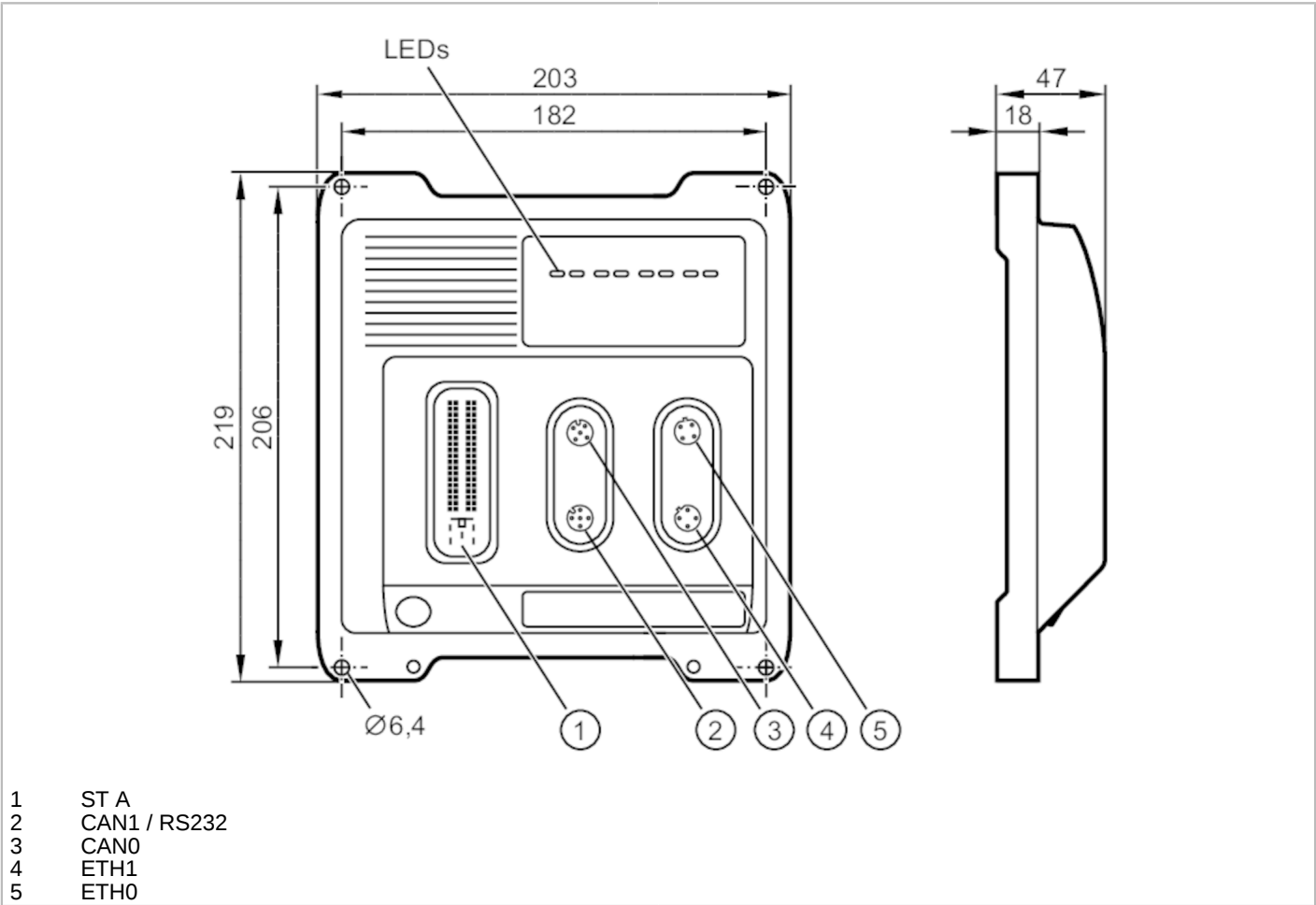




Programmable controller for mobile machines

ecomatController/60/Std.



Product characteristics

|                         |                                                                                                                           |
|-------------------------|---------------------------------------------------------------------------------------------------------------------------|
| Total number of inputs  | 32                                                                                                                        |
| Total number of outputs | 28                                                                                                                        |
| 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 | 60 |
|------------------------------------|----|

Inputs

|                            |    |
|----------------------------|----|
| Total number of inputs     | 32 |
| Number of frequency inputs | 8  |



## Programmable controller for mobile machines

ecomatController/60/Std.

|                                                   |                          |                            |
|---------------------------------------------------|--------------------------|----------------------------|
| Number of resistor inputs                         | 4                        |                            |
| Number of digital inputs                          | 32                       |                            |
| Number of analogue inputs                         | 16                       |                            |
| 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                 | ± 10 μs                    |
| 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                 | ± 10 μs                    |
| 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                 | ± 10 μs                    |
| 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                 | ± 10 μs                    |
| 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                 | ± 10 μs                    |
| 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                 | ± 10 μs                    |



## Programmable controller for mobile machines

ecomatController/60/Std.

|                                                                |                               |                                 |
|----------------------------------------------------------------|-------------------------------|---------------------------------|
| Analogue input                                                 | function type                 | Voltage                         |
|                                                                | software mode                 | IN_VOLTAGE_10                   |
|                                                                | input range [V]               | 0...10                          |
|                                                                | input resistance [ $\Omega$ ] | 67600                           |
|                                                                | Resolution                    | 12 Bit                          |
|                                                                | accuracy                      | 100 mV                          |
|                                                                | input frequency [Hz]          | < 330                           |
|                                                                | diagnostic level low          | 0 V; (parameterisable)          |
|                                                                | diagnostic level high         | 10 V; (parameterisable)         |
| Digital input                                                  | function type                 | binary, High-Side               |
|                                                                | software mode                 | IN_DIGITAL_CSO                  |
|                                                                | switching level high [V]      | > 65 % VBB30; (parameterisable) |
|                                                                | switching level low [V]       | < 25 % VBB30; (parameterisable) |
|                                                                | Resolution                    | 12 Bit                          |
|                                                                | accuracy                      | 960 mV                          |
|                                                                | input frequency [Hz]          | < 330                           |
|                                                                | input resistance [ $\Omega$ ] | 10000                           |
|                                                                | diagnostic level low          | 0 % VBB30; (parameterisable)    |
| Digital input                                                  | function type                 | binary, low-side                |
|                                                                | software mode                 | IN_DIGITAL_CSI                  |
|                                                                | switching level high [V]      | > 70 % VBB30; (parameterisable) |
|                                                                | switching level low [V]       | < 30 % VBB30; (parameterisable) |
|                                                                | Resolution                    | 12 Bit                          |
|                                                                | accuracy                      | 320 mV                          |
|                                                                | input frequency [Hz]          | < 330                           |
|                                                                | input resistance [ $\Omega$ ] | 10000                           |
|                                                                | diagnostic level low          | 0 % VBB30; (parameterisable)    |
| Multi-function inputs, analogue / digital (IN MULTIFUNCTION-A) | function type                 | Current                         |
|                                                                | software mode                 | IN_CURRENT_CSI                  |
|                                                                | input range [mA]              | 0...20                          |
|                                                                | input resistance [ $\Omega$ ] | 298                             |
|                                                                | Resolution                    | 12 Bit                          |
|                                                                | accuracy                      | $\pm 345 \mu\text{A}$           |
|                                                                | input frequency [Hz]          | < 330                           |
|                                                                | diagnostic level low          | 0 mA; (parameterisable)         |
|                                                                | diagnostic level high         | 20 mA; (parameterisable)        |



## Programmable controller for mobile machines

ecomatController/60/Std.

|                                           |                               |                               |
|-------------------------------------------|-------------------------------|-------------------------------|
| Analogue input                            | function type                 | Voltage                       |
|                                           | software mode                 | IN_VOLTAGE_10                 |
|                                           | input range [V]               | 0...10                        |
|                                           | input resistance [ $\Omega$ ] | 67600                         |
|                                           | Resolution                    | 12 Bit                        |
|                                           | accuracy                      | 100 mV                        |
|                                           | input frequency [Hz]          | < 330                         |
|                                           | diagnostic level low          | 0 V; (parameterisable)        |
|                                           | diagnostic level high         | 10 V; (parameterisable)       |
| Analogue input                            | function type                 | Voltage                       |
|                                           | software mode                 | IN_VOLTAGE_32                 |
|                                           | input range [V]               | 0...32                        |
|                                           | input resistance [ $\Omega$ ] | 51000                         |
|                                           | Resolution                    | 12 Bit                        |
|                                           | accuracy                      | 320 mV                        |
|                                           | input frequency [Hz]          | < 330                         |
|                                           | diagnostic level low          | 0 V; (parameterisable)        |
|                                           | diagnostic level high         | 32 V; (parameterisable)       |
| Analogue input                            | function type                 | Voltage, ratiometric          |
|                                           | software mode                 | IN_VOLTAGE_RATIO              |
|                                           | input range [V]               | 0...100 % VBB30               |
|                                           | input resistance [ $\Omega$ ] | 51000                         |
|                                           | Resolution                    | 12 Bit                        |
|                                           | accuracy                      | 320 mV                        |
|                                           | input frequency [Hz]          | < 330                         |
|                                           | diagnostic level low          | 0 ‰; (parameterisable)        |
|                                           | diagnostic level high         | 1000 ‰; (parameterisable)     |
| 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 [ $\Omega$ ] | 9500                          |
|                                           | diagnostic level low          | 1 V; (parameterisable)        |
|                                           | diagnostic level high         | 95 % VBB30; (parameterisable) |
| 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; (parameterisable)   |
|                                 | diagnostic level high    | 400 % VBB30; (parameterisable) |
| 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; (parameterisable)         |
|                                 | diagnostic level high    | 31000 Ω; (parameterisable)     |
| Digital inputs (IN DIGITAL-B)   |                          |                                |
| Number                          | 4                        |                                |
| Plug ST A                       | IN0300, IN0301           |                                |
|                                 | IN0800, IN0801           |                                |
| 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     | 1 V; (parameterisable)         |
|                                 | diagnostic level high    | 95 % VBB30; (parameterisable)  |
| 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         | 28                       |                                |
| Number of digital outputs       | 27                       |                                |
| Number of analogue outputs      | 1                        |                                |
| Number of PWM outputs           | 27                       |                                |
| Number of PWM-I outputs         | 18                       |                                |
| Number of outputs with H-bridge | 6; (3 x 2)               |                                |



## Programmable controller for mobile machines

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| Output groups                                                |                                          |                                                                    |
|--------------------------------------------------------------|------------------------------------------|--------------------------------------------------------------------|
| Number                                                       | 3                                        |                                                                    |
| Plug ST A                                                    | VBB0...VBB2                              |                                                                    |
| Output group switch                                          | function type                            | second independent option for safety shut-down of the output group |
|                                                              | voltage range [V]                        | 6...32 DC                                                          |
|                                                              | voltage measurement [V]                  | 0...36                                                             |
|                                                              | accuracy of the voltage measurement [mV] | 360                                                                |
|                                                              | diagnostic function                      | current monitoring, voltage monitoring                             |
|                                                              | lower limit of current monitoring [mA]   | 0; (parameterisable)                                               |
|                                                              | upper limit of current monitoring [mA]   | 12000; (parameterisable)                                           |
| Digital / PWM outputs; 4,0 A; H-bridge (OUT PWM-40-BRIDGE-A) |                                          |                                                                    |
| Number                                                       | 6                                        |                                                                    |
| Plug ST A                                                    | OUT0006, OUT0007                         |                                                                    |
|                                                              | OUT0106, OUT0107                         |                                                                    |
|                                                              | OUT0206, OUT0207                         |                                                                    |
| 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 ‰; (parameterisable)                                      |
|                                                              | 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; (parameterisable)                                               |
|                                                              | upper limit of current monitoring [mA]   | 4000; (parameterisable)                                            |
| 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 ‰; (parameterisable)                                      |
|                                                              | Resolution                               | 1 ‰; (20...250 Hz)                                                 |
|                                                              | protective circuitry                     | inductive load; thermal protection                                 |



## Programmable controller for mobile machines

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|                                             |                                                 |                                               |
|---------------------------------------------|-------------------------------------------------|-----------------------------------------------|
| PWM-I output                                | function type                                   | PID-Stromregler                               |
|                                             | 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; (parameterisable)                          |
|                                             | upper limit of current monitoring [mA]          | 4000; (parameterisable)                       |
| 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                                             |
|                                             | accuracy of the switching status monitoring [V] | ± 1                                           |
|                                             | diagnostic function                             | wire break; short circuit; current monitoring |
|                                             | lower limit of current monitoring [mA]          | 0; (parameterisable)                          |
| Digital output                              | upper limit of current monitoring [mA]          | 4000; (parameterisable)                       |
|                                             | 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; 4,0 A (OUT PWM-40-A) |                                                 |                                               |
| Number                                      | 3                                               |                                               |
| Plug ST A                                   | OUT0008, OUT0108, OUT0208                       |                                               |
| 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 ‰; (parameterisable)                 |
|                                             | 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; (parameterisable)                          |
|                                             | upper limit of current monitoring [mA]          | 4000; (parameterisable)                       |



## Programmable controller for mobile machines

ecomatController/60/Std.

|                                             |                                                 |                                               |
|---------------------------------------------|-------------------------------------------------|-----------------------------------------------|
| 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; (parameterisable)                          |
|                                             | upper limit of current monitoring [mA]          | 4000; (parameterisable)                       |
| 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                                             |
|                                             | accuracy of the switching status monitoring [V] | ± 1                                           |
|                                             | diagnostic function                             | wire break; short circuit; current monitoring |
|                                             | lower limit of current monitoring [mA]          | 0; (parameterisable)                          |
|                                             | upper limit of current monitoring [mA]          | 4000; (parameterisable)                       |
| Digital / PWM outputs; 2,5 A (OUT PWM-25-A) |                                                 |                                               |
| Number                                      | 9                                               |                                               |
| Plug ST A                                   | OUT0000, OUT0002, OUT0004                       |                                               |
|                                             | OUT0100, OUT0102, OUT0104                       |                                               |
|                                             | OUT0200, OUT0202, OUT0204                       |                                               |
| 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 ‰; (parameterisable)                 |
|                                             | 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; (parameterisable)                          |
|                                             | upper limit of current monitoring [mA]          | 2500; (parameterisable)                       |





## Programmable controller for mobile machines

ecomatController/60/Std.

|                                             |                                                 |                                               |
|---------------------------------------------|-------------------------------------------------|-----------------------------------------------|
| PWM-I output                                | function type                                   | current-controlled                            |
|                                             | 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; (parameterisable)                          |
|                                             | upper limit of current monitoring [mA]          | 2500; (parameterisable)                       |
| 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                                             |
|                                             | accuracy of the switching status monitoring [V] | ± 1                                           |
|                                             | diagnostic function                             | wire break; short circuit; current monitoring |
|                                             | lower limit of current monitoring [mA]          | 0; (parameterisable)                          |
|                                             | upper limit of current monitoring [mA]          | 2500; (parameterisable)                       |
| Digital / PWM outputs; 2,5 A (OUT PWM-25-B) |                                                 |                                               |
| Number                                      | 9                                               |                                               |
| Plug ST A                                   | OUT0001, OUT0003, OUT0005                       |                                               |
|                                             | OUT0101, OUT0103, OUT0105                       |                                               |
|                                             | OUT0201, OUT0203, OUT0205                       |                                               |
| 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 ‰; (parameterisable)                 |
|                                             | 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; (parameterisable)                          |
|                                             | upper limit of current monitoring [mA]          | 2500; (parameterisable)                       |



## Programmable controller for mobile machines

ecomatController/60/Std.

|                                  |                                                 |                                               |
|----------------------------------|-------------------------------------------------|-----------------------------------------------|
| 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                                             |
|                                  | accuracy of the switching status monitoring [V] | ± 1                                           |
|                                  | diagnostic function                             | wire break; short circuit; current monitoring |
|                                  | lower limit of current monitoring [mA]          | 0; (parameterisable)                          |
|                                  | upper limit of current monitoring [mA]          | 2500; (parameterisable)                       |
| Sensor supply (OUT SUPPLY-A)     |                                                 |                                               |
| Number                           | 1                                               |                                               |
| Plug ST A                        | OUT3000                                         |                                               |
| Sensor supply                    | function type                                   | power 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                                        |
|                                  | accuracy of the voltage measurement [mV]        | 500                                           |
|                                  | diagnostic functions                            | wire break; short circuit; current monitoring |
|                                  | lower limit of current monitoring [mA]          | 0; (parameterisable)                          |
|                                  | upper limit of current monitoring [mA]          | 2500; (parameterisable)                       |
| Sensor supply                    | function type                                   | power 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                                        |
|                                  | accuracy of the voltage measurement [mV]        | 500                                           |
|                                  | diagnostic functions                            | wire break; short circuit; current monitoring |
|                                  | lower limit of current monitoring [mA]          | 0; (parameterisable)                          |
|                                  | upper limit of current monitoring [mA]          | 2500; (parameterisable)                       |
| Analogue outputs (OUT VOLTAGE-A) |                                                 |                                               |
| Number                           | 1                                               |                                               |
| Plug ST A                        | OUT3001                                         |                                               |



## Programmable controller for mobile machines

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|                 |                                         |                   |
|-----------------|-----------------------------------------|-------------------|
| Analogue 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            |
|                 | accuracy of the voltage measurement [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 |

### 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) |
| Pollution degree            |             | 2                                                                                                                         |
| Chemical media              | ISO 16750-5 | AA, BA, BD, CC, DB, DC, DD                                                                                                |



## Programmable controller for mobile machines

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| 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 change              | 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]                           | 1455.5                                |                                            |
| Housing                              | rectangular                           |                                            |
| Type of mounting                     | screw mounting; (4 x M6)              |                                            |
| Dimensions [mm]                      | 219 x 203 x 47                        |                                            |
| Materials                            | housing: diecast aluminium passivated |                                            |
| Displays / operating elements        |                                       |                                            |
| Display                              | status (SYS0)                         | 1 LED, multi-colour                        |
|                                      | status (SYS1)                         | 1 LED, multi-colour                        |
|                                      | Ethernet (ETH0)                       | 1 LED, green                               |
|                                      | Ethernet (ETH1)                       | 1 LED, green                               |
|                                      | status (APP0)                         | 1 LED, multi-colour programmable           |
|                                      | status (APP1)                         | 1 LED, multi-colour programmable           |
|                                      | status (APP2)                         | 1 LED, multi-colour programmable           |
|                                      | status (APP3)                         | 1 LED, multi-colour programmable           |
| Operating states - system / hardware |                                       |                                            |
| Display                              | no operating system loaded            | LED (SYS0), green flashing 5 Hz            |
|                                      | hardware error (Fatal Error+)         | LED (SYS0), red lights                     |
|                                      | system error (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                              | no application                        | 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                         |



Programmable controller for mobile machines

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Ethernet (ETH0 / ETH1)

|         |                   |                     |
|---------|-------------------|---------------------|
| Display | connection        | LED, green lights   |
|         | data transmission | LED, green flashing |

Hardware

|                     |                    |
|---------------------|--------------------|
| Processor           | 32-Bit Triple-Core |
| RAM                 | 2,7 MByte RAM      |
| Mass storage        | 9 MByte Flash      |
| Non-volatile memory | 10 kByte           |

Accessories

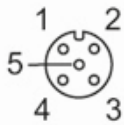
|                |                                                   |
|----------------|---------------------------------------------------|
| Items supplied | Protective cap: M12                               |
|                | self-tapping screw: 1 x M4, for shield connection |

Remarks

|               |        |
|---------------|--------|
| Pack quantity | 1 pcs. |
|---------------|--------|

Electrical connection - CAN0

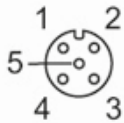
Connector: 1 x M12; coding: A



|   |         |
|---|---------|
| 1 | n.c.    |
| 2 | n.c.    |
| 3 | GND_COM |
| 4 | CAN0_H  |
| 5 | CAN0_L  |

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    |

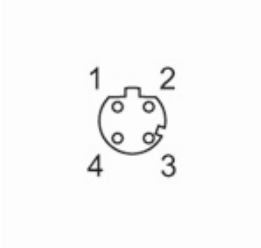


Programmable controller for mobile machines

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Electrical connection - Ethernet

Connector: 2 x M12; coding: D

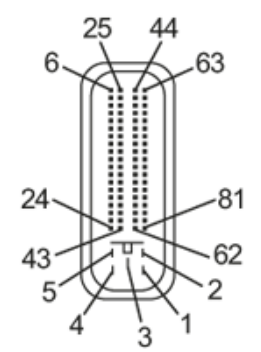


ETH0 / ETH1

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

Electrical connection - ST A

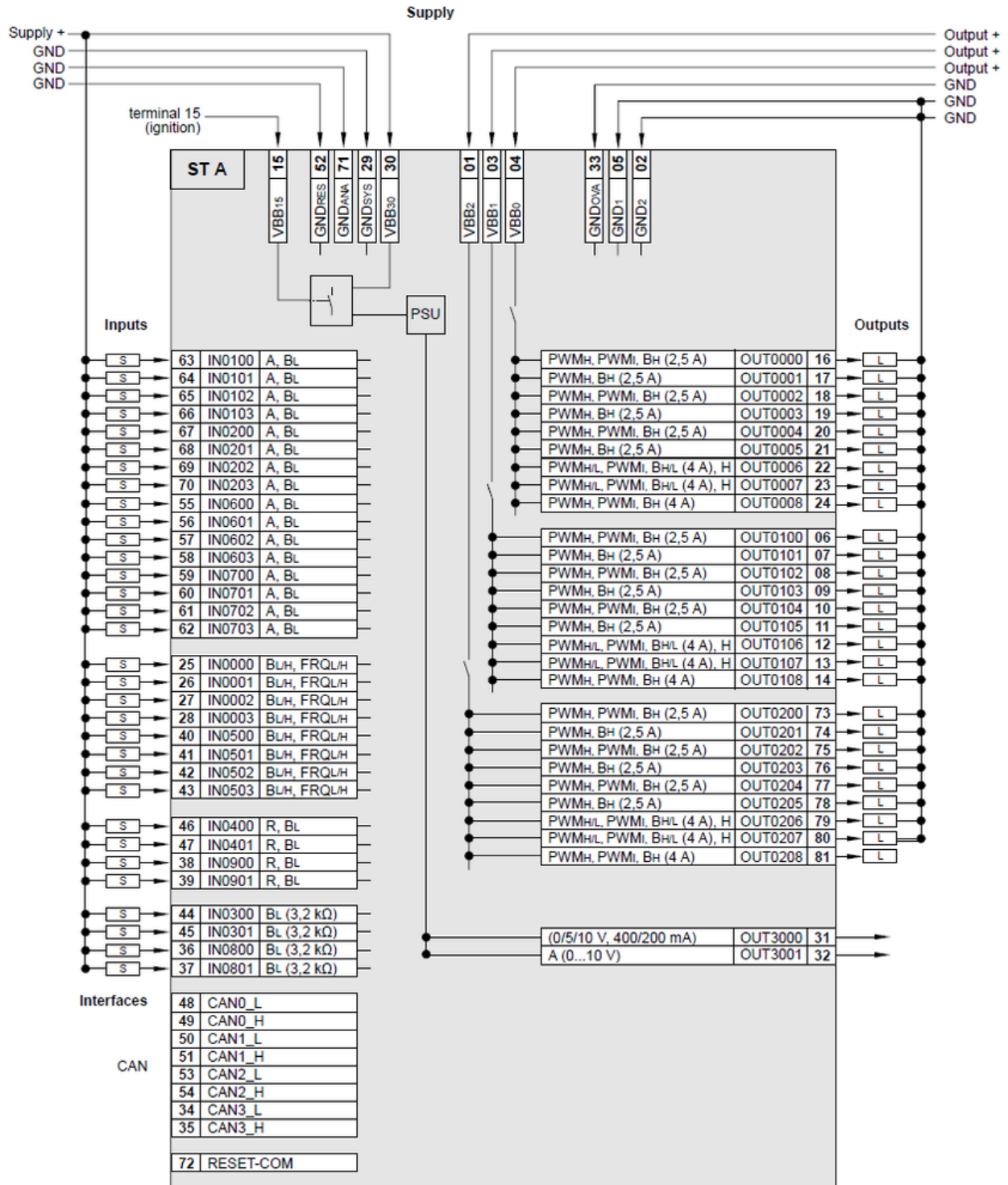
Connector: 1 x AMP; coding: A



# Programmable controller for mobile machines

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## Connection



|             |                                                          |
|-------------|----------------------------------------------------------|
| A           | analogue                                                 |
| 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         | voltage 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                                                 |
| VBB0...VBB2 | power supply, output group                               |
| VBB30       | power supply, controller                                 |



## Programmable controller for mobile machines

ecomatController/60/Std.

### power 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    |

### multi-function inputs - analogue / digital

|    |                            |
|----|----------------------------|
| 63 | IN0100 - INMULTIFUNCTION-A |
| 64 | IN0101 - INMULTIFUNCTION-A |
| 65 | IN0102 - INMULTIFUNCTION-A |
| 66 | IN0103 - INMULTIFUNCTION-A |
| 67 | IN0200 - INMULTIFUNCTION-A |
| 68 | IN0201 - INMULTIFUNCTION-A |
| 69 | IN0202 - INMULTIFUNCTION-A |
| 70 | IN0203 - INMULTIFUNCTION-A |
| 55 | IN0600 - INMULTIFUNCTION-A |
| 56 | IN0601 - INMULTIFUNCTION-A |
| 57 | IN0602 - INMULTIFUNCTION-A |
| 58 | IN0603 - INMULTIFUNCTION-A |
| 59 | IN0700 - INMULTIFUNCTION-A |
| 60 | IN0701 - INMULTIFUNCTION-A |
| 61 | IN0702 - INMULTIFUNCTION-A |
| 62 | IN0703 - 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 |

### digital inputs

|    |                       |
|----|-----------------------|
| 44 | IN0300 - IN DIGITAL-B |
| 45 | IN0301 - IN DIGITAL-B |
| 36 | IN0302 - IN DIGITAL-B |
| 37 | IN0303 - IN DIGITAL-B |





## Programmable controller for mobile machines

ecomatController/60/Std.

| 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 |
| 24                    | OUT0008 - OUT PWM-40-A        |
| 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  |
| 14                    | OUT0108 - OUTPWM-40-A         |
| Outputs - group: VBB2 |                               |
| 73                    | OUT0200 - OUTPWM-25-A         |
| 74                    | OUT0201 - OUTPWM-25-B         |
| 75                    | OUT0202 - OUTPWM-25-A         |
| 76                    | OUT0203 - OUTPWM-25-B         |
| 77                    | OUT0204 - OUTPWM-25-A         |
| 78                    | OUT0205 - OUTPWM-25-B         |
| 79                    | OUT0206 - OUTPWM-40-BRIDGE-A  |
| 80                    | OUT0207 - OUTPWM-40-BRIDGE-A  |
| 81                    | OUT0208 - OUTPWM-40-A         |
| Sensor supply         |                               |
| 31                    | OUT3000 - OUTSUPPLY-A         |
| analogue output       |                               |
| 32                    | OUT3001 - OUTVOLTAGE-A        |