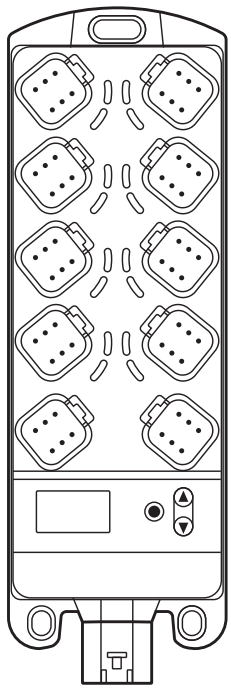
Gerätehandbuch

DE

ioControl

CR2050
CR2051
CR2052



80268387 / 00 04 / 2018

Inhalt

Das vorliegende Dokument ist die Originalanleitung.
Alle benutzten Warenzeichen und Firmenbezeichnungen unterliegen dem Copyright der jeweiligen Firmen.

1 Vorbemerkung

Dieses Dokument gilt für Geräte des Typs "ioControl" (Art.-Nr.: CR2050, CR2051 und CR2052).
Es ist Bestandteil des Gerätes.

Das Dokument enthält Angaben zum korrekten Umgang mit dem Gerät.

Sicherheitshinweise befolgen.

Technische Daten, Zulassungen, Zubehör und weitere Informationen unter: www.ifm.com.

1.1 Zeichenerklärung

► Handlungsanweisung
> Reaktion, Ergebnis
[…] Bezeichnung von Tasten, Schaltflächen oder Anzeigen
→ Querverweis

Wichtiger Hinweis
Fehlfunktionen oder Störungen sind bei Nichtbeachtung möglich.

Information
Ergänzender Hinweis

⚠ WARNUNG
Warnung vor schweren Personenschäden.
Tod oder schwere, irreversible Verletzungen sind möglich.

⚠ VORSICHT
Warnung vor Personenschäden.
Leichte, reversible Verletzungen sind möglich.

ACHTUNG
Warnung vor Sachschäden.

2 Sicherheitshinweise

2.1 Allgemeine Sicherheitshinweise

- Dieses Dokument vor Inbetriebnahme des Gerätes lesen und während der Einsatzdauer aufbewahren.
- Sicherstellen, dass sich das Produkt uneingeschränkt für die betreffenden Applikationen und Umgebungsbedingungen eignet.

- Unsachgemäße oder nicht bestimmungsgemäße Verwendung können zu Funktionsstörungen des Gerätes, zu unerwünschten Auswirkungen in der Applikation oder zum Verlust der Gewährleistungsansprüche führen.
  Für Folgen durch Eingriffe in das Gerät oder Fehlgebrauch durch den Betreiber übernimmt der Hersteller keine Haftung.
- Montage, elektrischer Anschluss, Inbetriebnahme, Bedienung und Wartung des Gerätes dürfen nur durch ausgebildetes, vom Anlagenbetreiber autorisiertes und geschultes Fachpersonal durchgeführt werden.
- Nach Installation, Wartung oder Reparatur des Systems komplette Funktionsprüfung durchführen.
- Die Sicherheit eines Systems, in welches das Gerät integriert wird, liegt in der Verantwortung des Errichters des Systems.

2.2 Zielgruppe

Die Anleitung richtet sich an Personen, die im Sinne der EMV- und der Niederspannungsrichtlinie als fachkundig angesehen werden können. Das Gerät darf nur von einer Elektrofachkraft eingebaut, angeschlossen und in Betrieb gesetzt werden.

2.3 Elektrischer Anschluss

⚠ WARNUNG

Schalten Sie das Gerät extern spannungsfrei bevor Sie irgendwelche Arbeiten an ihm vornehmen.

Versorgung durch mobiles Bordnetz 12/24V Batteriespannung oder Schutzkleinspannung SELV gemäß der technischen Daten. Die Versorgung wird direkt an die angeschlossene Sensorik/Aktorik weitergeleitet.

Berührbare Oberflächen des Gehäuses sind zu den Stromkreisen isoliert mit Basisisolierung nach IEC 61010-1, Sekundärstromkreis mit maximal 32 V DC, abgeleitet von Netzstromkreis bis 300 V der Überspannungskategorie II.

Die externe Verdrahtung muss die jeweils erforderliche Trennung zu anderen Stromkreisen sicherstellen.

Der Kabelquerschnit ist, unter Berücksichtigung der geltenden Vorschriften für die jeweilige Applikation, auf die verwendete Sicherung abzustimmen.

Die Verkabelung muss für die in der Applikation maximal erreichte Temperatur geeignet seit.

Wird die zugeführte SELV-Spannung extern geerdet (SELV wird zu PELV), geschieht dies in der Verantwortung des Betreibers und im Rahmen der dort geltenden nationalen Installationsvorschriften.

An den Anschlüssen dürfen nur die in den technischen Daten, bzw. auf dem Geräteaufdruck angegebenen Signale eingespeist bzw. die zugelassenen Zubehörkomponenten der ifm electronic gmbh angeschlossen werden.

2.4 Eingriffe in das Gerät

⚠ WARNUNG

Bei Fehlfunktionen oder Unklarheiten mit dem Hersteller in Verbindung setzen. Eingriffe in das Gerät können schwerwiegende Beeinträchtigungen der Sicherheit von Menschen und Anlagen zur Folge haben.

3 Bestimmungsgemäße Verwendung

Die frei programmierbaren Steuerungen der Baureihe "ioControl" sind für den Einsatz unter erschwerten Bedingungen ausgelegt (z.B. erweiterter Temperaturbereich, starke Vibrationen, intensive EMV-Belastung). Sie sind geeignet zum direkten Einbau in mobilen Arbeitsmaschinen, auch in nasser Umgebung.

Die Ein- und Ausgänge werden vom Anwender durch die Applikationssoftware auf die jeweiligen Einsatzfälle angepasst. Die Steuerungen können als CANopen-Slave, CANopen-Master oder intelligentes E/A-Modul eingesetzt werden (→ 9 Technische Daten).

In Verbindung mit zusätzlichen Produkten der modularen ioControl- und Basic-Baureihe sind applikationsspezifische Erweiterungen und Anpassungen möglich.

⚠ WARNUNG

Die Steuerungen "ioControl" sind nicht für sicherheitsrelevante Aufgaben im Sinne des Personenschutzes zugelassen.

ACHTUNG

Die Steuerungen "ioControl" sind für den Anbauort Karosserie vorgesehen. Nicht für den Anbauort Motor.

ACHTUNG

Das Gerät darf nur innerhalb der in den technischen Daten vorgegebenen Grenzen eingesetzt werden (→ 9 Technische Daten). Wird das Gerät in einer vom Hersteller nicht festgelegten Weise verwendet, kann der vom Gerät unterstützte Schutz beeinträchtigt werden.

4 Funktion

- Die Applikationssoftware kann vom Anwender mit dem IEC 61131-3 konformen Programmiersystem CODESYS 2.3 erstellt werden. Im Lieferungszustand sind die Geräte als CANopen-Slave vorkonfiguriert.
- 2 CAN Schnittstellen
- Konfigurierbare Ein-/Ausgänge
- Status-LEDs, I/O-LEDs und 4-stellige 10-Segment-Anzeige
- Bedientasten

Weitere Informationen und Zubehör unter www.ifm.com.

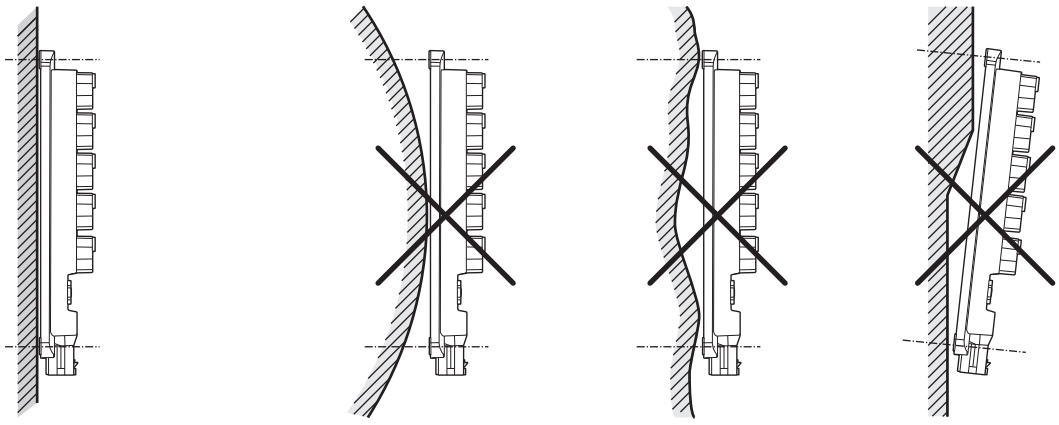
5 Montage

5.1 Montagefläche

ACHTUNG

Auf das Gehäuse dürfen keine Verwindungskräfte oder mechanische Belastungen wirken.

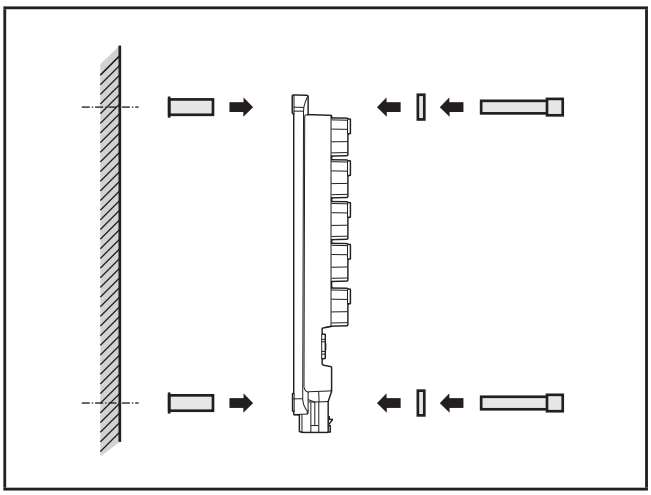
► Das Gerät auf einer ebenen Fläche montieren.
► Steht keine ebene Montagefläche zur Verfügung, Ausgleichelemente verwenden.

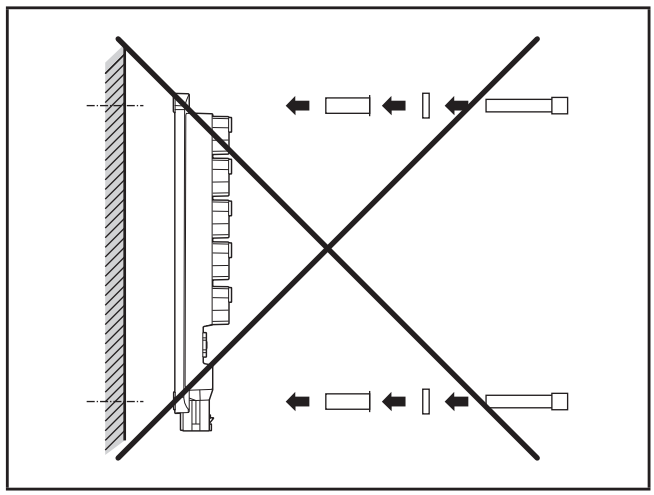


Montagefläche

5.2 Befestigung

► Die beiliegenden Rohrnieten von der Geräterückseite in die 3 Befestigungslöcher setzen.
► Das Gerät mit 3 Unterlegscheiben und M5 Schrauben befestigen.
Die Schrauben dabei wechselweise anziehen.





Einsetzen der Rohrnieten

Anzugdrehmoment: 2,0 Nm
Bohrmaße (→ 9 Technische Daten)

Verwendbare Schrauben (Beispiele):	Norm
Zylinderschrauben mit Innensechskant (M5 x L)	DIN EN ISO 4762
Zylinderschrauben mit Innensechskant und niedrigem Kopf (M5 x L)	DIN 7984

5.3 Kabeldichtung

ACHTUNG

Schutzart IP 65 / IP 67 ist nur gewährleistet, wenn alle Steckplätze durch Stecker oder durch Blindstecker abgedichtet werden.

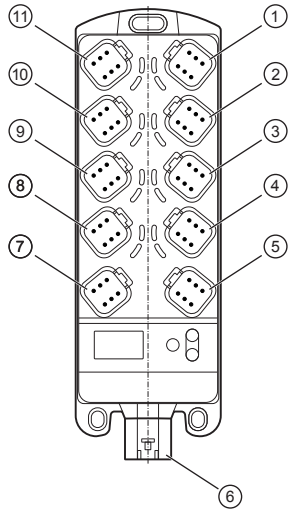
6 Elektrischer Anschluss

6.1 Generelle Anschlusshinweise

Die Anschlüsse der Versorgungsleitungen und der CAN2-Schnittstelle erfolgen über den Stecker X1 an der Geräteunterseite. Die Anschlüsse der Ein-/Ausgänge, der CAN1-Schnittstelle und der CAN-Versorgung erfolgen über die Deutsch-Stecker auf der Gehäusefrontseite.

DE

Anschlussbelegung (→ 9 Technische Daten)



1: Stecker 8
2: Stecker 6
3: Stecker 4
4: Anschluss 2
5: CAN1 OUT
6: X1 - Anschluss Leistungsstecker
7: CAN1 IN
8: Stecker 1
9: Stecker 3
10: Stecker 5
11: Stecker 7

Steckerfeld (hier z.B. CR0403)

Stecker	CR2050	CR2051	CR2052	Polzahl
1	IN00 / IN08	OUT00 / OUT08	IN00 / IN04	6
2	IN01 / IN09	OUT01 / OUT09	OUT00 / OUT04	6
3	IN02 / IN10	OUT02 / OUT10	IN01 / IN05	6
4	IN03 / IN11	OUT03 / OUT11	OUT01 / OUT05	6
5	IN04 / IN12	OUT04 / OUT12	IN02 / IN06	6
6	IN05 / IN13	OUT05 / OUT13	OUT02 / OUT06	6
7	IN06 / IN14	OUT06 / OUT14	IN03 / IN07	6
8	IN07 / IN15	OUT07 / OUT15	OUT03 / OUT07	6
CAN1 IN	CAN1-Schnittstelle			6
CAN1 OUT	CAN1-Schnittstelle (z. B. zum Durchschleifen)			6
X1	Versorgungsspannung und CAN2-Schnittstelle			6

ACHTUNG

Falscher Anschluss kann zur Beschädigung des Gerätes führen.
► Sicherheitshinweise beachten (→ 2.3 Elektrischer Anschluss).

- ► Grundsätzlich alle Versorgungs- und Signalleitungen getrennt führen.
- ► Versorgungs- und Signalleitungen auf kürzestem Weg vom Gerät wegführen.
- ► Alle angeschlossenen Leitungen maximal 400 mm nach Geräteaustritt mit einer Zugentlastung versehen.
- ► Nicht verwendete Stecker mit entsprechenden Blindsteckern / geschlossenen Dichtungen verschließen.

6.2 Anschlusszubehör

Informationen zum verfügbaren Zubehör unter www.ifm.com

6.3 Frequenzeingänge

CR2050 / CR2052:

- ► Frequenzeingänge mit geschirmten Leitungen betreiben, damit Nutzsignale nicht durch Fremdstörungen beeinflusst werden.

6.4 Verpolungsschutz

Ein Schutz gegen Verpolung der Betriebsspannung ist nur beim Betrieb an einem Bordnetz in Verbindung mit einer Sicherung gegeben. Beim Betrieb über ein Netzteil ist kein Schutz gegen Verpolung der Betriebsspannung gegeben.

CR2051: Ein Schutz gegen Verpolung der CAN-Versorgungsspannung ist nicht gegeben, da diese Spannung innerhalb des Gerätes nicht verwendet wird.

6.5 Versorgung der Signalgeber an den Eingängen

CR2050 / CR2052:

- ► Als Versorgungsspannung für die Signalgeber an den Eingängen (z.B. Schalter oder Sensoren) die Sensorspannung VBB_S des entsprechenden Anschlusssteckers verwenden.
- ► Wenn der Eingang (Schalter oder Sensor) über eine externe Spannung versorgt wird, diese mit max. 3 A absichern.

6.6 Sicherungen

- ► Zum Schutz des gesamten Systems die einzelnen Stromkreise absichern.

Bezeichnung		Potential	Stecker: Pin	Sicherung
VBB_S	Versorgung Sensorik/Modul	8…32 V DC	AMP-Anschlussstecker: Pin 4	CR2050: 3 A CR2052: 3 A
VBB_1	Versorgung Ausgänge CR2050: nicht vorhanden CR2051: OUT00, 02, 04, 06, 08, 10, 12, 14 CR2052: nicht vorhanden	8…32 V DC	AMP-Anschlussstecker: Pin 4	CR2050: - CR2051: ≤ 25 A CR2052: -
VBB_2	Versorgung Ausgänge CR2050: nicht vorhanden CR2051: OUT01, 03, 05, 07, 09, 11, 13, 15 CR2052: OUT00...07	8…32 V DC	AMP-Anschlussstecker: Pin 6	CR2050: - CR2051: ≤ 25 A CR2052: ≤ 25 A

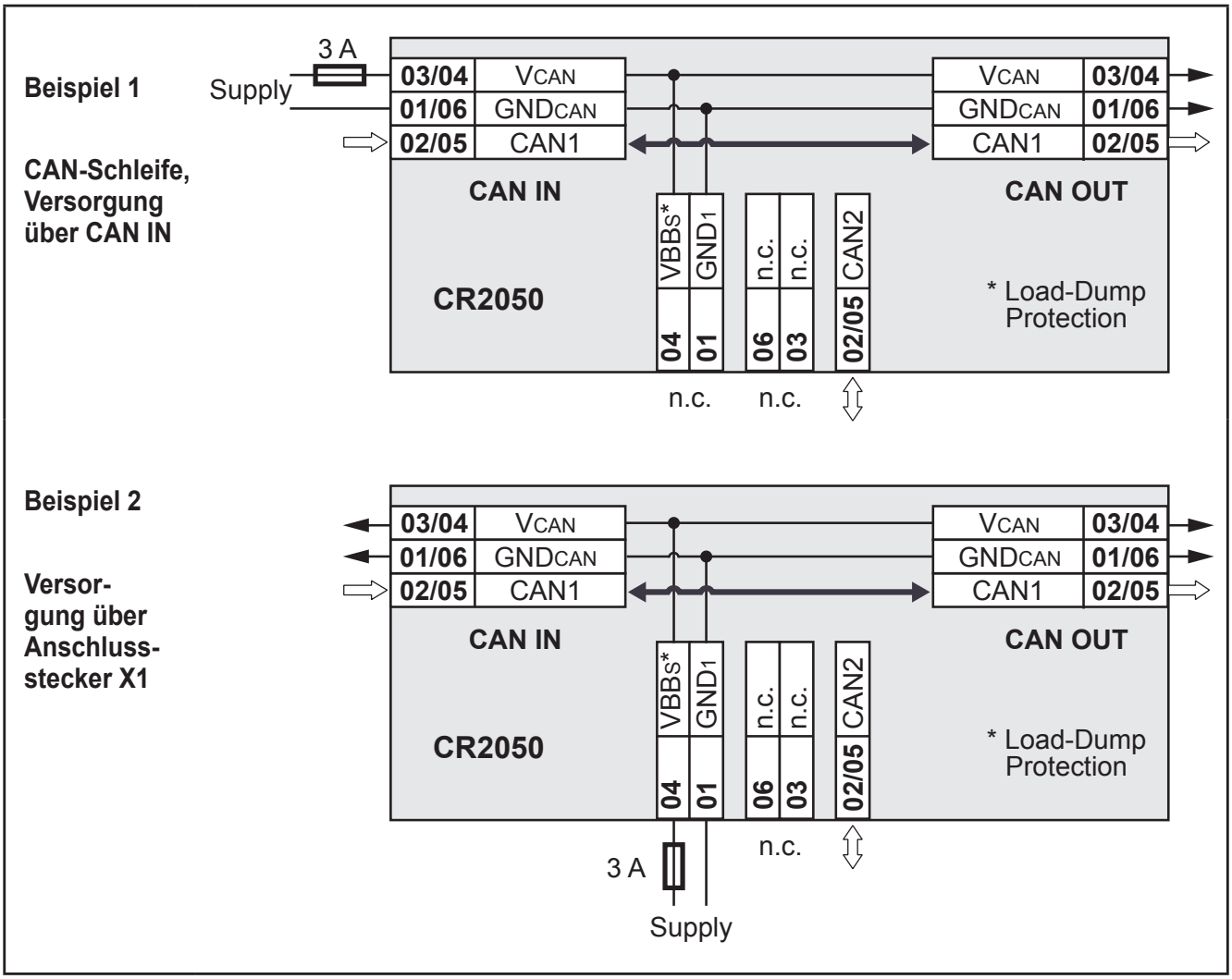
Bezeichnung		Potential	Stecker: Pin	Sicherung
V_{CAN}	Optionale Versorgung CAN1-Schnittstelle CR2050: verbunden mit VBB_S CR2051: keine Verbindung mit VBB_S CR2052: verbunden mit VBB_S	8…32 V DC	CAN IN: Pin 3 + 4	 CR2050: - CR2051: 3 A CR2052: -

► Die zu den Versorgungsspannungen gehörenden Masse-Pins (GND_1, GND_2, ggf. GND_{CAN}) mit der gemeinsamen Masse verbinden.

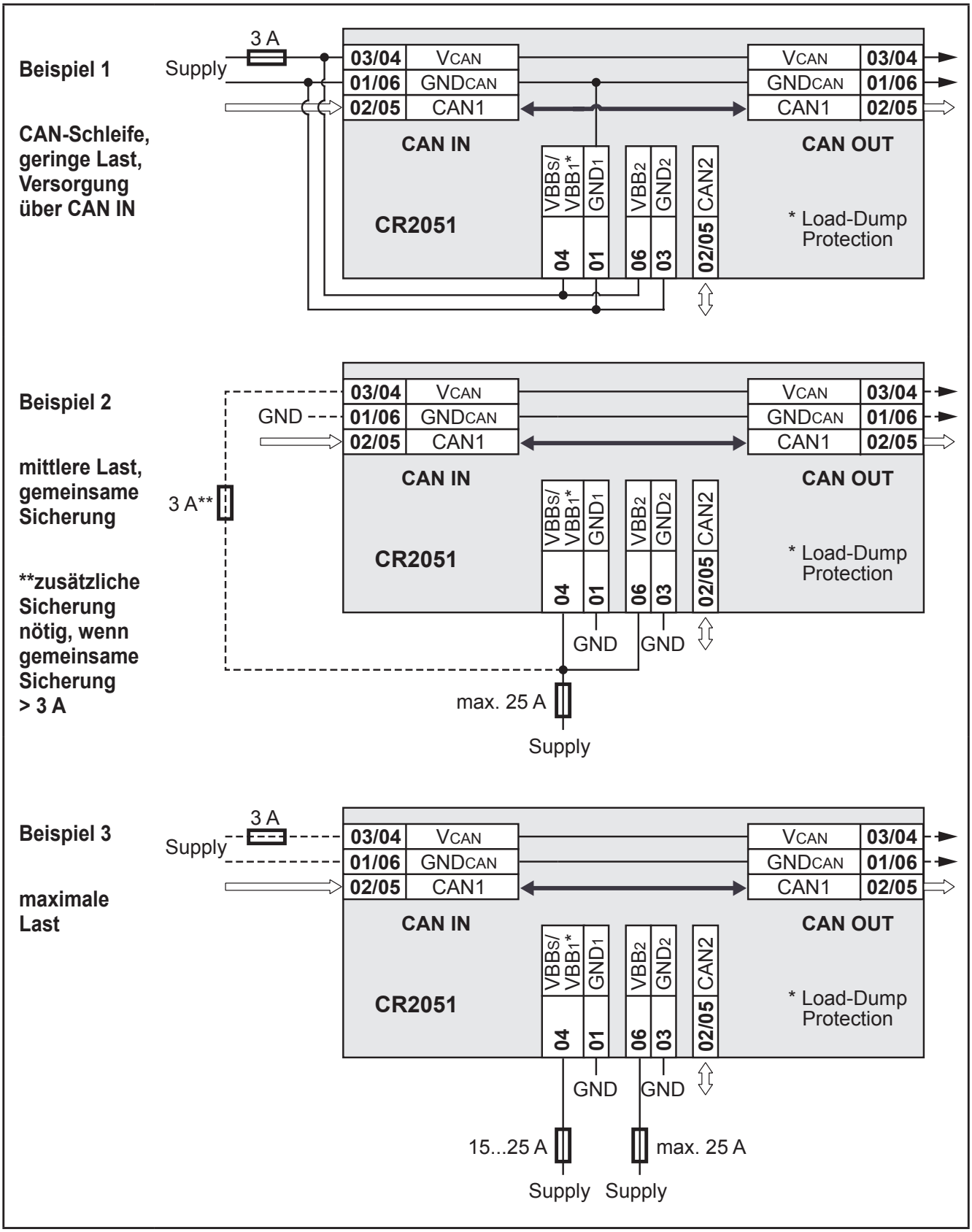
DE

6.7 Beispiele für Anschlussarten

6.7.1 CR2050

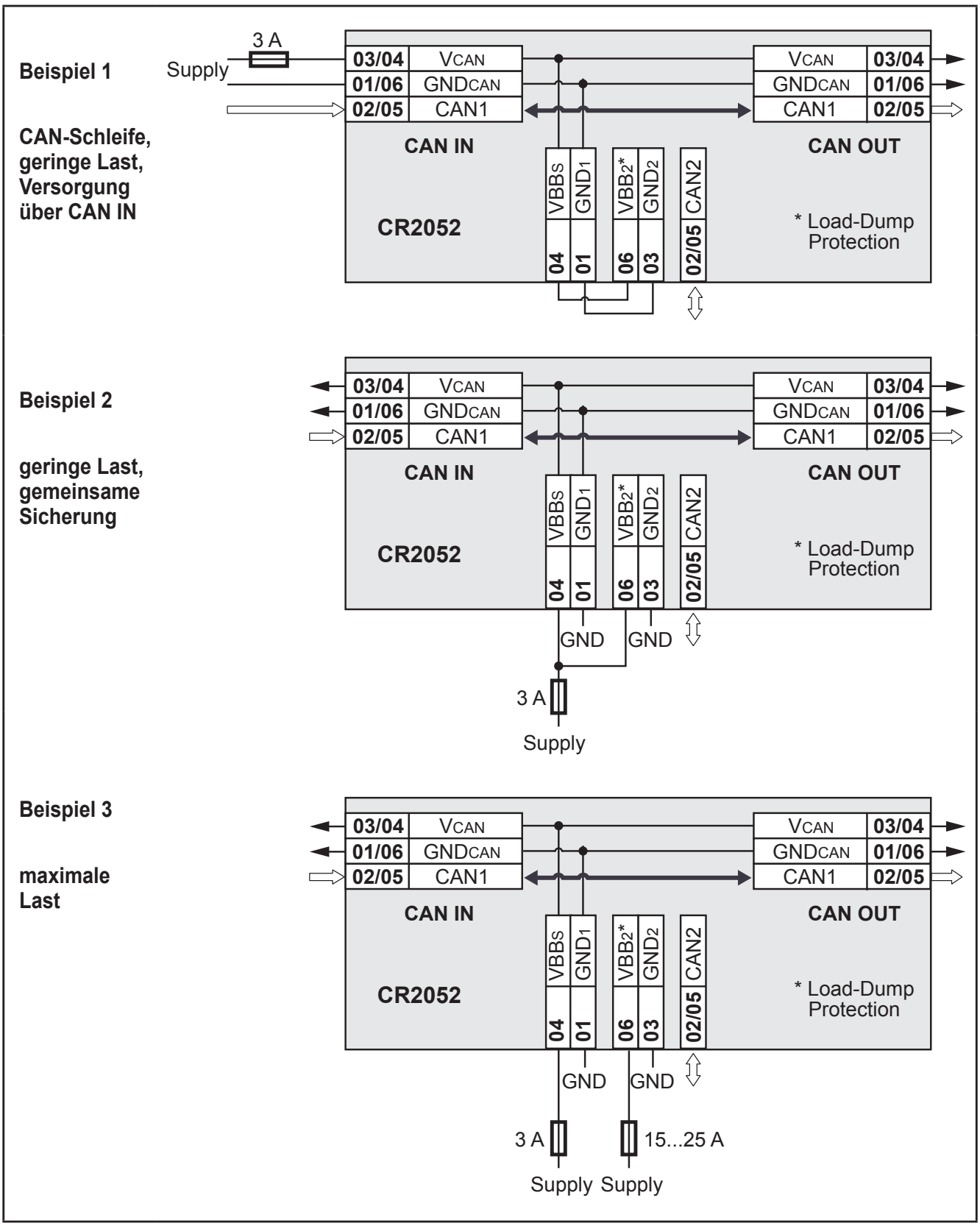


6.7.2 CR2051



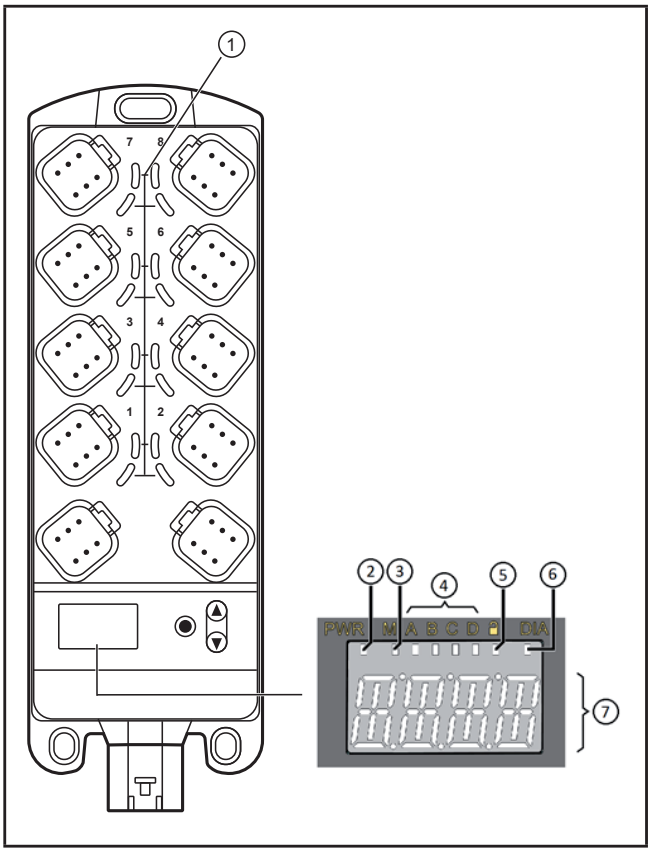
Ein Schutz gegen Überspannung aus dem KFZ-Bordnetz ist nur gegeben, wenn der Anschluss VBB_S/VBB_1 mit mindestens 15 A abgesichert wird (Beispiel 3) oder wenn alle Spannungen über eine gemeinsame Sicherung abgesichert werden (Beispiele 1 und 2).

6.7.3 CR2052



Ein Schutz gegen Überspannung aus dem KFZ-Bordnetz ist nur gegeben, wenn der Anschluss VBB_2 mit mindestens 15 A abgesichert wird (Beispiel 3) oder wenn alle Spannungen über eine gemeinsame Sicherung abgesichert werden (Beispiele 1 und 2).

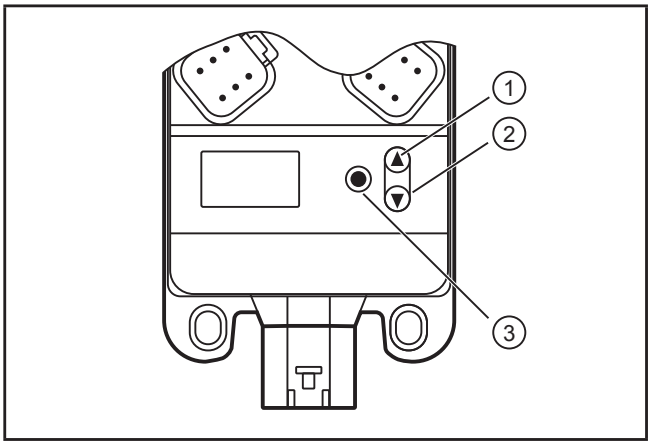
7 Bedien- und Anzeigeelemente



1: I/O-LEDs (gelb)
2: Power-LED (grün)
3: Mode-LED (grün)
4: Applikations-LEDs LED A...LED D (grün)
5: Lock-LED (grün)
6: Diagnose-LED (rot)
7: 4-stellige 10-Segment-Anzeige

Anzeigeelemente

10-Segment-Anzeige (→ 9 Technische Daten)



1: Taste UP
2: Taste DOWN
3: Taste ENTER

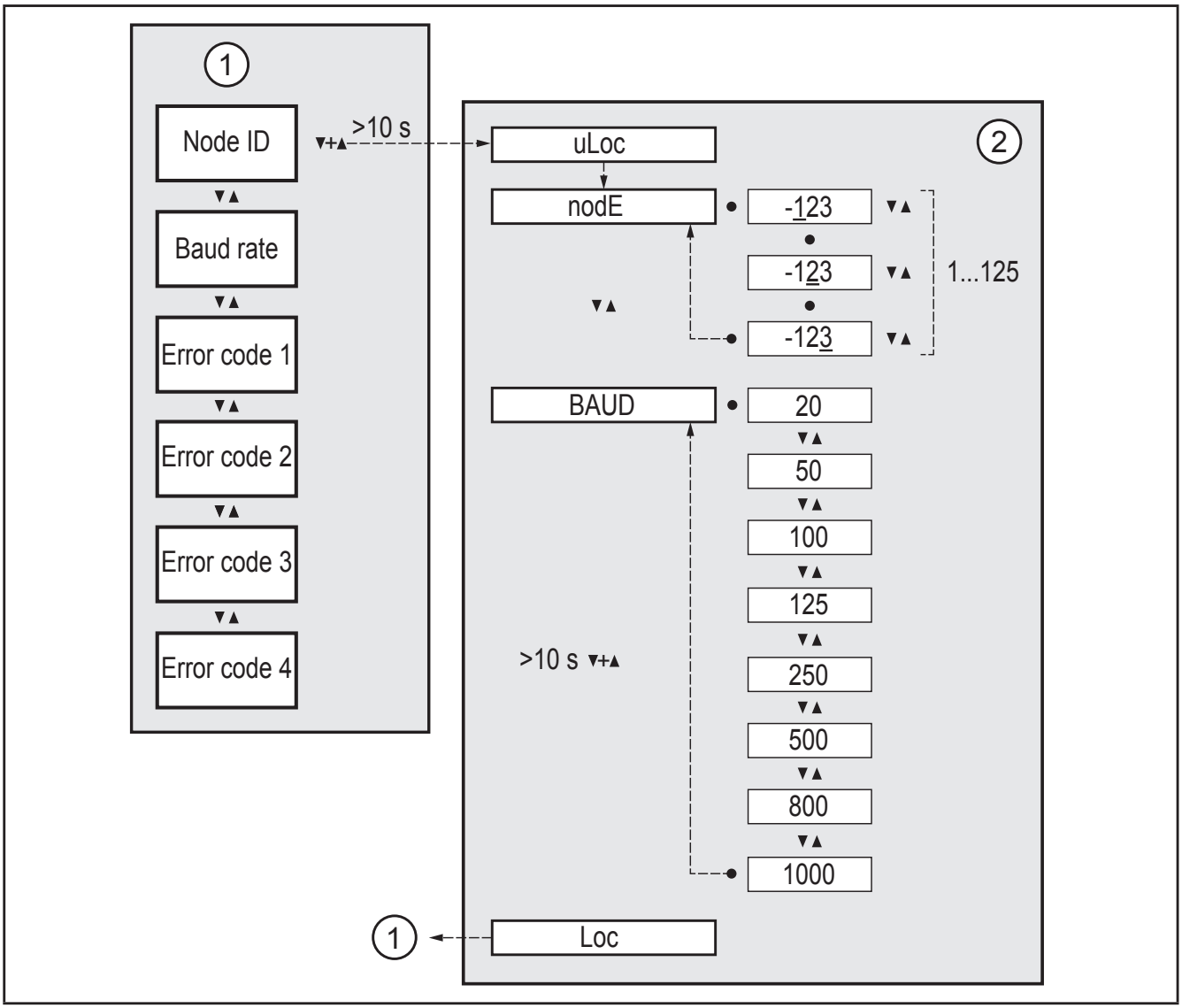
Bedienelemente

Tastenfunktionen (→ 8.1 E/A-Modul).

7.1 Menüstruktur

Die folgende Beschreibung der Menüstruktur bezieht sich auf den Auslieferzustand des Geräts als E/A-Modul. Wenn das Gerät als Controller eingerichtet wird, muss eine entsprechende Menüstruktur definiert werden (siehe Systemhandbuch iControl).

DE



1: Anzeigemodus (→ 8.1.1)

2: Editiermodus (→ 8.1.2)

Parameterliste: (→ 8.1.3)

7.2 Statusanzeige der Eingänge/Ausgänge (I/O-LEDs, gelb)

I/O-Konfiguration (siehe Objektverzeichnis im Anhang)	LED-Zustand	Beschreibung
0 (nicht benutzt)	Aus	
1 (Digitaleingang B_L)	Aus	Eingangssignal FALSE
	Ein	Eingangssignal TRUE
2 (Digitalausgang B_H)	Aus	Ausgangssignal FALSE
	Ein	Ausgangssignal TRUE
3 (Spannungseingang 10 V)	Aus	
4 (PWM-Ausgang)	Aus	PWM = 0
	Ein	PWM > 0
5 (Stromgeregelter Ausgang)	Aus	Stromwert ≤ 20 mA
	Ein	Stromwert > 20 mA
6 (Spannungseingang 32 V, ratiometrisch)	Aus	
7 (Stromeingang 20 mA)	Aus	
	2 Hz	Fehler am Eingang
9 (Spannungseingang 32 V)	Aus	
10 (Digitaleingang B_L)	Aus	Eingangssignal FALSE
	Ein	Eingangssignal TRUE
11 (Digitaleingang B_L, mit Diagnose)	Aus	Eingangssignal FALSE
	Ein	Eingangssignal TRUE
	2 Hz	Fehler am Eingang
12 (Digitaleingang B_H)	Aus	Eingangssignal FALSE
	Ein	Eingangssignal TRUE
14 (Frequenzeingang)	Aus	
	2 Hz	Fehler am Eingang
15 (Digitalausgang B_H, mit Diagnose)	Aus	Ausgangssignal FALSE
	Ein	Ausgangssignal TRUE
	2 Hz	Fehler am Ausgang
16 (Digitalausgang B_H, mit Diagnose, kurzschluss- und überlastfest)	Aus	Ausgangssignal FALSE
	Ein	Ausgangssignal TRUE
	2 Hz	Fehler am Ausgang
18 (Widerstandseingang)	Aus	
	2 Hz	Fehler am Eingang
20 (Periodendauermessung)	Aus	
	2 Hz	Fehler am Eingang

8 Inbetriebnahme

8.1 E/A-Modul

Im Auslieferzustand ist das Gerät als E/A-Modul konfiguriert.

Nach dem Einschalten zeigt die 10-Segment-Anzeige die Artikelnummer des Geräts und danach die eingestellte Node-ID an.

8.1.1 Anzeigemodus

Leuchtet die grüne Lock-LED, befindet sich das Gerät im Anzeigemodus. Das Gerät kann nur die eingestellte Node-ID und Baudrate sowie ggf. vorliegende Fehlermeldungen anzeigen; Parameter können nicht editiert werden.

► Taste DOWN drücken.

> Gerät zeigt eingestellte Baudrate an.

► Taste DOWN drücken.

> Gerät zeigt Fehlercode 1 an, sofern vorhanden.

► Taste DOWN erneut drücken.

> Gerät zeigt bei jedem Tastendruck DOWN einen weiteren Fehlercode an, sofern vorhanden.

► Mit Taste UP zurück.

Maximal 4 verschiedene Fehlercodes können vorliegen und angezeigt werden:

Fehlercode	Beschreibung
SH	Kurzschluss gegen GND
OP	Leiterbruch
oL	Überstrom
Comm	Kommunikationsfehler

Nach 10 s ohne Tastenbedienung zeigt das Gerät die eingestellte Node-ID an.

8.1.2 Parametrierung

► Tasten UP und DOWN gleichzeitig min. 10 s drücken, um in den Editiermodus zu wechseln.

> Grüne Lock-LED erlischt.

> Parameter können editiert werden.

> Anzeige "uLoc" für 5 s

> Anzeige "nodE"

► Taste ENTER drücken.

> Gerät zeigt eingestellte Node-ID an.

> Die 1. editierbare Ziffer blinkt.
► Mit den Tasten UP und DOWN den gewünschten Wert einstellen.
► Mit der Taste ENTER zur nächsten Ziffer springen.
> Die 2. editierbare Ziffer blinkt.
► Mit den Tasten UP und DOWN den gewünschten Wert einstellen.
► Mit der Taste ENTER zur nächsten Ziffer springen.
> Die 3. editierbare Ziffer blinkt.
► Mit den Tasten UP und DOWN den gewünschten Wert einstellen.
► Taste ENTER drücken.
> Eingestellte Node-ID wird übernommen.
> Anzeige "nodE"
► Taste DOWN drücken.
> Anzeige "BAUD"
► Taste ENTER drücken.
> Gerät zeigt eingestellte Baudrate an.
► Mit den Tasten UP und DOWN den gewünschten Wert einstellen.
► Taste ENTER drücken.
> Eingestellte Baudrate wird übernommen.

Änderungen der Parameter werden erst nach einem Reset des Geräts wirksam.

Editiermodus beenden:

► Tasten UP und DOWN gleichzeitig min. 10 s drücken.
> Grüne Lock-LED an.
> Parameter können nicht editiert werden.
> Anzeige "Loc" für 5 s, danach Anzeige der eingestellten Node-ID

Nach 30 s ohne Tastaturbedienung beendet das Gerät den Editiermodus automatisch.

8.1.3 Parameterliste

Parameter	Funktion	Wertebereich	Defaultwert
nodE	Node-ID des Geräts	1...125	125
BAUD	Baudrate	20, 50, 100, 125, 250, 500, 800, 1000 kBit/s	250 kBit/s

8.2 Controller

Das Gerät kann als Controller konfiguriert werden. Dadurch verliert es die bisherige Menüstruktur sowie die Eigenschaften als E/A-Modul.

8.2.1 Programmierung

Die Applikationssoftware kann vom Anwender mit dem IEC 61131-3 konformen Programmiersystem CODESYS 2.3 erstellt werden.

⚠ WARNUNG

Für die sichere Funktion der vom Anwender erstellten Applikationsprogramme ist dieser selbst verantwortlich. Bei Bedarf muss er entsprechend der nationalen Vorschriften zusätzlich eine Abnahme durch entsprechende Prüf- und Überwachungsorganisationen durchführen lassen.

Hinweise zur Einstellung der CAN-ID und der Baudrate bei Verwendung als CANopen-Slave finden Sie im Systemhandbuch.

8.3 Benötigte Dokumentationen

Neben dem Programmiersystem CODESYS werden zur Inbetriebnahme und Programmierung des Gerätes folgende Dokumente benötigt:

- Programmierhandbuch CODESYS V2.3
  (alternativ als Onlinehilfe)
- Systemhandbuch ioControl
  (alternativ als Onlinehilfe)

Als Download-File stehen die Handbücher im Internet zur Verfügung:
www.ifm.com

8.4 Benötigte Hardware

Bei Verwendung als Mobilsteuerung ist zum Laden des Applikationsprogramms in das Gerät ein CAN-Interface für den Anschluss an einen PC oder ein Notebook erforderlich.

Beispiel:

- CAN/RS232-USB Interface CANfox
- Adapterkabel für CANfox

Informationen zum verfügbaren Zubehör unter:
www.ifm.com

9 Technische Daten

9.1 CR2050

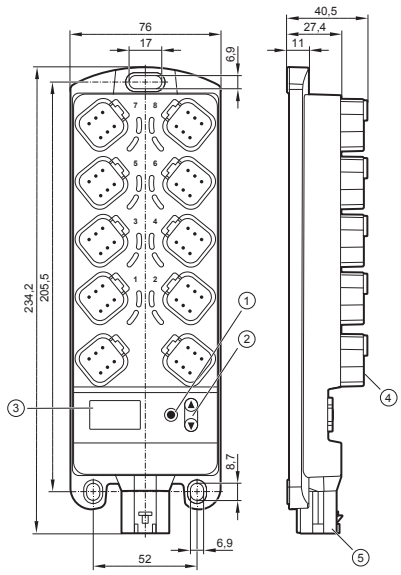
CR2050

E/A-Modul
digital und analog
für System R360
CANopen Slave

Mobilsteuerung
Programmierung
nach IEC 61131-3

16 Eingänge
2 CAN-Schnittstellen

8...32 V DC



1: Taste ENTER
2: Tasten UP/DOWN
3: 10-Segment-Anzeige
4: DEUTSCH-Stecker
5: AMP-Anschlussstecker

Technische Daten	Modulares Steuerungssystem Einsetzbar als CANopen-Slave oder intelligentes E/A-Modul
Mechanische Daten	
Gehäuse	Gehäuse: PA6/6.6 Anzeige: PA Tasten: Silikon
Abmessungen (H x B x T)	234 x 76 x 40,5 mm (ohne Rohrniete)
Montage	Befestigung mit 3 Schrauben M5 nach DIN EN ISO 4762 oder DIN 7984, 3 Rohrnieten nach DIN 7340 und 3 Unterlegscheiben nach DIN EN ISO 7092 (Rohrniete und Unterlegscheiben liegen bei)
Anschluss	Versorgung: MCP2.8 6 polig für Stecker TE-AMP 1745078-1 Ein-/Ausgänge: Deutsch DT04-6S 6 polig Kontakte: AMP: CuFe verzinnt; Deutsch: CuZn vergoldet)
Eingänge CAN1-Schnittstelle Betriebsspannung, CAN2	8 x 6-polig 2 x 6-polig 1 x 6-polig
Schutzart	IP 65 und IP 67 (alle Stecker gesteckt)
Betriebs-/Lagertemperatur	-40...85° C / -40...85° C
Max. zulässige relative Luftfeuchtigkeit	90 %, nicht kondensierend
Max. Höhe über NN	2000 m
Verschmutzungsgrad	2
Gewicht	500 g
Elektrische Daten	
Betriebsspannung	8...32 V DC
Stromaufnahme	100 mA (bei 24 V DC) / 185 mA (bei 12 V DC) / max. 300 mA
Überspannung Unterspannungserkennung Unterspannungsabschaltung	36 V für t ≤ 10 s bei U_B ≤ 7,8 V bei U_B ≤ 7,0 V
Prozessor	Freescale PowerPC, 50 MHz
Speicher (gesamt)	592 kByte RAM / 1536 kByte Flash / 1 kByte FRAM
Speicheraufteilung	siehe Systemhandbuch ioControl und www.ifm.com

DE

CR2050	Technische Daten
Geräteüberwachung	Unterspannungsüberwachung Watchdogfunktion Checksummenprüfung für Programm und System Übertemperaturüberwachung
CAN Schnittstellen 1 und 2 Baudrate Kommunikationsprofil	CAN Interface 2.0 A/B, ISO 11898 20 kBit/s...1 MBit/s (Default CAN1: 250 kBit/s, CAN2: 250 kBit/s) CANopen, CiA DS 301 Version 4, CiA DS 401 Version 1.4 oder SAE J 1939 oder freies Protokoll
Software/Programmierung	
Programmiersystem	CODESYS Version 2.3 (IEC 61131-3)
Eingänge	16 (konfigurierbar)
Konfigurationen	

Anzahl	Ausführung	
8	digital für positive/negative Gebersignale analog (0…10/32 V DC, 0...20 mA, ratiometrisch)	B_L/B_H A
4	digital für positive Gebersignale Widerstandsmessung (0,016...30 kΩ)	B_L R
4	digital für positive Gebersignale digital für negative Gebersignale* Frequenz (≤ 30 kHz)	B_L B_H FRQ

* nicht im E/A-Modul (CANopen Slave) verfügbar

Anzeigeelemente	
I/O-LEDs	16 x LED orange (Voreinstellung: Statusanzeige des jeweiligen Eingangs)
Power-LED (PWR)	LED grün (Voreinstellung: Signalisieren des System-Status)
Mode-LED (M)	LED grün (Voreinstellung: Signalisiert eine Anzeige der Node-ID)
Applikations-LEDs (A...D)	4 x LED grün
Lock-LED (Schloss-Symbol)	1 x LED grün (Voreinstellung: Verriegelung der eingestellten Parameter)
Diagnose-LED (DIA)	1 x LED rot (Voreinstellung: Anzeigen eines Fehlers)
Anzeige	4-stellige 10-Segment-Anzeige (zweifarbig: rot / grün) (Voreinstellung: Anzeige der Baudrate oder Node-ID)
Betriebszustände bei Verwendung als Mobilsteuerung	

LED	Zustand	Beschreibung
–	konstant aus	keine Betriebsspannung
PWR + DIA	1 x ein	Initialisierung oder Reset Checks
PWR	5 Hz	kein Betriebssystem geladen
	2 Hz	Applikation läuft (RUN)
	konstant ein	Applikation angehalten (STOP)
DIA	10 Hz	Applikation angehalten (STOP mit Fehler)
	5 Hz	Applikation angehalten wegen Unterspannung
	konstant ein	System-Fehler (Fatal Error)

CR2050	Technische Daten
Bedienelemente	
Tasten	ENTER, UP, DOWN
Tasten (Voreinstellung)	Einstellen der CAN-ID / Baudrate
Kennwerte der Eingänge	

Analogeingänge (B_L, B_H, A)
IN00 - Anschluss 1, Pin 5
IN01 - Anschluss 2, Pin 5
IN02 - Anschluss 3, Pin 5
IN03 - Anschluss 4, Pin 5
IN04 - Anschluss 5, Pin 5
IN05 - Anschluss 6, Pin 5
IN06 - Anschluss 7, Pin 5
IN07 - Anschluss 8, Pin 5
konfigurierbar als...

● Spannungseingänge	
Eingangsspannung	0...10 V oder 0...32 V
Auflösung	12 Bit
Genauigkeit	± 1% FS
Eingangswiderstand	65,6 kΩ (0...10 V), 50,7 kΩ (0...32 V)
Eingangsfrequenz	≤ 500 Hz
● Stromeingänge, diagnosefähig	
Eingangsstrom	0...20 mA
Auflösung	12 Bit
Genauigkeit	± 1% FS
Eingangswiderstand	400 Ω
Eingangsfrequenz	≤ 500 Hz
Bei Strömen > 23 mA wird der Eingang auf Spannungseingang umgeschaltet!	
● Spannungseingänge, 0...32 V, ratiometrisch	
Funktion	(U_{IN} ÷ U_B) x 1000 ‰
Wertebereich	0...1000 ‰
Eingangswiderstand	50,7 kΩ
● Binäre Spannungseingänge für positive Gebersignale	
Einschaltpegel	> 0,7 U_B
Ausschaltpegel	< 0,3 U_B
Eingangswiderstand	3,2 kΩ
Eingangsfrequenz	50 Hz
Diagnose Leiterbruch	> 0,95 U_B
Diagnose Kurzschluss	< 1 V
● Binäre Spannungseingänge für negative Gebersignale	
Einschaltpegel	> 0,7 U_B
Ausschaltpegel	< 0,3 U_B
Eingangswiderstand	3,2 kΩ
Eingangsfrequenz	50 Hz

Digitaleingänge (B_L, R)
IN08 - Anschluss 1, Pin 2
IN10 - Anschluss 3, Pin 2
IN12 - Anschluss 5, Pin 2
IN14 - Anschluss 7, Pin 2
konfigurierbar als…

● Binäre Spannungseingänge für positive Gebersignale	
Einschaltpegel	> 0,7 U_B
Ausschaltpegel	< 0,3 U_B
Eingangswiderstand	3,2 kΩ
Eingangsfrequenz	50 Hz
Diagnose Leiterbruch	> 0,95 U_B
Diagnose Kurzschluss	< 1 V
● Widerstandseingang	
Messbereich	0,016…30 kΩ
Genauigkeit	± 2 % FS: 16 Ω...3 kΩ ± 5 % FS: 3...15 kΩ ± 10 % FS: 15...30 kΩ

CR2050	Technische Daten

Frequenzeingänge (B_L, B_H, FRQ)
IN09 - Anschluss 2, Pin 2
IN11 - Anschluss 4, Pin 2
IN13 - Anschluss 6, Pin 2
IN15 - Anschluss 8, Pin 2
konfigurierbar als…

● Frequenzeingänge	
Eingangswiderstand	3,2 kΩ
Eingangsfrequenz	≤ 30 kHz
Einschaltpegel	> 0,7 U_B
Ausschaltpegel	< 0,3 U_B
● Binäre Spannungseingänge für positive Gebersignale	
Einschaltpegel	> 0,7 U_B
Ausschaltpegel	< 0,3 U_B
Eingangswiderstand	3,2 kΩ
Eingangsfrequenz	50 Hz
Diagnose Leiterbruch*	> 0,95 U_B
Diagnose Kurzschluss*	< 1 V
● Binäre Spannungseingänge für negative Gebersignale*	
Einschaltpegel	> 0,7 U_B
Ausschaltpegel	< 0,3 U_B
Eingangswiderstand	3,2 kΩ
Eingangsfrequenz	50 Hz

* nicht im E/A-Modul (CANopen Slave) verfügbar

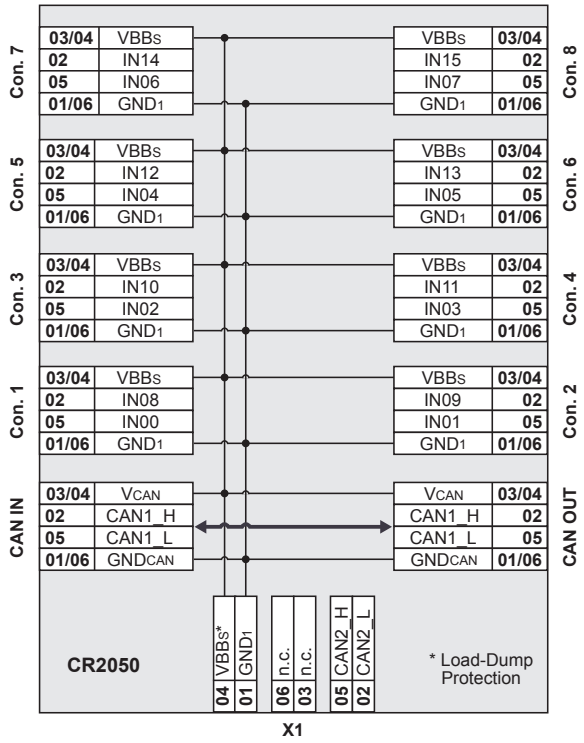
Max. Summenstrom der CAN-Versorgung + Sensorversorgungen V_{CAN} + VBB_S — 1,5 A

CR2050	Technische Daten	
Prüfnormen und Bestimmungen		
CE-Zeichen	EN 61000-6-2	Elektromagnetische Verträglichkeit (EMV) Störfestigkeit
	EN 61000-6-4	Elektromagnetische Verträglichkeit (EMV) Störaussendung
E1-Zeichen	UN/ECE-R10	Störaussendung Störfestigkeit mit 100 V/m
	ISO 7637-2	Impuls 1, Schärfegrad: IV; Funktionszustand C Impuls 2a, Schärfegrad: IV; Funktionszustand A Impuls 2b, Schärfegrad: IV; Funktionszustand C Impuls 3a, Schärfegrad: IV; Funktionszustand A Impuls 3b, Schärfegrad: IV; Funktionszustand A Impuls 4, Schärfegrad: IV; Funktionszustand B Impuls 5, Schärfegrad: III; Funktionszustand C (Angaben gelten für 24 V System) Impuls 4, Schärfegrad: III; Funktionszustand C (Angabe gilt für 12 V System)
Klimatische Prüfungen	EN 60068-2-30	Feuchte Wärme zyklisch obere Temperatur 55°C, Anzahl Zyklen: 6
	EN 60068-2-78	Feuchte Wärme konstant Prüftemperatur 40°C / 93% RH, Prüfdauer: 21 Tage
	EN 60068-2-52	Salznebel Sprühtest Schärfegrad 3 (Kraftfahrzeug)
Mechanische Prüfungen	ISO 16750-3	Test VII; Vibration, random Anbauort Karosserie
	EN 60068-2-6	Vibration, sinus 10...500 Hz; 0,72 mm/10 g; 10 Zyklen/Achse
	ISO 16750-3	Dauerschocken 30 g/6 ms; 24.000 Schocks
Chemische Beständigkeit	ISO 16750-5:2010	AA, AB, BA, BD, CC, DB, DC, DD
Hinweis	EG-Konformitätserklärung und Zulassungen sind abrufbar unter: www.ifm.com	

DE

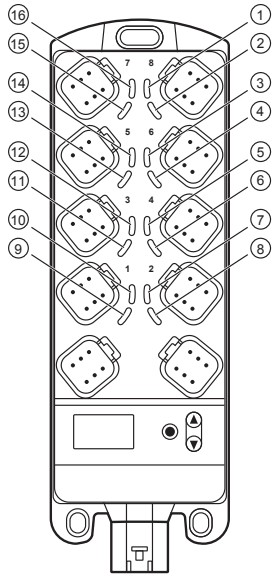
CR2050	Technische Daten

Anschlussbelegung



LED-Zuordnung

1: LED IN15
2: LED IN07
3: LED IN13
4: LED IN05
5: LED IN11
6: LED IN03
7: LED IN09
8: LED IN01
9: LED IN08
10: LED IN00
11: LED IN10
12: LED IN02
13: LED IN12
14: LED IN04
15: LED IN14
16: LED IN06



Abkürzungen

A	Analog
B_H	Binär High-Side
B_L	Binär Low-Side
FRQ	Frequenz-/Impulseingang
R	Widerstandseingang
VBB_S	Versorgung Sensorik/Modul
V_{CAN}	Versorgung CAN-Stecker

9.2 CR2051

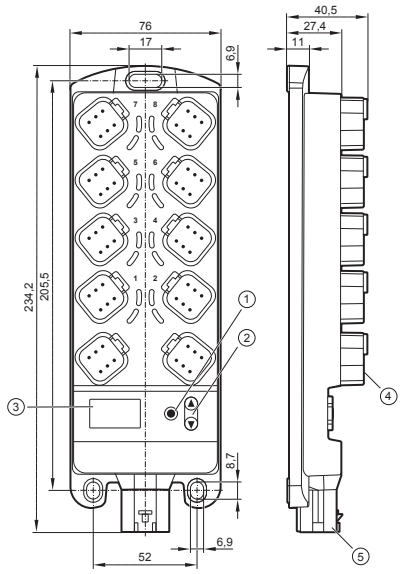
CR2051

E/A-Modul
digital und analog
für System R360
CANopen Slave

Mobilsteuerung
Programmierung
nach IEC 61131-3

16 Ausgänge
2 CAN-Schnittstellen

8...32 V DC



1: Taste ENTER
2: Tasten UP/DOWN
3: 10-Segment-Anzeige
4: DEUTSCH-Stecker
5: AMP-Anschlussstecker

Technische Daten	Modulares Steuerungssystem Einsetzbar als CANopen-Slave oder intelligentes E/A-Modul
Mechanische Daten	
Gehäuse	Gehäuse: PA6/6.6 Anzeige: PA Tasten: Silikon
Abmessungen (H x B x T)	234 x 76 x 40,5 mm (ohne Rohrniete)
Montage	Befestigung mit 3 Schrauben M5 nach DIN EN ISO 4762 oder DIN 7984, 3 Rohrnieten nach DIN 7340 und 3 Unterlegscheiben nach DIN EN ISO 7092 (Rohrniete und Unterlegscheiben liegen bei)
Anschluss	Versorgung: MCP2.8 6 polig für Stecker TE-AMP 1745078-1 Ein-/Ausgänge: Deutsch DT04-6S 6 polig Kontakte: AMP: CuFe verzinnt; Deutsch: CuZn vergoldet)
Eingänge CAN1-Schnittstelle Betriebsspannung, CAN2	8 x 6-polig 2 x 6-polig 1 x 6-polig
Schutzart	IP 65 und IP 67 (alle Stecker gesteckt)
Betriebs-/Lagertemperatur	-40...85° C / -40...85° C
Max. zulässige relative Luftfeuchtigkeit	90 %, nicht kondensierend
Max. Höhe über NN	2000 m
Verschmutzungsgrad	2
Gewicht	500 g
Elektrische Daten	
Betriebsspannung	8...32 V DC
Stromaufnahme	104 mA (bei 24 V DC) / 185 mA (bei 12 V DC) / max. 300 mA
Überspannung Unterspannungserkennung Unterspannungsabschaltung	36 V für t ≤ 10 s bei U_B ≤ 7,8 V bei U_B ≤ 7,0 V
Prozessor	Freescale PowerPC, 50 MHz
Speicher (gesamt)	592 kByte RAM / 1536 kByte Flash / 1 kByte FRAM
Speicheraufteilung	siehe Systemhandbuch ioControl und www.ifm.com

DE

CR2051	Technische Daten
Geräteüberwachung	Unterspannungsüberwachung Watchdogfunktion Checksummenprüfung für Programm und System Übertemperaturüberwachung
CAN Schnittstellen 1 und 2 Baudrate Kommunikationsprofil	CAN Interface 2.0 A/B, ISO 11898 20 kBit/s...1 MBit/s (Default CAN1: 250 kBit/s, CAN2: 250 kBit/s) CANopen, CiA DS 301 Version 4, CiA DS 401 Version 1.4 oder SAE J 1939 oder freies Protokoll
Software/Programmierung	
Programmiersystem	CODESYS Version 2.3 (IEC 61131-3)
Ausgänge	16 (konfigurierbar)

Konfigurationen

Anzahl	Ausführung	
4	plusschaltend (High-Side), 4 A, Diagnose PWM-Ausgang (20…250 Hz), 4 A, Diagnose stromgeregelt 0,02…4 A	B_H PWM PWM_I
4	plusschaltend (High-Side), 2,5 A, Diagnose PWM-Ausgang (20…250 Hz), 2,5 A, Diagnose stromgeregelt 0,02…2,5 A	B_H PWM PWM_I
4	plusschaltend (High-Side), 4 A, Diagnose PWM-Ausgang (20…250 Hz), 4 A	B_H PWM
4	plusschaltend (High-Side), 2,5 A, Diagnose PWM-Ausgang (20…250 Hz), 2,5 A	B_H PWM

Anzeigeelemente	
I/O-LEDs	16 x LED orange (Voreinstellung: Statusanzeige des jeweiligen Ausgangs)
Power-LED (PWR)	LED grün (Voreinstellung: Signalisieren des System-Status)
Mode-LED (M)	LED grün (Voreinstellung: Signalisiert eine Anzeige der Node-ID)
Applikations-LEDs (A...D)	4 x LED grün
Lock-LED (Schloss-Symbol)	1 x LED grün (Voreinstellung: Verriegelung der eingestellten Parameter)
Diagnose-LED (DIA)	1 x LED rot (Voreinstellung: Anzeigen eines Fehlers)
Anzeige	4-stellige 10-Segment-Anzeige (zweifarbig: rot / grün) (Voreinstellung: Anzeige der Baudrate oder Node-ID)

Betriebszustände bei Verwendung als Mobilsteuerung

LED	Zustand	Beschreibung
–	konstant aus	keine Betriebsspannung
PWR + DIA	1 x ein	Initialisierung oder Reset Checks
PWR	5 Hz	kein Betriebssystem geladen
	2 Hz	Applikation läuft (RUN)
	konstant ein	Applikation angehalten (STOP)
DIA	10 Hz	Applikation angehalten (STOP mit Fehler)
	5 Hz	Applikation angehalten wegen Unterspannung
	konstant ein	System-Fehler (Fatal Error)

CR2051	Technische Daten
Bedienelemente	
Tasten	ENTER, UP, DOWN
Tasten (Voreinstellung)	Einstellen der CAN-ID / Baudrate
Kennwerte der Ausgänge	

Digitalausgänge (B_H, PWM, PWM_I)
OUT00 - Anschluss 1, Pin 5
OUT01 - Anschluss 2, Pin 5
OUT02 - Anschluss 3, Pin 5
OUT03 - Anschluss 4, Pin 5
konfigurierbar als...

● Halbleiterausgänge, plusschaltend (High-Side), kurzschluss- und überlastfest. Diagnose über Stromrücklesung (Leiterbruch / Überlast) Diagnose über Spannungsrücklesung, Pullup-Widerstand abschaltbar (Leiterbruch/Kurzschluss)	
Schaltspannung	8...32 V
Schaltstrom	≤ 4 A
Lastwiderstand	≥ 3 Ω (bei 12 V DC) ≥ 6 Ω (bei 24 V DC)
Strommessbereich	0,02...6 A
● PWM-Ausgänge	
Ausgangsfrequenz	20...250 Hz
Tastverhältnis	1...1000 ‰
Schaltstrom	≤ 4 A
Strommessbereich	0,02...6 A
● Stromgeregelter Ausgang	
Ausgangsfrequenz	20...250 Hz
Regelbereich	0,02...4 A
Einstellauflösung	1 mA
Max. Einschaltstrom	≤ 24 A

Digitalausgänge (B_H, PWM, PWM_I)
OUT04 - Anschluss 5, Pin 5
OUT05 - Anschluss 6, Pin 5
OUT06 - Anschluss 7, Pin 5
OUT07 - Anschluss 8, Pin 5
konfigurierbar als…

● Halbleiterausgänge, plusschaltend (High-Side), kurzschluss- und überlastfest. Diagnose über Stromrücklesung (Leiterbruch / Überlast) Diagnose über Spannungsrücklesung, Pullup-Widerstand abschaltbar (Leiterbruch/Kurzschluss)	
Schaltspannung	8...32 V
Schaltstrom	≤ 2,5 A
Lastwiderstand	≥ 4,8 Ω (bei 12 V DC) ≥ 9,6 Ω (bei 24 V DC)
Strommessbereich	0,02...4 A
● PWM-Ausgänge	
Ausgangsfrequenz	20...250 Hz
Tastverhältnis	1...1000 ‰
Schaltstrom	≤ 2,5 A
Strommessbereich	0,02...4 A
● Stromgeregelter Ausgang	
Ausgangsfrequenz	20...250 Hz
Regelbereich	0,02...2,5 A
Einstellauflösung	1 mA
Max. Einschaltstrom	≤ 24 A

DE

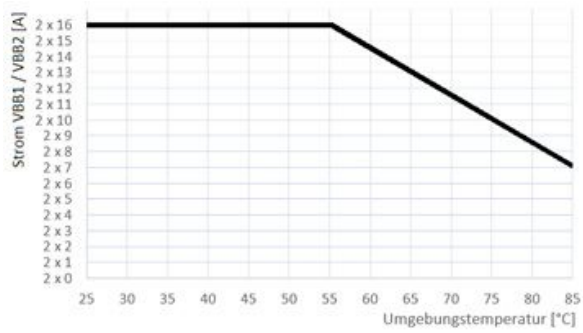
CR2051	Technische Daten

Digitalausgänge (B_H, PWM)
OUT08 - Anschluss 1, Pin 2
OUT09 - Anschluss 2, Pin 2
OUT10 - Anschluss 3, Pin 2
OUT11 - Anschluss 4, Pin 2
konfigurierbar als...

● Halbleiterausgänge, plusschaltend (High-Side), kurzschluss- und überlastfest. Diagnose über Spannungsrücklesung, Pullup-Widerstand abschaltbar (Leiterbruch/Kurzschluss)	
Schaltspannung	8...32 V
Schaltstrom	≤ 2,5 A
● PWM-Ausgänge	
Ausgangsfrequenz	20...250 Hz
Tastverhältnis	1...1000 ‰
Schaltstrom	≤ 2,5 A
Max. Einschaltstrom	≤ 24 A

Digitalausgänge (B_H, PWM)
OUT12 - Anschluss 5, Pin 2
OUT13 - Anschluss 6, Pin 2
OUT14 - Anschluss 7, Pin 2
OUT15 - Anschluss 8, Pin 2
konfigurierbar als…

● Halbleiterausgänge, plusschaltend (High-Side), kurzschluss- und überlastfest. Diagnose über Spannungsrücklesung, Pullup-Widerstand abschaltbar (Leiterbruch/Kurzschluss)	
Schaltspannung	8...32 V
Schaltstrom	≤ 4 A
● PWM-Ausgänge	
Ausgangsfrequenz	20...250 Hz
Tastverhältnis	1...1000 ‰
Schaltstrom	≤ 4 A
Max. Einschaltstrom	≤ 24 A

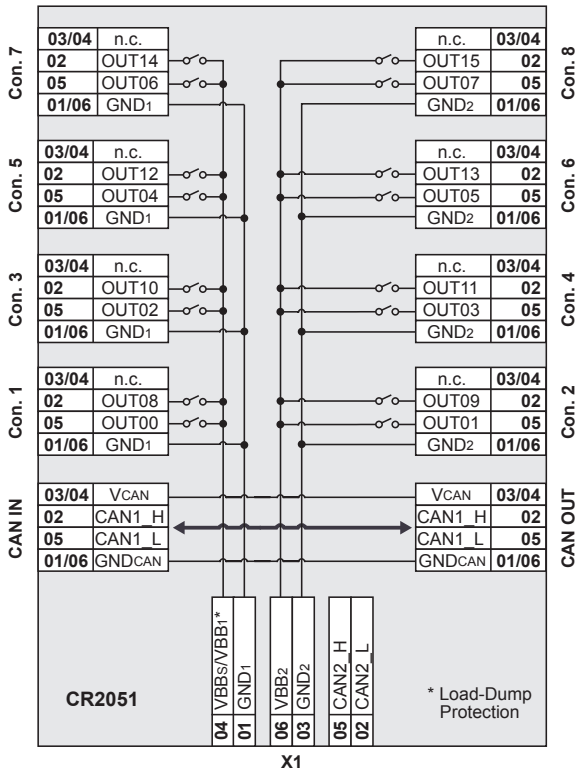
Freilaufdioden	Freilaufdioden zur Abschaltung induktiver Lasten sind integriert
Überlastfestigkeit (Gültig für alle Ausgänge)	≤ 5 Minuten (bei 100% Überlast)
Kurzschlussfestigkeit (gültig für alle Ein- und Ausgänge)	≤ 5 Minuten
Max. Summenstrom der CAN-Versorgung V_{CAN}	1,5 A
Max. Summenstrom der Ausgangsversorgungen VBB_1 / VBB_2	

CR2051	Technische Daten	
Prüfnormen und Bestimmungen		
CE-Zeichen	EN 61000-6-2	Elektromagnetische Verträglichkeit (EMV) Störfestigkeit
	EN 61000-6-4	Elektromagnetische Verträglichkeit (EMV) Störaussendung
E1-Zeichen	UN/ECE-R10	Störaussendung Störfestigkeit mit 100 V/m
	ISO 7637-2	Impuls 1, Schärfegrad: IV; Funktionszustand C Impuls 2a, Schärfegrad: IV; Funktionszustand A Impuls 2b, Schärfegrad: IV; Funktionszustand C Impuls 3a, Schärfegrad: IV; Funktionszustand A Impuls 3b, Schärfegrad: IV; Funktionszustand A Impuls 4, Schärfegrad: IV; Funktionszustand B Impuls 5, Schärfegrad: III; Funktionszustand C (Angaben gelten für 24 V System) Impuls 4, Schärfegrad: III; Funktionszustand C (Angabe gilt für 12 V System)
Klimatische Prüfungen	EN 60068-2-30	Feuchte Wärme zyklisch obere Temperatur 55°C, Anzahl Zyklen: 6
	EN 60068-2-78	Feuchte Wärme konstant Prüftemperatur 40°C / 93% RH, Prüfdauer: 21 Tage
	EN 60068-2-52	Salznebel Sprühtest Schärfegrad 3 (Kraftfahrzeug)
Mechanische Prüfungen	ISO 16750-3	Test VII; Vibration, random Anbauort Karosserie
	EN 60068-2-6	Vibration, sinus 10...500 Hz; 0,72 mm/10 g; 10 Zyklen/Achse
	ISO 16750-3	Dauerschocken 30 g/6 ms; 24.000 Schocks
Chemische Beständigkeit	ISO 16750-5:2010	AA, AB, BA, BD, CC, DB, DC, DD
Hinweis	EG-Konformitätserklärung und Zulassungen sind abrufbar unter: www.ifm.com	

DE

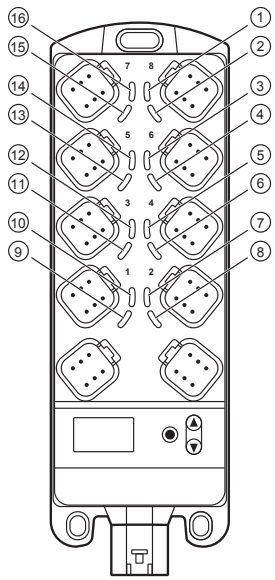
CR2051	Technische Daten

Anschlussbelegung



LED-Zuordnung

1: LED OUT15
2: LED OUT07
3: LED OUT13
4: LED OUT05
5: LED OUT11
6: LED OUT03
7: LED OUT09
8: LED OUT01
9: LED OUT08
10: LED OUT00
11: LED OUT10
12: LED OUT02
13: LED OUT12
14: LED OUT04
15: LED OUT14
16: LED OUT06



Abkürzungen

B_H	Binär High-Side
B_L	Binär Low-Side
PWM	Pulsweitenmodulation
PWM_I	Pulsweitenmodulation, stromgeregelt
VBB_S	Versorgung Sensorik/Modul
VBB_1	Versorgung OUT00, OUT02, OUT04, OUT06, OUT08, OUT10, OUT12, OUT14
VBB_2	Versorgung OUT01, OUT03, OUT05, OUT07, OUT09, OUT11, OUT13, OUT15
V_{CAN}	Versorgung CAN-Stecker

9.3 CR2052

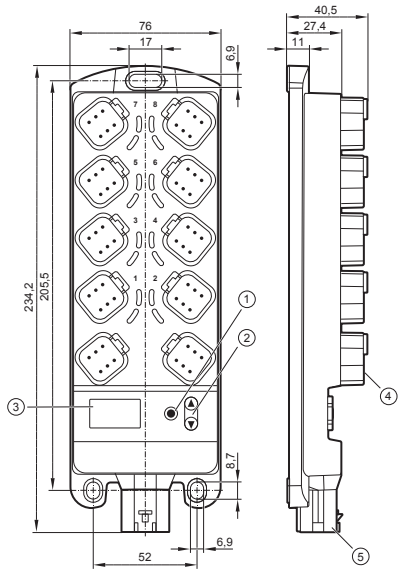
CR2052

E/A-Modul
digital und analog
für System R360
CANopen Slave

Mobilsteuerung
Programmierung
nach IEC 61131-3

8 Eingänge
8 Ausgänge
2 CAN-Schnittstellen

8...32 V DC



1: Taste ENTER
2: Tasten UP/DOWN
3: 10-Segment-Anzeige
4: DEUTSCH-Stecker
5: AMP-Anschlussstecker

Technische Daten	Modulares Steuerungssystem Einsetzbar als CANopen-Slave oder intelligentes E/A-Modul
Mechanische Daten	
Gehäuse	Gehäuse: PA6/6.6 Anzeige: PA Tasten: Silikon
Abmessungen (H x B x T)	234 x 76 x 40,5 mm (ohne Rohrniete)
Montage	Befestigung mit 3 Schrauben M5 nach DIN EN ISO 4762 oder DIN 7984, 3 Rohrnieten nach DIN 7340 und 3 Unterlegscheiben nach DIN EN ISO 7092 (Rohrniete und Unterlegscheiben liegen bei)
Anschluss	Versorgung: MCP2.8 6 polig für Stecker TE-AMP 1745078-1 Ein-/Ausgänge: Deutsch DT04-6S 6 polig Kontakte: AMP: CuFe verzinnt; Deutsch: CuZn vergoldet)
Eingänge Ausgänge CAN1-Schnittstelle Betriebsspannung, CAN2	4 x 6-polig 4 x 6-polig 2 x 6-polig 1 x 6-polig
Schutzart	IP 65 und IP 67 (alle Stecker gesteckt)
Betriebs-/Lagertemperatur	-40...85° C / -40...85° C
Max. zulässige relative Luftfeuchtigkeit	90 %, nicht kondensierend
Max. Höhe über NN	2000 m
Verschmutzungsgrad	2
Gewicht	500 g
Elektrische Daten	
Betriebsspannung	8...32 V DC
Stromaufnahme	105 mA (bei 24 V DC) / 188 mA (bei 12 V DC) / max. 300 mA
Überspannung Unterspannungserkennung Unterspannungsabschaltung	36 V für t ≤ 10 s bei U_B ≤ 7,8 V bei U_B ≤ 7,0 V
Prozessor	Freescale PowerPC, 50 MHz
Speicher (gesamt)	592 kByte RAM / 1536 kByte Flash / 1 kByte FRAM
Speicheraufteilung	siehe Systemhandbuch ioControl und www.ifm.com

DE

CR2052	Technische Daten
Geräteüberwachung	Unterspannungsüberwachung Watchdogfunktion Checksummenprüfung für Programm und System Übertemperaturüberwachung
CAN Schnittstellen 1 und 2 Baudrate Kommunikationsprofil	CAN Interface 2.0 A/B, ISO 11898 20 kBit/s...1 MBit/s (Default CAN1: 250 kBit/s, CAN2: 250 kBit/s) CANopen, CiA DS 301 Version 4, CiA DS 401 Version 1.4 oder SAE J 1939 oder freies Protokoll
Software/Programmierung	
Programmiersystem	CODESYS Version 2.3 (IEC 61131-3)
Eingänge	8 (konfigurierbar)
Konfigurationen	

Anzahl	Ausführung	
4	digital für positive/negative Gebersignale analog (0…10/32 V DC, 0...20 mA, ratiometrisch) Frequenz (≤ 30 kHz)	B_L/B_H A FRQ
4	digital für positive Gebersignale Widerstandsmessung (0,016...30 kΩ)	B_L R

Ausgänge	8 (konfigurierbar)
Konfigurationen	

Anzahl	Ausführung	
4	plusschaltend (High-Side), 4 A, Diagnose PWM-Ausgang (20…250 Hz), 4 A, Diagnose stromgeregelt 0,02…4 A	B_H PWM PWM_I
4	plusschaltend (High-Side), 2,5 A, Diagnose PWM-Ausgang (20…250 Hz), 2,5 A, Diagnose stromgeregelt 0,02…2,5 A	B_H PWM PWM_I

Anzeigeelemente	
I/O-LEDs	16 x LED orange (Voreinstellung: Statusanzeige des jeweiligen Eingangs)
Power-LED (PWR)	LED grün (Voreinstellung: Signalisieren des System-Status)
Mode-LED (M)	LED grün (Voreinstellung: Signalisiert eine Anzeige der Node-ID)
Applikations-LEDs (A...D)	4 x LED grün
Lock-LED (Schloss-Symbol)	1 x LED grün (Voreinstellung: Verriegelung der eingestellten Parameter)
Diagnose-LED (DIA)	1 x LED rot (Voreinstellung: Anzeigen eines Fehlers)
Anzeige	4-stellige 10-Segment-Anzeige (zweifarbig: rot / grün) (Voreinstellung: Anzeige der Baudrate oder Node-ID)

CR2052	Technische Daten

Betriebszustände bei Verwendung als Mobilsteuerung

LED	Zustand	Beschreibung
–	konstant aus	keine Betriebsspannung
PWR + DIA	1 x ein	Initialisierung oder Reset Checks
PWR	5 Hz	kein Betriebssystem geladen
	2 Hz	Applikation läuft (RUN)
	konstant ein	Applikation angehalten (STOP)
DIA	10 Hz	Applikation angehalten (STOP mit Fehler)
	5 Hz	Applikation angehalten wegen Unterspannung
	konstant ein	System-Fehler (Fatal Error)

Bedienelemente

Tasten	ENTER, UP, DOWN
Tasten (Voreinstellung)	Einstellen der CAN-ID / Baudrate

Kennwerte der Eingänge

Analogeingänge (B_L, B_H, A, FRQ)
IN00 - Anschluss 1, Pin 5
IN01 - Anschluss 3, Pin 5
IN04 - Anschluss 1, Pin 2
IN05 - Anschluss 3, Pin 2
konfigurierbar als...

● Spannungseingänge	
Eingangsspannung	0...10 V oder 0...32 V
Auflösung	12 Bit
Genauigkeit	± 1% FS
Eingangswiderstand	65,6 kΩ (0...10 V), 50,7 kΩ (0...32 V)
Eingangsfrequenz	≤ 500 Hz
● Stromeingänge, diagnosefähig	
Eingangsstrom	0...20 mA
Auflösung	12 Bit
Genauigkeit	± 1% FS
Eingangswiderstand	400 Ω
Eingangsfrequenz	≤ 500 Hz
Bei Strömen > 23 mA wird der Eingang auf Spannungseingang umgeschaltet!	
● Spannungseingänge, 0...32 V, ratiometrisch	
Funktion	$(U_{IN} \div U_B) \times 1000$ ‰
Wertebereich	0...1000 ‰
Eingangswiderstand	50,7 kΩ
● Binäre Spannungseingänge für positive Gebersignale	
Einschaltpegel	> 0,7 U_B
Ausschaltpegel	< 0,3 U_B
Eingangswiderstand	3,2 kΩ
Eingangsfrequenz	50 Hz
Diagnose Leiterbruch	> 0,95 U_B
Diagnose Kurzschluss	< 1 V
● Binäre Spannungseingänge für negative Gebersignale	
Einschaltpegel	> 0,7 U_B
Ausschaltpegel	< 0,3 U_B
Eingangswiderstand	3,2 kΩ
Eingangsfrequenz	50 Hz
● Frequenzeingänge	
Eingangswiderstand	3,2 kΩ
Eingangsfrequenz	≤ 30 kHz
Einschaltpegel	> 0,7 U_B
Ausschaltpegel	< 0,3 U_B

CR2052	Technische Daten

Digitaleingänge (B_L, R)
IN02 - Anschluss 5, Pin 5
IN03 - Anschluss 7, Pin 5
IN06 - Anschluss 5, Pin 2
IN07 - Anschluss 7, Pin 2
konfigurierbar als…

● Binäre Spannungseingänge für positive Gebersignale	
Einschaltpegel	> 0,7 U_B
Ausschaltpegel	< 0,3 U_B
Eingangswiderstand	3,2 kΩ
Eingangsfrequenz	50 Hz
Diagnose Leiterbruch	> 0,95 U_B
Diagnose Kurzschluss	< 1 V
● Widerstandseingang	
Messbereich	0,016…30 kΩ
Genauigkeit	± 2 % FS: 16 Ω...3 kΩ ± 5 % FS: 3...15 kΩ ± 10 % FS: 15...30 kΩ

Kennwerte der Ausgänge

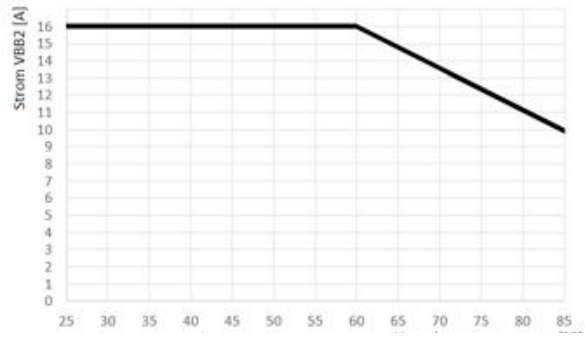
Digitalausgänge (B_H, PWM, PWM_I)
OUT00 - Anschluss 2, Pin 5
OUT01 - Anschluss 4, Pin 5
OUT02 - Anschluss 6, Pin 5
OUT03 - Anschluss 8, Pin 5
konfigurierbar als...

● Halbleiterausgänge, plusschaltend (High-Side), kurzschluss- und überlastfest. Diagnose über Stromrücklesung (Leiterbruch / Überlast) Diagnose über Spannungsrücklesung, Pullup-Widerstand abschaltbar (Leiterbruch/Kurzschluss)	
Schaltspannung	8...32 V
Schaltstrom	≤ 4 A
Lastwiderstand	≥ 3 Ω (bei 12 V DC) ≥ 6 Ω (bei 24 V DC)
Strommessbereich	0,02...6 A
● PWM-Ausgänge	
Ausgangsfrequenz	20...250 Hz
Tastverhältnis	1...1000 ‰
Schaltstrom	≤ 4 A
Strommessbereich	0,02...6 A
● Stromgeregelter Ausgang	
Ausgangsfrequenz	20...250 Hz
Regelbereich	0,02...4 A
Einstellauflösung	1 mA
Max. Einschaltstrom	≤ 24 A

CR2052	Technische Daten

Digitalausgänge (B_H, PWM, PWM_I)
OUT04 - Anschluss 2, Pin 2
OUT05 - Anschluss 4, Pin 2
OUT06 - Anschluss 6, Pin 2
OUT07 - Anschluss 8, Pin 2
konfigurierbar als…

● Halbleiterausgänge, plusschaltend (High-Side), kurzschluss- und überlastfest. Diagnose über Stromrücklesung (Leiterbruch / Überlast) Diagnose über Spannungsrücklesung, Pullup-Widerstand abschaltbar (Leiterbruch/Kurzschluss)	
Schaltspannung	8...32 V
Schaltstrom	≤ 2,5 A
Lastwiderstand	≥ 4,8 Ω (bei 12 V DC) ≥ 9,6 Ω (bei 24 V DC)
Strommessbereich	0,02...4 A
● PWM-Ausgänge	
Ausgangsfrequenz	20...250 Hz
Tastverhältnis	1...1000 ‰
Schaltstrom	≤ 2,5 A
Strommessbereich	0,02...4 A
● Stromgeregelter Ausgang	
Ausgangsfrequenz	20...250 Hz
Regelbereich	0,02...2,5 A
Einstellauflösung	1 mA
Max. Einschaltstrom	≤ 24 A

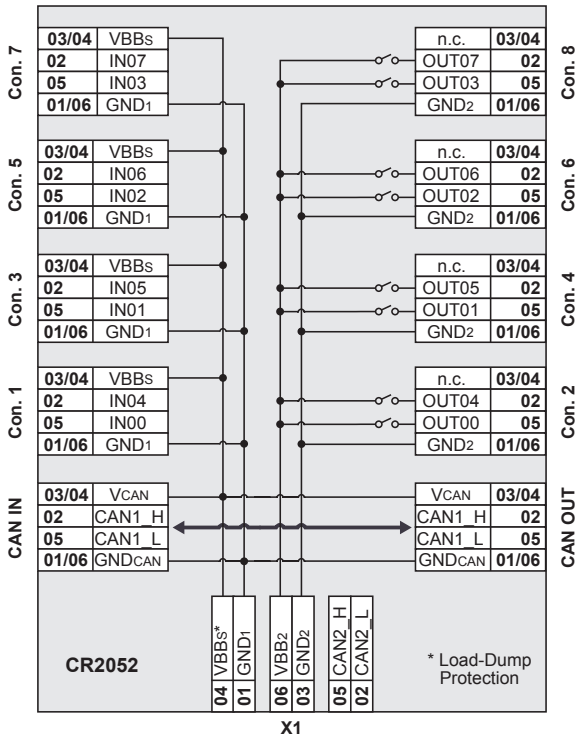
Freilaufdioden	Freilaufdioden zur Abschaltung induktiver Lasten sind integriert
Überlastfestigkeit (Gültig für alle Ausgänge)	≤ 5 Minuten (bei 100% Überlast)
Kurzschlussfestigkeit (gültig für alle Ein- und Ausgänge)	≤ 5 Minuten
Max. Summenstrom der CAN-Versorgung + Sensorversorgungen V_{CAN} + VBB_S	1,5 A
Max. Summenstrom der Ausgangsversorgungen VBB_2	

CR2052	Technische Daten	
Prüfnormen und Bestimmungen		
CE-Zeichen	EN 61000-6-2	Elektromagnetische Verträglichkeit (EMV) Störfestigkeit
	EN 61000-6-4	Elektromagnetische Verträglichkeit (EMV) Störaussendung
E1-Zeichen	UN/ECE-R10	Störaussendung Störfestigkeit mit 100 V/m
	ISO 7637-2	Impuls 1, Schärfegrad: IV; Funktionszustand C Impuls 2a, Schärfegrad: IV; Funktionszustand A Impuls 2b, Schärfegrad: IV; Funktionszustand C Impuls 3a, Schärfegrad: IV; Funktionszustand A Impuls 3b, Schärfegrad: IV; Funktionszustand A Impuls 4, Schärfegrad: IV; Funktionszustand B Impuls 5, Schärfegrad: III; Funktionszustand C (Angaben gelten für 24 V System) Impuls 4, Schärfegrad: III; Funktionszustand C (Angabe gilt für 12 V System)
Klimatische Prüfungen	EN 60068-2-30	Feuchte Wärme zyklisch obere Temperatur 55°C, Anzahl Zyklen: 6
	EN 60068-2-78	Feuchte Wärme konstant Prüftemperatur 40°C / 93% RH, Prüfdauer: 21 Tage
	EN 60068-2-52	Salznebel Sprühtest Schärfegrad 3 (Kraftfahrzeug)
Mechanische Prüfungen	ISO 16750-3	Test VII; Vibration, random Anbauort Karosserie
	EN 60068-2-6	Vibration, sinus 10...500 Hz; 0,72 mm/10 g; 10 Zyklen/Achse
	ISO 16750-3	Dauerschocken 30 g/6 ms; 24.000 Schocks
Chemische Beständigkeit	ISO 16750-5:2010	AA, AB, BA, BD, CC, DB, DC, DD
Hinweis	EG-Konformitätserklärung und Zulassungen sind abrufbar unter: www.ifm.com	

DE

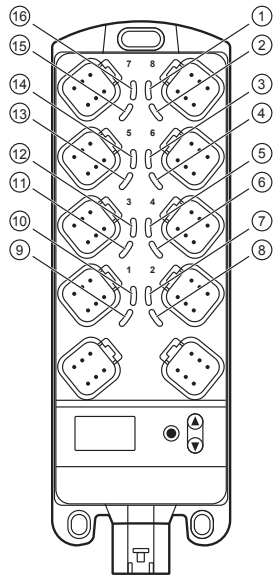
CR2052	Technische Daten

Anschlussbelegung



LED-Zuordnung

1: LED OUT07
2: LED OUT03
3: LED OUT06
4: LED OUT02
5: LED OUT05
6: LED OUT01
7: LED OUT04
8: LED OUT00
9: LED IN04
10: LED IN00
11: LED IN05
12: LED IN01
13: LED IN06
14: LED IN02
15: LED IN07
16: LED IN03



Abkürzungen

A	Analog
R	Widerstandseingang
FRQ	Frequenz-/Impulseingang
B_H	Binär High-Side
B_L	Binär Low-Side
PWM	Pulsweitenmodulation
PWM_I	Pulsweitenmodulation, stromgeregelt
VBB_S	Versorgung Sensorik/Modul
VBB_2	Versorgung OUT01...OUT07
V_{CAN}	Versorgung CAN-Stecker

10 Wartung, Instandsetzung und Entsorgung

10.1 Wartung

Das Gerät enthält keine vom Anwender zu wartenden Bauteile.

10.2 Reinigen der Gehäuseoberfläche

- ► Gerät von der Betriebsspannung trennen.
- ► Verschmutzungen mit einem weichen, chemisch unbehandelten und trockenen Tuch entfernen.
- ► Bei starker Verschmutzung ein feuchtes Tuch verwenden.

Folgende Mittel sind zur Gerätereinigung ungeeignet:
Kunststofflösende Chemikalien, wie z.B. Isopropanol, Brennspiritus, Benzin, Verdünner, Alkohol, Azeton oder Ammoniak.

Empfohlen werden Microfaser-Tücher ohne chemische Zusatzmittel.

10.3 Instandsetzung

- ► Das Gerät nur durch den Hersteller instandsetzen lassen.
  Sicherheitshinweise beachten (→ 2.4 Eingriffe in das Gerät)

10.4 Entsorgung

- ► Das Gerät gemäß den nationalen Umweltvorschriften entsorgen.

11 Zulassungen/Normen

Prüfnormen und Bestimmungen (→ 9 Technische Daten)

Die EG-Konformitätserklärung und Zulassungen sind abrufbar unter:
www.ifm.com

12 Appendix

12.1 EMCY Object

The following error codes according to DSP-401 or DSP-301 are supported:

EMCY code	Error reg	Additional code	Description
0x6100	0x11	0x00	Internal Software Overflow of an Rx queue e.g. frequency of the Rx PDOs is too high. Reset only externally via entry in the index 0x1003 SubIdx 00.
0x6101	0x11	0x00	Internal Software Overflow of a Tx queue e.g. device does not communicate with the bus. Reset only externally via entry in the index 0x1003 SubIdx 00.
0x8100	0x11	0x00	Monitoring (Guarding Error) No guard object is received for „guard time“ x „life time factor“. Reset with the next communication.
0x8200	0x11	0x00	Monitoring (Synch Error) For "communication cycle" no synch object is received Only in OPEATIONAL. Reset with the next synch OBJ or PREOP.

CANopen does not provide for two identical EMCY objects to be sent consecutively.

12.2 Object directory CR205x

Obligatory objects (index 0x1000…0x1FFF):

Index	S-idx	Designation	Data type		Default	Details
0x1001		Device type	ro	UDINT	0x000F0191	Device type
0x1001		Error register	ro	USINT	0	Error register bitcoded to profile 301 Permissible values: 0b0000 0000 = no error 0b0000 0001 = generic error 0b0001 0000 = communication error 0b1000 0000 = manufacturer specific

Index	S-idx	Designation	Data type		Default	Details
0x1018	0x00	Device identification Number of entries	ro	USINT	0x04	Device identification
	0x01	Vendor-ID	ro	UDINT	0x0069666D	Vendor ID oft he device according to CiA specifikation
	0x02	Product code	ro	STRING	0	Product code of the device
	0x03	Revision number	ro	UDINT	0	Revision number of the device
	0x04	Serial number	ro	UDINT	0	Serial number of the device
0x1003	0x00	Predefined error field Number of entries	rw	UDINT	0	An error list with 4 entries is supported
	0x01	Error history	ro	UDINT	0	Error occured, coded according to EMCY list The last error is indicated in the sub-index 1
	0x02	Error history	ro	UDINT	0	Error occured, coded according to EMCY list
	0x03	Error history	ro	UDINT	0	Error occured, coded according to EMCY list
	0x04	Error history	ro	UDINT	0	Error occured, coded according to EMCY list
	0x05	Error history	ro	UDINT	0	Error occured, coded according to EMCY list
0x1005		COB-ID synch message	rw	UDINT	0x0000 0080	Identifier of the synch message Bit 30 = 0 → device generates no synch message Bit 30 = 1 → device generates a synch message Bit 29 = 0 → 11 bit ID Bit 29 = 1 → ID = 0x80 + node ID
0x1006		Communi-cation cycle period	rw	UDINT	0	Max. time between 2 synch objects in [µs] Control resolution = 1 ms
0x1008		Manufacturer device name	ro	STRING	CR205x	Device designation (CR2050 or CR2051 or CR2052)
0x1009		Manufacturer hardware version	ro	STRING	V00.00.00	Hardware version

Index	S-idx	Designation	Data type		Default	Details
0x100A		Manufacturer software version	ro	STRING	V00.00.00	Software version
0x100C		Guard time	rw	UINT	0	Within this time in [ms] the device expects a „node guarding“ of the master oft he system. 0 = this function is not supported. **The monitoring oft he node with „node guarding“ or „heart-beat“ is only possible as an alternative!**
0x100D		Lifetime factor	rw	USINT	0	If for „guard time“ • “lifetime” no "node guarding" was received, the device switches off the outputs. The device changes the CANopen status to PREOP. Default: "guard time" • "lifetime" = 0...65535
0x1010	0x00	Store parameters Largest sub-index supported	ro	USINT	0x01	Number of “save options”
	0x01	Save all parameters	rw	UDINT	2	Automatic saving of all parameters changed 0 = AutoSave OFF 2 = AutoSave ON
0x1011	0x00	Restore default parameters Largest sub-index supported	ro	USINT	0x01	Number of "restore options"
	0x01	Restore all default parameters	rw	UDINT	0x01	If the String "load" is entered here, the default parameters set at the factory are restored and become valid after the next reset.
0x1014		COBId Emergency	rw	UDINT	0x80 + node ID	Bit 31 = 0 → EMCY is valid Bit 31 = 1 → EMCY is not valid Bit 29 = 0 → 11-bit ID Bit 29 = 1 → ID = 0x80 + node ID CAN identifier can be changed by the user.

Index	S-idx	Designation	Data type		Default	Details
0x1016	0x00	Consumer heartbeat times Nums consumer heartbeat time	ro	USINT	0x01	Heartbeat monitoring time for the node Number of devices monitored = 1
	0x01	Consumer heartbeat time	rw	UDINT	0	Heartbeat monitoring time for the node Format: 0x0nnttttt tttt = monitoring time [ms] nn = node number if nn=0 or tttt=0 → no monitoring **The monitoring of the node with „node guarding“ or „heartbeat“ is only possible as an alternative!**
0x1017		Producer heartbeat time	rw	UINT	0	Time intervall [ms] during which the device generates a producer heartbeat

12.2.1 Device-specific CR2050

Transmit PDO communication parameters (index 0x1800…0x18FF):

Index	S-idx	Designation	Data type		Default	Details
0x1800	0x00	Transmit PDO Communication Parameter Number of entries	ro	USINT	0x05	Configuration transmit PDO 1 number of entries = 5
	0x01	COBID used by PDO	rw	UDINT	0x180 + Node ID	CAN ID of the transmit PDO 1 Bit 31 = 0 → PDO is valid Bit 31 = 1 → PDO is not valid
	0x02	transmission type	rw	USINT	0xFF	0x00 = synch acyclic 0x01...0xF0 = synch cyclic; values are only transmitted after „n" synch objects n = 1…240 = 0x01...0xF0 0xFC/0xFD not implemented 0xFE = asynch man. spec. event; values are immediately transferred 0xFF = asynch device profile event; values are immediately transferred
	0x03	inhibit time	rw	UINT	0	delay time in the transmission type "asynch" before the PDO is transmitted again at the earliest. (0...65535 • 100 µs)
	0x04	reserved	rw	USINT	0	reserve
	0x05	event time	rw	UINT	0	max. transfer break in the transmission type „asynch" (0...65535 ms) When this time has elapsed, the PDO is transferred even if the appl. event has not accured.

Index	S-idx	Designation	Data type		Default	Details
0x1801	0x00	Transmit PDO Communication Parameter Number of entries	ro	USINT	0x05	Configuration transmit PDO 2 number of entries = 5
	0x01	COBID used by PDO	rw	UDINT	0x280 + Node ID	CAN ID of the transmit PDO 2 Bit 31 = 0 → PDO is valid Bit 31 = 1 → PDO is not valid
	0x02	transmission type	rw	USINT	0x01	0x00 = synch acyclic 0x01...0xF0 = synch cyclic; values are only transmitted after „n" synch objects n = 1…240 = 0x01...0xF0 0xFC/0xFD not implemented 0xFE = asynch man. spec. event; values are immediately transferred 0xFF = asynch device profile event; values are immediately transferred
	0x03	inhibit time	rw	UINT	0	delay time in the transmission type "asynch" before the PDO is transmitted again at the earliest. (0...65535 • 100 µs)
	0x04	reserved	rw	USINT	0	reserve
	0x05	event time	rw	UINT	0	max. transfer break in the transmission type „asynch" (0...65535 ms) When this time has elapsed, the PDO is transferred even if the appl. event has not accured.

Index	S-idx	Designation	Data type		Default	Details
0x1802	0x00	Transmit PDO Communication Parameter Number of entries	ro	USINT	0x05	Configuration transmit PDO 3 number of entries = 5
	0x01	COBID used by PDO	rw	UDINT	0x380 + Node ID	CAN ID of the transmit PDO 3 Bit 31 = 0 → PDO is valid Bit 31 = 1 → PDO is not valid
	0x02	transmission type	rw	USINT	0x01	0x00 = synch acyclic 0x01...0xF0 = synch cyclic; values are only transmitted after „n" synch objects n = 1…240 = 0x01...0xF0 0xFC/0xFD not implemented 0xFE = asynch man. spec. event; values are immediately transferred 0xFF = asynch device profile event; values are immediately transferred
	0x03	inhibit time	rw	UINT	0	delay time in the transmission type "asynch" before the PDO is transmitted again at the earliest. (0...65535 • 100 µs)
	0x04	reserved	rw	USINT	0	reserve
	0x05	event time	rw	UINT	0	max. transfer break in the transmission type „asynch" (0...65535 ms) When this time has elapsed, the PDO is transferred even if the appl. event has not accured.

Index	S-idx	Designation	Data type		Default	Details
0x1803	0x00	Transmit PDO Communication Parameter Number of entries	ro	USINT	0x05	Configuration transmit PDO 4 number of entries = 5
	0x01	COBID used by PDO	rw	UDINT	0x480 + Node ID	CAN ID of the transmit PDO 4 Bit 31 = 0 → PDO is valid Bit 31 = 1 → PDO is not valid
	0x02	transmission type	rw	USINT	0x01	0x00 = synch acyclic 0x01...0xF0 = synch cyclic; values are only transmitted after „n" synch objects n = 1…240 = 0x01...0xF0 0xFC/0xFD not implemented 0xFE = asynch man. spec. event; values are immediately transferred 0xFF = asynch device profile event; values are immediately transferred
	0x03	inhibit time	rw	UINT	0	delay time in the transmission type "asynch" before the PDO is transmitted again at the earliest. (0...65535 • 100 µs)
	0x04	reserved	rw	USINT	0	reserve
	0x05	event time	rw	UINT	0	max. transfer break in the transmission type „asynch" (0...65535 ms) When this time has elapsed, the PDO is transferred even if the appl. event has not accured.

Index	S-idx	Designation	Data type		Default	Details
0x1804	0x00	Transmit PDO Communication Parameter Number of entries	ro	USINT	0x05	Configuration transmit PDO 5 number of entries = 5
	0x01	COBID used by PDO	rw	UDINT	0x181 + Node ID	CAN ID of the transmit PDO 5 Bit 31 = 0 → PDO is valid Bit 31 = 1 → PDO is not valid
	0x02	transmission type	rw	USINT	0x01	0x00 = synch acyclic 0x01...0xF0 = synch cyclic; values are only transmitted after „n" synch objects n = 1…240 = 0x01...0xF0 0xFC/0xFD not implemented 0xFE = asynch man. spec. event; values are immediately transferred 0xFF = asynch device profile event; values are immediately transferred
	0x03	inhibit time	rw	UINT	0	delay time in the transmission type "asynch" before the PDO is transmitted again at the earliest. (0...65535 • 100 µs)
	0x04	reserved	rw	USINT	0	reserve
	0x05	event time	rw	UINT	0	max. transfer break in the transmission type „asynch" (0...65535 ms) When this time has elapsed, the PDO is transferred even if the appl. event has not accured.

Index	S-idx	Designation	Data type		Default	Details
0x1805	0x00	Transmit PDO Communication Parameter Number of entries	ro	USINT	0x05	Configuration transmit PDO 6 number of entries = 5
	0x01	COBID used by PDO	rw	UDINT	0x281 + Node ID	CAN ID of the transmit PDO 6 Bit 31 = 0 → PDO is valid Bit 31 = 1 → PDO is not valid
	0x02	transmission type	rw	USINT	0x01	0x00 = synch acyclic 0x01...0xF0 = synch cyclic; values are only transmitted after „n" synch objects n = 1…240 = 0x01...0xF0 0xFC/0xFD not implemented 0xFE = asynch man. spec. event; values are immediately transferred 0xFF = asynch device profile event; values are immediately transferred
	0x03	inhibit time	rw	UINT	0	delay time in the transmission type "asynch" before the PDO is transmitted again at the earliest. (0...65535 • 100 µs)
	0x04	reserved	rw	USINT	0	reserve
	0x05	event time	rw	UINT	0	max. transfer break in the transmission type „asynch" (0...65535 ms) When this time has elapsed, the PDO is transferred even if the appl. event has not accured.

Index	S-idx	Designation	Data type		Default	Details
0x1806	0x00	Transmit PDO Communication Parameter Number of entries	ro	USINT	0x05	Configuration transmit PDO 7 number of entries = 5
	0x01	COBID used by PDO	rw	UDINT	0x381 + Node ID	CAN ID of the transmit PDO 7 Bit 31 = 0 → PDO is valid Bit 31 = 1 → PDO is not valid
	0x02	transmission type	rw	USINT	0x01	0x00 = synch acyclic 0x01...0xF0 = synch cyclic; values are only transmitted after „n" synch objects n = 1…240 = 0x01...0xF0 0xFC/0xFD not implemented 0xFE = asynch man. spec. event; values are immediately transferred 0xFF = asynch device profile event; values are immediately transferred
	0x03	inhibit time	rw	UINT	0	delay time in the transmission type "asynch" before the PDO is transmitted again at the earliest. (0...65535 • 100 µs)
	0x04	reserved	rw	USINT	0	reserve
	0x05	event time	rw	UINT	0	max. transfer break in the transmission type „asynch" (0...65535 ms) When this time has elapsed, the PDO is transferred even if the appl. event has not accured.

Index	S-idx	Designation	Data type		Default	Details
0x1807	0x00	Transmit PDO Communication Parameter Number of entries	ro	USINT	0x05	Configuration transmit PDO 8 number of entries = 5
	0x01	COBID used by PDO	rw	UDINT	0x481 + Node ID	CAN ID of the transmit PDO 8 Bit 31 = 0 → PDO is valid Bit 31 = 1 → PDO is not valid
	0x02	transmission type	rw	USINT	0x01	0x00 = synch acyclic 0x01...0xF0 = synch cyclic; values are only transmitted after „n" synch objects n = 1…240 = 0x01...0xF0 0xFC/0xFD not implemented 0xFE = asynch man. spec. event; values are immediately transferred 0xFF = asynch device profile event; values are immediately transferred
	0x03	inhibit time	rw	UINT	0	delay time in the transmission type "asynch" before the PDO is transmitted again at the earliest. (0...65535 • 100 µs)
	0x04	reserved	rw	USINT	0	reserve
	0x05	event time	rw	UINT	0	max. transfer break in the transmission type „asynch" (0...65535 ms) When this time has elapsed, the PDO is transferred even if the appl. event has not accured.

Index	S-idx	Designation	Data type		Default	Details
0x1808	0x00	Transmit PDO Communication Parameter Number of entries	ro	USINT	0x05	Configuration transmit PDO 9 number of entries = 5
	0x01	COBID used by PDO	rw	UDINT	0x182 + Node ID	CAN ID of the transmit PDO 9 Bit 31 = 0 → PDO is valid Bit 31 = 1 → PDO is not valid
	0x02	transmission type	rw	USINT	0x01	0x00 = synch acyclic 0x01...0xF0 = synch cyclic; values are only transmitted after „n" synch objects n = 1…240 = 0x01...0xF0 0xFC/0xFD not implemented 0xFE = asynch man. spec. event; values are immediately transferred 0xFF = asynch device profile event; values are immediately transferred
	0x03	inhibit time	rw	UINT	0	delay time in the transmission type "asynch" before the PDO is transmitted again at the earliest. (0...65535 • 100 µs)
	0x04	reserved	rw	USINT	0	reserve
	0x05	event time	rw	UINT	0	max. transfer break in the transmission type „asynch" (0...65535 ms) When this time has elapsed, the PDO is transferred even if the appl. event has not accured.

Index	S-idx	Designation	Data type		Default	Details
0x1809	0x00	Transmit PDO Communication Parameter Number of entries	ro	USINT	0x05	Configuration transmit PDO 10 number of entries = 5
	0x01	COBID used by PDO	rw	UDINT	0x282 + Node ID	CAN ID of the transmit PDO 10 Bit 31 = 0 → PDO is valid Bit 31 = 1 → PDO is not valid
	0x02	transmission type	rw	USINT	0x01	0x00 = synch acyclic 0x01...0xF0 = synch cyclic; values are only transmitted after „n" synch objects n = 1…240 = 0x01...0xF0 0xFC/0xFD not implemented 0xFE = asynch man. spec. event; values are immediately transferred 0xFF = asynch device profile event; values are immediately transferred
	0x03	inhibit time	rw	UINT	0	delay time in the transmission type "asynch" before the PDO is transmitted again at the earliest. (0...65535 • 100 µs)
	0x04	reserved	rw	USINT	0	reserve
	0x05	event time	rw	UINT	0	max. transfer break in the transmission type „asynch" (0...65535 ms) When this time has elapsed, the PDO is transferred even if the appl. event has not accured.

Transmit PDO mapping (index 0x1A00…0x1AFF):

Index	S-idx	Designation	Data type		Default	Details
0x1A00	0x00	Transmit PDO mapping Number of mapped objects in PDO	rw	USINT	0x07	mapping transmit PDO 1 number of integrated application objects = 7
	0x01	PDO mapping	rw	UDINT	0x6000 0108	Index 0x6000, SubIndex 0x01 binary inputs 00...07: actual values (bit coded)
	0x02	PDO mapping	rw	UDINT	0x6000 0208	Index 0x6000, SubIndex 0x02 binary inputs 08…15: actual values (bit coded)
	0x03	PDO mapping	rw	UDINT	0x2020 0108	Index 0x2020, SubIndex 0x01 binary inputs 00...07: flag "short circuit" (bit coded)
	0x04	PDO mapping	rw	UDINT	0x2020 0208	Index 0x2020, SubIndex 0x02 binary inputs 08…15: flag "short circuit" (bit coded)
	0x05	PDO mapping	rw	UDINT	0x2021 0108	Index 0x2021, SubIndex 0x01 outputs 00...07: flag " wire break " (bit coded)
	0x06	PDO mapping	rw	UDINT	0x2021 0208	Index 0x2021, SubIndex 0x02 outputs 08…15: flag " wire break " (bit coded)
	0x07	PDO mapping	rw	UDINT	0x2025 0108	Index 0x2025, SubIndex 0x01 inputs 00...03: flag " overload " (bit coded)

Index	S-idx	Designation	Data type		Default	Details
0x1A01	0x00	Transmit PDO mapping Number of mapped objects in PDO	rw	USINT	0x04	mapping transmit PDO 2 (analogue inputs) number of integrated application objects = 4
	0x01	PDO mapping	rw	UDINT	0x6404 0110	Index 0x6404, SubIndex 0x01 analogue input 00: actual value (depending on the configuration 0x2000)
	0x02	PDO mapping	rw	UDINT	0x6404 0210	Index 0x6404, SubIndex 0x02 analogue input 01: actual value (depending on the configuration 0x2000))
	0x03	PDO mapping	rw	UDINT	0x6404 0310	Index 0x6404, SubIndex 0x03 analogue input 02: actual value (depending on the configuration 0x2000)
	0x04	PDO mapping	rw	UDINT	0x6404 0410	Index 0x6404, SubIndex 0x04 analogue input 03: actual value (depending on the configuration 0x2000)
0x1A02	0x00	Transmit PDO mapping Number of mapped objects in PDO	rw	USINT	0x04	mapping transmit PDO 3 (analogue inputs) number of integrated application objects = 4
	0x01	PDO mapping	rw	UDINT	0x6404 0510	Index 0x6404, SubIndex 0x05 analogue input 04: actual value (depending on the configuration 0x2000)
	0x02	PDO mapping	rw	UDINT	0x6404 0610	Index 0x6404, SubIndex 0x06 analogue input 05: actual value (depending on the configuration 0x2000))
	0x03	PDO mapping	rw	UDINT	0x6404 0710	Index 0x6404, SubIndex 0x07 analogue input 06: actual value (depending on the configuration 0x2000)
	0x04	PDO mapping	rw	UDINT	0x6404 0810	Index 0x6404, SubIndex 0x08 analogue input 07: actual value (depending on the configuration 0x2000)

Index	S-idx	Designation	Data type		Default	Details
0x1A03	0x00	Transmit PDO mapping Number of mapped objects in PDO	rw	USINT	0x04	mapping transmit PDO 4 number of integrated application objects = 4
	0x01	PDO mapping	rw	UDINT	0x2030 0110	Index 0x2030, SubIndex 0x01 input 08: actual resistor value
	0x02	PDO mapping	rw	UDINT	0x2030 0210	Index 0x2030, SubIndex 0x02 input 10: actual resistor value
	0x03	PDO mapping	rw	UDINT	0x2030 0310	Index 0x2030, SubIndex 0x03 input 12: actual resistor value
	0x04	PDO mapping	rw	UDINT	0x2030 0410	Index 0x2030, SubIndex 0x04 input 14: actual resistor value
0x1A04	0x00	Transmit PDO mapping Number of mapped objects in PDO	rw	USINT	0x02	mapping transmit PDO 5 (periode time IN09, IN11) number of integrated application objects = 2
	0x01	PDO mapping	rw	UDINT	0x2012 0120	Index 0x2012, SubIndex 0x01 frequency input IN09: periode time of the signal
	0x02	PDO mapping	rw	UDINT	0x2012 0220	Index 0x2012, SubIndex 0x02 frequency input IN11: periode time of the signal
0x1A05	0x00	Transmit PDO mapping Number of mapped objects in PDO	rw	USINT	0x02	mapping transmit PDO 6 (periode time IN13, IN15) number of integrated application objects = 2
	0x01	PDO mapping	rw	UDINT	0x2012 0320	Index 0x2012, SubIndex 0x03 frequency input IN13: periode time of the signal
	0x02	PDO mapping	rw	UDINT	0x2012 0420	Index 0x2012, SubIndex 0x04 frequency input IN15: periode time of the signal

Index	S-idx	Designation	Data type		Default	Details
0x1A06	0x00	Transmit PDO mapping Number of mapped objects in PDO	rw	USINT	0x04	mapping transmit PDO 7 (duty cycle of the signal on the frequency input IN09, IN11, IN13, IN15) number of integrated application objects = 4
	0x01	PDO mapping	rw	UDINT	0x2014 0110	Index 0x2014, SubIndex 0x01 frequency input IN09: duty cycle of the signal in ‰
	0x02	PDO mapping	rw	UDINT	0x2014 0210	Index 0x2014, SubIndex 0x02 frequency input IN11: duty cycle of the signal in ‰
	0x03	PDO mapping	rw	UDINT	0x2014 0310	Index 0x2014, SubIndex 0x03 frequency input IN13: duty cycle of the signal in ‰
	0x04	PDO mapping	rw	UDINT	0x2014 0410	Index 0x2014, SubIndex 0x04 frequency input IN15: duty cycle of the signal in ‰
0x1A07	0x00	Transmit PDO mapping Number of mapped objects in PDO	rw	USINT	0x02	mapping transmit PDO 8 (frequency on IN09, IN11) number of integrated application objects = 2
	0x01	PDO mapping	rw	UDINT	0x2015 0120	Index 0x2015, SubIndex 0x01 frequency input IN09: frequency value of the signal in Hz
	0x02	PDO mapping	rw	UDINT	0x2015 0220	Index 0x2015, SubIndex 0x02 frequency input IN11: frequency value of the signal in Hz
0x1A08	0x00	Transmit PDO mapping Number of mapped objects in PDO	rw	USINT	0x02	mapping transmit PDO 9 (frequency on IN13, IN15) number of integrated application objects = 2
	0x01	PDO mapping	rw	UDINT	0x2015 0320	Index 0x2015, SubIndex 0x03 frequency input IN13: frequency value of the signal in Hz
	0x02	PDO mapping	rw	UDINT	0x2015 0420	Index 0x2015, SubIndex 0x04 frequency input IN15: frequency value of the signal in Hz

Index	S-idx	Designation	Data type		Default	Details
0x1A09	0x00	Transmit PDO mapping Number of mapped objects in PDO	rw	USINT	0x02	mapping transmit PDO 10 (system flag) number of integrated application objects = 2
	0x01	PDO mapping	rw	UDINT	0x2040 0110	Index 0x2040, SubIndex 0x01 supply voltage of the system VBBS
	0x02	PDO mapping	rw	UDINT	0x2050 0010	Index 0x2050, SubIndex 0x00 system temperature in °C

Manufacturer-specific objekts (index 0x2000...0x6FFF):

Index	S-idx	Designation	Data type		Default	Details	
0x2000	0x00	IO configuration Largest sub-index supported	ro	USINT	16	Configuration inputs/outputs largest supported Sub-index = 32	
	0x01	Configuration IN00	rw	USINT	10	0 = 0x00 3 = 0x03 6 = 0x06 7 = 0x07 9 = 0x09 10 = 0x0A 11 = 0x0B 12 = 0x0C	off Input IN00 0...10 000 mV ratiometric 0...1000 ‰ 0...20 000 µA 0...32 000 mV binary plus switched binary plus switched with diagnosis binary minus switched
	0x02	Configuration IN01	rw	USINT	10	0 = 0x00 3 = 0x03 6 = 0x06 7 = 0x07 9 = 0x09 10 = 0x0A 11 = 0x0B 12 = 0x0C	off Input IN01 0...10 000 mV ratiometric 0...1000 ‰ 0...20 000 µA 0...32 000 mV binary plus switched binary plus switched with diagnosis binary minus switched
	0x03	Configuration IN02	rw	USINT	10	0 = 0x00 3 = 0x03 6 = 0x06 7 = 0x07 9 = 0x09 10 = 0x0A 11 = 0x0B 12 = 0x0C	off Input IN02 0...10 000 mV ratiometric 0...1000 ‰ 0...20 000 µA 0...32 000 mV binary plus switched binary plus switched with diagnosis binary minus switched

Index	S-idx	Designation	Data type		Default	Details	
0x2000	0x04	Configuration IN03	rw	USINT	10	0 = 0x00 3 = 0x03 6 = 0x06 7 = 0x07 9 = 0x09 10 = 0x0A 11 = 0x0B 12 = 0x0C	off Input IN03 0...10 000 mV ratiometric 0...1000 ‰ 0...20 000 µA 0...32 000 mV binary plus switched binary plus switched with diagnosis binary minus switched
	0x05	Configuration IN04	rw	USINT	10	0 = 0x00 3 = 0x03 6 = 0x06 7 = 0x07 9 = 0x09 10 = 0x0A 11 = 0x0B 12 = 0x0C	off Input IN04 0...10 000 mV ratiometric 0...1000 ‰ 0...20 000 µA 0...32 000 mV binary plus switched binary plus switched with diagnosis binary minus switched
	0x06	Configuration IN05	rw	USINT	10	0 = 0x00 3 = 0x03 6 = 0x06 7 = 0x07 9 = 0x09 10 = 0x0A 11 = 0x0B 12 = 0x0C	off Input IN05 0...10 000 mV ratiometric 0...1000 ‰ 0...20 000 µA 0...32 000 mV binary plus switched binary plus switched with diagnosis binary minus switched
	0x07	Configuration IN06	rw	USINT	10	0 = 0x00 3 = 0x03 6 = 0x06 7 = 0x07 9 = 0x09 10 = 0x0A 11 = 0x0B 12 = 0x0C	off Input IN06 0...10 000 mV ratiometric 0...1000 ‰ 0...20 000 µA 0...32 000 mV binary plus switched binary plus switched with diagnosis binary minus switched
	0x08	Configuration IN07	rw	USINT	10	0 = 0x00 3 = 0x03 6 = 0x06 7 = 0x07 9 = 0x09 10 = 0x0A 11 = 0x0B 12 = 0x0C	off Input IN07 0...10 000 mV ratiometric 0...1000 ‰ 0...20 000 µA 0...32 000 mV binary plus switched binary plus switched with diagnosis binary minus switched
	0x09	Configuration IN08	rw	USINT	10	0 = 0x00 10 = 0x0A 11 = 0x0B 18 = 0x12	off Input IN08 binary plus switched binary plus switched with diagnosis 16…30 000 Ohm

Index	S-idx	Designation	Data type		Default	Details	
0x2000	0x0A	Configuration IN09	rw	USINT	01	0 = 0x00 01 = 0x01 14 = 0x0E 20 = 0x14	off Input IN09 binary plus switched frequency 0…30 000 Hz period duration
	0x0B	Configuration IN10	rw	USINT	10	0 = 0x00 10 = 0x0A 11 = 0x0B 18 = 0x12	off Input IN10 binary plus switched binary plus switched with diagnosis 16…30 000 Ohm
	0x0C	Configuration IN11	rw	USINT	01	0 = 0x00 01 = 0x01 14 = 0x0E 20 = 0x14	off Input IN11 binary plus switched frequency 0…30 000 Hz period duration
	0x0D	Configuration IN12	rw	USINT	10	0 = 0x00 10 = 0x0A 11 = 0x0B 18 = 0x12	off Input IN12 binary plus switched binary plus switched with diagnosis 16…30 000 Ohm
	0x0E	Configuration IN13	rw	USINT	01	0 = 0x00 01 = 0x01 14 = 0x0E 20 = 0x14	off Input IN12 binary plus switched frequency 0…30 000 Hz period duration
	0x0F	Configuration IN14	rw	USINT	10	0 = 0x00 10 = 0x0A 11 = 0x0B 18 = 0x12	off Input IN14 binary plus switched binary plus switched with diagnosis 16…30 000 Ohm
	0x10	Configuration IN15	rw	USINT	01	0 = 0x00 01 = 0x01 14 = 0x0E 20 = 0x14	off Input IN15 binary plus switched frequency 0…30 000 Hz period duration
0x2012	0x00	Period input	ro	USINT	4	Largest sub-index supported	
	0x01	Period duration IN09	ro	UDINT	0	IN09 period duration [µs]	
	0x02	Period duration IN11	ro	UDINT	0	IN11 period duration [µs]	
	0x03	Period duration IN13	ro	UDINT	0	IN13 period duration [µs]	
	0x04	Period duration IN15	ro	UDINT	0	IN15 period duration [µs]	

Index	S-idx	Designation	Data type		Default	Details	
0x2013	0x00	Period input number of periods for average	ro	USINT	4	Largest sub-index supported	
	0x01	Number of periods IN09	rw	USINT	4	1…255	IN09 number of periods
	0x02	Number of periods IN11	rw	USINT	4	1…255	IN11 number of periods
	0x03	Number of periods IN13	rw	USINT	4	1…255	IN13 number of periods
	0x04	Number of periods IN15	rw	USINT	4	1…255	IN15 number of periods
0x2014	0x00	Period input – ratio value	ro	USINT	4	Largest sub-index supported	
	0x01	Period ratio value IN09	ro	UINT	0	0…1 000	IN09 marc-to-space ratio [‰]
	0x02	Period ratio value IN11	ro	UINT	0	0…1 000	IN11 marc-to-space ratio [‰]
	0x03	Period ratio value IN13	ro	UINT	0	0…1 000	IN13 marc-to-space ratio [‰]
	0x04	Period ratio value IN15	ro	UINT	0	0…1 000	IN15 marc-to-space ratio [‰]
0x2015	0x00	Frequency input	ro	USINT	4	Largest sub-index supported	
	0x01	Frequency IN09	ro	REAL	1	0…30 000	IN09 frequency [Hz]
	0x02	Frequency IN11	ro	REAL	1	0…30 000	IN11 frequency [Hz]
	0x03	Frequency IN13	ro	REAL	1	0…30 000	IN13 frequency [Hz]
	0x04	Frequency IN15	ro	REAL	1	0…30 000	IN15 frequency [Hz]
0x2016	0x00	Timebase	ro	USINT	4	Largest sub-index supported	
	0x01	Timebase IN09	rw	UINT	50	0…2 000	IN09 timebase [ms]
	0x02	Timebase IN11	rw	UINT	50	0…2 000	IN11 timebase [ms]
	0x03	Timebase IN13	rw	UINT	50	0…2 000	IN13 timebase [ms]
	0x04	Timebase IN15	rw	UINT	50	0…2 000	IN15 timebase [ms]

Index	S-idx	Designation	Data type		Default	Details	
0x2020	0x00	Input – short to supply voltage	ro	USINT	2	Largest sub-index supported	
	0x01	Short to supply voltage IN00...IN07	ro	USINT	0	0 = normal 1 = short circuit	channels (bit coded) 0b---- ---X = IN00 0b---- --X- = IN01 0b---- -X-- = IN02 0b---- X--- = IN03 0b---X ---- = IN04 0b--X- ---- = IN05 0b-X-- ---- = IN06 0bX--- ---- = IN07
	0x02	Short to supply voltage IN08, IN10, IN12, IN14	ro	USINT	0	0 = normal 1 = short circuit	channels (bit coded) 0b---- ---X = IN08 0b---- --X- = IN10 0b---- -X-- = IN12 0b---- X--- = IN14
0x2021	0x00	Input – wire break	ro	USINT	2	Largest sub-index supported	
	0x01	Wire break IN00...IN07	ro	USINT	0	0 = normal 1 = wire break	channels (bit coded) 0b---- ---X = IN00 0b---- --X- = IN01 0b---- -X-- = IN02 0b---- X--- = IN03 0b---X ---- = IN04 0b--X- ---- = IN05 0b-X-- ---- = IN06 0bX--- ---- = IN07
	0x02	Wire break IN08, IN10, IN12, IN14	ro	USINT	0	0 = normal 1 = wire break	channels (bit coded) 0b---- ---X = IN08 0b---- --X- = IN10 0b---- -X-- = IN12 0b---- X--- = IN14
0x2025	0x00	Input analog – overcurrent	ro	USINT	1	Largest sub-index supported	
	0x01	Overcurrent IN00...IN07	ro	USINT	0	0 = normal 1 = overcurrent	channels (bit coded) 0b---- ---X = IN00 0b---- --X- = IN01 0b---- -X-- = IN02 0b---- X--- = IN03 0b---X ---- = IN04 0b--X- ---- = IN05 0b-X-- ---- = IN06 0bX--- ---- = IN07

Index	S-idx	Designation	Data type		Default	Details	
0x2030	0x00	Input resistor	ro	USINT	4	Largest sub-index supported	
	0x01	Resistance IN08	ro	UINT	0	0…30 000	IN08 resistance [Ohms]
	0x02	Resistance IN10	ro	UINT	0	0…30 000	IN10 resistance [Ohms]
	0x03	Resistance IN12	ro	UINT	0	0…30 000	IN12 resistance [Ohms]
	0x04	Resistance IN14	ro	UINT	0	0…30 000	IN14 resistance [Ohms]
0x2040	0x00	System supply voltage VBBS	ro	USINT	1	Largest sub-index supported	
	0x01	VBBS	ro	USINT	0	VBBS voltage [mV]	
0x2050		Device temperature	ro	UINT	0	temperature [°C]	
0x20F0		Node ID	rw	USINT	125	1…125	node ID [!] value(0x20F0) != value(20F1)
0x20F1		Node ID	rw	USINT	125	1…125	node ID [!] value(0x20F0) != value(20F1)
0x20F2		Baud rate	rw	USINT	3	baud rate [!] value(0x20F2) != value(20F3)	
						0	1000 kBit/s
						1	800 kBit/s
						2	500 kBit/s
						3	250 kBit/s
						4	125 kBit/s
						5	100 kBit/s
						6	50 kBit/s
						7	20 kBit/s
0x20F3		Baud rate	rw	USINT	3	baud rate [!] value(0x20F2) != value(20F3)	
0x20F4		Autostart	rw	UINT	0	not used	
0x20F5		Lock edit mode	rw	USINT	0	0 = edit mode unlocked 1 = edit mode locked	

UK

Index	S-idx	Designation	Data type		Default	Details
0x6000	0x00	Binary input Largest sub-index supported	ro	USINT	0x02	Binary inputs Largest supported sub-index = 2
	0x01	Binary inputs IN00 - IN07	ro	USINT	0	Binary inputs IN00…IN07 0b---- ---X = IN00 0b---- --X- = IN01 0b---- -X-- = IN02 0b---- X--- = IN03 0b---X ---- = IN04 0b--X- ---- = IN05 0b-X-- ---- = IN06 0bX--- ---- = IN07
	0x02	Binary inputs IN08 - IN15	ro	USINT	0	Binary inputs IN08…IN15 0b---- ---X = IN08 0b---- --X- = IN09 0b---- -X-- = IN10 0b---- X--- = IN11 0b---X ---- = IN12 0b--X- ---- = IN13 0b-X-- ---- = IN14 0bX--- ---- = IN15
0x6404	0x00	Analogue input Largest sub-index supported	ro	USINT	0x08	Analogue inputs Largest supported sub-index = 4
	0x01	Analogue input IN00	ro	UINT	--	Analogue value of input IN00
	0x02	Analogue input IN01	ro	UINT	--	Analogue value of input IN01
	0x03	Analogue input IN02	ro	UINT	--	Analogue value of input IN02
	0x04	Analogue input IN03	ro	UINT	--	Analogue value of input IN03
	0x05	Analogue input IN04	ro	UINT	--	Analogue value of input IN04
	0x06	Analogue input IN05	ro	UINT	--	Analogue value of input IN05
	0x07	Analogue input IN06	ro	UINT	--	Analogue value of input IN06
	0x08	Analogue input IN07	ro	UINT	--	Analogue value of input IN07

12.2.2 Device-specific CR2051

Receive PDO communication parameters (index 0x1400…0x14FF):

Index	S-idx	Designation	Data type		Default	Details
0x1400	0x00	Receive PDO Communication Parameter Number of entries	ro	USINT	0x02	Receive PDO 1: binary outputs 0 - 15 number of entries = 2
	0x01	COBID used by PDO	rw	UDINT	0x200 + node ID	CAN ID of the first read PDO Bit 31 = 0 → PDO is valid Bit 31 = 1 → PDO is not valid
	0x02	transmission type	rw	USINT	0x01	0x00 = synch acyclic 0x01...0xF0 = synch cyclic; outputs are only updated after „n" synch objects n = 1…240 = 0x01...0xF0 0xFC/0xFD not implemented 0xFE = asynch man. spec. event; outputs are updated immediately 0xFF = asynch device profile event; outputs are updated immediately
0x1401	0x00	Receive PDO Communication Parameter Number of entries	ro	USINT	0x02	Receive PDO 2: PWM outputs 0 - 3 number of entries = 2
	0x01	COBID used by PDO	rw	UDINT	0x300 + node ID	CAN ID of the second read PDO Bit 31 = 0 → PDO is valid Bit 31 = 1 → PDO is not valid
	0x02	transmission type	rw	USINT	0x01	0x00 = synch acyclic 0x01...0xF0 = synch cyclic; outputs are only updated after „n" synch objects n = 1…240 = 0x01...0xF0 0xFC/0xFD not implemented 0xFE = asynch man. spec. event; outputs are updated immediately 0xFF = asynch device profile event; outputs are updated immediately

Index	S-idx	Designation	Data type		Default	Details
0x1402	0x00	Receive PDO Communication Parameter Number of entries	ro	USINT	0x02	Receive PDO 3: PWM outputs 4 - 7 number of entries = 2
	0x01	COBID used by PDO	rw	UDINT	0x400 + node ID	CAN-ID of the 3. read PDO Bit 31 = 0 → PDO is valid Bit 31 = 1 → PDO is not valid
	0x02	transmission type	rw	USINT	0x01	0x00 = synch acyclic 0x01...0xF0 = synch cyclic; outputs are only updated after „n" synch objects n = 1…240 = 0x01...0xF0 0xFC/0xFD not implemented 0xFE = asynch man. spec. event; outputs are updated immediately 0xFF = asynch device profile event; outputs are updated immediately
0x1403	0x00	Receive PDO Communication Parameter Number of entries	ro	USINT	0x02	Receive PDO 4: PWM outputs 8 - 11 number of entries = 2
	0x01	COBID used by PDO	rw	UDINT	0x500 + node ID	CAN-ID of the 3. read PDO Bit 31 = 0 → PDO is valid Bit 31 = 1 → PDO is not valid
	0x02	transmission type	rw	USINT	0x01	0x00 = synch acyclic 0x01...0xF0 = synch cyclic; outputs are only updated after „n" synch objects n = 1…240 = 0x01...0xF0 0xFC/0xFD not implemented 0xFE = asynch man. spec. event; outputs are updated immediately 0xFF = asynch device profile event; outputs are updated immediately

Index	S-idx	Designation	Data type		Default	Details
0x1404	0x00	Receive PDO Communication Parameter Number of entries	ro	USINT	0x02	Receive PDO 5: PWM outputs 12 - 15 number of entries = 2
	0x01	COBID used by PDO	rw	UDINT	0x201 + node ID	CAN-ID of the 3. read PDO Bit 31 = 0 → PDO is valid Bit 31 = 1 → PDO is not valid
	0x02	transmission type	rw	USINT	0x01	0x00 = synch acyclic 0x01...0xF0 = synch cyclic; outputs are only updated after „n" synch objects n = 1…240 = 0x01...0xF0 0xFC/0xFD not implemented 0xFE = asynch man. spec. event; outputs are updated immediately 0xFF = asynch device profile event; outputs are updated immediately

Receive PDO mapping (index 0x1600…0x16FF):

Index	S-idx	Designation	Data type		Default	Details
0x1600	0x00	Receive PDO mapping Number of mapped objects in PDO	rw	USINT	0x02	Mapping read PDO 1: binary outputs number of integrated application objects = 2
	0x01	PDO mapping	ro	UDINT	0x6200 0108	1 byte in index 0x6200, SubIndex 01 Binary outputs OUT00…OUT07 0b---- ---X = OUT00 0b---- --X- = OUT01 0b---- -X-- = OUT02 0b---- X--- = OUT03 0b---X ---- = OUT04 0b--X- ---- = OUT05 0b-X-- ---- = OUT06 0bX--- ---- = OUT07
	0x02	PDO mapping	ro	UDINT	0x6200 0208	1 byte in index 0x6200, SubIndex 02 Binary outputs OUT08…OUT15 0b---- ---X = OUT08 0b---- --X- = OUT09 0b---- -X-- = OUT10 0b---- X--- = OUT11 0b---X ---- = OUT12 0b--X- ---- = OUT13 0b-X-- ---- = OUT14 0bX--- ---- = OUT15

Index	S-idx	Designation	Data type		Default	Details
0x1601	0x00	Receive PDO mapping Number of mapped objects in PDO	rw	USINT	0x04	Mapping read PDO 2: PWM outputs OUT00…OUT03 number of integrated application objects = 4
	0x01	PDO mapping	rw	UDINT	0x6414 0110	PWM/current output OUT00 Index 0x6414, SubIndex 0x01 contains the preset value of the PWM output OUT00, the value is interpreted as duty cycle in ‰ or as target current value (depending on the configuration index 0x2000)
	0x02	PDO mapping	rw	UDINT	0x6414 0210	PWM/ current output OUT01 Index 0x6414, SubIndex 0x02 contains the preset value of the PWM output OUT01, the value is interpreted as duty cycle in ‰ or as target current value (depending on the configuration index 0x2000)
	0x03	PDO mapping	rw	UDINT	0x6414 0310	PWM/ current output OUT02 Index 0x6414, SubIndex 0x03 contains the preset value of the PWM output OUT02, the value is interpreted as duty cycle in ‰ or as target current value (depending on the configuration index 0x2000)
	0x04	PDO mapping	rw	UDINT	0x6414 0410	PWM/ current output OUT03 Index 0x6414, SubIndex 0x04 contains the preset value of the PWM output OUT03, the value is interpreted as duty cycle in ‰ or as target current value (depending on the configuration index 0x2000)

Index	S-idx	Designation	Data type		Default	Details
0x1602	0x00	"Receive PDO mapping Number of mapped objects in PDO"	rw	USINT	0x04	Mapping read PDO 3: PWM outputs OUT04…OUT07 number of integrated application objects = 4
	0x01	PDO mapping	rw	UDINT	0x6414 0510	PWM/ current output OUT04 Index 0x6414, SubIndex 0x05 contains the preset value of the PWM output OUT04, the value is interpreted as duty cycle in ‰ or as target current value (depending on the configuration index 0x2000)
	0x02	PDO mapping	rw	UDINT	0x6414 0610	PWM/ current output OUT05 Index 0x6414, SubIndex 0x06 contains the preset value of the PWM output OUT05, the value is interpreted as duty cycle in ‰ or as target current value (depending on the configuration index 0x2000)
	0x03	PDO mapping	rw	UDINT	0x6414 0710	PWM/ current output OUT06 Index 0x6414, SubIndex 0x07 contains the preset value of the PWM output OUT06, the value is interpreted as duty cycle in ‰ or as target current value (depending on the configuration index 0x2000)
	0x04	PDO mapping	rw	UDINT	0x6414 0810	PWM/ current output OUT07 Index 0x6414, SubIndex 0x08 contains the preset value of the PWM output OUT07, the value is interpreted as duty cycle in ‰ or as target current value (depending on the configuration index 0x2000)

Index	S-idx	Designation	Data type		Default	Details
0x1603	0x00	Receive PDO mapping Number of mapped objects in PDO	rw	USINT	0x04	Mapping read PDO 4: PWM outputs OUT08…OUT11 number of integrated application objects = 4
	0x01	PDO mapping	rw	UDINT	0x6414 0910	PWM/ current output OUT08 Index 0x6414, SubIndex 0x09 contains the preset value of the PWM output OUT08, the value is interpreted as duty cycle in ‰ or as target current value (depending on the configuration index 0x2000)
	0x02	PDO mapping	rw	UDINT	0x6414 0A10	PWM/ current output OUT09 Index 0x6414, SubIndex 0x0A contains the preset value of the PWM output OUT09, the value is interpreted as duty cycle in ‰ or as target current value (depending on the configuration index 0x2000)
	0x03	PDO mapping	rw	UDINT	0x6414 0B10	PWM/ current output OUT10 Index 0x6414, SubIndex 0x0B contains the preset value of the PWM output OUT10, the value is interpreted as duty cycle in ‰ or as target current value (depending on the configuration index 0x2000)
	0x04	PDO mapping	rw	UDINT	0x6414 0C10	PWM/ current output OUT11 Index 0x6414, SubIndex 0x0C contains the preset value of the PWM output OUT11, the value is interpreted as duty cycle in ‰ or as target current value (depending on the configuration index 0x2000)

Index	S-idx	Designation	Data type		Default	Details
0x1604	0x00	Receive PDO mapping Number of mapped objects in PDO	rw	USINT	0x04	Mapping read PDO 5: PWM outputs OUT12…OUT15 number of integrated application objects = 4
	0x01	PDO mapping	rw	UDINT	0x6414 0D10	PWM/ current output OUT12 Index 0x6414, SubIndex 0x0D contains the preset value of the PWM output OUT12, the value is interpreted as duty cycle in ‰ or as target current value (depending on the configuration index 0x2000)
	0x02	PDO mapping	rw	UDINT	0x6414 0E10	PWM/ current output OUT13 Index 0x6414, SubIndex 0x0E contains the preset value of the PWM output OUT13, the value is interpreted as duty cycle in ‰ or as target current value (depending on the configuration index 0x2000)
	0x03	PDO mapping	rw	UDINT	0x6414 0F10	PWM/ current output OUT14 Index 0x6414, SubIndex 0x0F contains the preset value of the PWM output OUT14, the value is interpreted as duty cycle in ‰ or as target current value (depending on the configuration index 0x2000)
	0x04	PDO mapping	rw	UDINT	0x6414 1010	PWM/ current output OUT15 Index 0x6414, SubIndex 0x10 contains the preset value of the PWM output OUT15, the value is interpreted as duty cycle in ‰ or as target current value (depending on the configuration index 0x2000)

Transmit PDO communication parameters (index 0x1800…0x18FF):

Index	S-idx	Designation	Data type		Default	Details
0x1800	0x00	Transmit PDO Communication Parameter Number of entries	ro	USINT	0x05	Configuration transmit PDO 1 number of entries = 5
	0x01	COBID used by PDO	rw	UDINT	0x180 + Node ID	CAN ID of the transmit PDO 1 Bit 31 = 0 → PDO is valid Bit 31 = 1 → PDO is not valid
	0x02	transmission type	rw	USINT	0x01	0x00 = synch acyclic 0x01...0xF0 = synch cyclic; values are only transmitted after „n" synch objects n = 1…240 = 0x01...0xF0 0xFC/0xFD not implemented 0xFE = asynch man. spec. event; values are immediately transferred 0xFF = asynch device profile event; values are immediately transferred
	0x03	inhibit time	rw	UINT	0	delay time in the transmission type "asynch" before the PDO is transmitted again at the earliest. (0...65535 • 100 µs)
	0x04	reserved	rw	USINT	0	reserve
	0x05	event time	rw	UINT	0	max. transfer break in the transmission type „asynch" (0...65535 ms) When this time has elapsed, the PDO is transferred even if the appl. event has not accured.

Index	S-idx	Designation	Data type		Default	Details
0x1801	0x00	Transmit PDO Communication Parameter Number of entries	ro	USINT	0x05	Configuration transmit PDO 2 number of entries = 5
	0x01	COBID used by PDO	rw	UDINT	0x280 + Node ID	CAN ID of the transmit PDO 2 Bit 31 = 0 → PDO is valid Bit 31 = 1 → PDO is not valid
	0x02	transmission type	rw	USINT	0x01	0x00 = synch acyclic 0x01...0xF0 = synch cyclic; values are only transmitted after „n" synch objects n = 1…240 = 0x01...0xF0 0xFC/0xFD not implemented 0xFE = asynch man. spec. event; values are immediately transferred 0xFF = asynch device profile event; values are immediately transferred
	0x03	inhibit time	rw	UINT	0	delay time in the transmission type "asynch" before the PDO is transmitted again at the earliest. (0...65535 • 100 µs)
	0x04	reserved	rw	USINT	0	reserve
	0x05	event time	rw	UINT	0	max. transfer break in the transmission type „asynch" (0...65535 ms) When this time has elapsed, the PDO is transferred even if the appl. event has not accured.

Index	S-idx	Designation	Data type		Default	Details
0x1802	0x00	Transmit PDO Communication Parameter Number of entries	ro	USINT	0x05	Configuration transmit PDO 3 number of entries = 5
	0x01	COBID used by PDO	rw	UDINT	0x380 + Node ID	CAN ID of the transmit PDO 3 Bit 31 = 0 → PDO is valid Bit 31 = 1 → PDO is not valid
	0x02	transmission type	rw	USINT	0x01	0x00 = synch acyclic 0x01...0xF0 = synch cyclic; values are only transmitted after „n" synch objects n = 1…240 = 0x01...0xF0 0xFC/0xFD not implemented 0xFE = asynch man. spec. event; values are immediately transferred 0xFF = asynch device profile event; values are immediately transferred
	0x03	inhibit time	rw	UINT	0	delay time in the transmission type "asynch" before the PDO is transmitted again at the earliest. (0...65535 • 100 µs)
	0x04	reserved	rw	USINT	0	reserve
	0x05	event time	rw	UINT	0	max. transfer break in the transmission type „asynch" (0...65535 ms) When this time has elapsed, the PDO is transferred even if the appl. event has not accured.

Index	S-idx	Designation	Data type		Default	Details
0x1803	0x00	Transmit PDO Communication Parameter Number of entries	ro	USINT	0x05	Configuration transmit PDO 4 number of entries = 5
	0x01	COBID used by PDO	rw	UDINT	0x480 + Node ID	CAN ID of the transmit PDO 4 Bit 31 = 0 → PDO is valid Bit 31 = 1 → PDO is not valid
	0x02	transmission type	rw	USINT	0x01	0x00 = synch acyclic 0x01...0xF0 = synch cyclic; values are only transmitted after „n" synch objects n = 1…240 = 0x01...0xF0 0xFC/0xFD not implemented 0xFE = asynch man. spec. event; values are immediately transferred 0xFF = asynch device profile event; values are immediately transferred
	0x03	inhibit time	rw	UINT	0	delay time in the transmission type "asynch" before the PDO is transmitted again at the earliest. (0...65535 • 100 µs)
	0x04	reserved	rw	USINT	0	reserve
	0x05	event time	rw	UINT	0	max. transfer break in the transmission type „asynch" (0...65535 ms) When this time has elapsed, the PDO is transferred even if the appl. event has not accured.

Transmit PDO mapping (index 0x1A00…0x1AFF):

Index	S-idx	Designation	Data type		Default	Details
0x1A00	0x00	Transmit PDO mapping Number of mapped objects in PDO	rw	USINT	0x04	mapping transmit PDO 01 (output current OUT00...OUT03) number of integrated application objects = 4
	0x01	PDO mapping	rw	UDINT	0x2002 0110	Index 0x2002, SubIndex 0x01 current on output OUT00
	0x02	PDO mapping	rw	UDINT	0x2002 0210	Index 0x2002, SubIndex 0x02 current on output OUT01
	0x03	PDO mapping	rw	UDINT	0x2002 0310	Index 0x2002, SubIndex 0x03 current on output OUT02
	0x04	PDO mapping	rw	UDINT	0x2002 0410	Index 0x2002, SubIndex 0x04 current on output OUT03
0x1A01	0x00	Transmit PDO mapping Number of mapped objects in PDO	rw	USINT	0x04	mapping transmit PDO 02 (output current OUT04...OUT07) number of integrated application objects = 4
	0x01	PDO mapping	rw	UDINT	0x2002 0510	Index 0x2002, SubIndex 0x05 current on output OUT04
	0x02	PDO mapping	rw	UDINT	0x2002 0610	Index 0x2002, SubIndex 0x06 current on output OUT05
	0x03	PDO mapping	rw	UDINT	0x2002 0710	Index 0x2002, SubIndex 0x07 current on output OUT06
	0x04	PDO mapping	rw	UDINT	0x2002 0810	Index 0x2002, SubIndex 0x08 current on output OUT07

Index	S-idx	Designation	Data type		Default	Details
0x1A02	0x00	Transmit PDO mapping Number of mapped objects in PDO	rw	USINT	0x05	mapping transmit PDO 3 number of integrated application objects = 5
	0x01	PDO mapping	rw	UDINT	0x2022 0108	Index 0x2022, SubIndex 0x01 outputs 00...07: flag " short circuit " (bit coded)
	0x02	PDO mapping	rw	UDINT	0x2022 0208	Index 0x2022, SubIndex 0x02 outputs 08…15: flag " short circuit " (bit coded)
	0x03	PDO mapping	rw	UDINT	0x2023 0108	Index 0x2023, SubIndex 0x01 outputs 00...07: flag " wire break " (bit coded)
	0x04	PDO mapping	rw	UDINT	0x2023 0208	Index 0x2023, SubIndex 0x02 outputs 08...015: flag " wire break " (bit coded)
	0x05	PDO mapping	rw	UDINT	0x2024 0108	Index 0x2024, SubIndex 0x01 outputs 00...07: flag " overload " (bit coded)
0x1A03	0x00	Transmit PDO mapping Number of mapped objects in PDO	rw	USINT	0x04	mapping transmit PDO 4 (system flag) number of integrated application objects = 4
	0x01	PDO mapping	rw	UDINT	0x2040 0110	Index 0x2040, SubIndex 0x01 supply voltage of the system VBBS
	0x02	PDO mapping	rw	UDINT	0x2041 0110	Index 0x2041, SubIndex 0x01 output supply voltage VBB1
	0x03	PDO mapping	rw	UDINT	0x2041 0210	Index 0x2041, SubIndex 0x02 output supply voltage VBB2
	0x04	PDO mapping	rw	UDINT	0x2050 0010	Index 0x2050, SubIndex 0x00 system temperature in °C

Manufacturer-specific objekts (index 0x2000...0x6FFF):

Index	S-idx	Designation	Data type		Default	Details	
0x2000	0x00	IO configu-ration Largest sub-index supported	ro	USINT	16	Configuration inputs/outputs largest supported Sub-index = 32	
	0x01	Configuration OUT00	rw	USINT	2	0 = 0x00 2 = 0x02 4 = 0x04 5 = 0x05 15 = 0x0F 16 = 0x10	off Input OUT00 binary plus switched PWM output current control binary plus switched with diagnosis binary plus switched with diagnosis + protection
	0x02	Configuration OUT01	rw	USINT	2	0 = 0x00 2 = 0x02 4 = 0x04 5 = 0x05 15 = 0x0F 16 = 0x10	off Input OUT01 binary plus switched PWM output current control binary plus switched with diagnosis binary plus switched with diagnosis + protection
	0x03	Configuration OUT02	rw	USINT	2	0 = 0x00 2 = 0x02 4 = 0x04 5 = 0x05 15 = 0x0F 16 = 0x10	off Input OUT02 binary plus switched PWM output current control binary plus switched with diagnosis binary plus switched with diagnosis + protection
	0x04	Configuration OUT03	rw	USINT	2	0 = 0x00 2 = 0x02 4 = 0x04 5 = 0x05 15 = 0x0F 16 = 0x10	off Input OUT03 binary plus switched PWM output current control binary plus switched with diagnosis binary plus switched with diagnosis + protection
	0x05	Configuration OUT04	rw	USINT	2	0 = 0x00 2 = 0x02 4 = 0x04 5 = 0x05 15 = 0x0F 16 = 0x10	off Input OUT04 binary plus switched PWM output current control binary plus switched with diagnosis binary plus switched with diagnosis + protection

Index	S-idx	Designation	Data type		Default	Details	
0x2000	0x06	Configuration OUT05	rw	USINT	2	0 = 0x00 2 = 0x02 4 = 0x04 5 = 0x05 15 = 0x0F 16 = 0x10	off Input OUT05 binary plus switched PWM output current control binary plus switched with diagnosis binary plus switched with diagnosis + protection
	0x07	Configuration OUT06	rw	USINT	2	0 = 0x00 2 = 0x02 4 = 0x04 5 = 0x05 15 = 0x0F 16 = 0x10	off Input OUT06 binary plus switched PWM output current control binary plus switched with diagnosis binary plus switched with diagnosis + protection
	0x08	Configuration OUT07	rw	USINT	2	0 = 0x00 2 = 0x02 4 = 0x04 15 = 0x0F	off Input OUT07 binary plus switched PWM output binary plus switched with diagnosis
	0x09	Configuration OUT08	rw	USINT	2	0 = 0x00 2 = 0x02 4 = 0x04 15 = 0x0F	off Input OUT08 binary plus switched PWM output binary plus switched with diagnosis
	0x0A	Configuration OUT09	rw	USINT	2	0 = 0x00 2 = 0x02 4 = 0x04 15 = 0x0F	off Input OUT09 binary plus switched PWM output binary plus switched with diagnosis
	0x0B	Configuration OUT10	rw	USINT	2	0 = 0x00 2 = 0x02 4 = 0x04 15 = 0x0F	off Input OUT10 binary plus switched PWM output binary plus switched with diagnosis
	0x0C	Configuration OUT11	rw	USINT	2	0 = 0x00 2 = 0x02 4 = 0x04 15 = 0x0F	off Input OUT11 binary plus switched PWM output binary plus switched with diagnosis
	0x0D	Configuration OUT12	rw	USINT	2	0 = 0x00 2 = 0x02 4 = 0x04 15 = 0x0F	off Input OUT12 binary plus switched PWM output binary plus switched with diagnosis

Index	S-idx	Designation	Data type		Default	Details	
0x2000	0x0E	Configuration OUT13	rw	USINT	2	0 = 0x00 2 = 0x02 4 = 0x04 15 = 0x0F	off Input OUT13 binary plus switched PWM output binary plus switched with diagnosis
	0x0F	Configuration OUT14	rw	USINT	2	0 = 0x00 2 = 0x02 4 = 0x04 15 = 0x0F	off Input OUT14 binary plus switched PWM output binary plus switched with diagnosis
	0x10	Configuration OUT15	rw	USINT	2	0 = 0x00 2 = 0x02 4 = 0x04 15 = 0x0F	off Input OUT15 binary plus switched PWM output binary plus switched with diagnosis
0x2001	0x00	PWM frequency	ro	USINT	16	Largest sub-index supported	
	0x01	PWM frequency OUT00	rw	UINT	100	20…250	OUT00 PWM frequency [Hz]
	0x02	PWM frequency OUT01	rw	UINT	100	20…250	OUT01 PWM frequency [Hz]
	0x03	PWM frequency OUT02	rw	UINT	100	20…250	OUT02 PWM frequency [Hz]
	0x04	PWM frequency OUT03	rw	UINT	100	20…250	OUT03 PWM frequency [Hz]
	0x05	PWM frequency OUT04	rw	UINT	100	20…250	OUT04 PWM frequency [Hz]
	0x06	PWM frequency OUT05	rw	UINT	100	20…250	OUT05 PWM frequency [Hz]
	0x07	PWM frequency OUT06	rw	UINT	100	20…250	OUT06 PWM frequency [Hz]
	0x08	PWM frequency OUT07	rw	UINT	100	20…250	OUT07 PWM frequency [Hz]
	0x09	PWM frequency OUT08	rw	UINT	100	20…250	OUT08 PWM frequency [Hz]
	0x0A	PWM frequency OUT09	rw	UINT	100	20…250	OUT09 PWM frequency [Hz]

Index	S-idx	Designation	Data type		Default	Details	
0x2001	0x0B	PWM frequency OUT10	rw	UINT	100	20…250	OUT10 PWM frequency [Hz]
	0x0C	PWM frequency OUT11	rw	UINT	100	20…250	OUT11 PWM frequency [Hz]
	0x0D	PWM frequency OUT12	rw	UINT	100	20…250	OUT12 PWM frequency [Hz]
	0x0E	PWM frequency OUT13	rw	UINT	100	20…250	OUT13 PWM frequency [Hz]
	0x0F	PWM frequency OUT14	rw	UINT	100	20…250	OUT14 PWM frequency [Hz]
	0x10	PWM frequency OUT15	rw	UINT	100	20…250	OUT15 PWM frequency [Hz]
0x2002	0x00	Current value	ro	USINT	8	Largest sub-index supported	
	0x01	Current value OUT00	ro	UINT	0	0…4000	OUT00 output current [mA]
	0x02	Current value OUT01	ro	UINT	0	0…4000	OUT01 output current [mA]
	0x03	Current value OUT02	ro	UINT	0	0…2500	OUT02 output current [mA]
	0x04	Current value OUT03	ro	UINT	0	0…2500	OUT03 output current [mA]
	0x05	Current value OUT04	ro	UINT	0	0…4000	OUT04 output current [mA]
	0x06	Current value OUT05	ro	UINT	0	0…4000	OUT05 output current [mA]
	0x07	Current value OUT06	ro	UINT	0	0…2500	OUT06 output current [mA]
	0x08	Current value OUT07	ro	UINT	0	0…2500	OUT07 output current [mA]

Index	S-idx	Designation	Data type		Default	Details	
0x2004	0x00	P-value	ro	USINT	8	Largest sub-index supported	
	0x01	P-value OUT00	rw	USINT	30	0…255	OUT00 P-value for current control
	0x02	P-value OUT01	rw	USINT	30	0…255	OUT01 P-value for current control
	0x03	P-value OUT02	rw	USINT	30	0…255	OUT02 P-value for current control
	0x04	P-value OUT03	rw	USINT	30	0…255	OUT03 P-value for current control
	0x05	P-value OUT04	rw	USINT	30	0…255	OUT04 P-value for current control
	0x06	P-value OUT05	rw	USINT	30	0…255	OUT05 P-value for current control
	0x07	P-value OUT06	rw	USINT	30	0…255	OUT06 P-value for current control
	0x08	P-value OUT07	rw	USINT	30	0…255	OUT07 P-value for current control
0x2005	0x00	I-value	ro	USINT	8	Largest sub-index supported	
	0x01	I-value OUT00	rw	USINT	20	0…255	OUT00 I-value for current control
	0x02	I-value OUT01	rw	USINT	20	0…255	OUT01 I-value for current control
	0x03	I-value OUT02	rw	USINT	20	0…255	OUT02 I-value for current control
	0x04	I-value OUT03	rw	USINT	20	0…255	OUT03 I-value for current control
	0x05	I-value OUT04	rw	USINT	20	0…255	OUT04 I-value for current control
	0x06	I-value OUT05	rw	USINT	20	0…255	OUT05 I-value for current control
	0x07	I-value OUT06	rw	USINT	20	0…255	OUT06 I-value for current control
	0x08	I-value OUT07	rw	USINT	20	0…255	OUT07 I-value for current control
0x2006	0x00	PWM dither frequency	ro	USINT	16	Largest sub-index supported	
	0x01	PWM dither frequency OUT00	rw	UINT	0	0…PWM-freq / 2	OUT00 PWM dither frequency [Hz]
	0x02	PWM dither frequency OUT01	rw	UINT	0	0…PWM-freq / 2	OUT01 PWM dither frequency [Hz]

Index	S-idx	Designation	Data type		Default	Details	
0x2006	0x03	PWM dither frequency OUT02	rw	UINT	0	0…PWM-freq / 2	OUT02 PWM dither frequency [Hz]
	0x04	PWM dither frequency OUT03	rw	UINT	0	0…PWM-freq / 2	OUT03 PWM dither frequency [Hz]
	0x05	PWM dither frequency OUT04	rw	UINT	0	0…PWM-freq / 2	OUT04 PWM dither frequency [Hz]
	0x06	PWM dither frequency OUT05	rw	UINT	0	0…PWM-freq / 2	OUT05 PWM dither frequency [Hz]
	0x07	PWM dither frequency OUT06	rw	UINT	0	0…PWM-freq / 2	OUT06 PWM dither frequency [Hz]
	0x08	PWM dither frequency OUT07	rw	UINT	0	0…PWM-freq / 2	OUT07 PWM dither frequency [Hz]
	0x09	PWM dither frequency OUT08	rw	UINT	0	0…PWM-freq / 2	OUT08 PWM dither frequency [Hz]
	0x0A	PWM dither frequency OUT09	rw	UINT	0	0…PWM-freq / 2	OUT09 PWM dither frequency [Hz]
	0x0B	PWM dither frequency OUT10	rw	UINT	0	0…PWM-freq / 2	OUT10 PWM dither frequency [Hz]
	0x0C	PWM dither frequency OUT11	rw	UINT	0	0…PWM-freq / 2	OUT11 PWM dither frequency [Hz]
	0x0D	PWM dither frequency OUT12	rw	UINT	0	0…PWM-freq / 2	OUT12 PWM dither frequency [Hz]
	0x0E	PWM dither frequency OUT13	rw	UINT	0	0…PWM-freq / 2	OUT13 PWM dither frequency [Hz]
	0x0F	PWM dither frequency OUT14	rw	UINT	0	0…PWM-freq / 2	OUT14 PWM dither frequency [Hz]
	0x10	PWM dither frequency OUT15	rw	UINT	0	0…PWM-freq / 2	OUT15 PWM dither frequency [Hz]

Index	S-idx	Designation	Data type		Default	Details	
0x2007	0x00	PWM dither value	ro	USINT	16	Largest sub-index supported	
	0x01	PWM dither value OUT00	rw	UINT	0	0…1 000	OUT00 PWM dither value [‰]
	0x02	PWM dither value OUT01	rw	UINT	0	0…1 000	OUT01 PWM dither value [‰]
	0x03	PWM dither value OUT02	rw	UINT	0	0…1 000	OUT02 PWM dither value [‰]
	0x04	PWM dither value OUT03	rw	UINT	0	0…1 000	OUT03 PWM dither value [‰]
	0x05	PWM dither value OUT04	rw	UINT	0	0…1 000	OUT04 PWM dither value [‰]
	0x06	PWM dither value OUT05	rw	UINT	0	0…1 000	OUT05 PWM dither value [‰]
	0x07	PWM dither value OUT06	rw	UINT	0	0…1 000	OUT06 PWM dither value [‰]
	0x08	PWM dither value OUT07	rw	UINT	0	0…1 000	OUT07 PWM dither value [‰]
	0x09	PWM dither value OUT08	rw	UINT	0	0…1 000	OUT08 PWM dither value [‰]
	0x0A	PWM dither value OUT09	rw	UINT	0	0…1 000	OUT09 PWM dither value [‰]
	0x0B	PWM dither value OUT10	rw	UINT	0	0…1 000	OUT10 PWM dither value [‰]
	0x0C	PWM dither value OUT11	rw	UINT	0	0…1 000	OUT11 PWM dither value [‰]
	0x0D	PWM dither value OUT12	rw	UINT	0	0…1 000	OUT12 PWM dither value [‰]
	0x0E	PWM dither value OUT13	rw	UINT	0	0…1 000	OUT13 PWM dither value [‰]
	0x0F	PWM dither value OUT14	rw	UINT	0	0…1 000	OUT14 PWM dither value [‰]
	0x10	PWM dither value OUT15	rw	UINT	0	0…1 000	OUT15 PWM dither value [‰]

Index	S-idx	Designation	Data type		Default	Details	
0x2022	0x00	Output – short circuit	ro	USINT	2	Largest sub-index supported	
	0x01	Short circuit OUT00… OUT07	ro	USINT	0	0 = normal 1 = short circuit	channels (bit coded) 0b---- ---X = OUT00 0b---- --X- = OUT01 0b---- -X-- = OUT02 0b---- X--- = OUT03 0b---X ---- = OUT04 0b--X- ---- = OUT05 0b-X-- ---- = OUT06 0bX--- ---- = OUT07
	0x02	Short circuit OUT08… OUT15	ro	USINT	0	0 = normal 1 = short circuit	channels (bit coded) 0b---- ---X = OUT08 0b---- --X- = OUT09 0b---- -X-- = OUT10 0b---- X--- = OUT11 0b---X ---- = OUT12 0b--X- ---- = OUT13 0b-X-- ---- = OUT14 0bX--- ---- = OUT15
0x2023	0x00	Output – open circuit	ro	USINT	2	Largest sub-index supported	
	0x01	Open circuit OUT00… OUT07	ro	USINT	0	0 = normal 1 = open circuit	channels (bit coded) 0b---- ---X = OUT00 0b---- --X- = OUT01 0b---- -X-- = OUT02 0b---- X--- = OUT03 0b---X ---- = OUT04 0b--X- ---- = OUT05 0b-X-- ---- = OUT06 0bX--- ---- = OUT07
	0x02	Open circuit OUT08… OUT15	ro	USINT	0	0 = normal 1 = open circuit	channels (bit coded) 0b---- ---X = OUT08 0b---- --X- = OUT09 0b---- -X-- = OUT10 0b---- X--- = OUT11 0b---X ---- = OUT12 0b--X- ---- = OUT13 0b-X-- ---- = OUT14 0bX--- ---- = OUT15
0x2024	0x00	Output – overload	ro	USINT	1	Largest sub-index supported	
	0x01	Overload OUT00… OUT07	ro	USINT	0	0 = normal 1 = overload	channels (bit coded) 0b---- ---X = OUT00 0b---- --X- = OUT01 0b---- -X-- = OUT02 0b---- X--- = OUT03 0b---X ---- = OUT04 0b--X- ---- = OUT05 0b-X-- ---- = OUT06 0bX--- ---- = OUT07

Index	S-idx	Designation	Data type		Default	Details	
0x2040	0x00	System supply voltage VBBS	ro	USINT	1	Largest sub-index supported	
	0x01	VBBS	ro	USINT	0	VBBS voltage [mV]	
0x2041	0x00	Output supply voltage	ro	USINT	2	Largest sub-index supported	
	0x01	VBB1	ro	UINT	0	VBB1 voltage [mV]	
	0x02	VBB2	ro	UINT	0	VBB2 voltage [mV]	
0x2050		Device temperature	ro	UINT	0	temperature [°C]	
0x20F0		Node ID	rw	USINT	125	1…125	node ID [!] value(0x20F0) != value(20F1)
0x20F1		Node ID	rw	USINT	125	1…125	node ID [!] value(0x20F0) != value(20F1)
0x20F2		Baud rate	rw	USINT	3	baud rate [!] value(0x20F2) != value(20F3)	
						0	1000 kBit/s
						1	800 kBit/s
						2	500 kBit/s
						3	250 kBit/s
						4	125 kBit/s
						5	100 kBit/s
						6	50 kBit/s
						7	20 kBit/s
0x20F3		Baud rate	rw	USINT	3	baud rate [!] value(0x20F2) != value(20F3)	
0x20F4		Autostart	rw	UINT	0	not used	
0x20F5		Lock edit mode	rw	USINT	0	0 = edit mode unlocked 1 = edit mode locked	

Index	S-idx	Designation	Data type		Default	Details
0x6200	0x00	Binary output Largest sub-index supported	ro	USINT	2	Binary outputs Largest supported sub-index = 2
	0x01	Binary outputs OUT00 - OUT07	wo	USINT	0	Binary outputs OUT00…OUT07 0b---- ---X = OUT00 0b---- --X- = OUT01 0b---- -X-- = OUT02 0b---- X--- = OUT03 0b---X ---- = OUT04 0b--X- ---- = OUT05 0b-X-- ---- = OUT06 0bX--- ---- = OUT07
	0x02	Binary outputs OUT08 - OUT15	wo	USINT	0	Binary outputs OUT08…OUT15 0b---- ---X = OUT08 0b---- --X- = OUT09 0b---- -X-- = OUT10 0b---- X--- = OUT11 0b---X ---- = OUT12 0b--X- ---- = OUT13 0b-X-- ---- = OUT14 0bX--- ---- = OUT15

Index	S-idx	Designation	Data type		Default	Details
0x6414	0x00	PWM output Largest sub-index supported	ro	USINT	16	PWM outputs Largest supported sub-index = 16
	0x01	PWM output OUT00	wo	UINT	--	Value for PWM output OUT00
	0x02	PWM output OUT01	wo	UINT	--	Value for PWM output OUT01
	0x03	PWM output OUT02	wo	UINT	--	Value for PWM output OUT02
	0x04	PWM output OUT03	wo	UINT	--	Value for PWM output OUT03
	0x05	PWM output OUT04	wo	UINT	--	Value for PWM output OUT04
	0x06	PWM output OUT05	wo	UINT	--	Value for PWM output OUT05
	0x07	PWM output OUT06	wo	UINT	--	Value for PWM output OUT06
	0x08	PWM output OUT07	wo	UINT	--	Value for PWM output OUT07
	0x09	PWM output OUT08	wo	UINT	--	Value for PWM output OUT08
	0x0A	PWM output OUT09	wo	UINT	--	Value for PWM output OUT09
	0x0B	PWM output OUT10	wo	UINT	--	Value for PWM output OUT10
	0x0C	PWM output OUT11	wo	UINT	--	Value for PWM output OUT11
	0x0D	PWM output OUT12	wo	UINT	--	Value for PWM output OUT12
	0x0E	PWM output OUT13	wo	UINT	--	Value for PWM output OUT13
	0x0F	PWM output OUT14	wo	UINT	--	Value for PWM output OUT14
	0x10	PWM output OUT15	wo	UINT	--	Value for PWM output OUT15

12.2.3 Device-specific CR2052

Receive PDO communication parameters (index 0x1400…0x14FF):

Index	S-idx	Designation	Data type		Default	Details
0x1400	0x00	Receive PDO Communication Parameter Number of entries	ro	USINT	0x02	Receive PDO 1: binary outputs 0 - 7 number of entries = 2
	0x01	COBID used by PDO	rw	UDINT	0x200 + node ID	CAN ID of the first read PDO Bit 31 = 0 → PDO is valid Bit 31 = 1 → PDO is not valid
	0x02	transmission type	rw	USINT	0x01	0x00 = synch acyclic 0x01...0xF0 = synch cyclic; outputs are only updated after „n" synch objects n = 1…240 = 0x01...0xF0 0xFC/0xFD not implemented 0xFE = asynch man. spec. event; outputs are updated immediately 0xFF = asynch device profile event; outputs are updated immediately
0x1401	0x00	Receive PDO Communication Parameter Number of entries	ro	USINT	0x02	Receive PDO 2: PWM outputs 0 - 3 number of entries = 2
	0x01	COBID used by PDO	rw	UDINT	0x300 + node ID	CAN ID of the second read PDO Bit 31 = 0 → PDO is valid Bit 31 = 1 → PDO is not valid
	0x02	transmission type	rw	USINT	0x01	0x00 = synch acyclic 0x01...0xF0 = synch cyclic; outputs are only updated after „n" synch objects n = 1…240 = 0x01...0xF0 0xFC/0xFD not implemented 0xFE = asynch man. spec. event; outputs are updated immediately 0xFF = asynch device profile event; outputs are updated immediately

Index	S-idx	Designation	Data type		Default	Details
0x1402	0x00	Receive PDO Communication Parameter Number of entries	ro	USINT	0x02	Receive PDO 3: PWM outputs 4 - 7 number of entries = 2
	0x01	COBID used by PDO	rw	UDINT	0x400 + node ID	CAN-ID of the 3. read PDO Bit 31 = 0 → PDO is valid Bit 31 = 1 → PDO is not valid
	0x02	transmission type	rw	USINT	0x01	0x00 = synch acyclic 0x01...0xF0 = synch cyclic; outputs are only updated after „n" synch objects n = 1…240 = 0x01...0xF0 0xFC/0xFD not implemented 0xFE = asynch man. spec. event; outputs are updated immediately 0xFF = asynch device profile event; outputs are updated immediately

Receive PDO mapping (index 0x1600…0x16FF):

Index	S-idx	Designation	Data type		Default	Details
0x1600	0x00	Receive PDO mapping Number of mapped objects in PDO	rw	USINT	0x01	Mapping read PDO 1: binary outputs
	0x01	PDO mapping	ro	UDINT	0x6200 0108	1 byte in index 0x6200, SubIndex 01 Binary outputs OUT00…OUT07 0b---- ---X = OUT00 0b---- --X- = OUT01 0b---- -X-- = OUT02 0b---- X--- = OUT03 0b---X ---- = OUT04 0b--X- ---- = OUT05 0b-X-- ---- = OUT06 0bX--- ---- = OUT07

Index	S-idx	Designation	Data type		Default	Details
0x1601	0x00	Receive PDO mapping Number of mapped objects in PDO	rw	USINT	0x04	Mapping read PDO 2: PWM outputs OUT00…OUT03 number of integrated application objects = 4
	0x01	PDO mapping	rw	UDINT	0x6414 0110	PWM/current output OUT00 Index 0x6414, SubIndex 0x01 contains the preset value of the PWM output OUT00, the value is interpreted as duty cycle in ‰ or as target current value (depending on the configuration index 0x2000)
	0x02	PDO mapping	rw	UDINT	0x6414 0210	PWM/ current output OUT01 Index 0x6414, SubIndex 0x02 contains the preset value of the PWM output OUT01, the value is interpreted as duty cycle in ‰ or as target current value (depending on the configuration index 0x2000)
	0x03	PDO mapping	rw	UDINT	0x6414 0310	PWM/ current output OUT02 Index 0x6414, SubIndex 0x03 contains the preset value of the PWM output OUT02, the value is interpreted as duty cycle in ‰ or as target current value (depending on the configuration index 0x2000)
	0x04	PDO mapping	rw	UDINT	0x6414 0410	PWM/ current output OUT03 Index 0x6414, SubIndex 0x04 contains the preset value of the PWM output OUT03, the value is interpreted as duty cycle in ‰ or as target current value (depending on the configuration index 0x2000)

Index	S-idx	Designation	Data type		Default	Details
0x1602	0x00	Receive PDO mapping Number of mapped objects in PDO	rw	USINT	0x04	Mapping read PDO 3: PWM outputs OUT04…OUT07 number of integrated application objects = 4
	0x01	PDO mapping	rw	UDINT	0x6414 0510	PWM/ current output OUT04 Index 0x6414, SubIndex 0x05 contains the preset value of the PWM output OUT04, the value is interpreted as duty cycle in ‰ or as target current value (depending on the configuration index 0x2000)
	0x02	PDO mapping	rw	UDINT	0x6414 0610	PWM/ current output OUT05 Index 0x6414, SubIndex 0x06 contains the preset value of the PWM output OUT05, the value is interpreted as duty cycle in ‰ or as target current value (depending on the configuration index 0x2000)
	0x03	PDO mapping	rw	UDINT	0x6414 0710	PWM/ current output OUT06 Index 0x6414, SubIndex 0x07 contains the preset value of the PWM output OUT06, the value is interpreted as duty cycle in ‰ or as target current value (depending on the configuration index 0x2000)
	0x04	PDO mapping	rw	UDINT	0x6414 0810	PWM/ current output OUT07 Index 0x6414, SubIndex 0x08 contains the preset value of the PWM output OUT07, the value is interpreted as duty cycle in ‰ or as target current value (depending on the configuration index 0x2000)

Transmit PDO communication parameters (index 0x1800…0x18FF):

Index	S-idx	Designation	Data type		Default	Details
0x1800	0x00	Transmit PDO Communication Parameter Number of entries	ro	USINT	0x05	Configuration transmit PDO 1 number of entries = 5
	0x01	COBID used by PDO	rw	UDINT	0x180 + Node ID	CAN ID of the transmit PDO 1 Bit 31 = 0 → PDO is valid Bit 31 = 1 → PDO is not valid
	0x02	transmission type	rw	USINT	0x01	0x00 = synch acyclic 0x01...0xF0 = synch cyclic; values are only transmitted after „n" synch objects n = 1…240 = 0x01...0xF0 0xFC/0xFD not implemented 0xFE = asynch man. spec. event; values are immediately transferred 0xFF = asynch device profile event; values are immediately transferred
	0x03	inhibit time	rw	UINT	0	delay time in the transmission type "asynch" before the PDO is transmitted again at the earliest. (0...65535 • 100 µs)
	0x04	reserved	rw	USINT	0	reserve
	0x05	event time	rw	UINT	0	max. transfer break in the transmission type „asynch" (0...65535 ms) When this time has elapsed, the PDO is transferred even if the appl. event has not accured.

Index	S-idx	Designation	Data type		Default	Details
0x1801	0x00	Transmit PDO Communication Parameter Number of entries	ro	USINT	0x05	Configuration transmit PDO 2 number of entries = 5
	0x01	COBID used by PDO	rw	UDINT	0x280 + Node ID	CAN ID of the transmit PDO 2 Bit 31 = 0 → PDO is valid Bit 31 = 1 → PDO is not valid
	0x02	transmission type	rw	USINT	0x01	0x00 = synch acyclic 0x01...0xF0 = synch cyclic; values are only transmitted after „n" synch objects n = 1…240 = 0x01...0xF0 0xFC/0xFD not implemented 0xFE = asynch man. spec. event; values are immediately transferred 0xFF = asynch device profile event; values are immediately transferred
	0x03	inhibit time	rw	UINT	0	delay time in the transmission type "asynch" before the PDO is transmitted again at the earliest. (0...65535 • 100 µs)
	0x04	reserved	rw	USINT	0	reserve
	0x05	event time	rw	UINT	0	max. transfer break in the transmission type „asynch" (0...65535 ms) When this time has elapsed, the PDO is transferred even if the appl. event has not accured.

Index	S-idx	Designation	Data type		Default	Details
0x1802	0x00	Transmit PDO Communication Parameter Number of entries	ro	USINT	0x05	Configuration transmit PDO 3 number of entries = 5
	0x01	COBID used by PDO	rw	UDINT	0x380 + Node ID	CAN ID of the transmit PDO 3 Bit 31 = 0 → PDO is valid Bit 31 = 1 → PDO is not valid
	0x02	transmission type	rw	USINT	0x01	0x00 = synch acyclic 0x01...0xF0 = synch cyclic; values are only transmitted after „n" synch objects n = 1…240 = 0x01...0xF0 0xFC/0xFD not implemented 0xFE = asynch man. spec. event; values are immediately transferred 0xFF = asynch device profile event; values are immediately transferred
	0x03	inhibit time	rw	UINT	0	delay time in the transmission type "asynch" before the PDO is transmitted again at the earliest. (0...65535 • 100 µs)
	0x04	reserved	rw	USINT	0	reserve
	0x05	event time	rw	UINT	0	max. transfer break in the transmission type „asynch" (0...65535 ms) When this time has elapsed, the PDO is transferred even if the appl. event has not accured.

Index	S-idx	Designation	Data type		Default	Details
0x1803	0x00	Transmit PDO Communication Parameter Number of entries	ro	USINT	0x05	Configuration transmit PDO 4 number of entries = 5
	0x01	COBID used by PDO	rw	UDINT	0x480 + Node ID	CAN ID of the transmit PDO 4 Bit 31 = 0 → PDO is valid Bit 31 = 1 → PDO is not valid
	0x02	transmission type	rw	USINT	0x01	0x00 = synch acyclic 0x01...0xF0 = synch cyclic; values are only transmitted after „n" synch objects n = 1…240 = 0x01...0xF0 0xFC/0xFD not implemented 0xFE = asynch man. spec. event; values are immediately transferred 0xFF = asynch device profile event; values are immediately transferred
	0x03	inhibit time	rw	UINT	0	delay time in the transmission type "asynch" before the PDO is transmitted again at the earliest. (0...65535 • 100 µs)
	0x04	reserved	rw	USINT	0	reserve
	0x05	event time	rw	UINT	0	max. transfer break in the transmission type „asynch" (0...65535 ms) When this time has elapsed, the PDO is transferred even if the appl. event has not accured.

Index	S-idx	Designation	Data type		Default	Details
0x1804	0x00	Transmit PDO Communication Parameter Number of entries	ro	USINT	0x05	Configuration transmit PDO 5 number of entries = 5
	0x01	COBID used by PDO	rw	UDINT	0x181 + Node ID	CAN ID of the transmit PDO 5 Bit 31 = 0 → PDO is valid Bit 31 = 1 → PDO is not valid
	0x02	transmission type	rw	USINT	0x01	0x00 = synch acyclic 0x01...0xF0 = synch cyclic; values are only transmitted after „n" synch objects n = 1…240 = 0x01...0xF0 0xFC/0xFD not implemented 0xFE = asynch man. spec. event; values are immediately transferred 0xFF = asynch device profile event; values are immediately transferred
	0x03	inhibit time	rw	UINT	0	delay time in the transmission type "asynch" before the PDO is transmitted again at the earliest. (0...65535 • 100 µs)
	0x04	reserved	rw	USINT	0	reserve
	0x05	event time	rw	UINT	0	max. transfer break in the transmission type „asynch" (0...65535 ms) When this time has elapsed, the PDO is transferred even if the appl. event has not accured.

Index	S-idx	Designation	Data type		Default	Details
0x1805	0x00	Transmit PDO Communication Parameter Number of entries	ro	USINT	0x05	Configuration transmit PDO 6 number of entries = 5
	0x01	COBID used by PDO	rw	UDINT	0x281 + Node ID	CAN ID of the transmit PDO 6 Bit 31 = 0 → PDO is valid Bit 31 = 1 → PDO is not valid
	0x02	transmission type	rw	USINT	0x01	0x00 = synch acyclic 0x01...0xF0 = synch cyclic; values are only transmitted after „n" synch objects n = 1…240 = 0x01...0xF0 0xFC/0xFD not implemented 0xFE = asynch man. spec. event; values are immediately transferred 0xFF = asynch device profile event; values are immediately transferred
	0x03	inhibit time	rw	UINT	0	delay time in the transmission type "asynch" before the PDO is transmitted again at the earliest. (0...65535 • 100 µs)
	0x04	reserved	rw	USINT	0	reserve
	0x05	event time	rw	UINT	0	max. transfer break in the transmission type „asynch" (0...65535 ms) When this time has elapsed, the PDO is transferred even if the appl. event has not accured.

Index	S-idx	Designation	Data type		Default	Details
0x1806	0x00	Transmit PDO Communication Parameter Number of entries	ro	USINT	0x05	Configuration transmit PDO 7 number of entries = 5
	0x01	COBID used by PDO	rw	UDINT	0x381 + Node ID	CAN ID of the transmit PDO 7 Bit 31 = 0 → PDO is valid Bit 31 = 1 → PDO is not valid
	0x02	transmission type	rw	USINT	0x01	0x00 = synch acyclic 0x01...0xF0 = synch cyclic; values are only transmitted after „n" synch objects n = 1…240 = 0x01...0xF0 0xFC/0xFD not implemented 0xFE = asynch man. spec. event; values are immediately transferred 0xFF = asynch device profile event; values are immediately transferred
	0x03	inhibit time	rw	UINT	0	delay time in the transmission type "asynch" before the PDO is transmitted again at the earliest. (0...65535 • 100 µs)
	0x04	reserved	rw	USINT	0	reserve
	0x05	event time	rw	UINT	0	max. transfer break in the transmission type „asynch" (0...65535 ms) When this time has elapsed, the PDO is transferred even if the appl. event has not accured.

Index	S-idx	Designation	Data type		Default	Details
0x1807	0x00	Transmit PDO Communication Parameter Number of entries	ro	USINT	0x05	Configuration transmit PDO 8 number of entries = 5
	0x01	COBID used by PDO	rw	UDINT	0x481 + Node ID	CAN ID of the transmit PDO 8 Bit 31 = 0 → PDO is valid Bit 31 = 1 → PDO is not valid
	0x02	transmission type	rw	USINT	0x01	0x00 = synch acyclic 0x01...0xF0 = synch cyclic; values are only transmitted after „n" synch objects n = 1…240 = 0x01...0xF0 0xFC/0xFD not implemented 0xFE = asynch man. spec. event; values are immediately transferred 0xFF = asynch device profile event; values are immediately transferred
	0x03	inhibit time	rw	UINT	0	delay time in the transmission type "asynch" before the PDO is transmitted again at the earliest. (0...65535 • 100 µs)
	0x04	reserved	rw	USINT	0	reserve
	0x05	event time	rw	UINT	0	max. transfer break in the transmission type „asynch" (0...65535 ms) When this time has elapsed, the PDO is transferred even if the appl. event has not accured.

Index	S-idx	Designation	Data type		Default	Details
0x1808	0x00	Transmit PDO Communication Parameter Number of entries	ro	USINT	0x05	Configuration transmit PDO 9 number of entries = 5
	0x01	COBID used by PDO	rw	UDINT	0x182 + Node ID	CAN ID of the transmit PDO 9 Bit 31 = 0 → PDO is valid Bit 31 = 1 → PDO is not valid
	0x02	transmission type	rw	USINT	0x01	0x00 = synch acyclic 0x01...0xF0 = synch cyclic; values are only transmitted after „n" synch objects n = 1…240 = 0x01...0xF0 0xFC/0xFD not implemented 0xFE = asynch man. spec. event; values are immediately transferred 0xFF = asynch device profile event; values are immediately transferred
	0x03	inhibit time	rw	UINT	0	delay time in the transmission type "asynch" before the PDO is transmitted again at the earliest. (0...65535 • 100 µs)
	0x04	reserved	rw	USINT	0	reserve
	0x05	event time	rw	UINT	0	max. transfer break in the transmission type „asynch" (0...65535 ms) When this time has elapsed, the PDO is transferred even if the appl. event has not accured.

Index	S-idx	Designation	Data type		Default	Details
0x1809	0x00	Transmit PDO Communication Parameter Number of entries	ro	USINT	0x05	Configuration transmit PDO 10 number of entries = 5
	0x01	COBID used by PDO	rw	UDINT	0x282 + Node ID	CAN ID of the transmit PDO 10 Bit 31 = 0 → PDO is valid Bit 31 = 1 → PDO is not valid
	0x02	transmission type	rw	USINT	0x01	0x00 = synch acyclic 0x01...0xF0 = synch cyclic; values are only transmitted after „n" synch objects n = 1…240 = 0x01...0xF0 0xFC/0xFD not implemented 0xFE = asynch man. spec. event; values are immediately transferred 0xFF = asynch device profile event; values are immediately transferred
	0x03	inhibit time	rw	UINT	0	delay time in the transmission type "asynch" before the PDO is transmitted again at the earliest. (0...65535 • 100 µs)
	0x04	reserved	rw	USINT	0	reserve
	0x05	event time	rw	UINT	0	max. transfer break in the transmission type „asynch" (0...65535 ms) When this time has elapsed, the PDO is transferred even if the appl. event has not accured.

Index	S-idx	Designation	Data type		Default	Details
0x180A	0x00	Transmit PDO Communication Parameter Number of entries	ro	USINT	0x05	Configuration transmit PDO 11 number of entries = 5
	0x01	COBID used by PDO	rw	UDINT	0x382 + Node ID	CAN ID of the transmit PDO 11 Bit 31 = 0 → PDO is valid Bit 31 = 1 → PDO is not valid
	0x02	transmission type	rw	USINT	0x01	0x00 = synch acyclic 0x01...0xF0 = synch cyclic; values are only transmitted after „n" synch objects n = 1…240 = 0x01...0xF0 0xFC/0xFD not implemented 0xFE = asynch man. spec. event; values are immediately transferred 0xFF = asynch device profile event; values are immediately transferred
	0x03	inhibit time	rw	UINT	0	delay time in the transmission type "asynch" before the PDO is transmitted again at the earliest. (0...65535 • 100 µs)
	0x04	reserved	rw	USINT	0	reserve
	0x05	event time	rw	UINT	0	max. transfer break in the transmission type „asynch" (0...65535 ms) When this time has elapsed, the PDO is transferred even if the appl. event has not accured.

Transmit PDO mapping (index 0x1A00…0x1AFF):

Index	S-idx	Designation	Data type		Default	Details
0x1A00	0x00	Transmit PDO mapping Number of mapped objects in PDO	rw	USINT	0x07	mapping transmit PDO 1 number of integrated application objects = 7
	0x01	PDO mapping	rw	UDINT	0x6000 0108	Index 0x6000, SubIndex 0x01 binary inputs 00...07: actual values (bit coded)
	0x02	PDO mapping	rw	UDINT	0x2020 0108	Index 0x2020, SubIndex 0x01 binary inputs 00...07: flag "short circuit" (bit coded)
	0x03	PDO mapping	rw	UDINT	0x2021 0108	Index 0x2021, SubIndex 0x01 binary inputs 00...07: flag "wire break" (bit coded)
	0x04	PDO mapping	rw	UDINT	0x2025 0108	Index 0x2025, SubIndex 0x01 inputs 00, 01, 04 und 05: flag "overload" (bit coded)
	0x05	PDO mapping	rw	UDINT	0x2022 0108	Index 0x2022, SubIndex 0x01 outputs 00...07: flag " short circuit " (bit coded)
	0x06	PDO mapping	rw	UDINT	0x2023 0108	Index 0x2023, SubIndex 0x01 outputs 00...07: flag " wire break " (bit coded)
	0x07	PDO mapping	rw	UDINT	0x2024 0108	Index 0x2024, SubIndex 0x01 outputs 00...07: flag " overload " (bit coded)

Index	S-idx	Designation	Data type		Default	Details
0x1A01	0x00	Transmit PDO mapping Number of mapped objects in PDO	rw	USINT	0x04	mapping transmit PDO 2 (analogue inputs) number of integrated application objects = 4
	0x01	PDO mapping	rw	UDINT	0x6404 0110	Index 0x6404, SubIndex 0x01 analogue input 00: actual value (depending on the configuration 0x2000)
	0x02	PDO mapping	rw	UDINT	0x6404 0210	Index 0x6404, SubIndex 0x02 analogue input 01: actual value (depending on the configuration 0x2000))
	0x03	PDO mapping	rw	UDINT	0x6404 0310	Index 0x6404, SubIndex 0x03 analogue input 04: actual value (depending on the configuration 0x2000)
	0x04	PDO mapping	rw	UDINT	0x6404 0410	Index 0x6404, SubIndex 0x04 analogue input 05: actual value (depending on the configuration 0x2000)
0x1A02	0x00	Transmit PDO mapping Number of mapped objects in PDO	rw	USINT	0x04	mapping transmit PDO 3 number of integrated application objects = 4
	0x01	PDO mapping	rw	UDINT	0x2030 0110	Index 0x2030, SubIndex 0x01 input 02: actual resistor value
	0x02	PDO mapping	rw	UDINT	0x2030 0210	Index 0x2030, SubIndex 0x02 input 03: actual resistor value
	0x03	PDO mapping	rw	UDINT	0x2030 0310	Index 0x2030, SubIndex 0x03 input 06: actual resistor value
	0x04	PDO mapping	rw	UDINT	0x2030 0410	Index 0x2030, SubIndex 0x04 input 07: actual resistor value

Index	S-idx	Designation	Data type		Default	Details
0x1A03	0x00	Transmit PDO mapping Number of mapped objects in PDO	rw	USINT	0x02	mapping transmit PDO 4 (periode time IN00...IN01) number of integrated application objects = 2
	0x01	PDO mapping	rw	UDINT	0x2012 0120	Index 0x2012, SubIndex 0x01 frequency input IN00: periode time of the signal
	0x02	PDO mapping	rw	UDINT	0x2012 0220	Index 0x2012, SubIndex 0x02 frequency input IN01: periode time of the signal
0x1A04	0x00	Transmit PDO mapping Number of mapped objects in PDO	rw	USINT	0x02	mapping transmit PDO 5 (periode time IN04...IN05) number of integrated application objects = 2
	0x01	PDO mapping	rw	UDINT	0x2012 0320	Index 0x2012, SubIndex 0x03 frequency input IN04: periode time of the signal
	0x02	PDO mapping	rw	UDINT	0x2012 0420	Index 0x2012, SubIndex 0x04 frequency input IN05: periode time of the signal
0x1A05	0x00	Transmit PDO mapping Number of mapped objects in PDO	rw	USINT	0x04	mapping transmit PDO 6 (duty cycle of the signal on the frequency input IN00, IN01, IN04, IN05) number of integrated application objects = 4
	0x01	PDO mapping	rw	UDINT	0x2014 0110	Index 0x2014, SubIndex 0x01 frequency input IN00: duty cycle of the signal in ‰
	0x02	PDO mapping	rw	UDINT	0x2014 0210	Index 0x2014, SubIndex 0x02 frequency input IN01: duty cycle of the signal in ‰
	0x03	PDO mapping	rw	UDINT	0x2014 0310	Index 0x2014, SubIndex 0x03 frequency input IN04: duty cycle of the signal in ‰
	0x04	PDO mapping	rw	UDINT	0x2014 0410	Index 0x2014, SubIndex 0x04 frequency input IN05: duty cycle of the signal in ‰

Index	S-idx	Designation	Data type		Default	Details
0x1A06	0x00	Transmit PDO mapping Number of mapped objects in PDO	rw	USINT	0x02	mapping transmit PDO 7 (frequency on IN00...IN01) number of integrated application objects = 2
	0x01	PDO mapping	rw	UDINT	0x2015 0120	Index 0x2015, SubIndex 0x01 frequency input IN00: frequency value of the signal in Hz
	0x02	PDO mapping	rw	UDINT	0x2015 0220	Index 0x2015, SubIndex 0x02 frequency input IN01: frequency value of the signal in Hz
0x1A07	0x00	Transmit PDO mapping Number of mapped objects in PDO	rw	USINT	0x02	mapping transmit PDO 8 (frequency on IN04...IN05) number of integrated application objects = 2
	0x01	PDO mapping	rw	UDINT	0x2015 0320	Index 0x2015, SubIndex 0x03 frequency input IN04: frequency value of the signal in Hz
	0x02	PDO mapping	rw	UDINT	0x2015 0420	Index 0x2015, SubIndex 0x04 frequency input IN05: frequency value of the signal in Hz
0x1A08	0x00	Transmit PDO mapping Number of mapped objects in PDO	rw	USINT	0x04	mapping transmit PDO 9 (output current OUT00...OUT03) number of integrated application objects = 4
	0x01	PDO mapping	rw	UDINT	0x2002 0110	Index 0x2002, SubIndex 0x01 current on output OUT00
	0x02	PDO mapping	rw	UDINT	0x2002 0210	Index 0x2002, SubIndex 0x02 current on output OUT01
	0x03	PDO mapping	rw	UDINT	0x2002 0310	Index 0x2002, SubIndex 0x03 current on output OUT02
	0x04	PDO mapping	rw	UDINT	0x2002 0410	Index 0x2002, SubIndex 0x04 current on output OUT03

Index	S-idx	Designation	Data type		Default	Details
0x1A09	0x00	Transmit PDO mapping Number of mapped objects in PDO	rw	USINT	0x04	mapping transmit PDO 10 (output current OUT04...OUT07) number of integrated application objects = 4
	0x01	PDO mapping	rw	UDINT	0x2002 0510	Index 0x2002, SubIndex 0x05 current on output OUT04
	0x02	PDO mapping	rw	UDINT	0x2002 0610	Index 0x2002, SubIndex 0x06 current on output OUT05
	0x03	PDO mapping	rw	UDINT	0x2002 0710	Index 0x2002, SubIndex 0x07 current on output OUT06
	0x04	PDO mapping	rw	UDINT	0x2002 0810	Index 0x2002, SubIndex 0x08 current on output OUT07
0x1A0A	0x00	Transmit PDO mapping Number of mapped objects in PDO	rw	USINT	0x03	mapping transmit PDO 11 (system flag) number of integrated application objects = 4
	0x01	PDO mapping	rw	UDINT	0x2040 0110	Index 0x2040, SubIndex 0x01 supply voltage of the system VBBS
	0x02	PDO mapping	rw	UDINT	0x2041 0110	Index 0x2041, SubIndex 0x01 output supply voltage VBB2
	0x03	PDO mapping	rw	UDINT	0x2050 0010	Index 0x2050, SubIndex 0x00 system temperature in °C

Manufacturer-specific objekts (index 0x2000...0x6FFF):

Index	S-idx	Designation	Data type		Default	Details	
0x2000	0x00	IO configu-ration Largest sub-index supported	ro	USINT	16	Configuration inputs/outputs largest supported Sub-index = 32	
	0x01	Configuration IN00	rw	USINT	10	0 = 0x00 3 = 0x03 6 = 0x06 7 = 0x07 9 = 0x09 10 = 0x0A 11 = 0x0B 12 = 0x0C 14 = 0x0E 20 = 0x14	off Input IN00 0...10 000 mV ratiometric 0...1000 ‰ 0...20 000 µA 0...32 000 mV binary plus switched binary plus switched with diagnosis binary minus switched frequency 0…30 000 Hz period duration as ratio 0…1 000 ‰
	0x02	Configuration IN01	rw	USINT	10	0 = 0x00 3 = 0x03 6 = 0x06 7 = 0x07 9 = 0x09 10 = 0x0A 11 = 0x0B 12 = 0x0C 14 = 0x0E 20 = 0x14	off Input IN01 0...10 000 mV ratiometric 0...1000 ‰ 0...20 000 µA 0...32 000 mV binary plus switched binary plus switched with diagnosis binary minus switched frequency 0…30 000 Hz period duration as ratio 0…1 000 ‰
	0x03	Configuration IN02	rw	USINT	10	0 = 0x00 10 = 0x0A 11 = 0x0B 18 = 0x12	off Input IN02 binary plus switched binary plus switched with diagnosis 16…30 000 Ohm
	0x04	Configuration IN03	rw	USINT	10	0 = 0x00 10 = 0x0A 11 = 0x0B 18 = 0x12	off Input IN03 binary plus switched binary plus switched with diagnosis 16…30 000 Ohm

Index	S-idx	Designation	Data type		Default	Details	
0x2000	0x05	Configuration IN04	rw	USINT	10	0 = 0x00 3 = 0x03 6 = 0x06 7 = 0x07 9 = 0x09 10 = 0x0A 11 = 0x0B 12 = 0x0C 14 = 0x0E 20 = 0x14	off Input IN04 0...10 000 mV ratiometric 0...1000 ‰ 0...20 000 µA 0...32 000 mV binary plus switched binary plus switched with diagnosis binary minus switched frequency 0…30 000 Hz period duration as ratio 0…1 000 ‰
	0x06	Configuration IN05	rw	USINT	10	0 = 0x00 3 = 0x03 6 = 0x06 7 = 0x07 9 = 0x09 10 = 0x0A 11 = 0x0B 12 = 0x0C 14 = 0x0E 20 = 0x14	off Input IN05 0...10 000 mV ratiometric 0...1000 ‰ 0...20 000 µA 0...32 000 mV binary plus switched binary plus switched with diagnosis binary minus switched frequency 0…30 000 Hz period duration as ratio 0…1 000 ‰
	0x07	Configuration IN06	rw	USINT	10	0 = 0x00 10 = 0x0A 11 = 0x0B 18 = 0x12	off Input IN06 binary plus switched binary plus switched with diagnosis 16…30 000 Ohm
	0x08	Configuration IN07	rw	USINT	10	0 = 0x00 10 = 0x0A 11 = 0x0B 18 = 0x12	off Input IN07 binary plus switched binary plus switched with diagnosis 16…30 000 Ohm
	0x09	Configuration OUT00	rw	USINT	2	0 = 0x00 2 = 0x02 4 = 0x04 5 = 0x05 15 = 0x0F 16 = 0x10	off Output OUT00 binary plus switched PWM output current control binary plus switched with diagnosis binary plus switched with diagnosis + protection

Index	S-idx	Designation	Data type		Default	Details	
0x2000	0x0A	Configuration OUT01	rw	USINT	2	0 = 0x00 2 = 0x02 4 = 0x04 5 = 0x05 15 = 0x0F 16 = 0x10	off Output OUT01 binary plus switched PWM output current control binary plus switched with diagnosis binary plus switched with diagnosis + protection
	0x0B	Configuration OUT02	rw	USINT	2	0 = 0x00 2 = 0x02 4 = 0x04 5 = 0x05 15 = 0x0F 16 = 0x10	off Output OUT02 binary plus switched PWM output current control binary plus switched with diagnosis binary plus switched with diagnosis + protection
	0x0C	Configuration OUT03	rw	USINT	2	0 = 0x00 2 = 0x02 4 = 0x04 5 = 0x05 15 = 0x0F 16 = 0x10	off Output OUT03 binary plus switched PWM output current control binary plus switched with diagnosis binary plus switched with diagnosis + protection
	0x0D	Configuration OUT04	rw	USINT	2	0 = 0x00 2 = 0x02 4 = 0x04 5 = 0x05 15 = 0x0F 16 = 0x10	off Output OUT04 binary plus switched PWM output current control binary plus switched with diagnosis binary plus switched with diagnosis + protection
	0x0E	Configuration OUT05	rw	USINT	2	0 = 0x00 2 = 0x02 4 = 0x04 5 = 0x05 15 = 0x0F 16 = 0x10	off Output OUT05 binary plus switched PWM output current control binary plus switched with diagnosis binary plus switched with diagnosis + protection

Index	S-idx	Designation	Data type		Default	Details	
0x2000	0x0F	Configuration OUT06	rw	USINT	2	0 = 0x00 2 = 0x02 4 = 0x04 5 = 0x05 15 = 0x0F 16 = 0x10	off Output OUT06 binary plus switched PWM output current control binary plus switched with diagnosis binary plus switched with diagnosis + protection
	0x10	Configuration OUT07	rw	USINT	2	0 = 0x00 2 = 0x02 4 = 0x04 5 = 0x05 15 = 0x0F 16 = 0x10	off Output OUT07 binary plus switched PWM output current control binary plus switched with diagnosis binary plus switched with diagnosis + protection
0x2001	0x00	PWM frequency	ro	USINT	8	Largest sub-index supported	
	0x01	PWM frequency OUT00	rw	UINT	100	20…250	OUT00 PWM frequency [Hz]
	0x02	PWM frequency OUT01	rw	UINT	100	20…250	OUT01 PWM frequency [Hz]
	0x03	PWM frequency OUT02	rw	UINT	100	20…250	OUT02 PWM frequency [Hz]
	0x04	PWM frequency OUT03	rw	UINT	100	20…250	OUT03 PWM frequency [Hz]
	0x5	PWM frequency OUT04	rw	UINT	100	20…250	OUT04 PWM frequency [Hz]
	0x6	PWM frequency OUT05	rw	UINT	100	20…250	OUT05 PWM frequency [Hz]
	0x7	PWM frequency OUT06	rw	UINT	100	20…250	OUT06 PWM frequency [Hz]
	0x8	PWM frequency OUT07	rw	UINT	100	20…250	OUT07 PWM frequency [Hz]

Index	S-idx	Designation	Data type		Default	Details	
0x2002	0x00	Current value	ro	USINT	8	Largest sub-index supported	
	0x01	Current value OUT00	ro	UINT	0	0…4000	OUT00 output current [mA]
	0x02	Current value OUT01	ro	UINT	0	0…4000	OUT01 output current [mA]
	0x03	Current value OUT02	ro	UINT	0	0…2500	OUT02 output current [mA]
	0x04	Current value OUT03	ro	UINT	0	0…2500	OUT03 output current [mA]
	0x05	Current value OUT04	ro	UINT	0	0…4000	OUT04 output current [mA]
	0x06	Current value OUT05	ro	UINT	0	0…4000	OUT05 output current [mA]
	0x07	Current value OUT06	ro	UINT	0	0…2500	OUT06 output current [mA]
	0x08	Current value OUT07	ro	UINT	0	0…2500	OUT07 output current [mA]
0x2004	0x00	P-value	ro	USINT	8	Largest sub-index supported	
	0x01	P-value OUT00	rw	USINT	30	0…255	OUT00 P-value for current control
	0x02	P-value OUT01	rw	USINT	30	0…255	OUT01 P-value for current control
	0x03	P-value OUT02	rw	USINT	30	0…255	OUT02 P-value for current control
	0x04	P-value OUT03	rw	USINT	30	0…255	OUT03 P-value for current control
	0x05	P-value OUT04	rw	USINT	30	0…255	OUT04 P-value for current control
	0x06	P-value OUT05	rw	USINT	30	0…255	OUT05 P-value for current control
	0x07	P-value OUT06	rw	USINT	30	0…255	OUT06 P-value for current control
	0x08	P-value OUT07	rw	USINT	30	0…255	OUT07 P-value for current control

Index	S-idx	Designation	Data type		Default	Details	
0x2005	0x00	I-value	ro	USINT	8	Largest sub-index supported	
	0x01	I-value OUT00	rw	USINT	20	0…255	OUT00 I-value for current control
	0x02	I-value OUT01	rw	USINT	20	0…255	OUT01 I-value for current control
	0x03	I-value OUT02	rw	USINT	20	0…255	OUT02 I-value for current control
	0x04	I-value OUT03	rw	USINT	20	0…255	OUT03 I-value for current control
	0x05	I-value OUT04	rw	USINT	20	0…255	OUT04 I-value for current control
	0x06	I-value OUT05	rw	USINT	20	0…255	OUT05 I-value for current control
	0x07	I-value OUT06	rw	USINT	20	0…255	OUT06 I-value for current control
	0x08	I-value OUT07	rw	USINT	20	0…255	OUT07 I-value for current control
0x2006	0x00	PWM dither frequency	ro	USINT	8	Largest sub-index supported	
	0x01	PWM dither frequency OUT00	rw	UINT	0	0…PWM-freq / 2	OUT00 PWM dither frequency [Hz]
	0x02	PWM dither frequency OUT01	rw	UINT	0	0…PWM-freq / 2	OUT01 PWM dither frequency [Hz]
	0x03	PWM dither frequency OUT02	rw	UINT	0	0…PWM-freq / 2	OUT02 PWM dither frequency [Hz]
	0x04	PWM dither frequency OUT03	rw	UINT	0	0…PWM-freq / 2	OUT03 PWM dither frequency [Hz]
	0x05	PWM dither frequency OUT04	rw	UINT	0	0…PWM-freq / 2	OUT04 PWM dither frequency [Hz]
	0x06	PWM dither frequency OUT05	rw	UINT	0	0…PWM-freq / 2	OUT05 PWM dither frequency [Hz]
	0x07	PWM dither frequency OUT06	rw	UINT	0	0…PWM-freq / 2	OUT06 PWM dither frequency [Hz]
	0x08	PWM dither frequency OUT07	rw	UINT	0	0…PWM-freq / 2	OUT07 PWM dither frequency [Hz]

Index	S-idx	Designation	Data type		Default	Details	
0x2007	0x00	PWM dither value	ro	USINT	8	Largest sub-index supported	
	0x01	PWM dither value OUT00	rw	UINT	0	0…1 000	OUT00 PWM dither value [‰]
	0x02	PWM dither value OUT01	rw	UINT	0	0…1 000	OUT01 PWM dither value [‰]
	0x03	PWM dither value OUT02	rw	UINT	0	0…1 000	OUT02 PWM dither value [‰]
	0x04	PWM dither value OUT03	rw	UINT	0	0…1 000	OUT03 PWM dither value [‰]
	0x05	PWM dither value OUT04	rw	UINT	0	0…1 000	OUT04 PWM dither value [‰]
	0x06	PWM dither value OUT05	rw	UINT	0	0…1 000	OUT05 PWM dither value [‰]
	0x07	PWM dither value OUT06	rw	UINT	0	0…1 000	OUT06 PWM dither value [‰]
	0x08	PWM dither value OUT07	rw	UINT	0	0…1 000	OUT07 PWM dither value [‰]
0x2012	0x00	Period input	ro	USINT	4	Largest sub-index supported	
	0x01	Period duration IN00	ro	UDINT	0	IN00 period duration [µs]	
	0x02	Period duration IN01	ro	UDINT	0	IN01 period duration [µs]	
	0x03	Period duration IN04	ro	UDINT	0	IN04 period duration [µs]	
	0x04	Period duration IN05	ro	UDINT	0	IN05 period duration [µs]	
0x2013	0x00	Period input number of periods for average	ro	USINT	4	Largest sub-index supported	
	0x01	Number of periods IN00	rw	USINT	4	1…255	IN00 number of periods
	0x02	Number of periods IN01	rw	USINT	4	1…255	IN01 number of periods
	0x03	Number of periods IN04	rw	USINT	4	1…255	IN04 number of periods
	0x04	Number of periods IN05	rw	USINT	4	1…255	IN05 number of periods

Index	S-idx	Designation	Data type		Default	Details	
0x2014	0x00	Period input – ratio value	ro	USINT	4	Largest sub-index supported	
	0x01	Period ratio value IN00	ro	UINT	0	0…1 000	IN00 marc-to-space ratio [‰]
	0x02	Period ratio value IN01	ro	UINT	0	0…1 000	IN01 marc-to-space ratio [‰]
	0x03	Period ratio value IN04	ro	UINT	0	0…1 000	IN04 marc-to-space ratio [‰]
	0x04	Period ratio value IN05	ro	UINT	0	0…1 000	IN05 marc-to-space ratio [‰]
0x2015	0x00	Frequency input	ro	USINT	4	Largest sub-index supported	
	0x01	Frequency IN00	ro	REAL	1	0…30 000	IN00 frequency [Hz]
	0x02	Frequency IN01	ro	REAL	1	0…30 000	IN01 frequency [Hz]
	0x03	Frequency IN04	ro	REAL	1	0…30 000	IN04 frequency [Hz]
	0x04	Frequency IN05	ro	REAL	1	0…30 000	IN05 frequency [Hz]
0x2016	0x00	Timebase	ro	USINT	4	Largest sub-index supported	
	0x01	Timebase IN00	rw	UINT	50	0…2 000	IN00 timebase [ms]
	0x02	Timebase IN01	rw	UINT	50	0…2 000	IN01 timebase [ms]
	0x03	Timebase IN04	rw	UINT	50	0…2 000	IN04 timebase [ms]
	0x04	Timebase IN05	rw	UINT	50	0…2 000	IN05 timebase [ms]
0x2020	0x00	Input – short to supply voltage	ro	USINT	1	Largest sub-index supported	
	0x01	Short to supply voltage IN00...IN07	ro	USINT	0	0 = normal 1 = short circuit	channels (bit coded) 0b---- ---X = IN00 0b---- --X- = IN01 0b---- -X-- = IN02 0b---- X--- = IN03 0b---X ---- = IN04 0b--X- ---- = IN05 0b-X-- ---- = IN06 0bX--- ---- = IN07

Index	S-idx	Designation	Data type		Default	Details	
0x2021	0x00	Input – wire break	ro	USINT	1	Largest sub-index supported	
	0x01	Wire break IN00...IN07	ro	USINT	0	0 = normal 1 = wire break	channels (bit coded) 0b---- ---X = IN00 0b---- --X- = IN01 0b---- -X-- = IN02 0b---- X--- = IN03 0b---X ---- = IN04 0b--X- ---- = IN05 0b-X-- ---- = IN06 0bX--- ---- = IN07
0x2022	0x00	Output – short circuit	ro	USINT	1	Largest sub-index supported	
	0x01	Short circuit OUT00… OUT07	ro	USINT	0	0 = normal 1 = short circuit	channels (bit coded) 0b---- ---X = OUT00 0b---- --X- = OUT01 0b---- -X-- = OUT02 0b---- X--- = OUT03 0b---X ---- = OUT04 0b--X- ---- = OUT05 0b-X-- ---- = OUT06 0bX--- ---- = OUT07
0x2023	0x00	Output – open circuit	ro	USINT	1	Largest sub-index supported	
	0x01	Open circuit OUT00… OUT07	ro	USINT	0	0 = normal 1 = open circuit	channels (bit coded) 0b---- ---X = OUT00 0b---- --X- = OUT01 0b---- -X-- = OUT02 0b---- X--- = OUT03 0b---X ---- = OUT04 0b--X- ---- = OUT05 0b-X-- ---- = OUT06 0bX--- ---- = OUT07
0x2024	0x00	Output – overload	ro	USINT	1	Largest sub-index supported	
	0x01	Overload OUT00… OUT07	ro	USINT	0	0 = normal 1 = overload	channels (bit coded) 0b---- ---X = OUT00 0b---- --X- = OUT01 0b---- -X-- = OUT02 0b---- X--- = OUT03 0b---X ---- = OUT04 0b--X- ---- = OUT05 0b-X-- ---- = OUT06 0bX--- ---- = OUT07

Index	S-idx	Designation	Data type		Default	Details	
0x2025	0x00	Input analog – overcurrent	ro	USINT	1	Largest sub-index supported	
	0x01	Overcurrent IN00, IN01,N04 und IN05	ro	USINT	0	0 = normal 1 = overcurrent	channels (bit coded) 0b---- ---X = IN00 0b---- --X- = IN01 0b---- -X-- = IN04 0b---- X--- = IN05
0x2030	0x00	Input resistor	ro	USINT	4	Largest sub-index supported	
	0x01	Resistance IN02	ro	UINT	0	0…30 000	IN02 resistance [Ohms]
	0x02	Resistance IN03	ro	UINT	0	0…30 000	IN03 resistance [Ohms]
	0x03	Resistance IN06	ro	UINT	0	0…30 000	IN06 resistance [Ohms]
	0x04	Resistance IN07	ro	UINT	0	0…30 000	IN07 resistance [Ohms]
0x2040	0x00	System supply voltage VBBS	ro	USINT	1	Largest sub-index supported	
	0x01	VBBS	ro	USINT	0	VBBS voltage [mV]	
0x2041	0x00	Output supply voltage	ro	USINT	1	Largest sub-index supported	
	0x01	VBB2	ro	UINT	0	VBB2 voltage [mV]	
0x2050		Device temperature	ro	UINT	0	temperature [°C]	
0x20F0		Node ID	rw	USINT	125	1…125	node ID [!] value(0x20F0) != value(20F1)
0x20F1		Node ID	rw	USINT	125	1…125	node ID [!] value(0x20F0) != value(20F1)
0x20F2		Baud rate	rw	USINT	3	baud rate [!] value(0x20F2) != value(20F3)	
						0	1000 kBit/s
						1	800 kBit/s
						2	500 kBit/s
						3	250 kBit/s
						4	125 kBit/s
						5	100 kBit/s
						6	50 kBit/s
						7	20 kBit/s

Index	S-idx	Designation	Data type		Default	Details
0x20F3		Baud rate	rw	USINT	3	baud rate [!] value(0x20F2) != value(20F3)
0x20F4		Autostart	rw	UINT	0	not used
0x20F5		Lock edit mode	rw	USINT	0	0 = edit mode unlocked 1 = edit mode locked
0x6000	0x00	Binary input Largest sub-index supported	ro	USINT	0x02	Binary inputs Largest supported sub-index = 2
	0x01	Binary inputs IN00 - IN07	ro	USINT	0	Binary inputs IN00…IN07 0b---- ---X = IN00 0b---- --X- = IN01 0b---- -X-- = IN02 0b---- X--- = IN03 0b---X ---- = IN04 0b--X- ---- = IN05 0b-X-- ---- = IN06 0bX--- ---- = IN07
0x6200	0x00	Binary output Largest sub-index supported	ro	USINT	0x02	Binary outputs Largest supported sub-index = 2
	0x01	Binary outputs OUT00 - OUT07	wo	USINT	0	Binary outputs OUT00…OUT07 0b---- ---X = OUT00 0b---- --X- = OUT01 0b---- -X-- = OUT02 0b---- X--- = OUT03 0b---X ---- = OUT04 0b--X- ---- = OUT05 0b-X-- ---- = OUT06 0bX--- ---- = OUT07
0x6404	0x00	Analogue input Largest sub-index supported	ro	USINT	0x04	Analogue inputs Largest supported sub-index = 4
	0x01	Analogue input IN00	ro	UINT	--	Analogue value of input IN00
	0x02	Analogue input IN01	ro	UINT	--	Analogue value of input IN01
	0x03	Analogue input IN04	ro	UINT	--	Analogue value of input IN04
	0x04	Analogue input IN05	ro	UINT	--	Analogue value of input IN05

UK

Index	S-idx	Designation	Data type		Default	Details
0x6414	0x00	PWM output Largest sub-index supported	ro	USINT	0x08	PWM outputs Largest supported sub-index = 12
	0x01	PWM output OUT00	wo	UINT	--	Value for PWM output OUT00
	0x02	PWM output OUT01	wo	UINT	--	Value for PWM output OUT01
	0x03	PWM output OUT02	wo	UINT	--	Value for PWM output OUT02
	0x04	PWM output OUT03	wo	UINT	--	Value for PWM output OUT03
	0x05	PWM output OUT04	wo	UINT	--	Value for PWM output OUT04
	0x06	PWM output OUT05	wo	UINT	--	Value for PWM output OUT05
	0x07	PWM output OUT06	wo	UINT	--	Value for PWM output OUT06
	0x08	PWM output OUT07	wo	UINT	--	Value for PWM output OUT07

12.3 SDOs error messages

12.3.1 CR2050

The following messages are created in case of an error:

Index	S-idx	Designation	Data type		Default	Details	
0x1001		Error register	ro	USINT	0	Error register bitcodiert to profil 301 permissible values: 0b0000 0000 = no error 0b0000 0001 = generic error 0b0001 0000 = communication error 0b1000 0000 = manufacturer specific	
0x1003	0x00	Predefined error field Number of entries	rw	UDINT	0	An error list with 4 entries is supported.	
	0x01	Error history	ro	UDINT	0	Error occured; coded according to EMCY list The last error is indicated in the sub-index 1	
	0x02	Error history	ro	UDINT	0	Error occured; coded according to EMCY list	
	0x03	Error history	ro	UDINT	0	Error occured; coded according to EMCY list	
	0x04	Error history	ro	UDINT	0	Error occured; coded according to EMCY list	
	0x05	Error history	ro	UDINT	0	Error occured; coded according to EMCY list	
0x2020	0x00	Input – short to supply voltage	ro	USINT	2	Largest sub-index supported	
	0x01	Short to supply voltage IN00... IN07	ro	USINT	0	0 = normal 1 = short circuit	channels (bit coded) 0b---- ---X = IN00 0b---- --X- = IN01 0b---- -X-- = IN02 0b---- X--- = IN03 0b---X ---- = IN04 0b--X- ---- = IN05 0b-X-- ---- = IN06 0bX--- ---- = IN07
	0x02	Short to supply voltage IN08, IN10, IN12, IN14	ro	USINT	0	0 = normal 1 = short circuit	channels (bit coded) 0b---- ---X = IN08 0b---- --X- = IN10 0b---- -X-- = IN12 0b---- X--- = IN14

Index	S-idx	Designation	Data type		Default	Details	
0x2021	0x00	Input – wire break	ro	USINT	2	Largest sub-index supported	
	0x01	Wire break IN00... IN07	ro	USINT	0	0 = normal 1 = wire break	channels (bit coded) 0b---- ---X = IN00 0b---- --X- = IN01 0b---- -X-- = IN02 0b---- X--- = IN03 0b---X ---- = IN04 0b--X- ---- = IN05 0b-X-- ---- = IN06 0bX--- ---- = IN07
	0x02	Wire break IN08, IN10, IN12, IN14	ro	USINT	0	0 = normal 1 = wire break	channels (bit coded) 0b---- ---X = IN08 0b---- --X- = IN10 0b---- -X-- = IN12 0b---- X--- = IN14
0x2025	0x00	Input analog – overcurrent	ro	USINT	1	Largest sub-index supported	
	0x01	Overcurrent IN00...IN07	ro	USINT	0	0 = normal 1 = overcurrent	channels (bit coded) 0b---- ---X = IN00 0b---- --X- = IN01 0b---- -X-- = IN02 0b---- X--- = IN03 0b---X ---- = IN04 0b--X- ---- = IN05 0b-X-- ---- = IN06 0bX--- ---- = IN07

12.3.2 CR2051

The following messages are created in case of an error:

Index	S-idx	Designation	Data type		Default	Details	
0x1001		Error register	ro	USINT	0	Error register bitcodiert to profil 301 permissible values: 0b0000 0000 = no error 0b0000 0001 = generic error 0b0001 0000 = communication error 0b1000 0000 = manufacturer specific	
0x1003	0x00	Predefined error field Number of entries	rw	UDINT	0	An error list with 4 entries is supported.	
	0x01	Error history	ro	UDINT	0	Error occured; coded according to EMCY list The last error is indicated in the sub-index 1	
	0x02	Error history	ro	UDINT	0	Error occured; coded according to EMCY list	
	0x03	Error history	ro	UDINT	0	Error occured; coded according to EMCY list	
	0x04	Error history	ro	UDINT	0	Error occured; coded according to EMCY list	
	0x05	Error history	ro	UDINT	0	Error occured; coded according to EMCY list	
0x2022	0x00	Output – short circuit	ro	USINT	2	Largest sub-index supported	
	0x01	Short circuit OUT00…OUT07	ro	USINT	0	0 = normal 1 = short circuit	channels (bit coded) 0b---- ---X = OUT00 0b---- --X- = OUT01 0b---- -X-- = OUT02 0b---- X--- = OUT03 0b---X ---- = OUT04 0b--X- ---- = OUT05 0b-X-- ---- = OUT06 0bX--- ---- = OUT07
	0x02	Short circuit OUT08…OUT15	ro	USINT	0	0 = normal 1 = short circuit	channels (bit coded) 0b---- ---X = OUT08 0b---- --X- = OUT09 0b---- -X-- = OUT10 0b---- X--- = OUT11 0b---X ---- = OUT12 0b--X- ---- = OUT13 0b-X-- ---- = OUT14 0bX--- ---- = OUT15

Index	S-idx	Designation	Data type		Default	Details	
0x2023	0x00	Output – open circuit	ro	USINT	2	Largest sub-index supported	
	0x01	Open circuit OUT00…OUT07	ro	USINT	0	0 = normal 1 = open circuit	channels (bit coded) 0b---- ---X = OUT00 0b---- --X- = OUT01 0b---- -X-- = OUT02 0b---- X--- = OUT03 0b---X ---- = OUT04 0b--X- ---- = OUT05 0b-X-- ---- = OUT06 0bX--- ---- = OUT07
	0x02	Open circuit OUT08…OUT15	ro	USINT	0	0 = normal 1 = open circuit	channels (bit coded) 0b---- ---X = OUT08 0b---- --X- = OUT09 0b---- -X-- = OUT10 0b---- X--- = OUT11 0b---X ---- = OUT12 0b--X- ---- = OUT13 0b-X-- ---- = OUT14 0bX--- ---- = OUT15
0x2024	0x00	Output – overload	ro	USINT	1	Largest sub-index supported	
	0x01	Overload OUT00…OUT07	ro	USINT	0	0 = normal 1 = overload	channels (bit coded) 0b---- ---X = OUT00 0b---- --X- = OUT01 0b---- -X-- = OUT02 0b---- X--- = OUT03 0b---X ---- = OUT04 0b--X- ---- = OUT05 0b-X-- ---- = OUT06 0bX--- ---- = OUT07

12.3.3 CR2052

The following messages are created in case of an error:

Index	S-idx	Designation	Data type		Default	Details	
0x1001		Error register	ro	USINT	0	Error register bitcodiert to profil 301 permissible values: 0b0000 0000 = no error 0b0000 0001 = generic error 0b0001 0000 = communication error 0b1000 0000 = manufacturer specific	
0x1003	0x00	Predefined error field Number of entries	rw	UDINT	0	An error list with 4 entries is supported.	
	0x01	Error history	ro	UDINT	0	Error occured; coded according to EMCY list The last error is indicated in the sub-index 1	
	0x02	Error history	ro	UDINT	0	Error occured; coded according to EMCY list	
	0x03	Error history	ro	UDINT	0	Error occured; coded according to EMCY list	
	0x04	Error history	ro	UDINT	0	Error occured; coded according to EMCY list	
	0x05	Error history	ro	UDINT	0	Error occured; coded according to EMCY list	
0x2020	0x00	Input – short to supply voltage	ro	USINT	1	Largest sub-index supported	
	0x01	Short to supply voltage IN00...IN07	ro	USINT	0	0 = normal 1 = short circuit	channels (bit coded) 0b---- ---X = IN00 0b---- --X- = IN01 0b---- -X-- = IN02 0b---- X--- = IN03 0b---X ---- = IN04 0b--X- ---- = IN05 0b-X-- ---- = IN06 0bX--- ---- = IN07
0x2021	0x00	Input – wire break	ro	USINT	1	Largest sub-index supported	
	0x01	Wire break IN00... IN07	ro	USINT	0	0 = normal 1 = wire break	channels (bit coded) 0b---- ---X = IN00 0b---- --X- = IN01 0b---- -X-- = IN02 0b---- X--- = IN03 0b---X ---- = IN04 0b--X- ---- = IN05 0b-X-- ---- = IN06 0bX--- ---- = IN07

Index	S-idx	Designation	Data type		Default	Details	
0x2022	0x00	Output – short circuit	ro	USINT	1	Largest sub-index supported	
	0x01	Short circuit OUT00…OUT07	ro	USINT	0	0 = normal 1 = short circuit	channels (bit coded) 0b---- ---X = OUT00 0b---- --X- = OUT01 0b---- -X-- = OUT02 0b---- X--- = OUT03 0b---X ---- = OUT04 0b--X- ---- = OUT05 0b-X-- ---- = OUT06 0bX--- ---- = OUT07
0x2023	0x00	Output – open circuit	ro	USINT	1	Largest sub-index supported	
	0x01	Open circuit OUT00…OUT07	ro	USINT	0	0 = normal 1 = open circuit	channels (bit coded) 0b---- ---X = OUT00 0b---- --X- = OUT01 0b---- -X-- = OUT02 0b---- X--- = OUT03 0b---X ---- = OUT04 0b--X- ---- = OUT05 0b-X-- ---- = OUT06 0bX--- ---- = OUT07
0x2024	0x00	Output – overload	ro	USINT	1	Largest sub-index supported	
	0x01	Overload OUT00…OUT07	ro	USINT	0	0 = normal 1 = overload	channels (bit coded) 0b---- ---X = OUT00 0b---- --X- = OUT01 0b---- -X-- = OUT02 0b---- X--- = OUT03 0b---X ---- = OUT04 0b--X- ---- = OUT05 0b-X-- ---- = OUT06 0bX--- ---- = OUT07
0x2025	0x00	Input analog – overcurrent	ro	USINT	1	Largest sub-index supported	
	0x01	Overcurrent IN00, IN01, IN04 und IN05	ro	USINT	0	0 = normal 1 = overcurrent	channels (bit coded) 0b---- ---X = IN00 0b---- --X- = IN01 0b---- -X-- = IN04 0b---- X--- = IN05