

**ML 311
directly connected on N2-OPEN Bus**

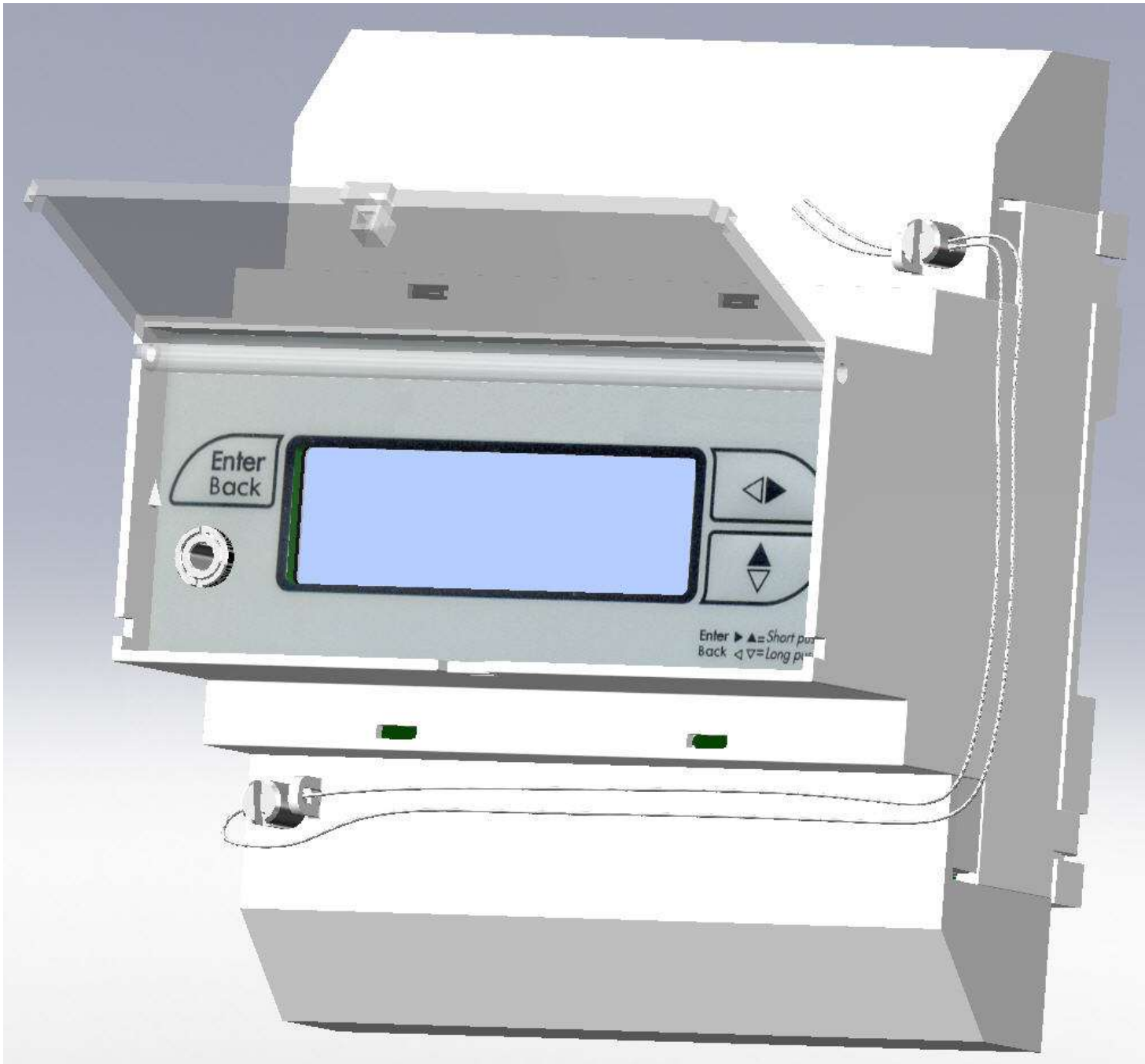
Introduction	1
Systems Integration Services Europe Contacts	3
Application details	3
Vendor Contact Information	4
Cable Connections	5
Cable Pinouts for RS485 Bus	5
Point Mapping Table	6
ML 311 + Unit Analog Inputs	6
ML 311 Unit Binary Input	8
ML 311 Unit Binary Outputs	9

Introduction

This document explains how to install and connect an ML 311 device on Johnson Controls N2 Bus.

ML 311 is a ISOIL device, capable of measuring energy quantities , which may be connected directly on N2 Bus without any additional hardware device.

As it will be explained in detail a little further, there are only some setting configurations that must be performed.



**Systems
Integration
Services
Europe
Contacts**

For any information on Johnson Control integration on VENDOR VND/N2 OPEN Protocols, Metasys Integrator (MIG), LONWORKS®, BACNET™, OPC® and other protocols or applications, please contact Johnson Controls Systems Integration Services Europe (SIS) at the following addresses or see contact list on Advisor, European Sites:

Milan	Essen
Via Manzoni, 44	Westendhof 3
20095 Cusano Milanino, MI, Italy	45143 Essen, Germany
Phone ++39 02 28042.1	Phone ++49 201 2400 425
Fax ++39 02 28042.221	Fax ++49 201 2400 457

This document is property of Johnson Controls, do not disclose, copy, reproduce in whole or in part without a written authorization by Johnson; Further, some notes may be modified or changed without prior notice and without incurring in any liability.

**Application
details**

After ML 311 devices have been connected to Metasys directly on N2 Bus, their data become available to the full complement of Metasys FMS features, including COS monitoring, alarm notification, scheduling, trend and totalization.

When integrating the ML 311 device, keep the following considerations in mind :

Refer to the User Manual for detailed instructions.

Anyway the necessary parameters that must be programmed in the setup are :

- Set the protocol N2open with the function Protocol in the menu Communication
- Set the Baud rate with the function Speed of the menu Communication
- Set the N2 address of the device with the function Address in the menu Communication

***Vendor
Contact
Information***

For technical information about ISOIL equipment, contact:

**JOHNSON CONTROLS
Via Manzoni, 44
20095 Cusano Milanino, MI, ITALY
phone # ++39 02 28042.1
fax # ++39 02 28042.221**

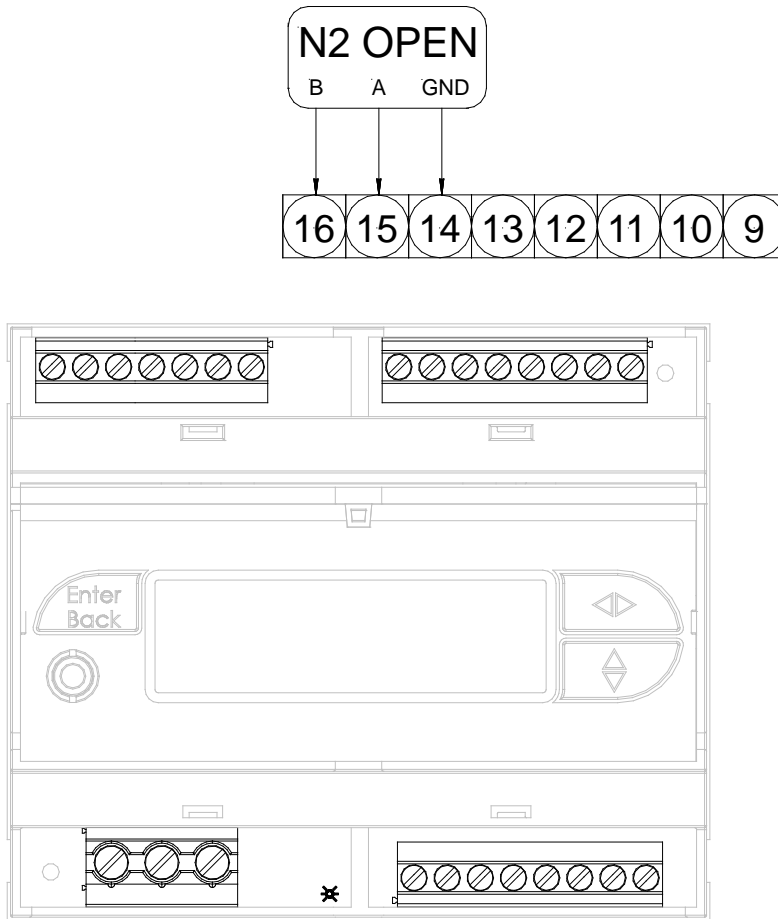
Or :

**Isoil Insustria Spa
Via F.lli Gracchi, 27
20092 Cinisello Balsamo - MI**

Cable Connections

Cable Pinouts for RS485 Bus

Use the following cable pinouts for the connection between Metasys N2bus and ML 311 device:



Note : For more details refer to documentation obtainable by ISOIL representative.

Point Mapping Table

The following tables shows the available points for the ML 311 devices.

NPT ¹	NPA ²	Unit / Note	Description : read only data
AI	1	l	Volume Heat-Conveying Liquid (*)
	2	m ³	Volume Heat-Conveying Liquid (*)
	3	Wh or kWh	Thermal Energy Heat (Low) Counter (*)
	4	kWh or MWh	Thermal Energy Heat (High) Counter (*)
	5	Wh or kWh	Thermal Energy Heat (Low) <i>Partial</i> Counter (*)(**)
	6	kWh or MWh	Thermal Energy Heat (High) <i>Partial</i> Counter (*)(**)
	7	l	Volume Cool-Conveying Liquid (*)
	8	m ³	Volume Cool-Conveying Liquid (*)
	9	Wh or kWh	Thermal Energy Cool (Low) Counter (*)
	10	kWh or MWh	Thermal Energy Cool (High) Counter (*)
	11	Wh or kWh	Thermal Energy Cool (Low) <i>Partial</i> Counter (*)(**)
	12	kWh or MWh	Thermal Energy Cool (High) <i>Partial</i> Counter (*)(**)
	13	l	Volume Hot Water
	14	m ³	Volume Hot Water
	15	l	Volume Hot Water, <i>Partial</i> counter (**)
	16	m ³	Volume Hot Water, <i>Partial</i> counter (**)
	17	l	Volume Cold Water
	18	m ³	Volume Cold Water
	19	l	Volume Cold Water, <i>Partial</i> counter (**)
	20	m ³	Volume Cold Water, <i>Partial</i> counter (**)
	21	kW	Thermal Power
	22	m ³ /h	Flow Rate

23	°C	Flow Temperature
24	°C	Return Temperature
25	°C	Delta Temperature
26	%	Thermal Power
27	%	Flow Rate
28	%	Flow Temperature
29	%	Return Temperature
30	%	Delta Temperature
¹ Network Point Type ² Network Point Address		

(*) Volumes and Thermal Energy Counters are composed by two counters: *low and high*, where *low* represents the *decimal part* of displayed value, *high* represents the *integer part* of displayed value.

Depending on plant sizing, *low/high* engineering units will be: Wh/kWh or kWh/MWh regarding Thermal counters, l/m³ for Volumes (in any case units displayed on CTE device)

Low counters range: 0..999, high counters range: 0..999999

(**) *Partial* Counters are counter values that can be resetted by BO2, so it is possible to start a counting period for Heat and Cool Thermal Energy, Hot and Cold Water Volume by these additional counters

**ML 311 Unit
Binary Input**

NPT¹	NPA²	Unit / Note	Read Only data : 0 = off/normal ; 1 = on/alarm
BI	1		General Alarm
	2		RAM backup Alarm
	3		Analog to Digital Converter Alarm
	4		Flow Temperature Probe Alarm
	5		Return Temperature Probe Alarm
	6		Delta Temperature Alarm
	7		Plant Type: Off=Heat; On=Cool
	8		Control Plant Type: Off=local; On=remote
	9		Thermal Power Max Alarm
	10		Thermal Power Min Alarm
	11		Delta Temperature Max Alarm
	12		Delta Temperature Min Alarm
	13		Flow Temperature Max Alarm
	14		Flow Temperature Min Alarm
	15		Return Temperature Max Alarm
	16		Return Temperature Min Alarm
	17		Flow Rate Max Alarm
	18		Flow Rate Min Alarm
	19		Measure Overflow
	20		Pulse Overflow
	21		Ain Outrange (Input 4-20 mA > 5% of range 4-20 mA)
	22		Energy Outrange (Energy sign and remote input not match)
	23		RTD error
	24		Supply Error
¹ Network Point Type ² Network Point Address			

**ML 311 Unit
Binary Outputs**

NPT¹	NPA²	Commanding data
BO	1	Plant Type Selection: Off=Heat On=Cool
	2	Reset <i>Partial</i> Counters (all):off=Count; On=Reset
	3	Reset Event Logger
¹ Network Point Type		
² Network Point Address		

Normally, BO2 should be at OFF (count) position.

This action resets ALL *Partial* Counters.

Other N2open functions supported:

- Sinc Time Command: set the data and time of the converter
- Warm start of the converter
- Status Update message: life time of the converter and Day in services
- Data Logger feature implemented with Upload Message (command 8)

Data Logger function

For reading records from Data Logger the N2open Upload Message function is implemented (command 8).

The Data Logger information are divided in the following area:

Hourly records (0 to 23 records)

Daily records (0 to 30 records)

Monthly records (0 to 11 records)

Decimal point position for volume totalizers

Decimal point position for energy totalizers

Events Data Logger

Hourly records

In the memory there are present 24 records: Upload Message from 0 to 23

Every record contains 14 bytes:

Offset	Byte Size	Description
0	4	Data Time in seconds from midnight (long integer)
4	2	Integer incremental value for Flow Tot. (unsigned integer)
6	2	Integer incremental value for Hot water Tot. (unsigned integer)
8	2	Integer incremental value for Cold water Tot. (unsigned integer)
10	2	Integer incremental value for Heat Energy Tot. (unsigned integer)
12	2	Integer incremental value for Cool Energy Tot. (unsigned integer)

Daily records

In the memory there are present 31 records: Upload Message from 100 to 130

Every record contains 24 bytes:

Offset	Byte Size	Description
0	4	Data Time in seconds from midnight (long integer)
4	4	Integer incremental value for Flow Tot. (long integer)
8	4	Integer incremental value for Hot water Tot. (long integer)
12	4	Integer incremental value for Cold water Tot. (long integer)
16	4	Integer incremental value for Heat Energy Tot. (long integer)
20	4	Integer incremental value for Cool Energy Tot. (long integer)

Monthly records

In the memory there are present 12 records: Upload Message from 200 to 211
Every record contains 24 bytes:

Offset	Byte Size	Description
0	4	Data Time in seconds from midnight (long integer)
4	4	Integer incremental value for Flow Tot. (long integer)
8	4	Integer incremental value for Hot water Tot. (long integer)
12	4	Integer incremental value for Cold water Tot. (long integer)
16	4	Integer incremental value for Heat Energy Tot. (long integer)
20	4	Integer incremental value for Cool Energy Tot. (long integer)

Decimal point position for volume totalizers

In the memory there is present the position of the decimal point for the volume totalizers:

Use function Upload Message at offset 300 and return 1 byte with the information of decimal point.

Decimal point position for energy totalizers

In the memory there is present the position of the decimal point for the volume totalizers:

Use function Upload Message at offset 301 and return 1 byte with the information of decimal point.

Events Data Logger

In the memory there are present 32 records: Upload Message from 401 to 432
Every record contains 6 bytes:

Offset	Byte Size	Description
0	4	Data Time in seconds from midnight (long integer)
4	2	Flags value (see Internal Parameter for bit description) (unsigned integer)

