



CHAPTER 5: SERIAL COMMUNICATIONS

TABLE OF CONTENTS

Chapter 5: Serial Communications

Serial RS-485 Communication Features 5-2

 Communication Standards 5-2

 Common Third-Party Modbus RTU Masters. 5-2

 AutomationDirect PLCs as Modbus Master 5-3

 RS-232C to RS-485 Conversion. 5-4

 Communication Protocol 5-12

 Drive Expansion Common Area Parameter 5-15

 Drive Parameter Modbus Communication Addresses 5-24

SERIAL RS-485 COMMUNICATION FEATURES

This chapter details how to control an ACN series drive with a PLC or a computer using the RS-485 serial communication features. The ACN series drive terminals S+, S-, SG will accommodate an RS-485 connection, through which the drive can be controlled by a remote master device on an RS-485 network. RS-232 signals can be converted to RS-485 by using a separate converter.

The ACN AC drive communication address (station ID) is specified in parameter CM.01, and the remote master device can control each AC drive according to its individual communication address. The ACN drive serial communications utilizes the Modbus RTU protocol. The mode and serial network settings must be the same for all devices on a Modbus network. The Station IDs must all be unique. See “Setting Communication Parameters” on page 5–7 for more details.



NOTE: Ethernet connectivity for EtherNet/IP or Modbus TCP communication is possible with an optional communication card (ACN-ETH). Refer to Appendix C: Ethernet Module ACN-ETH for details

COMMUNICATION STANDARDS

Following the RS-485 communication standards, ACN series products exchange data with a PLC and computer. The RS-485 communication standards support the Multi-drop Link System and offer an interface that is strongly resistant to noise. Please refer to the following table for details about the communication standards.

Communication Standards	
Item	Standard
Communication method/ Transmission type	RS-485/Bus type, Multi-drop Link System
Drive type name	ACN Series
Number of connected drives/ Transmission distance	Maximum of 16 drives / Maximum 1,200m (recommended distance: within 700m)
Recommended cable size	0.75mm ² , (18AWG), shielded type twisted-pair (STP) wire
Installation type	Dedicated terminals (S+/S-/SG) on the control terminal block
Power supply	Supplied by the drive - insulated power source from the drive's internal circuit
Communication speed	1,200/2,400/9,600/19,200/38,400/57,600/115,200 bps
Control procedure	Asynchronous communications system
Communication system	Half duplex system
Character system	Modbus-RTU: Binary
Stop bit length	1-bit/2-bit
Frame error check	2 bytes
Parity check	None/Even/Odd

COMMON THIRD-PARTY MODBUS RTU MASTERS

- Modbus Poll from www.modbustools.com

AUTOMATIONDIRECT PLCs AS MODBUS MASTER

Serial Modbus-capable AutomationDirect PLCs can communicate with the ACN drive. Serial Modbus control is easier to accomplish from a PLC that has a built-in RS-485 port and supports dedicated Modbus messaging. [RS-232-only PLCs will require an RS-232/RS-485 converter (FA-ISOCOCON); and older PLCs may require programming to construct the Modbus strings.] We recommend PLCs with built-in RS-485 ports and dedicated Modbus serial commands: CLICK (with RS-485 ports), P1000, P2000, P3000, BRX/Do-more, DirectLogic (DL06, D2-260, or D2-262). Other PLC-Drive connectivity is possible: Please refer to the chart below

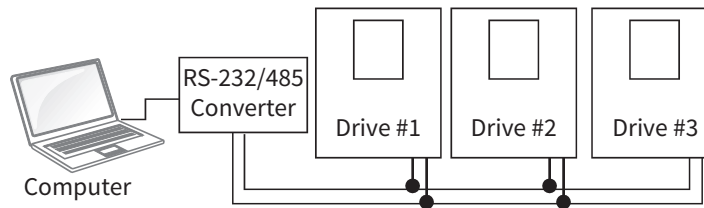
Typical ADC PLC to ACN Serial Communications Connectivity

Typical ADC PLC to ACN Serial Communications Connectivity Matrix*					
Recommended PLC Connectivity			Communication	Direct Cable	ACN
PLC	Port #	Port Type			Terminals
CLICK	3	3 screw terminals	RS-485	L19954 cable	S+ S- SG
D2-260	2	HD15	RS-485	D2-DSCBL-2	
D2-262	2	HD15	RS-485	D2-DSCBL-2	
DL06	2	HD15	RS-485	D2-DSCBL-2	
BRX/Do-more	RS-485	3 screw terminals	RS-485	L19954 cable	
Do-more H2-DM1	RS-232	RJ12	RS-232 to RS-485	FA-ISOCOCON with L19954 cable	
P1-550	RS-485	4 screw terminals	RS-485	L19954 cable	
P2-550	RS-485	3 screw terminals	RS-485	L19954 cable	
P3-530	RS-485	3 screw terminals	RS-485	L19954 cable	
P3-550	RS-485	3 screw terminals	RS-485	L19954 cable	
P3-550E	RS-485	3 screw terminals	RS-485	L19954 cable	
Other PLC Connectivity			Communication	Direct Cable	
D2-250-1	2	HD15	RS-485	D2-DSCBL-2	
D4-450/D4-454	1	DB25	RS-232 to RS-485	FA-ISOCOCON with L19954 cable	
DL05	2	RJ12	RS-232 to RS-485	FA-ISOCOCON with L19954 cable	
DL06 + DCM	2	HD15	RS-485	D2-DSCBL-2	
Do-more H2-DM1 + H2-SERIO-4	3	5 screw terminals	RS-485	L19954 cable	
Do-more T1H-DM1	RS-232	RJ12	RS-232 to RS-485	FA-ISOCOCON with L19954 cable	
P2-SCM	4	4 screw terminals	RS-485	L19954 cable	
P3-SCM	4	4 screw terminals	RS-485	L19954 cable	
*Ethernet connectivity for EtherNet/IP or Modbus TCP communication is possible with an optional communication card ACN-ETH. Refer to Appendix C: Ethernet Module ACN-ETH for details					

RS-232C TO RS-485 CONVERSION

In an RS-485 communication system, the PLC or computer is the master device and the drive is the slave device. When using a computer as the master, the RS-232 converter must be integrated with the computer, so that it can communicate with the drive through the RS-232/RS-485 converter. Specifications and performance of converters may vary depending on the manufacturer, but the basic functions are identical. Please refer to the converter manufacturer's user manual for details about features and specifications. RS-232 signals can be converted to RS-485 by using a separate converter (see the FA-ISOCN drawings below).

Connect the wires and configure the communication parameters on the drive by referring to the following illustration of the communication system configuration.



RS-232C TO RS-485 CONVERSION

Many AutomationDirect PLCs have only RS-232C communication ports, and require an FA-ISOCAN (RS-232C to RS-422/485 network adapter) in order to make an RS-485 connection.

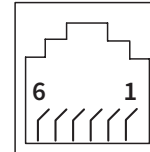


NOTE: If an FA-ISOCAN module is used, set the module dipswitches as required. Refer to the FA-ISOCAN manual for more detailed information.

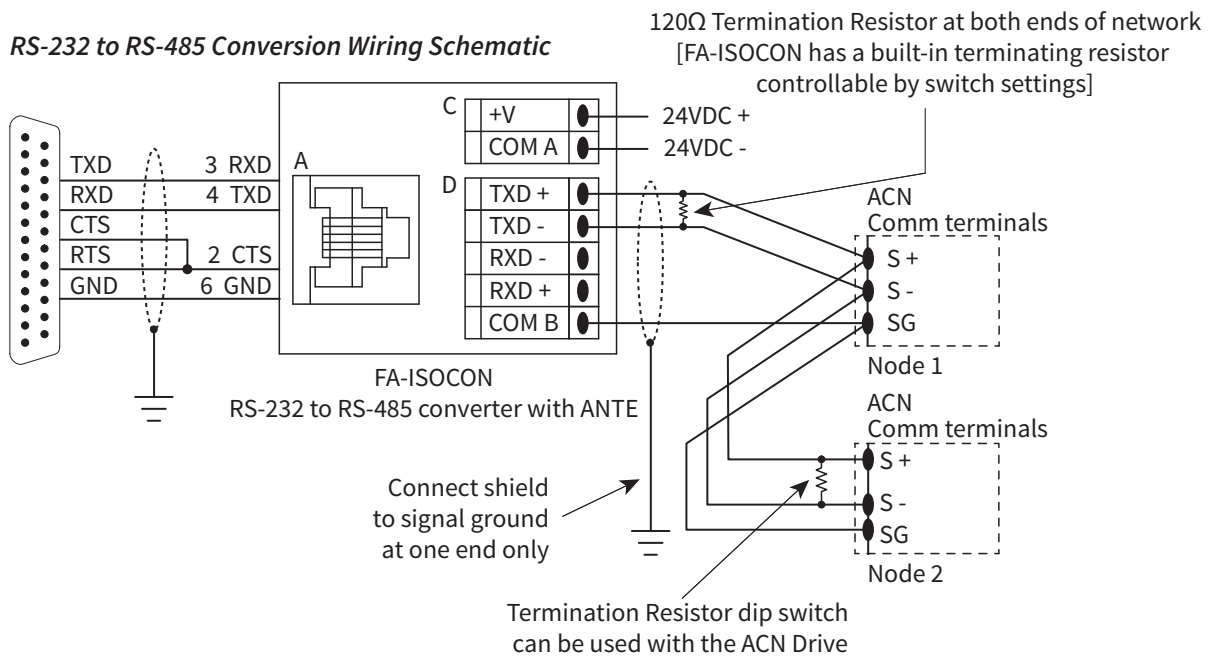
FA-ISOCAN Switch Settings:

- S21–S23: OFF, ON, ON (19200 baud)
- S24–S27: OFF (Automatic Network Transmit Enable)
- Terminate: ON (end of run term resistors)
- Bias (2): ON (end of run bias resistors)
- 1/2 DPX (2): ON (RS-485 TXD/RXD jumpers)

Helpful Hint: Some applications require that the FA-ISOCAN baud rate is set faster than the drive/network baud rate.

**FA-ISOCAN RJ-12 Serial Comm Port A
RS-232 Input Port**

- 1: Signal Ground
- 2: CTS (input)
- 3: RXD (input)
- 4: TXD (output)
- 5: +5VDC in
- 6: Signal Ground

FA-ISOCAN Wiring**RS-232 to RS-485 Conversion Wiring Schematic**

NOTE: For information regarding configuration of AutomationDirect PLCs or other PLCs, please refer to Appendix D: Safe Torque Off, or to the applicable PLC user manual for your application.

COMMUNICATION CABLE CONNECTION

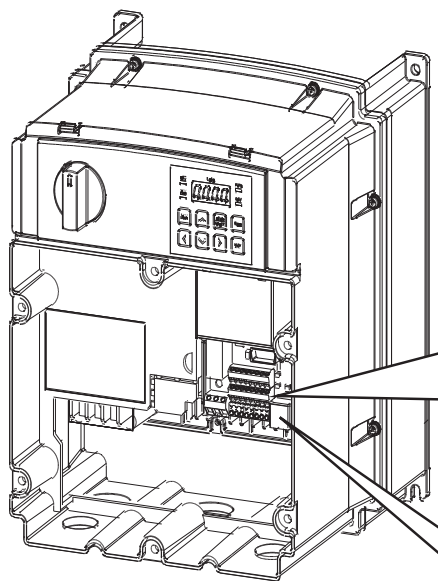
Make sure that the drive is turned off completely, and then connect the RS-485 communication cable to the S+/S-/SG terminals of the terminal block. The maximum number of drives you can connect is 16. For communication wiring, use shielded twisted pair (STP) cables. The maximum length of the communication cable is 1,200 meters, but it is recommended to use no more than 700 meters of communication cable to ensure stable communication. Please use a repeater to enhance the communication speed when using a communication cable longer than 1,200 meters or when using a large number of devices. A repeater is effective at reducing noise where smooth communication is required.



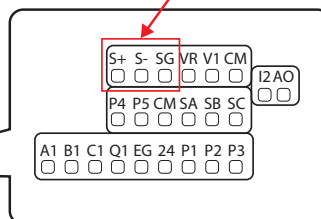
NOTE: Recommended RS-485 cable: Belden 9842, AutomationDirect L19954 series, or equivalent.



NOTE: RJ45 connector is for connection to LCD keypad or PC software only. Communication settings are fixed at 19,200bps, 8,N,1.



Connection terminals for RS-485 serial network.
Comm settings determined by parameters
CM.2, CM.3, CM.4



RJ45 connection to LCD keypad or PC only.
Comm setting hard coded to 19,200, 8N1

SERIAL COMMUNICATION TO VFD SUITE SOFTWARE

For instruction on serial communication to VFD Suite, see page A-44.

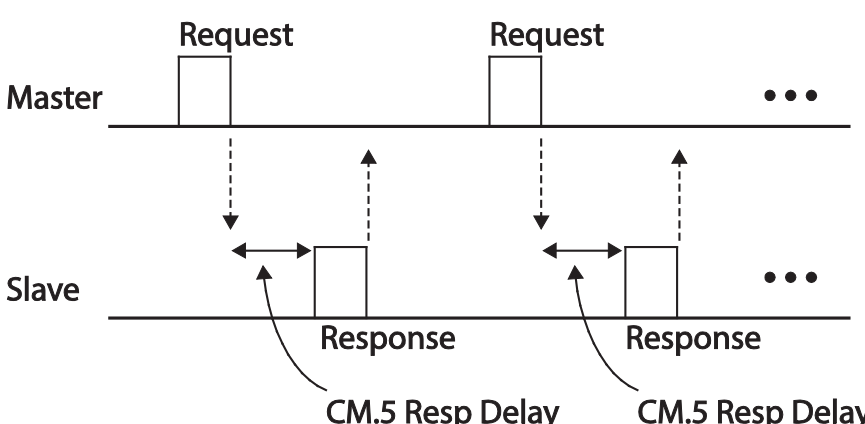
**SETTING COMMUNICATION PARAMETERS**

Before proceeding with setting communication configurations, make sure that the communication cables are connected properly. Turn on the drive and set the communication parameters.

Setting Communication Parameters						
Parameter Group	Parameter Number	Name	LCD Display	Parameter Setting		Setting Range
CM	01	Built-in communication drive ID	Int485 St ID	1		1-250
	02	Built-in communication protocol	Int485 Proto	0	Modbus RTU	0
	03	Built-in communication speed	Int485 Baudr	3	9600 bps	0-7
	04	Built-in communication frame setting	Int485 Mode	0	D8/PN/S1	0-3
	05	Transmission delay after reception	Resp Delay	5		0-1000 ms

Communication Parameters Setting Details

Communication Parameters Setting Details			
Parameter	Description		
CM.01 Int485 St ID	Set the drive station ID between 1 and 250.		
CM.02 Int485 Proto	Select one of the two built-in protocols: Modbus-RTU or LS INV 485.		
	Setting		Function
	0	Modbus-RTU	Modbus-RTU compatible protocol
	2	Not supported	–

Communication Parameters Setting Details		
Parameter	Description	
CM.03 Int485 Baudr	Set a communication setting speed up to 115,200 bps.	
	Setting	Function
	0	1,200 bps
	1	2,400 bps
	2	4,800 bps
	3	9,600 bps
	4	19,200 bps
	5	38,400 bps
	6	56 Kbps
	7	115 Kbps
CM.04 Int485 Mode	Set a communication configuration. Set the data length, parity check method, and the number of stop bits.	
	Setting	Function
	0	D8/PN/S1 8-bit data / no parity check / 1 stop bit
	1	D8/PN/S2 8-bit data / no parity check / 2 stop bits
	2	D8/PE/S1 8-bit data / even parity / 1 stop bit
	3	D8/PO/S1 8-bit data / odd parity / 1 stop bit
CM.05 Resp Delay	Set the response time for the slave (drive) to react to the request from the master. Response time is used in a system where the slave device response is too fast for the master device to process. Set this code to an appropriate value for smooth master-slave communication.	
	 The diagram illustrates the timing of a request-response cycle between a Master and a Slave. The Master's signal line shows two 'Request' pulses. The Slave's signal line shows two corresponding 'Response' pulses. Dashed vertical arrows connect each Request pulse to its respective Response pulse. A horizontal double-headed arrow between the start of a Request pulse and the start of its corresponding Response pulse is labeled 'CM.5 Resp Delay'. Ellipses (...) at the end of both signal lines indicate that the sequence can continue.	

SETTING OPERATION COMMAND AND FREQUENCY

To select the built-in RS-485 communication as the source of command, set the Frq code to 6 (Int485) and set the DrV code to 3 (Int485). Then, set common area parameters for the operation command and frequency via communication.

Setting Operation Command and Frequency							
Parameter Group	Parameter Number	Name	LCD Display	Parameter Setting		Setting Range	Unit
Pr	12	Speed command loss operation mode	Lost Cmd Mode	1	Free-Run	0-5	-
	13	Time to determine speed command loss	Lost Cmd Time	1.0		0.1-120	s
	14	Operation frequency at speed command loss	Lost Preset F	0.00		Start frequency–Maximum frequency	Hz
OU	31	Multi-function relay 1	Relay 1	13	Lost Command	0-35	-
	33	Multi-function output 1	Q1 Define				
Operation	DrV	Command source	Cmd Source (DrV.06 on LCD)	3	Int485	0-5	-
	Frq	Frequency setting method	Freq Ref Src (DrV.07 on LCD)	6	Int485	0-12	-

COMMAND LOSS PROTECTIVE OPERATION

Set the following parameters to determine the drive action in the event of a communication loss.

Command Loss Protective Operation			
Parameter Group	Description		
Pr.12 Lost Cmd Mode, Pr.13 Lost Cmd Time	Select the drive function that will occur after the communication loss time is expired (set in Pr.13).		
	Setting		Function
	0	None	The speed command immediately becomes the operation frequency without any protection function.
	1	Free-Run	The drive blocks output. The motor performs in free-run condition.
	2	Dec	The motor decelerates and then stops at the time set at Pr.07 (Trip Dec Time).
	3	Hold Input	The drive calculates the average input value for 10 seconds before the loss of the speed command and uses it as the speed reference.
	4	Hold Output	The drive calculates the average output value for 10 seconds before the loss of the speed command and uses it as the speed reference.
	5	Lost Preset	The drive operates at the frequency set at Pr. 14 (Lost Preset F).

SETTING VIRTUAL MULTI-FUNCTION INPUT

Multi-function input can be controlled using a communication address (0h0385). Set codes CM.70–77 to the functions to operate, and then set the bit relevant to the function to 1 at 0h0385 to operate it. Virtual multi-function operates independently from In.65–69 analog multi-function inputs and cannot be set redundantly. Virtual multi-function input can be monitored using CM.86 (Virt DI Status). Before you configure the virtual multi-function inputs, set the DrV code according to the command source.

Setting Virtual Multi-Function Input							
Parameter Group	Parameter Number	Name	LCD Display	Parameter Setting		Setting Range	Unit
CM	70-77	Communication multi-function input x	Virtual DI x (x: 1-8)	0	None	0-49	-
	86	Communication multi-function input monitoring	Virt DI Status	-	-	-	-

Example: When sending the Forward and Reverse command by controlling virtual multi-function input in the common area via Int485, set the following:

- 1) Set CMD= Fx/Rx-1
 - » For Forward motion: set CM.70 = FX and set address 0h0385 to 0h0001.
 - » For Reverse motion: Set CM.71 = Rx and set address 0h0385 to 0h0002.



NOTE: The following are values and functions that are applied to address 0h0385

Values and functions that are applied to address 0h0385	
Setting	Function
0h0001	Forward operation (Fx)
0h0002	Reverse operation (Rx)
0h0000	Stop

SAVING PARAMETERS DEFINED BY COMMUNICATION

After changing settings in the common area parameters, it is best practice to complete the “Save Parameters” action to ensure all settings are recognized by the drive. This can be accomplished through comm address 0h03E0 or the LCD keypad parameter CNF.48.

If the drive is powered off after setting the common area parameters or keypad parameters via communication, the settings will be lost. Performing the “Save Parameters” operation immediately after setting common area parameters will prevent any data loss.

Set CNF-48 to 1 (Yes) to allow all the changes over communication to be saved, so that the drive retains all the existing values even after the power has been turned off.

Setting address 0h03E0 to 0 and then setting it again to 1 via communication allows the existing parameter settings to be saved. However, setting address 0h03E0 to 1 and then setting it to 0 does not carry out the same function. Parameters defined by communication can only be saved using an LCD keypad.

Saving Parameters Defined by Communication							
Parameter Group	Parameter Number	Name	LCD Display	Parameter Setting		Setting Range	Unit
CNF (LCD keypad only)	48	Save parameters	Parameter Save	0	Yes	0-1	-
				1	No		

TOTAL MEMORY MAP FOR COMMUNICATION

Total Memory Map for Communication		
Item	Memory Map	Details
Parameter registration type area	0h0100-0h01FF	Areas registered at CM.31–38 and CM.51–58
	0h0200-0h023F	Area registered for User Group
	0h0240-0h027F	Area registered for Macro Group
	0h0280-0h02FF	Reserved
Drive communication common area	0h0300-0h037F	Drive monitoring area
	0h0380-0h03DF	Drive control area
	0h03E0-0h03FF	Drive memory control area
	0h0400-0h0FFF	Reserved
	0h1100	dr Group
	0h1200	bA Group
	0h1300	Ad Group
	0h1400	Cn Group
	0h1500	In Group
	0h1600	OU Group
	0h1700	CM Group
	0h1800	AP Group
	0h1B00	Pr Group
	0h1C00	M2 Group

PARAMETER GROUP FOR DATA TRANSMISSION

By defining a parameter group for data transmission, the communication addresses registered in the communication function group (CM) can be used in communication. Parameter group for data transmission may be defined to transmit multiple parameters at once, into the communication frame.

Parameter Group for Data Transmission							
Parameter Group	Parameter Number	Name	LCD Display	Parameter Setting		Setting Range	Unit
CM	31-38	Output communication address x	Para Status-x	-	-	0000-FFFF	Hex
	51-58	Input communication address x	Para Control-x	-	-	0000-FFFF	Hex

Currently Registered CM Group Parameter

Currently Registered CM Group Parameter		
Address	Parameter	Assigned content by bit
0h0100-0h0107	Status Parameter-1- Status Parameter-8	Parameter communication code value registered at CM.31-38 (Read-only)
0h0110-0h0117	Control Parameter-1- Control Parameter-8	Parameter communication code value registered at CM.51-58 (Read/Write access)



NOTE: When registering control parameters, register the operation speed (0h0380, 0h0381) and operation command (0h0006, 0h0382) parameters at the end of a parameter control frame. For example, when the parameter control frame has 5 parameter control items (Para Control - x), register the operation speed at Para Control-4 and the operation command to Para Control-5.

COMMUNICATION PROTOCOL

The built-in RS-485 communication supports Modbus-RTU protocol only.

MODBUS-RTU PROTOCOL**Function Code and Protocol (unit: byte)**

In the following section, station ID is the value set at CM.01 (Int485 St ID), and starting address is the communication address. (starting address size is in bytes).

Function Code #03: Read Holding Register

Query Field Name	Response Field Name	Number of Points
Station ID	Station ID	
Function(0x03)	Function(0x03)	
Starting Address Hi	Byte Count	
Starting Address Lo	Data Hi	
Number of Points Hi	Data Lo	
Number of Points Lo	...	
CRC Lo	...	
CRC Hi	Data Hi	
	Data Lo	
	CRC Lo	
	CRC Hi	

Function Code #04: Read Input Register

Query Field Name	Response Field Name
Station ID	Station ID
Function(0x04)	Function(0x04)
Starting Address Hi	Byte Count
Starting Address Lo	Data Hi
Number of Points Hi	Data Lo
Number of Points Lo	...
CRC Lo	...
CRC Hi	Data Hi
	Data Lo
	CRC Lo
	CRC Hi

} Number of Points

Function Code #06: Preset Single Register

Query Field Name	Response Field Name
Station ID	Station ID
Function(0x06)	Function(0x06)
Starting Address Hi	Register Address Hi
Starting Address Lo	Register Address Lo
Preset Data Hi	Preset Data Hi
Preset Data Lo	Preset Data Lo
CRC Lo	CRC Lo
CRC Hi	CRC Hi

Function Code #16 (hex 0h10): Preset Multiple Register

Query Field Name		Response Field Name
Station ID		Station ID
Function(0x06)		Function(0x06)
Starting Address Hi		Register Address Hi
Starting Address Lo		Register Address Lo
Number of Register Hi		Preset Data Hi
Number of Register Lo		Preset Data Lo
Byte Count		CRC Lo
Data Hi	} Number of Points	CRC Hi
Data Lo		
...		
...		
Data Hi		
Data Lo		
CRC Lo		
CRC Hi		

Exception Code

Code
01: ILLEGAL FUNCTION
02: ILLEGAL DATA ADDRESS
03: ILLEGAL DATA VALUE
06: SLAVE DEVICE BUSY

Response

Field Name
Station ID
Function (The function value uses the top level bit for all query values.)
Exception Code
CRC Lo
CRC Hi

Example of Modbus-RTU Communication in Use

When the Acc time (Communication address 0x1103) is changed to 5.0 sec and the Dec time (Communication address 0x1104) is changed to 10.0 sec.

Frame Transmission from Master to Slave (Request)								
Item	Station ID	Function	Starting Address	Number of Register	Byte Count	Data 1	Data 2	CRC
Hex	0x01	0x10	0x1102	0x0002	0x04	0x0032	0x0064	0x1202
Description	CM.01 Int485 St ID	Preset Multiple Register	Starting Address -1 (0x1103-1)	-	-	50 (ACC time 5.0sec)	100 (DEC time 10.0sec)	-

Frame Transmission from Slave to Master (Response)					
Item	Station ID	Function	Starting Address	Number of Register	CRC
Hex	0x01	0x10	0x1102	0x0002	0xE534
Description	CM.01 Int485 St ID	Preset Multiple Register	Starting Address -1 (0x1103-1)	-	-

DRIVE EXPANSION COMMON AREA PARAMETER**MONITORING AREA PARAMETER (READ ONLY)**

Monitoring Area Parameter (Read Only)						
Comm. Address			Parameter	Scale	Unit	Assigned Content by Bit
Hex	Modbus RTU	Modbus TCP				
0h0300	40768	40769	Drive model	-	-	ACN: 0006h
0h0301	40769	40770	Drive capacity	-	-	0.4 kW 1900h
						1.1 kW 4011h
						2.2 kW 4022h
						3.7 kW 4037h
						5.5 kW 4055h
						11kW 40B0h
						18.5 kW 4125h
						0.75 kW 3200h
						1.5 kW 4015h
						3.0 kW 4030h
						4.0 kW 4040h
						7.5 kW 4075h
						15kW 40F0h
						22kW 4160h
0h0302	40770	40771	Drive input voltage/power (Single phase, 3-phase)/cooling method	-	-	230V 3-phase forced cooling: 0231h
						460V single phase self cooling: 0420h
						230V single phase self cooling: 0220h
						460V 3-phase self cooling: 0430h
						230V 3-phase self cooling: 0230h
						460V single phase forced cooling: 0421h
						230V single phase forced cooling: 0221h
						460V 3-phase forced cooling: 0431h
0h0303	40771	40772	Drive S/W version	-	-	(Ex) 0h0100: Version 1.00
						(Ex) 0h0101: Version 1.01
0h0304	40772	40773	Reserved	-	-	-

Monitoring Area Parameter (Read Only)								
Comm. Address			Parameter	Scale	Unit	Assigned Content by Bit		
Hex	Modbus RTU	Modbus TCP						
0h0305	40773	40774	Drive operation state	-	-	B12–B15	0	Normal state
							4	Warning occurred
							8	Fault occurred [operates according to Pr. 30 (Trip Out Mode) setting.]
						B8–B11	-	
						B4–B7	1	Speed searching
							2	Accelerating
							3	Operating at constant rate
							4	Decelerating
							5	Decelerating to stop
							6	H/W OCS
							7	S/W OCS
							8	Dwell operating
						B0–B3	0	Stopped
							1	Operating in forward direction
							2	Operating in reverse direction
							3	DC operating (0 speed control)
0h0306	40774	40775	Drive operation frequency command source	-	-	B8–B15	Operation command source	
							0	Keypad
							1	Communication option
							2	User Sequence
							3	Built-in RS 485
							4	Terminal block
						B0–B7	Frequency command source	
							0	Keypad speed
							1	Keypad torque
							2–4	Up/Down operation speed
							5	V1
							7	V2
							8	I2
							9	Pulse
							10	Built-in RS 485
							11	Communication option
							12	User Sequence
							13	Jog
							14	PID
							25–39	Multi-step speed frequency
0h0307	40775	40776	LCD keypad S/W version	-	-	(Ex.) 0h0100: Version 1.00		
0h0308	40776	40777	LCD keypad title version	-	-	(Ex.) 0h0101: Version 1.01		
0h0309 - 0h030F	40777 - 40783	40778 - 40784	Reserved	-	-	-		

Monitoring Area Parameter (Read Only)							
Comm. Address			Parameter	Scale	Unit	Assigned Content by Bit	
Hex	Modbus RTU	Modbus TCP					
0h0310	40784	40785	Output current	0.1	A	-	
0h0311	40785	40786	Output frequency	0.01	Hz	-	
0h0312	40786	40787	Output rpm	0	rpm	-	
0h0313	40787	40788	Motor feedback speed	0	rpm	-32768 rpm-32767 rpm (directional)	
0h0314	40788	40789	Output voltage	1	V	-	
0h0315	40789	40790	DC Link voltage	1	V	-	
0h0316	40790	40791	Output power	0.1	%	-	
0h0317	40791	40792	Output torque	0.1	%	-	
0h0318	40792	40793	PID reference	0.1	%	-	
0h0319	40793	40794	PID feedback	0.1	%	-	
0h031A	40794	40795	Display the number of poles for the first motor	-	-	Displays the number of poles for the first motor	
0h031B	40795	40796	Display the number of poles for the second motor	-	-	Displays the number of poles for the second motor	
0h031C	40796	40797	Display the number of poles for the selected motor	-	-	Displays the number of poles for the selected motor	
0h031D	40797	40798	Select Hz/rpm	-	-	0	Hz
						1	RPM
0h031E - 0h031F	40798 - 40799	40799 - 40800	Reserved	-	-	-	
0h0320	40800	40801	Digital input information	-	-	B5-B15	Reserved
						B4	P5(I/O board)
						B3	P4(I/O board)
						B2	P3(I/O board)
						B1	P2(I/O board)
						B0	P1(I/O board)
0h0321	40801	40802	Digital output information	-	-	B2-B15	Reserved
						B1	Q1
						B0	Relay 1
0h0322	40802	40803	Virtual digital input information	-	-	B8-B15	Reserved
						B7	Virtual DI 8(CM.77)
						B6	Virtual DI 7(CM.76)
						B5	Virtual DI 6(CM.75)
						B4	Virtual DI 5(CM.74)
						B3	Virtual DI 4(CM.73)
						B2	Virtual DI 3(CM.72)
						B1	Virtual DI 2(CM.71)
						B0	Virtual DI 1(CM.70)

Monitoring Area Parameter (Read Only)							
Comm. Address			Parameter	Scale	Unit	Assigned Content by Bit	
Hex	Modbus RTU	Modbus TCP					
0h0323	40803	40804	Display the selected motor	-	-	0	First Motor
						1	Second Motor
0h0324	40804	40805	AI1	0.01	%	Analog input V1 (I/O board)	
0h0325	40805	40806	Reserved	0.01	%		
0h0326	40806	40807	AI3	0.01	%	Analog input V2 (I/O board)	
0h0327	40807	40808	AI4	0.01	%	Analog input I2 (I/O board)	
0h0328	40808	40809	AO1	0.01	%	Analog output 1 (I/O board)	
0h0329	40809	40810	Reserved	0.01	%	Not used	
0h032A	40810	40811	AO3	0.01	%	Analog output 3 (extension IO board)	
0h032B	40811	40812	Reserved	0.01	%	Reserved	
0h032C	40812	40813	Reserved	-	-	-	
0h032D	40813	40814	Drive module temperature	1	°C	-	
0h032E	40814	40815	Drive power consumption	1	kWh	-	
0h032F	40815	40816	Drive power consumption		MWh	-	
0h0330	40816	40817	Latch type trip information - 1	-	-	BI5	Fuse Open Trip
						BI4	Over Heat Trip
						BI3	Arm Short
						BI2	External Trip
						BI1	Overvoltage Trip
						BI0	Overcurrent Trip
						B9	NTC Trip
						B8	Reserved
						B7	Reserved
						B6	Input open-phase trip
						B5	Output open-phase trip
						B4	Ground Fault Trip
						B3	E-Thermal Trip
						B2	Drive Overload Trip
						B1	Underload Trip
						B0	Overload Trip

Monitoring Area Parameter (Read Only)							
Comm. Address			Parameter	Scale	Unit	Assigned Content by Bit	
Hex	Modbus RTU	Modbus TCP					
0h0331	40817	40818	Latch type trip information - 2	-	-	B15	Reserved
						B14	Reserved
						B13	Safety B
						B12	Safety A
						B11	Reserved
						B10	Bad option card
						B9	No motor trip
						B8	External brake trip
						B7	Bad contact at basic I/O board
						B6	Pre PID Fail
						B5	Error while writing parameter
						B4	Reserved
						B3	FAN Trip
						B2	Reserved
						B1	Reserved
						B0	Reserved
0h0332	40818	40819	Level type trip information	-	-	B4-B15	Reserved
						B3	Keypad Lost Command
						B2	Lost Command
						B1	LV
						B0	BX
0h0333	40819	40820	H/W Diagnosis Trip information	-	-	B6-B15	Reserved
						B5	Queue Full
						B4	Reserved
						B3	Watchdog-2 error
						B2	Watchdog-1 error
						B1	EEPROM error
						B0	ADC error
0h0334	40820	40821	Warning information	-	-	B10-B15	Reserved
						B9	Auto Tuning failed
						B8	Keypad lost
						B7	Encoder disconnection
						B6	Wrong installation of encoder
						B5	DB
						B4	FAN running
						B3	Lost command
						B2	Drive Overload
						B1	Underload
						B0	Overload
0h0335 - 0h033F	40821 - 40831	40822 - 40832	Reserved	-	-	-	
0h0340	40832	40833	On Time date	0	Day	Total number of days the drive has been powered on	

Monitoring Area Parameter (Read Only)						
Comm. Address			Parameter	Scale	Unit	Assigned Content by Bit
Hex	Modbus RTU	Modbus TCP				
0h0341	40833	40834	On Time minute	0	Min	Total number of minutes excluding the total number of On Time days
0h0342	40834	40835	Run Time date	0	Day	Total number of days the drive has driven the motor
0h0343	40835	40836	Run Time minute	0	Min	Total number of minutes excluding the total number of Run Time days
0h0344	40836	40837	Fan Time date	0	Day	Total number of days the heat sink fan has been running
0h0345	40837	40838	Fan Time minute	0	Min	Total number of minutes excluding the total number of Fan Time days
0h0346 - 0h0348	40838 - 40840	40839 - 40841	Reserved	-	-	-
0h0349	40841	40842	Reserved	-	-	-
0h034A	40842	40843	Option 1	-	-	0 None
						9 Not Supported
0h034B	40843	40844	Reserved	-	-	-
0h034C	40844	40845	Reserved	-	-	-

CONTROL AREA PARAMETER (READ/ WRITE)

Control Area Parameter (Read/ Write)								
Comm. Address			Parameter	Scale	Unit	Assigned Content by Bit		
Hex	Modbus RTU	Modbus TCP						
0h0380	40896	40897	Frequency command	0.01	Hz	Command frequency setting		
0h0381	40897	40898	RPM command	1	rpm	Command rpm setting		
0h0382	40898	40899	Operation command	-	-	B7	Reserved	
						B6	Reserved	
						B5	Reserved	
						B4	Reserved	
						B3	0 → 1: Free-run stop	
						B2	0 → 1: Trip initialization	
						B1	0: Reverse command	
							1: Forward command	
						B0	0	Stop command
							1	Run command
		Example: Forward operation command 0003h, Reverse operation command 0001h.						
0h0383	40899	40900	Acceleration time	0.1	s	Acceleration time setting		
0h0384	40900	40901	Deceleration time	0.1	s	Deceleration time setting		
0h0385	40901	40902	Virtual digital input control (0: Off, 1:On)	-	-	B8–B15	Reserved	
						B7	Virtual DI 8(CM.77)	
						B6	Virtual DI 7(CM.76)	
						B5	Virtual DI 6(CM.75)	
						B4	Virtual DI 5(CM.74)	
						B3	Virtual DI 4(CM.73)	
						B2	Virtual DI 3(CM.72)	
						B1	Virtual DI 2(CM.71)	
B0	Virtual DI 1(CM.70)							
0h0386	40902	40903	Digital output control (0:Off, 1:On)	-	-	B5–B15	Reserved	
						B4	Relay 4 (Ext I/O, OUT-35: None)	
						B3	Relay 3 (Ext I/O, OUT-34: None)	
						B2	Not Supported	
						B1	Q1 (0.4~22kW, OUT-33: None)	
						B0	Relay 1 (0.4~22kW, OUT-31: None)	
0h0387	40903	40904	Reserved	-	-	Reserved		
0h0388	40904	40905	PID reference	0.1	%	PID reference command		
0h0389	40905	40906	PID feedback value	0.1	%	PID feedback value		
0h038A	40906	40907	Motor rated current	0.1	A	-		
0h038B	40907	40908	Motor rated voltage	1	A	-		
0h038C-0h038F	40908 - 40911	40909 - 40912	Reserved	-	-	-		

Control Area Parameter (Read/ Write)						
Comm. Address			Parameter	Scale	Unit	Assigned Content by Bit
Hex	Modbus RTU	Modbus TCP				
0h0390	40912	40913	Torque Ref	0.1	%	Torque command
0h0391	40913	40914	Fwd Pos Torque Limit	0.1	%	Forward motoring torque limit
0h0392	40914	40915	Fwd Neg Torque Limit	0.1	%	Forward regenerative torque limit
0h0393	40915	40916	Rev Pos Torque Limit	0.1	%	Reverse motoring torque limit
0h0394	40916	40917	Rev Neg Torque Limit	0.1	%	Reverse regenerative torque limit
0h0395	40917	40918	Torque Bias	0.1	%	Torque bias
0h0396 - 0h0399	40918 - 40921	40919 - 40922	Reserved	-	-	-
0h039A	40922	40923	Anytime Para	-	-	Set the CNF.20 value (displayed on LCD keypad only)
0h039B	40923	40924	Monitor Line-1	-	-	Set the CNF.21 value (displayed on LCD keypad only)
0h039C	40924	40925	Monitor Line-2	-	-	Set the CNF.22 value (displayed on LCD keypad only)
0h039D	40925	40926	Monitor Line-3	-	-	Set the CNF.23 value (displayed on LCD keypad only)

A frequency set via communication using the common area frequency address (0h0380) is not saved even when used with the parameter save function. To save a changed frequency to use after a power cycle, follow these steps:

- 2) Set dr.07 to Keypad-1 and select a random target frequency.
- 3) Set the frequency via communication into the parameter area frequency address (0h1101).
- 4) Perform the parameter save (0h03E0: '1') before turning off the power. After the power cycle, the frequency set before turning off the power is displayed.

DRIVE MEMORY CONTROL AREA PARAMETER (READ AND WRITE)

- ♦R/W – Parameter Write–enabled during Operation (Run mode)
- R/W – Parameter Write–enabled when stopped
- Parameter Read Only

Drive Memory Control Area Parameter (Read and Write)								
Comm. Address			Parameter	Scale	Unit	Changeable During Operation	Function	
Hex	Modbus RTU	Modbus TCP						
0h03E0	40992	40993	Save parameters	-	-	R/W	0	No
							1	Yes
0h03E1	40993	40994	Monitor mode initialization	-	-	♦R/W	0	No
							1	Yes

Drive Memory Control Area Parameter (Read and Write)								
Comm. Address			Parameter	Scale	Unit	Changeable During Operation	Function	
Hex	Modbus RTU	Modbus TCP						
0h03E2	40994	40995	Parameter initialization	-	-	R/W	0	No
							1	All Grp
							2	Drv Grp
							3	bA Grp
							4	Ad Grp
							5	Cn Grp
							6	In Grp
							7	OU Grp
							8	CM Grp
							9	AP Grp
							12	Pr Grp
							13	M2 Grp
							Setting is prohibited during fault trip interruptions.	
0h03E3	40995	40996	Display changed parameters	-	-	◆R/W	0	No
							1	Yes
0h03E4	40996	40997	Reserved	-	-	Read Only	-	
0h03E5	40997	40998	Delete all fault history	-	-	◆R/W	0	No
							1	Yes
0h03E6	40998	40999	Delete user-registered codes	-	-	◆R/W	0	No
							1	Yes
0h03E7	40999	41000	Hide parameter mode	0	Hex	◆R/W	Write: 0-9999	
							Read	
							0	Unlock
							1	Lock
0h03E8	41000	41001	Lock parameter mode	0	Hex	◆R/W	Write: 0-9999	
							Read	
							0	Unlock
							1	Lock
0h03E9	41001	41002	Easy start on (easy parameter setup mode)	-	-	◆R/W	0	No
							1	Yes
0h03EA	41002	41003	Initializing power consumption	-	-	◆R/W	0	No
							1	Yes
0h03EB	41003	41004	Initialize drive operation accumulative time	-	-	◆R/W	0	No
							1	Yes
0h03EC	41004	41005	Initialize cooling fan accumulated operation time	-	-	◆R/W	0	No
							1	Yes

When setting parameters in the drive memory control area, the values are reflected to the drive operation and saved. Parameters set in other areas via communication are reflected to the drive operation, but are not saved. All set values are cleared following a drive power cycle and revert back to its previous values. When setting

parameters via communication, ensure that a parameter save is completed prior to shutting the drive down.

Whereas the drive may respond and operate to new parameters written via communications, some parameters set via communications are not retentive upon a power cycle UNLESS the new parameter values have been SAVED prior to the power cycle.

- Parameter SET via Communications + NOT Saved + Power Cycle = Parameters reverts back to previous setting.
- Parameter SET via Communications + SAVED + Power Cycle = Parameters holds saved value.

The addresses 0h03E7 and 0h03E8 are parameters for entering the password. When the password is entered, the condition will change from Lock to Unlock, and vice versa. When the same parameter value is entered continuously, the parameter is executed just once. Therefore, if the same value is entered again, change it to another value first and then re-enter the previous value. For example, if you want to enter 244 twice, enter it in the following order: 244 → 0 → 244.



NOTE: It may take longer to set the parameter values in the drive memory control area because all data is saved to the drive. Be careful as communication may be lost during parameter setup if parameter setup is continues for an extended period of time.

DRIVE PARAMETER MODBUS COMMUNICATION ADDRESSES

The following tables list the specific modbus addresses for all parameters in the ACN series drive. Please note, the Modbus RTU addresses for serial use are different than the Modbus TCP addresses for use with the ACN-ETH communications option card. Hex Address 0000 is unavailable with Modbus RTU.

Parameter	HEX	ModbusRTU Decimal	ModbusTCP Decimal	Parameter	HEX	ModbusRTU Decimal	ModbusTCP Decimal
Drive Group							
dr.01	1101	44353	44354	dr.20	1114	44372	44373
dr.02	1102	44354	44355	dr.21	1115	44373	44374
dr.03	1103	44355	44356	dr.22	1116	44374	44375
dr.04	1104	44356	44357	dr.23	1117	44375	44376
dr.06	1106	44358	44359	dr.24	1118	44376	44377
dr.07	1107	44359	44360	dr.25	1119	44377	44378
dr.08	1108	44360	44361	dr.80	1150	44432	44433
dr.09	1109	44361	44362	dr.81	1151	44433	44434
dr.10	1110A	44362	44363	dr.89	1159	40995	40996
dr.11	110B	44363	44364	dr.90	115A	44442	44443
dr.12	110C	44364	44365	dr.91	115B	44443	44444
dr.13	110D	44365	44366	dr.93	115D	44445	44446
dr.14	110E	44366	44367	dr.94	115E	44446	44447
dr.15	110F	44367	44368	dr.95	115F	44447	44448
dr.16	1110	44368	44369	dr.97	1161	44449	44450
dr.17	1111	44369	44370	dr.98	1162	44450	44451
dr.18	1112	44370	44371	dr.99	1163	44451	44452
dr.19	1113	44371	44372				

Parameter	HEX	ModbusRTU Decimal	ModbusTCP Decimal	Parameter	HEX	ModbusRTU Decimal	ModbusTCP Decimal
Basic Group							
bA.1	1201	44609	44610	bA.35	-	-	-
bA.2	1202	44610	44611	bA.41	1229	44649	44650
bA.3	1203	44611	44612	bA.42	122A	44650	44651
bA.4	1204	44612	44613	bA.43	122B	44651	44652
bA.5	1205	44613	44614	bA.44	122C	44652	44653
bA.6	1206	44614	44615	bA.45	122D	44653	44654
bA.7	1207	44615	44616	bA.46	122E	44654	44655
bA.8	1208	44616	44617	bA.47	122F	44655	44656
bA.9	1209	44617	44618	bA.48	1230	44656	44657
bA.10	120A	44618	44619	-	-	40000	40001
bA.11	120B	44619	44620	bA.50	1232	44658	44659
bA.12	120C	44620	44621	bA.51	1233	44659	44660
bA.13	120D	44621	44622	bA.52	1234	44660	44661
bA.14	120E	44622	44623	bA.53	1235	44661	44662
bA.15	120F	44623	44624	bA.54	1236	44662	44663
bA.16	1210	44624	44625	bA.55	1237	44663	44664
bA.17	1211	44625	44626	bA.56	1238	44664	44665
bA.18	1212	44626	44627	bA.70	1246	44678	44679
bA.19	1213	44627	44628	bA.71	1247	44679	44680
bA.20	-	-	-	bA.72	1248	44680	44681
bA.21	-	-	-	bA.73	1249	44681	44682
bA.22	-	-	-	bA.74	124A	44682	44683
bA.23	-	-	-	bA.75	124B	44683	44684
bA.24	-	-	-	bA.76	124C	44684	44685
bA.25	-	-	-	bA.77	124D	44685	44686
bA.26	-	-	-	bA.78	124E	44686	44687
bA.28	-	-	-	bA.79	124F	44687	44688
bA.29	-	-	-	bA.80	1250	44688	44689
bA.30	-	-	-	bA.81	1251	44689	44690
bA.31	-	-	-	bA.82	1252	44690	44691
bA.32	-	-	-	bA.83	1253	44691	44692
bA.34	-	-	-				

Parameter	HEX	ModbusRTU Decimal	ModbusTCP Decimal	Parameter	HEX	ModbusRTU Decimal	ModbusTCP Decimal
Advanced Group							
Ad.1	1301	44865	44866	Ad.44	132C	44908	44909
Ad.2	1302	44866	44867	Ad.45	132D	44909	44910
Ad.3	1303	44867	44868	Ad.46	132E	44910	44911
Ad.4	1304	44868	44869	Ad.47	132F	44911	44912
Ad.5	1305	44869	44870	Ad.50	1332	44914	44915
Ad.6	1306	44870	44871	Ad.51	1333	44915	44916
Ad.7	1307	44871	44872	Ad.60	133C	44924	44925
Ad.8	1308	44872	44873	Ad.61	133D	44925	44926
Ad.9	1309	44873	44874	Ad.62	133E	44926	44927
Ad.10	130A	44874	44875	Ad.63	133F	44927	44928
Ad.12	130C	44876	44877	Ad.64	1340	44928	44929
Ad.13	130D	44877	44878	Ad.65	1341	44929	44930
Ad.14	130E	44878	44879	Ad.66	1342	44930	44931
Ad.15	130F	44879	44880	Ad.67	1343	44931	44932
Ad.16	1310	44880	44881	Ad.68	1344	44932	44933
Ad.17	1311	44881	44882	Ad.70	1346	44934	44935
Ad.20	1314	44884	44885	Ad.71	1347	44935	44936
Ad.21	1315	44885	44886	Ad.72	1348	44936	44937
Ad.22	1316	44886	44887	Ad.74	134A	44938	44939
Ad.23	1317	44887	44888	Ad.75	134B	44939	44940
Ad.24	1318	44888	44889	Ad.76	134C	44940	44941
Ad.25	1319	44889	44890	Ad.77	134D	44941	44942
Ad.26	131A	44890	44891	Ad.78	134E	44942	44943
Ad.27	131B	44891	44892	Ad.79	134F	44943	44944
Ad.28	131C	44892	44893	Ad.80	1350	44944	44945
Ad.29	131D	44893	44894	Ad.81	1351	44945	44946
Ad.30	131E	44894	44895	Ad.82	1352	44946	44947
Ad.31	131F	44895	44896	Ad.83	-	-	-
Ad.32	1320	44896	44897	Ad.85	1355	44949	44950
Ad.33	1321	44897	44898	Ad.86	1356	44950	44951
Ad.41	1329	44905	44906	Ad.87	1357	44951	44952
Ad.42	132A	44906	44907				

Parameter	HEX	ModbusRTU Decimal	ModbusTCP Decimal	Parameter	HEX	ModbusRTU Decimal	ModbusTCP Decimal
Control Group							
Cn.4	1404	45124	45125	Cn.50	1432	45170	45171
Cn.5	1405	45125	45126	Cn.51	1433	45171	45172
Cn.9	1409	45129	45130	Cn.52	1434	45172	45173
Cn.10	140A	45130	45131	Cn.53	1435	45173	45174
Cn.11	140B	45131	45132	Cn.54	1436	45174	45175
Cn.12	140C	45133	45134	Cn.55	1437	45175	45176
Cn.13	140D	45135	45136	Cn.56	1438	45176	45177
Cn.15	140F	45136	45137	Cn.57	1439	45177	45178
Cn.16	1410	45137	45138	Cn.62	143E	45182	45183
Cn.20	1414	45140	45141	Cn.63	143F	45183	45184
Cn.21	1415	45141	45142	Cn.64	1440	45184	45185
Cn.22	1416	45142	45143	Cn.65	1441	45185	45186
Cn.23	1417	45143	45144	Cn.69	-	-	-
Cn.24	1418	45144	45145	Cn.70	1446	45190	45191
Cn.25	1419	45145	45146	Cn.71	1447	45191	45192
Cn.26	141A	45146	45147	Cn.72	1448	45192	45193
Cn.27	141B	45147	45148	Cn.73	1449	45193	45194
Cn.28	141C	45148	45149	Cn.74	144A	45194	45195
Cn.29	141D	45149	45150	Cn.75	144B	45195	45196
Cn.30	141E	45150	45151	Cn.76	144C	45196	45197
Cn.31	141F	45151	45152	Cn.77	144D	45197	45198
Cn.32	1420	45152	45153	Cn.78	144E	45198	45199
Cn.33	1421	45153	45154	Cn.79	144F	45199	45200
Cn.34	1422	45154	45155	Cn.80	1450	45200	45201
Cn.35	1423	45155	45156	Cn.81	1451	45201	45202
Cn.36	1424	45156	45157	Cn.82	1452	45202	45203
Cn.37	1425	45157	45158	Cn.83	1453	45203	45204
Cn.38	1426	45158	45159	Cn.85	1455	45205	45206
Cn.39	1427	45159	45160	Cn.86	1456	45206	45207
Cn.40	1428	45160	45161	Cn.87	1457	45207	45208
Cn.41	1429	45161	45162	Cn.88	1458	45208	45209
Cn.42	142A	45162	45163	Cn.89	1459	45209	45210
Cn.43	142B	45163	45164	Cn.90	145A	45210	45211
Cn.44	142C	45164	45165	Cn.91	145B	45211	45212
Cn.45	142D	45165	45166	Cn.92	145C	45212	45213
Cn.46	142E	45166	45167	Cn.93	145D	45213	45214
Cn.48	1430	45168	45169	Cn.94	145E	45214	45215
Cn.49	1431	45169	45170	Cn.95	145F	45215	45216

Parameter	HEX	ModbusRTU Decimal	ModbusTCP Decimal	Parameter	HEX	ModbusRTU Decimal	ModbusTCP Decimal
Input Group							
In.1	1501	45377	45378	In.54	1536	45430	45431
In.2	1502	45378	45379	In.55	1537	45431	45432
In.5	1505	45381	45382	In.56	1538	45432	45433
In.6	1506	45382	45383	In.61	153D	45437	45438
In.7	1507	45383	45384	In.62	153E	45438	45439
In.8	1508	45384	45385	In.65	1541	45441	45442
In.9	1509	45385	45386	In.66	1542	45442	45443
In.10	150A	45386	45387	In.67	1543	45443	45444
In.11	150B	45387	45388	In.68	1544	45444	45445
In.12	150C	45388	45389	In.69	1545	45445	45446
In.13	150D	45389	45390	In.84	1554	45460	45461
In.14	150E	45390	45391	In.85	1555	45461	45462
In.15	150F	45391	45392	In.86	1556	45462	45463
In.16	1510	45392	45393	In.87	1557	45463	45464
In.17	1511	45393	45394	In.89	1559	45465	45466
In.35	1523	45411	45412	In.90	155A	45466	45467
In.37	1525	45413	45414	In.91	155B	45467	45468
In.38	1526	45414	45415	In.92	155C	45468	45469
In.39	1527	45415	45416	In.93	155D	45469	45470
In.40	1528	45416	45417	In.94	155E	45470	45471
In.41	1529	45417	45418	In.95	155F	45471	45472
In.46	152E	45422	45423	In.96	1560	45472	45473
In.47	152F	45423	45424	In.97	1561	45473	45474
In.50	1532	45426	45427	In.98	1562	45474	45475
In.52	1534	45428	45429	In.99	1563	45475	45476
In.53	1535	45429	45430				
Output Group							
OU.1	1601	45633	45634	OU.52	1634	45684	45685
OU.2	1602	45634	45635	OU.53	1635	45685	45686
OU.3	1603	45635	45636	OU.54	1636	45686	45687
OU.4	1604	45636	45637	OU.55	1637	45687	45688
OU.5	1605	45637	45638	OU.56	1638	45688	45689
OU.6	1606	45638	45639	OU.57	1639	45689	45690
OU.30	161E	45662	45663	OU.58	163A	45690	45691
OU.31	161F	45663	45664	OU.61	163D	45693	45694
OU.32	1620	45664	45665	OU.62	163E	45694	45695
OU.33	1621	45665	45666	OU.63	163F	45695	45696
OU.41	1629	45673	45674	OU.64	1640	45696	45697
OU.50	1632	45682	45683	OU.65	1641	45697	45698
OU.51	1633	45683	45684	OU.66	1642	45698	45699

Parameter	HEX	ModbusRTU Decimal	ModbusTCP Decimal	Parameter	HEX	ModbusRTU Decimal	ModbusTCP Decimal
Communication Group							
CM.1	1701	45889	45890	CM.35	1723	45923	45924
CM.2	1702	45890	45891	CM.36	1724	45924	45925
CM.3	1703	45891	45892	CM.37	1725	45925	45926
CM.4	1704	45892	45893	CM.38	1726	45926	45927
CM.5	1705	45893	45894	CM.49	1731	45937	45938
CM.6	1706	45894	45895	CM.50	1732	45938	45939
CM.7	1707	45895	45896	CM.51	1733	45939	45940
CM.8	1708	45896	45897	CM.52	1734	45940	45941
CM.9	1709	45897	45898	CM.53	1735	45941	45942
CM.10	170A	45898	45899	CM.54	1736	45942	45943
CM.11	170B	45899	45900	CM.55	1737	45943	45944
CM.12	170C	45900	45901	CM.56	1738	45944	45945
CM.13	170D	45901	45902	CM.57	1739	45945	45946
CM.14	170E	45902	45903	CM.58	173A	45946	45947
CM.15	170F	45903	45904	CM.68	1744	45956	45957
CM.16	1710	45904	45905	CM.70	1746	45958	45959
CM.17	1711	45905	45906	CM.71	1747	45959	45960
CM.18	1712	45906	45907	CM.72	1748	45960	45961
CM.19	1713	45907	45908	CM.73	1749	45961	45962
CM.20	1714	45908	45909	CM.74	174A	45962	45963
CM.21	1715	45909	45910	CM.75	174B	45963	45964
CM.22	1716	45910	45911	CM.76	174C	45964	45965
CM.23	1717	45911	45912	CM.77	174D	45965	45966
CM.24	1718	45912	45913	CM.86	1756	45974	45975
CM.25	1719	45913	45914	CM.90	175A	45978	45979
CM.29	171D	45917	45918	CM.91	175B	45979	45980
CM.30	171E	45918	45919	CM.92	175C	45980	45981
CM.31	171F	45919	45920	CM.93	175D	45981	45982
CM.32	1720	45920	45921	CM.94	-	-	-
CM.33	1721	45921	45922	CM.95	1760	45984	45985
CM.34	1722	45922	45923	CM.96	-	-	-

Parameter	HEX	ModbusRTU Decimal	ModbusTCP Decimal	Parameter	HEX	ModbusRTU Decimal	ModbusTCP Decimal
Application Group							
AP.1	1801	46145	46146	AP.29	181D	46173	46174
AP.2	-	46146	46147	AP.30	181E	46174	46175
AP.16	1810	46160	46161	AP.31	181F	46175	46176
AP.17	1811	46161	46162	AP.32	1820	46176	46177
AP.18	1812	46162	46163	AP.34	1822	46178	46179
AP.19	1813	46163	46164	AP.35	1823	46179	46180
AP.20	1814	46164	46165	AP.36	1824	46180	46181
AP.21	1815	46165	46166	AP.37	1825	46181	46182
AP.22	1816	46166	46167	AP.38	1826	46182	46183
AP.23	1817	46167	46168	AP.39	1827	46183	46184
AP.24	1818	46168	46169	AP.40	1828	46184	46185
AP.25	1819	46169	46170	AP.42	182A	46186	46187
AP.26	181A	46170	46171	AP.43	182B	46187	46188
AP.27	181B	46171	46172	AP.44	182C	46188	46189
AP.28	181C	46172	46173	AP.45	182D	46189	46190
Extension IO Group							
AO.1	1A01	46657	46658	AO.20	1A14	46676	46677
AO.2	1A02	46658	46659	AO.21	1A15	46677	46678
AO.3	1A03	46659	46660	AO.22	1A16	46678	46679
AO.4	1A04	46660	46661	AO.23	1A17	46679	46680
AO.5	1A05	46661	46662	AO.24	1A18	46680	46681
AO.6	1A06	46662	46663	AO.25	1A19	46681	46682
AO.7	1A07	46663	46664	AO.26	1A1A	46682	46683
AO.8	1A08	46664	46665	AO.27	1A1B	46683	46684
AO.9	1A09	46665	46666	AO.28	1A1C	46684	46685
AO.10	1A0A	46666	46667	AO.29	1A1D	46685	46686
AO.11	1A0B	46667	46668	AO.30	1A1E	46686	46687
AO.12	1A0C	46668	46669	AO.31	1A1F	46687	46688
AO.13	1A0D	46669	46670	AO.32	1A20	46688	46689
AO.14	1A0E	46670	46671	AO.33	1A21	46689	46690
AO.15	1A0F	46671	46672	AO.34	1A22	46690	46691
AO.16	1A10	46672	46673	AO.35	1A23	46691	46692
AO.17	1A11	46673	46674	AO.36	1A24	46692	46693
AO.18	1A12	46674	46675	AO.37	1A25	46693	46694
AO.19	1A13	46675	46676				

Parameter	HEX	ModbusRTU Decimal	ModbusTCP Decimal	Parameter	HEX	ModbusRTU Decimal	ModbusTCP Decimal
Protection Group							
Pr.4	1B04	46916	46917	Pr.51	1B33	46963	46964
Pr.5	1B05	46917	46918	Pr.52	1B34	46964	46965
Pr.6	1B06	46918	46919	Pr.53	1B35	46965	46966
Pr.7	1B07	46919	46920	Pr.54	1B36	46966	46967
Pr.8	1B08	46920	46921	Pr.55	1B37	46967	46968
Pr.9	1B09	46921	46922	Pr.56	1B38	46968	46969
Pr.10	1B0A	46922	46923	Pr.57	1B39	46969	46970
Pr.12	1B0C	46924	46925	Pr.58	1B3A	46970	46971
Pr.13	1B0D	46925	46926	Pr.59	1B3B	46971	46972
Pr.14	1B0E	46926	46927	Pr.60	1B3C	46972	46973
Pr.15	1B0F	46927	46928	Pr.61	1B3D	46973	46974
Pr.17	1B11	46929	46930	Pr.62	1B3E	46974	46975
Pr.18	1B12	46930	46931	Pr.63	1B3F	46975	46976
Pr.19	1B13	46931	46932	Pr.66	1B42	46978	46979
Pr.20	1B14	46932	46933	Pr.73	1B49	46946	46947
Pr.21	1B15	46933	46934	Pr.74	1B4A	46947	46948
Pr.22	1B16	46934	46935	Pr.75	1B4B	46948	46949
Pr.25	1B19	46937	46938	Pr.79	1B4F	46991	46992
Pr.26	1B1A	46938	46939	Pr.80	1B50	46992	46993
Pr.27	1B1B	46939	46940	Pr.81	1B51	46993	46994
Pr.28	1B1C	46940	46941	Pr.82	1B52	46994	46995
Pr.29	1B1D	46941	46942	Pr.86	1B56	46998	46999
Pr.30	1B1E	46942	46943	Pr.87	1B57	46999	47000
Pr.31	1B1F	46943	46944	Pr.88	1B58	47000	47001
Pr.32	1B20	46944	46945	Pr.89	1B59	47001	47002
Pr.33	1B21	46945	46946	Pr.91	1B5B	47003	47004
Pr.40	1B28	46952	46953	Pr.92	1B5C	47004	47005
Pr.41	1B29	46953	46954	Pr.93	1B5D	47005	47006
Pr.42	1B2A	46954	46955	Pr.94	1B5E	47006	47007
Pr.43	1B2B	46955	46956	Pr.95	1B5F	47007	47008
Pr.45	1B2D	46957	46958	Pr.96	1B60	47008	47009
Pr.50	1B32	46962	46963				

Parameter	HEX	ModbusRTU Decimal	ModbusTCP Decimal	Parameter	HEX	ModbusRTU Decimal	ModbusTCP Decimal
2nd Motor Group							
m2.4	1C04	47172	47173	m2.18	-	-	-
m2.5	1C05	47173	47174	m2.19	-	-	-
m2.6	1C06	47174	47175	m2.20	-	-	-
m2.7	1C07	47175	47176	m2.25	1C19	47193	47194
m2.8	1C08	47176	47177	m2.26	1C1A	47194	47195
m2.10	1C0A	47178	47179	m2.27	1C1B	47195	47196
m2.11	1C0B	47179	47180	m2.28	1C1C	47196	47197
m2.12	1C0C	47180	47181	m2.29	1C1D	47197	47198
m2.13	1C0D	47181	47182	m2.30	1C1E	47198	47199
m2.14	1C0E	47182	47183	m2.40	1C28	47208	47209
m2.15	1C0F	47183	47184	m2.41	1C29	47209	47210
m2.16	1C10	47184	47185	m2.42	1C2A	47210	47211
m2.17	-	-	-				
User Sequence Group							
US.1	1D01	47425	47426	US.39	1D27	47463	47464
US.2	1D02	47426	47427	US.40	1D28	47464	47465
US.11	1D0B	47435	47436	US.41	1D29	47465	47466
US.12	1D0C	47436	47437	US.42	1D2A	47466	47467
US.13	1D0D	47437	47438	US.43	1D2B	47467	47468
US.14	1D0E	47438	47439	US.44	1D2C	47468	47469
US.15	1D0F	47439	47440	US.45	1D2D	47469	47470
US.16	1D10	47440	47441	US.46	1D2E	47470	47471
US.17	1D11	47441	47442	US.47	1D2F	47471	47472
US.18	1D12	47442	47443	US.48	1D30	47472	47473
US.19	1D13	47443	47444	US.49	1D31	47473	47474
US.20	1D14	47444	47445	US.50	1D32	47474	47475
US.21	1D15	47445	47446	US.51	1D33	47475	47476
US.22	1D16	47446	47447	US.52	1D34	47476	47477
US.23	1D17	47447	47448	US.53	1D35	47477	47478
US.24	1D18	47448	47449	US.54	1D36	47478	47479
US.25	1D19	47449	47450	US.55	1D37	47479	47480
US.26	1D1A	47450	47451	US.56	1D38	47480	47481
US.27	1D1B	47451	47452	US.57	1D39	47481	47482
US.28	1D1C	47452	47453	US.58	1D3A	47482	47483
US.31	1D1F	47455	47456	US.59	1D3B	47483	47484
US.32	1D20	47456	47457	US.60	1D3C	47484	47485
US.33	1D21	47457	47458	US.80	1D50	47504	47505
US.34	1D22	47458	47459	US.81	1D51	47505	47506
US.35	1D23	47459	47460	US.82	1D52	47506	47507
US.36	1D24	47460	47461	US.85	1D55	47509	47510
US.37	1D25	47461	47462	US.88	1D58	47512	47513
US.38	1D26	47462	47463				

Parameter	HEX	ModbusRTU Decimal	ModbusTCP Decimal	Parameter	HEX	ModbusRTU Decimal	ModbusTCP Decimal
User Sequence Function Group							
UF.1	1E01	47681	47682	UF.46	1E2E	47726	47727
UF.2	1E02	47682	47683	UF.47	1E2F	47727	47728
UF.3	1E03	47683	47684	UF.48	1E30	47728	47729
UF.4	1E04	47684	47685	UF.49	1E31	47729	47730
UF.5	1E05	47685	47686	UF.50	1E32	47730	47731
UF.6	1E06	47686	47687	UF.51	1E33	47731	47732
UF.7	1E07	47687	47688	UF.52	1E34	47732	47733
UF.8	1E08	47688	47689	UF.53	1E35	47733	47734
UF.9	1E09	47689	47690	UF.54	1E36	47734	47735
UF.10	1E0A	47690	47691	UF.55	1E37	47735	47736
UF.11	1E0B	47691	47692	UF.56	1E38	47736	47737
UF.12	1E0C	47692	47693	UF.57	1E39	47737	47738
UF.13	1E0D	47693	47694	UF.58	1E3A	47738	47739
UF.14	1E0E	47694	47695	UF.59	1E3B	47739	47740
UF.15	1E0F	47695	47696	UF.60	1E3C	47740	47741
UF.16	1E10	47696	47697	UF.61	1E3D	47741	47742
UF.17	1E11	47697	47698	UF.62	1E3E	47742	47743
UF.18	1E12	47698	47699	UF.63	1E3F	47743	47744
UF.19	1E13	47699	47700	UF.64	1E40	47744	47745
UF.20	1E14	47700	47701	UF.65	1E41	47745	47746
UF.21	1E15	47701	47702	UF.66	1E42	47746	47747
UF.22	1E16	47702	47703	UF.67	1E43	47747	47748
UF.23	1E17	47703	47704	UF.68	1E44	47748	47749
UF.24	1E18	47704	47705	UF.69	1E45	47749	47750
UF.25	1E19	47705	47706	UF.70	1E46	47750	47751
UF.26	1E1A	47706	47707	UF.71	1E47	47751	47752
UF.27	1E1B	47707	47708	UF.72	1E48	47752	47753
UF.28	1E1C	47708	47709	UF.73	1E49	47753	47754
UF.29	1E1D	47709	47710	UF.74	1E4A	47754	47755
UF.30	1E1E	47710	47711	UF.75	1E4B	47755	47756
UF.31	1E1F	47711	47712	UF.76	1E4C	47756	47757
UF.32	1E20	47712	47713	UF.77	1E4D	47757	47758
UF.33	1E21	47713	47714	UF.78	1E4E	47758	47759
UF.34	1E22	47714	47715	UF.79	1E4F	47759	47760
UF.35	1E23	47715	47716	UF.80	1E50	47760	47761
UF.36	1E24	47716	47717	UF.81	1E51	47761	47762
UF.37	1E25	47717	47718	UF.82	1E52	47762	47763
UF.38	1E26	47718	47719	UF.83	1E53	47763	47764
UF.39	1E27	47719	47720	UF.84	1E54	47764	47765
UF.40	1E28	47720	47721	UF.85	1E55	47765	47766
UF.41	1E29	47721	47722	UF.86	1E56	47766	47767
UF.42	1E2A	47722	47723	UF.87	1E57	47767	47768
UF.43	1E2B	47723	47724	UF.88	1E58	47768	47769

Parameter	HEX	ModbusRTU Decimal	ModbusTCP Decimal	Parameter	HEX	ModbusRTU Decimal	ModbusTCP Decimal
UF.44	1E2C	47724	47725	UF.89	1E59	47769	47770
UF.45	1E2D	47725	47726	UF.90	1E5A	47770	47771
Operation Group							
0.00	1F00	47936	47937	St3	1F07	47943	47944
ACC	1F01	47937	47938	Cur	1F08	47944	47945
dEC	1F02	47938	47939	RPM	1F09	47945	47946
drv	1F03	47939	47940	dCL	1F0A	47946	47947
Fr9	1F04	47940	47941	vOL	1F0B	47947	47948
St1	1F05	47941	47942	nOn	1F0C	47948	47949
St2	1F06	47942	47943	drC	1F0D	47949	47950