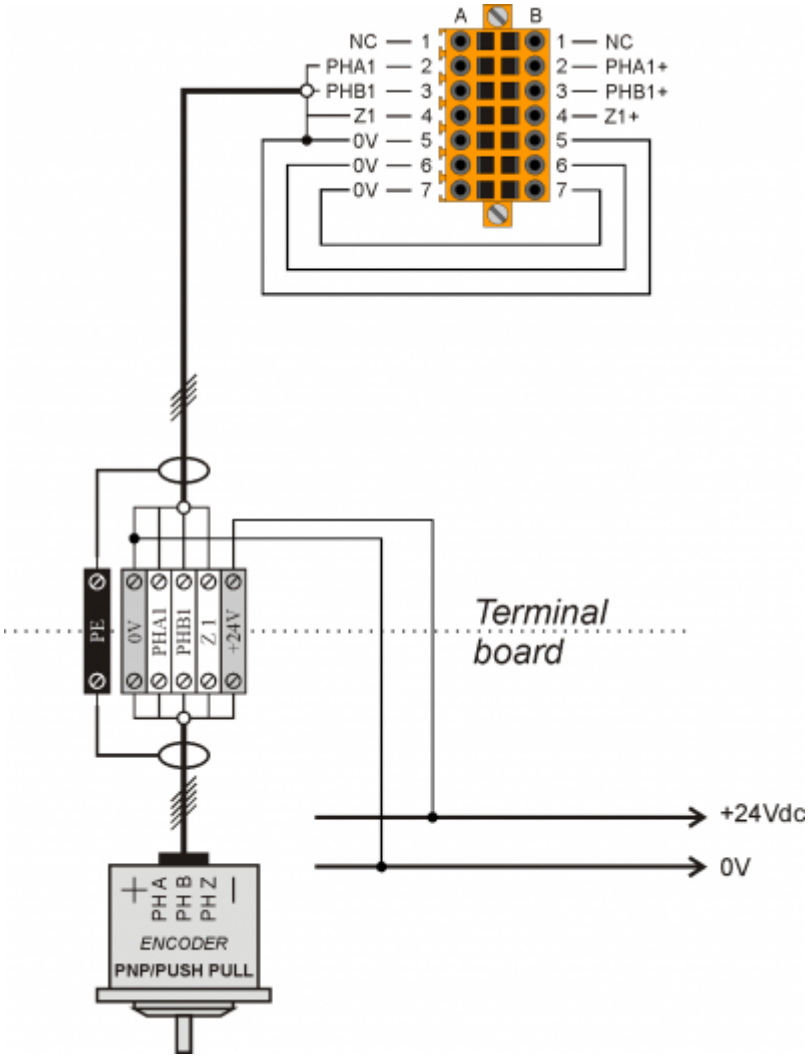
3.1 Digital inputs



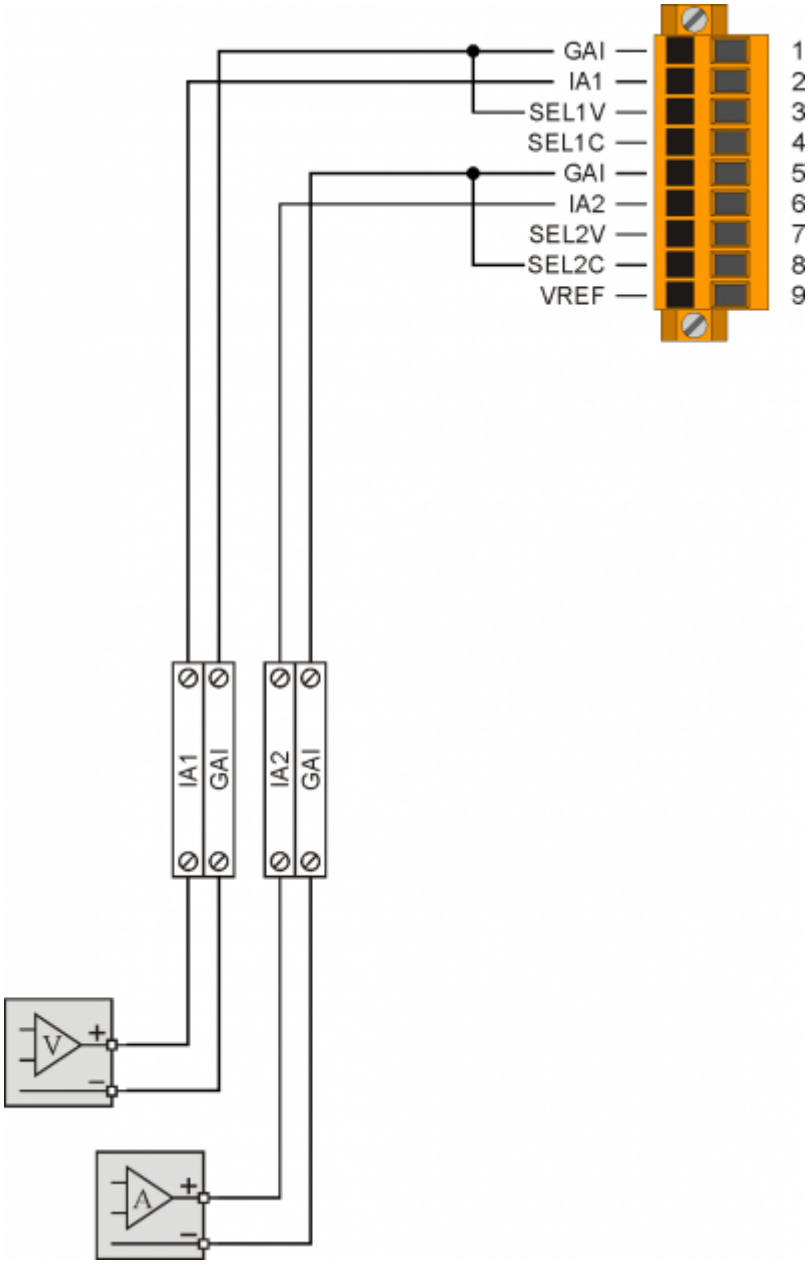
3.2 Line Driver counter inputs



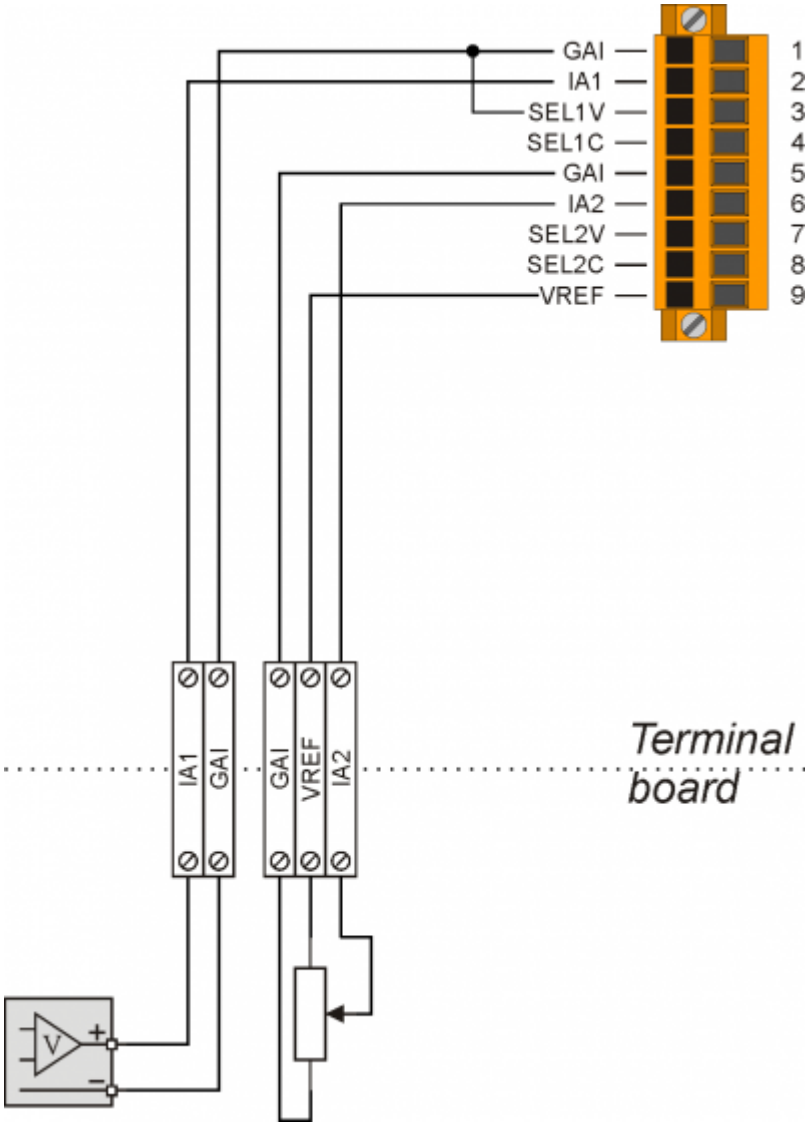
3.3 PNP / Push Pull counter inputs



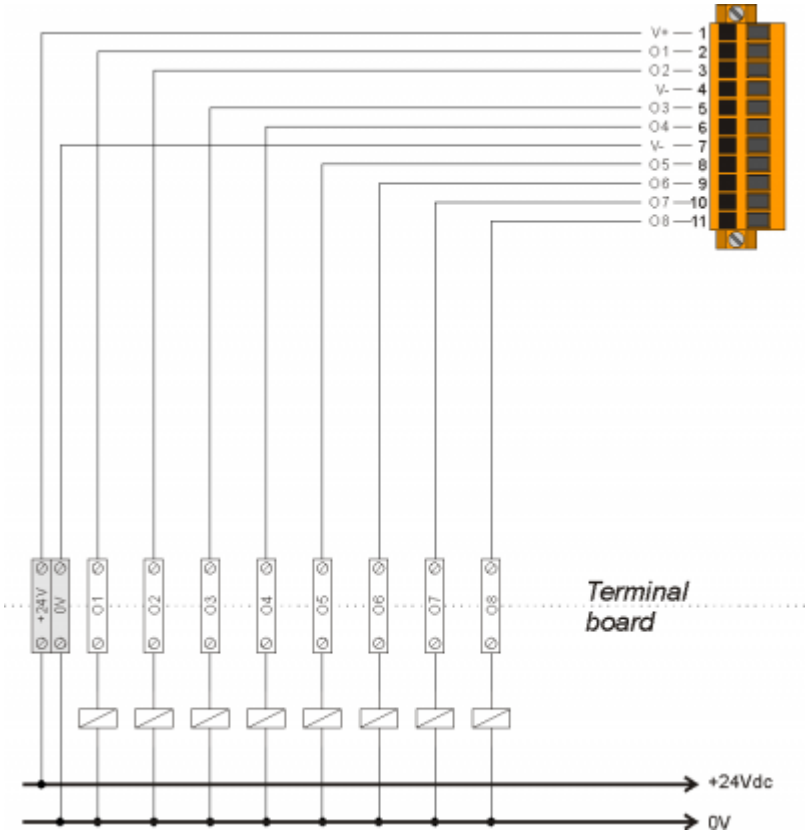
3.4 Voltmetric and amperometric analog inputs



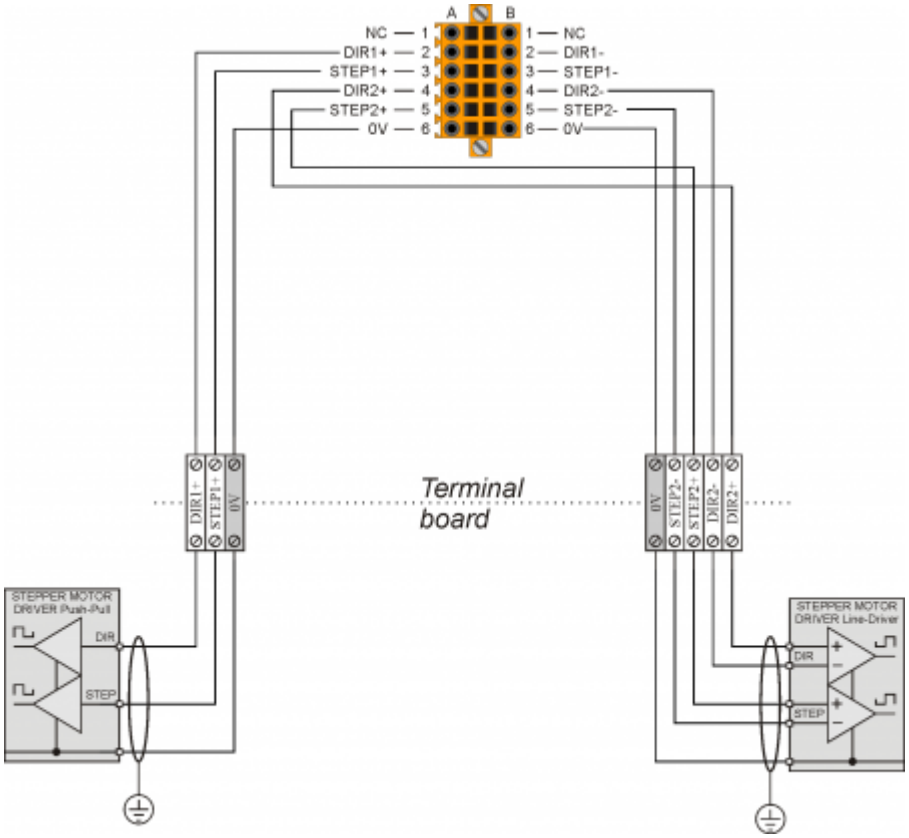
3.5 Voltmetric and potentiometric analog inputs



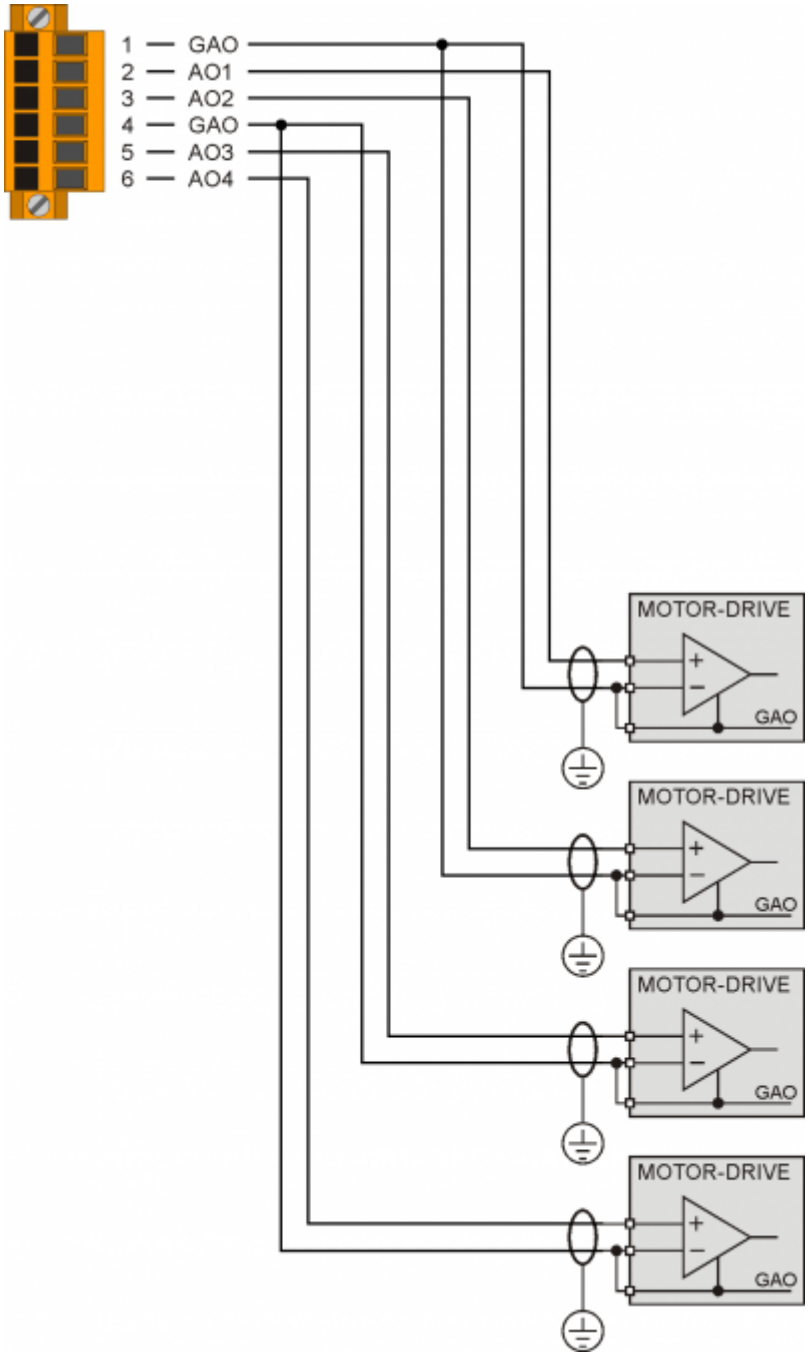
3.6 Protected digital outputs



3.7 STEP - DIRECTION outputs



3.8 Analog outputs



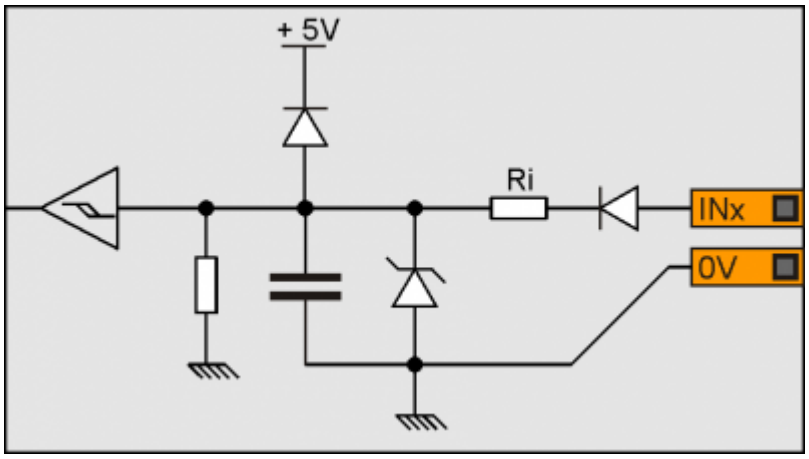
4. Electrical features

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

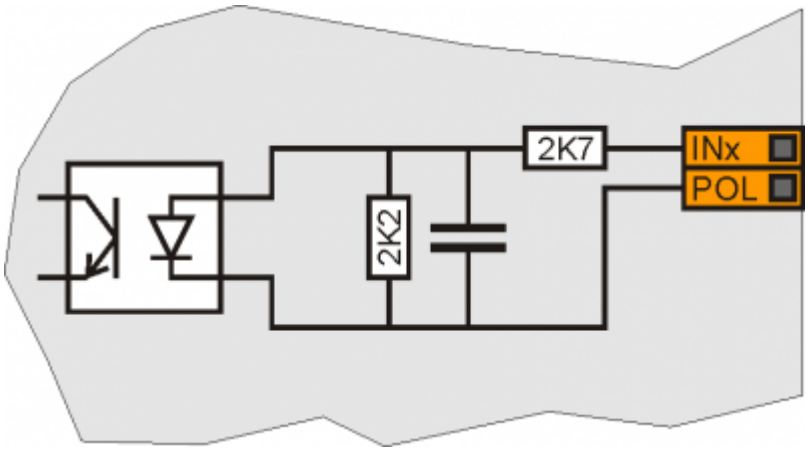
Type of polarisation	PNP
Min. acquisition time (hardware)	3ms
Isolation	1000Vrms
Rated operating voltage	24Vdc
Voltage of logic state 0	0-2 V
Voltage of logic state 1	10.5 - 26.5 V
Internal voltage drop	5V
Input resistance (Ri)	2700Ω
Sink current	2mA ÷ 8mA[1)]

[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)	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	1.2 V
Input resistance	2700Ω



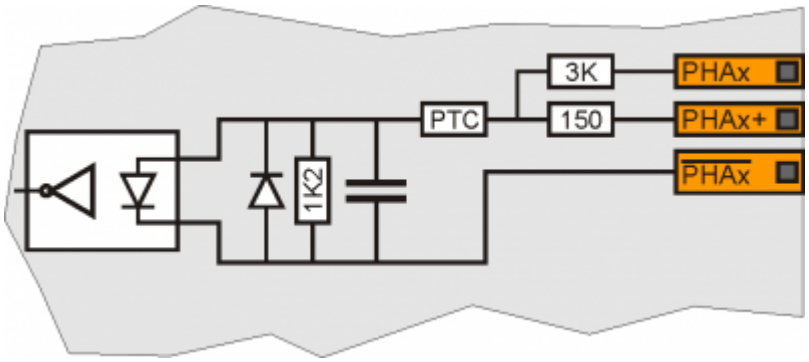
4.0.3 Bidirectional digital inputs 200KHz

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

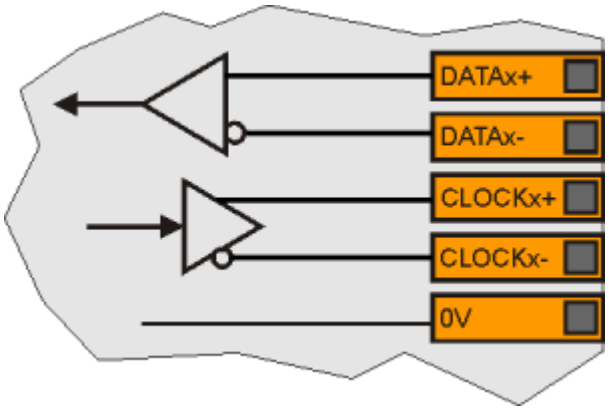
Line-Driver

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 restistance	150Ω



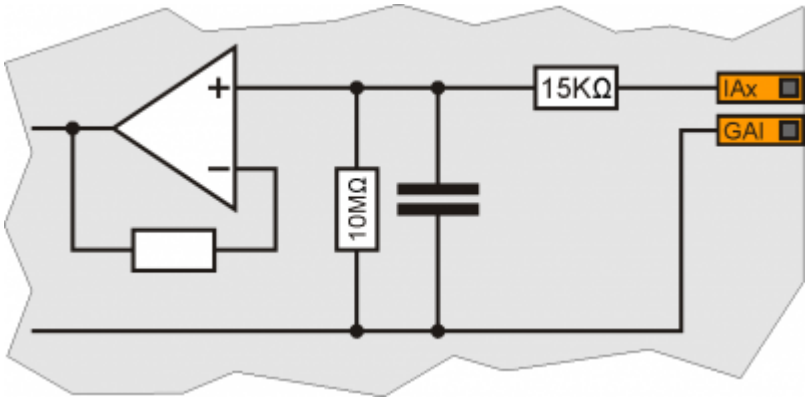
4.0.4 SSI absolute counters

Frequency	320KHz
Operation mode	Differential
Input impedance	>= 12KO
Short circuit current limit	>= 35mA



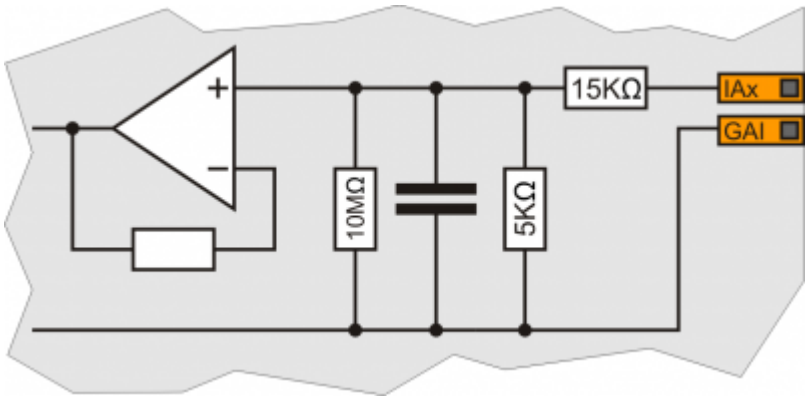
4.0.5 Potentiometric analog inputs

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



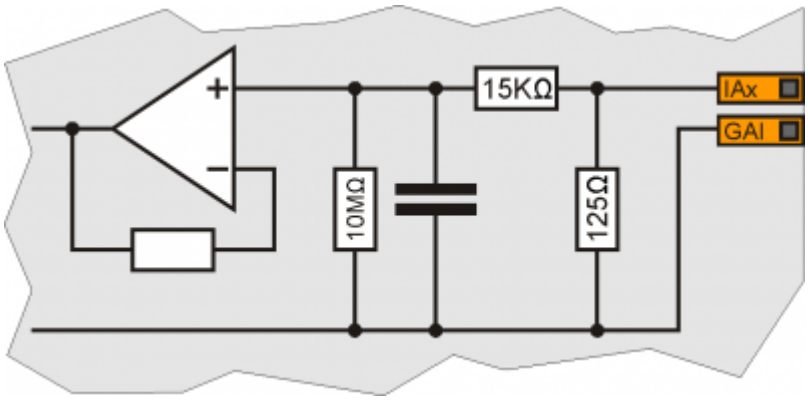
4.0.6 Voltmetric analog inputs

Type of connection	Voltmetric 0-10V
Resolution	12bit/16bit
Input resistance (Rin)	20KΩ
Damage value	20V
Max. linearity error	± 0.1% Vfs
Max. offset error	± 0.1% Vfs
S.n.	71 dB
Update speed	1ms
Insulation	1000 Vrms



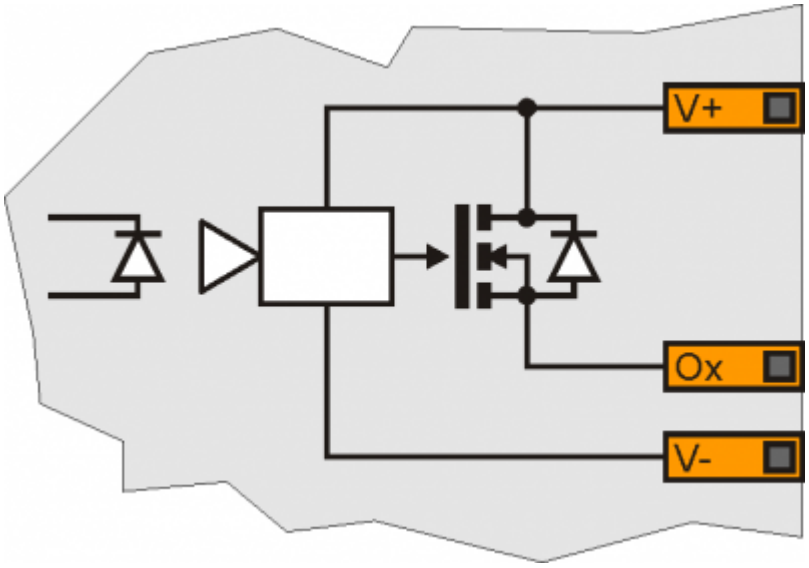
4.0.7 Amperometric analog inputs

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



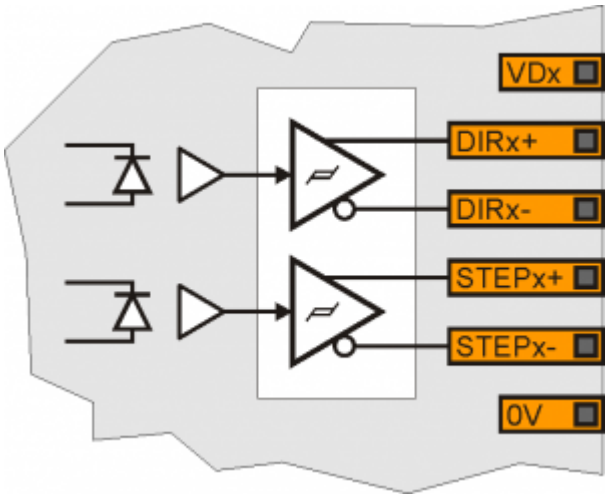
4.0.8 Protected digital outputs

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



4.0.9 Stepper outputs

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



4.0.10 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 µV/mA
Output resistence	249Ω