CANOPEN INTERFACE FOR OJ1436

This document applies to OJ1436 software version 4.2.x

CONTENTS

1 Introduction

1.1 Overview

The CANopen interface is one of the network communication options available for the OJ1436 *smart* Belt Weigher Indicator.

The CANopen interface provides the facility to connect the OJ1436 to CANopen networks for communication with host PLC or computer systems.

This manual provides details of how to configure the network settings and then communicate with the OJ1436.

For further information relating to the general operation of the indicator refer to the OJ1436 *smart* Belt Weigher Indicator user manual.

2 Configuration

The network configuration settings are accessed by operating:

MENU → Configuration → Interfaces → Network

Parameter	Range	Factory Setting
Network Interface This should be set to **CANopen** to match the installed network interface option.	None / Ethernet / EtherNet/IP / Profibus DP / DeviceNet / CANopen	Ethernet
Node ID The address of the OJ1436 on the CANopen network. **Altering this parameter will not take effect until the unit is power cycled.**	1 - 127	1
Baud Rate – kbps This sets the units communication speed on the CANopen network. **Altering this parameter will not take effect until the unit is power cycled.**	10 - 1000	125

3 CANopen Communications

3.1 Overview

CANopen is a higher-layer protocol based on the Control Area Network serial bus system and the CAN Application layer.

Through the CANopen network it is possible to:

- Retrieve process data, such as the live flow rate and totals, using Process Data Objects (PDO)
- Perform dedicated actions such as clearing the total or performing a dynamic tare
- Retrieve diagnostic data to ensure system integrity
- Store and Retrieve all calibration and configuration data, to allow the backup and restore of system critical data, using Service Data Objects (SDO) or PDOs.

The CANopen Object Dictionary, detailed in section 0, lists all available OJ1436 real-time, calibration, configuration and diagnostic data.

An EDS (Electronic Data Sheet) is supplied with the OJ1436 to enable simple configuration on the CANopen network.

3.2 Process Data Objects (PDO)

3.2.1 Overview

Process Data Objects contain real-time process data.

The OJ1436 supports up to five active Transmit PDOs (TPDO) and two active Receive PDOs (RPDO). Dynamic mapping is also supported, thus enabling the system designer to access only the process data required for the application and therefore reduce bus loading.

3.2.2 Transmission Types

The following transmission types are supported by the OJ1436.

Transmission Type	PDO Transmission				
	Cyclic	Acyclic	Synchronous	Asynchronous	RTR only
0		x	x		
1 – 240	x		x		
241 – 251	Reserved				
252			x		x
253				x	
254				x	

The default transmission type for all PDOs is 254 i.e. manufacturer specific event. The PDO is transmitted each time the data within it is updated. In order to transmit the TPDOs more frequently the Event Time, within the Transmit PDO Communication Parameter (index 1800-1804 sub-index 5), can be set.

The transmission type of a PDO is defined in the PDO Communication Parameter (index 1400-1401 for RPDOs and 1800-1804 for TPDOs), Sub-Index 2, see section 3.6.1.

3.2.3 PDO Mapping

3.2.3.1 TPDO1

As default, TPDO1 contains the live Flow Rate and Belt Speed as 32-bit floating point numbers. The Flow Rate is updated every 100ms, the Belt Speed is updated every second. The PDO is transmitted each time a value is updated.

TPDO1 Data Byte	Data
1	Flow Rate (Least Significant Byte)
2	Flow Rate
3	Flow Rate
4	Flow Rate (Most Significant Byte)
5	Belt Speed (Least Significant Byte)
6	Belt Speed
7	Belt Speed
8	Belt Speed (Most Significant Byte)

3.2.3.2 TPDO2

As default, TPDO2 contains the live Resettable and Non-Resettable Totals as 32-bit floating point numbers. The PDO is transmitted every second.

TPDO2 Data Byte	Data
1	Resettable Total (Least Significant Byte)
2	Resettable Total
3	Resettable Total
4	Resettable Total (Most Significant Byte)
5	Non-Resettable Total (Least Significant Byte)
6	Non-Resettable Total
7	Non-Resettable Total
8	Non-Resettable Total (Most Significant Byte)

3.2.3.3 TPDO3

As default, TPDO3 contains the live Flow Time and Belt Running Time as 32-bit unsigned integers. The timers are updated every second, when active. The PDO is transmitted each time a value is updated.

TPDO3 Data Byte	Data
1	Flow Time (Least Significant Byte)
2	Flow Time
3	Flow Time
4	Flow Time (Most Significant Byte)
5	Belt Running Time (Least Significant Byte)
6	Belt Running Time
7	Belt Running Time
8	Belt Running Time (Most Significant Byte)

3.2.3.4 TPDO4

As default, TPDO4 contains the live Belt Load as a 32-bit floating point number, the currently selected Material Number and the Status byte. The PDO is transmitted each time a value is updated.

TPDO4 Data Byte	Data
1	Belt Load (Least Significant Byte)
2	Belt Load
3	Belt Load
4	Belt Load (Most Significant Byte)
5	Material Number
6	Status

3.2.3.5 TPDO5

As default, TPDO5 contains the Calibration/Configuration/Diagnostic Data Access items, returned by the OJ1436. The Calibration/Configuration/Diagnostic Data Access items are updated each time RPDO2 is received, see section 3.2.4 for further details. The PDO is transmitted each time a value is updated.

TPDO5 Data Byte	Data
1	Tx Index (Least Significant Byte)
2	Tx Index (Most Significant Byte)
3	Tx Sub-Index
4	Tx Value (Least Significant Byte)
5	Tx Value
6	Tx Value
7	Tx Value (Most Significant Byte)

3.2.3.6 RPDO1

As default, RPDO1 contains a list of commands which can be used to trigger the appropriate event at the OJ1436. It also allows the Material Number to be set (in the range 1 – 12).

RPDO1 Data Byte	Data
1	Clear Resettable Total
2	Clear Non-Resettable Total
3	Clear Flow Time
4	Clear Belt Running Time
5	Start Tare
6	Abort Tare
7	Material Number

3.2.3.7 RPDO2

As default, RPDO2 contains the Calibration/Configuration/Diagnostic Data Access items, sent by the host. The OJ1436 expects the host to setup all of the items before sending the PDO i.e. send the PDO once per read/write cycle, see section 3.2.4 for further details. **The items within this PDO must remain in the following order, remapping could cause incorrect operation.**

RPDO2 Data Byte	Data
1	Rx Index (Least Significant Byte)
2	Rx Index (Most Significant Byte)
3	Rx Sub-Index
4	Rx Value (Least Significant Byte)
5	Rx Value
6	Rx Value
7	Rx Value (Most Significant Byte)
8	Rx Write

3.2.3.8 Dynamic Mapping

The PDOs can be changed to contain any of data from the Object Dictionary which has an Attribute type of PDO.

The procedure for re-mapping PDOs is as follows:

1. Set the most significant bit of the PDO Communication Parameter (1400-1401 for RPDOs and 1800–1804 for TPDOs), sub-index 1. This marks the PDO as invalid and disables transmission.
2. Set the Number of mapped application objects within the PDO Mapping Parameter (1600-1601 for RPDOs and 1A00–1A04 for TPDOs, sub-index 0) to zero.
3. Set the PDO mapping registers within the PDO Mapping Parameter (1600-1601 for RPDOs and 1A00–1A04 for TPDOs, sub-index 1 – n) to reflect the new application objects.
4. Set the Number of mapped application objects within the PDO Mapping Parameter (1600-1601 for RPDOs and 1A00–1A04 for TPDOs, sub-index 0) to the number of application objects being mapped.
5. Clear the most significant bit of the PDO Communication Parameter (1400-1401 for RPDOs and 1800–1804 for TPDOs), sub-index 1. This marks the PDO as valid and enables transmission.

3.2.3.9 Disabling a PDO

A PDO can be disabled by setting the most significant bit of the PDO Communication Parameter (1400-1401 for RPDOs and 1800–1804 for TPDOs), sub-index 1.

3.2.4 Calibration & Configuration Data Access via PDO

The standard method of accessing the calibration and configuration data stored within the OJ1436 is via SDO messaging. However, the OJ1436 also supports an alternative method of accessing the data using PDO messaging.

The OJ1436 uses RPDO2 and TPDO5 in order to allow read/write access from the host to the stored data. Refer to section 0 & 3.2.3.7 for details of the PDO mapping.

The items returned to the host system, within TPDO5, will only be updated and transmitted if the items within RPDO2 pass all validity checks.

An emergency object will be transmitted by the OJ1436 if any of the following conditions occur during the read/write cycle: invalid index or sub-index, attempt to write to a read-only parameter or attempt to write a value that is out of range for the referenced parameter. Refer to the list of error codes in section 3.4.2 for further details.

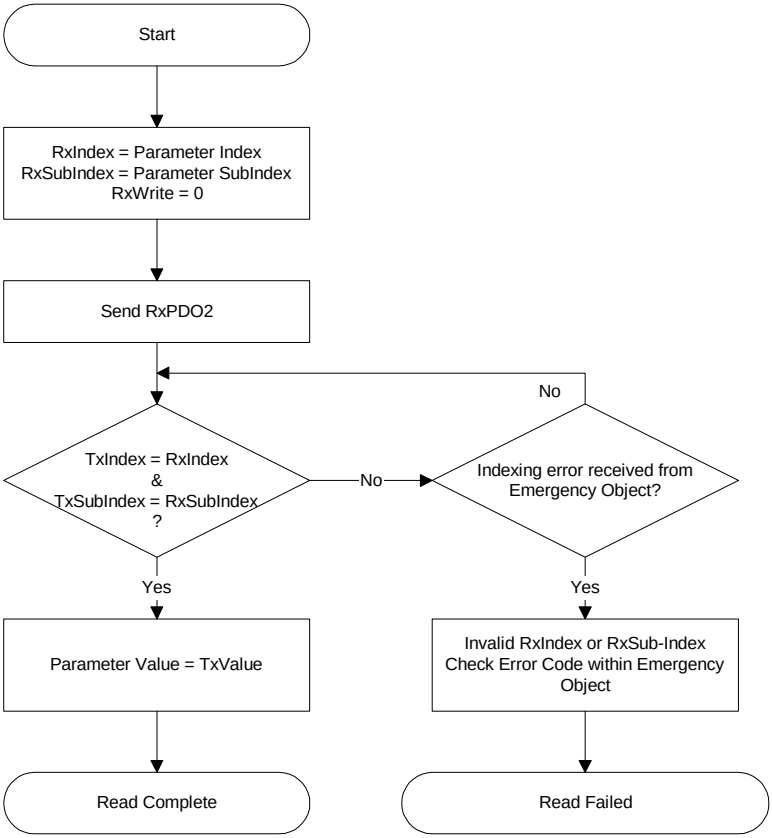
The following sections give a detailed explanation of how to implement the read and write cycles within the host system.

3.2.4.1 Reading

The host can read the value of any parameter by using the RxIndex and RxSub-Index items within RPDO2 to reference the appropriate parameter within the manufacturer specific profile area of the object dictionary.

The TxIndex and TxSub-Index items within TPDO5 then give verification that the parameter being referenced was found within the object dictionary. The TxValue item within TPDO5 holds the current value of the referenced parameter.

The read cycle performed by the host should be implemented as represented below.

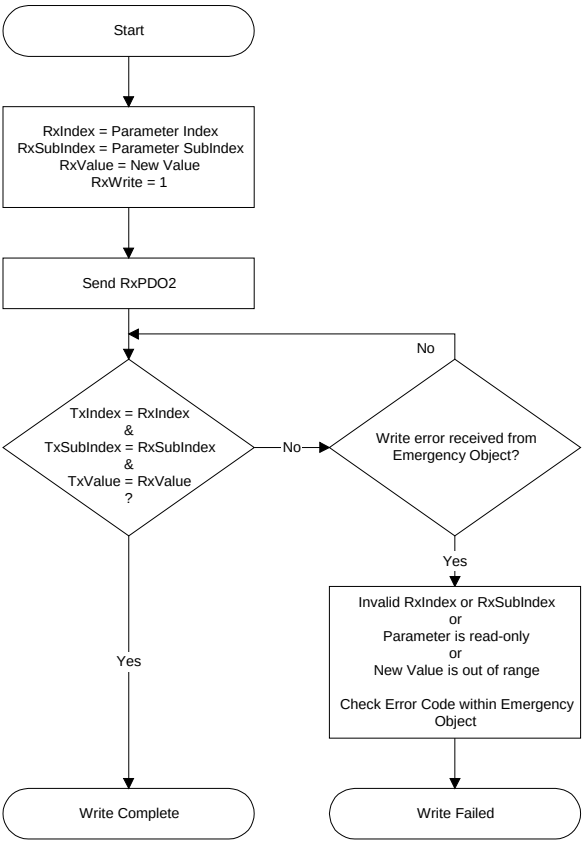


3.2.4.2 Writing

As with reading, the RxIndex and RxSub-Index items within RPDO2 are used to reference the parameter. Additionally, the RxValue item should be set to the value to be written and the RxWrite item should then be set to 1.

The TxIndex, TxSub-Index and TxValue items within TPDO5 then give verification that the parameter being referenced was found within the object dictionary, is not read-only and the value written was within range.

The write cycle performed by the host should be implemented as represented below.



3.3 Node Guarding and Heartbeat

The OJ1436 supports both Node Guarding and Heartbeat protocols in order to detect failures on the CANopen network. It is not allowed for one device to use both error control mechanisms simultaneously.

3.3.1 Node Guarding

The master polls each slave at regular time intervals. This time interval is called the Guard Time (index 100C). The response of the slave contains the state of that slave. The node life time is given by the Guard Time multiplied by the Life Time Factor (index 100D). If the slave has not been polled during its life time, a remote node error is indicated at the slave. This has no effect on the operation of the OJ1436. A remote node error is indicated at the master if the remote transmit request is not confirmed within the node life time or the reported slave state does not match the expected state.

3.3.2 Heartbeat

The OJ1436 transmits a Heartbeat message cyclically determined by the Producer Heartbeat Time (index 1017). One or more Heartbeat consumers receive the indication. The heartbeat consumer guards the reception of the heartbeat within the heartbeat consumer time. If the heartbeat is not received within the heartbeat consumer time, a heartbeat event will be generated.

3.4 The Emergency Object

Emergency objects are triggered by the occurrence of an error generated by the OJ1436. An emergency object is transmitted once per error event. As long as no new errors occur then no further emergency objects will be transmitted. If the error condition is removed an emergency object will be transmitted with an emergency error code of 0000 i.e. no error.

3.4.1 Emergency Object Data

The emergency telegram consists of 8 bytes of data as shown below.

Data Byte	Data
1	Emergency Error Code (LSB)
2	Emergency Error Code (MSB)
3	Error Register (index 1001)
4	OJ1436 Error Code (LSB)
5	OJ1436 Error Code (MSB)
6	Unused
7	Unused
8	Unused

The OJ1436 supports the following Emergency Error Codes:

0000 - Error reset or no error
1000 - Generic error
FF00 - Device specific error

For device specific errors, the OJ1436 Error Code will be populated.

3.4.2 OJ1436 Error Codes

Error Code	Description
0810	**Number Too Small** When editing a configurable parameter, the value entered is less than the minimum allowable value for this parameter.
0811	**Number Too Large** When editing a configurable parameter, the value entered is greater than the maximum allowable value for this parameter.
1810	**Loadcell Saturated -** Indicates that the load cell input is outside the range in the negative direction i.e. the signal is below 0mV.
1811	**Loadcell Saturated +** Indicates that the load cell input is outside the range in the positive direction i.e. the signal is greater than the range specified by the Load Cell Input Range parameter.
1818	**Regulator Fault** The load cell supply is overloaded due to a wiring or load cell fault, or the internal 10V supply regulator has failed.
1821	**Sense Error** The sense voltage (between the +SE and -SE load cell terminals) has varied by more than 3V with respect to the internal value which was stored at the last dynamic tare operation.
3901	**Config Index Not Found** Index not found in Object Dictionary
3902	**Config Sub-Index Not Found** Sub-Index not found in Object Dictionary
3903	**Config Write To Read-Only** Attempt to write to a read-only parameter
3904	**Config Value Out Of Range** Attempt to write data that is out of range

Note: any other error code would be due to internal errors and should be reported to OJ:s VÅGSYSTEM AB.

3.5 Status LED

On the rear of the OJ1436 a single bi-colour LED gives a visual indication of the CANopen network status.

The possible states are detailed below.

Status LED	State	Description
Green Blinking	PRE-OPERATIONAL	The device is in the PRE-OPERATIONAL state.
Green Single Flash	STOPPED	The device is in the STOPPED state.
Green On	OPERATIONAL	The device is in the OPERATIONAL state.
Red Single Flash	Warning Limit Reached	At least one of the error counters of the CAN controller has reached or exceeded the warning level (too many frames).
Red Double Flash	Error Control Event	A guard event has occurred, see section 3.3.1.
Red On	Bus Off	The CAN controller is bus off.

3.6 OJ1436 Object Dictionary

The OJ1436 Object Dictionary contains all Communication Objects. A listing of the Object Dictionary is given below.

Attribute Definitions:
RO - Read only
WO - Write only
RW - Read/Write
PDO - Can be mapped to a PDO

3.6.1 Communication Profile Area

Index (Hex)	Sub-Index	Type	Attribute	**Name** and Information
1000	0	Unsigned 32	RO	**Device Type** Describes the type of the device. Composed of two 16-bit fields (one for device profile, the other for additional information). The object value of the OJ1436 is 0x0000, standard profile not applicable.
1001	0	Unsigned 8	RO	**Error Register** Error Register for the OJ1436. Bit-encoded according to DS301. Bit value 1 = Error occurred. **Bit** **Description** 0 Generic Error 1 Current 2 Voltage 3 Temperature 4 Communication Error 5 Device Profile Specific 6 Reserved 7 Manufacturer Specific

Index (Hex)	Sub-Index	Type	Attribute	**Name** and Information
1003	0	Unsigned 8	RW	**Pre-defined Error Field** The number of errors occurred and listed at sub-indexes 1 to A. Writing a zero here deletes the list.
	1	Unsigned 32	RO	**Pre-defined Error Field** The error history list. When a new error occurs, previous errors move down the list and the new error appears at sub-index 1. Error numbers comprise of a 16-bit error code (see sec 3.4.1), and a 16-bit additional information field. The error code is contained in the lower 2 bytes and the additional information in the upper 2 bytes. For device specific error codes the additional information field holds the error information as detailed in section 3.4.2.
	-	-	-	
	A	Unsigned 32	RO	
1005	0	Unsigned 32	RW	**COB ID SYNC Message** Identifier of the SYNC message. The SYNC message controls the actions of the PDOs that have the transmission type *Synchronous*.
1008	0	Visible String	RO	**Manufacturer Device Name** The constant string is *1436*.
1009	0	Visible String	RO	**Manufacturer Hardware Version** The current OJ1436 hardware revision. The constant string is *HW 1.1*.
100A	0	Visible String	RO	**Manufacturer Software Version** The current OJ1436 software revision. The constant string is *SW 4.2*.
100C	0	Unsigned 16	RW	**Guard Time** Guard Time (ms) x Life Time Factor = Life Time for the Node Guarding protocol, see section 3.3.1 for further details.
100D	0	Unsigned 8	RW	**Life Time Factor** See above.

Index (Hex)	Sub-Index	Type	Attribute	**Name** and Information
1014	0	Unsigned 32	RW	**COB ID Emergency Message** Defines the COB ID of the Emergency Object (EMCY). Default: 80h + Node ID.
1016	0	Unsigned 8	RO	**Consumer Heartbeat Time** Number of entries.
	1	Unsigned 32	RW	**Consumer Heartbeat Time** Defines the expected heartbeat cycle time in multiples of 1ms. Default: 0 (not used)
	-	-	-	
	3	Unsigned 32	RW	
1017	0	Unsigned 16	RW	**Producer Heartbeat Time** Defines the cycle time of the heartbeat message transmitted by the OJ1436, in multiples of 1ms. Default: 0 (not used).
1018	0	Unsigned 8	RO	**Identity Object** Number of entries.
	1	Unsigned 32	RO	**Vendor ID** The Vendor ID.
	2	Unsigned 32	RO	**Product Code** 1436
	3	Unsigned 32	RO	**Revision Number** Bits 31-16 correspond to the major revision number and bits 15-0 correspond to the minor revision number. Current revision: Major 1 Minor 1
	4	Unsigned 32	RO	**Serial Number** Factory set to the units serial number.
1200	0	Unsigned 8	RO	**Server SDO Parameter** Number of entries.
	1	Unsigned 32	RW	**COB ID Client -> Server (Rx)** Default: 600h + Node ID.

Index (Hex)	Sub-Index	Type	Attribute	**Name** and Information
	2	Unsigned 32	RW	**COB ID Server -> Client (Tx)** Default: 580h + Node ID.
1400	0	Unsigned 8	RO	**1st Receive PDO Parameter** Number of entries.
	1	Unsigned 32	RW	**COB ID Used by PDO** Default: 200h + Node ID.
	2	Unsigned 8	RW	**Transmission Type** Default: 254 (event-controlled asynchronous transmission).
1401	0	Unsigned 8	RO	**2nd Receive PDO Parameter** Number of entries.
	1	Unsigned 32	RW	**COB ID Used by PDO** Default: 300h + Node ID.
	2	Unsigned 8	RW	**Transmission Type** Default: 254 (event-controlled asynchronous transmission).
1600	0	Unsigned 32	RW	**1st Receive PDO Mapping** Number of mapped application objects.
	1	Unsigned 32	RW	**1st Mapping Object** Default: Clear Resettable Total Index: 2100h Sub-Index: 0h Length: 8 bits
	2	Unsigned 32	RW	**2nd Mapping Object** Default: Clear Non-Resettable Total Index: 2101h Sub-Index: 0h Length: 8 bits
	3	Unsigned 32	RW	**3rd Mapping Object** Default: Clear Flow Time Index: 2102h Sub-Index: 0h Length: 8 bits

Index (Hex)	Sub-Index	Type	Attribute	**Name** and Information
	4	Unsigned 32	RW	**4th Mapping Object** Default: Clear Belt Running Time Index: 2103h Sub-Index: 0h Length: 8 bits
	5	Unsigned 32	RW	**5th Mapping Object** Default: Start Tare Index: 2104h Sub-Index: 0h Length: 8 bits
	6	Unsigned 32	RW	**6th Mapping Object** Default: Abort Tare Index: 2105h Sub-Index: 0h Length: 8 bits
	7	Unsigned 32	RW	**7th Mapping Object** Default: Material Number Index: 2007h Sub-Index: 0h Length: 8 bits
1601	0	Unsigned 32	RW	**2nd Receive PDO Mapping** Number of mapped application objects.
	1	Unsigned 32	RW	**1st Mapping Object** Default: Rx Index Index: 2300h Sub-Index: 0h Length: 16 bits
	2	Unsigned 32	RW	**2nd Mapping Object** Default: Rx Sub-Index Index: 2301h Sub-Index: 0h Length: 8 bits
	3	Unsigned 32	RW	**3rd Mapping Object** Default: Rx Value Index: 2302h Sub-Index: 0h Length: 32 bits

Index (Hex)	Sub-Index	Type	Attribute	**Name** and Information
	4	Unsigned 32	RW	**4th Mapping Object** Default: Rx Write Index: 2303h Sub-Index: 0h Length: 8 bits
1800	0	Unsigned 8	RO	**1st Transmit PDO Parameter** Number of entries.
	1	Unsigned 32	RW	**COB ID Used by PDO** Default: 180h + Node ID.
	2	Unsigned 8	RW	**Transmission Type** Default: 254 (event-controlled asynchronous transmission).
	3	Unsigned 16	RW	**Inhibit Time** Not supported.
	4	Unsigned 8	RW	**CMS Priority Group** Not supported.
	5	Unsigned 16	RW	**Event Time** Default: 0 ms (not used)
1801	0	Unsigned 8	RO	**2nd Transmit PDO Parameter** Number of entries.
	1	Unsigned 32	RW	**COB ID Used by PDO** Default: 280h + Node ID.
	2	Unsigned 8	RW	**Transmission Type** Default: 254 (event-controlled asynchronous transmission).
	3	Unsigned 16	RW	**Inhibit Time** Not supported.
	4	Unsigned 8	RW	**CMS Priority Group** Not supported.
	5	Unsigned 16	RW	**Event Time** Default: 0 ms (not used)
1802	0	Unsigned 8	RO	**3rd Transmit PDO Parameter** Number of entries.
	1	Unsigned 32	RW	**COB ID Used by PDO** Default: 380h + Node ID.

Index (Hex)	Sub-Index	Type	Attribute	**Name** and Information
	2	Unsigned 8	RW	**Transmission Type** Default: 254 (event-controlled asynchronous transmission).
	3	Unsigned 16	RW	**Inhibit Time** Not supported.
	4	Unsigned 8	RW	**CMS Priority Group** Not supported.
	5	Unsigned 16	RW	**Event Time** Default: 0 ms (not used)
1803	0	Unsigned 8	RO	**4th Transmit PDO Parameter** Number of entries.
	1	Unsigned 32	RW	**COB ID Used by PDO** Default: 480h + Node ID.
	2	Unsigned 8	RW	**Transmission Type** Default: 254 (event-controlled asynchronous transmission).
	3	Unsigned 16	RW	**Inhibit Time** Not supported.
	4	Unsigned 8	RW	**CMS Priority Group** Not supported.
	5	Unsigned 16	RW	**Event Time** Default: 0 ms (not used)
1804	0	Unsigned 8	RO	**5th Transmit PDO Parameter** Number of entries.
	1	Unsigned 32	RW	**COB ID Used by PDO** Default: 580h + Node ID.
	2	Unsigned 8	RW	**Transmission Type** Default: 254 (event-controlled asynchronous transmission).
	3	Unsigned 16	RW	**Inhibit Time** Not supported.
	4	Unsigned 8	RW	**CMS Priority Group** Not supported.
	5	Unsigned 16	RW	**Event Time** Default: 0 ms (not used)

Index (Hex)	Sub-Index	Type	Attribute	**Name** and Information
1A00	0	Unsigned 32	RW	**1st Transmit PDO Mapping** Number of mapped application objects.
	1	Unsigned 32	RW	**1st Mapping Object** Default: Flow Rate Index: 2000h Sub-Index: 0h Length: 32 bits
	2	Unsigned 32	RW	**2nd Mapping Object** Default: Belt Speed Index: 2005h Sub-Index: 0h Length: 32 bits
1A01	0	Unsigned 32	RW	**2nd Transmit PDO Mapping** Number of mapped application objects.
	1	Unsigned 32	RW	**1st Mapping Object** Default: Resettable Total Index: 2001h Sub-Index: 0h Length: 32 bits
	2	Unsigned 32	RW	**2nd Mapping Object** Default: Non-Resettable Total Index: 2002h Sub-Index: 0h Length: 32 bits
1A02	0	Unsigned 32	RW	**3rd Transmit PDO Mapping** Number of mapped application objects.
	1	Unsigned 32	RW	**1st Mapping Object** Default: Flow Time Index: 2003h Sub-Index: 0h Length: 32 bits
	2	Unsigned 32	RW	**2nd Mapping Object** Default: Belt Running Time Index: 2004h Sub-Index: 0h Length: 32 bits

Index (Hex)	Sub-Index	Type	Attribute	**Name** and Information
1A03	0	Unsigned 32	RW	**4th Transmit PDO Mapping** Number of mapped application objects.
	1	Unsigned 32	RW	**1st Mapping Object** Default: Belt Load Index: 2006h Sub-Index: 0h Length: 32 bits
	2	Unsigned 32	RW	**2nd Mapping Object** Default: Material Number Index: 2007h Sub-Index: 0h Length: 8 bits
	3	Unsigned 32	RW	**3rd Mapping Object** Default: Status Index: 2008h Sub-Index: 0h Length: 32 bits
1A04	0	Unsigned 32	RW	**5th Transmit PDO Mapping** Number of mapped application objects.
	1	Unsigned 32	RW	**1st Mapping Object** Default: Tx Index Index: 2200h Sub-Index: 0h Length: 16 bits
	2	Unsigned 32	RW	**2nd Mapping Object** Default: Tx Sub-Index Index: 2201h Sub-Index: 0h Length: 8 bits
	3	Unsigned 32	RW	**3rd Mapping Object** Default: Tx Value Index: 2202h Sub-Index: 0h Length: 32 bits

3.6.2 Manufacturer-specific Profile Area

The manufacturer specific data items are indexed as follows.

2000 – 2008	Real time data items
2100 – 2105	Process actions
2200 – 2202	Configuration Access via PDO
2300 – 2303	Configuration Access via PDO
3000 – 3004	Diagnostic items
4000 – 4053	Calibration items
4100 – 4805	Configuration items
4900 – 4907	Time and Date

Refer to the appropriate section of the OJ1436 *smart* Belt Weigher Indicator user manual for a more detailed description of each item.

Index (Hex)	Sub-Index	Type	Attribute	Information
2000	0	Real32	RO PDO	**Flow Rate** – kg/h or t/h The current Flow Rate.
2001	0	Real32	RO PDO	**Resettable Total** – kg or t The current Resettable Total.
2002	0	Real32	RO PDO	**Non-Resettable Total** – kg or t The current Non-Resettable Total.
2003	0	Unsigned 32	RO PDO	**Flow Time** - seconds The current Flow Time.
2004	0	Unsigned 32	RO PDO	**Belt Running Time** – seconds The current Belt Running Time.
2005	0	Real32	RO PDO	**Belt Speed** – m/s or m/min The current Belt Speed.
2006	0	Real32	RO PDO	**Belt Load** - % The current Belt Load.
2007	0	Real32	RW PDO	**Material Number** The currently selected Material Number (in the range 1 – 12).

Index (Hex)	Sub-Index	Type	Attribute	Information
2008	0	Unsigned 8	RO PDO	**Status** This gives an indication of the current status of the OJ1436. Each bit is defined as follows: Bit Function 0 Belt Running 1 Dead Range 2 Tare In Progress 3 Trip 1 status 4 Trip 2 status 5 Weight Units 6 Belt Speed Units Updated upon change of state of any bit.
2100	0	Unsigned 8	WO PDO	**Clear Resettable Total** Write a value of 1 to this index to clear the Resettable Total.
2101	0	Unsigned 8	WO PDO	**Clear Non-Resettable Total** Write a value of 1 to this index to clear the Non-Resettable Total.
2102	0	Unsigned 8	WO PDO	**Clear Flow Time** Write a value of 1 to this index to clear the Flow Time.
2103	0	Unsigned 8	WO PDO	**Clear Belt Running Time** Write a value of 1 to this index to clear the Belt Running Time.
2104	0	Unsigned 8	WO PDO	**Start Tare** Write a value of 1 to this index to perform a Dynamic Tare.
2105	0	Unsigned 8	WO PDO	**Abort Tare** Write a value of 1 to this index to abort a Dynamic Tare.

Index (Hex)	Sub-Index	Type	Attribute	Information
2200	0	Unsigned 16	RO PDO	**Tx Index** This is the Object Dictionary index of the parameter currently being requested by Rx Index.
2201	0	Unsigned 8	RO PDO	**Tx Sub-Index** This is the Object Dictionary sub-index of the parameter currently being requested by Rx Sub-Index.
2202	0	Real32	RO PDO	**Tx Value** This is the current value of the parameter being referenced by Tx Index and Tx Sub-Index.
2300	0	Unsigned 16	WO PDO	**Rx Index** This is the Object Dictionary index of the parameter the host is requesting.
2301	0	Unsigned 8	WO PDO	**Rx Sub-Index** This is the Object Dictionary sub-index of the parameter the host is requesting.
2302	0	Real32	WO PDO	**Rx Value** This is the value that will be written to the parameter, indexed by Rx Index and Rx Sub-Index, if Rx Write is set to 1.
2303	0	Unsigned 8	WO PDO	**Rx Write** Write a value of 1 to this index to write Rx Value to the parameter referenced by Rx Index and Rx Sub-Index
3000	0	Real32	RO	**Tacho** – Hz
3001	0	Real32	RO	**Load Cell Signal** - millivolts
3002	0	Real32	RO	**Load Cell Weight** - kg
3003	0	Real32	RO	**Material Weight** – kg
3004	0	Real32	RO	**Inclinometer Angle** - degrees
4000	0	Unsigned 32	RW	**Tare Period** – tacho pulses
4001	0	Real32	RW	**Calibration Period** - metres

Index (Hex)	Sub-Index	Type	Attribute	Information
4002	0	Unsigned 32	RW	**Weigh Length** - mm
4003	0	Real32	RW	**Test Weight per Weigh Length** - kg
4004	0	Unsigned 32	RW	**Speed Sensor Diameter** - mm
4005	0	Unsigned 32	RW	**Pulses per Sensor Revolution**
4006	0	Real32	RW	**Pulses per Metre**
4007	0	Real32	RW	**Dead Range** – kg/h or t/h
4050	0	Real32	RW	**Tare** – kg
4051	0	Real32	RW	**Calibration Factor**
4052	0	Unsigned 32	RO	**Calibration Counter**
4053	0	Unsigned 16	RO	**Tare Time Remaining** - seconds
4100	0	Real32	RW	**Load Cell Capacity** - kg
4101	0	Unsinged 8	RW	**Load Cell Input Range** 0 = 2.56V 1 = 1.28V 2 = 640mV 3 = 320mV 4 = 160mV 5 = 80mV 6 = 40mV 7 = 20mV
4102	0	Unsigned 8	RW	**Weigh Filter**
4103	0	Unsigned 8	RW	**Tacho Source** 0 = External 1 = Internal
4104	0	Unsigned 16	RW	**Internal Tacho Speed** - Hz
4105	0	Unsigned 8	RW	**Speed Filter**
4106	0	Real32	RW	**Belt Running Level** - Hz

Index (Hex)	Sub-Index	Type	Attribute	Information
4107	0	Unsigned 8	RW	**Weight Units** 0 = kg 1 = t
4108	0	Unsigned 8	RW	**Belt Speed Units** 0 = m/sec 1 = m/min
4109	0	Unsigned 8	RW	**Flow Rate DP**
410A	0	Unsigned 8	RW	**Resettable Total DP**
410B	0	Unsigned 8	RW	**Non-Resettable Total DP**
410C	0	Unsigned 8	RW	**Static DP**
410D	0	Real32	RW	**Flow Rate Increments** – kg/h or t/h
4200	0	Unsigned 8	RW	**Enable Inclinometer** 0 = No 1 = Yes
4201	0	Real32	RW	**Angle at 4mA** – degrees
4202	0	Real32	RW	**Angle at 20mA** – degrees
4300	0	Unsigned 8	RW	**Tile 1 Item** 0 = Flow Rate 1 = Resettable Total 2 = Non-Resettable Total 3 = Belt Load 4 = Belt Speed 5 = Flow Time 6 = Belt Run Time
4301	0	Unsigned 8	RW	**Tile 2 Item** (options as Tile 1 Item above).
4302	0	Unsigned 8	RW	**Tile 3 Item** (options as Tile 1 Item above).
4303	0	Real32	RW	**Flow Time Level** – kg/h or t/h

Index (Hex)	Sub-Index	Type	Attribute	Information
4400	0	Unsigned 8	RW	**Input D1 Function** 0 = None 1 = Print 2 = Tare 3 = Clear Total
4401	0	Unsigned 8	RW	**Input D2 Function** (options as Input D1 Function above).
4500	0	Real32	RW	**Output Pulse** – kg or t
4501	0	Real32	RW	**Output Pulse Length** – seconds
4502	0	Real32	RW	**Trip 1 Level**- kg/h or t/h
4503	0	Unsigned 8	RW	**Output T2 Function** 0 = Healthy 1 = Trip
4504	0	Real32	RW	**Trip 2 Level** – kg/h or t/h
4600	0	Real32	RW	**Output Range** – kg/h or t/h
4700	0	Unsigned 8	RW	**Serial Mode** 0 = SABus 1 = Transmit 2 = Printed Report 3 = Modbus ASCII 4 = Modbus RTU 5 = smartTONNES
4701	0	Unsigned 8	RW	**Baud Rate** – bps 0 = 1200 1 = 2400 2 = 4800 3 = 9600 4 = 19200
4702	0	Unsigned 8	RW	**Communication Standard** 0 = RS232 1 = RS485
4703	0	Unsigned 8	RW	**Address**

Index (Hex)	Sub-Index	Type	Attribute	Information
4704	0	Unsigned 8	RW	**Parity** 0 = None 1 = Even 2 = Odd
4705	0	Unsigned 8	RW	**Transmit Data Item** 0 = Flow Rate 1 = Resettable Total 2 = Non-Resettable Total
4706	0	Real32	RW	**Transmit Interval** - seconds
4800	0	Unsigned 8	RW	**Printed Report Log** 0 = No 1 = Internal 2 = Internal + USB
4801	0	Unsigned 8	RW	**Production Report Log** 0 = No 1 = Internal 2 = Internal + USB
4802	0	Unsigned 8	RW	**Production Log Period** 0 = Daily 1 = Clear Total
4803	0	Unsigned 8	RW	**Periodic Logging** 0 = No 1 = Yes
4804	0	Unsigned 16	RW	**Periodic Log Time**
4805	0	Unsigned 8	RW	**Periodic Log Units** 0 = Seconds 1 = Minutes
4900	0	Unsigned 8	RW	**Hours**
4901	0	Unsigned 8	RW	**Minutes**
4902	0	Unsigned 8	RW	**Seconds**

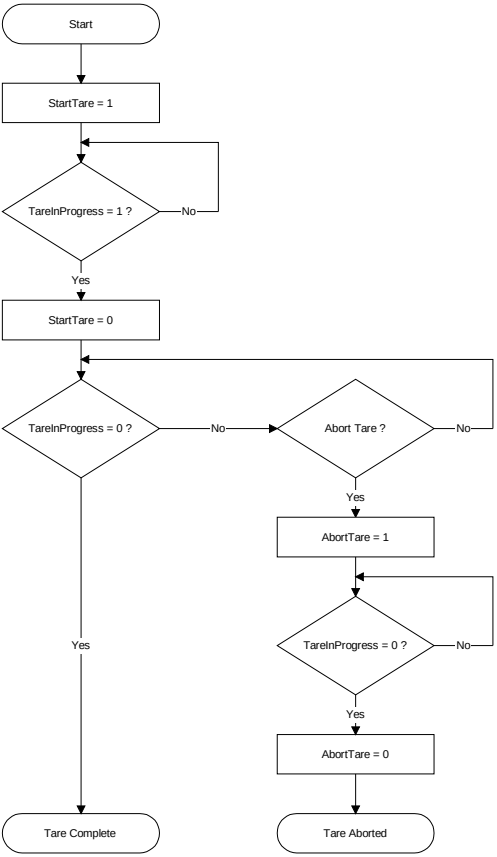
Index (Hex)	Sub-Index	Type	Attribute	Information
4903	0	Unsigned 8	RW	**Day Of Week**
4904	0	Unsigned 8	RW	**Day Of Month**
4905	0	Unsigned 8	RW	**Month**
4906	0	Unsigned 16	RW	**Year**

3.7 Performing a Dynamic Tare

As an alternative to performing a dynamic tare at the indicator it is possible to perform a dynamic tare from the host, using the CANopen interface.

The Start Tare, Abort Tare and Tare in Progress bits within the CANopen data are used to control the dynamic tare process within the OJ1436. If the dynamic tare process is aborted by the host then no adjustment will be made to the tare value i.e. the existing tare will be retained.

The routine within the host should be implemented as represented below.



4 Specification

CANopen Interface

Connector : 5 pin open style plug-in type.
Power : No power required from the bus. (CANopen Interface is powered from the mains supply).
Interface Type : Isolated CAN-based node.
Baud Rates : 10kbit/s, 20kbit/s, 50kbit/s, 125kbit/s, 250kbit/s, 500kbit/s, 800kbit/s and 1Mbit/s
Bus Termination : 120Ω 1% ¼W, see section 5.3.
Max. Bus Length : As below:

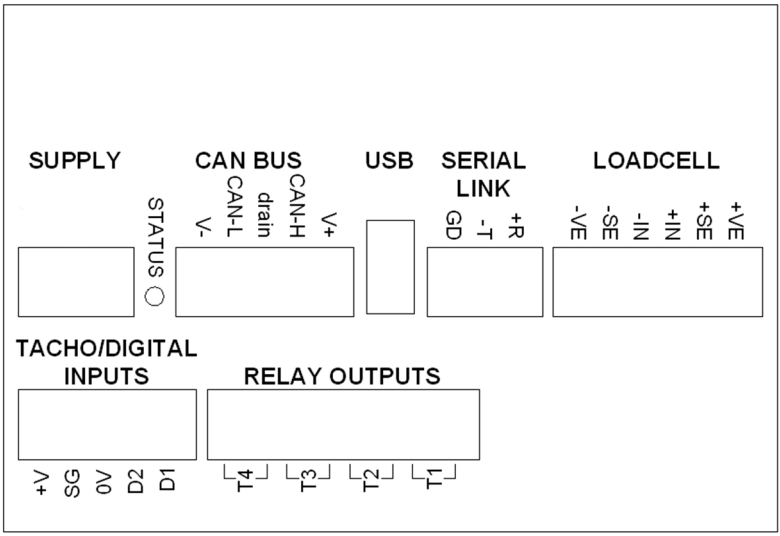
Baud Rate	Maximum Bus Length
1 Mbit/s	25 m
800 kbit/s	50 m
500 kbit/s	100 m
250 kbit/s	250 m
125 kbit/s	500 m
50 kbit/s	1000 m
20 kbit/s	2500 m
10 kbit/s	5000 m

Environment

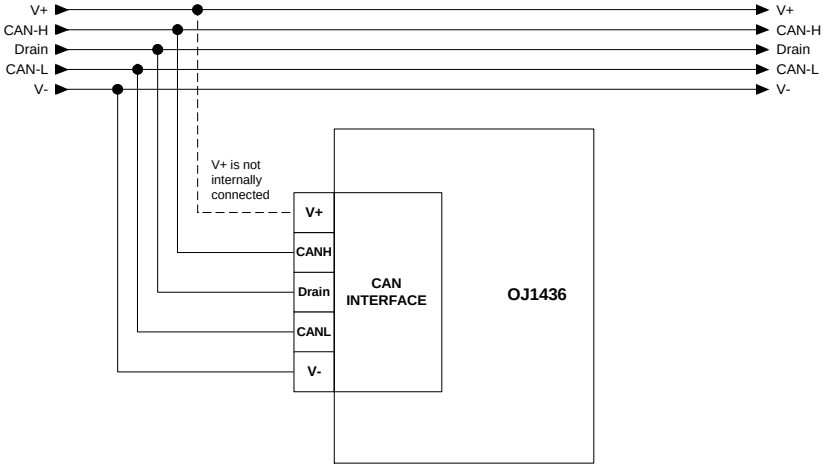
Operating : -20 to +50°C, 20 to 80% RH. Non-condensing.
Storage : -40 to + 80°C.

5 Installation Diagrams

5.1 Connection Layout

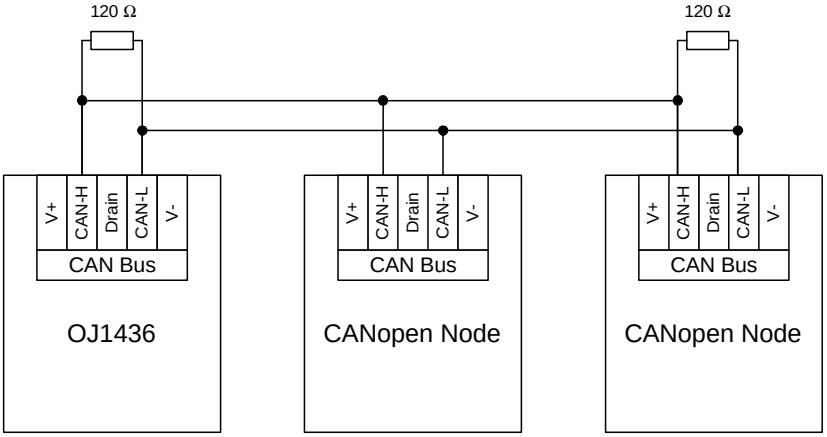


5.2 CANopen Wiring Diagram



5.3 CANopen Termination

The CANopen network should be terminated with 120Ω resistors at each end of the cable, as shown below.



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