

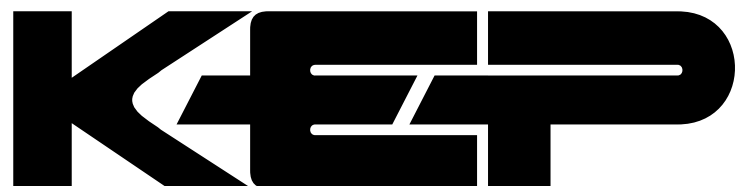
MINitrol, DRT and MINIbatcher

***RS-232, RS-422, RS-485 Option with
Modbus RTU Protocol***



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Introducing Modbus RTU Protocol for MINItrol, DRT and MINiBatcher

When the units are equipped with the Modbus communication option, the protocol it uses is the Modbus RTU protocol. This protocol defines a message structure that hosts and clients will recognize and use on the network over which they communicate. It describes the process a master device (PC compatible) uses to request access to another device, how it will respond to requests from the other devices, and how errors will be detected and reported. It establishes a common format for the layout and contents of message fields.

During communications on a Modbus RTU network, the protocol determines how each unit will know its device address, recognize a message addressed to it, determine the kind of action to be taken, and extract any data or other information contained in the message. If a reply is required, the Unit will construct the reply message and send it using Modbus RTU protocol.

RTU Mode

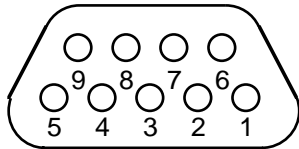
The MINItrol, DRT or MINiBatcher equipped with the Modbus communications option supports the Modbus RTU (Remote Terminal Unit) mode only. The Modbus ASCII mode is not supported. The main advantage of the RTU mode is that its greater character density allows better data throughput than ASCII for the same baud rate. The Modbus RTU uses a Master-Slave Query-Response Cycle in which the Unit's are the slave device.

Control Functions

The communications option supports the following function codes:

<u>CODE</u>	<u>NAME</u>	<u>DESCRIPTION</u>
01	Read Coil Status	Reads the status of a coil (ON or OFF)
03	Read Holding Registers	Reads the value in a holding register
06	Preset Single Register	Presets a value into a single holding register (4x reference)
15	Force Multiple Coil	Forces each coil (0x reference) in a sequence of coils to either ON or OFF
16	Preset Multiple Registers	Presets values into a sequence of holding registers (4x reference)

Port Pinout (recommended mating connector: DB-9M)



RS 232

1. INITIALIZE
2. TRANSMIT
3. RECEIVE
4. N/C
5. GROUND
6. STROBE
7. N/C
8. N/C
9. N/C

RS 422

1. INITIALIZE
2. TRANSMIT A (+)
3. RECEIVE A (+)
4. N/C
5. GROUND
6. STROBE
7. TRANSMIT B (-)
8. RECEIVE B (-)
9. N/C

RS 485

1. INITIALIZE
2. TRANSMIT A (+)
3. RECEIVE A (+)
4. N/C
5. GROUND
6. STROBE
7. TRANSMIT B (-)
8. RECEIVE B (-)
9. N/C

Installation Overview

RS422/485 may be multidropped up to 4000 ft. and up to 32 units may be chained together. A RS-485 to RS-232 interface adapter is required at the PC. An optically isolated type is recommended. The RS serial card is not isolated in the unit, therefore an optically isolated adapter is recommended at the PC. Suitable wiring should be selected based on anticipated electrical interference. Terminators should be used to help improve the quality of electronic signals sent over the RS serial wires. The RS serial chain should be terminated at the beginning (RS-485 adaptor) and at the last device in the RS serial chain and nowhere else. On the Unit this is accomplished by connecting a resistor (180Ω) from terminal 7 to terminal 4 or 8 at the RS-485 port. If lightning protection is required, a suitable surge protector should be used.

For additional information, refer to the technical requirements of EIA-485, interface adaptor user manual and the communication software user manual

Register & Coil Usage

Register Usage (each register is 2 bytes)

<u>Data</u>	<u>Register</u>	<u>Data Type</u>	<u>Access</u>
Baud Rate	Reg 40001	Integer	Read/Write
Parity	Reg 40002	Integer	Read/Write
Device I.D.	Reg 40003	Integer	Read/Write
A Total	Reg 40008 & 40009	Float	Read/Write
A Rate	Reg 40010 & 40011	Float	Read
B Total	Reg 40012 & 40013	Float	Read/Write
B Rate	Reg 40014 & 40015	Float	Read
C Total	Reg 40004 & 40005	Float	Read
C Rate	Reg 40006 & 40007	Float	Read
Preset A	Reg 40016 & 40017	Float	Read/Write
Preset B	Reg 40018 & 40019	Float	Read/Write
Factor A	Reg 40020 & 40021	Float	Read/Write
Factor B	Reg 40022 & 40023	Float	Read/Write
Decimal Point Position	Reg 40024	Integer	Read/Write

NOTE: The Float data type follows the IEEE format for a 32 bit float.

COIL USAGE (each coil is 1 bit)

<u>Data</u>	<u>Coil</u>	<u>Data Type</u>	<u>Access</u>
Reset B	Coil 00001	bit	Write
Reset A	Coil 00002	bit	Write
Start (MB2 only)	Coil 00003	bit	Write
Stop (MB2 only)	Coil 00004	bit	Write

COMMUNICATION GROUP

<u>Data</u>	<u>Register</u>	<u>Selection</u>	<u>Value</u>
Baud Rate	Reg 40001	300	0
		600	1
		1200	2
		2400	3
		4800	4
		9600	5
Parity	Reg 40002	None	0
		Odd	1
		Even	2
Unit I.D. Number	Reg 40003	ID#	1-247

SETUP

All serial communication mode changes must be done through serial communications. Mode changes can not be done through the front panel. To initialize the unit, place a jumper between pin 7 (+12V) bottom board and pin 1 (init) DB9 connector on initial power up. The unit defaults to: 300 baud rate, "MARK" parity and device number 01.