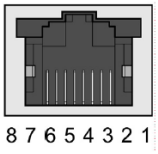
Schneider ATV320 control thru Modbus

Connection to Drive

Connection accessories should be ordered separately (See the catalog for more details).

Connect the RJ45 cable connector to the drive connector.

The following figure shows the pin layout for RJ45 connector:



The table describes the pin out of the RJ45 connector of the drive:

Pin	Signal
1	Reserved
2	
3	
4	D1(1)
5	D0(1)
6	–
7	VP, 10 Vdc(2)
8	Common
(1) Modbus signals (2) Supply for RS232 / RS485 converter or a remote terminal	

We will use node-red

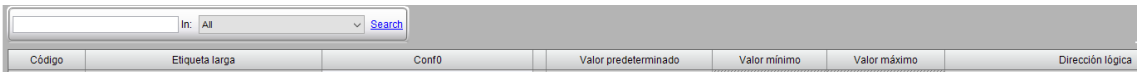
These are the main adresses

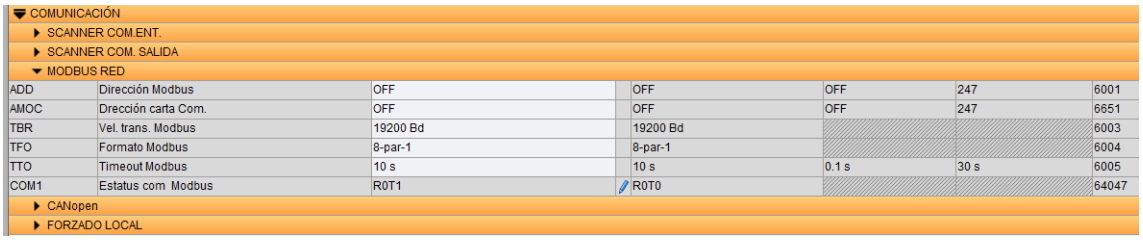
1	Code	Name	Logic address	CANopen index	DeviceNet path	Link	Category	Access	Type	Units
28	RFRD	Output velocity	16#219C = 8604	16#2038/5	16#8C/01/05 = 140/01/05	-	Actual values parameters	R	INT (Signed16)	1 rpm

This is how to configure the serial comm parameters

With Somove:

These are default parameters





COMUNICACIÓN						
SCANNER COM.ENT.						
SCANNER COM. SALIDA						
MODBUS RED						
ADD	Dirección Modbus	OFF	OFF	OFF	247	6001
AMOC	Drección carta Com.	OFF	OFF	OFF	247	6651
TBR	Vel. trans. Modbus	19200 Bd	19200 Bd			6003
TFO	Formato Modbus	8-par-1	8-par-1			6004
TTO	Timeout Modbus	10 s	10 s	0.1 s	30 s	6005
COM1	Estatus com Modbus	R0T1	R0T0			64047
CANopen						
FORZADO LOCAL						

We want 9600, 8 bits, no parity, so we adjust:

In: All Search

Código	Etiqueta larga	Conf0	Valor predeterminado	Valor mínimo	Valor máximo	Dirección lógica

MODBUS RED						
ADD	Dirección Modbus	1	OFF	OFF	247	6001
AMOC	Drección carta Com.	OFF	OFF	OFF	247	6651
TBR	Vel. trans. Modbus	9600 Bd	19200 Bd			6003
TFO	Formato Modbus	8-sin par-1	8-par-1			6004
TTO	Timeout Modbus	10	10 s	0.1 s	30 s	6005
COM1	Estatus com Modbus	R0T1	R0T0			64047

With the front panel:

Configuring the Communication Parameters

Overview

Configuration of the Modbus communication functions of the drive can be accessed from the **[Communication]** (*CoM-*) menu.

The modification of communication parameters is taken into account after a power cycle of the drive.

Ad1

Add

[Modbus Address] (*Add*)

About This Parameter

This parameter is used to set the Modbus timeout

Access

This is a read/write parameter.

The parameter Modbus address is 6001

Possible Settings

The table presents the parameter settings:

Settings	Code	Value	Description
[OFF] **[1 to 247]**	(*oFF*) (*1...247*)	0 1...247	Modbus address is not assigned. Modbus address is assigned. **Factory setting**: OFF

[Modbus baud rate] (tbr)

About This Parameter

This parameter defines the baud rate at which data is transferred.

Access

This is a read/write parameter.

The parameter Modbus address is 6003

Possible Settings

The table presents the parameter settings:

Settings	Code	Value	Description
[4800 bps]	(4 K8)	24	Baud rate is set to 4.8 Kbps.
[9600 bps]	(9 K6)	28	Baud rate is set to 9.6 Kbps.
[19200 bps]	(19 K2)	32	Baud rate is set to 19.2 Kbps.
[38.4 Kbps]	(38 K4)	36	Baud rate is set to 38.4 Kbps. **Factory setting**: 19.2 Kbps

[Modbus format] (tFo)

About This Parameter

This parameter is used to define the data format.

Access

This is a read/write parameter.

The parameter Modbus address is 6004

Possible Settings

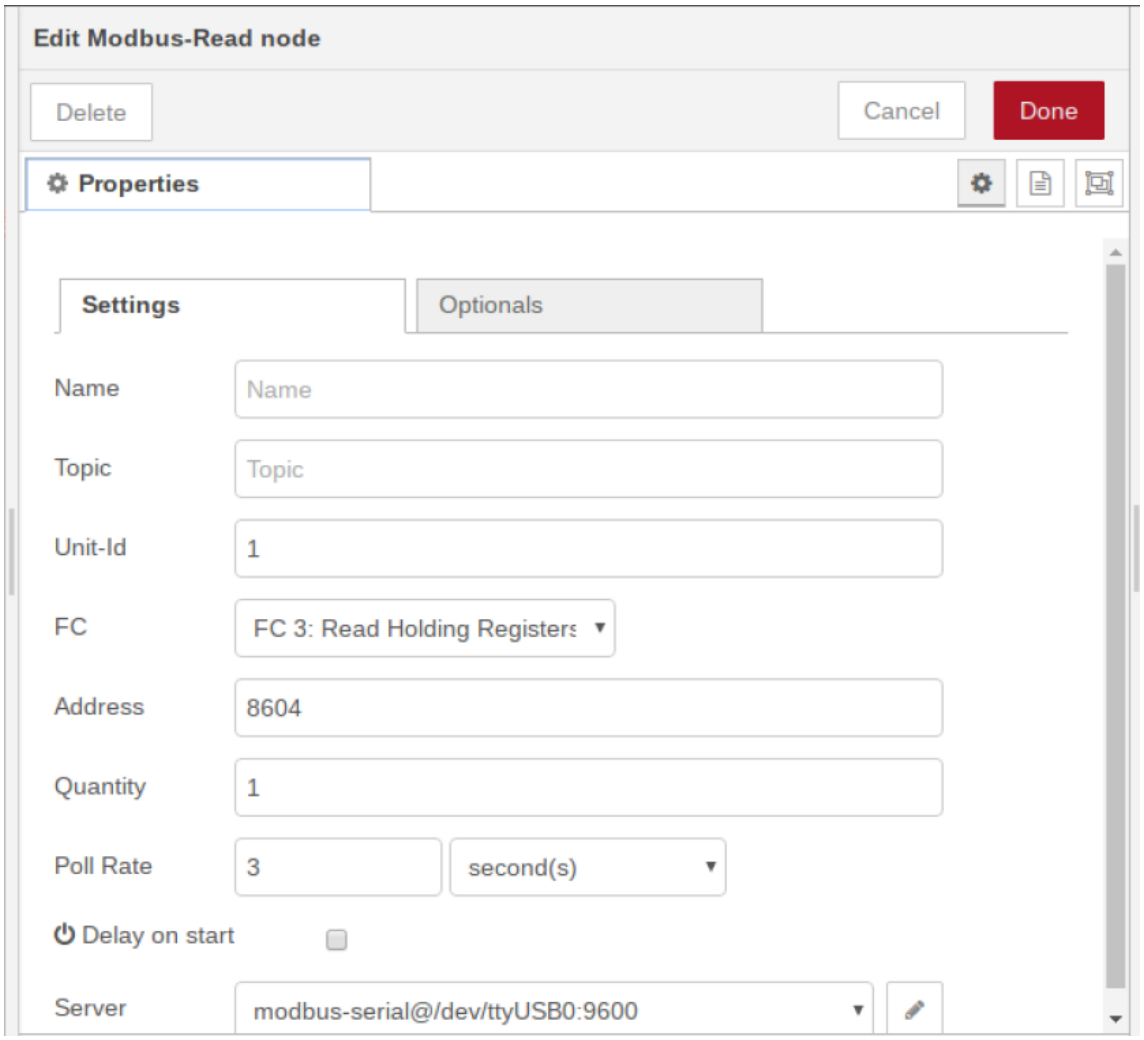
This table presents the parameter settings:

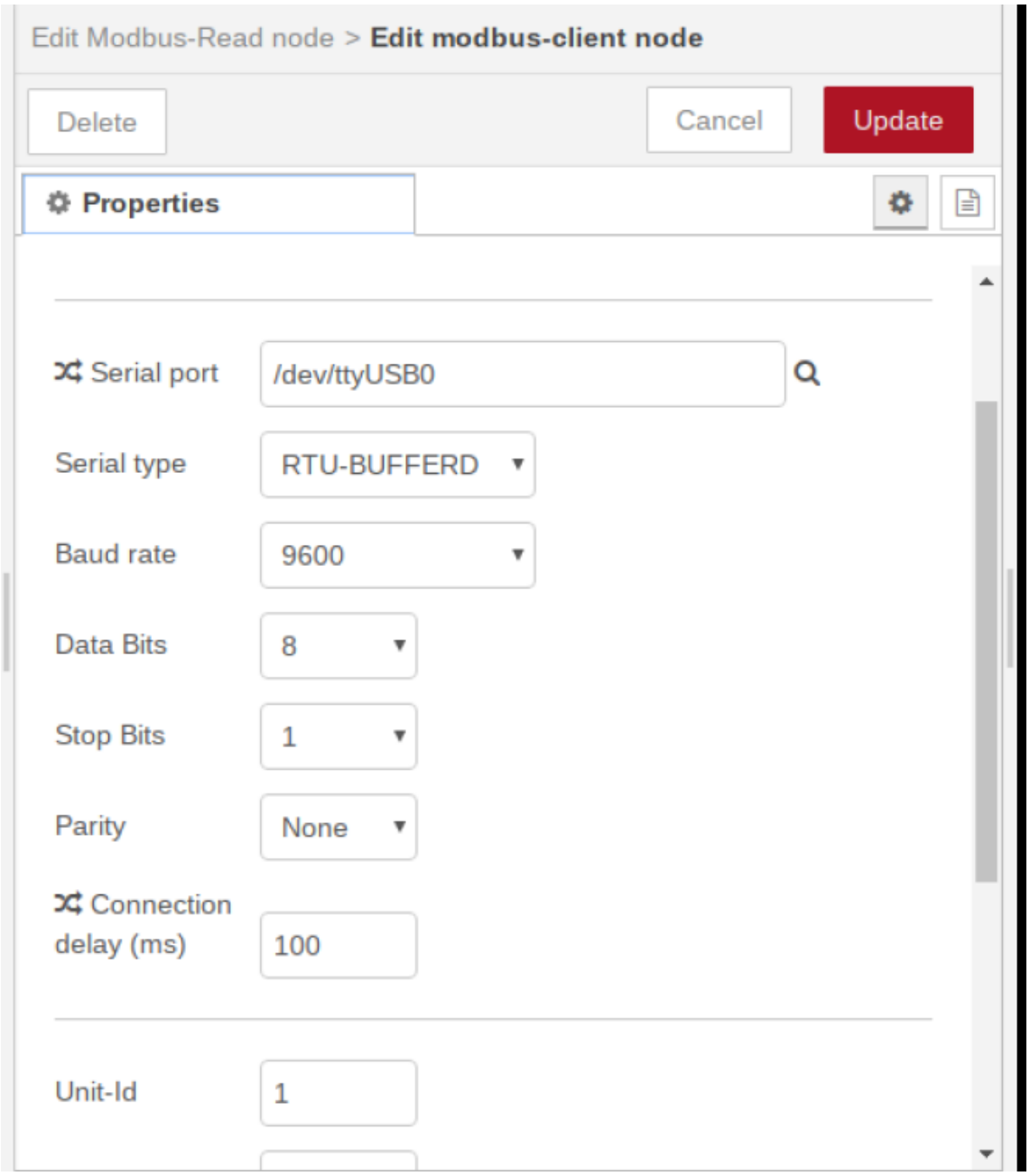
Settings	Code	Value	Description
[8-O-1]	(8o1)	2	8 data bits, odd parity, 1 stop bit
[8-E-1]	(8E1)	3	8 data bits, even parity, 1 stop bit
[8-N-1]	(8n1)	4	8 data bits, no parity, 1 stop bit
[8-N-2]	(8n2)	5	8 data bits, no parity, 2 stop bits **Factory setting**: 8E1

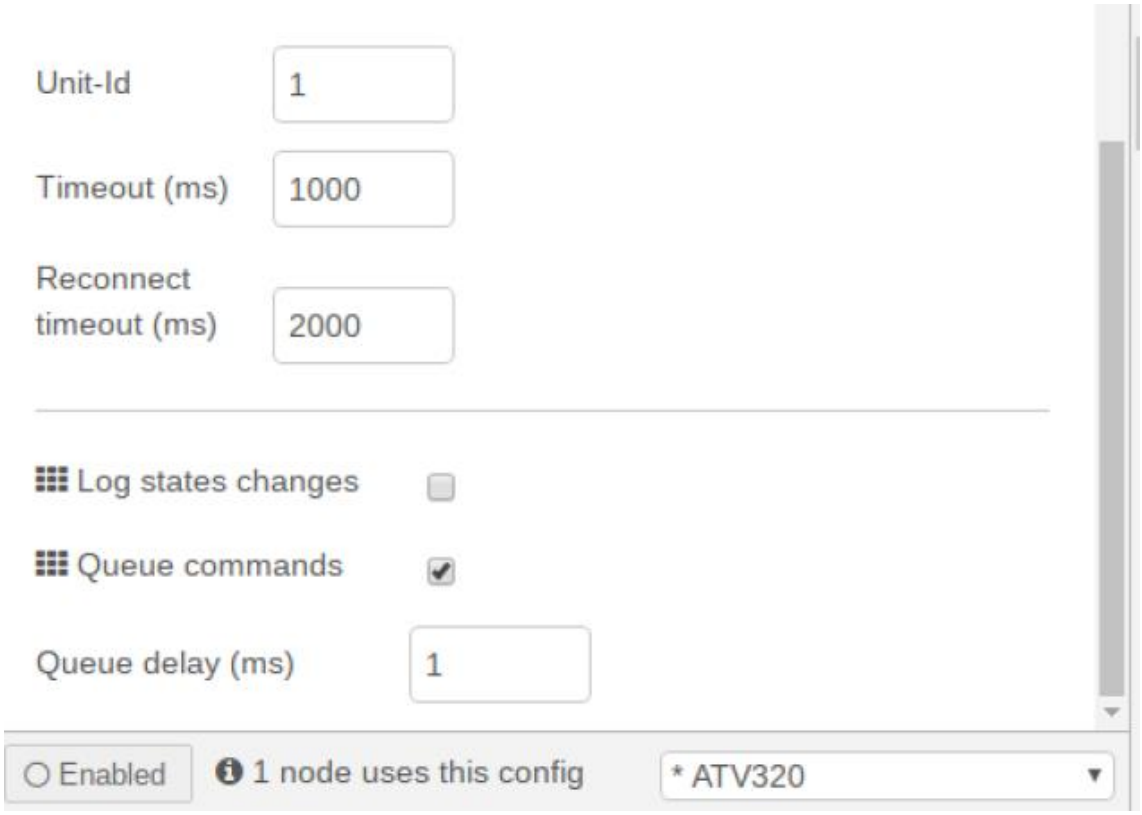
First test with Touchberry PI

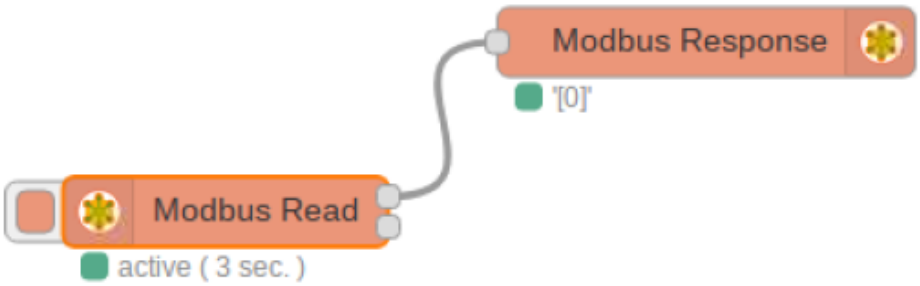
1	Code	Name	Logic address	CANopen index	DeviceNet path	Link	Category	Access	Type	Units
28	RFRD	Output velocity	16#219C = 8604	16#2038/5	16#8C/01/05 = 140/01/05	-	Actual values parameters	R	INT (Signed16)	1 rpm

It works


Edit Modbus-Read node
Delete
Cancel
Done
Properties
Settings
Optionals
Name
Name
Topic
Topic
Unit-Id
1
FC
FC 3: Read Holding Registers
Address
8604
Quantity
1
Poll Rate
3
second(s)
Delay on start
Server
modbus-serial@/dev/ttyUSB0:9600


Edit Modbus-Read node > Edit modbus-client node
Delete
Cancel
Update
Properties
Serial port
/dev/ttyUSB0
Serial type
RTU-BUFFERD
Baud rate
9600
Data Bits
8
Stop Bits
1
Parity
None
Connection delay (ms)
100
Unit-Id
1



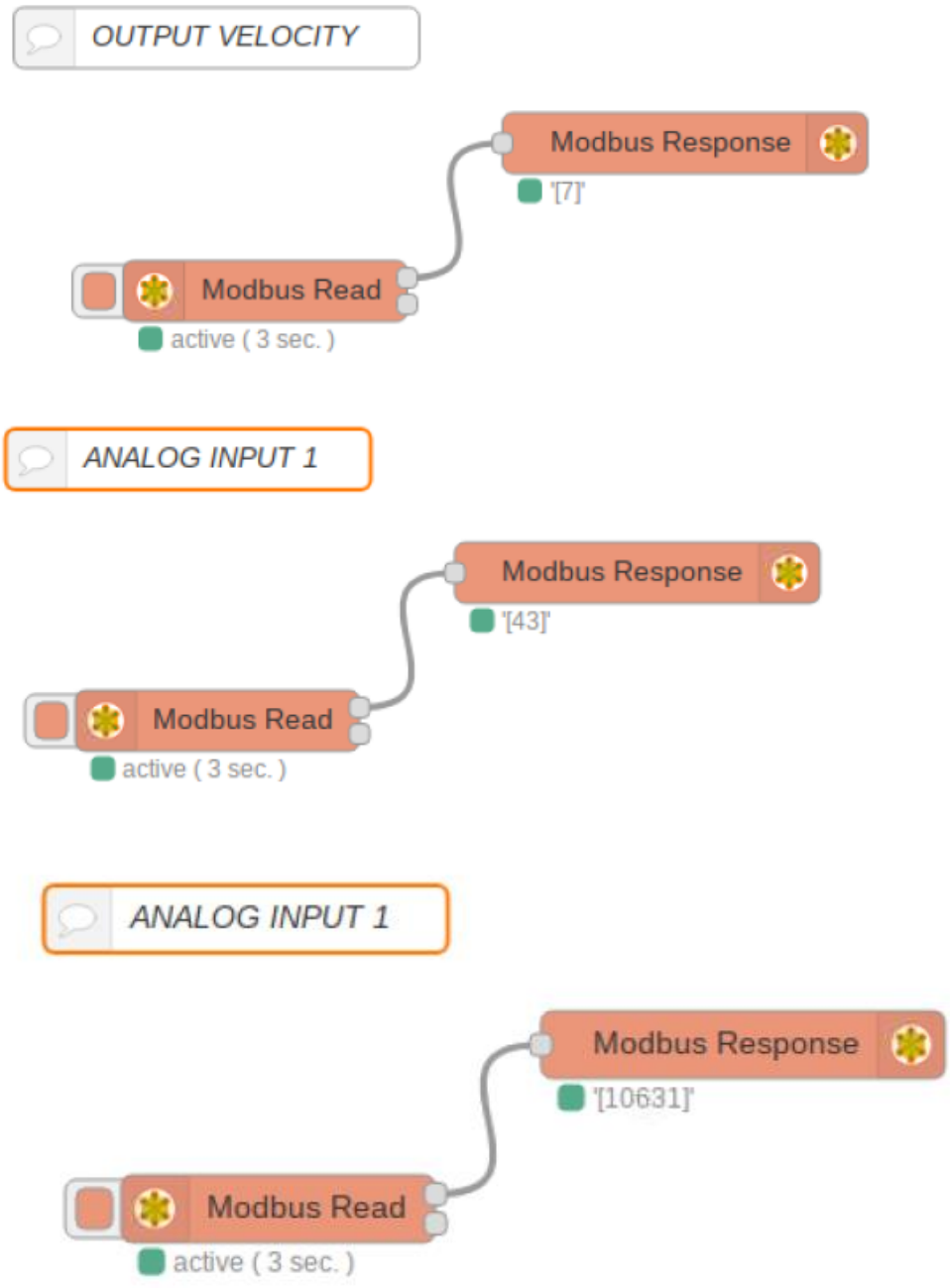


Analog input 1

It Works, if I change the potenciometer position, it changes the analog value!!!

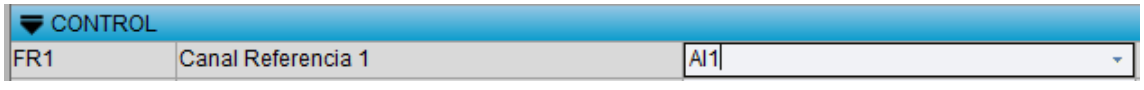
1	Code	Name	Logic address	CANopen index	DeviceNet path	Link	Category	Access	Type	Units
52	AI1C	Analog input 1 physical value	16#147A = 5242	16#2016/2B	16#7B/01/2B = 123/01/43	-	I/O parameters	R	INT (Signed16)	0.001 V

And now with speed control with analog input 1



Now we want to adjust speed from modbus

First we have to change these settings

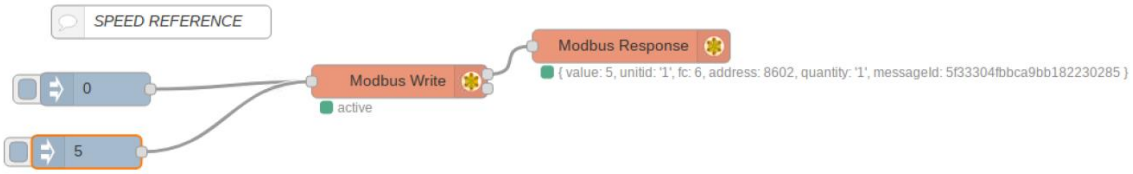


And set it to Modbus

And write on this parameter

1	Code	Name	Logic address	CANopen index	DeviceNet path	Link	Category	Access	Type	Units
5	LFRD	Speed setpoint	16#219A = 8602	16#2038/3	16#8C/01/03 = 140/01/03	-	Setpoint parameters	R/W	INT (Signed16)	1 rpm

We can even succesfully write on parameter Speed setpoint



But now we can not start with LI1

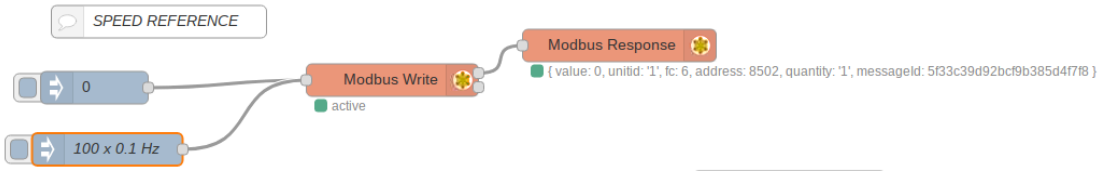
Then change this parameter

CHCF	Config. modo control	No separad.

To separated

Now we can start but at 0.0 speed and even changing Speed setpoint, the drive does not turn.

Now it Works, we start with the LI1 switch and we set up speed with Modbus (x 0.1Hz)



With this somove configuration

CONTROL		
FR1	Canal Referencia 1	Modbus
RIN	Inhibición marcha atrás	No
PST	Prioridad Tecla STOP	Sí
CHCF	Config. modo control	Separados
CCS	Conmutación canal ctrl	CD1
CD1	Config. canal control1	Bornero
CD2	Config. canal control2	Modbus
RFC	Asig.conmut.ref.(1a 2)	FR1
FR2	Canal Referencia 2	No
COP	Copiar Canal1 <->2	No
FN1	Asignación Tecla F1	NO
FN2	Asignación Tecla F2	NO
FN3	Asignación Tecla F3	NO
FN4	Asignación Tecla F4	NO
BMP	Control Consola (HMI)	Parar

START STOP MODBUS

Let’s try with the command start stop over Modbus on Somove settings

CD1	Config. canal control1	Bornero

Changing to Modbus

We have to set bit 3 of register 8501 to 1 to start the motor

1	Code	Name	Logic address	CANopen index	DeviceNet path	Link	Category	Access	Type
2	CMD	Control word	16#2135 = 8501	16#2037/2	16#8B/01/66 = 139/01/102	CMD	Control parameters	R/W	WORD (BitString16)

Cmd Register ८ ∩ ⊿

Bit Mapping of the Control Word

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Fault reset	Reserved (=0)	Reserved (=0)	Reserved (=0)	Enable operation	Quick stop	Enable voltage	Switch on
0 to 1 transition = Error is reset (after cause of error is no longer active)				1 = Run command	0 = Quick stop active	Authorization to supply AC power	Mains contactor control

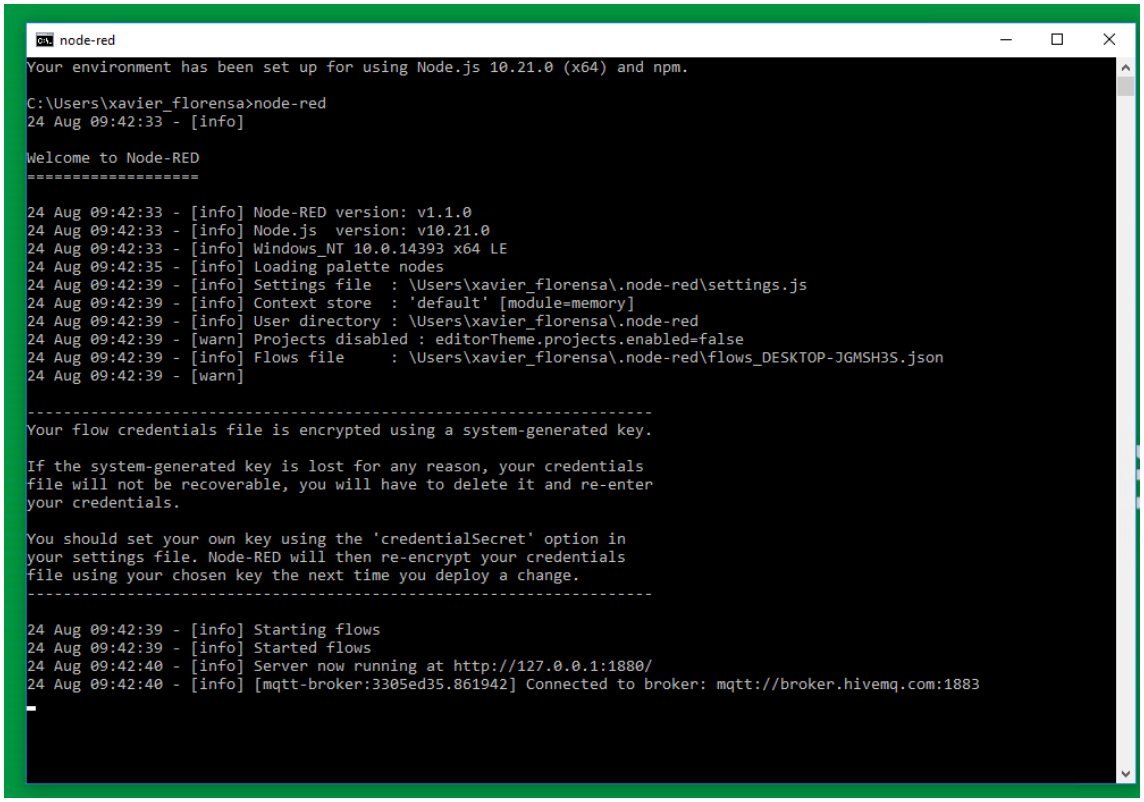
Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8
Manufacturer specific assignable	Manufacturer specific assignable	Manufacturer specific assignable	Manufacturer specific assignable	Manufacturer specific	Reserved (=0)	Reserved (=0)	Halt
				0 = Forward direction asked 1= Reverse direction asked			Halt

Second test with Schneider Edge Box Windows

Once the system is working, just unplug the USB converter from the previous cable and connect direct wires between the drive and the Edge Box DB-9 COM1 connector

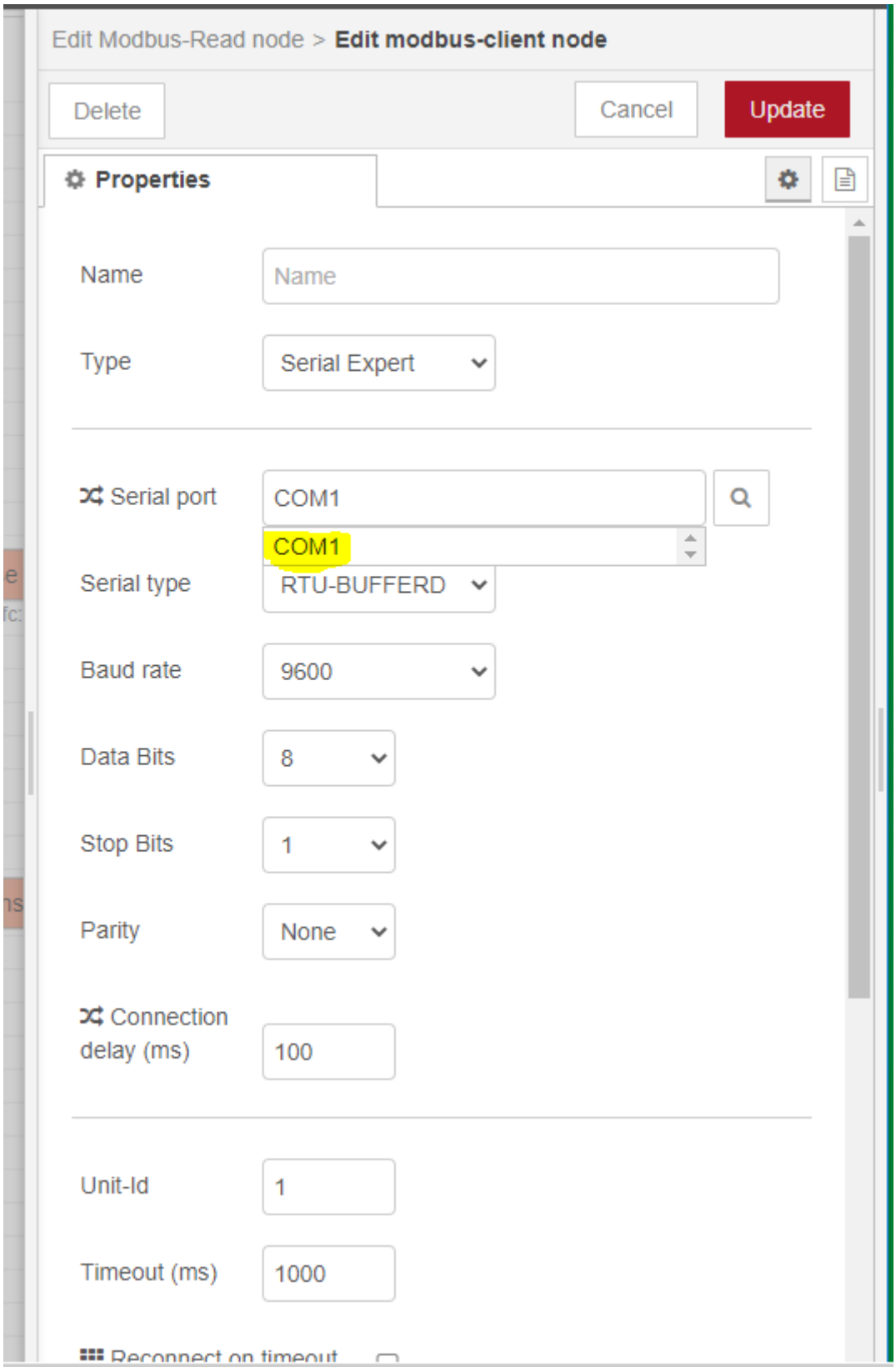
After connecting the cable and with the drive power ON, Node-red will see COM1 port

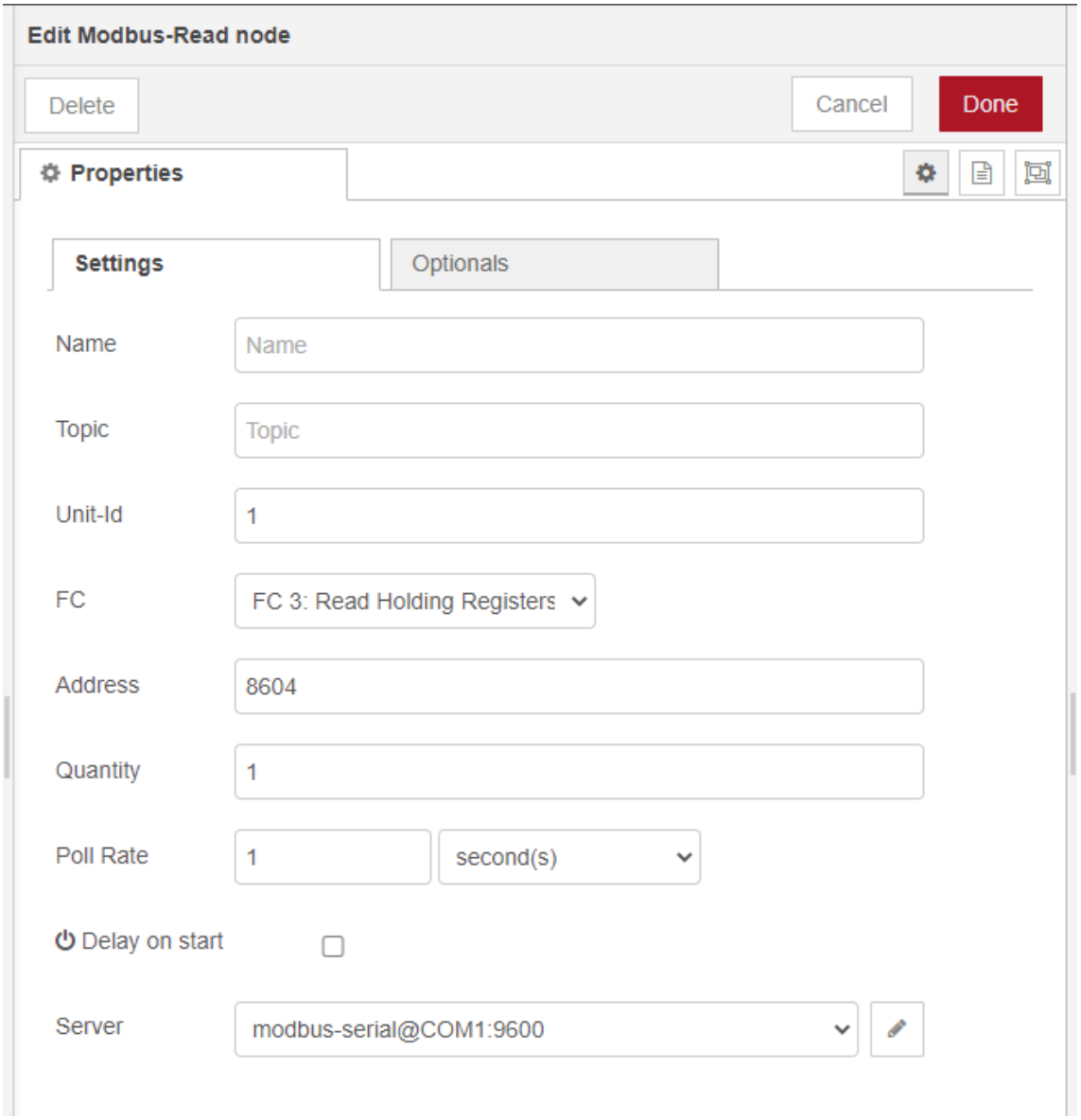
Do not forget to start Node-red on Windows Edge Box

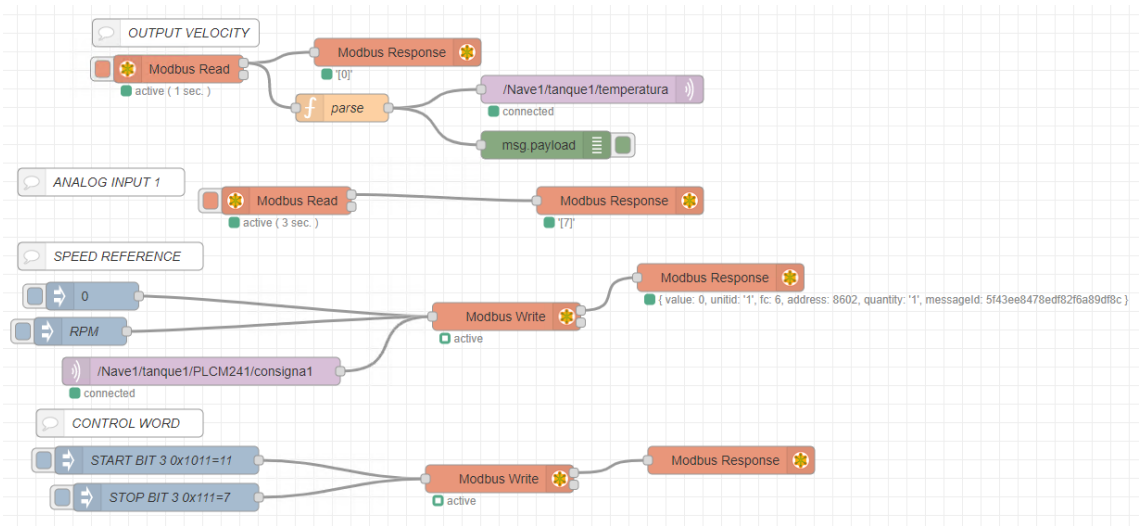


And use this configuration

COM1 on the serial options of Modbus node


Edit Modbus-Read node > Edit modbus-client node
Delete
Cancel
Update
Properties
Name
Name
Type
Serial Expert
Serial port
COM1
COM1
Serial type
RTU-BUFFERD
Baud rate
9600
Data Bits
8
Stop Bits
1
Parity
None
Connection delay (ms)
100
Unit-Id
1
Timeout (ms)
1000
Reconnect on timeout


Edit Modbus-Read node
Delete
Cancel
Done
Properties
Settings
Optionals
Name
Name
Topic
Topic
Unit-Id
1
FC
FC 3: Read Holding Registers
Address
8604
Quantity
1
Poll Rate
1
second(s)
Delay on start
Server
modbus-serial@COM1:9600


OUTPUT VELOCITY
Modbus Read
active (1 sec.)
Modbus Response
'[0]'
parse
/Nave1/tanque1/temperatura
connected
msg.payload
ANALOG INPUT 1
Modbus Read
active (3 sec.)
Modbus Response
'[7]'
SPEED REFERENCE
0
RPM
Modbus Write
active
Modbus Response
{ value: 0, unitid: '1', fc: 6, address: 8602, quantity: '1', messageId: 5f43ee8478edf82f6a89df8c }
/Nave1/tanque1/PLCM241/consigna1
connected
CONTROL WORD
START BIT 3 0x1011=11
STOP BIT 3 0x111=7
Modbus Write
active
Modbus Response

And here you can find the node-red code

https://github.com/xavierflorensa/Schneider-ATV320-Edge-Box-control-thru-mobile-phone

And here you can see the video

https://www.youtube.com/watch?v=hRrQzlhwS7M&ab_channel=XavierFlorensaBerenguer