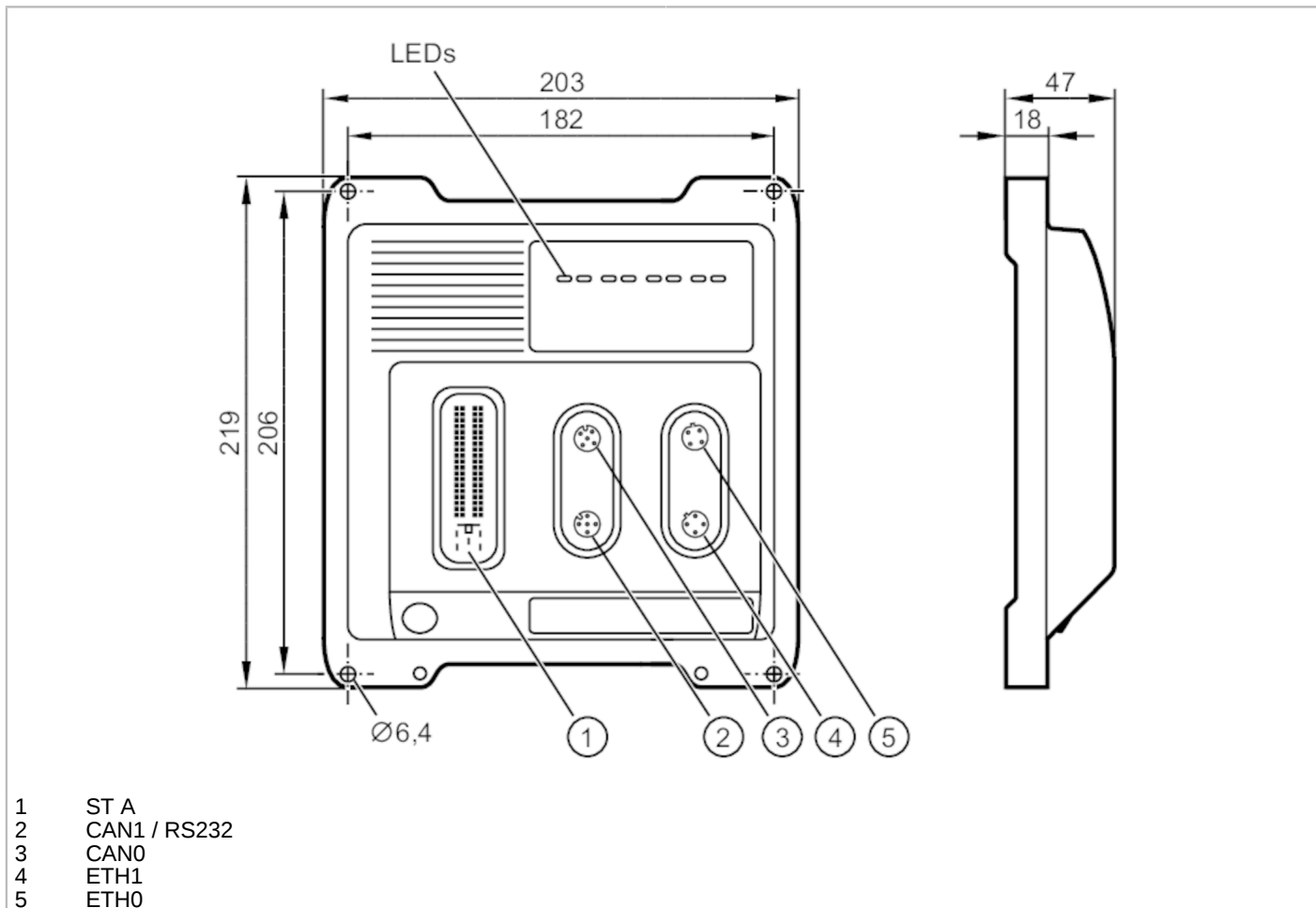


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Programmable controller for mobile machines

ecomatController/37/Std.



Product characteristics	
Total number of inputs	20
Total number of outputs	17
Communication interface	Ethernet; CAN; RS232
Protection	IP 65; IP 67; (for inserted connectors with individually sealed cores and inserted M12 connectors or sealing caps: IP 67)
Electrical data	
Operating voltage [V]	8...32 DC; (t < 10 s: 36 V)
Nominal voltage DC [V]	12 / 24
Current consumption [mA]	< 400
Power consumption [W]	8; (VBB30)
Reverse polarity protection	yes; (in case of supply via the on-board system / battery)
Inputs / outputs	
Total number of inputs and outputs	37
Inputs	
Total number of inputs	20
Number of frequency inputs	8



Programmable controller for mobile machines

ecomatController/37/Std.

Number of resistor inputs	4	
Number of digital inputs	20	
Number of analog inputs	8	
Digital inputs, frequency signal (IN FREQUENCY-B)		
Number	8	
Plug ST A	IN0000...IN0003	
	IN0500...IN0503	
Frequency input	function type	Frequency, Zykluszeit
	software mode	IN_PERIOD_RATIO_CSO/CSI
	Frequency [Hz]	0,01...5000
	Switching level high [V]	> 70 % VBB30
	Switching level low [V]	< 30 % VBB30
	input resistance [Ω]	10000
	Accuracy	$\pm 10 \mu\text{s}$
Frequency input	function type	Frequency, Zykluszeit
	software mode	IN_PERIOD_RATIO_US_CSO/CSI
	Frequency [Hz]	0,1...5000
	Switching level high [V]	> 70 % VBB30
	Switching level low [V]	< 30 % VBB30
	input resistance [Ω]	10000
	Accuracy	$\pm 10 \mu\text{s}$
Frequency input	function type	Frequency
	software mode	IN_FREQUENCY_CSO/CSI
	Frequency [Hz]	0,5...30000
	Switching level high [V]	> 70 % VBB30
	Switching level low [V]	< 30 % VBB30
	input resistance [Ω]	10000
	Accuracy	$\pm 10 \mu\text{s}$
Frequency input	function type	pulse
	software mode	IN_COUNT_CSO/CSI
	Frequency [Hz]	0...30000
	Switching level high [V]	> 70 % VBB30
	Switching level low [V]	< 30 % VBB30
	input resistance [Ω]	10000
	Accuracy	$\pm 10 \mu\text{s}$
Frequency input	function type	pulse, incremental
	software mode	IN_INC_ENCODER_CSO/CSI
	Frequency [Hz]	0,0625...5000
	Switching level high [V]	> 70 % VBB30
	Switching level low [V]	< 30 % VBB30
	input resistance [Ω]	10000
	Accuracy	$\pm 10 \mu\text{s}$
Frequency input	function type	phase
	software mode	IN_PHASE_CSO/CSI
	Frequency [Hz]	0,0625...5000
	Switching level high [V]	> 70 % VBB30
	Switching level low [V]	< 30 % VBB30
	input resistance [Ω]	10000
	Accuracy	$\pm 10 \mu\text{s}$



Programmable controller for mobile machines

ecomatController/37/Std.

Analog input	function type	Voltage
	software mode	IN_VOLTAGE_10
	input range [V]	0...10
	input resistance [Ω]	67600
	Resolution	12 Bit
	Accuracy	100 mV
	input frequency [Hz]	< 330
	diagnostic level low	0 V; (configurable)
	diagnostic level high	10 V; (configurable)
Digital input	function type	binary, High-Side
	software mode	IN_DIGITAL_CSO
	Switching level high [V]	> 65 % VBB30; (configurable)
	Switching level low [V]	< 25 % VBB30; (configurable)
	Resolution	12 Bit
	Accuracy	960 mV
	input frequency [Hz]	< 330
	input resistance [Ω]	10000
	diagnostic level low	0 % VBB30; (configurable)
diagnostic level high	100 % VBB30; (configurable)	
Digital input	function type	binary, low-side
	software mode	IN_DIGITAL_CSI
	Switching level high [V]	> 70 % VBB30; (configurable)
	Switching level low [V]	< 30 % VBB30; (configurable)
	Resolution	12 Bit
	Accuracy	320 mV
	input frequency [Hz]	< 330
	input resistance [Ω]	10000
	diagnostic level low	0 % VBB30; (configurable)
diagnostic level high	400 % VBB30; (configurable)	
Multifunction inputs, analog / digital (IN MULTIFUNCTION-A)		
Number	8	
Plug ST A	IN0100...IN0103	
	IN0600...IN0603	
Analog input	function type	Current
	software mode	IN_CURRENT_CSI
	input range [mA]	0...20
	input resistance [Ω]	298
	Resolution	12 Bit
	Accuracy	\pm 345 μ A
	input frequency [Hz]	< 330
	diagnostic level low	0 mA; (configurable)
	diagnostic level high	20 mA; (configurable)



Programmable controller for mobile machines

ecomatController/37/Std.

Analog input	function type	Voltage
	software mode	IN_VOLTAGE_10
	input range [V]	0...10
	input resistance [Ω]	67600
	Resolution	12 Bit
	Accuracy	100 mV
	input frequency [Hz]	< 330
	diagnostic level low	0 V; (configurable)
	diagnostic level high	10 V; (configurable)
Analog input	function type	Voltage
	software mode	IN_VOLTAGE_32
	input range [V]	0...32
	input resistance [Ω]	51000
	Resolution	12 Bit
	Accuracy	320 mV
	input frequency [Hz]	< 330
	diagnostic level low	0 V; (configurable)
	diagnostic level high	32 V; (configurable)
Analog input	function type	Voltage, ratiometric
	software mode	IN_VOLTAGE_RATIO
	input range [V]	0...100 % VBB30
	input resistance [Ω]	51000
	Resolution	12 Bit
	Accuracy	320 mV
	input frequency [Hz]	< 330
	diagnostic level low	0 ‰; (configurable)
	diagnostic level high	1000 ‰; (configurable)
Digital input	function type	binary, low-side
	software mode	IN_DIGITAL_CSI
	Switching level high [V]	> 70 % VBB30
	Switching level low [V]	< 30 % VBB30
	Resolution	12 Bit
	Accuracy	320 mV
	input frequency [Hz]	< 330
	input resistance [Ω]	9500
	diagnostic level low	1 V; (configurable)
	diagnostic level high	95 % VBB30; (configurable)
	Digital / resistor inputs (IN RESISTOR-A)	
Number	4	
Plug ST A	IN0400...IN0401	
	IN0900...IN0901	



Programmable controller for mobile machines

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Digital input	function type	binary, low-side
	software mode	IN_DIGITAL_CSI
	Switching level high [V]	> 70 % VBB30
	Switching level low [V]	< 30 % VBB30
	Resolution	12 Bit
	Accuracy	320 mV
	input frequency [Hz]	< 330
	input resistance [Ω]	3200
	diagnostic level low	0 % VBB30; (configurable)
	diagnostic level high	400 % VBB30; (configurable)
Resistor input	function type	binary, high-side
	software mode	IN_RESISTOR
	input range [Ω]	16...30000
	measuring current [mA]	< 2,0
	Resolution	12 Bit
	Accuracy	16...3000 Ω: ± 600 Ω
		3000...15000 Ω: ± 1500 Ω
		15000...30000 Ω: ± 3000 Ω
	diagnostic level low	0 Ω; (configurable)
	diagnostic level high	31000 Ω; (configurable)
Reset (RESET-COM)		
Number	1	
Digital input	Switching level high [V]	> 70 % VBB30
	Switching level low [V]	< 30 % VBB30
	Accuracy	1,6 V
Outputs		
Total number of outputs	17	
Number of digital outputs	16	
Number of analog outputs	1	
Number of PWM outputs	16	
Number of PWM-I outputs	10	
Number of outputs with H-bridge	4; (2 x 2)	
Output groups		
Number	2	
Plug ST A	VBB0, VBB1	
Output group switch	function type	second independent switch-off mode of the output group
	Voltage range [V]	6...32 DC
	voltage measurement [V]	0...36
	voltage measurement accuracy [mV]	360
	Diagnostic function	current monitoring, voltage monitoring
	lower limit of current monitoring [mA]	0; (configurable)
	upper limit of current monitoring [mA]	12000; (configurable)
Digital / PWM outputs; 4,0 A; H bridge (OUT PWM-40-BRIDGE-A)		
Number	4	
Plug ST A	OUT0006, OUT0007	
	OUT0106, OUT0107	



Programmable controller for mobile machines

ecomatController/37/Std.

PWM output	function type	binary, high-side	
	software mode	OUT_PWM_CSO	
	Voltage range [V]	6...32 DC	
	switching current [A]	0,025...4	
	output frequency [Hz]	20...2000	
	pulse/pause ratio	1...1000 ‰; (configurable)	
	Resolution	1 ‰; (20...250 Hz)	
	protective circuitry	inductive load; thermal protection	
	current measurement [A]	0...6	
	accuracy of the current measurement [A]	0,04	
	Diagnostic functions	wire break; short circuit; current monitoring	
	lower limit of current monitoring [mA]	0; (configurable)	
	upper limit of current monitoring [mA]	4000; (configurable)	
	PWM output	function type	binary, low-side
software mode		OUT_PWM_CSI	
Voltage range [V]		6...32 DC	
switching current [A]		0,025...4	
output frequency [Hz]		20...500	
pulse/pause ratio		1...1000 ‰; (configurable)	
Resolution		1 ‰; (20...250 Hz)	
protective circuitry		inductive load; thermal protection	
PWM-I output		function type	current-controlled
		software mode	OUT_CURRENT_CSO
		Voltage range [V]	6...32 DC
		switching current [A]	0,025...4
		output frequency [Hz]	20...2000
		control range [A]	0,05...4
	setting resolution [mA]	1	
	control resolution [mA]	2	
	Min. load resistance [Ω]	12 V: 3 Ω / 24 V: 6 Ω	
	protective circuitry	inductive load; thermal protection	
	current measurement [A]	0...6	
	accuracy of the current measurement [A]	0,04	
	Diagnostic functions	wire break; short circuit; current monitoring	
	lower limit of current monitoring [mA]	0; (configurable)	
upper limit of current monitoring [mA]	4000; (configurable)		
Digital output	function type	binary, high-side	
	software mode	OUT_DIGITAL_CSO	
	Voltage range [V]	6...32 DC	
	switching current [A]	0,025...4	
	protective circuitry	inductive load; thermal protection	
	current measurement [A]	0...6	
	accuracy of the current measurement [A]	0,04	
	switching status monitoring [V]	2	
	switching status monitoring accuracy [V]	± 1	
	Diagnostic function	wire break; short circuit; current monitoring	
	lower limit of current monitoring [mA]	0; (configurable)	
	upper limit of current monitoring [mA]	4000; (configurable)	



Programmable controller for mobile machines

ecomatController/37/Std.

Digital output	function type	binary, low-side
	software mode	OUT_DIGITAL_CSI
	Voltage range [V]	6...32 DC
	switching current [A]	0,025...4
	protective circuitry	inductive load; thermal protection
Digital / PWM outputs; 2,5 A (OUT PWM-25-A)		
Number	6	
Plug ST A	OUT0000, OUT0002, OUT0004	
	OUT0100, OUT0102, OUT0104	
PWM output	function type	binary, high-side
	software mode	OUT_PWM_CSO
	Voltage range [V]	6...32 DC
	switching current [A]	0,025...2,5
	output frequency [Hz]	20...2000
	pulse/pause ratio	1...1000 ‰; (configurable)
	Resolution	1 ‰; (20...250 Hz)
	protective circuitry	inductive load; thermal protection
	current measurement [A]	0...4
	accuracy of the current measurement [mA]	37,5
	Diagnostic functions	wire break; short circuit; current monitoring
	lower limit of current monitoring [mA]	0; (configurable)
	upper limit of current monitoring [mA]	2500; (configurable)
	PWM-I output	function type
software mode		OUT_CURRENT_CSO
Voltage range [V]		6...32 DC
switching current [A]		0,025...2,5
output frequency [Hz]		20...2000
control range [A]		0,05...2,5
setting resolution [mA]		1
control resolution [mA]		2
Min. load resistance [Ω]		12 V: 3 Ω / 24 V: 6 Ω
protective circuitry		inductive load; thermal protection
current measurement [A]		0...4
accuracy of the current measurement [mA]		37,5
Diagnostic functions		wire break; short circuit; current monitoring
lower limit of current monitoring [mA]		0; (configurable)
upper limit of current monitoring [mA]	2500; (configurable)	
Digital output	function type	binary, high-side
	software mode	OUT_DIGITAL_CSO
	Voltage range [V]	6...32 DC
	switching current [A]	0,025...2,5
	protective circuitry	inductive load; thermal protection
	current measurement [A]	0...4
	accuracy of the current measurement [mA]	37,5
	switching status monitoring [V]	2
	switching status monitoring accuracy [V]	± 1
	Diagnostic function	wire break; short circuit; current monitoring
	lower limit of current monitoring [mA]	0; (configurable)
	upper limit of current monitoring [mA]	2500; (configurable)



Programmable controller for mobile machines

ecomatController/37/Std.

Digital / PWM outputs; 2,5 A (OUT PWM-25-B)			
Number	6		
Plug ST A	OUT0001, OUT0003, OUT0005		
	OUT0101, OUT0103, OUT0105		
PWM output	function type	binary, high-side	
	software mode	OUT_PWM_CSO	
	Voltage range [V]	6...32 DC	
	switching current [A]	0,025...2,5	
	output frequency [Hz]	20...2000	
	pulse/pause ratio	1...1000 ‰; (configurable)	
	Resolution	1 ‰; (20...250 Hz)	
	protective circuitry	inductive load; thermal protection	
	current measurement [A]	0...4	
	accuracy of the current measurement [mA]	125	
	Diagnostic functions	wire break; short circuit; current monitoring	
	lower limit of current monitoring [mA]	0; (configurable)	
	upper limit of current monitoring [mA]	2500; (configurable)	
	Digital output	function type	binary, high-side
software mode		OUT_DIGITAL_CSO	
Voltage range [V]		6...32 DC	
switching current [A]		0,025...2,5	
protective circuitry		inductive load; thermal protection	
current measurement [A]		0...4	
accuracy of the current measurement [mA]		125	
switching status monitoring [V]		2	
switching status monitoring accuracy [V]		± 1	
Diagnostic function		wire break; short circuit; current monitoring	
lower limit of current monitoring [mA]		0; (configurable)	
upper limit of current monitoring [mA]		2500; (configurable)	
Sensor supply (OUT SUPPLY-A)			
Number		1	
Plug ST A	OUT3000		
Sensor supply	function type	voltage supply	
	software mode	OUT_SENSOR_05	
	Output voltage [V]	5	
	Accuracy	5 ‰	
	min. load current [mA]	10	
	max. load current [mA]	400	
	current measurement [A]	0...2,5	
	accuracy of the current measurement [mA]	125	
	voltage measurement [V]	0...10	
	voltage measurement accuracy [mV]	500	
	Diagnostic functions	wire break; short circuit; current monitoring	
	lower limit of current monitoring [mA]	0; (configurable)	
	upper limit of current monitoring [mA]	2500; (configurable)	



Programmable controller for mobile machines

ecomatController/37/Std.

Sensor supply	function type	voltage supply
	software mode	OUT_SENSOR_10
	Output voltage [V]	10
	Accuracy	5 %
	min. load current [mA]	10
	max. load current [mA]	200
	current measurement A]	0...2,5
	accuracy of the current measurement [mA]	125
	voltage measurement [V]	0...10
	voltage measurement accuracy [mV]	500
	Diagnostic functions	wire break; short circuit; current monitoring
	lower limit of current monitoring [mA]	0; (configurable)
	upper limit of current monitoring [mA]	2500; (configurable)
Analog outputs (OUT VOLTAGE-A)		
Number	1	
Plug ST A	OUT3001	
Analog output	function type	Voltage
	software mode	OUT_ANALOG_10
	Voltage range [V]	0...10 DC
	Accuracy	5 %
	max. load current [mA]	5
	step response time [ms]	< 1,8 (10...90 %)
	voltage measurement [V]	0...10
voltage measurement accuracy [V]	0,5 V	
Software / programming		
Parameter setting options	CODESYS 3.5	
PLC function to IEC 61131-3	yes	
Operating system	Echtzeit-Betriebssystem	
Interfaces		
Communication interface	Ethernet; CAN; RS232	
Number of CAN interfaces	4	
Number of Ethernet interfaces	2	
Number of R232 interfaces	1	
CAN		
Transmission rate	20 kBit/s... 1 MBit/s	
Protocol	CANopen; SAE J1939; free protocol	
Profile	CiA DS 301 Version 4.2; CiA DS 401 Version 1.4	
Interface	CAN Interface 2.0 A/B ISO 11898	
Factory settings	Transmission rate: 250 kBit/s	
Ethernet		
Transmission standard	10Base-T; 100Base-TX	
Transmission rate	10 MBit/s; 100 MBit/s	
Protocol	TCP/IP; UDP/IP; Modbus TCP	
Note on interfaces	2 ports with integrated switch	

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RS232 - service interface		
Transmission rate	9,6...115,2 kBit/s	
Factory settings	Transmission rate: 115,2 kBit/s	
Operating conditions		
Housing temperature [°C]	-40...85	
Storage temperature [°C]	-40...85	
Max. relative air humidity [%]	90; (non condensing)	
Max. height above sea level [m]	3000	
Protection	IP 65; IP 67; (for inserted connectors with individually sealed cores and inserted M12 connectors or sealing caps: IP 67)	
Degree of soiling	2	
Chemical media	ISO 16750-5	AA, BA, BD, CC, DB, DC, DD
Tests / approvals		
EMC	DIN EN 61000-6-2 ESD	
	DIN EN 61000-6-4 Burst	
	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 A (24 V)
	ISO 7637-2 pulse 5	severity level 3 / function state A (24 V)
	ISO 7637-2 pulse 4	severity level 4 / function state A (12 V)
Continuous shock resistance	ISO 16750-3	30 g 6 ms / 24000 shocks
Fast temperature changes	EN 60068-2-30 damp heat: cyclical	55 °C upper temperature limit / 6 cycles
	EN 60068-2-78 damp heat: constant	40 °C 93 % rH / test period 21 days
Vibration resistance	ISO 16750-3 Test VII	random, mounting place car body
	EN 60068-2-6 sine	10...500 Hz / 10 cycles/axis, sine
Salt spray test	EN 60068-2-52 Salt spray	severity level 3 / motor vehicle
Mechanical data		
Weight [g]	1446	
Housing	rectangular	
Type of mounting	screw mounting; (4 x M6)	
Dimensions [mm]	219 x 203 x 47	
Material	housing: diecast aluminium passivated	
Displays / operating elements		
Display	status (SYS0)	1 LED, multi-color
	status (SYS1)	1 LED, multi-color
	Ethernet (ETH0)	1 LED, green
	Ethernet (ETH1)	1 LED, green
	status (APP0)	1 LED, multi-color programmable
	status (APP1)	1 LED, multi-color programmable
	status (APP2)	1 LED, multi-color programmable
	status (APP3)	1 LED, multi-color programmable



Programmable controller for mobile machines

ecomatController/37/Std.

Operating states - system / hardware		
Display	kein Betriebssystem geladen	LED (SYS0), green flashing 5 Hz
	Hardware-Fehler (Fatal Error+)	LED (SYS0), red lights
	System-Fehler (Fatal Error)	LED (SYS0), red lights
		LED (SYS1), red lights
	Update	LED (SYS0), yellow/green flashing 2 Hz
		LED (SYS1), yellow/green flashing 2 Hz
Sleep Mode	LED (SYS0), blue lights	
PLC application (SYS0 / SYS1)		
Display	keine Applikation	LED, green lights
	Run	LED, green flashing 2 Hz
	fault	LED, red flashing 10 Hz
	Debug Run	LED, yellow flashing 2 Hz
	Debug Stop	LED, yellow lights
Ethernet (ETH0 / ETH1)		
Display	connection	LED, green lights
	Data transmission	LED, green flashing
Hardware		
Processor	32-Bit Triple-Core	
Working memory	2,7 MByte RAM	
Mass storage	9 MByte Flash	
Non-volatile memory	10 kByte	
Accessories		
Items supplied	Protective cap: M12	
	self-tapping screw: 1 x M4, for shield connection	
Remarks		
Pack quantity	1 pcs.	
Electrical connection - CAN0		
Connector: 1 x M12; coding: A		
1	n.c.	
2	n.c.	
3	GND_COM	
4	CAN0_H	
5	CAN0_L	

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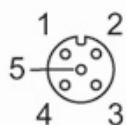


Programmable controller for mobile machines

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Electrical connection - CAN1 / RS232

Connector: 1 x M12; coding: A



1	RS232_TxD
2	RS232_RxD
3	GND_COM
4	CAN1_H
5	CAN1_L

Electrical connection - Ethernet

Connector: 2 x M12; coding: D

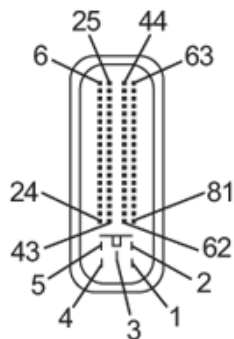


ETH0 / ETH1

1	TD+
2	RD+
3	TD-
4	RD-

Electrical connection - ST A

Connector: 1 x AMP; coding: A

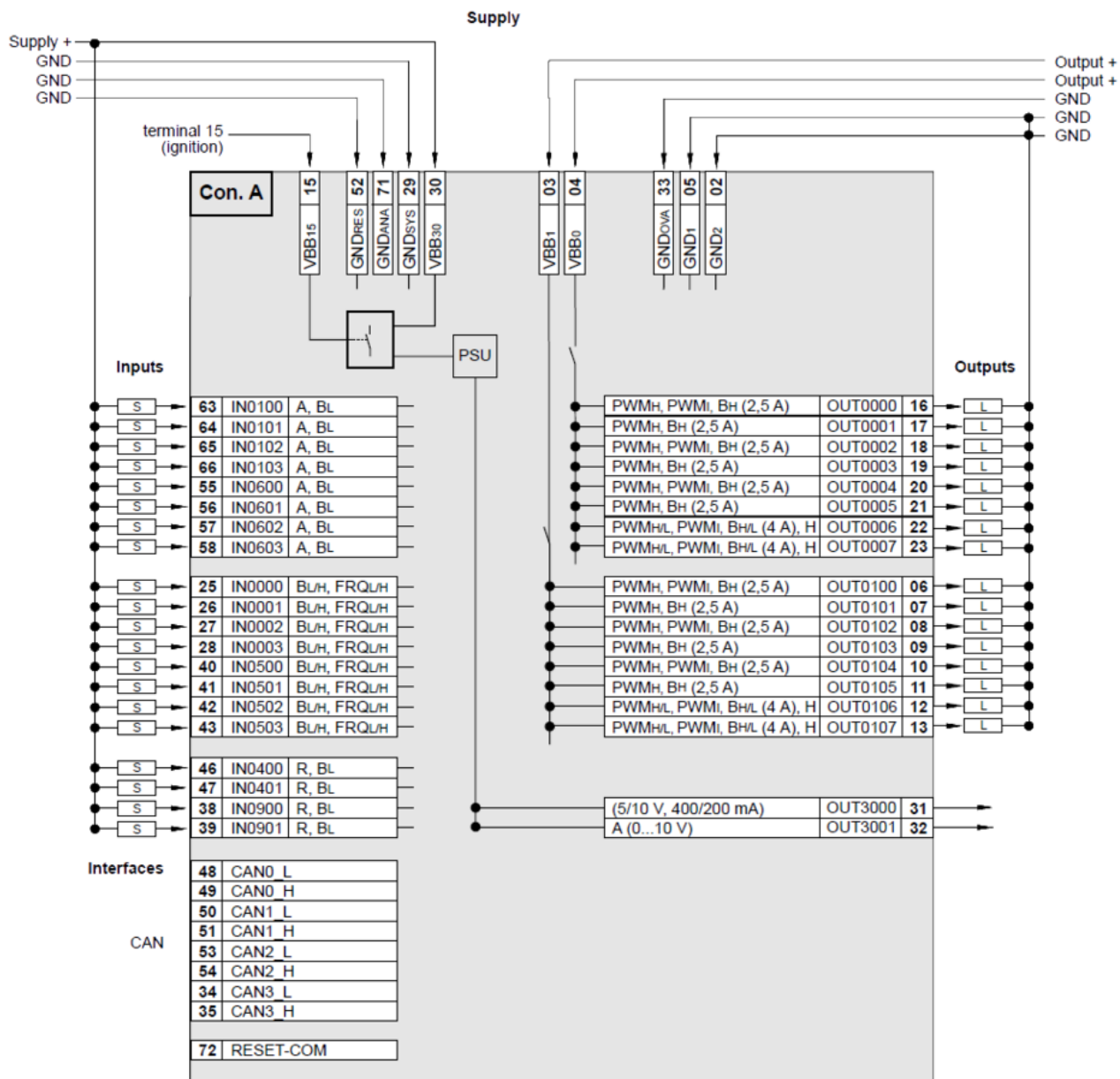




Programmable controller for mobile machines

ecomatController/37/Std.

Connection



- A analog
- B-L/H binary, low-side (CSI) / high-side (CSO)
- FRQ-L/H frequency/pulse input, low-side (CSI) / high-side (CSO)
- H H bridge
- PSU power supply for the system
- PWM-L/H pulse width modulation, low-side (CSI) / high-side (CSO)
- PWM-I pulse width modulation, current-controlled
- R resistor input
- VBB0...VBB1 voltage supply, output group
- VBB30 voltage supply, controller



Programmable controller for mobile machines

ecomatController/37/Std.

voltage supply

15	VBB15
30	VBB30
4	VBB0
3	VBB1
1	VBB2
29	GND_SYS
71	GND_ANA
52	GND_RES
33	GND_OVA
5	GND1
2	GND2

multifunction inputs - analog / digital

63	IN0100 - INMULTIFUNCTION-A
64	IN0101 - INMULTIFUNCTION-A
65	IN0102 - INMULTIFUNCTION-A
66	IN0103 - INMULTIFUNCTION-A
55	IN0600 - INMULTIFUNCTION-A
56	IN0601 - INMULTIFUNCTION-A
57	IN0602 - INMULTIFUNCTION-A
58	IN0603 - INMULTIFUNCTION-A

digital inputs - frequency signal

25	IN0000 - INFREQUENCY-B
26	IN0001 - INFREQUENCY-B
27	IN0002 - INFREQUENCY-B
28	IN0003 - INFREQUENCY-B
40	IN0500 - INFREQUENCY-B
41	IN0501 - INFREQUENCY-B
42	IN0502 - INFREQUENCY-B
43	IN0503 - INFREQUENCY-B

digital / resistor inputs

46	IN0400 - INRESISTOR-A
47	IN0401 - INRESISTOR-A
38	IN0900 - INRESISTOR-A
39	IN0901 - INRESISTOR-A

Interfaces

48	CAN0_L
49	CAN0_H
50	CAN1_L
51	CAN1_H
53	CAN2_L
54	CAN2_H
34	CAN3_L
35	CAN3_H
72	RESET-COM

Outputs - group: VBB0

16	OUT0000 - OUT PWM-25-A
17	OUT0001 - OUT PWM-25-B
18	OUT0002 - OUT PWM-25-A
19	OUT0003 - OUT PWM-25-B
20	OUT0004 - OUT PWM-25-A
21	OUT0005 - OUT PWM-25-B
22	OUT0006 - OUT PWM-40-BRIDGE-A
23	OUT0007 - OUT PWM-40-BRIDGE-A

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Programmable controller for mobile machines

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Outputs - group: VBB1

6	OUT0100 - OUTPWM-25-A
7	OUT0101 - OUTPWM-25-B
8	OUT0102 - OUTPWM-25-A
9	OUT0103 - OUTPWM-25-B
10	OUT0104 - OUTPWM-25-A
11	OUT0105 - OUTPWM-25-B
12	OUT0106 - OUTPWM-40-BRIDGE-A
13	OUT0107 - OUTPWM-40-BRIDGE-A

Sensor supply

31	OUT3000 - OUTSUPPLY-A
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analog output

32	OUT3001 - OUTVOLTAGE-A
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