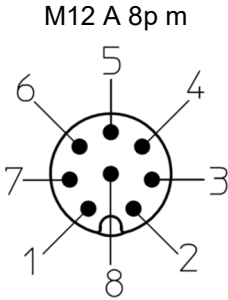
	HySense® CV 200 3402-CV20-G426C0-L00	
	<ul style="list-style-type: none"> • Viskositäts-Sensor, Messgrößen: Viskosität und Temperatur • CANopen Schnittstelle • Zusätzlich 2 Signalausgänge 4...20 mA für Viskosität und Temperatur • G3/8'' Einschraubgewinde • Max. Betriebsdruck 50 bar 	<ul style="list-style-type: none"> • <i>Viscosity sensor, measured variable: viscosity and temperature</i> • <i>CANopen interface</i> • <i>Add. 2 signal outputs 4...20 mA for viscosity and temperature</i> • <i>G3/8'' screw thread</i> • <i>Max. operating pressure 725 psi</i>

Beschreibung Description	<p>Der Viskositätssensor ist ein kompakter Sensor zur Überwachung der mechanischen Flüssigkeitseigenschaften Viskosität und Masendichte auf der Basis eines niederfrequenten Resonanzsensorelements.</p> <p>Die herausragende Leistung wird durch die Kombination einer patentierten Resonator-Auswertungs-Technologie mit einem robusten und zuverlässigen Quarzkristall-Stimmgabelresonator erreicht. Der Sensor bietet eine hohe Empfindlichkeit und Langzeitstabilität und eignet sich daher besonders für die Ölzustandsüberwachung in vorausschauenden Wartungsprogrammen.</p> <p>Durch die hohe Messrate kann auch bei instabilen Umgebungsbedingungen (Druck, Temperatur, Durchfluss) eine exzellente Datenqualität erzielt werden.</p> <p>Der Sensor bietet digitale und konfigurierbare analoge Schnittstellen zur einfachen und kosten-günstigen Integration in bestehende Umgebungen.</p>	<p><i>The viscosity sensor is a compact sensor for monitoring the mechanical fluid properties viscosity and mass density based on a low frequency resonant sensor element.</i></p> <p><i>The outstanding performance is achieved by combining a patented resonator evaluation technology with a robust and reliable quartz crystal tuning fork resonator. The sensor offers a high sensitivity and long-term stability and thus is particularly suitable for oil condition monitoring in predictive maintenance programs.</i></p> <p><i>Due to the high measurement rate excellent data quality can be obtained even in unsteady environmental conditions (pressure, temperature, flow).</i></p> <p><i>The sensor offers digital and configurable analog interfaces for easy and cost-effective integration into existing environments.</i></p>
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Verwendungszweck Designated use	Öldiagnose in mineralischem und synthetischem Öl	<i>Oil condition monitoring in mineral and synthetic oils</i>
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Warnhinweise Warning notices	Sensor darf nur in druckloser Anlage ausgetauscht werden!	<i>Replace sensor in pressureless equipment only!</i>
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Pinbelegungen <i>Pin assignments</i>		Rundsteckverbinder M12 x 1 mit Schraubverriegelung, A-Kodierung, 8-polig, Stecker <i>Circular connectors M12 x 1 with screw-locking, A-coding, 8 poles, male IEC / DIN EN 61076-2-101</i>		
 <p>M12 A 8p m</p>	Bezeichnung <i>Labeling</i>	Nr. <i>No</i>	Funktion	Function
	IOut2	1	4...20 mA	Viskosität <i>Viscosity signal</i>
	CFG reset	2	geführt auf Masse	Ground, Connect to Ground
	CAN H	3	CAN High	CAN High
	Terminator	4	Siehe Seite 8	See page 8
	CAN L	5	CAN Low	CAN Low
	IOut1	6	4...20 mA	Temperatur <i>temperature signal</i>
	+Ub	7	Stromversorgung	Power supply
	GND	8	Masse, verbunden mit dem Gehäuse	Ground, connected to chassis

Can Open Parameter	MIN	Typisch <i>typically</i>	MAX	Einheit <i>Unit</i>
Protokoll <i>Protocol</i>	Compatible to CANopen standard as specified in CiA 301 and CiA 404			
Übertragungsrate <i>Transfer rate</i>	50	250 (Default)	500	kbit/s
PDO <i>Process data object</i>	1			
PDO Senderate		1000		ms
Node-ID <i>Node-ID</i>	1	120	127	
Gerätestatus <i>Node state</i>	operational		alle CANopen-Dienste können genutzt werden <i>All CANopen services can be used.</i>	

Prozessdaten <i>Process data</i>	PDO 1	Viskosität [cSt]
Byte-Offset	2	
Anzahl Datenbytes <i>number of data bytes</i>	2	
Byte-Reihenfolge <i>Byte order</i>	little endian	
Umrechnungsoffset <i>conversion offset</i>	0	
Umrechnungsfaktor <i>conversion factor</i>	0.1	

Prozessdaten <i>Process data</i>	PDO 1	Temperatur [°C]
Byte-Offset	6	
Anzahl Datenbytes <i>number of data bytes</i>	2	
Byte-Reihenfolge <i>Byte order</i>	little endian	
Umrechnungsoffset <i>conversion offset</i>	0	
Umrechnungsfaktor <i>conversion factor</i>	0.01	

Elektrische Eigenschaften <i>Electrical characteristics</i>	Referenzbedingungen / <i>Reference conditions</i> : Umgebungstemperatur Ta = 24°C / <i>environmental temperature Ta = 75,2 °F</i>			
Parameter	MIN	MAX	Einheit <i>Units</i>	Bemerkung <i>Remarks</i>
Spannungsversorgung <i>Power supply</i>	9	32	V	
Spannungsausgang von IOUT <i>Supply Headroom of IOUT</i>	5		V	$V_{supply} - V_{out}$
Stromausgang <i>Power output</i>	4	20	mA	Ausgänge IOUT1 und IOUT2 sind frei konfigurierbar <i>IOUT1 and IOUT2 are freely configurable</i>
Stromaufnahme <i>Current consumption</i>	Max. 1.3		W	
Genauigkeit Stromausgang <i>Accuracy power output</i>	± 1		% FS	Bezogen auf den Messbereich <i>In relation to the full scale</i>
Schnittstellen <i>Interfaces</i>	Digital output CANopen Analog output: 2x 4...20mA			

Absolute Grenzwerte <i>Absolute maximum rating</i>				
Parameter	MIN	MAX	Einheit <i>Units</i>	Bemerkung <i>Remarks</i>
Kin. Viskosität <i>Kin. Viscosity</i>	1	200	mm ² /s	
Umgebungstemperatur <i>Environment temperature</i>	-40 -40	+85 +185	°C °F	Außerhalb des Messbereiches sind keine plausiblen Messwerte zu erwarten. <i>Outside the specified measuring range, there are no plausible measuring values to expected.</i>

Betriebstemperatur Fluid <i>Operating temperature fluid</i>	-40 -40	+125 +257	°C °F	Beachten Sie, dass die Flüssigkeitstemperatur die Gehäusetemperatur und damit die Betriebstemperatur der Elektronik beeinflussen kann. <i>Be aware that the liquid temperature influences the housing temperature and thus the operating temperature of the electronics.</i>
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Messgenauigkeit Accuracy	Referenzbedingungen / Reference conditions: Umgebungstemperatur Ta = 24°C / environmental temperature Ta = 75,2°F Referenzflüssigkeit / reference liquid oil: HLP32 @40°C, Laminares Fließverhalten / laminar flow regime			
Parameter	MIN	MAX	Einheit Units	Bemerkung Remarks
Analogausgang <i>Analog output 4...20mA</i>		±1	%FS	Bezogen auf den Messbereich <i>In relation to the full scale</i>
Kin. Viskosität (≤ 200 mm ² /s) ¹ <i>Kin. Viscosity (≤ 200 mm²/s)</i>		± 5%	±0,1mm ² /s	Bezogen auf den Messwert <i>In relation to the measured value</i>
Temperatur <i>Temperature</i>		± 1	°K	

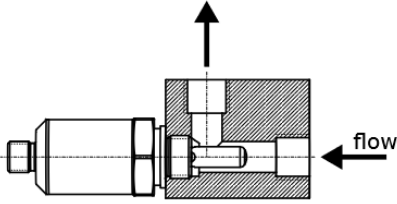
Wiederholgenauigkeit ² Repeatability				
Parameter	@	Typ	Einheit Units	Bemerkung Remarks
Kin. Viskosität <i>Kin. Viscosity</i>	50 mm ² /s	0.3	%	
Temperatur <i>Temperature</i>		0.02	°K	

Medienbeständigkeit Medium resistance	Vom Medium benetzte Materialien Materials wetted by the medium		
Innenteile <i>Inside parts</i>	Epoxidharz, Parylenbeschichtung, FKM-Dichtung	<i>Epoxy, Parylene Coating, FKM seal</i>	
Gehäuse <i>housing</i>	Edelstahl 1.4305	<i>Stainless Steel 1.4305</i>	
Außenteile <i>Outside parts</i>	NBR U-Sit-Scheibe	<i>NBR bonded seal washer</i>	

¹ Maximum permissible deviation between the measured values and reference measurements according to ASTM D7042 in a hydraulic oil HLP 32.

In fluids with pronounced non-Newtonian behavior additional deviations have to be expected.

² Standard deviation for 100 consecutive measurements under constant conditions, data filter disabled.

Einbauhinweise <i>Installation instruction</i>		
	<p>Das Sensorelement des Viskositätsensors ist ein Quarzkristall-Stimmgabelresonator. Zum Schutz dieses Resonators vor mechanischen Stößen, verfügt der Viskositätssensor über eine dauerhafte Schutzkappe. Die Flüssigkeit kann durch eine Öffnung an der Spitze in diese Kappe eintreten und durch seitliche Öffnungen wieder austreten. Es wird empfohlen, den Sensor in ein T-Stück (Einlass gegenüber dem Sensor und Auslass an der Seite) oder eine ähnliche Anordnung einzubauen. Zur Abdichtung empfehlen wir eine Dichtungsscheibe; das erforderliche Drehmoment für diese Scheiben liegt typischerweise im Bereich von 31 - 39 Nm.</p> <p>Für eine optimale Leistung empfehlen wir, einige Details zu beachten:</p> <ul style="list-style-type: none"> • Luftblasen verändern die mechanischen Eigenschaften einer Flüssigkeit und beeinflussen somit die Messung. Stellen Sie sicher, dass keine Luftblasen am Sensor eingeschlossen werden können und potenzielle Blasen durch Strömung oder Auftrieb vom Sensor weggetragen werden. Vermeiden Sie die Zufuhr von Öl mit eingeschlossener Luft zum Sensor und beachten Sie, dass im Öl gelöste Gase Blasen bilden können, wenn der Druck wieder gesenkt wird. • Wenn der Sensor in einem Reservoir oder einem Sumpf platziert wird, kann die Durchflussmenge sehr gering sein. Dies kann zu einer extrem langsamen Reaktion des Sensors führen und zu Rückständen, die die Messung beeinflussen oder sogar den Sensor verstopfen. 	<p><i>The sensor element of the viscosity sensor is a quartz crystal tuning fork resonator. To protect this resonator from mechanical impacts, the viscosity sensor features a permanent protective cap. The liquid can enter this cap through an opening at the tip and leave through openings at the side. It is recommended to mount the sensor in a T-fitting (inlet opposite to the sensor and outlet to the side) or a similar setup. For sealing we recommend a bonded seal washer; Torque required for these washers typically, is the range of 31 – 39 Nm.</i></p> <p><i>For optimal performance we recommend considering a few details:</i></p> <ul style="list-style-type: none"> • <i>Air bubbles change the mechanical properties of a liquid and thus influence the measurement. Make sure no air pockets can get trapped at the sensor and potential bubbles are carried away from the sensor by flow or buoyancy. Avoid feeding oil with entrained air to the sensor and be aware that dissolved gases in the oil may form bubbles when pressure is reduced.</i> • <i>When placing the sensor in a reservoir or a sump the flow rate may be very low. This may lead to extremely slow reaction of the sensor, to residuals influencing the measurement, or even clogging the sensor.</i>

	<ul style="list-style-type: none"> • Obwohl das Sensorelement selbst praktisch unempfindlich gegenüber Druck ist, ist die Viskosität des Öls eine Funktion des Drucks. Die Auswirkungen von Druckschwankungen auf die Messungen sind im Allgemeinen bei höherem Druck stärker ausgeprägt. • Berücksichtigen Sie die Wärmeübertragung von der Flüssigkeit auf das Sensorgehäuse, wenn Sie mit hohen Flüssigkeitstemperatur arbeiten. • In der Nähe des Sensors ist eine laminare Strömung erforderlich. Turbulenzen sind eine Quelle für hohe akustische Energie und kann daher das Rauschen der Messergebnisse erhöhen oder die Messung vorübergehend unterbrechen. • Ist eine Reinigung des Sensors erforderlich, verwenden Sie geeignete Lösungsmittel (z.B. Spiritus oder Alkohol). <p>Verwenden Sie keine Druckluft, da diese den Resonator aufgrund der hohen Strömungsgeschwindigkeit dauerhaft beschädigen kann.</p> <p>Durchdringen Sie die Schutzkappe nicht mit Gegenständen jeglicher Art (z. B. Nadeln oder Drähte).</p>	<ul style="list-style-type: none"> • <i>Although the sensor element itself is virtually insensitive to pressure, the viscosity of oil is a function of pressure. The effect of pressure fluctuation on the measurements is generally more pronounced at higher pressure.</i> • <i>Consider the heat transfer from the liquid to the sensor case when operating at high liquid temperature.</i> • <i>Laminar flow is required in the vicinity of the sensor. Turbulence is a source of high acoustic energy and can therefore increase the noise of the measurement results or temporarily interrupt the measurement.</i> • <i>If cleaning of the sensor is necessary use suitable solvents (e.g. white spirit or alcohol).</i> <p><i>Do not use compressed air as this may damage the resonator permanently due to high flow velocity.</i></p> <p><i>Do not penetrate the protective cap with any kind of object (e.g. needles or wires).</i></p>
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<p>Typenschild <i>Type plate</i></p>	<div style="text-align: center;"> <h2>HySense® CV 200</h2> <p>Part No: 3402-CV20-G426C0-L00</p> <p>Viscosity: 1...200 cSt Pmax: 50 bar</p> <p>Node ID: 120 Bit rate: 250 kbps</p> <p>HYDROTECHNIK</p> </div> <div style="text-align: right; margin-top: 10px;"> SN: 0A71CD47 Limburg / Germany www.hydrotechnik.com </div>
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TKZ / order number	Bestellnummer Order Number	Bemerkung / Remarks
HySense® CV 200	3402-CV20-G426C0-L00	

Erklärung zur elektrischen Verbindung / Explanation to electrical Connections		
CFG reset pin	<p>Der CFG-Reset-Pin dient zum Zurücksetzen des Sensors auf die Werkseinstellungen. Im Normalbetrieb sollte dieser Pin mit Masse verbunden sein, um Stör-Einkopplungen zu vermeiden.</p> <p>Zurücksetzen auf Werkseinstellung:</p> <ol style="list-style-type: none"> 1. CFG ist mit Masse verbunden 2. Sensor bestromen 3. Mindestens 5s warten 4. CFG mit U_{b+} verbinden 5. Mindestens 10s warten 6. CFG wieder mit Masse verbinden 7. Sensor vom Strom trennen 8. Sensor bestromen 9. Sensor startet in der Werkseinstellung 	<p><i>The CFG reset pin can be used to reset the sensor to factory default settings. During normal operation this pin should be connected to ground to avoid interference coupling.</i></p> <p><i>Reset to default config:</i></p> <ol style="list-style-type: none"> 1. <i>CFG connected to ground</i> 2. <i>Power up sensor</i> 3. <i>Wait at least 5s</i> 4. <i>Connect CFG to U_{b+}</i> 5. <i>Wait at least 10s</i> 6. <i>connect CFG to ground again</i> 7. <i>power cycle the sensor</i> 8. <i>Sensor will start in default setup</i>
CAN	<p>Die digitale Schnittstelle benötigt drei Leitungen: CAN H, CAN L und Masse. In Anwendungen, in denen die Bus-Masse nicht mit der Sensormasse verbunden werden kann, ist ein externer galvanischer Trenner erforderlich. Eine interne Bustermiierung kann durch Verbinden von Pin 4 mit CAN H (Pin 3) aktiviert werden. Um die Termination zu deaktivieren, verbinden Sie entweder Pin 4 mit CAN L (Pin 5) oder lassen Sie ihn unverbunden.</p>	<p><i>The digital interface requires three wires: CAN H, CAN L, and Ground. In applications where the bus ground cannot be connected to the sensor ground, an external galvanic isolator must be provided.</i></p> <p><i>An internal bus termination can be enabled by connecting pin 4 to CAN H (pin 3). To deactivate termination either connect pin 4 to CAN L (pin 5) or leave it unconnected.</i></p>

Haftungsausschluss / Limitation of Liability	<p>Änderungen an Produkten und Dokumentationen im Sinne des technischen Fortschritts und der stetigen Verbesserung sind vorbehalten und können jederzeit ohne vorherige Mitteilung eintreten. Die dann gültigen Spezifikationen können von den Angaben in dieser Revision des technischen Datenblatts abweichen. Druckfehler sind vorbehalten. Im Zweifelsfall gilt die deutsche Sprachversion.</p>	<p><i>Changes of products and documentation in the sense of technical progress and continuous improvement may occur at any time without prior notification. Hence specifications may than differ from those given in this revision of the technical data sheet. There is no liability for possible misprints. The German language version is valid in any case of doubt.</i></p>
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Europäische Konformität European Conformity	CE	
Elektromagnetische Verträglichkeit / <i>Electromagnetic compatibility</i>	Richtlinie 2014/30/EU	<i>Directive 2014/30/EU</i>
Druckgeräte / <i>Pressure equipment</i>	Richtlinie 2014/68/EU	<i>Directive 2014/68/EU</i>
RoHS - <i>Restriction of Hazardous Substances</i>	Richtlinie 2011/65/EU	<i>Directive: 2011/65/EU</i>

Hinweise zur Entsorgung / Disposal information		
WEEE Elektro- und Elektronik-Altgeräte / <i>Waste electrical and electronic equipment</i>	Richtlinie 2012/19/EU	<i>Directive 2012/19/EU</i>
	Dieses Produkt darf nicht mit dem Hausmüll entsorgt werden. Ausführliche Hinweise zur Entsorgung finden Sie auf unserer Homepage www.hydrotechnik.com	<i>This product is not to be disposed of in the household waste. Further information for disposal can be found on our website www.hydrotechnik.com</i>

CANopen Interface	weiterführende Informationen additional information
This device supports following features:	<ul style="list-style-type: none"> • NMT commands (start, stop, preoperational, reset communication, reset node) • Heartbeat producer • SDO read and write • 1 configurable TPDO for measurement results • LSS slave for configuration of node ID and bit rate • all configuration can be saved permanently • all configuration can be restored to default values
Startup	When powered up the device starts into operational mode. It begins to send process data with an interval of 1000 ms. The device can then be switched to pre-operational mode using parameter 0x2025 – “Autostart”, to 0.
Configuration	In general, all changes to the configuration are only temporarily. To save configuration permanently, the field 0x1010 – “Store Parameters”, can be used. For manufacturer specific parameters, the device has to be restarted to activate changes (with exception of 0x2026 - “Filter Length”).
Measurement Results	The measurement results together with the corresponding consecutive measurement number and status code can be read using 0x7130 – “AI Input PV”. The measurement values are scaled using the number of decimal digits configured in 0x6132 – “AI decimal digits PV”. The scaling of result values can be changed, however keep in mind that scaled values exceeding the range of the 16 bit datatype will be clipped. Invalid results are indicated by the maximum value of the according datatype which is 0xFFFF for ulnt16 and 0x7FFF for slnt16.

TPDO		By default, the measurement results (measurement number, kinematic viscosity, and temperature) are sent after every measurement cycle ($\approx 1/s$) using a TPDO. The behavior of the TPDO as well as the mapping of result values can be configured using 0x1800 – “TPDO communication” and 0x1A00 – “TPDO mapping” . E.g. to send the TPDO every 10 s, set the “Transmission Type” to 255 and the “Event Timer” to 10000.		
Index	Sub	Name	Datatype	
Communication Specific Parameters				
0x1010	1	Store Parameters	ulnt32	Write “save” (0x65766173) to save config. Write “load” (0x64616F6C) to restore default configuration. Heartbeat producer time in ms, 0 to disable.
0x1011	1	Restore Default	ulnt32	
0x1017	0	Producer Heartbeat Time	ulnt16	
0x1018	1	Identity Vendor ID	ulnt32	0x000001C0 Hydrotechnik GmbH
	2	Product Code	ulnt32	CV 200
	3	Revision Number	ulnt32	hardware revision
	4	Serial Number	ulnt32	
0x1800	1	TPDO communication COB ID	ulnt32	NodeID + 0x40000180
	2	Transmission Datatype	ulnt8	254
	3	Inhibit Time	ulnt16	0
	5	Event Timer	ulnt16	0
	6	SYNC start value	ulnt8	0
0x1A00	0	TPDO mapping number of mapped objects	ulnt8	4
	1	Application Object 1	ulnt32	0x71300110 (Measurement Number)
	2	Application Object 2	ulnt32	0x71300210 (Kinematic Viscosity)
	3	Application Object 3	ulnt32	0x71300310 (unused)
	4	Application Object 4	ulnt32	0x71300410 (Temperature)
Manufacturer Specific Parameters				
0x2022	0	Bit Rate	ulnt16	CAN bit rate in kBaud (10 ... 1000)
0x2024	0	Node ID	ulnt16	CAN node ID (1 ... 127)
0x2025	0	Operational Autostart	ulnt16	auto start to operational mode (true / false)
0x2026	0	Filter Length	ulnt16	length of data filter (1 ... 256)
0x2028	0	OUT1_select	ulnt16	selection of analog output 1 (see Tab. 1)
0x2029	0	OUT1_min	ulnt16	minimum process value for analog output 1
0x202A	0	OUT1_max	ulnt16	maximum process value for analog output 1
0x202C	0	OUT2_select	ulnt16	selection of analog output 2 (see Tab. 1)
0x202D	0	OUT2_min	ulnt16	minimum process value for analog output 2
0x202E	0	OUT2_max	ulnt16	maximum process value for analog output 2

Device Profile Specific Parameters				
0x6132	1	AI decimal digits PV Measurement Number	ulnt8	number of digits for result values 0
	2	Kinematic Viscosity	ulnt8	1 (0 ... 3)
	5	Temperature	ulnt8	2 (0 ... 2)
	6	Status Code	ulnt8	0
0x7130	1	AI Input PV Measurement Number	ulnt16	result values
	2	Kinematic Viscosity	ulnt16	cSt
	5	Temperature	slnt16	°C
	6	Status Code	ulnt16	

Status Code		
Bit	Description	Possible Reasons
0	No resonance detected	Resonance search is still in progress, Liquid out of measurement range
1	Out of range	Sensor damaged or contaminated, at least one parameter is out of range
2	Frequency controller error	Viscosity or density out of range
3	Noise error Invalid configuration	Electromagnetic interference,
4	Invalid configuration	Very high flow velocity Invalid or missing configuration
5	Resonator error	Resonator damaged
6	Temperature sensor error	Temperature sensor damaged
7	Hardware error	Damaged sensor electronics
8	Firmware error	An unspecified firmware error was triggered
9	reserved	ignore
10	Supply voltage too low or too high	Improper or unstable power supply
11	Internal temperature limit	The sensor is operated beyond the thermal specification
12-15	reserved	ignore

Default Configuration		
Parameter	Parameter	Value
Analog output 1	Temperature	-40...+125°C
Analog output 2	Viscosity	0...200 mm ² /s
Data filter	Sending interval	60s
Node ID		120
Bit rate		250kBaud
Operational autostart		true

Reset Default Configuration	
In case of misconfiguration the sensor can be reset to above factory defaults by applying the following procedure:	
Step	Action
1	Make sure the CFG reset pin is connected to ground.
2	Power up the sensor properly and wait at least 5 seconds.
3	Connect the CFG pin to the supply voltage (nominal +24 VDC)
4	Wait at least for 10 seconds.
5	Connect the CFG reset pin to ground again.
6	Power cycle the sensor.
7	The sensor will start with factory default configuration.

Revision	Rev 00	Rev 01						
	2025-11-27	2025-12-08						
	rba	rba						

CANopen device documentation

CV 200

Project File	CV-200-CANopen.xdd
File Version	1
Created	7/17/2024 4:30:24 PM
Created By	Friedrich Feichtinger
Modified	11/20/2025 5:22:43 PM
Modified By	Friedrich Feichtinger

This file was automatically generated by [CANopenEditor](#) v4.2-0-g3735e28

[TOC]

Device Information

Vendor Name	Hydrotechnik GmbH
Vendor ID	0x000001C0
Product Name	CV 200
Product ID	0x435600C8
Granularity	8
RPDO count	0
TPDO count	1
LSS Slave	True
LSS Master	False
NG Slave	False
NG Master	False

Supported Baud rates

- 10 kBit/s
- 20 kBit/s
- 50 kBit/s
- 125 kBit/s
- 250 kBit/s
- 500 kBit/s
- 800 kBit/s
- 1000 kBit/s
- auto

PDO Mapping

TPDO 0x1800

COB_ID	\$(NODEID+0x40000180)
Transmission	type=254; inhibit-time=0; event-timer=0
0x71300110	AI Input PV (frameNr)
0x71300210	AI Input PV (kinematic Viscosity)
0x71300310	AI Input PV (reserved)
0x71300510	AI Input PV (Temperature)

Communication Specific Parameters

0x1000 - Device type

Object Type	Count Label	Storage Group		
VAR		RAM		
Data Type	SDO	PDO	SRDO	Default Value
UNSIGNED32	ro	no	no	0x00020194

- bit 16-31: Additional information
- bit 0-15: Device profile number

0x1001 - Error register

Object Type	Count Label	Storage Group		
VAR		RAM		
Data Type	SDO	PDO	SRDO	Default Value
UNSIGNED8	ro	t	no	0x00

- bit 7: manufacturer specific
- bit 6: Reserved (always 0)
- bit 5: device profile specific
- bit 4: communication error (overrun, error state)
- bit 3: temperature
- bit 2: voltage
- bit 1: current
- bit 0: generic error

0x1003 - Pre-defined error field

Object Type	Count Label	Storage Group				
ARRAY		RAM				
Sub	Name	Data Type	SDO	PDO	SRDO	Default Value
0x00	Number of errors	UNSIGNED8	rw	no	no	
0x01	Standard error field	UNSIGNED32	ro	no	no	
0x02	Standard error field	UNSIGNED32	ro	no	no	
0x03	Standard error field	UNSIGNED32	ro	no	no	
0x04	Standard error field	UNSIGNED32	ro	no	no	
0x05	Standard error field	UNSIGNED32	ro	no	no	
0x06	Standard error field	UNSIGNED32	ro	no	no	
0x07	Standard error field	UNSIGNED32	ro	no	no	
0x08	Standard error field	UNSIGNED32	ro	no	no	
0x09	Standard error field	UNSIGNED32	ro	no	no	
0x0A	Standard error field	UNSIGNED32	ro	no	no	
0x0B	Standard error field	UNSIGNED32	ro	no	no	
0x0C	Standard error field	UNSIGNED32	ro	no	no	
0x0D	Standard error field	UNSIGNED32	ro	no	no	
0x0E	Standard error field	UNSIGNED32	ro	no	no	
0x0F	Standard error field	UNSIGNED32	ro	no	no	
0x10	Standard error field	UNSIGNED32	ro	no	no	

- Sub Index 0: Contains number of actual errors. 0 can be written to clear error history.
- sub-index 1 and above:
 - bit 16-31: Manufacturer specific additional information
 - bit 0-15: Error code as transmitted in the Emergency object

0x1005 - COB-ID SYNC message

Object Type	Count Label	Storage Group		
VAR		RAM		
Data Type	SDO	PDO	SRDO	Default Value
UNSIGNED32	ro	no	no	0x00000080

- bit 31: set to 0
- bit 30: If set, CANopen device generates SYNC object
- bit 11-29: set to 0
- bit 0-10: 11-bit CAN-ID

0x1006 - Communication cycle period

Object Type	Count Label	Storage Group		
VAR		RAM		
Data Type	SDO	PDO	SRDO	Default Value
UNSIGNED32	rw	no	no	0

Period of SYNC transmission in μ s (0 = transmission disabled).

0x100A - Manufacturer software version

Object Type	Count Label	Storage Group		
VAR		RAM		
Data Type	SDO	PDO	SRDO	Default Value
UNSIGNED32	ro	no	no	0

0x1010 - Store parameters

Object Type	Count Label	Storage Group				
ARRAY		RAM				
Sub	Name	Data Type	SDO	PDO	SRDO	Default Value
0x00	Highest sub-index supported	UNSIGNED8	ro	no	no	0x01
0x01	Save all parameters	UNSIGNED32	rw	no	no	0x00000001

Sub-indexes 1 and above: * Reading provides information about its storage functionality: * bit 1: If set, CANopen device saves parameters autonomously * bit 0: If set, CANopen device saves parameters on command * Writing value 0x65766173 ('s','a','v','e' from LSB to MSB) stores corresponding data.

0x1011 - Restore default parameters

Object Type	Count Label	Storage Group				
ARRAY		RAM				
Sub	Name	Data Type	SDO	PDO	SRDO	Default Value
0x00	Highest sub-index supported	UNSIGNED8	ro	no	no	0x01
0x01	Restore all default parameters	UNSIGNED32	rw	no	no	0x00000001

Sub-indexes 1 and above: * Reading provides information about its restoring capability: * bit 0: If set, CANopen device restores parameters * Writing value 0x64616F6C ('l','o','a','d' from LSB to MSB) restores corresponding data.

0x1014 - COB-ID EMCY

Object Type	Count Label	Storage Group
VAR		RAM

Data Type	SDO	PDO	SRDO	Default Value
UNSIGNED32	ro	no	no	\$NODEID+0x80

- bit 31: If set, EMCY does NOT exist / is NOT valid
- bit 11-30: set to 0
- bit 0-10: 11-bit CAN-ID

0x1017 - Producer heartbeat time

Object Type	Count Label	Storage Group
VAR		RAM

Data Type	SDO	PDO	SRDO	Default Value
UNSIGNED16	rw	no	no	1000

Heartbeat producer time in ms (0 = disable transmission).

0x1018 - Identity

Object Type	Count Label	Storage Group
RECORD		RAM

Sub	Name	Data Type	SDO	PDO	SRDO	Default Value
0x00	Highest sub-index supported	UNSIGNED8	ro	no	no	0x04
0x01	Vendor-ID	UNSIGNED32	ro	no	no	0x000001C0
0x02	Product code	UNSIGNED32	ro	no	no	0x435600C8
0x03	Revision number	UNSIGNED32	ro	no	no	0
0x04	Serial number	UNSIGNED32	ro	no	no	0

- Vendor-ID, assigned by CiA
- Product code, manufacturer specific
- Revision number:
 - bit 16-31: Major revision number (CANopen behavior has changed)
 - bit 0-15: Minor revision num. (CANopen behavior has not changed)
- Serial number, manufacturer specific See the ICMS datasheet for your product variant.
hardware revision

0x1200 - SDO server parameter

Object Type	Count Label	Storage Group
RECORD		RAM

Sub	Name	Data Type	SDO	PDO	SRDO	Default Value
0x00	Highest sub-index supported	UNSIGNED8	ro	no	no	2
0x01	COB-ID client to server (rx)	UNSIGNED32	ro	t	no	\$NODEID+0x600
0x02	COB-ID server to client (tx)	UNSIGNED32	ro	t	no	\$NODEID+0x580

Sub-indexes 1 and 2: * bit 11-31: set to 0 * bit 0-10: 11-bit CAN-ID

0x1800 - TPDO communication parameter

Object Type	Count Label	Storage Group
RECORD		RAM

Sub	Name	Data Type	SDO	PDO	SRDO	Default Value
0x00	Highest sub-index supported	UNSIGNED8	ro	no	no	0x06
0x01	COB-ID used by TPDO	UNSIGNED32	rw	no	no	\$NODEID+0x40000180
0x02	Transmission type	UNSIGNED8	rw	no	no	254
0x03	Inhibit time	UNSIGNED16	rw	no	no	0
0x05	Event timer	UNSIGNED16	rw	no	no	0

Sub	Name	Data Type	SDO	PDO	SRDO	Default Value
0x06	SYNC start value	UNSIGNED8	rw	no	no	0

- COB-ID used by RPDO:
- bit 31: If set, PDO does not exist / is not valid
- bit 30: If set, NO RTR is allowed on this PDO
- bit 11-29: set to 0
- bit 0-10: 11-bit CAN-ID
- Transmission type:
- Value 0: synchronous (acyclic)
- Value 1-240: synchronous (cyclic every (1-240)-th sync)
- Value 241-253: not used
- Value 254: event-driven (manufacturer-specific)
- Value 255: event-driven (device profile and application profile specific)
- Inhibit time in multiple of 100µs, if the transmission type is set to 254 or 255 (0 = disabled).
- Event timer interval in ms, if the transmission type is set to 254 or 255 (0 = disabled).
- SYNC start value
- Value 0: Counter of the SYNC message shall not be processed.
- Value 1-240: The SYNC message with the counter value equal to this value shall be regarded as the first received SYNC message.

0x1A00 - TPDO mapping parameter

Object Type	Count Label	Storage Group
RECORD		RAM

Sub	Name	Data Type	SDO	PDO	SRDO	Default Value
0x00	Number of mapped application objects in PDO	UNSIGNED8	rw	no	no	4
0x01	Application object 1	UNSIGNED32	rw	no	no	0x71300110
0x02	Application object 2	UNSIGNED32	rw	no	no	0x71300210
0x03	Application object 3	UNSIGNED32	rw	no	no	0x71300310
0x04	Application object 4	UNSIGNED32	rw	no	no	0x71300510
0x05	Application object 5	UNSIGNED32	rw	no	no	0x00000000
0x06	Application object 6	UNSIGNED32	rw	no	no	0x00000000
0x07	Application object 7	UNSIGNED32	rw	no	no	0x00000000
0x08	Application object 8	UNSIGNED32	rw	no	no	0x00000000

- Number of mapped application objects in PDO:
- Value 0: mapping is disabled.
- Value 1: sub-index 0x01 is valid.
- Value 2-8: sub-indexes 0x01 to (0x02 to 0x08) are valid.
- Application object 1-8:
- bit 16-31: index
- bit 8-15: sub-index
- bit 0-7: data length in bits

0x1F80 - NMT Startup

Object Type	Count Label	Storage Group
VAR		RAM

Data Type	SDO	PDO	SRDO	Default Value
UNSIGNED32	rw	no	no	8

Manufacturer Specific Parameters

0x2020 - LOCK

Object Type	Count Label	Storage Group		
VAR		RAM		
Data Type	SDO	PDO	SRDO	Default Value
UNSIGNED16	rw	no	no	0

lock register write 0xACDC to unlock Command register

0x2021 - Command

Object Type	Count Label	Storage Group		
VAR		RAM		
Data Type	SDO	PDO	SRDO	Default Value
UNSIGNED16	rw	no	no	0

Command Register unlock first

commands: 0x01 write configuration to FLASH 0xFF reboot

0x2022 - Bit Rate

Object Type	Count Label	Storage Group		
VAR		RAM		
Data Type	SDO	PDO	SRDO	Default Value
UNSIGNED16	rw	no	no	250

CAN bit rate in kBd

10 ... 1000 kBd

save config and reboot to activate new bit rate

0x2024 - Node ID

Object Type	Count Label	Storage Group		
VAR		RAM		
Data Type	SDO	PDO	SRDO	Default Value
UNSIGNED16	rw	no	no	120

node ID

1 ... 127

save config and reboot to active new node ID

0x2025 - reserved

Object Type	Count Label	Storage Group		
VAR		RAM		
Data Type	SDO	PDO	SRDO	Default Value
UNSIGNED16	rw	no	no	1

reserved, do not touch!

0x2026 - Filter Length

Object Type	Count Label	Storage Group		
VAR		RAM		
Data Type	SDO	PDO	SRDO	Default Value
UNSIGNED16	rw	no	no	60

length of data filter

1 ... 256

new filter length is activated immediately, but not saved permanently

0x2027 - reserved

Object Type	Count Label	Storage Group		
VAR		RAM		
Data Type	SDO	PDO	SRDO	Default Value
UNSIGNED16	rw	no	no	1

reserved, do not touch!

0x2028 - OUT1_select

Object Type	Count Label	Storage Group		
VAR		RAM		
Data Type	SDO	PDO	SRDO	Default Value
UNSIGNED16	rw	no	no	0

Selection of analog output 1:

0 Output disabled 22 Temperature (0.01 °C) 26 kinematic Viscosity (0.1 cSt)

0x2029 - OUT1_min

Object Type	Count Label	Storage Group		
VAR		RAM		
Data Type	SDO	PDO	SRDO	Default Value
UNSIGNED16	rw	no	no	0

minimum process value for analog output 1 this value is mapped to 4mA

0x202A - OUT1_max

Object Type	Count Label	Storage Group		
VAR		RAM		
Data Type	SDO	PDO	SRDO	Default Value
UNSIGNED16	rw	no	no	0

maximum process value for analog output 1 this value is mapped to 20mA

0x202C - OUT2_select

Object Type	Count Label	Storage Group		
VAR		RAM		
Data Type	SDO	PDO	SRDO	Default Value
UNSIGNED16	rw	no	no	0

Selection of analog output 1:

0 Output disabled 22 Temperature (0.01 °C) 26 kinematic Viscosity (0.1 cSt)

0x202D - OUT2_min

Object Type	Count Label	Storage Group		
VAR		RAM		
Data Type	SDO	PDO	SRDO	Default Value
UNSIGNED16	rw	no	no	0

minimum process value for analog output 2 this value is mapped to 4mA

0x202E - OUT2_max

Object Type	Count Label	Storage Group		
VAR		RAM		
Data Type	SDO	PDO	SRDO	Default Value
UNSIGNED16	rw	no	no	0

maximum process value for analog output 2 this value is mapped to 20mA

Device Profile Specific Parameters

0x6132 - AI decimal digits PV

Object Type	Count Label	Storage Group				
ARRAY		RAM				
Sub	Name	Data Type	SDO	PDO	SRDO	Default Value
0x00	Highest sub-index supported	UNSIGNED8	ro	no	no	0x06
0x01	frameNr	UNSIGNED8	rw	no	no	0
0x02	kinematic Viscosity	UNSIGNED8	rw	no	no	1
0x03	reserved	UNSIGNED8	rw	no	no	0
0x04	reserved	UNSIGNED8	rw	no	no	0
0x05	Temperature	UNSIGNED8	rw	no	no	2
0x06	Status Code	UNSIGNED8	rw	no	no	0

0x7130 - AI Input PV

Object Type	Count Label	Storage Group				
ARRAY		RAM				
Sub	Name	Data Type	SDO	PDO	SRDO	Default Value
0x00	Highest sub-index supported	UNSIGNED8	ro	no	no	0x06
0x01	frameNr	UNSIGNED16	ro	t	no	0
0x02	kinematic Viscosity	UNSIGNED16	ro	t	no	0
0x03	reserved	UNSIGNED16	ro	t	no	0
0x04	reserved	UNSIGNED16	ro	t	no	0
0x05	Temperature	UNSIGNED16	ro	t	no	0
0x06	Status Code	UNSIGNED16	ro	t	no	0