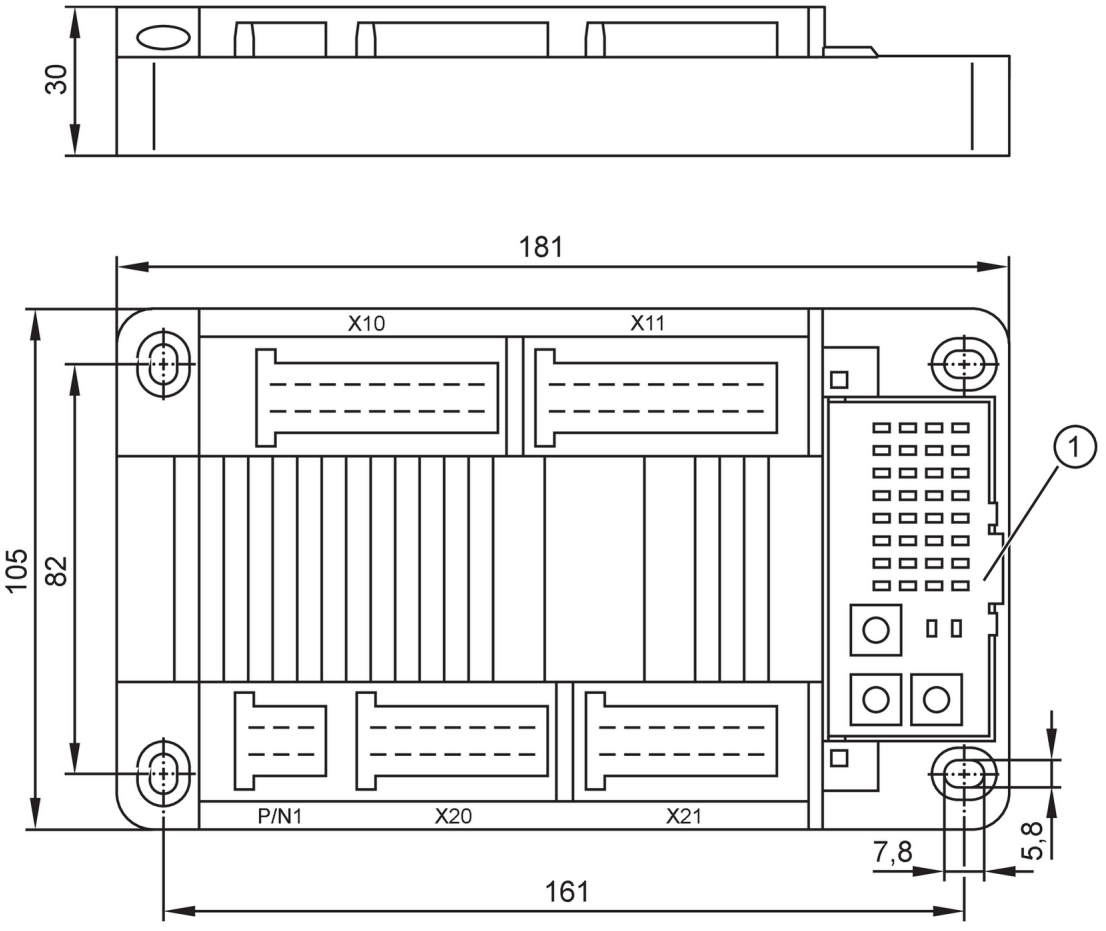
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I/O module for mobile machines

R360/CabinetModule/32I/0



1 hinged viewing window

Electrical data		
Operating voltage	[V]	10...32 DC
Nominal voltage DC	[V]	12 / 24
Current consumption	[mA]	< 125; (without load, 24 V DC)
Power consumption	[W]	4
Reverse polarity protection		yes; (in case of supply via the on-board system / battery)
Inputs / outputs		
Total number of inputs and outputs		32
Inputs		
Total number of inputs		16
Number of frequency inputs		4
Number of digital inputs		16
Number of analogue inputs		4
Digital inputs, frequency inputs (BL, PWM)		
Number		4
Plug X10		IN01...IN04

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Digital input	function type	binary, low-side
	input range [V]	0...32
	switching level high [V]	> 70 % VBB
	switching level low [V]	< 30 % VBB
	input frequency [Hz]	< 50
	input resistance [Ω]	3280
Frequency input	function type	frequency
	input range [V]	0...32
	frequency [Hz]	< 2000
	switching level high [V]	> 30...50 % VBB
	switching level low [V]	< 20 % VBB
	input resistance [Ω]	3280
	accuracy	± 16 µs
Digital inputs (BL)		
Number	4	
Plug X10	IN05...IN08	
Digital input	function type	binary, low-side
	input range [V]	0...32
	switching level high [V]	> 70 % VBB
	switching level low [V]	< 30 % VBB
	input frequency [Hz]	< 50
	input resistance [Ω]	3280
Digital inputs (BL/BH)		
Number	4	
Plug X11	IN09...IN12	
Digital input	function type	binary, high side
		binary, low-side
	input range [V]	0...32
	switching level high [V]	> 70 % VBB
	switching level low [V]	< 30 % VBB
	input frequency [Hz]	< 50
	input resistance [Ω]	3132
Analogue inputs (A, BH)		
Number	4	
Plug X11	A_IN01...A_IN04	
Analogue input	function type	Voltage
	input range [V]	0...10
	input resistance [Ω]	61600
	Resolution	12 Bit
	accuracy	± 1 % FS
	input frequency [Hz]	< 50
Analogue input	function type	Voltage
	input range [V]	0...32
	input resistance [Ω]	48400
	Resolution	12 Bit
	accuracy	± 1 % FS
	input frequency [Hz]	< 50

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Analogue input	function type	Current
	input range [mA]	0...20
	input resistance [Ω]	383
	Resolution	12 Bit
	accuracy	± 1 % FS
	input frequency [Hz]	< 50
Analogue input	function type	Voltage, ratiometric
	input range [V]	0...32
	input resistance [Ω]	48400
	accuracy	± 2 % FS
	input frequency [Hz]	< 50
Digital input	function type	binary, high side
	input range [V]	0...32
	switching level high [V]	> 70 % VBB
	switching level low [V]	< 30 % VBB
	input frequency [Hz]	< 50
	input resistance [Ω]	49690
Outputs		
Total number of outputs		16
Number of digital outputs		16
Number of PWM outputs		16
Output group (Group 1)		
Number		1
Plug X20		VBB01
Output group switch	voltage range [V]	10...32
	Current rating [A]	16
Output group (Group 2)		
Number		1
Plug X21		VBB02
Output group switch	voltage range [V]	10...32
	Current rating [A]	16
Digital / PWM outputs		
Number		4
Plug X20		OUT01...OUT04
Digital output	function type	binary, high side
	voltage range [V]	10...32
	switching current [A]	0,1...2,0
	Min. load resistance [Ω]	12 V: 6 Ω / 24 V: 12 Ω
	protective circuitry	inductive load; thermal protection
	diagnostic function	wire break (< 25 kΩ); short circuit; current monitoring

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PWM output	function type	binary, high side
	voltage range [V]	10...32
	switching current [A]	0,01..2,0
	output frequency [Hz]	20...250
	pulse/pause ratio	0...1000 ‰; (parameterisable)
	Resolution	1 ‰; (20...250 Hz)
	Min. load resistance [Ω]	12 V: 6 Ω / 24 V: 12 Ω
	protective circuitry	inductive load; thermal protection
	diagnostic functions	wire break (< 25 kΩ); short circuit; current monitoring
Digital / PWM outputs		
Number	12	
Plug X20	OUT01...OUT04	
Plug X21	OUT09...OUT016	
Digital output	function type	binary, high side
	voltage range [V]	10...32
	switching current [A]	0,1...2,0
	Min. load resistance [Ω]	12 V: 6 Ω / 24 V: 12 Ω
	protective circuitry	inductive load; thermal protection
	diagnostic function	wire break; short circuit; current monitoring
PWM output	function type	binary, high side
	voltage range [V]	10...32
	switching current [A]	0,01..2,0
	output frequency [Hz]	100
	pulse/pause ratio	0...1000 ‰; (parameterisable)
	Resolution	100 ‰
	Min. load resistance [Ω]	12 V: 6 Ω / 24 V: 12 Ω
	protective circuitry	inductive load; thermal protection
	diagnostic functions	wire break; short circuit; current monitoring
Software / programming		
Parameter setting options	CODESYS 2.3; CODESYS 3.5; (EDS)	
Interfaces		
Communication interface	CAN	
Number of CAN interfaces	1	
Transmission rate	20 kBit/s... 1 MBit/s	
Protocol	CANopen	
Profile	CiA DS 301 v. 4.02; CiA DS 401 v. 2.1	
Interface	CAN Interface 2.0 A/B ISO 11898	
Factory settings	Transmission rate: 125 kBit/s	
	Node-ID: 20 (hexadecimal), 32 (decimal)	
Operating conditions		
Ambient temperature [°C]	-40...60	
Note on ambient temperature	for further details see section Diagrams and graphs	
Storage temperature [°C]	-40...85	
Max. relative air humidity [%]	90; (non condensing)	
Max. height above sea level [m]	2000	
Protection	IP 20	

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Pollution degree		2	
Tests / approvals			
EMC		UN/ECE-R10 noise emission and noise immunity:	100 V/m
		DIN EN 61326	noise emission, immunity
		ISO 7637-2 pulse 1	severity level 4 / function state C (24 V)
		ISO 7637-2 pulse 2a	severity level 4 / function state A (24 V)
		ISO 7637-2 pulse 2b	severity level 4 / function state C (24 V)
		ISO 7637-2 pulse 3a	severity level 4 / function state A (24 V)
		ISO 7637-2 pulse 3b	severity level 4 / function state A (24 V)
		ISO 7637-2 pulse 4	severity level 4 / function state B (24 V)
		ISO 7637-2 pulse 5	severity level 1 / function state A (24 V)
		ISO 7637-2 pulse 4	severity level 4 / function state B (12 V)
Vibration resistance		EN 60068-2-30 Test Db	≤ 95 % relative humidity, non condensing
		EN 60068-2-6 Test Fc	vibration
		EN 60068-2-27 Test Ea	shock
Climatic tests		EN 60068-2-30 damp heat: cyclical	55 °C upper temperature limit / 6 cycles
		EN 60529	protection rating test
MTTF	[years]	102	
Railway applications		EN 50155 Pkt. 13.3	mechanical/climatic test
		EN 50121-3-2	EMC, noise emission, immunity
		BN 411 002	DIN EN 50155 Pkt. 10.2 / DIN EN 50121
Mechanical data			
Weight	[g]	501.2	
Housing		rectangular	
Type of mounting		screw mounting; (bore hole: 4 x M4)	
Dimensions	[mm]	181 x 105 x 30	
Materials		housing: plastics black	
Displays / operating elements			
Display		Power (PWR)	1 LED, green
		diagnosis (DIA)	1 LED, red
		Inputs / outputs	32 LED, yellow
Operating elements		S1	Baudrate (0 kBit/s...1000 kBit/s)
		S2	Node-ID, High-Nibble
		S3	Node-ID, Low-Nibble
Hardware			
Processor		STM32	
Accessories			
Items supplied		screws: 4 x M4, (DIN 912, DIN 7984)	
		tubular rivets: 4, (DIN 7984)	
Remarks			
Pack quantity		1 pcs.	

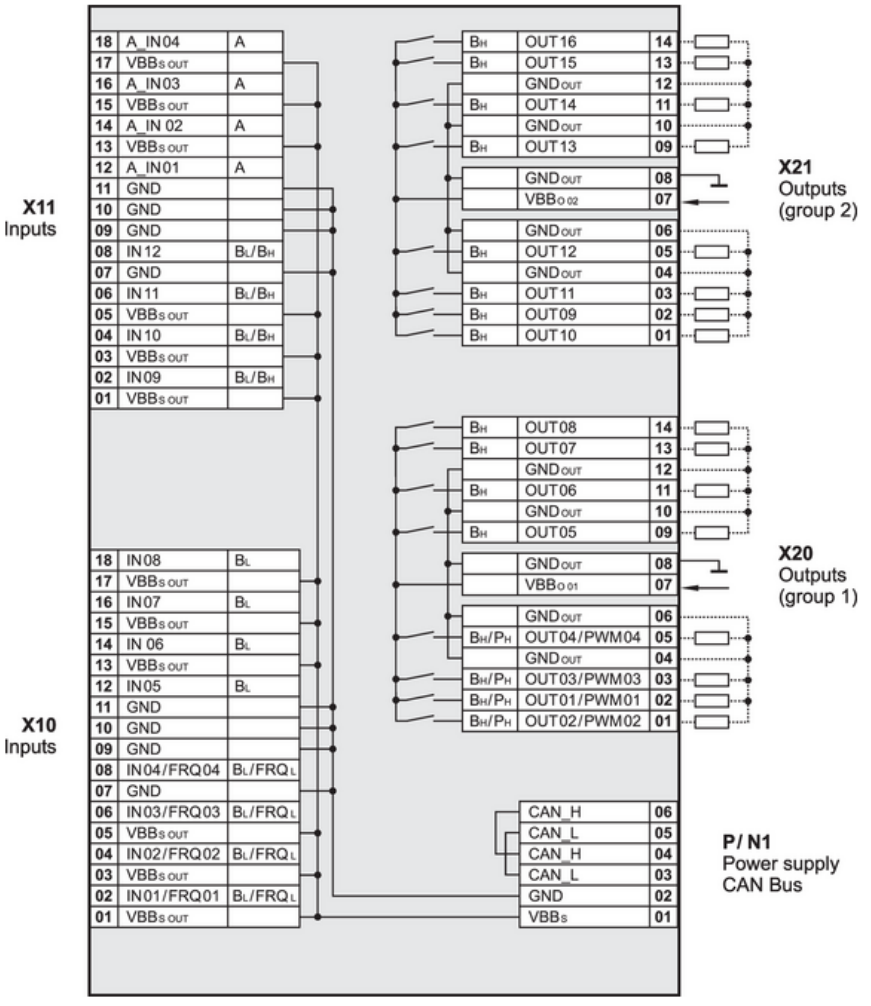
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Electrical connection

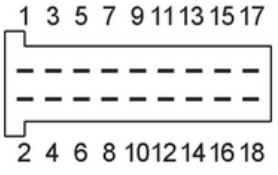
Connection



A	analogue
B_L	binary, low-side (CSI)
B_H	binary, high side (CSO)
FRQ_L	frequency inputs
PH	pulse width modulation, high side
PWM	pulse width modulation
VBB_S	voltage supply, controller, sensors
VBB_0	voltage supply, Outputs

Electrical connection - Inputs

Connector: 2 x AMP-Junior Timer (18-pole); lockable and with reverse polarity protection



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I/O module for mobile machines

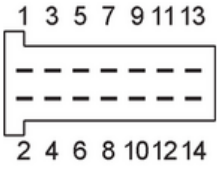
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digital / frequency inputs X10	
1	VBBs OUT
2	IN01 / FRQ01
3	VBBs OUT
4	IN02 / FRQ02
5	VBBs OUT
6	IN03 / FRQ03
7	GND
8	IN04 / FRQ04
9	GND
10	GND
11	GND
12	IN05
13	VBBs OUT
14	IN06
15	VBBs OUT
16	IN07
17	VBBs OUT
18	IN08

digital / analogue inputs X11	
1	VBBs OUT
2	IN09
3	VBBs OUT
4	IN10
5	VBBs OUT
6	IN11
7	GND
8	IN12
9	GND
10	GND
11	GND
12	A_IN01
13	VBBs OUT
14	A_IN02
15	VBBs OUT
16	A_IN03
17	VBBs OUT
18	A_IN04

Electrical connection - Outputs

Connector: 2 x AMP-Junior Timer (14-pole); lockable and with reverse polarity protection



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I/O module for mobile machines

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digital / PWM outputs X20

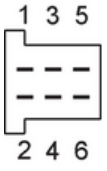
1	OUT02 / PWM02
2	OUT01 / PWM01
3	OUT03 / PWM03
4	GND OUT
5	OUT04 / PWM04
6	GND OUT
7	VBB01
8	GND OUT
9	OUT05
10	GND OUT
11	OUT06
12	GND OUT
13	OUT07
14	OUT08

digital outputs X21

1	OUT10
2	OUT09
3	OUT11
4	GND OUT
5	OUT12
6	GND OUT
7	VBB02
8	GND OUT
9	OUT13
10	GND OUT
11	OUT14
12	GND OUT
13	OUT15
14	OUT16

Electrical connection - CAN

Connector: 1 x AMP-Junior Timer (6-pole); lockable and with reverse polarity protection



supply, CAN interface P/N1

1	VBBs
2	GND
3	CAN_L
4	CAN_H
5	CAN_L
6	CAN_H

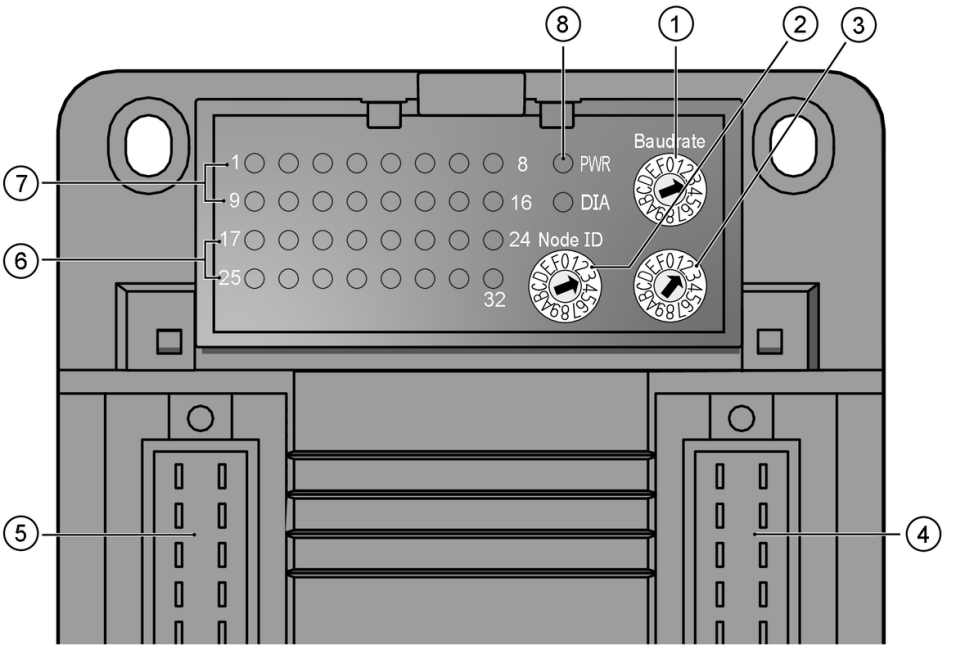
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Diagrams and graphs

application note relevant for the function



1: rotary switch Baud rate hexadecimal

2: rotary switch node ID High-Nibble hexadecimal

3: rotary switch node ID Low-Nibble hexadecimal

4: AMP Crimp connector Outputs

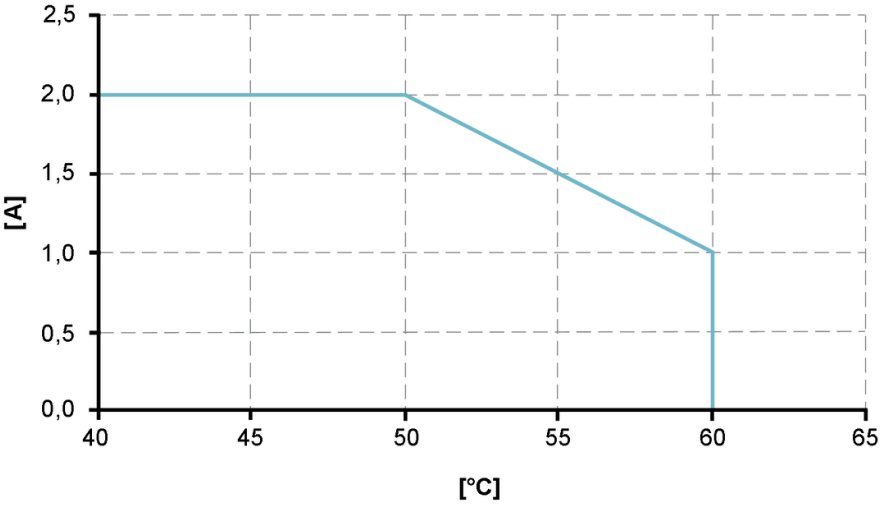
5: AMP Crimp connector Inputs

6: LEDs 17...32 OUT

7: LEDs 1...16 IN

8: LEDs PWR/ DIA

characteristic line for derating



characteristic curve with 70 % of inputs and outputs active

[A] current per active output

[°C] Ambient temperature