

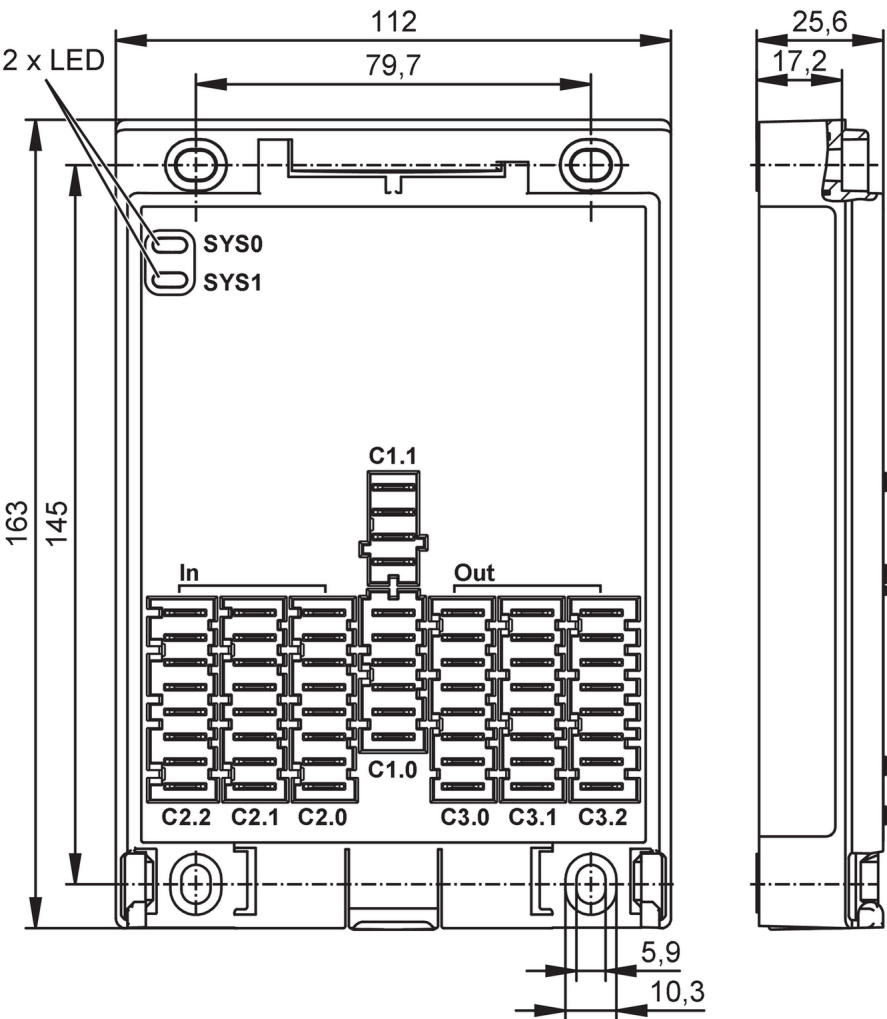
# CR403S



## Programmable controller for mobile machines

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for use as a safety controller, a separately available licence (CP100S) is required



### Product characteristics

|                         |       |
|-------------------------|-------|
| Total number of inputs  | 12    |
| Total number of outputs | 12    |
| Communication interface | CAN   |
| Protection              | IP 20 |

### Electrical data

|                             |                                                                               |
|-----------------------------|-------------------------------------------------------------------------------|
| Operating voltage [V]       | 8...32 DC                                                                     |
| Nominal voltage DC [V]      | 12 / 24                                                                       |
| Power consumption [W]       | 4; (VBB30)                                                                    |
| Reverse polarity protection | yes; (VBB30; VBB0, VBB1: in case of supply via the on-board system / battery) |
| Overvoltage category        | II                                                                            |

### Inputs / outputs

|                                    |    |
|------------------------------------|----|
| Total number of inputs and outputs | 24 |
|------------------------------------|----|



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| Inputs                                            |                          |                        |
|---------------------------------------------------|--------------------------|------------------------|
| Total number of inputs                            |                          | 12                     |
| Number of frequency inputs                        |                          | 4                      |
| Number of resistor inputs                         |                          | 4                      |
| Number of digital inputs                          |                          | 12                     |
| Number of analog inputs                           |                          | 8                      |
| Digital inputs, frequency signal (IN FREQUENCY-B) |                          |                        |
| Number                                            |                          | 4                      |
| Plug C2.0                                         |                          | IN0400, IN0401         |
|                                                   |                          | IN0500, IN0501         |
| Frequency input                                   | function type            | Frequency, cycle time  |
|                                                   | software mode            | IN_PERIOD_RATIO_CSO    |
|                                                   |                          | IN_PERIOD_RATIO_CSI    |
|                                                   | input range [V]          | 0...32                 |
|                                                   | 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, cycle time  |
|                                                   | software mode            | IN_PERIOD_RATIO_US_CSO |
|                                                   |                          | IN_PERIOD_RATIO_US_CSI |
|                                                   | input range [V]          | 0...32                 |
|                                                   | 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, cycle time  |
|                                                   | software mode            | IN_FREQUENCY_CSO       |
|                                                   |                          | IN_FREQUENCY_CSI       |
|                                                   | input range [V]          | 0...32                 |
|                                                   | 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           |
|                                                   |                          | IN_COUNT_CSI           |
|                                                   | input range [V]          | 0...32                 |
|                                                   | Frequency [Hz]           | 0...30000              |
|                                                   | Switching level high [V] | > 70 % VBB30           |
|                                                   | Switching level low [V]  | < 30 % VBB30           |
|                                                   | input resistance [Ω]     | 10000                  |
|                                                   | Accuracy                 | ± 10 μs                |



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|                 |                          |                              |
|-----------------|--------------------------|------------------------------|
| Frequency input | function type            | pulse, incremental           |
|                 | software mode            | IN_INC_ENCODER_CSO           |
|                 |                          | IN_INC_ENCODER_CSI           |
|                 | input pair               | A: IN0400 + B: IN0401        |
|                 |                          | A: IN0500 + B: IN0501        |
|                 | input range [V]          | 0...32                       |
|                 | Frequency [Hz]           | 0...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                 |
|                 |                          | IN_PHASE_CSI                 |
|                 | input pair               | A: IN0400 + B: IN0401        |
|                 |                          | A: IN0500 + B: IN0501        |
|                 | input range [V]          | 0...32                       |
|                 | Frequency [Hz]           | 0,0625...5000                |
|                 | Switching level high [V] | > 70 % VBB30                 |
|                 | Switching level low [V]  | < 30 % VBB30                 |
|                 | input resistance [Ω]     | 10000                        |
|                 | Accuracy                 | ± 10 μs                      |
| Analog input    | function type            | Voltage                      |
|                 | software mode            | IN_VOLTAGE_10                |
|                 | input range [V]          | 0...10                       |
|                 | input resistance [Ω]     | 87600                        |
|                 | 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               |
|                 | input range [V]          | 0...32                       |
|                 | 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)  |



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|                                                             |                          |                              |
|-------------------------------------------------------------|--------------------------|------------------------------|
| Digital input                                               | function type            | binary, low-side             |
|                                                             | software mode            | IN_DIGITAL_CSI               |
|                                                             |                          | IN_DIGITAL_CSI_NAMUR         |
|                                                             |                          | IN_DIGITAL_CSI_BLANKING      |
|                                                             | input range [V]          | 0...32                       |
|                                                             | 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                                                      | 4                        |                              |
| Plug C2.2                                                   | IN0000, IN0001           |                              |
|                                                             | IN0100, IN0101           |                              |
| Analog input                                                | function type            | Current                      |
|                                                             | software mode            | IN_CURRENT_CSI               |
|                                                             | input range [mA]         | 0...20                       |
|                                                             | input resistance [Ω]     | 298                          |
|                                                             | Resolution               | 12 Bit                       |
|                                                             | Accuracy                 | ± 345 µA                     |
|                                                             | input frequency [Hz]     | < 330                        |
|                                                             | diagnostic level low     | 0 mA; (configurable)         |
|                                                             | diagnostic level high    | 20 mA; (configurable)        |
| 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)         |



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|                                           |                          |                              |
|-------------------------------------------|--------------------------|------------------------------|
| Analog input                              | function type            | Voltage, ratiometric         |
|                                           | software mode            | IN_VOLTAGE_RATIO             |
|                                           | input range [V]          | 0...1000 ‰ 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               |
|                                           |                          | IN_DIGITAL_CSI_NAMUR         |
|                                           | input range [V]          | 0...32                       |
|                                           | 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]     | 9500                         |
|                                           | diagnostic level low     | 1 V; (configurable)          |
|                                           | diagnostic level high    | 400 % VBB30; (configurable)  |
| Digital / resistor inputs (IN RESISTOR-A) |                          |                              |
| Number                                    | 4                        |                              |
| Plug C2.1                                 | IN0200, IN0201           |                              |
|                                           | IN0300, IN0301           |                              |
| Digital input                             | function type            | binary, low-side             |
|                                           | software mode            | IN_DIGITAL_CSI               |
|                                           |                          | IN_DIGITAL_CSI_NAMUR         |
|                                           | input range [V]          | 0...32                       |
|                                           | 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]     | 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: ± 60 Ω          |
|                                           |                          | 3000...15000 Ω: ± 750 Ω      |
|                                           |                          | 15000...30000 Ω: ± 3000 Ω    |
|                                           | diagnostic level low     | 0 Ω; (configurable)          |
|                                           | diagnostic level high    | 30000 Ω; (configurable)      |
| Outputs                                   |                          |                              |
| Total number of outputs                   | 12                       |                              |



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|                                             |                                          |                                               |
|---------------------------------------------|------------------------------------------|-----------------------------------------------|
| Number of digital outputs                   | 12                                       |                                               |
| Number of PWM outputs                       | 12                                       |                                               |
| Number of PWM-I outputs                     | 2                                        |                                               |
| Output groups (OutputGroup-B)               |                                          |                                               |
| Number                                      | 2                                        |                                               |
| Plug C1.0                                   | VBB0, VBB1                               |                                               |
| Output group switch                         | function type                            | virtual switch                                |
|                                             | software mode                            | OUT_DIGITAL_VIRT                              |
|                                             | Voltage range [V]                        | 6...32                                        |
|                                             | voltage measurement [V]                  | 0...36                                        |
|                                             | voltage measurement accuracy [mV]        | ± 360                                         |
|                                             | Current rating [A]                       | 12                                            |
|                                             | lower limit of current monitoring [mA]   | 0; (configurable)                             |
|                                             | upper limit of current monitoring [mA]   | 12000; (configurable)                         |
| Digital / PWM outputs; 2,5 A (OUT PWM-25-A) |                                          |                                               |
| Number                                      | 2                                        |                                               |
| Plug C3.0                                   | OUT0000, OUT0001                         |                                               |
| PWM output                                  | function type                            | binary, high-side                             |
|                                             | software mode                            | OUT_PWM_CSO                                   |
|                                             | Voltage range [V]                        | 6...32                                        |
|                                             | switching current [A]                    | 0,025...2,5                                   |
|                                             | output frequency [Hz]                    | 20...2000                                     |
|                                             | pulse/pause ratio                        | 0...1000 ‰; (configurable)                    |
|                                             | Min. load resistance [Ω]                 | 12 V: 4,8 Ω / 24 V: 9,6 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)                          |
|                                             | PWM-I output                             | function type                                 |
| software mode                               |                                          | OUT_CURRENT_CSO                               |
| Voltage range [V]                           |                                          | 6...32                                        |
| switching current [A]                       |                                          | 0,025...2,5                                   |
| output frequency [Hz]                       |                                          | 20...2000                                     |
| control range [A]                           |                                          | 0,05...2,5                                    |
| control resolution [mA]                     |                                          | 2                                             |
| Min. load resistance [Ω]                    |                                          | 12 V: 4,8 Ω / 24 V: 9,6 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)                          |



## Programmable controller for mobile machines

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|                                             |                                          |                                               |
|---------------------------------------------|------------------------------------------|-----------------------------------------------|
| Digital output                              | function type                            | binary, high-side                             |
|                                             | software mode                            | OUT_DIGITAL_CSO                               |
|                                             | Voltage range [V]                        | 6...32                                        |
|                                             | switching current [A]                    | 0,025...2,5                                   |
|                                             | Min. load resistance [ $\Omega$ ]        | 12 V: 4,8 $\Omega$ / 24 V: 9,6 $\Omega$       |
|                                             | protective circuitry                     | inductive load; thermal protection            |
|                                             | current measurement [A]                  | 0...4                                         |
|                                             | accuracy of the current measurement [mA] | $\pm 37,5$                                    |
|                                             | Diagnostic function                      | wire break; short circuit; current monitoring |
|                                             | lower limit of current monitoring [mA]   | 0; (configurable)                             |
|                                             | upper limit of current monitoring [mA]   | 2500; (configurable)                          |
| Digital / PWM outputs; 2,5 A (OUT PWM-25-B) |                                          |                                               |
| Number                                      | 4                                        |                                               |
| Plug C3.0                                   | OUT0002, OUT0003                         |                                               |
| Plug C3.2                                   | OUT0100, OUT0101                         |                                               |
| PWM output                                  | function type                            | binary, high-side                             |
|                                             | software mode                            | OUT_PWM_CSO                                   |
|                                             | Voltage range [V]                        | 6...32                                        |
|                                             | switching current [A]                    | 0,025...2,5                                   |
|                                             | output frequency [Hz]                    | 20...2000                                     |
|                                             | pulse/pause ratio                        | 0...1000 ‰; (configurable)                    |
|                                             | Min. load resistance [ $\Omega$ ]        | 12 V: 4,8 $\Omega$ / 24 V: 9,6 $\Omega$       |
|                                             | protective circuitry                     | inductive load; thermal protection            |
|                                             | current measurement [A]                  | 0...4                                         |
|                                             | accuracy of the current measurement [mA] | $\pm 188$                                     |
| Digital output                              | Diagnostic functions                     | wire break; short circuit; current monitoring |
|                                             | lower limit of current monitoring [mA]   | 0; (configurable)                             |
|                                             | upper limit of current monitoring [mA]   | 2500; (configurable)                          |
|                                             | function type                            | binary, high-side                             |
|                                             | software mode                            | OUT_DIGITAL_CSO                               |
|                                             | Voltage range [V]                        | 6...32                                        |
|                                             | switching current [A]                    | 0,025...2,5                                   |
|                                             | Min. load resistance [ $\Omega$ ]        | 12 V: 4,8 $\Omega$ / 24 V: 9,6 $\Omega$       |
|                                             | protective circuitry                     | inductive load; thermal protection            |
|                                             | current measurement [A]                  | 0...4                                         |
| Digital output                              | accuracy of the current measurement [mA] | $\pm 188$                                     |
|                                             | Diagnostic function                      | wire break; short circuit; current monitoring |
|                                             | lower limit of current monitoring [mA]   | 0; (configurable)                             |
|                                             | upper limit of current monitoring [mA]   | 2500; (configurable)                          |
|                                             | function type                            | binary, high-side                             |
|                                             | software mode                            | OUT_DIGITAL_CSO                               |
|                                             | Voltage range [V]                        | 6...32                                        |
|                                             | switching current [A]                    | 0,025...2,5                                   |
|                                             | Min. load resistance [ $\Omega$ ]        | 12 V: 4,8 $\Omega$ / 24 V: 9,6 $\Omega$       |
|                                             | protective circuitry                     | inductive load; thermal protection            |
| Digital / PWM outputs; 4,0 A (OUT PWM-40-B) |                                          |                                               |
| Number                                      | 2                                        |                                               |
| Plug C3.2                                   | OUT0102, OUT0103                         |                                               |



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|                                             |                                          |                                               |
|---------------------------------------------|------------------------------------------|-----------------------------------------------|
| PWM output                                  | function type                            | binary, high-side                             |
|                                             | software mode                            | OUT_PWM_CSO                                   |
|                                             | Voltage range [V]                        | 6...32                                        |
|                                             | switching current [A]                    | 0,025...4,0                                   |
|                                             | output frequency [Hz]                    | 20...2000                                     |
|                                             | pulse/pause ratio                        | 0...1000 ‰; (configurable)                    |
|                                             | Min. load resistance [Ω]                 | 12 V: 4,8 Ω / 24 V: 9,6 Ω                     |
|                                             | protective circuitry                     | inductive load; thermal protection            |
|                                             | current measurement [A]                  | 0...6                                         |
|                                             | accuracy of the current measurement [mA] | ± 300                                         |
|                                             | 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                                        |
|                                             | switching current [A]                    | 0,025...4,0                                   |
|                                             | Min. load resistance [Ω]                 | 12 V: 4,8 Ω / 24 V: 9,6 Ω                     |
|                                             | protective circuitry                     | inductive load; thermal protection            |
|                                             | current measurement [A]                  | 0...6                                         |
|                                             | accuracy of the current measurement [mA] | ± 300                                         |
|                                             | Diagnostic function                      | wire break; short circuit; current monitoring |
|                                             | lower limit of current monitoring [mA]   | 0; (configurable)                             |
|                                             | upper limit of current monitoring [mA]   | 4000; (configurable)                          |
|                                             |                                          |                                               |
|                                             |                                          |                                               |
|                                             |                                          |                                               |
| Digital / PWM outputs; 1,0 A (OUT PWM-10-D) |                                          |                                               |
| Number                                      | 4                                        |                                               |
| Plug C3.1                                   | OUT0004...OUT0007                        |                                               |
| PWM output                                  | function type                            | binary, high-side                             |
|                                             | software mode                            | OUT_PWM_CSO                                   |
|                                             | Voltage range [V]                        | 6...32                                        |
|                                             | switching current [A]                    | 0,025...1,0                                   |
|                                             | output frequency [Hz]                    | 20...2000                                     |
|                                             | pulse/pause ratio                        | 1...1000 ‰; (configurable)                    |
|                                             | Resolution                               | 1 ‰; (20...250 Hz)                            |
|                                             | Min. load resistance [Ω]                 | 12 V: 12 Ω / 24 V: 24 Ω                       |
|                                             | protective circuitry                     | inductive load; thermal protection            |
|                                             |                                          |                                               |
|                                             |                                          |                                               |
|                                             |                                          |                                               |
|                                             |                                          |                                               |
|                                             | Digital output                           | function type                                 |
| software mode                               |                                          | OUT_DIGITAL_CSO                               |
| Voltage range [V]                           |                                          | 6...32                                        |
| switching current [A]                       |                                          | 0,025...1,0                                   |
| Min. load resistance [Ω]                    |                                          | 12 V: 12 Ω / 24 V: 24 Ω                       |
| protective circuitry                        |                                          | inductive load; thermal protection            |
|                                             |                                          |                                               |
| Software / programming                      |                                          |                                               |
| Parameter setting options                   | CODESYS 3.5                              |                                               |
| PLC function to IEC 61131-3                 | yes                                      |                                               |
| Operating system                            | real-time operating system               |                                               |
| Interfaces                                  |                                          |                                               |
| Communication interface                     | CAN                                      |                                               |

# CR403S



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|                             |                                   |                                                                    |  |
|-----------------------------|-----------------------------------|--------------------------------------------------------------------|--|
| Number of CAN interfaces    |                                   | 2                                                                  |  |
| Transmission rate           |                                   | 20 kBit/s... 1 MBit/s                                              |  |
| Protocol                    |                                   | CANopen; SAE J1939                                                 |  |
| Interface                   |                                   | CAN Interface 2.0 A/B ISO 11898                                    |  |
| Operating conditions        |                                   |                                                                    |  |
| Ambient temperature         | [°C]                              | -40...85                                                           |  |
| Note on ambient temperature |                                   | for further details see section Diagrams and graphs                |  |
| Storage temperature         | [°C]                              | -40...85                                                           |  |
| Max. relative air humidity  | [%]                               | 90; (non condensing)                                               |  |
| Max. height above sea level | [m]                               | 5000                                                               |  |
| Protection                  |                                   | IP 20                                                              |  |
| Pollution degree            |                                   | 2                                                                  |  |
| Chemical media              | ISO 16750-5                       | AA, BA, BD, CC, DB, DC, DD                                         |  |
|                             |                                   | chemical resistance of the plastics                                |  |
|                             |                                   | only one chemical permitted at a time                              |  |
| Tests / approvals           |                                   |                                                                    |  |
| EMC                         | IEC 61000-6-2                     | noise immunity                                                     |  |
|                             | IEC 61000-6-4                     | noise emission                                                     |  |
|                             | 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 3 / function state B (12 V)                         |  |
|                             | ISO 7637-2 pulse 4                | severity level 4 / function state B (24 V)                         |  |
|                             | ISO 16750-2 (load dump)           | function state D (24 V)                                            |  |
|                             | DIN EN ISO 13766-1                | earth-moving and construction machines                             |  |
|                             | UN/ECE-R10                        | Noise emission and noise interference:                             |  |
| Continuous shock resistance | ISO 16750-3                       | 30 g 6 ms / 24000 shocks                                           |  |
| Vibration resistance        | ISO 16750-3 Test VII              | random, mounting place car body                                    |  |
|                             | EN 60068-2-6 sine                 | 10...500 Hz / 10 cycles/axis, sine                                 |  |
| Climatic tests              | 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                                |  |
| Electrical safety           | IEC 61010-1                       | safety requirements: general requirements                          |  |
|                             | IEC 61010-2-201                   | safety requirements: particular requirements for control equipment |  |
| UL approval                 | Enclosure type                    | Open Type                                                          |  |
|                             | File number UL                    | E205959                                                            |  |
|                             | digital / PWM outputs C3.0        | 2.5 A / 24 V DC / Pilot Duty (DC-13)                               |  |
|                             | digital / PWM outputs C3.1        | 1.0 A / 24 V DC / Pilot Duty (DC-13)                               |  |
|                             | digital / PWM outputs C3.2        | 4.0 A / 24 V DC / Pilot Duty (DC-13)                               |  |
| Railway applications        | EN 50121-3-2                      |                                                                    |  |
|                             | EN 50155                          |                                                                    |  |
| Mechanical data             |                                   |                                                                    |  |
| Weight                      | [g]                               | 424.4                                                              |  |
| Housing                     |                                   | rectangular                                                        |  |
| Type of mounting            |                                   | screw mounting; (4 x M4)                                           |  |

# CR403S



## Programmable controller for mobile machines

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|            |      |                   |
|------------|------|-------------------|
| Dimensions | [mm] | 163 x 112 x 25.6  |
| Material   |      | housing: PPE + PS |

### Displays / operating elements

|         |               |                    |
|---------|---------------|--------------------|
| Display | status (SYS0) | 1 LED, multi-color |
|         | status (SYS1) | 1 LED, multi-color |

### 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/SYS1), red lights                 |
|         | update                      | LED (SYS0/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        |

### Hardware

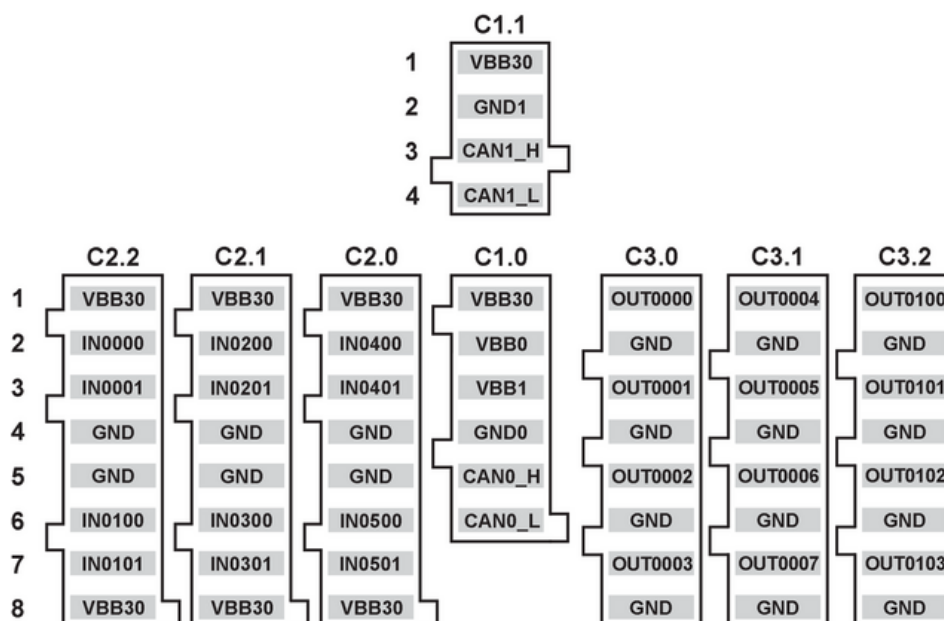
|                     |                    |
|---------------------|--------------------|
| Processor           | 32-Bit Triple-Core |
| Working memory      | 2,7 MByte RAM      |
| Mass storage        | 9 MByte Flash      |
| Non-volatile memory | 10 kByte           |
| Boot time           | ≤ 3 s              |

### Remarks

|               |                                                                                     |
|---------------|-------------------------------------------------------------------------------------|
| Notes         | for use as a safety controller, a separately available licence (CP100S) is required |
| Pack quantity | 1 pcs.                                                                              |

### Electrical connection

#### Connection





## Programmable controller for mobile machines

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### voltage supply / C1.0

|   |        |
|---|--------|
| 1 | VBB30  |
| 2 | VBB0   |
| 3 | VBB1   |
| 4 | GND0   |
| 5 | CAN0_H |
| 6 | CAN0_L |

### voltage supply / C1.1

|   |        |
|---|--------|
| 1 | VBB30  |
| 2 | GND1   |
| 3 | CAN1_H |
| 4 | CAN1_L |

### IN FREQUENCY - B / C2.0

|   |        |
|---|--------|
| 1 | VBB30  |
| 2 | IN0400 |
| 3 | IN0401 |
| 4 | GND    |
| 5 | GND    |
| 6 | IN0500 |
| 7 | IN0501 |
| 8 | VBB30  |

### IN RESISTOR - A / C2.1

|   |        |
|---|--------|
| 1 | VBB30  |
| 2 | IN0200 |
| 3 | IN0201 |
| 4 | GND    |
| 5 | GND    |
| 6 | IN0300 |
| 7 | IN0301 |
| 8 | VBB30  |

### IN MULTIFUNCTION - A / C2.2

|   |        |
|---|--------|
| 1 | VBB30  |
| 2 | IN0000 |
| 3 | IN0001 |
| 4 | GND    |
| 5 | GND    |
| 6 | IN0100 |
| 7 | IN0101 |
| 8 | VBB30  |

### OUT PWM-25-A / C3.0

|   |         |
|---|---------|
| 1 | OUT0000 |
| 2 | GND     |
| 3 | OUT0001 |
| 4 | GND     |

### OUT PWM-25-B / C3.0

|   |         |
|---|---------|
| 5 | OUT0002 |
| 6 | GND     |
| 7 | OUT0003 |
| 8 | GND     |

## Programmable controller for mobile machines

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## OUT PWM-10-D / C3.1

|   |         |
|---|---------|
| 1 | OUT0004 |
| 2 | GND     |
| 3 | OUT0005 |
| 4 | GND     |
| 5 | OUT0006 |
| 6 | GND     |
| 7 | OUT0007 |
| 8 | GND     |

## OUT PWM-25-B / C3.2

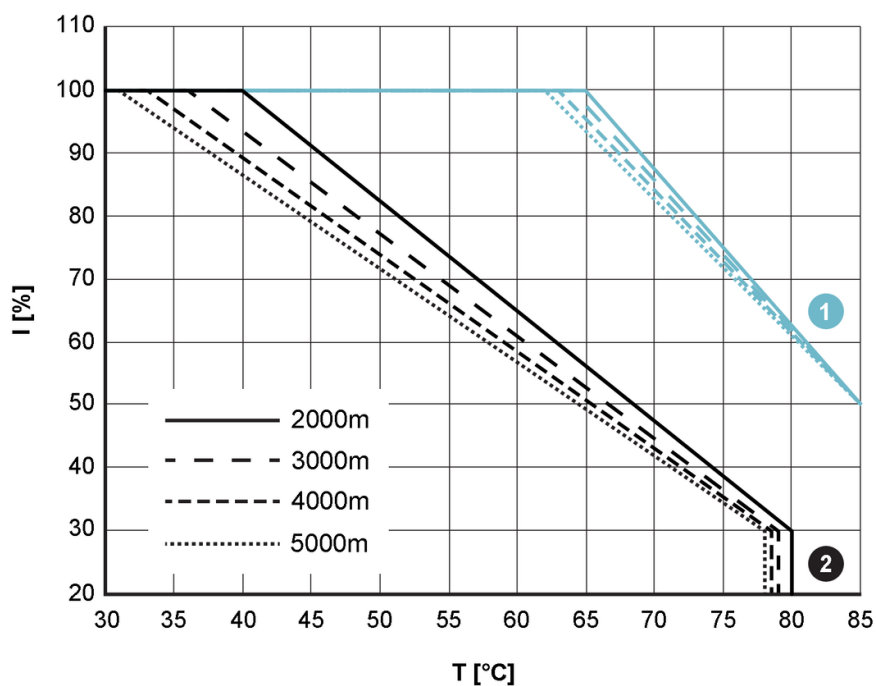
|   |         |
|---|---------|
| 1 | OUT0100 |
| 2 | GND     |
| 3 | OUT0101 |
| 4 | GND     |

## OUT PWM-40-B / C3.2

|   |         |
|---|---------|
| 5 | OUT0102 |
| 6 | GND     |
| 7 | OUT0103 |
| 8 | GND     |

## Diagrams and graphs

characteristics current rating



characteristics for the current rating depending on the temperature and operating altitude

X: Ambient temperature  $T$  [°C]

Y: current rating for VBB0, VBB1  $I$  [%]

1: installation on painted metal plate

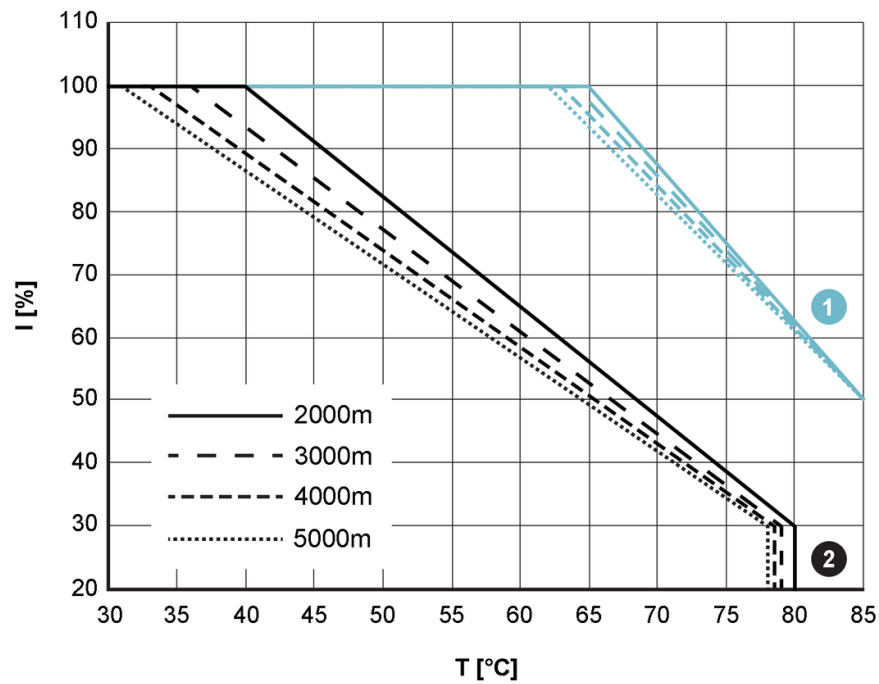
2: installation in a standard cabinet on a surface with low thermal conductivity (e.g. wood/plastic)



Programmable controller for mobile machines

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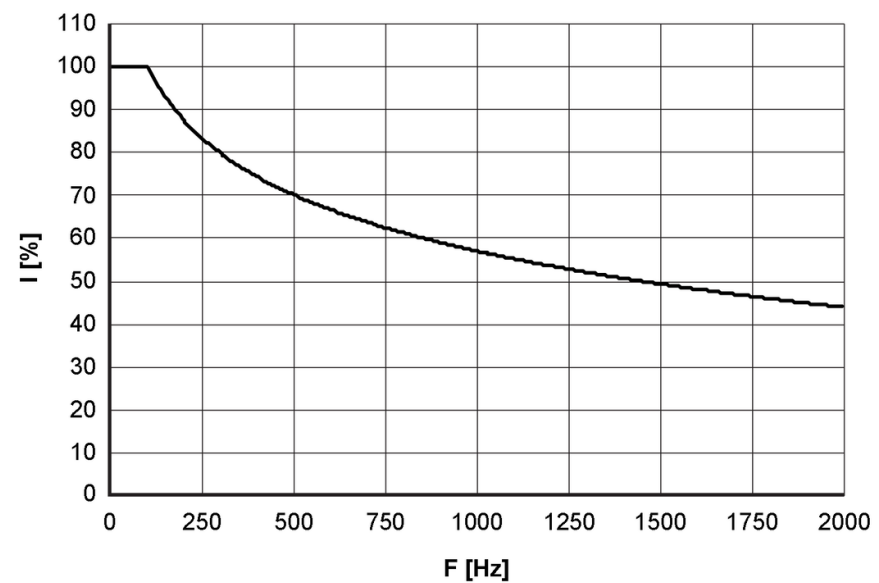
characteristics switching current



characteristics for the switching current depending on the temperature and operating altitude

- X: Ambient temperature  $T$  [°C]  
Y: switching current of the outputs  $I$  [%]  
1: installation on painted metal plate  
2: installation in a standard cabinet on a surface with low thermal conductivity (e.g. wood/plastic)

characteristics output frequency



characteristics for the switching current depending on the output frequency

- X: output frequency  $F$  [Hz]  
Y: switching current of the outputs  $I$  [%]