MYOSTAT MOTION CONTROL INC.

Myostat
CM1 Modbus User Manual

Version: 1.0.3

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Table of Contents

1 Getting Started

1.1 Introduction

Modbus on the CM1 can be implemented over Modbus RTU or Modbus TCP. The main motor remains the same over both variants but require different interface modules. Modbus is not available on motors with firmware RT3.12 but requires versions RT3.13 or higher.

1.1.1 Modbus TCP

Modbus TCP requires the Modbus Ethernet module and has the following part numbers for the 4 motor options.

Part Number	**Description**
CM1-C-17S30-MBT	NEMA 17 single stack CM1 Cool Muscle motor with Modbus TCP
CM1-C-17L30-MBT	NEMA 17 double stack CM1 Cool Muscle motor with Modbus TCP*
CM1-C-23S30-MBT	NEMA 23 single stack CM1 Cool Muscle motor with Modbus TCP*
CM1-C-23L20-MBT	NEMA 23 double stack CM1 Cool Muscle motor with Modbus TCP*

*For torque and speed characteristics please see the CM1 data sheet.

1.1.2 Modbus RTU

Modbus RTU is available on the standard motor as it uses serial as its communication protocol. The standard motor can then be coupled with different interface modules (-SRLM, -SRLS, -EIO) to allow for a wider range of connectivity to a PLC, HMI, PC or embedded controller. It can be ordered with standard motor part numbers but should include the firmware version to ensure the correct version is ordered.

Part Number	**Description**
CM1-C-11S30-RT3.13	NEMA 11 single stack CM1 Cool Muscle motor**
CM1-C-11L30-RT3.13	NEMA 11 double stack CM1 Cool Muscle motor**
CM1-C-17S30-RT3.13	NEMA 17 single stack CM1 Cool Muscle motor with Modbus RTU*

Part Number	Description
CM1-C-17L30-RT3.13	NEMA 17 double stack CM1 Cool Muscle motor with Modbus RTU*
CM1-C-23S30-RT3.13	NEMA 23 single stack CM1 Cool Muscle motor with Modbus RTU*
CM1-C-23L30-RT3.13	NEMA 23 double stack CM1 Cool Muscle motor with Modbus RTU*

*For torque and speed characteristics please see the CM1 data sheet.

**The 11L and 11S motors have a different packaging and additional interface modules cannot be mounted and integrated directly onto the motor.

1.2 Modbus Registers and Usage

All motor parameters are available in read/write access through Modbus holding registers. All registers are 32bit little endian registers. CML code is required in the motor to execute a move. All Modbus TCP motors have a generic point-to-point program written in the motor and this can be modfied to suit the application. As Modbus RTU is a user select-able option it does not come preloaded, however, the program is shown and described further in this documentation and can easily be loaded onto the motor.

The supplied program contains 4 main write variables.

1. Position (P0 register)
2. Speed (S0 register)
3. Acceleration (A0 register)
4. Control Word (R0 register)

The control word allows the user to start, stop, home, enable and disable the motor. Starting the motor will run the motor to the defined position, speed and acceleration. Position feedback, speed and motor status are available for read through the relevant registers. Please see the supplied code example for a complete description.

2 Configuring Modbus

2.1 Configuring Modbus RTU

2.1.1 Requirements

To switch the motor into Modbus RTU you will need the following

1. CM1 motor with RT3.13 firmware (Send "?85" to query the version if you are not sure)
2. Control Room (which can be found here)
3. Communication to the motor from the PC running Control Room. This can be achieved with a number of cables and/or interfaces.
    a. If you are unsure of how to communicate with the motor please see the quick start guide.

2.1.2 Set to Modbus RTU

Once the motor is connected and communicating with Control Room it can be switched from standard ascii communication to Modbus RTU. The following parameters are used to make the change. Read through the descriptions of them and then follow the step-by-step instructions

K20 - COM1 Communication Baud Rate

K20 sets the communication baud rate between the Modbus master and the motor. Using the standard baud rate setting +10 will switch it to Modbus mode with that baud rate

K20 Value	**Baudrate (bps)**
K20=10	38400
K20=11	9600
K20=12	19200
K20=13	57600

The motor default baudrate is 38400.

K62 - Modbus station ID

K62 sets the Modbus station ID. This ID is also used for the RS485 protocol. If the motor starts streaming { with the ID that has been set then it is in RS485 (the software protocol) mode. See this Application Note to switch out of RS485 mode.

K65 - COM2 Communication Baud Rate

COM2 on the motor can be used for Modbus communication. This is not typically used and requires a special cable. If you need to use COM1 for standard communication and COM2 for Modbus communication please contact a Myostat engineer for assistance.

FFFFFFFFF - 9 x Fs function

"FFFFFFFFF" (9xF) is used to temporarily switch the motor out of Modbus mode. This will allow you, until a power cycle, to communicate with the motor using standard ASCII and regular CML. To switch back into Modbus the motor will need to be power cycled or K20 set to normal ASCII and then back to Modbus.

Step-By-Step Guide

Use the following steps to set a motor into Modbus mode. In this example we are setting the motor to ID=1 with a baud rate of 38400bps.

1. Set the motor into modbus mode with a baud rate = 38400

```
K20=10
```

2. Send 9 x F to get out of Modbus mode

```
FFFFFFFFF
```

3. Set the station ID to 1

```
K62=1
```

4. Cycle power on the motor.

The motor is now in Modbus RTU mode and can be communicated with a Modbus master.

2.2 Configuring Modbus TCP

The user will want to setup the network settings for the Modbus TCP motor. This could include setting a static/dynamic IP and/or a password.

2.2.1 Requirements

To configure a CM1 with Modbus TCP you should have the following

1. CM1 motor with -MBT module (e.g. CM1-C-23L20-MBT)
2. Control Room (which can be found here)

2.2.2 Configure Network Settings

Two main network settings can be changed

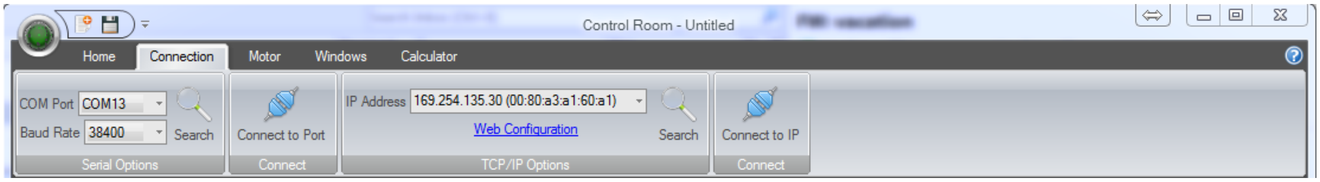
1. Static or dynamic (default) IP address
2. Network password

When you logon to the Modbus TCP web configuration page there are other Modbus related settings. These should be left as they are. If you reset the module to defaults please refer to the Configuring Modbus section at the bottom of this page.

Logon to the Configuration page

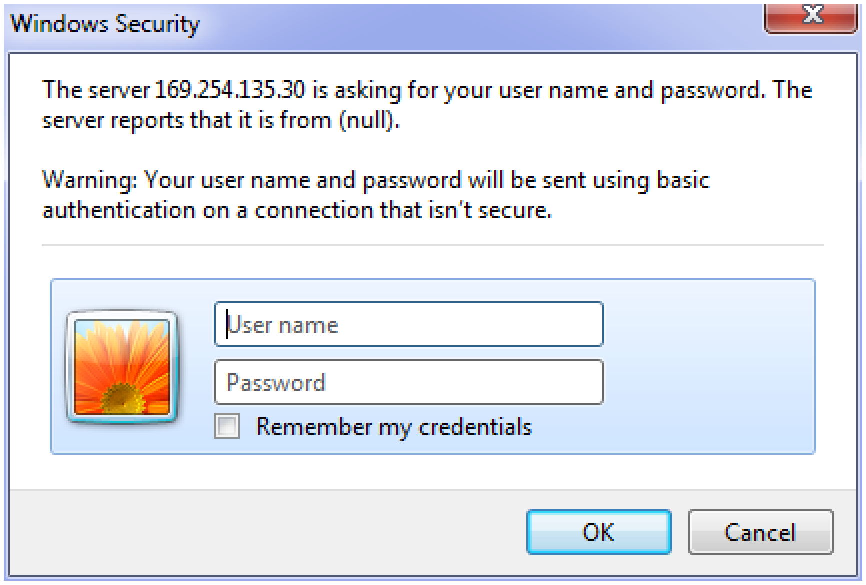
When logging onto the configuration page for the first time there is no password. Follow the steps below to logon.

1. Open Control Room and search for the module under the TCP/IP options
2. Once the module has been found click "Web Configuration"



COM Port COM13
Baud Rate 38400
IP Address 169.254.135.30 (00:80:a3:a1:60:a1)

3. If using for the first time and you haven't set a password click okay when the security window pops up.



Windows Security

The server 169.254.135.30 is asking for your user name and password. The server reports that it is from (null).

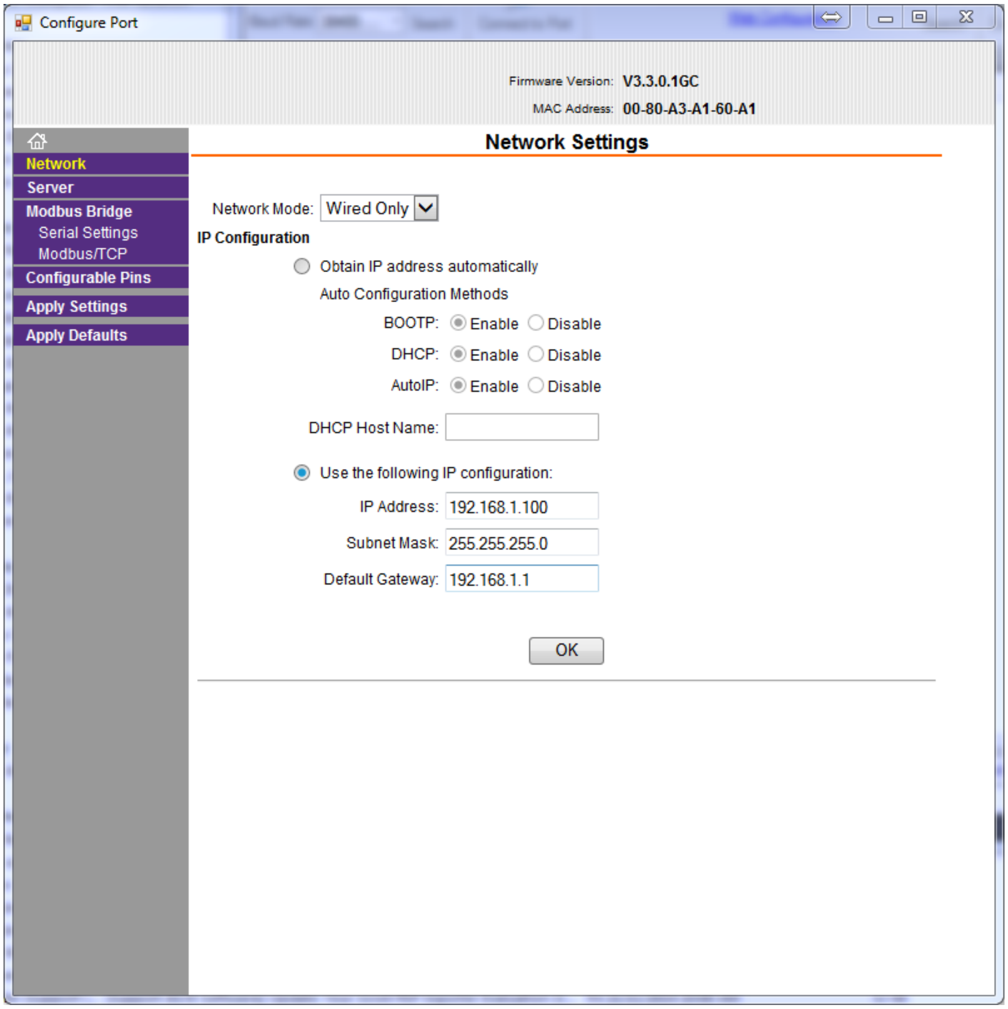
Warning: Your user name and password will be sent using basic authentication on a connection that isn't secure.

Set to Static IP

The motor comes standard with a dynamic IP looking for a DHCP server. If no server is found the module will assign itself and address in the 169.254 range. If the module is plugged directly into a computer it will typically get set in this manner. To assign a static IP use the following step-by-step guide.

1. Logon as described above in the logon guide

2. Click "Network" in the left panel to open up the Network settings



Firmware Version: V3.3.0.1GC

MAC Address: 00-80-A3-A1-60-A1

Network Settings

Network Mode: Wired Only

IP Configuration

○ Obtain IP address automatically

Auto Configuration Methods

BOOTP: ● Enable ○ Disable

DHCP: ● Enable ○ Disable

AutoIP: ● Enable ○ Disable

DHCP Host Name:

● Use the following IP configuration:

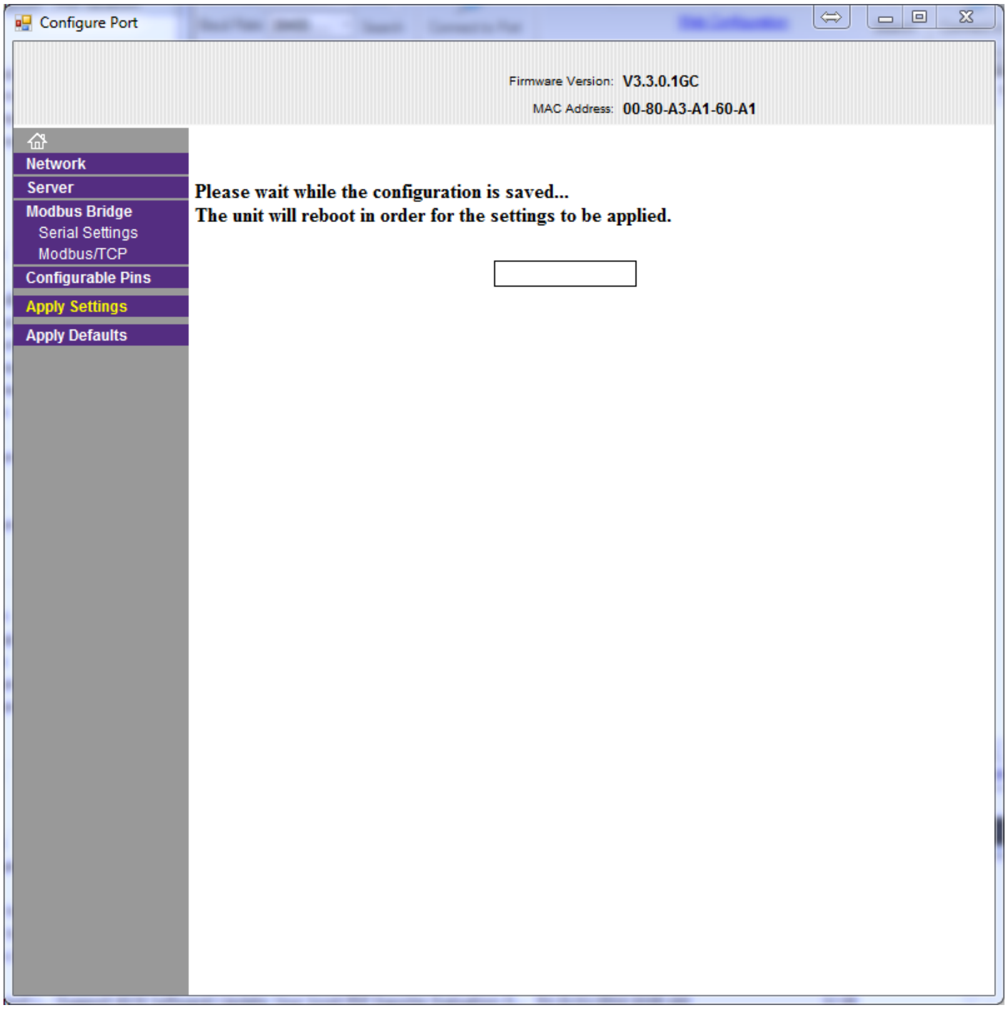
IP Address: 192.168.1.100

Subnet Mask: 255.255.255.0

Default Gateway: 192.168.1.1

   a. Select "Use the following IP configuration" and set your required network settings
   b. Click the OK button

3. Click "Apply Settings" in the left column. The unit will now reboot.



Please wait while the configuration is saved...
The unit will reboot in order for the settings to be applied.

To set back to DHCP or another configuration for a dynamic IP select the "Obtain IP address automatically" radio button.

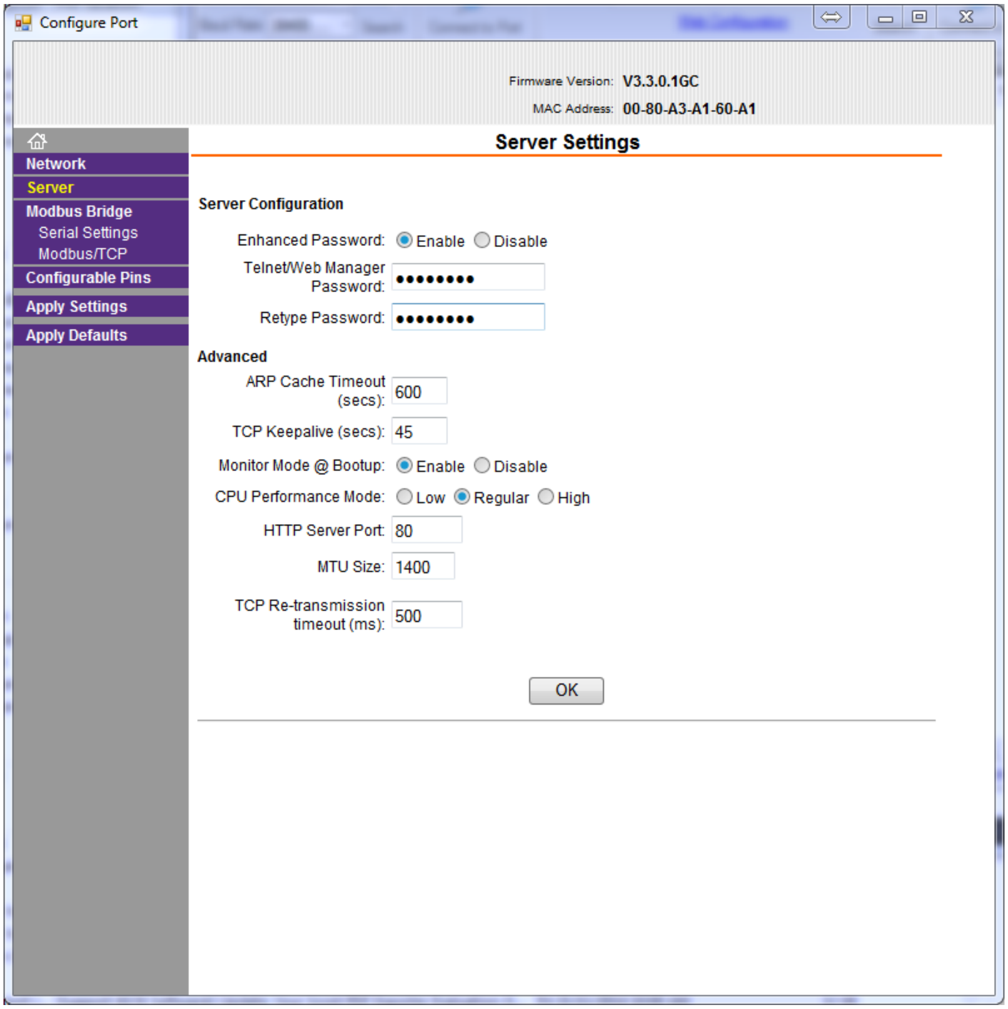
Set Network Password

The web configuration can be protected with a password.

> There is no way to reset the password if it is forgotten without returning the module to the factory.

1. Logon to the web configuration as described above

2. Click "Server" in the left column



Firmware Version: V3.3.0.1GC

MAC Address: 00-80-A3-A1-60-A1

Server Settings

Server Configuration

Enhanced Password: ● Enable ○ Disable

Telnet/Web Manager Password: ••••••••

Retype Password: ••••••••

Advanced

ARP Cache Timeout (secs): 600

TCP Keepalive (secs): 45

Monitor Mode @ Bootup: ● Enable ○ Disable

CPU Performance Mode: ○ Low ● Regular ○ High

HTTP Server Port: 80

MTU Size: 1400

TCP Re-transmission timeout (ms): 500

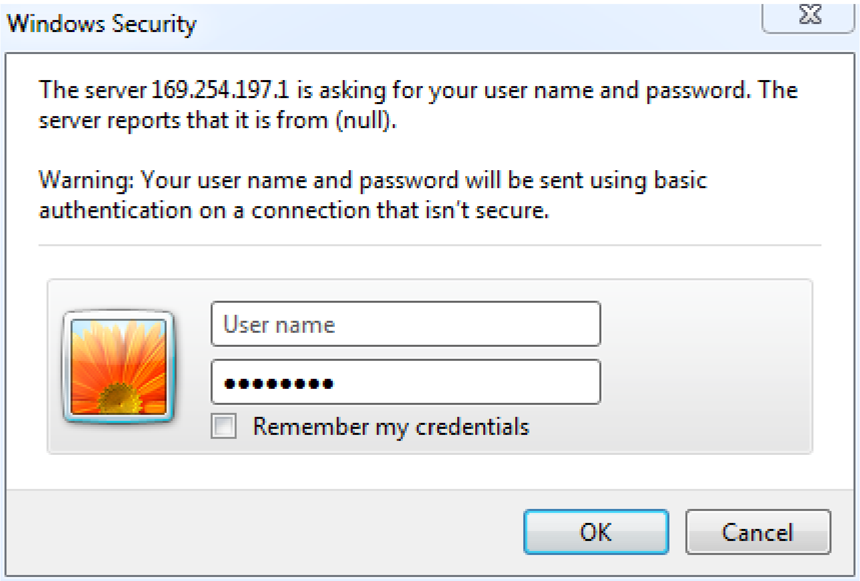
a. Click the Enable radio button on "Enhanced Password"

b. Enter a password

c. Click OK

3. Click "Apply Settings" in the left column.

4. The module will reboot. To login again use the password that has just been set.



The server 169.254.197.1 is asking for your user name and password. The server reports that it is from (null).

Warning: Your user name and password will be sent using basic authentication on a connection that isn't secure.

User name

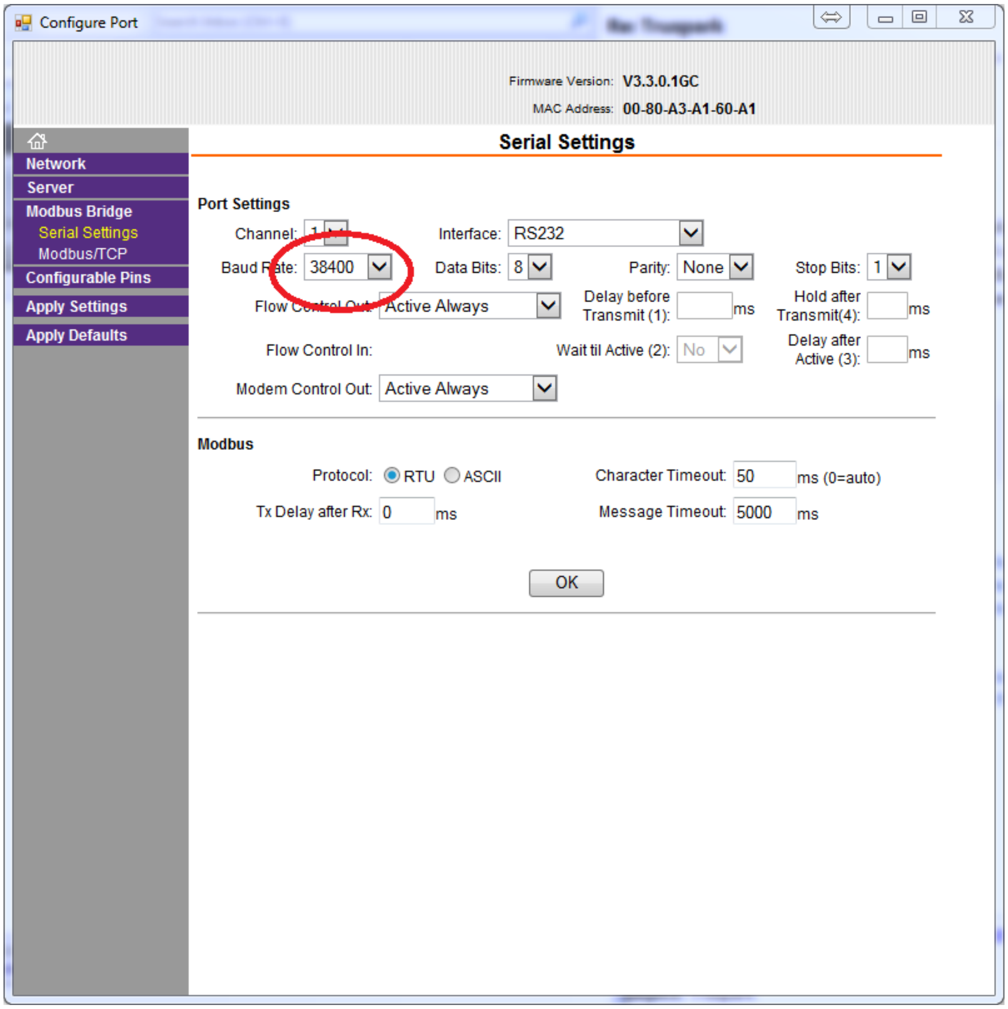
●●●●●●●●●

□ Remember my credentials

Configuring Modbus

This section is relevant if a user has clicked "Apply Defaults" on the web interface. The module will have arrived with the correct Modbus TCP settings. Do not change Modbus settings unless instructed to my a Myostat engineer.

1. Click "Serial Settings"
   a. changed the Baud Rate to 38400
   b. Click OK



Firmware Version: V3.3.0.1GC
MAC Address: 00-80-A3-A1-60-A1

Serial Settings

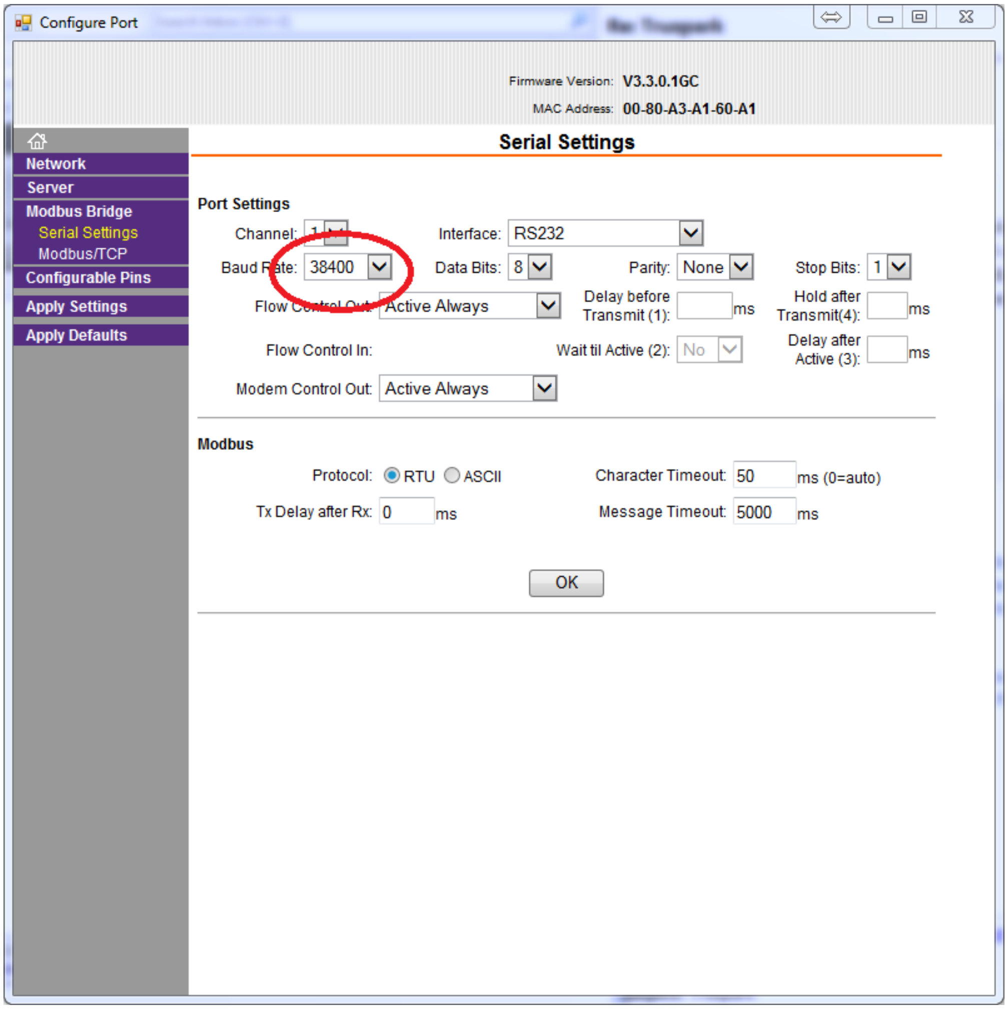
Port Settings

Channel: 1
Interface: RS232
Baud Rate: 38400
Data Bits: 8
Parity: None
Stop Bits: 1
Flow Control Out: Active Always
Delay before Transmit (1): ms
Hold after Transmit(4): ms
Flow Control In:
Wait til Active (2): No
Delay after Active (3): ms
Modem Control Out: Active Always

Modbus

Protocol: ● RTU ○ ASCII
Character Timeout: 50 ms (0=auto)
Tx Delay after Rx: 0 ms
Message Timeout: 5000 ms

2. Select "Modbus/TCP"
    a. Change "Fixed Slave Address" to 1
    b. Click Okay



Firmware Version: V3.3.0.1GC
MAC Address: 00-80-A3-A1-60-A1

Serial Settings

Port Settings

Channel: 1
Interface: RS232
Baud Rate: 38400
Data Bits: 8
Parity: None
Stop Bits: 1
Flow Control Out: Active Always
Delay before Transmit (1): ms
Hold after Transmit(4): ms
Flow Control In:
Wait til Active (2): No
Delay after Active (3): ms
Modem Control Out: Active Always

Modbus

Protocol: ● RTU ○ ASCII
Character Timeout: 50 ms (0=auto)
Tx Delay after Rx: 0 ms
Message Timeout: 5000 ms

OK

3. Click "Apply Settings"

The Modbus TCP module has now been set to correctly communicate with the motor.

3 Read/Write Access Table

Included below is a table which details the location and function of the CM1 Modbus registers.
The addresses included below are referenced to the Modbus data model (PLC address for read/write to holding registers)

Click on a link below to jump to the associated registers

1. Motor Information Registers
2. Variables
3. Direct Registers
4. IO
5. CML Port
6. Positions
7. R Registers
8. N Registers
9. Speeds
10. Accelerations
11. Torque
12. K Parameters
13. H Gain Parameters
14. Timers

Holding Register Address	**Motor Parameter**	**Read Access**	**Write Access**
40001	Position Error (?95)	Yes	No
40003	Motor Position (?96)	Yes	No
40005	Motor Speed (?97)	Yes	No
40007	Motor Torque (?98)	Yes	No
40009	Motor Status (?99)	Yes	No

Holding Register Address	Motor Parameter	Read Access	Write Access
40011	V0	Yes	Yes
40013	V1	Yes	Yes
40015	V2	Yes	Yes
40017	V3	Yes	Yes
40019	V4	Yes	Yes
40021	V5	Yes	Yes
40023	V6	Yes	Yes
40025	V7	Yes	Yes
40027	V8	Yes	Yes
40029	V9	Yes	Yes
40031	V10	Yes	Yes
40033	V11	Yes	Yes
40035	V12	Yes	Yes
40037	V13	Yes	Yes
40039	V14	Yes	Yes
40041	V15	Yes	Yes
40043	P0	Yes	Yes

Holding Register Address	Motor Parameter	Read Access	Write Access
40045	S0	Yes	Yes
40047	A0	Yes	Yes
40049	V0	Yes	Yes
40051	R0	Yes	Yes
40053	M0	Yes	Yes
40055	Analog Output	Yes	Yes
40057	Input Status (?70)	Yes	No
40059	Output Status (?50)	Yes	Yes
40103	CML Port [ASCII]	No	Yes
40201	P0	Yes	Yes
40203	P1	Yes	Yes
40205	P2	Yes	Yes
40207	P3	Yes	Yes
40209	P4	Yes	Yes
40211	P5	Yes	Yes
40213	P6	Yes	Yes
40215	P7	Yes	Yes

Holding Register Address	Motor Parameter	Read Access	Write Access
40217	P8	Yes	Yes
40219	P9	Yes	Yes
40221	P10	Yes	Yes
40223	P11	Yes	Yes
40225	P12	Yes	Yes
40227	P13	Yes	Yes
40229	P14	Yes	Yes
40231	P15	Yes	Yes
40233	P16	Yes	Yes
40235	P17	Yes	Yes
40237	P18	Yes	Yes
40239	P19	Yes	Yes
40241	P20	Yes	Yes
40243	P21	Yes	Yes
40245	P22	Yes	Yes
40247	P23	Yes	Yes
40249	P24	Yes	Yes
40251	P25	Yes	Yes

Holding Register Address	Motor Parameter	Read Access	Write Access
40301	R0	Yes	Yes
40303	R1	Yes	Yes
40305	R2	Yes	Yes
40307	R3	Yes	Yes
40309	R4	Yes	Yes
40311	R5	Yes	Yes
40313	R6	Yes	Yes
40315	R7	Yes	Yes
40317	P8	Yes	Yes
40319	P9	Yes	Yes
40321	R10	Yes	Yes
40323	R11	Yes	Yes
40325	R12	Yes	Yes
40327	R13	Yes	Yes
40329	R14	Yes	Yes
40331	R15	Yes	Yes
40333	R16	Yes	Yes
40335	R17	Yes	Yes

Holding Register Address	Motor Parameter	Read Access	Write Access
40337	R18	Yes	Yes
40339	R19	Yes	Yes
40341	R20	Yes	Yes
40343	R21	Yes	Yes
40345	R22	Yes	Yes
40347	R23	Yes	Yes
40349	R24	Yes	Yes
40351	R25	Yes	Yes
40401	N0	Yes	Yes
40403	N1	Yes	Yes
40405	N2	Yes	Yes
40407	N3	Yes	Yes
40409	N4	Yes	Yes
40411	N5	Yes	Yes
40413	N6	Yes	Yes
40415	N7	Yes	Yes
40417	N8	Yes	Yes
40419	N9	Yes	Yes

Holding Register Address	**Motor Parameter**	**Read Access**	**Write Access**
40421	N10	Yes	Yes
40423	N11	Yes	Yes
40425	N12	Yes	Yes
40427	N13	Yes	Yes
40429	N14	Yes	Yes
40431	N15	Yes	Yes
40433	N16	Yes	Yes
40435	N17	Yes	Yes
40437	N18	Yes	Yes
40439	N19	Yes	Yes
40441	N20	Yes	Yes
40443	N21	Yes	Yes
40445	N22	Yes	Yes
40447	N23	Yes	Yes
40449	N24	Yes	Yes
40451	N25	Yes	Yes
40603	S0	Yes	Yes
40605	S1	Yes	Yes

Holding Register Address	Motor Parameter	Read Access	Write Access
40607	S2	Yes	Yes
40609	S3	Yes	Yes
40611	S4	Yes	Yes
40613	S5	Yes	Yes
40615	S6	Yes	Yes
40617	S7	Yes	Yes
40619	S8	Yes	Yes
40621	S9	Yes	Yes
40623	S10	Yes	Yes
40625	S11	Yes	Yes
40627	S12	Yes	Yes
40629	S13	Yes	Yes
40631	S14	Yes	Yes
40633	S15	Yes	Yes
40635	A0	Yes	Yes
40637	A1	Yes	Yes
40639	A2	Yes	Yes
40641	A3	Yes	Yes

Holding Register Address	**Motor Parameter**	**Read Access**	**Write Access**
40643	A4	Yes	Yes
40645	A5	Yes	Yes
40647	A6	Yes	Yes
40649	A7	Yes	Yes
40651	A8	Yes	Yes
40653	M0	Yes	Yes
40655	M1	Yes	Yes
40657	M2	Yes	Yes
40659	M3	Yes	Yes
40661	M4	Yes	Yes
40663	M5	Yes	Yes
40665	M6	Yes	Yes
40667	M7	Yes	Yes
40669	M8	Yes	Yes
40671	K0	Yes	Yes
40673	K1	Yes	Yes
40675	K2	Yes	Yes

Holding Register Address	Motor Parameter	Read Access	Write Access
40677	K3	Yes	Yes
40679	K4	Yes	Yes
40681	K5	Yes	Yes
40683	K6	Yes	Yes
40685	K7	Yes	Yes
40687	K8	Yes	Yes
40689	K9	Yes	Yes
40691	K10	Yes	Yes
40693	K11	Yes	Yes
40695	K12	Yes	Yes
40697	K13	Yes	Yes
40699	K14	Yes	Yes
40701	K15	Yes	Yes
40703	K16	Yes	Yes
40705	K17	Yes	Yes
40707	K18	Yes	Yes
40709	K19	Yes	Yes
40711	K20	Yes	Yes

Holding Register Address	Motor Parameter	Read Access	Write Access
40713	K21	Yes	Yes
40715	K22	Yes	Yes
40717	K23	Yes	Yes
40719	K24	Yes	Yes
40721	K25	Yes	Yes
40723	K26	Yes	Yes
40725	K27	Yes	Yes
40727	K28	Yes	Yes
40729	K29	Yes	Yes
40731	K30	Yes	Yes
40733	K31	Yes	Yes
40735	K32	Yes	Yes
40737	K33	Yes	Yes
40739	K34	Yes	Yes
40741	K35	Yes	Yes
40743	K36	Yes	Yes
40745	K37	Yes	Yes
40747	K38	Yes	Yes

Holding Register Address	**Motor Parameter**	**Read Access**	**Write Access**
40749	K39	Yes	Yes
40751	K40	Yes	Yes
40753	K41	Yes	Yes
40755	K42	Yes	Yes
40757	K43	Yes	Yes
40759	K44	Yes	Yes
40761	K45	Yes	Yes
40763	K46	Yes	Yes
40765	K47	Yes	Yes
40767	K48	Yes	Yes
40769	K49	Yes	Yes
40771	K50	Yes	Yes
40773	K51	Yes	Yes
40775	K52	Yes	Yes
40777	K53	Yes	Yes
40779	K54	Yes	Yes
40781	K55	Yes	Yes
40783	K56	Yes	Yes

Holding Register Address	Motor Parameter	Read Access	Write Access
40785	K57	Yes	Yes
40787	K58	Yes	Yes
40789	K59	Yes	Yes
40791	K60	Yes	Yes
40793	K61	Yes	Yes
40795	K62	Yes	Yes
40797	K63	Yes	Yes
40799	K64	Yes	Yes
40801	K65	Yes	Yes
40803	K66	Yes	Yes
40805	K67	Yes	Yes
40807	K68	Yes	Yes
40809	K69	Yes	Yes
40811	K70	Yes	Yes
40813	K71	Yes	Yes
40815	K72	Yes	Yes
40817	K73	Yes	Yes
40819	K74	Yes	Yes

Holding Register Address	Motor Parameter	Read Access	Write Access
40821	K75	Yes	Yes
40823	K76	Yes	Yes
40825	K77	Yes	Yes
40827	K78	Yes	Yes
40829	K79	Yes	Yes
40831	K80	Yes	Yes
40833	K81	Yes	Yes
40835	K82	Yes	Yes
40837	K83	Yes	Yes
40839	K84	Yes	Yes
40841	K85	Yes	Yes
40843	K86	Yes	Yes
40845	K87	Yes	Yes
40847	K88	Yes	Yes
40849	K89	Yes	Yes
40875	RESERVED	Yes	Yes
40901	H0	Yes	Yes

Holding Register Address	Motor Parameter	Read Access	Write Access
40903	H1	Yes	Yes
40905	H2	Yes	Yes
40907	H3	Yes	Yes
40909	H4	Yes	Yes
40911	H5	Yes	Yes
40913	H6	Yes	Yes
40915	H7	Yes	Yes
40951	T0	Yes	No
40953	T1	Yes	Yes
40955	T2	Yes	Yes
40957	T3	Yes	Yes
40959	T4	Yes	Yes
40951	T5	Yes	Yes
40953	T6	Yes	Yes
40955	T7	Yes	Yes

4 Running the motor in Modbus Mode

4.1 Introduction

Modbus gives read/write access to all Cool Muscle registers such as K-parameters, positions, speeds and accelerations. A CML program needs to reside in the motor to execute functions depending on the status of these registers. Below you will find an example program that is used in all Modbus TCP motors. It uses a control word in the R0 register to execute a number of functions. This code is useful for point-to-point motion and speed control. An application may require a significantly more complex program which can replace the example program. The CML is written to be compiled and sent from Control Room. The user does not need to understand the code but only how to use it. The full program code is supplied for those users wanting to change or get a better understanding of how the program works. Modbus TCP motors come standard with the Modbus program loaded.

4.2 Running the motor

The following list of holding registers can be used to the read and write move data to the motor.

Holding Register	**Parameter**	**Description**	**R/W**
40201	P0	Target position	R/W
40603	S0	Target speed	R/W
40635	A0	Target acceleration	R/W
40301	R0	Control Word	R/W
40003	Motor Position	Motors current position in pulses	R
40009	Motor Status	Motors current status	R

4.2.1 Position, Speed and Acceleration

The default setting for the motor is K37=3 which sets the following units. This can easily be changed by modifying the value of K37.

Register	Unit/Resolution
P0	1000 pulses/revolution
S0	100 pulse/s
A0	1K pulses/s^2

4.2.2 Control Word

The R1 register is used for the Control Word. It has the following value options

R0 Value	Description
0	Do nothing
1	Start the position move
2	Stop the motor
3	Enable the motor
4	Disable the motor
5	Home the motor

Some things to note when using the control word

1. Changing the value of the control word immediately executes the operation
2. If the Control Word is left with the value 1 then changing the position once the motor has come to a stop will execute the next move. This allows the Modbus master to only change the position and not need to also toggle the control word to execute the next move.
3. The home routine is by default set to a hardstop search in the CCW direction. Please see K42 to K48 for home routine options.

4.3 CML Code

The following is the CML code used for motor control in Modbus. It is not required for users to understand the code unless they are looking to change it.

CML Modbus Code

```
//set the logic scan rate to 1ms
K87.1=1
//set logic bank 1 to scan on power up
K85.1=1
//set the modbus register offset to 0
K89.1=0
//switch off all automatic motor event reporting
K23.1=0
//make sure carraige return is not automatic after line feed (legacy
setting)
K70.1=0
/*create variables for the old/previous target
control word
position
speed
acceleration
These are used to find a change in the target
Init them to 0
*/
var old_ControlWord R1.1                //old control word
R1.1=0
var old_TargetPos P1.1        //old position
P1.1=0
var old_TargetSpd S1.1        //old speed
S1.1=0
var old_TargetAcc A1.1        //old acceleration
A1.1=0
/*create variables for the new target
control word
position
speed
acceleration
These are used to find a change in the target
Init them to 0
*/
var ControlWord R0.1                //control word
R0.1=0
var TargetPos P0.1        //position
P0.1=0
```

```
var TargetSpd S0.1        //speed
S0.1=0
var TargetAcc A0.1        //acceleration
A0.1=0
/*
Logic L1 scans for a change in the word or any target value
if a change is detected it call the relevant logic bank
*/
L1.1
ControlWord!= old_ControlWord, CL2.1, T0.1    //scan control word
TargetPos!= old_TargetPos, CL3.1, T0.1        //scan position
TargetAcc!= old_TargetAcc, CL4.1, T0.1        //scan acceleration
TargetSpd!= old_TargetSpd, CL5.1, T0.1        //scan speed
END.1
/*
Logic L2 is called if there is a change in the control word
1) it saves the new state into the old state
2) It compares the changed value with defined values to
execute the relavant command
*/
L2.1
old_ControlWord= ControlWord;
old_ControlWord== 1, ^.1, T0.1        //run
old_ControlWord== 2, ].1, T0.1        //stop
old_ControlWord== 3, (.1, T0.1        //enable
old_ControlWord== 4, ).1, T0.1        //disable
old_ControlWord== 5,|.1,T0.1        //home
END.1
/*
Logic L3 executes a change in position
If the control word eqauls 1 then it executes the move immediately
*/
L3.1
old_TargetPos= TargetPos;
ControlWord== 1, ^.1, T0.1    //execute move is ControlWord equals 1
END.1
/*
The following 2 logic banks set the speed and acceleration
Writing to the value through modbus only changes the register
it does not process the change.
The change must be processed through CML for it to be
executed immediately
*/
//Logic L4 sets the acceleration
L4.1
old_TargetAcc= TargetAcc;
TargetAcc= TargetAcc;
END.1
//Logic L4 sets the speed
L5.1
old_TargetSpd= TargetSpd;
```

```
TargetSpd= TargetSpd;
END.1
$.1
```

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