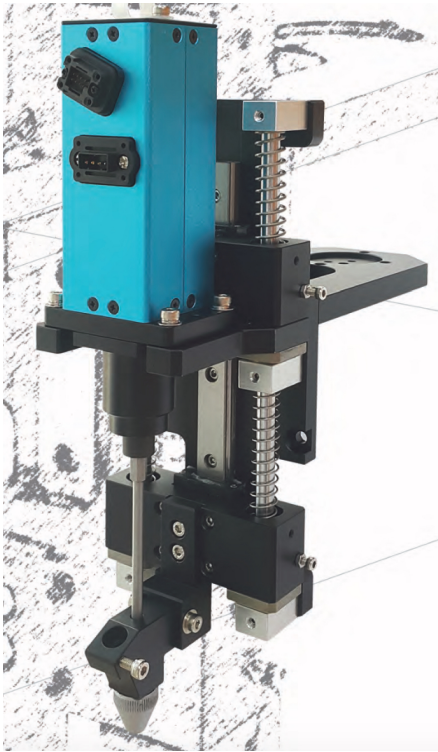


COM Protocol Manual

for MDC and ADC

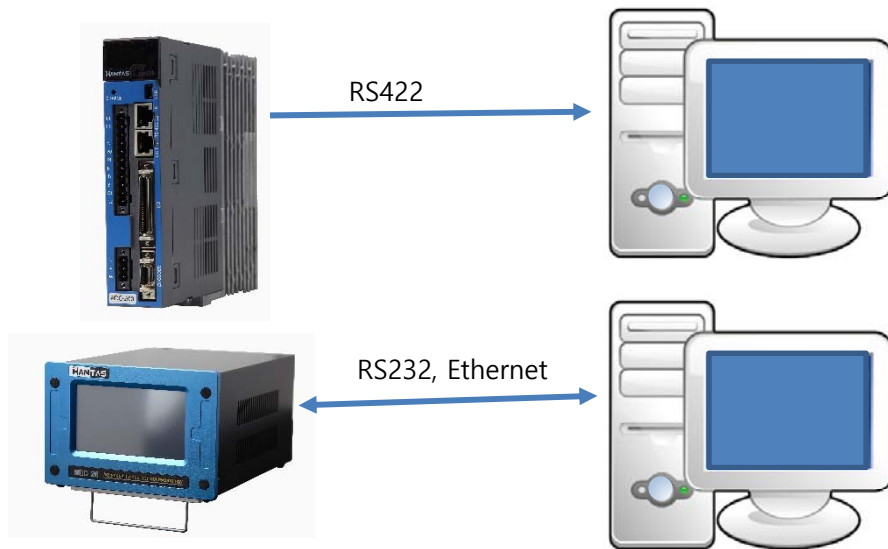


1 Overview and Communication Specifications

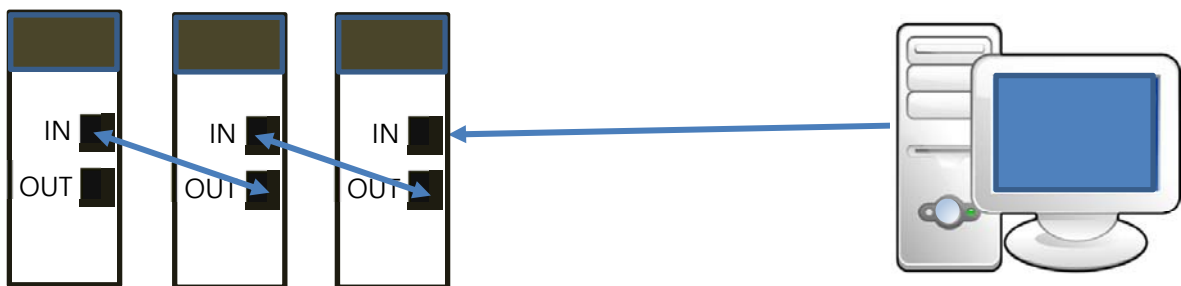
1.1 Overview

If the PC does not have Serial COM port, use good quality of USB to RS422 Serial converter. MDC, ADC is capable of connecting to the host controller (Handy Loader, HMI, PLC, PC, etc.) through RS232, RS422 serial communication or Ethernet, allowing the user to use such functions as parameter change and data monitoring.

◆ Series Communication Connection using RS232(MDC), RS422(ADC)



◆ Multi-Drop Connection using RS422 (up to 31 controllers max.)



The pins of IN & OUT port are connected by parallel together (1:1), allowing for convenient multi-drop wiring.

If the PC does not have Serial COM port, use good quality of USB to RS422 Serial converter.



USB to RS422 Serial converter.

1.2 Communication Specifications and Connection Diagram

◆ Communication Specifications

Item		Specifications
Communication Standard		ANSI/TIA/EIA-422 Standard
Communication Protocol		MODBUS-RTU (Remote Terminal Unit)
Data Type	Data bit	8 bit
	Stop bit	1 bit
	Parity	None
Synchronous		Asynchronous method
Transmission Speed		9600/19200/38400/57600/115200(MDC)[bps] Speed can be selected at communication speed setting [0x3002]
Transmission Distance		Up to 200 [m]
Power Consumption		Less than 100[mA]

◆ Modbus-RTU Mode

RTU (Remote Terminal Unit) mode, each 8-bit byte in a message contains two 4-bit hexadecimal characters. The main advantage of this mode is that its greater character density allows better data throughput than ASCII for the same baud rate. Each message must be transmitted in a continuous stream.

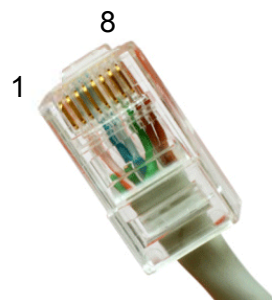
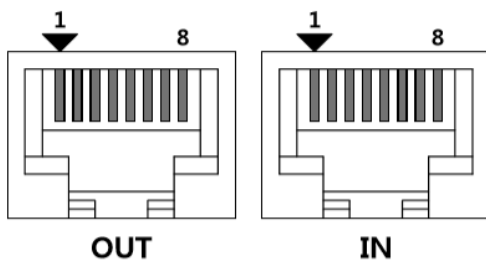
The format for each byte in RTU mode is:

Coding System: 8-bit binary, hexadecimal 0-9, A-F Two hexadecimal characters contained in each 8-bit field of the message

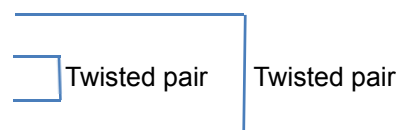
Bits per Byte: 1 start bit 8 data bits, least significant bit sent first 1 bit for even/odd parity; no bit for no parity 1 stop bit if parity is used; 2 bits if no parity

Error Check Field: Cyclical Redundancy Check (CRC)

◆ RS422 communication connector pin details (for ADC)



Pin no.	Description
1	No use
2	No use
3	RXD +
4	TXD -
5	TXD +
6	RXD -
7	No use (Note 1)
8	No use (Note 1)



The pair of TXD+ / TXD- (4,5) and RXD+ / RXD- (3,6) wires should be twisted wiring.

Note 1 : Never use these two pins to others. There is 5V power output for other purpose.

2 Basic Structure of Communication Protocol

ADC complies with the MODBUS-RTU Protocol for communication. For issues not specified in this manual, please see the related standards (Related Standard: Modbus Application Protocol Specification 1.1b, 2006.12.28)

In addition, the transmission (Tx) and reception (Rx) concepts are defined in reference to the host.

◆ Protocol Packet Descriptions

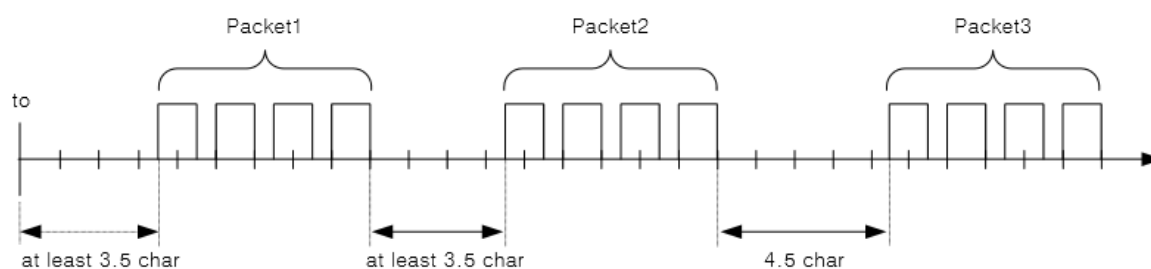
- Modbus RTU Frame Format

Name	Length(bits)	Function
Start	28	at least 3 ½ character times of silence (mark condition)
Address	8	Station Address
Function	8	Indicates the function code, eg read coils / inputs
Data	n * 8	Data + length will be filled depending on the message type
CRC	16	Error checks
End	28	at least 3 ½ character times of silence between frames

Transmission(Query)/Reception(Response) Packet Structure

Maximum length of transmission/reception packet of MODBUS-RTU is 256 Byte. Please make sure the total length of transmission/reception packet does not exceed 256 byte..

To classify packets, MODBUS-RTU Communication Mode requires empty spaces of at least 3.5 characters at the starting point and the end point.



ADC controller provide limit of maximum transmission up to 100 integers.

Modbus-RTU frame structure

Slave address (00 for TCP)	Function Code	Data	CRC (RTU) Low	CRC (RTU) High
-------------------------------	------------------	------	------------------	-------------------

- ◆ Slave address
- ◆ Function Code
- ◆ data
- ◆ CRC

How to Compute the Modbus RTU Message CRC

To ensure message data integrity, it is advisable to implement code that checks for serial port (UART) framing errors in addition to the verifying the message CRC. If the CRC in the received message does not match the CRC calculated by the receiving device, the message should be ignored. The C language code snippet below shows how to compute the Modbus message CRC using bit-wise shift and exclusive OR operations. The CRC is computed using every byte in the message frame except for the last two bytes which comprise the CRC itself.

```
// Compute the MODBUS RTU CRC
UInt16 ModRTU_CRC(byte[] buf, int len)
{
    UInt16 crc = 0xFFFF;

    for (int pos = 0; pos < len; pos++) {
        crc ^= (UInt16)buf[pos];          // XOR byte into least sig. byte of crc
        for (int i = 8; i != 0; i--) {    // Loop over each bit
            if ((crc & 0x0001) != 0) {    // If the LSB is set
                crc >>= 1;                // Shift right and XOR 0xA001
                crc ^= 0xA001;
            }
            else                          // Else LSB is not set
                crc >>= 1;                // Just shift right
        }
    }
    // Note, this number has low and high bytes swapped, so use it accordingly (or swap
    bytes)
    return crc;
}
```

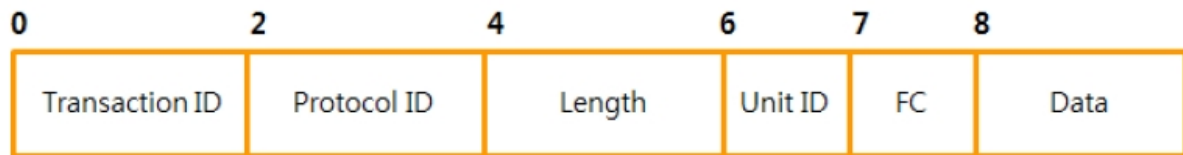
[On-line CRC calculation and free library and Help site](#)

- Modbus TCP Frame Format

Name	Length(byte)	Function
Transaction Identifier	2	For synchronization between messages of server & client
Protocol Identifier	2	Zero for Modbus/TCP
Length Field	2	Number of remaining bytes in this frame
Unit Identifier	1	Slave Address (use 0)
Function	1	Function codes as in other variants
Data	n	Data as response or commands

Format of Modbus/TCP frame is described in the below figure.

MODBUS TCP Frame Structure



◆ byte 0 ~ 1: transaction ID (Transaction Identification)

This means the sequence number of queries and responses. While TCP operates as a master, it is incremented by one in every query (It doesn't matter if this field is set to 0x0000).

◆ byte 2 ~ 3: protocol ID (Protocol Identification)

This means the protocol identification and the value is fixed as 0x0000 for Modbus/TCP

◆ byte 4 ~ 5: length

The value of this means the number of bytes from next byte of length field to the end of the frame.

◆ byte 6: unit ID (Unit Identification)

◆ byte 7: FC (Function Code)

◆ byte 8 ~ : data depending on function code

2 Function code & message details

Function code	Description	Remark
03 (0x03)	Read Holding Register	16bit data (Integer) ex) parameter
04 (0x04)	Read Input Register	16bit data ex) monitoring data
06 (0x06)	Write Single Register	16bit integer format ex) parameter data
16 (0x10)	Write Multi Register	16bit integer format ex) parameter data
17 (0x11)	Request Slave ID	
100 (0x64)	Request Graph date for MD	No use (Factory only)
200 (0xc8)	Request Graph date for AD	No use (Factory only)

◆ < **READ** > Function code 03 & 04 details

Function code 03 & 04 is used to read the register as like parameters and alarm in the slave device. The only integer number is allowed.

[Query (Request)]

Slave address (00 for TCP)	Function Code	Start address High	Start address Low	No of address High	No of address Low	CRC (RTU) Low	CRC (RTU) High
-------------------------------	------------------	-----------------------	----------------------	--------------------------	-------------------------	---------------------	----------------------

Function code consist of one byte. But start address and number of address are consisted by 2 bytes with 4 digits of hexadecimal, starting with first 2 digits for high number, second 2 digits for low number.

[OK Response]

Slave address (00 for TCP)	Function Code	No of byte	Data #1 High	Data #1 Low	... x n data	CRC (RTU) Low	CRC (RTU) High
-------------------------------	---------------	------------	-----------------	----------------	-----------------	------------------	-------------------

The number of data is consisted by 2 bytes with 4 digits of hexadecimal. So the total number of data is equal to 1/2 of the number of byte.

[Abnormal Respons]

Slave address (00 for TCP)	Function code +0x080	Error code	CRC (RTU) Low	CRC (RTU) High
-------------------------------	-------------------------	------------	------------------	-------------------

By adding 0x080 to the function code, it response any abnormal or wrong message

[Address for parameters]

Refer the appendix A for all address details for parameters

1 – 250 : Parameter address

1001 – 1250 : Parameter value range MIN

2001 – 2250 : Parameter value range MAX

[Example message, Query & Response]

To read the data of parameter 1 and 2, which is torque & speed value of Preset #1

(03 : Query)

Slave address (00 for TCP)	03	00	02	00	02	CRC Low	CRC High
-------------------------------	----	----	----	----	----	------------	-------------

Start address : 0002 (hex) = 2 (dec)

Number of address : 0002 (hex) = 2 (dec)

Read (Function code 03) data of two addresses (number of address 0002) from the address starting from address #2 (0002)

(03 : Response)

Slave address (00 for TCP)	Function Code	No of byte	Data #1 High	Data #1 Low	... x n data	CRC Low	CRC High
-------------------------------	---------------	------------	-----------------	----------------	--------------	------------	-------------

Slave address (00 for TCP)	03	04	01	0F	03	21	CRC Low	CRC High
-------------------------------	----	----	----	----	----	----	------------	-------------

Data value of 1st address : 010F (hex) = 271 (dec) ← torque value of Preset #1

Date value of 2nd address : 03E8(hex) = 1000 (dec) ← Torque limit value 10.00%

[Address for monitoring]

Refer the appendix A for all address details for monitoring

3100 – 3199 : Alarm data

3200 – 3299 : Data updated by event (Start, F/L, Preset change, Torque up)

3300 – 3399 : Real-time data

◆ < **WRITE** > Function code 06 : writing parameters

Function code 06 is used to WRITE the parameter value in each register. The only integer number is allowed.

(Query)

Slave address (00 for TCP)	Function Code	Address High	Address Low	Date High	Data Low	CRC Low	CRC High
-------------------------------	------------------	-----------------	----------------	--------------	-------------	------------	-------------

(OK Response)

Slave address (00 for TCP)	Function Code	Address High	Address Low	Date High	Data Low	CRC Low	CRC High
-------------------------------	------------------	-----------------	----------------	--------------	-------------	------------	-------------

It provides the echo response on the query (request) after writing data in register.

- Refer the appendix A for all address details for writing.
- For frequent torque parameter changing, there are register addresses from 261 to 267 for torque of preset #1 7. These data are saved in RAM of the controller for quick and temporary use. It can save the life time of EEPROM from frequent erase and writing. These memory are disappeared when the power is off.
- Address for the REMOTE CONTROL via serial COM.

Description	Address	Data
Alarm reset	4000	1
Driver operation Lock	4001	0 : Driver Unlock 1 : Lock both For & Rev 2 : Lock Reverse 3 : Lock Forward
Real-time monitoring	4002	No use (Factory only)
Remote start	4003	0 : Stop 1 : Start
Preset no. change	4004	1 – 15 : Preset #1 – 15 16 : Multi sequence A 17 : Multi sequence B
Forward / Reverse rotation	4005	0 : Fastening (Forward) 1 : Loosening (Reverse)
Firmware upgrade	4500	No use (Factory only)
Initialize to factory setting of the controller parameters	170	77

◆ < **WRITE - Multiple parameters** > Function code 16 : writing multiple parameters

!!! **ADC controller ONLY** !!!

Function code 16 is used to WRITE the multiple parameters in multiple registers. The only integer number is allowed.

For remote control, use the function code 06.

It is recommended not over 20 parameters for writing at once. Max data is limited within 200 bytes.

(Query)

Slave address (00 for TCP)	Function code	Start address High	Start address Low	Number of address High	Number of address Low	Byte count (address no x 2)	Date High	Date Low	CRC (RTU) Low	CRC (RTU) High

(OK Response)

Slave address (00 for TCP)	Function Code	Start address High	Start address Low	Number of address High	Number of address Low	CRC (RTU) Low	CRC (RTU) High

[Example message, Query & Response]

To write the data of parameter 2 and 3, which is torque & torque limit value of Preset #1
as below

Torque : 15.00 Torque limit : 10% (10.00)

Query

01 10 00 02 00 03 04 05 DC 03 E8 B2 EF

Response

01 10 00 02 00 02 E0 08

◆ < **REQUEST** > Function code 17 : Slave device information

Function code 17 is used to read the slave device information about ID no, controller model, screwdriver model, serial no and firmware version.

(Query)

Slave address (00 for TCP)	Function Code (17)	CRC (RTU) Low	CRC (RTU) High

(Response)

Slave address (00 for TCP)	Function Code	No. of byte	ID High	ID Low	Controller model High	Controller model Low	Screw driver model High	Screw driver model Low	Ver. High	Ver. Low	S/N 4	S/N 3	S/N 2	S/N 1	CRC (RTU) Low	CRC (RTU) High

◆ **Error code** for abnormal response

If there are wrong function code or communication failure by protocol (parity, LRC, CRC..etc.), there will be no response. The master will show “ TIME OUT ” error.

If the query contains wrong function code or address, the function code + 0x80 will be responded together with the following error code in data registry.

Error code	Description
0x01	No defined function code or wrong function code
0x02	Wrong address or no existing address
0x03	Data length over the capacity
0x07	Wrong CRC value in query
0x0C	Over the number of byte
0x0E	Range of data is not available

[Example message, Query & Response]

To read the 5 parameter data starting from 564 to 568

(01 : Query)

Slave address (00 for TCP)	01	02	34	00	05	CRC Low	CRC High
-------------------------------	----	----	----	----	----	------------	-------------

Start address : 0234 (hex) = 564 (dec)

Number of address : 0005 (hex) = 5 (dec)

Function code 01 is not defined. → Function code error

Parameter from 564 to 568 are not existing. → No existing address

(01 + 80 : Response)

Slave address (00 for TCP)	81	02	CRC Low	CRC High
-------------------------------	----	----	------------	-------------

Function code (01) + 0x80 = 81

Error code for wrong data address = 02

- ◆ < **REQUEST** > Function code 100 (0x64) : monitoring data output for MDC
Function code 200 (0x64) : monitoring data output for ADC

*** This function is exceptional from Modbus protocol.

Function code 100 is used to response with the monitoring data.

To request the monitoring data, use the function code 06 with data on the below address.

Parameter and data for monitoring

Address	Description	Data
4100	Monitoring curve data output	0 : Disable, 1 : Enable To keep monitoring ON, repeat request with 1(Enable) in every 10 seconds.
4101	Channel 1 monitoring data	1:torque, 2:current, 3:speed, 4:angle, 5:speed command, 6:current command (mA), 7: Sung Angle
4102	Channel 2 monitoring data	0: disable, 1:torque, 2:current, 3:speed, 4:angle, 5:speed command, 6:current command (mA), 7: Sung Angle
4103	Sampling time	1 : 5ms, 2 : 10ms, 3 : 15ms
4104	Option 1	1 : fastening, 2: loosening, 3 : both

Request the desired data on the above parameters in the address 4101, 4102, 4103 and 4104. And repeat the request data "1" (Enable) on the parameter address 4100 in every 10 seconds to keep data output ON. Otherwise the data output will be OFF

For example, to monitor the curve data of torque at channel 1, speed at channel 2,

Address 4101 : 1 (torque at channel 1)

Address 4102 : 2 (speed at channel 2)

(Query)

Slave address (00 for TCP)	Function Code 06	Address High	Address Low	Date High	Data Low	CRC Low	CRC High
-------------------------------	---------------------	-----------------	----------------	--------------	-------------	------------	-------------

(Response)

Slave address (00 for TCP)	Function Code 100	No of byte High	No of byte Low	Data #1 High	Data #1 Low	... x n data	CRC Low	CRC High
-------------------------------	----------------------	--------------------	-------------------	-----------------	----------------	--------------	------------	-------------

The order of response data

1 : Channel 1

2 : Channel 2

3 : Sampling time

4 : Option 1

5 : Number of data

6 : Fastening time

7 : Target torque

8 : Converted torque

9 : Speed

10 : A1 angle

11 : A2 angle

12 : Sung Angle

13 : Error code

14 : Number of Screw Count

15 : Status (1 : Complete, 0 : others)

16 – 415 (max) : monitoring data (not fixed number) / maximum 400 data for two channels.

If the monitoring data is for only channel 1, all from 16th data are included in Channel 1.

If two channels are selected, the data for channel 2 comes later the data of channel 1.

For example, total number of data are 400, the first 200 data are for channel 1. The rest 200 data are for channel 2

16th – 215th : Data for channel 1

216th – 415th : Data for channel 2

Quick Guide to Auto Data Output for the MDC

There are two ways to retrieve data from the MDC.

1. Standard mode (Auto data output is not enabled)

The ParaMon software utilizes Modbus-RTU protocol. This mode allows you to read and write to the registry within the controller.

- ## 2. Auto data output (Parameter A297)

If auto data output is enabled on the controller, data is available via RS232 or via ethernet. A selection for Auto data output type (Parameter A303) must be selected. Options are RS232 or Ethernet. This mode will allow you to retrieve data in real time.

It is not possible to communicate with the controller via the ParaMon software if Auto data output is enabled. Auto data output must be set to no if there is a need to communicate with the controller via the data type, i.e. RS232 or Ethernet.

If Auto data output is enabled. The controller will send sets of 33 bytes, as shown in following figure. Each byte is represented by 2 hexadecimal characters.



The following figure depicts the Modbus-RTU Frame Structure.

Slave address (00 for TCP)	Function Code	No of byte	Data #1 High	Data #1 Low	... x n data	CRC (RTU)	CRC (RTU)
-------------------------------	---------------	------------	-----------------	----------------	-----------------	--------------	--------------

The following figure represents the main structure of the message received.



- First data byte (red), is the address for your device.

Quick Guide to Auto Data Output for the MDC

- The second data byte (orange), indicates the command for the message, also called, function code, in auto data output it will be a hex value for the message received.
- The third data byte (green), indicates number of data bytes ahead on this particular message, before the CRC values.
- The data values come in byte pairs, the first byte will be the high value for the first piece of data, and the second byte will be the low value. The first pair (blue), represents the sequential count for the messages sent. The following pairs will be 0CCB, 0001.....etc., as shown in the table below.
- The last pair of bytes (purple) are the cyclic redundancy check (CRC) from the protocol, which are utilized to verify that the message is complete. Please refer to the Com Protocol manual for CRC Calculation.

Data updated on events (Start, F/L, Preset, Torque up)	Event count no. (1- 65,536)	0x0146
	Fastening time (ms)	0x0CCB : 3275ms
	Preset no.	0x0001 : 1
	Target torque (* x 100)	0x0640 : 1600 :16.00 lbf.in
	Converted torque (* x 100)	0x5F5 : 1556 : 15.56 lbf.in
	Target speed (rpm)	0x008D : 141
	A1 => Angle to engage ->degree	0x0C54 : 3156
	A2 => Angle after engaging ->degree	0x0013 : 19
	A3 => Total angle ->degree	0x0C67 : 3175
	Screw count value	0x0001 : 1
	Error	0x0000
	Forward / Loosening (F=01, L=1)	0x0000
	Status (Fastening complete= 1, other=0)	0x0001
	Snug torque angle (degree)	0x0000

Appendix A: Parameter factory setting, Address and Function code details for MDC

	Preset #	Parameter	Address	Factory setting	Address for Min value	Address for Max value	Function code
	1	TC/AM_AC/TM	1	0	1001	2001	Read : 0x03 Write : 0x06
		Torque	2	Auto	1002	2002	Read : 0x03 Write : 0x06
		Torque min/max (%)	3	0	1003	2003	Read : 0x03 Write : 0x06
		Target angle(degree)	4	0	1004	2004	Read : 0x03 Write : 0x06
		Min angle(degree)	5	0	1005	2005	Read : 0x03 Write : 0x06
		Max angle(degree)	6	0	1006	2006	Read : 0x03 Write : 0x06
		Snug torque(%)	7	0	1007	2007	Read : 0x03 Write : 0x06
		Speed (rpm)	8	Auto	1008	2008	Read : 0x03 Write : 0x06
		Free fastenig angle(degree)	9	0	1009	2009	Read : 0x03 Write : 0x06
		Free fastenig speed(rpm)	10	0	1010	2010	Read : 0x03 Write : 0x06
		Soft start(1-300ms)	11	0	1011	2011	Read : 0x03 Write : 0x06
		Seating point (%) 10-90	12	Auto	1012	2012	Read : 0x03 Write : 0x06
		Torque rising rate(ms) 50-200	13	50	1013	2013	Read : 0x03 Write : 0x06
		Ramp up speed(rpm) 20-80% of max	14	Auto	1014	2014	Read : 0x03 Write : 0x06
		Torque compensation (%) 90-110	15	100	1015	2015	Read : 0x03 Write : 0x06
	2	TC/AM_AC/TM	16	0	1016	2016	Read : 0x03 Write : 0x06
		Torque	17	Auto	1017	2017	Read : 0x03 Write : 0x06
		Torque min/max (%)	18	0	1018	2018	Read : 0x03 Write : 0x06
		Target angle(degree)	19	0	1019	2019	Read : 0x03 Write : 0x06
		Min angle(degree)	20	0	1020	2020	Read : 0x03 Write : 0x06
		Max angle(degree)	21	0	1021	2021	Read : 0x03 Write : 0x06
		Snug torque(%)	22	0	1022	2022	Read : 0x03 Write : 0x06
		Speed (rpm)	23	Auto	1023	2023	Read : 0x03 Write : 0x06
		Free fastenig angle(degree)	24	0	1024	2024	Read : 0x03 Write : 0x06
		Free fastenig speed(rpm)	25	0	1025	2025	Read : 0x03 Write : 0x06
		Soft start(1-300ms)	26	0	1026	2026	Read : 0x03 Write : 0x06
		Seating point (%) 10-90	27	Auto	1027	2027	Read : 0x03 Write : 0x06
		Torque rising rate(ms) 50-200	28	50	1028	2028	Read : 0x03 Write : 0x06
		Ramp up speed(rpm) 20-80% of max	29	Auto	1029	2029	Read : 0x03 Write : 0x06
		Torque compensation (%) 90-110	30	100	1030	2030	Read : 0x03 Write : 0x06
	3	TC/AM_AC/TM	31	0	1031	2031	Read : 0x03 Write : 0x06
		Torque	32	Auto	1032	2032	Read : 0x03 Write : 0x06
		Torque min/max (%)	33	0	1033	2033	Read : 0x03 Write : 0x06
		Target angle(degree)	34	0	1034	2034	Read : 0x03 Write : 0x06
		Min angle(degree)	35	0	1035	2035	Read : 0x03 Write : 0x06
		Max angle(degree)	36	0	1036	2036	Read : 0x03 Write : 0x06
		Snug torque(%)	37	0	1037	2037	Read : 0x03 Write : 0x06
		Speed (rpm)	38	Auto	1038	2038	Read : 0x03 Write : 0x06
		Free fastenig angle(degree)	39	0	1039	2039	Read : 0x03 Write : 0x06
		Free fastenig speed(rpm)	40	0	1040	2040	Read : 0x03 Write : 0x06
		Soft start(1-300ms)	41	0	1041	2041	Read : 0x03 Write : 0x06
		Seating point (%) 10-90	42	Auto	1042	2042	Read : 0x03 Write : 0x06
		Torque rising rate(ms) 50-200	43	50	1043	2043	Read : 0x03 Write : 0x06
		Ramp up speed(rpm) 20-80% of max	44	Auto	1044	2044	Read : 0x03 Write : 0x06
		Torque compensation (%) 90-110	45	100	1045	2045	Read : 0x03 Write : 0x06
	4	TC/AM_AC/TM	46	0	1046	2046	Read : 0x03 Write : 0x06
		Torque	47	Auto	1047	2047	Read : 0x03 Write : 0x06
		Torque min/max (%)	48	0	1048	2048	Read : 0x03 Write : 0x06
		Target angle(degree)	49	0	1049	2049	Read : 0x03 Write : 0x06
		Min angle(degree)	50	0	1050	2050	Read : 0x03 Write : 0x06
		Max angle(degree)	51	0	1051	2051	Read : 0x03 Write : 0x06
		Snug torque(%)	52	0	1052	2052	Read : 0x03 Write : 0x06
		Speed (rpm)	53	Auto	1053	2053	Read : 0x03 Write : 0x06
		Free fastenig angle(degree)	54	0	1054	2054	Read : 0x03 Write : 0x06
		Free fastenig speed(rpm)	55	0	1055	2055	Read : 0x03 Write : 0x06
		Soft start(1-300ms)	56	0	1056	2056	Read : 0x03 Write : 0x06
		Seating point (%) 10-90	57	Auto	1057	2057	Read : 0x03 Write : 0x06
		Torque rising rate(ms) 50-200	58	50	1058	2058	Read : 0x03 Write : 0x06
		Ramp up speed(rpm) 20-80% of max	59	Auto	1059	2059	Read : 0x03 Write : 0x06
		Torque compensation (%) 90-110	60	100	1060	2060	Read : 0x03 Write : 0x06
	5	TC/AM_AC/TM	61	0	1061	2061	Read : 0x03 Write : 0x06
		Torque	62	Auto	1062	2062	Read : 0x03 Write : 0x06
		Torque min/max (%)	63	0	1063	2063	Read : 0x03 Write : 0x06
		Target angle(degree)	64	0	1064	2064	Read : 0x03 Write : 0x06
		Min angle(degree)	65	0	1065	2065	Read : 0x03 Write : 0x06
		Max angle(degree)	66	0	1066	2066	Read : 0x03 Write : 0x06
		Snug torque(%)	67	0	1067	2067	Read : 0x03 Write : 0x06
		Speed (rpm)	68	Auto	1068	2068	Read : 0x03 Write : 0x06
		Free fastenig angle(degree)	69	0	1069	2069	Read : 0x03 Write : 0x06
		Free fastenig speed(rpm)	70	0	1070	2070	Read : 0x03 Write : 0x06
		Soft start(1-300ms)	71	0	1071	2071	Read : 0x03 Write : 0x06
		Seating point (%) 10-90	72	Auto	1072	2072	Read : 0x03 Write : 0x06
		Torque rising rate(ms) 50-200	73	50	1073	2073	Read : 0x03 Write : 0x06
		Ramp up speed(rpm) 20-80% of max	74	Auto	1074	2074	Read : 0x03 Write : 0x06

Fastening	6	Torque compensation (%) 90-110	75	100	1075	2075	Read : 0x03 Write : 0x06
		TC/AM_AC/TM	76	0	1076	2076	Read : 0x03 Write : 0x06
		Torque	77	Auto	1077	2077	Read : 0x03 Write : 0x06
		Torque min/max (%)	78	0	1078	2078	Read : 0x03 Write : 0x06
		Target angle(degree)	79	0	1079	2079	Read : 0x03 Write : 0x06
		Min angle(degree)	80	0	1080	2080	Read : 0x03 Write : 0x06
		Max angle(degree)	81	0	1081	2081	Read : 0x03 Write : 0x06
		Snug torque(%)	82	0	1082	2082	Read : 0x03 Write : 0x06
		Speed (rpm)	83	Auto	1083	2083	Read : 0x03 Write : 0x06
		Free fastenig angle(degree)	84	0	1084	2084	Read : 0x03 Write : 0x06
		Free fastenig speed(rpm)	85	0	1085	2085	Read : 0x03 Write : 0x06
		Soft start(1-300ms)	86	0	1086	2086	Read : 0x03 Write : 0x06
		Seating point (%) 10-90	87	Auto	1087	2087	Read : 0x03 Write : 0x06
		Torque rising rate(ms) 50-200	88	50	1088	2088	Read : 0x03 Write : 0x06
		Ramp up speed(rpm) 20-80% of max	89	Auto	1089	2089	Read : 0x03 Write : 0x06
	7	Torque compensation (%) 90-110	90	100	1090	2090	Read : 0x03 Write : 0x06
		TC/AM_AC/TM	91	0	1091	2091	Read : 0x03 Write : 0x06
		Torque	92	Auto	1092	2092	Read : 0x03 Write : 0x06
		Torque min/max (%)	93	0	1093	2093	Read : 0x03 Write : 0x06
		Target angle(degree)	94	0	1094	2094	Read : 0x03 Write : 0x06
		Min angle(degree)	95	0	1095	2095	Read : 0x03 Write : 0x06
		Max angle(degree)	96	0	1096	2096	Read : 0x03 Write : 0x06
		Snug torque(%)	97	0	1097	2097	Read : 0x03 Write : 0x06
		Speed (rpm)	98	Auto	1098	2098	Read : 0x03 Write : 0x06
		Free fastenig angle(degree)	99	0	1099	2099	Read : 0x03 Write : 0x06
		Free fastenig speed(rpm)	100	0	1100	2100	Read : 0x03 Write : 0x06
		Soft start(1-300ms)	101	0	1101	2101	Read : 0x03 Write : 0x06
		Seating point (%) 10-90	102	Auto	1102	2102	Read : 0x03 Write : 0x06
		Torque rising rate(ms) 50-200	103	50	1103	2103	Read : 0x03 Write : 0x06
		Ramp up speed(rpm) 20-80% of max	104	Auto	1104	2104	Read : 0x03 Write : 0x06
	8	Torque compensation (%) 90-110	105	100	1105	2105	Read : 0x03 Write : 0x06
		TC/AM_AC/TM	106	0	1106	2106	Read : 0x03 Write : 0x06
		Torque	107	Auto	1107	2107	Read : 0x03 Write : 0x06
		Torque min/max (%)	108	0	1108	2108	Read : 0x03 Write : 0x06
		Target angle(degree)	109	0	1109	2109	Read : 0x03 Write : 0x06
		Min angle(degree)	110	0	1110	2110	Read : 0x03 Write : 0x06
		Max angle(degree)	111	0	1111	2111	Read : 0x03 Write : 0x06
		Snug torque(%)	112	0	1112	2112	Read : 0x03 Write : 0x06
		Speed (rpm)	113	Auto	1113	2113	Read : 0x03 Write : 0x06
		Free fastenig angle(degree)	114	0	1114	2114	Read : 0x03 Write : 0x06
		Free fastenig speed(rpm)	115	0	1115	2115	Read : 0x03 Write : 0x06
		Soft start(1-300ms)	116	0	1116	2116	Read : 0x03 Write : 0x06
		Seating point (%) 10-90	117	Auto	1117	2117	Read : 0x03 Write : 0x06
		Torque rising rate(ms) 50-200	118	50	1118	2118	Read : 0x03 Write : 0x06
		Ramp up speed(rpm) 20-80% of max	119	Auto	1119	2119	Read : 0x03 Write : 0x06
	9	Torque compensation (%) 90-110	120	100	1120	2120	Read : 0x03 Write : 0x06
		TC/AM_AC/TM	121	0	1121	2121	Read : 0x03 Write : 0x06
		Torque	122	Auto	1122	2122	Read : 0x03 Write : 0x06
		Torque min/max (%)	123	0	1123	2123	Read : 0x03 Write : 0x06
		Target angle(degree)	124	0	1124	2124	Read : 0x03 Write : 0x06
		Min angle(degree)	125	0	1125	2125	Read : 0x03 Write : 0x06
		Max angle(degree)	126	0	1126	2126	Read : 0x03 Write : 0x06
		Snug torque(%)	127	0	1127	2127	Read : 0x03 Write : 0x06
		Speed (rpm)	128	Auto	1128	2128	Read : 0x03 Write : 0x06
		Free fastenig angle(degree)	129	0	1129	2129	Read : 0x03 Write : 0x06
		Free fastenig speed(rpm)	130	0	1130	2130	Read : 0x03 Write : 0x06
		Soft start(1-300ms)	131	0	1131	2131	Read : 0x03 Write : 0x06
		Seating point (%) 10-90	132	Auto	1132	2132	Read : 0x03 Write : 0x06
		Torque rising rate(ms) 50-200	133	50	1133	2133	Read : 0x03 Write : 0x06
		Ramp up speed(rpm) 20-80% of max	134	Auto	1134	2134	Read : 0x03 Write : 0x06
	10	Torque compensation (%) 90-110	135	100	1135	2135	Read : 0x03 Write : 0x06
		TC/AM_AC/TM	136	0	1136	2136	Read : 0x03 Write : 0x06
		Torque	137	Auto	1137	2137	Read : 0x03 Write : 0x06
		Torque min/max (%)	138	0	1138	2138	Read : 0x03 Write : 0x06
		Target angle(degree)	139	0	1139	2139	Read : 0x03 Write : 0x06
		Min angle(degree)	140	0	1140	2140	Read : 0x03 Write : 0x06
		Max angle(degree)	141	0	1141	2141	Read : 0x03 Write : 0x06
		Snug torque(%)	142	0	1142	2142	Read : 0x03 Write : 0x06
		Speed (rpm)	143	Auto	1143	2143	Read : 0x03 Write : 0x06
		Free fastenig angle(degree)	144	0	1144	2144	Read : 0x03 Write : 0x06
		Free fastenig speed(rpm)	145	0	1145	2145	Read : 0x03 Write : 0x06
		Soft start(1-300ms)	146	0	1146	2146	Read : 0x03 Write : 0x06
		Seating point (%) 10-90	147	Auto	1147	2147	Read : 0x03 Write : 0x06
		Torque rising rate(ms) 50-200	148	50	1148	2148	Read : 0x03 Write : 0x06
		Ramp up speed(rpm) 20-80% of max	149	Auto	1149	2149	Read : 0x03 Write : 0x06
		Torque compensation (%) 90-110	150	100	1150	2150	Read : 0x03 Write : 0x06
		TC/AM_AC/TM	151	0	1151	2151	Read : 0x03 Write : 0x06
		Torque	152	Auto	1152	2152	Read : 0x03 Write : 0x06
		Torque min/max (%)	153	0	1153	2153	Read : 0x03 Write : 0x06
		Target angle(degree)	154	0	1154	2154	Read : 0x03 Write : 0x06
		Min angle(degree)	155	0	1155	2155	Read : 0x03 Write : 0x06
		Max angle(degree)	156	0	1156	2156	Read : 0x03 Write : 0x06
		Snug torque(%)	157	0	1157	2157	Read : 0x03 Write : 0x06

11	Speed (rpm)	158	Auto	1158	2158	Read : 0x03 Write : 0x06
	Free fastenig angle(degree)	159	0	1159	2159	Read : 0x03 Write : 0x06
	Free fastenig speed(rpm)	160	0	1160	2160	Read : 0x03 Write : 0x06
	Soft start(1-300ms)	161	0	1161	2161	Read : 0x03 Write : 0x06
	Seating point (%) 10-90	162	Auto	1162	2162	Read : 0x03 Write : 0x06
	Torque rising rate(ms) 50-200	163	50	1163	2163	Read : 0x03 Write : 0x06
	Ramp up speed(rpm) 20-80% of max	164	Auto	1164	2164	Read : 0x03 Write : 0x06
	Torque compensation (%) 90-110	165	100	1165	2165	Read : 0x03 Write : 0x06
	TC/AM AC/TM	166	0	1166	2166	Read : 0x03 Write : 0x06
	Torque	167	Auto	1167	2167	Read : 0x03 Write : 0x06
12	Torque min/max (%)	168	0	1168	2168	Read : 0x03 Write : 0x06
	Target angle(degree)	169	0	1169	2169	Read : 0x03 Write : 0x06
	Min angle(degree)	170	0	1170	2170	Read : 0x03 Write : 0x06
	Max angle(degree)	171	0	1171	2171	Read : 0x03 Write : 0x06
	Snug torque(%)	172	0	1172	2172	Read : 0x03 Write : 0x06
	Speed (rpm)	173	Auto	1173	2173	Read : 0x03 Write : 0x06
	Free fastenig angle(degree)	174	0	1174	2174	Read : 0x03 Write : 0x06
	Free fastenig speed(rpm)	175	0	1175	2175	Read : 0x03 Write : 0x06
	Soft start(1-300ms)	176	0	1176	2176	Read : 0x03 Write : 0x06
	Seating point (%) 10-90	177	Auto	1177	2177	Read : 0x03 Write : 0x06
13	Torque rising rate(ms) 50-200	178	50	1178	2178	Read : 0x03 Write : 0x06
	Ramp up speed(rpm) 20-80% of max	179	Auto	1179	2179	Read : 0x03 Write : 0x06
	Torque compensation (%) 90-110	180	100	1180	2180	Read : 0x03 Write : 0x06
	TC/AM AC/TM	181	0	1181	2181	Read : 0x03 Write : 0x06
	Torque	182	Auto	1182	2182	Read : 0x03 Write : 0x06
	Torque min/max (%)	183	0	1183	2183	Read : 0x03 Write : 0x06
	Target angle(degree)	184	0	1184	2184	Read : 0x03 Write : 0x06
	Min angle(degree)	185	0	1185	2185	Read : 0x03 Write : 0x06
	Max angle(degree)	186	0	1186	2186	Read : 0x03 Write : 0x06
	Snug torque(%)	187	0	1187	2187	Read : 0x03 Write : 0x06
14	Speed (rpm)	188	Auto	1188	2188	Read : 0x03 Write : 0x06
	Free fastenig angle(degree)	189	0	1189	2189	Read : 0x03 Write : 0x06
	Free fastenig speed(rpm)	190	0	1190	2190	Read : 0x03 Write : 0x06
	Soft start(1-300ms)	191	0	1191	2191	Read : 0x03 Write : 0x06
	Seating point (%) 10-90	192	Auto	1192	2192	Read : 0x03 Write : 0x06
	Torque rising rate(ms) 50-200	193	50	1193	2193	Read : 0x03 Write : 0x06
	Ramp up speed(rpm) 20-80% of max	194	Auto	1194	2194	Read : 0x03 Write : 0x06
	Torque compensation (%) 90-110	195	100	1195	2195	Read : 0x03 Write : 0x06
	TC/AM AC/TM	196	0	1196	2196	Read : 0x03 Write : 0x06
	Torque	197	Auto	1197	2197	Read : 0x03 Write : 0x06
15	Torque min/max (%)	198	0	1198	2198	Read : 0x03 Write : 0x06
	Target angle(degree)	199	0	1199	2199	Read : 0x03 Write : 0x06
	Min angle(degree)	200	0	1200	2200	Read : 0x03 Write : 0x06
	Max angle(degree)	201	0	1201	2201	Read : 0x03 Write : 0x06
	Snug torque(%)	202	0	1202	2202	Read : 0x03 Write : 0x06
	Speed (rpm)	203	Auto	1203	2203	Read : 0x03 Write : 0x06
	Free fastenig angle(degree)	204	0	1204	2204	Read : 0x03 Write : 0x06
	Free fastenig speed(rpm)	205	0	1205	2205	Read : 0x03 Write : 0x06
	Soft start(1-300ms)	206	0	1206	2206	Read : 0x03 Write : 0x06
	Seating point (%) 10-90	207	Auto	1207	2207	Read : 0x03 Write : 0x06
	Torque rising rate(ms) 50-200	208	50	1208	2208	Read : 0x03 Write : 0x06
	Ramp up speed(rpm) 20-80% of max	209	Auto	1209	2209	Read : 0x03 Write : 0x06
	Torque compensation (%) 90-110	210	100	1210	2210	Read : 0x03 Write : 0x06
	TC/AM AC/TM	211	0	1211	2211	Read : 0x03 Write : 0x06
	Torque	212	Auto	1212	2212	Read : 0x03 Write : 0x06
	Torque min/max (%)	213	0	1213	2213	Read : 0x03 Write : 0x06
	Target angle(degree)	214	0	1214	2214	Read : 0x03 Write : 0x06
	Min angle(degree)	215	0	1215	2215	Read : 0x03 Write : 0x06
	Max angle(degree)	216	0	1216	2216	Read : 0x03 Write : 0x06
	Snug torque(%)	217	0	1217	2217	Read : 0x03 Write : 0x06
	Speed (rpm)	218	Auto	1218	2218	Read : 0x03 Write : 0x06
	Free fastenig angle(degree)	219	0	1219	2219	Read : 0x03 Write : 0x06
	Free fastenig speed(rpm)	220	0	1220	2220	Read : 0x03 Write : 0x06
	Soft start(1-300ms)	221	0	1221	2221	Read : 0x03 Write : 0x06
	Seating point (%) 10-90	222	Auto	1222	2222	Read : 0x03 Write : 0x06
	Torque rising rate(ms) 50-200	223	50	1223	2223	Read : 0x03 Write : 0x06
	Ramp up speed(rpm) 20-80% of max	224	Auto	1224	2224	Read : 0x03 Write : 0x06
	Torque compensation (%) 90-110	225	100	1225	2225	Read : 0x03 Write : 0x06
	TC/AM AC/TM	226	1	1226	2226	Read : 0x03 Write : 0x06
	Torque	227	2	1227	2227	Read : 0x03 Write : 0x06
I/O	Input #1	0) None				
	Input #2	1) Torque select 1				
	Input #3	2) Torque select 2				
	Input #4	3) Torque select 3				
	Input #5	4) Torque select 4				
	Input #6	5) Start				
	Input #7	6) Fastening / Loosening				
	Input #8	7) Driver Lock				
	Output #1	8) Multi sequence				
	Output #2	9) Alarm reset				
I/O (OUT)	Output #3	10) Count start				
	Output #4	11) Count reset				
	Output #5	12) Count(workpiece)				
	Output #6	13) Model cancel				
	Output #7	14) Model select 1				
		15) Model select 2				
		16) Model select 3				
		Choose one of the below				
		0) None				
		1) Torque Up				
	Output #1	2) Fastening OK				
	Output #2	3) Ready				
	Output #3	4) Alarm				
	Output #4	5) Status of F/L				
	Output #5	6) Count complete				
	Output #6	7) Alarm code 1				
	Output #7					

		Output #8	7) Alarm code 1 8) Alarm code 2	241	8	1241	2241	Read : 0x03 Write : 0x06
Screw count	Screw count	Sensor signal type 0 - 3		242	0	1242	2242	Read : 0x03 Write : 0x06
		Time limit (if P122-->2)		243	0	1243	2243	Read : 0x03 Write : 0x06
		Count complete OUT manage		244	0	1244	2244	Read : 0x03 Write : 0x06
		Middle count no. 0 - 99		245	0	1245	2245	Read : 0x03 Write : 0x06
		Sensor signal delay time (x10ms)		246	0	1246	2246	Read : 0x03 Write : 0x06
		Total count (screw no.)		247	5	1247	2247	Read : 0x03 Write : 0x06
Advanced Function	Free Reverse	Enable(1) / Disable(0)		250	0	1250	2250	Read : 0x03 Write : 0x06
		Speed (rpm)		251	0	1251	2251	Read : 0x03 Write : 0x06
		Angle (turn) 0 - 20		252	0	1252	2252	Read : 0x03 Write : 0x06
		Applicable Preset # 1-15		253	0	1253	2253	Read : 0x03 Write : 0x06
	Engaging torque detection	Enable(1) / Disable(0)		254	0	1254	2254	Read : 0x03 Write : 0x06
		Speed (rpm)		255	0	1255	2255	Read : 0x03 Write : 0x06
		Torque(%)		256	0	1256	2256	Read : 0x03 Write : 0x06
		Angle limit (turn) 0 - 20		257	0	1257	2257	Read : 0x03 Write : 0x06
		Time limit (sec)		258	0	1258	2258	Read : 0x03 Write : 0x06
		Applicable Preset # 1-15		259	0	1259	2259	Read : 0x03 Write : 0x06
		Angle start from engaging		260	0	1260	2260	Read : 0x03 Write : 0x06
	Extra angle after torque up	Enable(1) / Disable(0)		261	0	1261	2261	Read : 0x03 Write : 0x06
		Speed (rpm)		262	0	1262	2262	Read : 0x03 Write : 0x06
		Angle (degree) 0-3600		263	0	1263	2263	Read : 0x03 Write : 0x06
		Direction		264	0	1264	2264	Read : 0x03 Write : 0x06
		Applicable Preset # 1-15		265	0	1265	2265	Read : 0x03 Write : 0x06
Controller	Setting 1	Run time limit / Forward (sec)		270	10	1270	2270	Read : 0x03 Write : 0x06
		Run time limit / Reverse (sec)		271	10	1271	2271	Read : 0x03 Write : 0x06
		Motor stall time limit (sec)		272	0.2	1272	2272	Read : 0x03 Write : 0x06
		Loosening speed (rpm)		273	Auto	1273	2273	Read : 0x03 Write : 0x06
		Motor acceleration (ms)		274	100	1274	2274	Read : 0x03 Write : 0x06
		Fastening complete signal OUT time		275	0	1275	2275	Read : 0x03 Write : 0x06
		Driver ID no.		276	1	1276	2276	Read : 0x03 Write : 0x06
		Error display reset time		277	1	1277	2277	Read : 0x03 Write : 0x06
		Torque compensation master (%) 90-110		278	100	1278	2278	Read : 0x03 Write : 0x06
		LCD brightness 10-64		279	45	1279	2279	Read : 0x03 Write : 0x06
		Initial preset # when power ON		280	1	1280	2280	Read : 0x03 Write : 0x06
		Driver model no. 1-99		281	Auto	1281	2281	Read : 0x03 Write : 0x06
		Password 0-9999		282	0	1282	2282	Read : 0x03 Write : 0x06
		Parameter initialize to factory setting		283	0	1283	2283	Read : 0x03 Write : 0x06
	Setting 2	Driver auto lock (for Model)		284	0	1284	2284	Read : 0x03 Write : 0x06
		Torque holding time(ms) 1-20		285	2	1285	2285	Read : 0x03 Write : 0x06
		Auto speed on torque setting		290	1	1290	2290	Read : 0x03 Write : 0x06
		Judge fastening min turns		291	0	1291	2291	Read : 0x03 Write : 0x06
		Model select		292	0	1292	2292	Read : 0x03 Write : 0x06
		Fastening stop error		293	0	1293	2293	Read : 0x03 Write : 0x06
		Reverse Lock		294	0	1294	2294	Read : 0x03 Write : 0x06
		Trigger start (Handheld only)		295	0	1295	2295	Read : 0x03 Write : 0x06
		Reverse start (Handheld only)		296	0	1296	2296	Read : 0x03 Write : 0x06
		Auto data output		297	0	1297	2297	Read : 0x03 Write : 0x06
		Beep sound		298	1	1298	2298	Read : 0x03 Write : 0x06
		Preset change by Touch pannel		299	1	1299	2299	Read : 0x03 Write : 0x06
		COM port Baud rate		300	4	1300	2300	Read : 0x03 Write : 0x06
		Torque unit		301	0	1301	2301	Read : 0x03 Write : 0x06
		Screw type		302	0	1302	2302	Read : 0x03 Write : 0x06
		Auto update port		303	0	1303	2303	Read : 0x03 Write : 0x06
		Lamp on time		304	0	1304	2304	Read : 0x03 Write : 0x06
		Option card		305	0	1305	2305	Read : 0x03 Write : 0x06
IP Address		IP Address1		310	192	1310	2310	Read : 0x03 Write : 0x06
		IP Address2		311	168	1311	2311	Read : 0x03 Write : 0x06
		IP Address3		312	1	1312	2312	Read : 0x03 Write : 0x06
		IP Address4		313	100	1313	2313	Read : 0x03 Write : 0x06
		Gateway 1		314	192	1314	2314	Read : 0x03 Write : 0x06
		Gateway 2		315	168	1315	2315	Read : 0x03 Write : 0x06
		Gateway 3		316	1	1316	2316	Read : 0x03 Write : 0x06
		Gateway 4		317	1	1317	2317	Read : 0x03 Write : 0x06
Multi SQ		Port		318	5000	1318	2318	Read : 0x03 Write : 0x06
		MS PG 1		321	0	1321	2321	Read : 0x03 Write : 0x06
		MS PG 2		322	0	1322	2322	Read : 0x03 Write : 0x06
		MS PG 3		323	0	1323	2323	Read : 0x03 Write : 0x06
		MS PG 4		324	0	1324	2324	Read : 0x03 Write : 0x06
		MS PG 5		325	0	1325	2325	Read : 0x03 Write : 0x06
		MS PG 6		326	0	1326	2326	Read : 0x03 Write : 0x06
		MS PG 7		327	0	1327	2327	Read : 0x03 Write : 0x06
		MS PG 8		328	0	1328	2328	Read : 0x03 Write : 0x06
		MS PG 9		329	0	1329	2329	Read : 0x03 Write : 0x06
		MS PG 10		330	0	1330	2330	Read : 0x03 Write : 0x06
		MS PG 11		331	0	1331	2331	Read : 0x03 Write : 0x06
		MS PG 12		332	0	1332	2332	Read : 0x03 Write : 0x06
		MS PG 13		333	0	1333	2333	Read : 0x03 Write : 0x06
		MS PG 14		334	0	1334	2334	Read : 0x03 Write : 0x06
		MS PG 15		335	0	1335	2335	Read : 0x03 Write : 0x06
		MS PG 16		336	0	1336	2336	Read : 0x03 Write : 0x06
		MS PG 17		337	0	1337	2337	Read : 0x03 Write : 0x06
		MS PG 18		338	0	1338	2338	Read : 0x03 Write : 0x06
		MS PG 19		339	0	1339	2339	Read : 0x03 Write : 0x06

		MS PG 20	340	0	1340	2340	Read : 0x03 Write : 0x06
ERROR		ERROR 1	341	0	1341	2341	Read : 0x03 Write : 0x06
		ERROR 2	342	0	1342	2342	Read : 0x03 Write : 0x06
		ERROR 3	343	0	1343	2343	Read : 0x03 Write : 0x06
		ERROR 4	344	0	1344	2344	Read : 0x03 Write : 0x06
		ERROR 5	345	0	1345	2345	Read : 0x03 Write : 0x06
		ERROR 6	346	0	1346	2346	Read : 0x03 Write : 0x06
		ERROR 7	347	0	1347	2347	Read : 0x03 Write : 0x06
		ERROR 8	348	0	1348	2348	Read : 0x03 Write : 0x06
		Controller model	349	Auto	1349	2349	Read : 0x03 Write : 0x06
Model		Model data(150)	350 ~ 499	0	1349 ~ 1449	2349 ~ 2449	Read : 0x03 Write : 0x06
Firmware Version			500	Auto			Read : 0x03 Write : 0x06
Monitoring data	Alarm data	Alarm no.	3100				Read : 0x04
		Warning no.	3101				Read : 0x04
	Data updated on events (Start, F/L, Preset, Torque up)	Event count no. (1-65,536)	3200				Read : 0x04
		Fastening time (ms)	3201				Read : 0x04
		Preset no.	3202				Read : 0x04
		Target torque (* x 100)	3203				Read : 0x04
		Converted torque (* x 100)	3204				Read : 0x04
		Target speed (rpm)	3205				Read : 0x04
		A1 (* 100)	3206				Read : 0x04
		A2 (* 100)	3207				Read : 0x04
		A3 (* 100)	3208				Read : 0x04
		Screw count value	3209				Read : 0x04
		Error	3210				Read : 0x04
		Forward / Loosening (F=01, L=1)	3211				Read : 0x04
		Status (Fastening OK=1, Fastening NG=2, F/R change=3, Preset# change=4, Alarm reset=5, Errors = 6, other=0)	3212				Read : 0x04
		Snug torque angle (degree)	3213				Read : 0x04
	Realtime Data	Converted torque (* x 100)	3300				Read : 0x04
		Speed (rpm)	3301				Read : 0x04
		Motor current (mA)	3302				Read : 0x04
		Current Preset #	3303				Read : 0x04
		Torque up	3304				Read : 0x04
		Fastening OK	3305				Read : 0x04
		Ready	3306				Read : 0x04
		Motor RUN	3307				Read : 0x04
		Alarm no.	3308				Read : 0x04
		Forward / Loosening (F=01, L=1)	3309				Read : 0x04
		Screw count value	3310				Read : 0x04
		Input status (MSB=IN 8, LSB=IN 1)	3311				Read : 0x04
		Output status (MSB=OUT 8, LSB=OUT 1)	3312				Read : 0x04
Temporary parameter in RAM	Virtual Preset #1	TC/AM_AC/TM	511				Write : 0x06
		Torque	512				Write : 0x06
		Torque min/max (%)	513				Write : 0x06
		Target angle(degree)	514				Write : 0x06
		Min angle(degree)	515				Write : 0x06
		Max angle(degree)	516				Write : 0x06
		Snug torque(%)	517				Write : 0x06
		Speed (rpm)	518				Write : 0x06
		Free fastenig angle(degree)	519				Write : 0x06
		Free fastenig speed(rpm)	520				Write : 0x06
		Soft start(1-300ms)	521				Write : 0x06
		Seating point (%) 10-90	522				Write : 0x06
		Torque rising rate(ms) 50-200	523				Write : 0x06
		Torque holding time(ms) 1-20	524				Write : 0x06
		Torque compensation (%) 90-110	525				Write : 0x06
Remote control	Operation	Alarm reset	4000				Write : 0x06
		Driver Lock 0 : Unlock 1: Lock all dirction 2 : Lock Loosening 3: Lock Fastening	4001				Write : 0x06
		No use (Factory only)	4002				Write : 0x06
		Remote start (0 : Stop, 1 : Start)	4003				Write : 0x06
		Preset # change (Not available on RUN) Data : 1 - 15 for preset #1 - 15 16 for Multi sequence A 17 for Multi sequence B	4004				Write : 0x06
		Forward / Loosening (F=01, L=1)	4005				Write : 0x06
		Output test only (0 : off, 1 : on) (MSB=OUT 8, LSB=OUT 1) ex) 0xff : output 1 - 8 port all on ex) 0x0f : output 1 - 4 port on	4006				Write : 0x06
		Output test enable (0 : disable, 1: enable)	4007				Write : 0x06

Mountz Calibration & Repair Services

Mountz Inc. features an experienced calibration and repair staff. Our trained technicians can calibrate and repair most any tool. Mountz provides rapid service with quality that you can trust as we offer three state-of-the-art calibration lab and repair facilities that can calibrate up to 20,000 lbf.ft.

Since 1965, Mountz Inc. has proven in-depth knowledge of torque is reflected in our tool's craftsmanship and our ability to provide solutions to both common and uncommon torque applications. We perform calibrations in accordance with ANSI/NCSL-Z540. Mountz is dedicated solely to the manufacturing, marketing and servicing of high quality torque tools.

Tool Service & Repair Capability

- Torque Wrench Calibration: Click Wrench, Dial Torque Wrench, Beam Wrench, Cam-Over & Break-Over Wrench
- Torque Screwdrivers: Dial, Micrometer, Preset & Adjustable
- Torque Analyzers/Sensors: All brands
- Electric Screwdrivers: All brands
- Air Tools: All brands
- Impact Wrenches, Drills, Pulse Tools, Grinders, Percussive Tools, Air Screwdrivers, Nutrunners, DC Controlled Nutrunners
- Torque Multipliers: All brands

Mountz Service Locations

Eastern Service Center

19051 Underwood Rd.
Foley, AL 36535
Phone: (251) 943-4125
Fax: (251) 943-4979

Western Service Center

1080 N.11th Street
San Jose, CA 95112
Phone: (408) 292-2214
Fax: (408) 292-2733

www.mountztorque.com
sales@mountztorque.com



Twitter: @mountztorque

Download a "Service Form" and include a copy when you send the tools in to be serviced.

Looking for fasteners?
www.mrmetric.com

**mr.
metric®**
your trusted source for screws, nuts, washers and