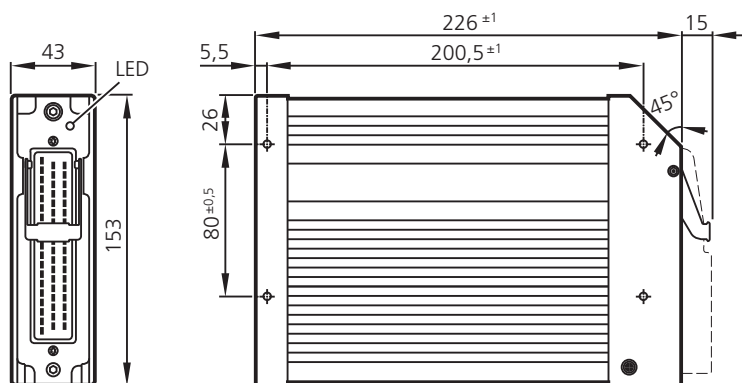


## CR0020

Mobilsteuerung  
ClassicController  
2. CAN-Schnittstelle  
für Gateway-Funktion  
gemäß SAE J 1939  
Programmierung  
nach IEC 61131-3  
Betriebsspannung  
10...32 V DC



e1

### Technische Daten

Gehäuse

Maße (H x B x T)

Montage

Anschluss

Gewicht

Gehäuse-/Lagertemperatur

Schutzart

**Ein-/Ausgangskanäle**  
gesamt

**Eingänge**

mögliche Konfigurationen

\*) nur positive Gebersignale diagnosefähig

### Ausgänge

mögliche Konfigurationen

Abkürzungen

A = analog  
B<sub>H</sub> = binär High-Side  
B<sub>L</sub> = binär Low-Side  
FRQ/CYL = Frequenzeingänge  
I<sub>H</sub> = Impuls High-Side  
I<sub>L</sub> = Impuls Low-Side  
PWM = Pulsweitenmodulation  
PWM<sub>I</sub> = strom geregelter Ausgang  
%IWx = IEC-Adresse für analogen Eingang  
%IX0.xx = IEC-Adresse für binären Eingang  
%QX0.xx = IEC-Adresse für binären Ausgang

### Steuerung als Black-Box-System

zur Realisierung eines zentralen oder dezentralen Systemaufbaus

geschlossenes, abgeschirmtes Metallgehäuse mit Flanschbefestigung

153 x 226 x 43 mm

Schraubbefestigung mit 4 Stk. M5xL nach DIN 7500 bzw. DIN 7984  
Einbaulage waagrecht liegend oder senkrecht stehend auf Montagewand

1 Anschlussstecker 55-polig, verriegelt, verpolsicher, Typ AMP oder Framatome  
Kontakte AMP-Junior-Timer, Crimp-Anschluß 0,5/2,5 mm<sup>2</sup>

1,2 kg

–40...85 °C (lastabhängig) / –40...85 °C

IP 67 (bei gestecktem Stecker mit Einzeladerabdichtung, z.B. EC2084)

max. 40 (die zur Verfügung stehende Anzahl ist abhängig  
von der Anschlussbelegung und der Konfiguration der Steuerung)

max. 40 (entspr. 0 Ausgänge)

| Anzahl    | Signal              | Ausführung                                                                                 |                                   |
|-----------|---------------------|--------------------------------------------------------------------------------------------|-----------------------------------|
| 8<br>oder | digital<br>analog   | für positive Gebersignale, diagnosefähig<br>0...10/32 V DC, 0/4...20 mA oder ratiometrisch | B <sub>L</sub><br>A               |
| 8         | digital             | für positive Gebersignale                                                                  | B <sub>L</sub>                    |
| 4<br>oder | digital<br>Frequenz | für positive Gebersignale, diagnosefähig<br>max. 50 kHz                                    | B <sub>L</sub><br>I <sub>L</sub>  |
| 4<br>oder | digital<br>Frequenz | für positive/negative Gebersignale, diagnosefähig*<br>max. 1 kHz                           | B <sub>LH</sub><br>I <sub>L</sub> |
| 8         | digital             | für positive/negative Gebersignale, diagnosefähig*                                         | B <sub>LH</sub>                   |
| 8         | digital             | für positive Gebersignale, diagnosefähig                                                   | B <sub>L</sub>                    |

max. 24 (entspr. 16 Eingänge)

| Anzahl            | Signal                           | Ausführung                                                                             |                                           |
|-------------------|----------------------------------|----------------------------------------------------------------------------------------|-------------------------------------------|
| 8<br>oder<br>oder | digital<br>PWM<br>strom geregelt | plusschaltend (High-Side), diagnosefähig<br>PWM-Frequenz 20...250 Hz<br>0,1...4 A      | B <sub>H</sub><br>PWM<br>PWM <sub>I</sub> |
| 8                 | digital                          | plusschaltend (High-Side), diagnosefähig                                               | B <sub>H</sub>                            |
| 4<br>oder         | digital<br>PWM                   | plusschaltend (High-Side), diagnosefähig<br>PWM-Frequenz 20...250 Hz                   | B <sub>H</sub><br>PWM                     |
| 4                 | digital                          | plus-/minusschaltend (High-/Low-Side),<br>diagnosefähig<br>(auch als H-Brücke nutzbar) | B <sub>H/L</sub><br>H-Bridge              |



| CR0020                                                               | Technische Daten                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                    |         |              |   |     |                        |      |         |                                   |      |      |                             |      |               |             |     |               |                                                    |
|----------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|---------|--------------|---|-----|------------------------|------|---------|-----------------------------------|------|------|-----------------------------|------|---------------|-------------|-----|---------------|----------------------------------------------------|
| Betriebsspannung $U_B$                                               | 10...32 V DC                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                    |         |              |   |     |                        |      |         |                                   |      |      |                             |      |               |             |     |               |                                                    |
| Überspannung<br>Unterspannungserkennung<br>Unterspannungsabschaltung | 36 V für $t \leq 10$ s<br>bei $U_B \leq 10$ V<br>bei $U_B \leq 8$ V                                                                                                                                                                                                                                                                                                                                                                                                            |                                                    |         |              |   |     |                        |      |         |                                   |      |      |                             |      |               |             |     |               |                                                    |
| Stromaufnahme                                                        | $\leq 160$ mA (ohne externe Last bei 24 V DC)                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                    |         |              |   |     |                        |      |         |                                   |      |      |                             |      |               |             |     |               |                                                    |
| CAN Schnittstelle 1<br>Baudrate<br>Kommunikationsprofil              | CAN Interface 2.0 B, ISO 11898<br>50 kBit/s...1 MBit/s (Default 125 kBit/s)<br>CANopen, CiA DS 301 Version 4, CiA DS 401 Version 1.4                                                                                                                                                                                                                                                                                                                                           |                                                    |         |              |   |     |                        |      |         |                                   |      |      |                             |      |               |             |     |               |                                                    |
| Node-ID (CANopen)                                                    | hex 7F (= dez 127)                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                    |         |              |   |     |                        |      |         |                                   |      |      |                             |      |               |             |     |               |                                                    |
| CAN Schnittstelle 2<br>Baudrate<br>Kommunikationsprofil              | CAN Interface 2.0 A/B, ISO 11898<br>50 kBit/s...1 MBit/s (Default 125 kBit/s)<br>SAE J 1939 oder freies Protokoll                                                                                                                                                                                                                                                                                                                                                              |                                                    |         |              |   |     |                        |      |         |                                   |      |      |                             |      |               |             |     |               |                                                    |
| Serielle Schnittstelle<br>Baudrate<br>Topologie<br>Protokoll         | RS-232 C<br>9,6 / 19,2 / 28,8 / 38,4 / 57,6 kBit/s (Default 57,6 kBit/s)<br>point-to-point (max. 2 Teilnehmer); Master-Slave-Verbindung<br>Vordefiniertes ifm-Protokoll (INTELHEX)                                                                                                                                                                                                                                                                                             |                                                    |         |              |   |     |                        |      |         |                                   |      |      |                             |      |               |             |     |               |                                                    |
| Prozessor                                                            | CMOS-Microcontroller 16 Bit C167CS<br>Taktfrequenz 20/40 MHz                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                    |         |              |   |     |                        |      |         |                                   |      |      |                             |      |               |             |     |               |                                                    |
| Geräteüberwachung                                                    | Unterspannungsüberwachung<br>Watchdogfunktion<br>Checksummenprüfung für Programm und System<br>Übertemperaturüberwachung                                                                                                                                                                                                                                                                                                                                                       |                                                    |         |              |   |     |                        |      |         |                                   |      |      |                             |      |               |             |     |               |                                                    |
| Prozessüberwachungskonzept                                           | Zweiter Abschaltweg für jeweils 12 Ausgänge<br>über Überwachungsrelais, nach EN 954                                                                                                                                                                                                                                                                                                                                                                                            |                                                    |         |              |   |     |                        |      |         |                                   |      |      |                             |      |               |             |     |               |                                                    |
| Programmspeicher                                                     | 768 KByte Flash vom Anwender nutzbar (+ 832 KByte für erweiterte Funktionen)                                                                                                                                                                                                                                                                                                                                                                                                   |                                                    |         |              |   |     |                        |      |         |                                   |      |      |                             |      |               |             |     |               |                                                    |
| Datenspeicher                                                        | 128 KByte SRAM, 128 KByte Flash                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                    |         |              |   |     |                        |      |         |                                   |      |      |                             |      |               |             |     |               |                                                    |
| Datenspeicher (spannungsausfallsicher)                               | 1024 Byte (Retain-Daten), 16 KByte (allg. Daten)                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                    |         |              |   |     |                        |      |         |                                   |      |      |                             |      |               |             |     |               |                                                    |
| Status-Anzeige                                                       | Dreifarben-LED (R/G/B)                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                    |         |              |   |     |                        |      |         |                                   |      |      |                             |      |               |             |     |               |                                                    |
| Betriebszustände (Status-LED)                                        | <table><tr><th>LED-Farbe</th><th>Zustand</th><th>Beschreibung</th></tr><tr><td>–</td><td>Aus</td><td>keine Betriebsspannung</td></tr><tr><td>Gelb</td><td>1 x Ein</td><td>Initialisierung oder Reset Checks</td></tr><tr><td>Grün</td><td>5 Hz</td><td>kein Betriebssystem geladen</td></tr><tr><td>Grün</td><td>2,0 Hz<br/>Ein</td><td>Run<br/>Stop</td></tr><tr><td>Rot</td><td>2,0 Hz<br/>Ein</td><td>Run mit Fehler<br/>Fatal Error oder Stop mit Fehler</td></tr></table> | LED-Farbe                                          | Zustand | Beschreibung | – | Aus | keine Betriebsspannung | Gelb | 1 x Ein | Initialisierung oder Reset Checks | Grün | 5 Hz | kein Betriebssystem geladen | Grün | 2,0 Hz<br>Ein | Run<br>Stop | Rot | 2,0 Hz<br>Ein | Run mit Fehler<br>Fatal Error oder Stop mit Fehler |
| LED-Farbe                                                            | Zustand                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Beschreibung                                       |         |              |   |     |                        |      |         |                                   |      |      |                             |      |               |             |     |               |                                                    |
| –                                                                    | Aus                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | keine Betriebsspannung                             |         |              |   |     |                        |      |         |                                   |      |      |                             |      |               |             |     |               |                                                    |
| Gelb                                                                 | 1 x Ein                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Initialisierung oder Reset Checks                  |         |              |   |     |                        |      |         |                                   |      |      |                             |      |               |             |     |               |                                                    |
| Grün                                                                 | 5 Hz                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | kein Betriebssystem geladen                        |         |              |   |     |                        |      |         |                                   |      |      |                             |      |               |             |     |               |                                                    |
| Grün                                                                 | 2,0 Hz<br>Ein                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Run<br>Stop                                        |         |              |   |     |                        |      |         |                                   |      |      |                             |      |               |             |     |               |                                                    |
| Rot                                                                  | 2,0 Hz<br>Ein                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Run mit Fehler<br>Fatal Error oder Stop mit Fehler |         |              |   |     |                        |      |         |                                   |      |      |                             |      |               |             |     |               |                                                    |
|                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                    |         |              |   |     |                        |      |         |                                   |      |      |                             |      |               |             |     |               |                                                    |
| Prüfnormen und Bestimmungen                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                    |         |              |   |     |                        |      |         |                                   |      |      |                             |      |               |             |     |               |                                                    |
| Klimatest                                                            | Feuchte Wärme nach EN 60068-2-30, Test Db<br>( $\leq 95\%$ rel. Luftfeuchtigkeit, nicht kondensierend)<br>Salznebelsprühtest nach EN 60068-2-52, Test Kb, Schärfegrad 3<br>Schutzartprüfung nach EN 60529                                                                                                                                                                                                                                                                      |                                                    |         |              |   |     |                        |      |         |                                   |      |      |                             |      |               |             |     |               |                                                    |
| Mechanische Festigkeit                                               | Schwingen nach EN 60068-2-6, Test Fc<br>Schocken nach EN 60068-2-27, Test Ea<br>Schocken im Betrieb nach EN 60068-2-29, Test Eb                                                                                                                                                                                                                                                                                                                                                |                                                    |         |              |   |     |                        |      |         |                                   |      |      |                             |      |               |             |     |               |                                                    |
| Störfestigkeit gegen leitungsgebundene Störungen                     | nach ISO 7637-2, Impulse 2, 3a, 3b, Schärfegrad 4, Funktionszustand A<br>nach ISO 7637-2, Impuls 5, Schärfegrad 1, Funktionszustand A<br>nach ISO 7637-2, Impuls 1, Schärfegrad 4, Funktionszustand C                                                                                                                                                                                                                                                                          |                                                    |         |              |   |     |                        |      |         |                                   |      |      |                             |      |               |             |     |               |                                                    |
| Störfestigkeit gegen Fremdfeld                                       | nach Richtlinie 95/54/EG mit 100 V/m (e1-Typgenehmigung)<br>und EN 61000-6-2 :2001 (CE)                                                                                                                                                                                                                                                                                                                                                                                        |                                                    |         |              |   |     |                        |      |         |                                   |      |      |                             |      |               |             |     |               |                                                    |
| Störabstrahlung                                                      | nach Richtlinie 95/54/EG (e1-Typgenehmigung)<br>und EN 61000-6-3 :2001 (CE)                                                                                                                                                                                                                                                                                                                                                                                                    |                                                    |         |              |   |     |                        |      |         |                                   |      |      |                             |      |               |             |     |               |                                                    |
| Prüfungen für die Bahnzulassung                                      | nach BN 411 002 (DIN EN 50155 Pkt. 10.2)                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                    |         |              |   |     |                        |      |         |                                   |      |      |                             |      |               |             |     |               |                                                    |
|                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                    |         |              |   |     |                        |      |         |                                   |      |      |                             |      |               |             |     |               |                                                    |



**CR0020**

**Kennwerte der Eingänge**

**Digital-/Analog-Eingänge** (B<sub>L</sub>, A)

%IW03...10  
%IX0.00...07  
konfigurierbar als...

■ Spannungseingänge

Eingangsspannung 0...10/32 V  
Auflösung 12 Bit  
Genauigkeit ±1,0% FS  
Eingangswiderstand 50/30 kΩ  
Eingangsfrequenz 50 Hz

■ Stromeingänge

Eingangsstrom 0/4...20 mA  
Auflösung 12 Bit  
Genauigkeit ±1,0% FS  
Eingangswiderstand 400 Ω  
Eingangsfrequenz 50 Hz

■ Digitaleingänge für positive Gebersignale, diagnosefähig \*)

Einschaltpegel 0,7 U<sub>B</sub>  
Ausschaltpegel 0,4 U<sub>B</sub>  
Eingangswiderstand 30 kΩ  
Eingangsfrequenz 50 Hz

**Digital-Eingänge** (B<sub>L</sub>)

%IX0.08...11  
%IX1.00...03  
konfigurierbar als...

■ Digitaleingänge für positive Gebersignale

Einschaltpegel 0,43...0,73 U<sub>B</sub>  
Ausschaltpegel 0,29 U<sub>B</sub>  
Eingangswiderstand 3,21 kΩ  
Eingangsfrequenz 50 Hz

**Digital-Eingänge** (B<sub>L</sub>, I<sub>L</sub>)

%IX0.12...15  
konfigurierbar als...

■ Digitaleingänge für positive Gebersignale, diagnosefähig \*)

Einschaltpegel 0,7 U<sub>B</sub>  
Ausschaltpegel 0,4 U<sub>B</sub>  
Eingangswiderstand 2,86 kΩ  
Eingangsfrequenz 50 Hz

■ Frequenzeingänge für positive Gebersignale

diagnosefähig; Auswertung mit Komperatorschaltung  
Einschaltpegel 0,43...0,73 U<sub>B</sub>  
Ausschaltpegel 0,29 U<sub>B</sub>  
Eingangswiderstand 2,86 kΩ  
Eingangsfrequenz max. 50 kHz

**Digital-Eingänge** (B<sub>LH</sub>, I<sub>L</sub>)

%IX1.04...07  
konfigurierbar als...

■ Digitaleingänge für positive/negative Gebersignale, positiv diagnosefähig \*)

Einschaltpegel 0,7 U<sub>B</sub>  
Ausschaltpegel 0,4 U<sub>B</sub>  
Eingangswiderstand 3,21 kΩ  
Eingangsfrequenz 50 Hz

■ Frequenzeingänge für positive Gebersignale

diagnosefähig; Auswertung mit Komperatorschaltung  
Einschaltpegel 0,43...0,73 U<sub>B</sub>  
Ausschaltpegel 0,29 U<sub>B</sub>  
Eingangswiderstand 3,21 kΩ  
Eingangsfrequenz max. 1 kHz

**Digital-Eingänge** (B<sub>LH</sub>)

%IX1.08...15  
konfigurierbar als...

■ Digitaleingänge für positive/negative Gebersignale, positiv diagnosefähig \*)

Einschaltpegel 0,7 U<sub>B</sub>  
Ausschaltpegel 0,4 U<sub>B</sub>  
Eingangswiderstand 3,21 kΩ  
Eingangsfrequenz 50 Hz

**Digital-Eingänge** (B<sub>L</sub>)

%IX2.00...07  
konfigurierbar als...

■ Digitaleingänge für positive Gebersignale, diagnosefähig \*)

Einschaltpegel 0,43...0,73 U<sub>B</sub>  
Ausschaltpegel 0,29 U<sub>B</sub>  
Eingangswiderstand 3,21 kΩ  
Eingangsfrequenz 50 Hz

**Test-Eingang**

Für die Dauer des Testbetriebes (z.B. zur Programmierung), muss der Anschluss mit VBB<sub>5</sub> (10...32 V DC) verbunden werden.  
Für den „RUN“-Betrieb bleibt der Test-Eingang unbeschaltet.  
Eingangswiderstand 3,21 kΩ

\*) NAMUR-Eingänge

■ Diagnosefähige Digitaleingänge können in Verbindung mit einer externen Widerstandsbeschaltung als NAMUR-Eingänge verwendet werden.  
Anschlussspannung 5...25 V; z.B. ifm NAMUR-Sensoren NT5001...NN5002

## CR0020

### Kennwerte der Ausgänge

**Ausgänge** (B<sub>H</sub>, PWM, PWM<sub>I</sub>)  
%QX0.00...07  
konfigurierbar als...

- Halbleiterausgänge, diagnosefähig  
plusschaltend (High-Side), kurzschluss- und überlastfest

|                  |                            |
|------------------|----------------------------|
| Schaltspannung   | 10...32 V DC               |
| Schaltstrom      | max. 4 A                   |
| Ausgangsfrequenz | max. 100 Hz (lastabhängig) |

|                                               |                               |
|-----------------------------------------------|-------------------------------|
| ■ PWM-Ausgänge, Diagnose über Stromrücklesung |                               |
| PWM-Frequenz                                  | max. 250 Hz                   |
| Tastverhältnis                                | 1...99 %                      |
| Auflösung                                     | abhängig von der PWM-Frequenz |
| Laststrom                                     | max. 4 A                      |

|                                                                 |                                                                                |
|-----------------------------------------------------------------|--------------------------------------------------------------------------------|
| <b>■ Stromgeregelter Ausgang, Diagnose über Stromrücklesung</b> |                                                                                |
| Laststrom                                                       | 0,1...4 A                                                                      |
| Lastwiderstand                                                  | min. 3 $\Omega$ (bei $U_B = 12$ V DC)<br>min. 6 $\Omega$ (bei $U_B = 24$ V DC) |
| Einstellauflösung                                               | 1 mA                                                                           |
| Nutzauflösung                                                   | 5 mA                                                                           |
| Genauigkeit                                                     | $\pm 2\%$ FS                                                                   |

**Ausgänge** (B<sub>H</sub>)  
%QX0.08...15  
konfigurierbar als...

|                                                                                                 |                            |
|-------------------------------------------------------------------------------------------------|----------------------------|
| ■ Halbleiterausgänge, diagnosefähig<br>plusschaltend (High-Side), kurzschluss- und überlastfest |                            |
| Schaltspannung                                                                                  | 10...32 V DC               |
| Schaltstrom                                                                                     | max. 2 A                   |
| Ausgangsfrequenz                                                                                | max. 100 Hz (lastabhängig) |

**Ausgänge** (B<sub>H</sub>, PWM)  
%QX1.00, 03, 04, 07  
konfigurierbar als...

|                                                                                                 |                            |
|-------------------------------------------------------------------------------------------------|----------------------------|
| ■ Halbleiterausgänge, diagnosefähig<br>plusschaltend (High-Side), kurzschluss- und überlastfest |                            |
| Schaltspannung                                                                                  | 10...32 V DC               |
| Schaltstrom                                                                                     | max. 4 A                   |
| Ausgangsfrequenz                                                                                | max. 100 Hz (lastabhängig) |

|                |                               |
|----------------|-------------------------------|
| ■ PWM-Ausgänge |                               |
| PWM-Frequenz   | max. 250 Hz                   |
| Tastverhältnis | 1...99 %                      |
| Auflösung      | abhängig von der PWM-Frequenz |
| Laststrom      | max. 4 A                      |

**Ausgänge** (B<sub>L/H</sub>)  
%QX1.01, 02, 05, 06  
konfigurierbar als...

|                                                                                                             |                            |
|-------------------------------------------------------------------------------------------------------------|----------------------------|
| ■ Halbleiterausgänge, diagnosefähig<br>plus-/minusschaltend (High-/Low-Side), kurzschluss- und überlastfest |                            |
| Schaltspannung                                                                                              | 10...32 V DC               |
| Schaltstrom                                                                                                 | max. 4 A                   |
| Ausgangsfrequenz                                                                                            | max. 100 Hz (lastabhängig) |

**Überlastfestigkeit**  
(gültig für alle Ausgänge)

max. 5 Minuten (bei 100%)

### Interne Relaisausgänge für die potentialgetrennte Abschaltung der Ausgänge

Schließerkontakte in Reihe zu 2 x 12 Halbleiterausgängen (= 2 Gruppen).  
Zwangssteuerung durch Hardware und zusätzliche Steuerung durch  
Anwenderprogramm.

Die Relais sollten prinzipiell lastfrei geschaltet werden!

|                       |                     |
|-----------------------|---------------------|
| Summenstrom           | max. 12 A je Gruppe |
| Schaltstrom           | 0,1...15 A          |
| Überlaststrom         | 20 A                |
| Schaltzahl (lastfrei) | $\geq 10^6$         |
| Schalt-Zeitkonstante  | $\leq 3$ ms         |

### Ausgang Error

|                      |                           |
|----------------------|---------------------------|
| ■ Halbleiterausgang, | plusschaltend (High-Side) |
| Schaltspannung       | 10...32 V DC              |
| Schaltstrom          | max. 100 mA               |
| Überlaststrom        | 0,5 A                     |
| Schaltfunktion       | OFF (0 V) bei Fehler      |

## Abkürzungen

|                  |                                    |
|------------------|------------------------------------|
| A                | = analog                           |
| B <sub>H</sub>   | = binär High-Side                  |
| B <sub>L</sub>   | = binär Low-Side                   |
| I <sub>H</sub>   | = Impuls High-Side                 |
| I <sub>L</sub>   | = Impuls Low-Side                  |
| PWM              | = Pulsweitenmodulation             |
| PWM <sub>I</sub> | = stromgeregelter Ausgang          |
| %IwX             | = IEC-Adresse für analogen Eingang |
| %IX0.xx          | = IEC-Adresse für binären Eingang  |
| %QX0.xx          | = IEC-Adresse für binären Ausgang  |



**ANSCHLUSSBELEGUNG / wiring / branchement**

| Pin | Potential                       | Bezeichnung / description                                 | Bemerkung / note                      |
|-----|---------------------------------|-----------------------------------------------------------|---------------------------------------|
| 23  | VBB <sub>S</sub> (10...32 V DC) | Versorgung Sensoren und Modul / supply sensors and module |                                       |
| 05  | VBB <sub>O</sub> (10...32 V DC) | Versorgung Ausgänge / supply outputs                      | relaisgeschaltet / relay switched (1) |
| 34  | VBB <sub>R</sub> (10...32 V DC) | Versorgung über Relais / supply via relay                 | relaisgeschaltet / relay switched (2) |
| 01  | GND <sub>S</sub>                | Masse Sensoren und Modul / ground sensors and module      |                                       |
| 15  | GND <sub>O</sub>                | Masse Ausgänge / ground outputs                           |                                       |
| 12  | GND <sub>A</sub>                | Masse Analogeingänge / ground analogue outputs            |                                       |

**CAN, RS-232, ERROR, TEST**

| Pin | Potential          | Bezeichnung / description                                  | Bemerkung / note         |
|-----|--------------------|------------------------------------------------------------|--------------------------|
| 14  | CAN 1 <sub>H</sub> | CAN-Interface 1 (High)                                     |                          |
| 32  | CAN 1 <sub>L</sub> | CAN-Interface 1 (Low)                                      |                          |
| 26  | CAN 2 <sub>H</sub> | CAN-Interface 2 (High)                                     | SAE J 1939               |
| 25  | CAN 2 <sub>L</sub> | CAN-Interface 2 (Low)                                      | SAE J 1939               |
| 33  | GND                | Masse / ground (RS-232/CAN)                                |                          |
| 06  | RxD                | RS-232 Interface (Programmierung / programming)            | Pin 03, PC D-Sub (9 pin) |
| 07  | TxD                | RS-232 Interface (Programmierung / programming)            | Pin 02, PC D-Sub (9 pin) |
| 13  | ERROR              | Fehlerausgang B <sub>H</sub> / error output B <sub>H</sub> |                          |
| 24  | TEST               | TEST-Eingang / test input                                  |                          |

**EIN-/AUSGÄNGE / inputs/outputs / entrées/sorties**

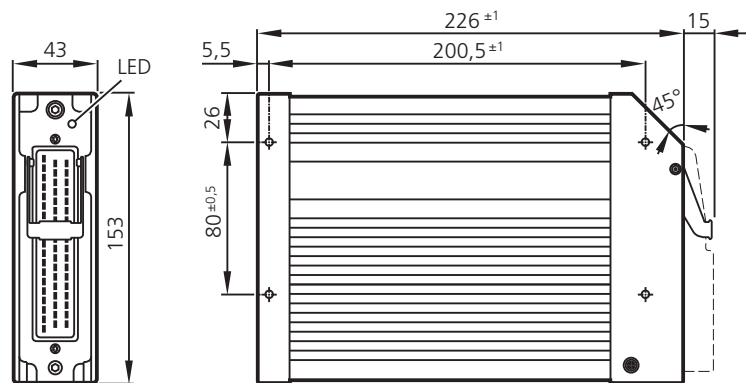
| Pin<br>pin | EINGÄNGE<br>INPUTS | Konfiguration<br>configuration        | AUSGÄNGE<br>OUTPUTS | Konfiguration<br>configuration      | diagnosefähig*<br>diagnostic capability*<br>INPUT / OUTPUT | relaisgeschaltet<br>relay switched |
|------------|--------------------|---------------------------------------|---------------------|-------------------------------------|------------------------------------------------------------|------------------------------------|
| 08         | %IX0.00 / %IW03    | B <sub>L</sub> A                      | –                   | –                                   | • / –                                                      |                                    |
| 27         | %IX0.01 / %IW04    | B <sub>L</sub> A                      | –                   | –                                   | • / –                                                      |                                    |
| 09         | %IX0.02 / %IW05    | B <sub>L</sub> A                      | –                   | –                                   | • / –                                                      |                                    |
| 28         | %IX0.03 / %IW06    | B <sub>L</sub> A                      | –                   | –                                   | • / –                                                      |                                    |
| 10         | %IX0.04 / %IW07    | B <sub>L</sub> A                      | –                   | –                                   | • / –                                                      |                                    |
| 29         | %IX0.05 / %IW08    | B <sub>L</sub> A                      | –                   | –                                   | • / –                                                      |                                    |
| 11         | %IX0.06 / %IW09    | B <sub>L</sub> A                      | –                   | –                                   | • / –                                                      |                                    |
| 30         | %IX0.07 / %IW10    | B <sub>L</sub> A                      | –                   | –                                   | • / –                                                      |                                    |
| 44         | %IX0.08            | B <sub>L</sub>                        | %QX0.00             | B <sub>H</sub> PWM PWM <sub>I</sub> | – / •                                                      | VBB <sub>O</sub> (1)               |
| 45         | %IX0.09            | B <sub>L</sub>                        | %QX0.01             | B <sub>H</sub> PWM PWM <sub>I</sub> | – / •                                                      | VBB <sub>O</sub> (1)               |
| 46         | %IX0.10            | B <sub>L</sub>                        | %QX0.02             | B <sub>H</sub> PWM PWM <sub>I</sub> | – / •                                                      | VBB <sub>O</sub> (1)               |
| 47         | %IX0.11            | B <sub>L</sub>                        | %QX0.03             | B <sub>H</sub> PWM PWM <sub>I</sub> | – / •                                                      | VBB <sub>O</sub> (1)               |
| 20         | %IX0.12            | B <sub>L</sub> I <sub>L</sub> (FRQ 0) | –                   | –                                   | • / –                                                      |                                    |
| 02         | %IX0.13            | B <sub>L</sub> I <sub>L</sub> (FRQ 1) | –                   | –                                   | • / –                                                      |                                    |
| 21         | %IX0.14            | B <sub>L</sub> I <sub>L</sub> (FRQ 2) | –                   | –                                   | • / –                                                      |                                    |
| 38         | %IX0.15            | B <sub>L</sub> I <sub>L</sub> (FRQ 3) | –                   | –                                   | • / –                                                      |                                    |
| 36         | %IX1.00            | B <sub>L</sub>                        | %QX0.04             | B <sub>H</sub> PWM PWM <sub>I</sub> | – / •                                                      | VBB <sub>R</sub> (2)               |
| 54         | %IX1.01            | B <sub>L</sub>                        | %QX0.05             | B <sub>H</sub> PWM PWM <sub>I</sub> | – / •                                                      | VBB <sub>R</sub> (2)               |
| 17         | %IX1.02            | B <sub>L</sub>                        | %QX0.06             | B <sub>H</sub> PWM PWM <sub>I</sub> | – / •                                                      | VBB <sub>R</sub> (2)               |
| 53         | %IX1.03            | B <sub>L</sub>                        | %QX0.07             | B <sub>H</sub> PWM PWM <sub>I</sub> | – / •                                                      | VBB <sub>R</sub> (2)               |
| 19         | %IX1.04            | B <sub>LH</sub> I <sub>L</sub> (CYL0) | –                   | –                                   | • / –                                                      |                                    |
| 55         | %IX1.05            | B <sub>LH</sub> I <sub>L</sub> (CYL1) | –                   | –                                   | • / –                                                      |                                    |
| 18         | %IX1.06            | B <sub>LH</sub> I <sub>L</sub> (CYL2) | –                   | –                                   | • / –                                                      |                                    |
| 37         | %IX1.07            | B <sub>LH</sub> I <sub>L</sub> (CYL3) | –                   | –                                   | • / –                                                      |                                    |
| 39         | %IX1.08            | B <sub>LH</sub>                       | %QX0.08             | B <sub>H</sub>                      | • / •                                                      | VBB <sub>O</sub> (1)               |
| 03         | %IX1.09            | B <sub>LH</sub>                       | %QX0.09             | B <sub>H</sub>                      | • / •                                                      | VBB <sub>O</sub> (1)               |
| 40         | %IX1.10            | B <sub>LH</sub>                       | %QX0.10             | B <sub>H</sub>                      | • / •                                                      | VBB <sub>O</sub> (1)               |
| 22         | %IX1.11            | B <sub>LH</sub>                       | %QX0.11             | B <sub>H</sub>                      | • / •                                                      | VBB <sub>O</sub> (1)               |
| 41         | %IX1.12            | B <sub>LH</sub>                       | %QX0.12             | B <sub>H</sub>                      | • / •                                                      | VBB <sub>O</sub> (1)               |
| 42         | %IX1.13            | B <sub>LH</sub>                       | %QX0.13             | B <sub>H</sub>                      | • / •                                                      | VBB <sub>O</sub> (1)               |
| 43         | %IX1.14            | B <sub>LH</sub>                       | %QX0.14             | B <sub>H</sub>                      | • / •                                                      | VBB <sub>O</sub> (1)               |
| 04         | %IX1.15            | B <sub>LH</sub>                       | %QX0.15             | B <sub>H</sub>                      | • / •                                                      | VBB <sub>O</sub> (1)               |
| 48         | %IX2.00            | B <sub>L</sub>                        | %QX1.00             | B <sub>H</sub> PWM                  | • / •                                                      | VBB <sub>R</sub> (2)               |
| 49         | %IX2.01            | B <sub>L</sub>                        | %QX1.01             | B <sub>H/L</sub> H-Bridge           | • / •                                                      | VBB <sub>R</sub> (2)               |
| 31         | %IX2.02            | B <sub>L</sub>                        | %QX1.02             | B <sub>H/L</sub> H-Bridge           | • / •                                                      | VBB <sub>R</sub> (2)               |
| 50         | %IX2.03            | B <sub>L</sub>                        | %QX1.03             | B <sub>H</sub> PWM                  | • / •                                                      | VBB <sub>R</sub> (2)               |
| 51         | %IX2.04            | B <sub>L</sub>                        | %QX1.04             | B <sub>H</sub> PWM                  | • / •                                                      | VBB <sub>R</sub> (2)               |
| 52         | %IX2.05            | B <sub>L</sub>                        | %QX1.05             | B <sub>H/L</sub> H-Bridge           | • / •                                                      | VBB <sub>R</sub> (2)               |
| 16         | %IX2.06            | B <sub>L</sub>                        | %QX1.06             | B <sub>H/L</sub> H-Bridge           | • / •                                                      | VBB <sub>R</sub> (2)               |
| 35         | %IX2.07            | B <sub>L</sub>                        | %QX1.07             | B <sub>H</sub> PWM                  | • / •                                                      | VBB <sub>R</sub> (2)               |

Doppelbelegung der Ein-/Ausgänge beachten.

\*) nur positive Gebersignale diagnosefähig

## CR0020

Mobile controller  
ClassicController  
2nd CAN interface  
for gateway function  
according to SAE J 1939  
Programming  
according to IEC 61131-3  
Operating voltage  
10...32 V DC



e1

### Technical data

Housing

Dimensions (H x W x D)

Mounting

Connection

Weight

Housing / storage temperature

Protection

**Input/output channels**  
total

**Inputs**

possible configurations

\*) only positive sensor signals  
with diagnostic capability

**Outputs**

possible configurations

Abbreviations

A = analogue  
B<sub>H</sub> = binary High Side  
B<sub>L</sub> = binary Low Side  
FRQ/CYL = frequency inputs  
I<sub>H</sub> = pulse High Side  
I<sub>L</sub> = pulse Low Side  
PWM = pulse width modulation  
PWM<sub>I</sub> = current-controlled output  
%IWx = IEC address for analogue input  
%IX0.xx = IEC address for binary input  
%QX0.xx = IEC address for binary output

### Controller as black box system

for the implementation of a central or decentralised system design

closed, screened metal housing with flange fastening

153 x 226 x 43 mm

screw connection by means of 4 M5xL screws according to DIN 7500 or DIN 7984  
mounting position horizontal or vertical to the mounting wall

55-pin connector, latched, protected against reverse polarity, type AMP or Framatome  
AMP junior timer contacts, crimp connection 0.5/2.5 mm<sup>2</sup>

1.2 kg

–40...85 °C (depending on the load) / –40...85 °C

IP 67 (for inserted plug with individually sealed cores e.g. EC2084)

max. 40 (the total number which is available depends  
on the wiring and configuration of the controller)

max. 40 (corr. to 0 outputs)

| Number  | Signal               | Version                                                                                               |                                   |
|---------|----------------------|-------------------------------------------------------------------------------------------------------|-----------------------------------|
| 8<br>or | digital<br>analogue  | for positive sensor signals, with diagnostic capability<br>0...10/32 V DC, 0/4...20 mA or ratiometric | B <sub>L</sub><br>A               |
| 8       | digital              | for positive sensor signals                                                                           | B <sub>L</sub>                    |
| 4<br>or | digital<br>frequency | for positive sensor signals, with diagnostic capability<br>max. 50 kHz                                | B <sub>L</sub><br>I <sub>L</sub>  |
| 4<br>or | digital<br>frequency | for positive/negative sensor signals, with diagnostic capability *<br>max. 1 kHz                      | B <sub>LH</sub><br>I <sub>L</sub> |
| 8       | digital              | for positive/negative sensor signals, with diagnostic capability *                                    | B <sub>LH</sub>                   |
| 8       | digital              | for positive sensor signals, with diagnostic capability                                               | B <sub>L</sub>                    |

max. 24 (corr. to 16 inputs)

| Number        | Signal                               | Version                                                                                                     |                                           |
|---------------|--------------------------------------|-------------------------------------------------------------------------------------------------------------|-------------------------------------------|
| 8<br>or<br>or | digital<br>PWM<br>current-controlled | positive switching (High Side), with diagnostic capability<br>PWM frequency 20...250 Hz<br>0,1...4 A        | B <sub>H</sub><br>PWM<br>PWM <sub>I</sub> |
| 8             | digital                              | positive switching (High Side), with diagnostic capability                                                  | B <sub>H</sub>                            |
| 4<br>or       | digital<br>PWM                       | positive switching (High Side), with diagnostic capability<br>PWM frequency 20...250 Hz                     | B <sub>H</sub><br>PWM                     |
| 4             | digital                              | positive/negative switching (High/Low Side)<br>with diagnostic capability<br>(can also be used as H bridge) | B <sub>H/L</sub><br>H bridge              |



| CR0020                                             | Technical data                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                  |        |             |   |     |                      |        |        |                                |       |      |                            |       |              |             |     |              |                                                  |
|----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|--------|-------------|---|-----|----------------------|--------|--------|--------------------------------|-------|------|----------------------------|-------|--------------|-------------|-----|--------------|--------------------------------------------------|
| Operating voltage U <sub>B</sub>                   | 10...32 V DC                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                  |        |             |   |     |                      |        |        |                                |       |      |                            |       |              |             |     |              |                                                  |
| overvoltage                                        | 36 V for t ≤ 10 s                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                  |        |             |   |     |                      |        |        |                                |       |      |                            |       |              |             |     |              |                                                  |
| undervoltage detection                             | for U <sub>B</sub> ≤ 10 V                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                  |        |             |   |     |                      |        |        |                                |       |      |                            |       |              |             |     |              |                                                  |
| switching-off in case of undervoltage              | for U <sub>B</sub> ≤ 8 V                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                  |        |             |   |     |                      |        |        |                                |       |      |                            |       |              |             |     |              |                                                  |
| Current consumption                                | ≤ 160 mA (without external load at 24 V DC)                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                  |        |             |   |     |                      |        |        |                                |       |      |                            |       |              |             |     |              |                                                  |
| CAN interface 1                                    | CAN interface 2.0 B, ISO 11898                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                  |        |             |   |     |                      |        |        |                                |       |      |                            |       |              |             |     |              |                                                  |
| Baud rate                                          | 50 kbits/s...1 Mbits/s (default setting 125 kbits/s)                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                  |        |             |   |     |                      |        |        |                                |       |      |                            |       |              |             |     |              |                                                  |
| Communication profile                              | CANopen, CiA DS 301 version 4, CiA DS 401 version 1.4                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                  |        |             |   |     |                      |        |        |                                |       |      |                            |       |              |             |     |              |                                                  |
| Node-ID (CANopen)                                  | hex 7F (= dec. 127)                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                  |        |             |   |     |                      |        |        |                                |       |      |                            |       |              |             |     |              |                                                  |
| CAN interface 2                                    | CAN interface 2.0 A/B, ISO 11898                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                  |        |             |   |     |                      |        |        |                                |       |      |                            |       |              |             |     |              |                                                  |
| Baud rate                                          | 50 kbits/s...1 Mbit/s (default setting 125 kbits/s)                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                  |        |             |   |     |                      |        |        |                                |       |      |                            |       |              |             |     |              |                                                  |
| Communication profile                              | SAE J 1939 or free protocol                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                  |        |             |   |     |                      |        |        |                                |       |      |                            |       |              |             |     |              |                                                  |
| Serial interface                                   | RS-232 C                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                  |        |             |   |     |                      |        |        |                                |       |      |                            |       |              |             |     |              |                                                  |
| Baud rate                                          | 9.6 / 19.2 / 28.8 / 38.4 / 57.6 kBit/s (default setting 57.6 kbits/s)                                                                                                                                                                                                                                                                                                                                                                                                  |                                                  |        |             |   |     |                      |        |        |                                |       |      |                            |       |              |             |     |              |                                                  |
| Topology                                           | point-to-point (max. 2 participants); master-slave connection                                                                                                                                                                                                                                                                                                                                                                                                          |                                                  |        |             |   |     |                      |        |        |                                |       |      |                            |       |              |             |     |              |                                                  |
| Protocol                                           | predefined ifm protocol (INTELHEX)                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                  |        |             |   |     |                      |        |        |                                |       |      |                            |       |              |             |     |              |                                                  |
| Processor                                          | CMOS microcontroller 16 bits C167CS<br>cycle frequency 20/40 MHz                                                                                                                                                                                                                                                                                                                                                                                                       |                                                  |        |             |   |     |                      |        |        |                                |       |      |                            |       |              |             |     |              |                                                  |
| Device monitoring                                  | undervoltage monitoring<br>watchdog function<br>check sum test for program and system<br>excess temperature monitoring                                                                                                                                                                                                                                                                                                                                                 |                                                  |        |             |   |     |                      |        |        |                                |       |      |                            |       |              |             |     |              |                                                  |
| Process monitoring concept                         | Two relays according to EN 954<br>monitor two groups of 12 outputs each                                                                                                                                                                                                                                                                                                                                                                                                |                                                  |        |             |   |     |                      |        |        |                                |       |      |                            |       |              |             |     |              |                                                  |
| Program memory                                     | 768 Kbytes Flash can be used by the user (+ 832 Kbytes for extended functions)                                                                                                                                                                                                                                                                                                                                                                                         |                                                  |        |             |   |     |                      |        |        |                                |       |      |                            |       |              |             |     |              |                                                  |
| Data memory                                        | 128 Kbytes SRAM, 128 Kbytes Flash                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                  |        |             |   |     |                      |        |        |                                |       |      |                            |       |              |             |     |              |                                                  |
| Data memory (protected in case of power failure)   | 1024 bytes (retain data), 16 Kbytes (general data)                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                  |        |             |   |     |                      |        |        |                                |       |      |                            |       |              |             |     |              |                                                  |
| Status indication                                  | three-colour LED (R/G/B)                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                  |        |             |   |     |                      |        |        |                                |       |      |                            |       |              |             |     |              |                                                  |
| Operating states (Status-LED)                      | <table><tr><th>LED colour</th><th>Status</th><th>Description</th></tr><tr><td>–</td><td>off</td><td>no operating voltage</td></tr><tr><td>yellow</td><td>1 x on</td><td>initialisation or reset checks</td></tr><tr><td>green</td><td>5 Hz</td><td>no operating system loaded</td></tr><tr><td>green</td><td>2.0 Hz<br/>on</td><td>Run<br/>Stop</td></tr><tr><td>red</td><td>2.0 Hz<br/>on</td><td>Run with error<br/>fatal error or stop with error</td></tr></table> | LED colour                                       | Status | Description | – | off | no operating voltage | yellow | 1 x on | initialisation or reset checks | green | 5 Hz | no operating system loaded | green | 2.0 Hz<br>on | Run<br>Stop | red | 2.0 Hz<br>on | Run with error<br>fatal error or stop with error |
| LED colour                                         | Status                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Description                                      |        |             |   |     |                      |        |        |                                |       |      |                            |       |              |             |     |              |                                                  |
| –                                                  | off                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | no operating voltage                             |        |             |   |     |                      |        |        |                                |       |      |                            |       |              |             |     |              |                                                  |
| yellow                                             | 1 x on                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | initialisation or reset checks                   |        |             |   |     |                      |        |        |                                |       |      |                            |       |              |             |     |              |                                                  |
| green                                              | 5 Hz                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | no operating system loaded                       |        |             |   |     |                      |        |        |                                |       |      |                            |       |              |             |     |              |                                                  |
| green                                              | 2.0 Hz<br>on                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Run<br>Stop                                      |        |             |   |     |                      |        |        |                                |       |      |                            |       |              |             |     |              |                                                  |
| red                                                | 2.0 Hz<br>on                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Run with error<br>fatal error or stop with error |        |             |   |     |                      |        |        |                                |       |      |                            |       |              |             |     |              |                                                  |
|                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                  |        |             |   |     |                      |        |        |                                |       |      |                            |       |              |             |     |              |                                                  |
| Test standards and regulations                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                  |        |             |   |     |                      |        |        |                                |       |      |                            |       |              |             |     |              |                                                  |
| Climatic test                                      | Damp heat to EN 60068-2-30, test Db<br>(≤ 95% rel. humidity, non-condensing)<br>Salt mist test to EN 60068-2-52, test Kb, severity level 3<br>Degree of protection to EN 60529                                                                                                                                                                                                                                                                                         |                                                  |        |             |   |     |                      |        |        |                                |       |      |                            |       |              |             |     |              |                                                  |
| Mechanical resistance                              | Vibration to EN 60068-2-6, test Fc<br>Shock to EN 60068-2-27, test Ea<br>Bump to EN 60068-2-29, test Eb                                                                                                                                                                                                                                                                                                                                                                |                                                  |        |             |   |     |                      |        |        |                                |       |      |                            |       |              |             |     |              |                                                  |
| Immunity to conducted interference                 | to ISO 7637-2, pulses 2, 3a, 3b, severity level 4, function state A<br>to ISO 7637-2, pulse 5, severity level 1, function state A<br>to ISO 7637-2, pulse 1, severity level 4, function state C                                                                                                                                                                                                                                                                        |                                                  |        |             |   |     |                      |        |        |                                |       |      |                            |       |              |             |     |              |                                                  |
| Immunity to interfering fields                     | directive 95/54/EC at 100 V/m (e1 type approval)<br>and EN 61000-6-2 :2001 (CE)                                                                                                                                                                                                                                                                                                                                                                                        |                                                  |        |             |   |     |                      |        |        |                                |       |      |                            |       |              |             |     |              |                                                  |
| Interference emission                              | directive 95/54/EC (e1 type approval)<br>and EN 61000-6-3 :2001 (CE)                                                                                                                                                                                                                                                                                                                                                                                                   |                                                  |        |             |   |     |                      |        |        |                                |       |      |                            |       |              |             |     |              |                                                  |
| Tests for the approval<br>for railway applications | to BN 411 002 (DIN EN 50155 clause 10.2)                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                  |        |             |   |     |                      |        |        |                                |       |      |                            |       |              |             |     |              |                                                  |



**CR0020**

**Characteristics of the inputs**

**Digital/analogue inputs (B<sub>L</sub>, A)**

%IW03...10  
%IX0.00...07  
can be configured as ...

■ Voltage inputs  
input voltage 0...10/32 V  
resolution 12 bits  
precision ± 1.0% FS  
input resistance 50/30 kΩ  
input frequency 50 Hz

■ Current inputs  
input current 0/4...20 mA  
resolution 12 bits  
precision ± 1.0% FS  
input resistance 400 Ω  
input frequency 50 Hz

■ Digital inputs for positive sensor signals, with diagnostic capability \*)  
switch-on level 0.7 U<sub>B</sub>  
switch-off level 0.4 U<sub>B</sub>  
input resistance 30 kΩ  
input frequency 50 Hz

**Digital inputs (B<sub>L</sub>)**

%IX0.08...11  
%IX1.00...03  
can be configured as ...

■ Digital inputs for positive sensor signals  
switch-on level 0.43...0.73 U<sub>B</sub>  
switch-off level 0.29 U<sub>B</sub>  
input resistance 3.21 kΩ  
input frequency 50 Hz

**Digital inputs (B<sub>L</sub>, I<sub>L</sub>)**

%IX0.12...15  
can be configured as ...

■ Digital inputs for positive sensor signals, with diagnostic capability \*)  
switch-on level 0.7 U<sub>B</sub>  
switch-off level 0.4 U<sub>B</sub>  
input resistance 2.86 kΩ  
input frequency 50 Hz

■ Frequency inputs for positive sensor signals  
with diagnostic capability, evaluation with integrated comparator  
switch-on level 0.43...0.73 U<sub>B</sub>  
switch-off level 0.29 U<sub>B</sub>  
input resistance 2.86 kΩ  
input frequency max. 50 kHz

**Digital inputs (B<sub>LH</sub>, I<sub>L</sub>)**

%IX1.04...07  
can be configured as ...

■ Digital inputs for positive/negative sensor signals, positive with diagnostic capability\*  
switch-on level 0.7 U<sub>B</sub>  
switch-off level 0.4 U<sub>B</sub>  
input resistance 3.21 kΩ  
input frequency 50 Hz

■ Frequency inputs for positive sensor signals  
with diagnostic capability, evaluation with integrated comparator  
switch-on level 0.43...0.73 U<sub>B</sub>  
switch-off level 0.29 U<sub>B</sub>  
input resistance 3.21 kΩ  
input frequency max. 1 kHz

**Digital inputs (B<sub>LH</sub>)**

%IX1.08...15  
can be configured as ...

■ Digital inputs for positive/negative sensor signals, positive with diagnostic capability\*  
switch-on level 0.7 U<sub>B</sub>  
switch-off level 0.4 U<sub>B</sub>  
input resistance 3.21 kΩ  
input frequency 50 Hz

**Digital inputs (B<sub>L</sub>)**

%IX2.00...07  
konfigurierbar als...

■ Digital inputs for positive sensor signals, with diagnostic capability \*)  
switch-on level 0.43...0.73 U<sub>B</sub>  
switch-off level 0.29 U<sub>B</sub>  
input resistance 3.21 kΩ  
input frequency 50 Hz

**Test input**

During the test mode (e.g. programming) the "TEST" connection must be connected to VBB<sub>5</sub> (10...32 V DC).  
For the "RUN" mode the test input must not be connected.  
input resistance 3.21 kΩ

\*) NAMUR inputs

■ Digital inputs with diagnostic capability can be used as NAMUR inputs when used with an external resistor connection.  
supply voltage 5...25 V; e.g. ifm NAMUR sensors NT5001...NN5002



**CR0020**

**Characteristics of the outputs**

**Outputs** (B<sub>H</sub>, PWM, PWM<sub>I</sub>)  
%QX0.00...07  
can be configured as ...

■ Semiconductor outputs, with diagnostic capability  
positive switching (high side), short-circuit and overload protected  
switching voltage 10...32 V DC  
switching current max. 4 A  
output frequency max. 100 Hz (depending on the load)

■ PWM outputs, diagnosis via current feedback  
PWM frequency max. 250 Hz  
mark-to-space ratio 1...99 %  
resolution depends on the PWM frequency  
load current max. 4 A

■ Current-controlled outputs, diagnosis via current feedback  
load current 0,1...4 A  
load resistance min. 3 Ω (at U<sub>B</sub> = 12 V DC)  
min. 6 Ω (at U<sub>B</sub> = 24 V DC)  
setting resolution 1 mA  
control resolution 5 mA  
accuracy ± 2 % FS

**Outputs** (B<sub>H</sub>)  
%QX0.08...15  
can be configured as ...

■ Semiconductor outputs, with diagnostic capability  
positive switching (high side), short-circuit and overload protected  
switching voltage 10...32 V DC  
switching current max. 2 A  
output frequency max. 100 Hz (depending on the load)

**Outputs** (B<sub>H</sub>, PWM)  
%QX1.00, 03, 04, 07  
can be configured as ...

■ Semiconductor outputs, with diagnostic capability  
positive switching (high side), short-circuit and overload protected  
switching voltage 10...32 V DC  
switching current max. 4 A  
output frequency max. 100 Hz (depending on the load)

■ PWM outputs  
PWM frequency max. 250 Hz  
pulse ratio 1...99 %  
resolution depends on the PWM frequency  
load current max. 4 A

**Outputs** (B<sub>L/H</sub>)  
%QX1.01, 02, 05, 06  
can be configured as ...

■ Semiconductor outputs, with diagnostic capability  
positive/negative switching (high/low side), short-circuit and overload protected  
switching voltage 10...32 V DC  
switching current max. 4 A  
output frequency max. 100 Hz (depending on the load)

**Overload protection**  
(valid for all outputs)

max. 5 minutes (at 100%)

**Internal relay outputs**  
for electrically isolated  
deactivation of the outputs

Normally open contacts in series to 2 groups of 12 semiconductor outputs.  
Sustained forcing by means of hardware and additional controlling  
by means of user program.

The relays must always be switched without load!

total current max. 12 A per group  
switching current 0.1...15 A  
overload current 20 A  
number of operating cycles ≥ 10<sup>6</sup> (without load)  
switching-time constant ≤ 3 ms

**Output Error**

■ Semiconductor output, positive switching (high side)  
switching voltage 10...32 V DC  
switching current max. 100 mA  
overload current 0.5 A  
switching function OFF (0 V) in case of an error

Abbreviations

A = analogue  
B<sub>H</sub> = binary High Side  
B<sub>L</sub> = binary Low Side  
FRQ/CYL = frequency inputs  
I<sub>H</sub> = pulse High Side  
I<sub>L</sub> = pulse Low Side  
PWM = pulse width modulation  
PWM<sub>I</sub> = current-controlled output  
%IWx = IEC address for analogue input  
%IX0.xx = IEC address for binary input  
%QX0.xx = IEC address for binary output



**ANSCHLUSSBELEGUNG / wiring / branchement**

| Pin | Potential                       | Bezeichnung / description                                 | Bemerkung / note                      |
|-----|---------------------------------|-----------------------------------------------------------|---------------------------------------|
| 23  | VBB <sub>S</sub> (10...32 V DC) | Versorgung Sensoren und Modul / supply sensors and module |                                       |
| 05  | VBB <sub>O</sub> (10...32 V DC) | Versorgung Ausgänge / supply outputs                      | relaisgeschaltet / relay switched (1) |
| 34  | VBB <sub>R</sub> (10...32 V DC) | Versorgung über Relais / supply via relay                 | relaisgeschaltet / relay switched (2) |
| 01  | GND <sub>S</sub>                | Masse Sensoren und Modul / ground sensors and module      |                                       |
| 15  | GND <sub>O</sub>                | Masse Ausgänge / ground outputs                           |                                       |
| 12  | GND <sub>A</sub>                | Masse Analogeingänge / ground analogue outputs            |                                       |

**CAN, RS-232, ERROR, TEST**

| Pin | Potential          | Bezeichnung / description                                  | Bemerkung / note         |
|-----|--------------------|------------------------------------------------------------|--------------------------|
| 14  | CAN 1 <sub>H</sub> | CAN-Interface 1 (High)                                     |                          |
| 32  | CAN 1 <sub>L</sub> | CAN-Interface 1 (Low)                                      |                          |
| 26  | CAN 2 <sub>H</sub> | CAN-Interface 2 (High)                                     | SAE J 1939               |
| 25  | CAN 2 <sub>L</sub> | CAN-Interface 2 (Low)                                      | SAE J 1939               |
| 33  | GND                | Masse / ground (RS-232/CAN)                                |                          |
| 06  | RxD                | RS-232 Interface (Programmierung / programming)            | Pin 03, PC D-Sub (9 pin) |
| 07  | TxD                | RS-232 Interface (Programmierung / programming)            | Pin 02, PC D-Sub (9 pin) |
| 13  | ERROR              | Fehlerausgang B <sub>H</sub> / error output B <sub>H</sub> |                          |
| 24  | TEST               | TEST-Eingang / test input                                  |                          |

**EIN-/AUSGÄNGE / inputs/outputs / entrées/sorties**

| Pin<br>pin | EINGÄNGE<br>INPUTS | Konfiguration<br>configuration        | AUSGÄNGE<br>OUTPUTS | Konfiguration<br>configuration      | diagnosefähig*<br>diagnostic capability*<br>INPUT / OUTPUT | relaisgeschaltet<br>relay switched |
|------------|--------------------|---------------------------------------|---------------------|-------------------------------------|------------------------------------------------------------|------------------------------------|
| 08         | %IX0.00 / %IW03    | B <sub>L</sub> A                      | –                   | –                                   | • / –                                                      |                                    |
| 27         | %IX0.01 / %IW04    | B <sub>L</sub> A                      | –                   | –                                   | • / –                                                      |                                    |
| 09         | %IX0.02 / %IW05    | B <sub>L</sub> A                      | –                   | –                                   | • / –                                                      |                                    |
| 28         | %IX0.03 / %IW06    | B <sub>L</sub> A                      | –                   | –                                   | • / –                                                      |                                    |
| 10         | %IX0.04 / %IW07    | B <sub>L</sub> A                      | –                   | –                                   | • / –                                                      |                                    |
| 29         | %IX0.05 / %IW08    | B <sub>L</sub> A                      | –                   | –                                   | • / –                                                      |                                    |
| 11         | %IX0.06 / %IW09    | B <sub>L</sub> A                      | –                   | –                                   | • / –                                                      |                                    |
| 30         | %IX0.07 / %IW10    | B <sub>L</sub> A                      | –                   | –                                   | • / –                                                      |                                    |
| 44         | %IX0.08            | B <sub>L</sub>                        | %QX0.00             | B <sub>H</sub> PWM PWM <sub>I</sub> | – / •                                                      | VBB <sub>O</sub> (1)               |
| 45         | %IX0.09            | B <sub>L</sub>                        | %QX0.01             | B <sub>H</sub> PWM PWM <sub>I</sub> | – / •                                                      | VBB <sub>O</sub> (1)               |
| 46         | %IX0.10            | B <sub>L</sub>                        | %QX0.02             | B <sub>H</sub> PWM PWM <sub>I</sub> | – / •                                                      | VBB <sub>O</sub> (1)               |
| 47         | %IX0.11            | B <sub>L</sub>                        | %QX0.03             | B <sub>H</sub> PWM PWM <sub>I</sub> | – / •                                                      | VBB <sub>O</sub> (1)               |
| 20         | %IX0.12            | B <sub>L</sub> I <sub>L</sub> (FRQ 0) | –                   | –                                   | • / –                                                      |                                    |
| 02         | %IX0.13            | B <sub>L</sub> I <sub>L</sub> (FRQ 1) | –                   | –                                   | • / –                                                      |                                    |
| 21         | %IX0.14            | B <sub>L</sub> I <sub>L</sub> (FRQ 2) | –                   | –                                   | • / –                                                      |                                    |
| 38         | %IX0.15            | B <sub>L</sub> I <sub>L</sub> (FRQ 3) | –                   | –                                   | • / –                                                      |                                    |
| 36         | %IX1.00            | B <sub>L</sub>                        | %QX0.04             | B <sub>H</sub> PWM PWM <sub>I</sub> | – / •                                                      | VBB <sub>R</sub> (2)               |
| 54         | %IX1.01            | B <sub>L</sub>                        | %QX0.05             | B <sub>H</sub> PWM PWM <sub>I</sub> | – / •                                                      | VBB <sub>R</sub> (2)               |
| 17         | %IX1.02            | B <sub>L</sub>                        | %QX0.06             | B <sub>H</sub> PWM PWM <sub>I</sub> | – / •                                                      | VBB <sub>R</sub> (2)               |
| 53         | %IX1.03            | B <sub>L</sub>                        | %QX0.07             | B <sub>H</sub> PWM PWM <sub>I</sub> | – / •                                                      | VBB <sub>R</sub> (2)               |
| 19         | %IX1.04            | B <sub>LH</sub> I <sub>L</sub> (CYL0) | –                   | –                                   | • / –                                                      |                                    |
| 55         | %IX1.05            | B <sub>LH</sub> I <sub>L</sub> (CYL1) | –                   | –                                   | • / –                                                      |                                    |
| 18         | %IX1.06            | B <sub>LH</sub> I <sub>L</sub> (CYL2) | –                   | –                                   | • / –                                                      |                                    |
| 37         | %IX1.07            | B <sub>LH</sub> I <sub>L</sub> (CYL3) | –                   | –                                   | • / –                                                      |                                    |
| 39         | %IX1.08            | B <sub>LH</sub>                       | %QX0.08             | B <sub>H</sub>                      | • / •                                                      | VBB <sub>O</sub> (1)               |
| 03         | %IX1.09            | B <sub>LH</sub>                       | %QX0.09             | B <sub>H</sub>                      | • / •                                                      | VBB <sub>O</sub> (1)               |
| 40         | %IX1.10            | B <sub>LH</sub>                       | %QX0.10             | B <sub>H</sub>                      | • / •                                                      | VBB <sub>O</sub> (1)               |
| 22         | %IX1.11            | B <sub>LH</sub>                       | %QX0.11             | B <sub>H</sub>                      | • / •                                                      | VBB <sub>O</sub> (1)               |
| 41         | %IX1.12            | B <sub>LH</sub>                       | %QX0.12             | B <sub>H</sub>                      | • / •                                                      | VBB <sub>O</sub> (1)               |
| 42         | %IX1.13            | B <sub>LH</sub>                       | %QX0.13             | B <sub>H</sub>                      | • / •                                                      | VBB <sub>O</sub> (1)               |
| 43         | %IX1.14            | B <sub>LH</sub>                       | %QX0.14             | B <sub>H</sub>                      | • / •                                                      | VBB <sub>O</sub> (1)               |
| 04         | %IX1.15            | B <sub>LH</sub>                       | %QX0.15             | B <sub>H</sub>                      | • / •                                                      | VBB <sub>O</sub> (1)               |
| 48         | %IX2.00            | B <sub>L</sub>                        | %QX1.00             | B <sub>H</sub> PWM                  | • / •                                                      | VBB <sub>R</sub> (2)               |
| 49         | %IX2.01            | B <sub>L</sub>                        | %QX1.01             | B <sub>H/L</sub> H-Bridge           | • / •                                                      | VBB <sub>R</sub> (2)               |
| 31         | %IX2.02            | B <sub>L</sub>                        | %QX1.02             | B <sub>H/L</sub> H-Bridge           | • / •                                                      | VBB <sub>R</sub> (2)               |
| 50         | %IX2.03            | B <sub>L</sub>                        | %QX1.03             | B <sub>H</sub> PWM                  | • / •                                                      | VBB <sub>R</sub> (2)               |
| 51         | %IX2.04            | B <sub>L</sub>                        | %QX1.04             | B <sub>H</sub> PWM                  | • / •                                                      | VBB <sub>R</sub> (2)               |
| 52         | %IX2.05            | B <sub>L</sub>                        | %QX1.05             | B <sub>H/L</sub> H-Bridge           | • / •                                                      | VBB <sub>R</sub> (2)               |
| 16         | %IX2.06            | B <sub>L</sub>                        | %QX1.06             | B <sub>H/L</sub> H-Bridge           | • / •                                                      | VBB <sub>R</sub> (2)               |
| 35         | %IX2.07            | B <sub>L</sub>                        | %QX1.07             | B <sub>H</sub> PWM                  | • / •                                                      | VBB <sub>R</sub> (2)               |

Note the double pin connection of inputs/outputs.

\*) only positive sensor signals with diagnostic capability

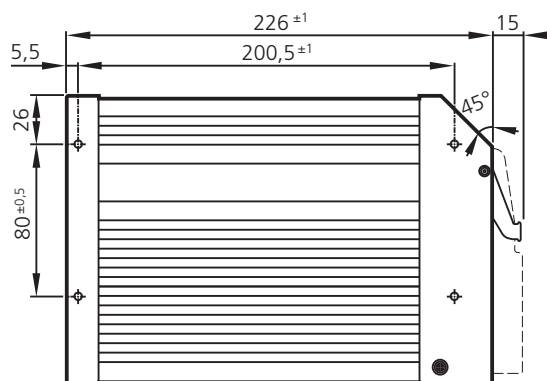
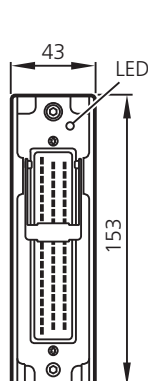
## CR0020

Système de commande  
embarqué ClassicController

Seconde interface CAN  
pour la fonction passerelle  
selon SAE J 1939

Programmation  
selon CEI 61131-3

Tension d'alimentation  
10...32 V DC



e1

### Données techniques

Boîtier

Dimensions (L x l x H)

Montage

Raccordement

Poids

Température boîtier / stockage

Protection

Voies d'entrée/de sortie

Entrées

configurations possibles

\*) seulement signaux capteurs positifs  
avec possibilité de diagnostic

Sorties

configurations possibles

Abréviations

A = analogique  
B<sub>H</sub> = TOR niveau haut  
B<sub>L</sub> = TOR niveau bas  
FRQ/CYL = entrées de fréquence  
I<sub>H</sub> = impulsion niveau haut  
I<sub>L</sub> = impulsion niveau bas  
PWM = modulation par la largeur des impulsions  
PWM<sub>I</sub> = sortie de courant régulé  
%IWx = adresse IEC pour entrée analogique  
%IX0.xx = adresse IEC pour entrée TOR  
%QX0.xx = adresse IEC pour sortie TOR

### Système de commande type boîte noire pour la réalisation d'un système central ou décentralisé

boîtier métallique fermé blindé avec fixation par bride

153 x 226 x 43 mm

fixation à vis avec 4 vis M5 x L selon DIN 7500 et DIN 7984  
position de montage horizontale ou verticale par rapport à la paroi de montage

1 connecteur 55 pôles, verrouillé, protégé contre l'inversion de polarité, type AMP  
ou Framatome, contacts AMP-Junior-Timer, raccordement crimp 0,5/2,5 mm<sup>2</sup>

1,2 kg

−40...85 °C (en fonction de la charge) / −40...85 °C

IP 67 (pour le connecteur mâle à fils conducteurs individuels étanchéifiés inséré, p.ex. EC2084)

max. 40 (le nombre disponible total dépend du raccordement  
et de la configuration du système de commande)

max. 40 (corr. à 0 sorties)

| Nombre  | Signal            | Version                                                                                                   |                                   |
|---------|-------------------|-----------------------------------------------------------------------------------------------------------|-----------------------------------|
| 8<br>ou | TOR<br>analogique | signaux capteurs positifs, avec possibilité de diagnostic<br>0...10/32 V DC, 0/4...20 mA ou ratiométrique | B <sub>L</sub><br>A               |
| 8       | TOR               | signaux capteurs positifs                                                                                 | B <sub>L</sub>                    |
| 4<br>ou | TOR<br>fréquence  | signaux capteurs positifs, avec possibilité de diagnostic<br>max. 50 kHz                                  | B <sub>L</sub><br>I <sub>L</sub>  |
| 4<br>ou | TOR<br>fréquence  | signaux capteurs positifs/négatifs, possibilité de diagnostic *                                           | B <sub>LH</sub><br>I <sub>L</sub> |
| 8       | TOR               | signaux capteurs positifs/négatifs, possibilité de diagnostic *                                           | B <sub>LH</sub>                   |
| 8       | TOR               | signaux capteurs positifs, possibilité de diagnostic                                                      | B <sub>L</sub>                    |

max. 24 (corr. à 16 entrées)

| Nombre        | Signal                       | Version                                                                                                    |                                           |
|---------------|------------------------------|------------------------------------------------------------------------------------------------------------|-------------------------------------------|
| 8<br>ou<br>ou | TOR<br>PWM<br>courant régulé | pnp (niveau haut), avec possibilité de diagnostic<br>fréquence PWM 20...250 Hz<br>0,1...4 A                | B <sub>H</sub><br>PWM<br>PWM <sub>I</sub> |
| 8             | TOR                          | pnp (niveau haut), avec possibilité de diagnostic                                                          | B <sub>H</sub>                            |
| 4<br>ou       | TOR<br>PWM                   | pnp (niveau haut), avec possibilité de diagnostic<br>fréquence PWM 20...250 Hz                             | B <sub>H</sub><br>PWM                     |
| 4             | TOR                          | pnp/npn (niveau haut/bas)<br>avec possibilité de diagnostic<br>(aussi utilisable comme shunt H (H-Bridge)) | B <sub>H/L</sub><br>H-Bridge              |



| CR0020                                                                                | Données techniques                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                       |      |             |   |         |                               |       |             |                              |       |      |                                     |       |                |             |       |                |                                                       |
|---------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|------|-------------|---|---------|-------------------------------|-------|-------------|------------------------------|-------|------|-------------------------------------|-------|----------------|-------------|-------|----------------|-------------------------------------------------------|
| Tension d'alimentation $U_B$                                                          | 10...32 V DC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                       |      |             |   |         |                               |       |             |                              |       |      |                                     |       |                |             |       |                |                                                       |
| Sur tension<br>détection de sous-tension<br>coupure du circuit en cas de sous-tension | 36 V pour $t \leq 10$ s<br>pour $U_B \leq 10$ V<br>pour $U_B \leq 8$ V                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                       |      |             |   |         |                               |       |             |                              |       |      |                                     |       |                |             |       |                |                                                       |
| Consommation                                                                          | $\leq 160$ mA (sans charge externe à 24 V DC)                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                       |      |             |   |         |                               |       |             |                              |       |      |                                     |       |                |             |       |                |                                                       |
| Interface CAN 1<br>Débit de transmission<br>Profil de communication                   | interface CAN 2.0 B, ISO 11898<br>50 kbits/s...1 Mbit/s (valeur par défaut 125 kbits/s)<br>CANopen, CiA DS 301 version 4, CiA DS 401 version 1.4                                                                                                                                                                                                                                                                                                                                                   |                                                       |      |             |   |         |                               |       |             |                              |       |      |                                     |       |                |             |       |                |                                                       |
| ID nœud (CANopen)                                                                     | hexa 7F (= déc. 127)                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                       |      |             |   |         |                               |       |             |                              |       |      |                                     |       |                |             |       |                |                                                       |
| Interface CAN 2<br>Débit de transmission<br>Profil de communication                   | interface CAN 2.0 A/B, ISO 11898<br>50 kbits/s...1 Mbit/s (valeur par défaut 125 kbits/s)<br>SAE J 1939 ou protocole libre                                                                                                                                                                                                                                                                                                                                                                         |                                                       |      |             |   |         |                               |       |             |                              |       |      |                                     |       |                |             |       |                |                                                       |
| Interface série<br>Débit de transmission<br>Topologie<br>Protocole                    | RS-232 C<br>9,6 / 19,2 / 28,8 / 38,4 / 57,6 kbits/s (valeur par défaut 57,6 kbits/s)<br>point à point (max. 2 postes); raccordement maître-esclave<br>protocole ifm prédéfini (INTELHEX)                                                                                                                                                                                                                                                                                                           |                                                       |      |             |   |         |                               |       |             |                              |       |      |                                     |       |                |             |       |                |                                                       |
| Processeur                                                                            | microcontrôleur CMOS 16 bits C167CS<br>fréquence d'horloge 20/40 MHz                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                       |      |             |   |         |                               |       |             |                              |       |      |                                     |       |                |             |       |                |                                                       |
| Surveillance de l'appareil                                                            | surveillance de la sous-tension<br>fonction chien de garde<br>test de contrôle (checksum) pour le programme et le système<br>surveillance de surélévation de température                                                                                                                                                                                                                                                                                                                           |                                                       |      |             |   |         |                               |       |             |                              |       |      |                                     |       |                |             |       |                |                                                       |
| Concept de surveillance du process                                                    | 2 relais selon EN954 pour contrôle de 2 groupes de 12 sorties chacun<br>par relais de surveillance selon EN 954                                                                                                                                                                                                                                                                                                                                                                                    |                                                       |      |             |   |         |                               |       |             |                              |       |      |                                     |       |                |             |       |                |                                                       |
| Mémoire programme                                                                     | 768 Koctets flash utilisable par le programmeur (+ 832 Koctets pour des fonctions étendues)                                                                                                                                                                                                                                                                                                                                                                                                        |                                                       |      |             |   |         |                               |       |             |                              |       |      |                                     |       |                |             |       |                |                                                       |
| Mémoire de données                                                                    | 128 Koctets SRAM, 128 Koctets flash                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                       |      |             |   |         |                               |       |             |                              |       |      |                                     |       |                |             |       |                |                                                       |
| Mémoire de données (protégée coupure tension)                                         | 1024 octets (données auto-sauvegardées), 16 Koctets (données générales)                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                       |      |             |   |         |                               |       |             |                              |       |      |                                     |       |                |             |       |                |                                                       |
| Indication d'état                                                                     | LED trois couleurs (R/J/B)                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                       |      |             |   |         |                               |       |             |                              |       |      |                                     |       |                |             |       |                |                                                       |
| Etats de fonctionnement (LED d'état)                                                  | <table><tr><th>Couleur</th><th>Etat</th><th>Description</th></tr><tr><td>–</td><td>Eteinte</td><td>aucune tension d'alimentation</td></tr><tr><td>jaune</td><td>1 x allumée</td><td>initialisation ou test reset</td></tr><tr><td>verte</td><td>5 Hz</td><td>aucun système d'exploitation chargé</td></tr><tr><td>verte</td><td>2,0 Hz allumée</td><td>Run<br/>Stop</td></tr><tr><td>rouge</td><td>2,0 Hz allumée</td><td>Run avec erreur<br/>erreur fatale ou arrêt avec erreur</td></tr></table> | Couleur                                               | Etat | Description | – | Eteinte | aucune tension d'alimentation | jaune | 1 x allumée | initialisation ou test reset | verte | 5 Hz | aucun système d'exploitation chargé | verte | 2,0 Hz allumée | Run<br>Stop | rouge | 2,0 Hz allumée | Run avec erreur<br>erreur fatale ou arrêt avec erreur |
| Couleur                                                                               | Etat                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Description                                           |      |             |   |         |                               |       |             |                              |       |      |                                     |       |                |             |       |                |                                                       |
| –                                                                                     | Eteinte                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | aucune tension d'alimentation                         |      |             |   |         |                               |       |             |                              |       |      |                                     |       |                |             |       |                |                                                       |
| jaune                                                                                 | 1 x allumée                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | initialisation ou test reset                          |      |             |   |         |                               |       |             |                              |       |      |                                     |       |                |             |       |                |                                                       |
| verte                                                                                 | 5 Hz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | aucun système d'exploitation chargé                   |      |             |   |         |                               |       |             |                              |       |      |                                     |       |                |             |       |                |                                                       |
| verte                                                                                 | 2,0 Hz allumée                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Run<br>Stop                                           |      |             |   |         |                               |       |             |                              |       |      |                                     |       |                |             |       |                |                                                       |
| rouge                                                                                 | 2,0 Hz allumée                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Run avec erreur<br>erreur fatale ou arrêt avec erreur |      |             |   |         |                               |       |             |                              |       |      |                                     |       |                |             |       |                |                                                       |
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|                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                       |      |             |   |         |                               |       |             |                              |       |      |                                     |       |                |             |       |                |                                                       |
|                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                       |      |             |   |         |                               |       |             |                              |       |      |                                     |       |                |             |       |                |                                                       |
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|                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                       |      |             |   |         |                               |       |             |                              |       |      |                                     |       |                |             |       |                |                                                       |
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|                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                       |      |             |   |         |                               |       |             |                              |       |      |                                     |       |                |             |       |                |                                                       |
|                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                       |      |             |   |         |                               |       |             |                              |       |      |                                     |       |                |             |       |                |                                                       |
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|                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                       |      |             |   |         |                               |       |             |                              |       |      |                                     |       |                |             |       |                |                                                       |
|                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                       |      |             |   |         |                               |       |             |                              |       |      |                                     |       |                |             |       |                |                                                       |
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|                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                       |      |             |   |         |                               |       |             |                              |       |      |                                     |       |                |             |       |                |                                                       |
|                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                       |      |             |   |         |                               |       |             |                              |       |      |                                     |       |                |             |       |                |                                                       |
|                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                       |      |             |   |         |                               |       |             |                              |       |      |                                     |       |                |             |       |                |                                                       |
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|                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                       |      |             |   |         |                               |       |             |                              |       |      |                                     |       |                |             |       |                |                                                       |
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|                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                       |      |             |   |         |                               |       |             |                              |       |      |                                     |       |                |             |       |                |                                                       |
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|                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                       |      |             |   |         |                               |       |             |                              |       |      |                                     |       |                |             |       |                |                                                       |
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|                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                       |      |             |   |         |                               |       |             |                              |       |      |                                     |       |                |             |       |                |                                                       |
|                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                       |      |             |   |         |                               |       |             |                              |       |      |                                     |       |                |             |       |                |                                                       |
|                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                       |      |             |   |         |                               |       |             |                              |       |      |                                     |       |                |             |       |                |                                                       |



Systèmes de contrôle-commande

**CR0020**

**Caractéristiques des entrées**

**Entrées TOR/analogiques (B<sub>L</sub>, A)**

%IW03...10  
%IX0.00...07  
configurables comme...

■ Entrées tension  
tension d'entrée 0...10/32 V  
résolution 12 bits  
précision ±1,0% FS  
résistance d'entrée 50/30 kΩ  
fréquence d'entrée 50 Hz

■ Entrées courant  
courant d'entrée 0/4...20 mA  
résolution 12 bits  
précision ±1,0% FS  
résistance d'entrée 400 Ω  
fréquence d'entrée 50 Hz

■ Entrées TOR pour des signaux capteurs positifs, avec possibilité de diagnostic \*)  
niveau d'enclenchement 0,7 U<sub>B</sub>  
niveau de déclenchement 0,4 U<sub>B</sub>  
résistance d'entrée 30 kΩ  
fréquence d'entrée 50 Hz

**Entrées TOR (B<sub>L</sub>)**

%IX0.08...11  
%IX1.00...03  
configurables comme...

■ Entrées TOR pour des signaux capteurs positifs  
niveau d'enclenchement 0,43...0,73 U<sub>B</sub>  
niveau de déclenchement 0,29 U<sub>B</sub>  
résistance d'entrée 3,21 kΩ  
fréquence d'entrée 50 Hz

**Entrées TOR (B<sub>L</sub>, I<sub>L</sub>)**

%IX0.12...15  
configurables comme...

■ Entrées TOR pour des signaux capteurs positifs, avec possibilité de diagnostic \*)  
niveau d'enclenchement 0,7 U<sub>B</sub>  
niveau de déclenchement 0,4 U<sub>B</sub>  
résistance d'entrée 2,86 kΩ  
fréquence d'entrée 50 Hz

■ Entrées de fréquence pour des signaux capteurs positifs  
avec possibilité de diagnostic, évaluation avec comparateur  
niveau d'enclenchement 0,43...0,73 U<sub>B</sub>  
niveau de déclenchement 0,29 U<sub>B</sub>  
résistance d'entrée 2,86 kΩ  
fréquence d'entrée max. 50 kHz

**Entrées TOR (B<sub>L/H</sub>, I<sub>L</sub>)**

%IX1.04...07  
configurables comme...

■ Entrées TOR pour des signaux capteurs positifs/négatifs,  
positifs avec possibilité de diagnostic \*)  
niveau d'enclenchement 0,7 U<sub>B</sub>  
niveau de déclenchement 0,4 U<sub>B</sub>  
résistance d'entrée 3,21 kΩ  
fréquence d'entrée 50 Hz

■ Entrées de fréquence pour des signaux capteurs positifs  
avec possibilité de diagnostic, évaluation avec comparateur  
niveau d'enclenchement 0,43...0,73 U<sub>B</sub>  
niveau de déclenchement 0,29 U<sub>B</sub>  
résistance d'entrée 3,21 kΩ  
fréquence d'entrée max. 1 kHz

**Entrées TOR (B<sub>L/H</sub>)**

%IX1.08...15  
configurables comme...

■ Entrées TOR pour des signaux capteurs positifs/négatifs,  
positifs avec possibilité de diagnostic \*)  
niveau d'enclenchement 0,7 U<sub>B</sub>  
niveau de déclenchement 0,4 U<sub>B</sub>  
résistance d'entrée 3,21 kΩ  
fréquence d'entrée 50 Hz

**Entrées TOR (B<sub>L</sub>)**

%IX2.00...07  
configurables comme...

■ Entrées TOR pour des signaux capteurs positifs, avec possibilité de diagnostic \*)  
niveau d'enclenchement 0,43...0,73 U<sub>B</sub>  
niveau de déclenchement 0,29 U<sub>B</sub>  
résistance d'entrée 3,21 kΩ  
fréquence d'entrée 50 Hz

**Entrée test**

Durant le mode test (par ex. programmation) la broche doit être raccordée à VBB<sub>5</sub> (10...32 V DC).  
Pour le mode "RUN" l'état logique de cette entrée doit être 0.  
résistance d'entrée 3,21 kΩ

\*) Entrées NAMUR

■ Des entrées TOR avec possibilité de diagnostic peuvent être utilisées en tant qu'entrées NAMUR en combinaison avec une résistance externe.  
tension d'alimentation 5...25 V; par ex. détecteurs NAMUR ifm NT5001...NN5002



**CR0020**

**Caractéristiques des sorties**

**Sorties** (B<sub>H</sub>, PWM, PWM<sub>I</sub>)  
%QX0.00...07  
configurables comme...

■ Sorties statiques , avec possibilité de diagnostic  
pnp (niveau haut), protection courts-circuits et surcharge  
tension de commutation 10...32 V DC  
courant de charge par sortie max. 4 A  
fréquence de sortie max. 100 Hz (dépend de la charge)

■ Sorties PWM, diagnostic par relecture du courant  
fréquence PWM max. 250 Hz  
taux d'impulsion 1...99 %  
résolution dépend de la fréquence PWM  
courant de charge par sortie max. 4 A

■ Sorties courant réglé, diagnostic par relecture du courant  
courant de charge 0,1...4 A  
résistance de charge min. 3 Ω (à U<sub>B</sub> = 12 V DC)  
min. 6 Ω (à U<sub>B</sub> = 24 V DC)  
résolution de réglage 1 mA  
résolution utilisée 5 mA  
précision ± 2 % FS

**Sorties** (B<sub>H</sub>)  
%QX0.08...15  
configurables comme...

■ Sorties statiques , avec possibilité de diagnostic  
pnp (niveau haut), protection courts-circuits et surcharge  
tension de commutation 10...32 V DC  
courant de charge par sortie max. 2 A  
fréquence de sortie max. 100 Hz (dépend de la charge)

**Sorties** (B<sub>H</sub>, PWM)  
%QX1.00, 03, 04, 07  
configurables comme...

■ Sorties statiques , avec possibilité de diagnostic  
pnp (niveau haut), protection courts-circuits et surcharge  
tension de commutation 10...32 V DC  
courant de charge par sortie max. 4 A  
fréquence de sortie max. 100 Hz (dépend de la charge)

■ Sorties PWM  
fréquence PWM max. 250 Hz  
taux d'impulsion 1...99 %  
résolution dépend de la fréquence PWM  
courant de charge max. 4 A

**Sorties** (B<sub>L/H</sub>)  
%QX1.01, 02, 05, 06  
configurables comme...

■ Sorties statiques , avec possibilité de diagnostic  
pnp/npn (niveau haut/bas), protection courts-circuits et surcharge  
tension de commutation 10...32 V DC  
courant de charge par sortie max. 4 A  
fréquence de sortie max. 100 Hz (dépend de la charge)

**Protection contre les surcharges**  
(valable pour toutes les sorties)

max. 5 minutes (à 100%)

**Sorties relais internes**  
pour la désactivation des sorties  
avec isolation électrique

Contacts normalement ouvert en série à 2 x 12 sorties semiconducteurs (= 2 groupes).  
Commande forcée par hardware et commande supplémentaire par programme d'application.

Les relais doivent toujours être commutés sans charge!

courant total max. 12 A par groupe  
courant par sortie 0,1...15 A  
courant de surcharge 20 A  
nombre de cycles d'opérations ≥ 10<sup>6</sup>  
constante commutation-temps ≤ 3 ms

**Sortie Error**

■ Sortie statiques, pnp (niveau haut)  
tension de commutation 10...32 V DC  
courant de charge par sortie max. 100 mA  
courant de surcharge 0,5 A  
fonction de commutation OFF (0 V) en cas d'erreur

**Abréviations**

A = analogique  
B<sub>H</sub> = TOR niveau haut  
B<sub>L</sub> = TOR niveau bas  
FRQ/CYL = entrées de fréquence  
I<sub>H</sub> = impulsion niveau haut  
I<sub>L</sub> = impulsion niveau bas  
PWM = modulation par la largeur des impulsions  
PWM<sub>I</sub> = sortie de courant réglé  
%IWx = adresse IEC pour entrée analogique  
%IX0.xx = adresse IEC pour entrée TOR  
%QX0.xx = adresse IEC pour sortie TOR



Systèmes de contrôle-commande

| ANSCHLUSSBELEGUNG / wiring / branchement         |                                 |                                                            |                     |                                     |                                                            |                                    |
|--------------------------------------------------|---------------------------------|------------------------------------------------------------|---------------------|-------------------------------------|------------------------------------------------------------|------------------------------------|
| Pin                                              | Potential                       | Bezeichnung / description                                  |                     |                                     | Bemerkung / note                                           |                                    |
| 23                                               | VBB <sub>S</sub> (10...32 V DC) | Versorgung Sensoren und Modul / supply sensors and module  |                     |                                     |                                                            |                                    |
| 05                                               | VBB <sub>O</sub> (10...32 V DC) | Versorgung Ausgänge / supply outputs                       |                     |                                     | relaisgeschaltet / relay switched (1)                      |                                    |
| 34                                               | VBB <sub>R</sub> (10...32 V DC) | Versorgung über Relais / supply via relay                  |                     |                                     | relaisgeschaltet / relay switched (2)                      |                                    |
| 01                                               | GND <sub>S</sub>                | Masse Sensoren und Modul / ground sensors and module       |                     |                                     |                                                            |                                    |
| 15                                               | GND <sub>O</sub>                | Masse Ausgänge / ground outputs                            |                     |                                     |                                                            |                                    |
| 12                                               | GND <sub>A</sub>                | Masse Analogeingänge / ground analogue outputs             |                     |                                     |                                                            |                                    |
| CAN, RS-232, ERROR, TEST                         |                                 |                                                            |                     |                                     |                                                            |                                    |
| Pin                                              | Potential                       | Bezeichnung / description                                  |                     |                                     | Bemerkung / note                                           |                                    |
| 14                                               | CAN 1 <sub>H</sub>              | CAN-Interface 1 (High)                                     |                     |                                     |                                                            |                                    |
| 32                                               | CAN 1 <sub>L</sub>              | CAN-Interface 1 (Low)                                      |                     |                                     |                                                            |                                    |
| 26                                               | CAN 2 <sub>H</sub>              | CAN-Interface 2 (High)                                     |                     |                                     | SAE J 1939                                                 |                                    |
| 25                                               | CAN 2 <sub>L</sub>              | CAN-Interface 2 (Low)                                      |                     |                                     | SAE J 1939                                                 |                                    |
| 33                                               | GND                             | Masse / ground (RS-232/CAN)                                |                     |                                     |                                                            |                                    |
| 06                                               | RxD                             | RS-232 Interface (Programmierung / programming)            |                     |                                     | Pin 03, PC D-Sub (9 pin)                                   |                                    |
| 07                                               | TxD                             | RS-232 Interface (Programmierung / programming)            |                     |                                     | Pin 02, PC D-Sub (9 pin)                                   |                                    |
| 13                                               | ERROR                           | Fehlerausgang B <sub>H</sub> / error output B <sub>H</sub> |                     |                                     |                                                            |                                    |
| 24                                               | TEST                            | TEST-Eingang / test input                                  |                     |                                     |                                                            |                                    |
| EIN-/AUSGÄNGE / inputs/outputs / entrées/sorties |                                 |                                                            |                     |                                     |                                                            |                                    |
| Pin<br>pin                                       | EINGÄNGE<br>INPUTS              | Konfiguration<br>configuration                             | AUSGÄNGE<br>OUTPUTS | Konfiguration<br>configuration      | diagnosefähig*<br>diagnostic capability*<br>INPUT / OUTPUT | relaisgeschaltet<br>relay switched |
| 08                                               | %IX0.00 / %IW03                 | B <sub>L</sub> A                                           | –                   | –                                   | • / –                                                      |                                    |
| 27                                               | %IX0.01 / %IW04                 | B <sub>L</sub> A                                           | –                   | –                                   | • / –                                                      |                                    |
| 09                                               | %IX0.02 / %IW05                 | B <sub>L</sub> A                                           | –                   | –                                   | • / –                                                      |                                    |
| 28                                               | %IX0.03 / %IW06                 | B <sub>L</sub> A                                           | –                   | –                                   | • / –                                                      |                                    |
| 10                                               | %IX0.04 / %IW07                 | B <sub>L</sub> A                                           | –                   | –                                   | • / –                                                      |                                    |
| 29                                               | %IX0.05 / %IW08                 | B <sub>L</sub> A                                           | –                   | –                                   | • / –                                                      |                                    |
| 11                                               | %IX0.06 / %IW09                 | B <sub>L</sub> A                                           | –                   | –                                   | • / –                                                      |                                    |
| 30                                               | %IX0.07 / %IW10                 | B <sub>L</sub> A                                           | –                   | –                                   | • / –                                                      |                                    |
| 44                                               | %IX0.08                         | B <sub>L</sub>                                             | %QX0.00             | B <sub>H</sub> PWM PWM <sub>I</sub> | – / •                                                      | VBB <sub>O</sub> (1)               |
| 45                                               | %IX0.09                         | B <sub>L</sub>                                             | %QX0.01             | B <sub>H</sub> PWM PWM <sub>I</sub> | – / •                                                      | VBB <sub>O</sub> (1)               |
| 46                                               | %IX0.10                         | B <sub>L</sub>                                             | %QX0.02             | B <sub>H</sub> PWM PWM <sub>I</sub> | – / •                                                      | VBB <sub>O</sub> (1)               |
| 47                                               | %IX0.11                         | B <sub>L</sub>                                             | %QX0.03             | B <sub>H</sub> PWM PWM <sub>I</sub> | – / •                                                      | VBB <sub>O</sub> (1)               |
| 20                                               | %IX0.12                         | B <sub>L</sub> I <sub>L</sub> (FRQ 0)                      | –                   | –                                   | • / –                                                      |                                    |
| 02                                               | %IX0.13                         | B <sub>L</sub> I <sub>L</sub> (FRQ 1)                      | –                   | –                                   | • / –                                                      |                                    |
| 21                                               | %IX0.14                         | B <sub>L</sub> I <sub>L</sub> (FRQ 2)                      | –                   | –                                   | • / –                                                      |                                    |
| 38                                               | %IX0.15                         | B <sub>L</sub> I <sub>L</sub> (FRQ 3)                      | –                   | –                                   | • / –                                                      |                                    |
| 36                                               | %IX1.00                         | B <sub>L</sub>                                             | %QX0.04             | B <sub>H</sub> PWM PWM <sub>I</sub> | – / •                                                      | VBB <sub>R</sub> (2)               |
| 54                                               | %IX1.01                         | B <sub>L</sub>                                             | %QX0.05             | B <sub>H</sub> PWM PWM <sub>I</sub> | – / •                                                      | VBB <sub>R</sub> (2)               |
| 17                                               | %IX1.02                         | B <sub>L</sub>                                             | %QX0.06             | B <sub>H</sub> PWM PWM <sub>I</sub> | – / •                                                      | VBB <sub>R</sub> (2)               |
| 53                                               | %IX1.03                         | B <sub>L</sub>                                             | %QX0.07             | B <sub>H</sub> PWM PWM <sub>I</sub> | – / •                                                      | VBB <sub>R</sub> (2)               |
| 19                                               | %IX1.04                         | B <sub>L/H</sub> I <sub>L</sub> (CYL 0)                    | –                   | –                                   | • / –                                                      |                                    |
| 55                                               | %IX1.05                         | B <sub>L/H</sub> I <sub>L</sub> (CYL 1)                    | –                   | –                                   | • / –                                                      |                                    |
| 18                                               | %IX1.06                         | B <sub>L/H</sub> I <sub>L</sub> (CYL 2)                    | –                   | –                                   | • / –                                                      |                                    |
| 37                                               | %IX1.07                         | B <sub>L/H</sub> I <sub>L</sub> (CYL 3)                    | –                   | –                                   | • / –                                                      |                                    |
| 39                                               | %IX1.08                         | B <sub>L/H</sub>                                           | %QX0.08             | B <sub>H</sub>                      | • / •                                                      | VBB <sub>O</sub> (1)               |
| 03                                               | %IX1.09                         | B <sub>L/H</sub>                                           | %QX0.09             | B <sub>H</sub>                      | • / •                                                      | VBB <sub>O</sub> (1)               |
| 40                                               | %IX1.10                         | B <sub>L/H</sub>                                           | %QX0.10             | B <sub>H</sub>                      | • / •                                                      | VBB <sub>O</sub> (1)               |
| 22                                               | %IX1.11                         | B <sub>L/H</sub>                                           | %QX0.11             | B <sub>H</sub>                      | • / •                                                      | VBB <sub>O</sub> (1)               |
| 41                                               | %IX1.12                         | B <sub>L/H</sub>                                           | %QX0.12             | B <sub>H</sub>                      | • / •                                                      | VBB <sub>O</sub> (1)               |
| 42                                               | %IX1.13                         | B <sub>L/H</sub>                                           | %QX0.13             | B <sub>H</sub>                      | • / •                                                      | VBB <sub>O</sub> (1)               |
| 43                                               | %IX1.14                         | B <sub>L/H</sub>                                           | %QX0.14             | B <sub>H</sub>                      | • / •                                                      | VBB <sub>O</sub> (1)               |
| 04                                               | %IX1.15                         | B <sub>L/H</sub>                                           | %QX0.15             | B <sub>H</sub>                      | • / •                                                      | VBB <sub>O</sub> (1)               |
| 48                                               | %IX2.00                         | B <sub>L</sub>                                             | %QX1.00             | B <sub>H</sub> PWM                  | • / •                                                      | VBB <sub>R</sub> (2)               |
| 49                                               | %IX2.01                         | B <sub>L</sub>                                             | %QX1.01             | B <sub>H/L</sub> H-Bridge           | • / •                                                      | VBB <sub>R</sub> (2)               |
| 31                                               | %IX2.02                         | B <sub>L</sub>                                             | %QX1.02             | B <sub>H/L</sub> H-Bridge           | • / •                                                      | VBB <sub>R</sub> (2)               |
| 50                                               | %IX2.03                         | B <sub>L</sub>                                             | %QX1.03             | B <sub>H</sub> PWM                  | • / •                                                      | VBB <sub>R</sub> (2)               |
| 51                                               | %IX2.04                         | B <sub>L</sub>                                             | %QX1.04             | B <sub>H</sub> PWM                  | • / •                                                      | VBB <sub>R</sub> (2)               |
| 52                                               | %IX2.05                         | B <sub>L</sub>                                             | %QX1.05             | B <sub>H/L</sub> H-Bridge           | • / •                                                      | VBB <sub>R</sub> (2)               |
| 16                                               | %IX2.06                         | B <sub>L</sub>                                             | %QX1.06             | B <sub>H/L</sub> H-Bridge           | • / •                                                      | VBB <sub>R</sub> (2)               |
| 35                                               | %IX2.07                         | B <sub>L</sub>                                             | %QX1.07             | B <sub>H</sub> PWM                  | • / •                                                      | VBB <sub>R</sub> (2)               |

Noter le double raccordement des broches des entrées/sorties.

\*) seulement signaux capteurs positifs avec possibilité de diagnostic