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A Sierra Monitor Company

Driver Manual
(Supplement to the FieldServer Instruction Manual)

FS-8700-67 Russelectric Model 2000

APPLICABILITY & EFFECTIVITY

Effective for all systems manufactured after May 1, 2001

Driver Version:	**1.04**
Document Revision:	**1**

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1. Russelectric Model 2000 Description

The Serial Russelectric Model 2000 driver allows the FieldServer to transfer data to and from devices over either RS-232 or RS-485 using RTU protocol. The Russelectric Model 2000 drivers implement a Model 2000 Client and a Model 2000 Server. The Client driver can read data from a remote Server and send write data commands. The Server driver emulates a Model 2000 device and responds to data read and write poll commands.

Messages
The client driver implements the following RTU message or command types:

- Read_Output_Table – Used to read the bit values of the discrete outputs on the Model 2000.
- Read_Registers – Used to read the integer values of the Model 2000's internal registers.
- Force_Single_Output – Used to set or clear the bit value of a single discrete output on the Model 2000.
- Preset_Single_Register – Used to load an integer value into a specific single register of the Model 2000.

Addressing
Every Model 2000 has a unique address assigned to it. The client driver can send messages to a specific Model 2000 by using the unique address in the message or by using a special broadcast address of value 0. Only the following messages can be sent in broadcast by the client (other messages are read data types and would cause a communications collision when all Model 2000 devices respond):

- Force_Single_Output
- Preset_Single_Register

All Model 2000 devices have to receive and process a broadcast message. No device may send a response message in reply. Subsequent data read commands by the client driver will update the data that was changed or loaded by a broadcast message.

2. Driver Scope of Supply

2.1. Supplied by FieldServer Technologies for this driver

FieldServer Technologies PART #	Description
FS-8917-02	RJ45 to DB9F connector adapter
FS-8700-67	Driver Manual.

2.2. Provided by the Supplier of 3rd Party Equipment

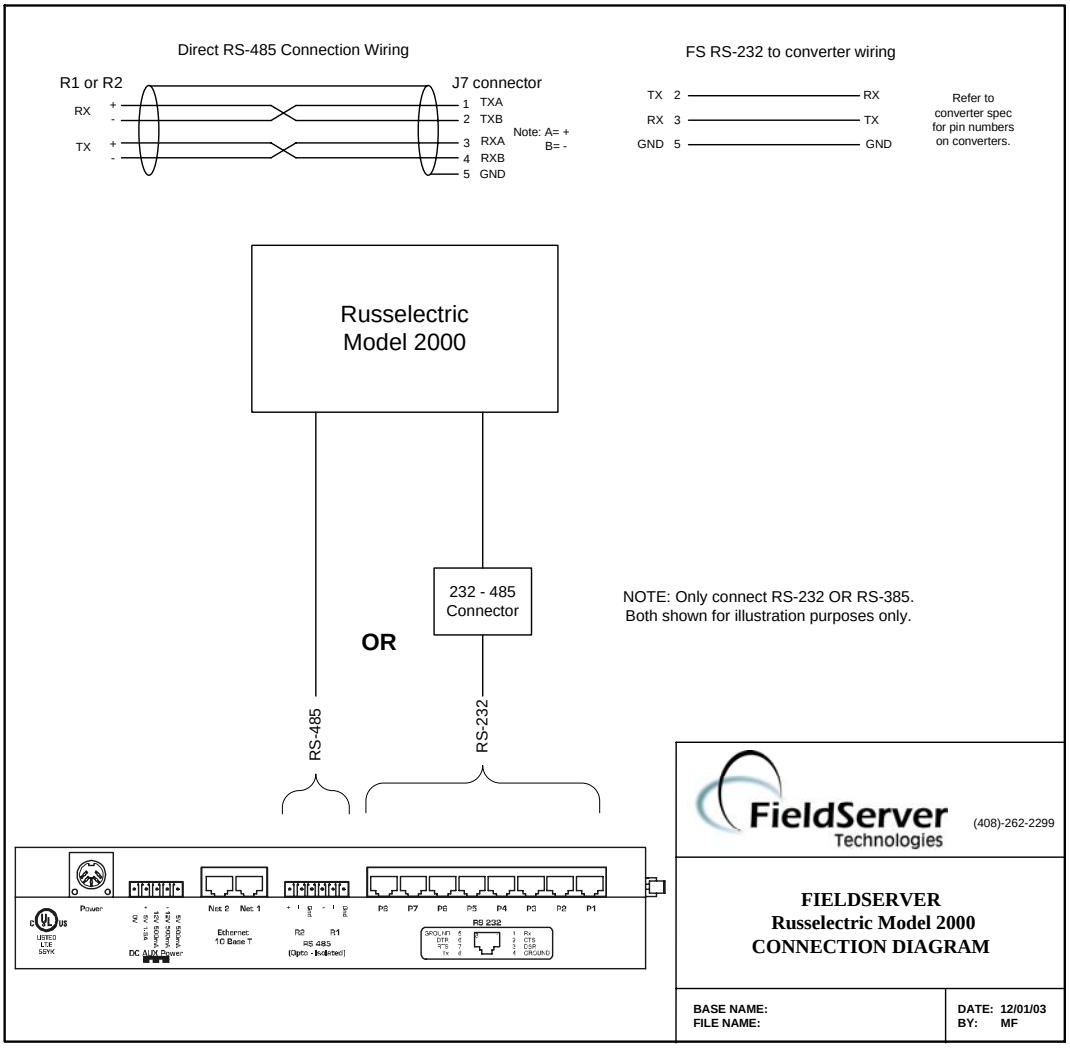
2.2.1. Required 3rd Party Hardware

The user has to provide a suitable cable with appropriate connectors that will connect the Model 2000 either directly to the FieldServer or to the RS-232 to RS-485 converter. When connecting to a converter, consult the converter's documentation for pinouts.

3. Hardware Connections

The FieldServer is connected to the Model 2000 as shown below.

Configure the Model 2000 according to manufacturer's instructions.



4. Configuring the FieldServer as a Russelectric Model 2000 Client

For a detailed discussion on FieldServer configuration, please refer to the FieldServer Configuration Manual. The information that follows describes how to expand upon the factory defaults provided in the configuration files included with the FieldServer (See ".csv" sample files provided with the FieldServer).

This section documents and describes the parameters necessary for configuring the FieldServer to communicate with a Russelectric Model 2000 Server.

4.1. Data Arrays/Descriptors

The configuration file tells the FieldServer about its interfaces, and the routing of data required. In order to enable the FieldServer for Russelectric Model 2000 communications, the driver independent FieldServer buffers need to be declared in the "Data Arrays" section, the destination device addresses need to be declared in the "Client Side Nodes" section, and the data required from the servers needs to be mapped in the "Client Side Map Descriptors" section. Details on how to do this can be found below.

Note that in the tables, * indicates an optional parameter, with the bold legal value being the default.

Section Title
Data_Arrays

Column Title	Function	Legal Values
Data_Array_Name	Provide name for Data Array	Up to 15 alphanumeric characters
Data_Array_Format	Provide data format. Each Data Array can only take on one format.	Float, Bit, UInt16, SInt16, Packed_Bit, Byte, Packed_Byte, Swapped_Byte
Data_Array_Length	Number of Data Objects. Must be larger than the data storage area required by the Map Descriptors for the data being placed in this array.	1-10,000

Example

```
//  Data Arrays

Data_Arrays
Data_Array_Name,    Data_Format,    Data_Array_Length
RTU_Registers,      Uint16,         79
RTU_Digital_Out,    Bit,            34
```

4.2. Client Side Connection Descriptions

Section Title
Connections

Column Title	Function	Legal Values
Port	Specify which port the device is connected to the FieldServer	P1-P8, R1-R2[1]
Protocol	Specify protocol used	Rus, RussElectric, Model2000
Baud*	Specify baud rate	110 – 115200, standard baud rates only (set to same value as used on Model 2000)
Parity*	Specify parity	Even, Odd, **None,** Mark, Space (refer to Model 2000 setup)
Data_Bits*	Specify data bits	**8**
Stop_Bits*	Specify stop bits	**1**
Handshaking*	Specify hardware handshaking	**None**
Poll _Delay*	Time between internal polls	0.5seconds.

Example

```
//  Client Side Connections

Connections
Port,       Baud,     Parity,  Protocol,  Handshaking,  Poll_Delay
P1,         9600,     None,    Rus,       None,         1.0s
```

4.3. Client Side Node Descriptors

Section Title
Nodes

Column Title	Function	Legal Values
Node_Name	Provide name for node	Up to 32 alphanumeric characters
Node_ID	Model 2000 station address	0-247 (Node 0 used exclusively to broadcast)
Protocol	Specify protocol used	Rus
Connection	Specify which port the device is connected to the FieldServer	P1-P8, R1-R2[1]

Example

```
//  Client Side Nodes

Nodes
Node_Name,    Node_ID,    Protocol,    Port
Node_1,       1,          Rus,         P1
```

Note that a node with Node_ID equal to zero (0) is reserved for a client's ability to transmit a message in broadcast. Other nodes specified refer to remote Model 2000 devices that will be communicated with.

[1] Not all ports shown are necessarily supported by the hardware. Consult the appropriate Instruction manual for details of the ports available on specific hardware.

4.4. Client Side Map Descriptors

4.4.1. FieldServer Related Map Descriptor Parameters

Column Title	Function	Legal Values
Map_Descriptor_Name	Name of this Map Descriptor	Up to 32 alphanumeric characters
Data_Array_Name	Name of Data Array where data is to be stored in the FieldServer	One of the Data Array names from "Data Array" section above
Data_Array_Offset	Starting location in Data Array	0 to maximum specified in "Data Array" section above
Function	Function of Client Map Descriptor	RDBC, WRBC, WRBX

4.4.2. Driver Related Map Descriptor Parameters

Column Title	Function	Legal Values
Node_Name	Name of Node to fetch data from or store data to	One of the node names specified in "Client Node Descriptor" above. Node_0 can be used to broadcast a command. Only write functions can be used with Node_0.
Data_Type	Used to indicate access to the Model2000 Registers or Points (flags)	Register Flag
Address	The starting register or point number	1-10,000 1-10,000
Length	The number of registers or points	For write functions, length defaults to 1. Length must be less than or equal to the maximum number of points or registers available. See your hardware manual for details.

4.4.3. Timing Parameters

Column Title	Function	Legal Values
Scan_Interval	Rate at which data is polled	>0.5s

4.5. Map Descriptor Example.

Map_Descriptor_Name,	Scan_Interval,	Data_Array_Name,	Data_Array_Offset,	Function,	Node_Name,	Data_Type,	Address,	Length
RUS_MBA1,	3.0s,	RTU_Digital_Out,	0,	Rdbc,	Node_1,	Flag,	1,	34

This can be any name but each name must be unique. Name will appear in FieldServer Map Descriptor status information screens.

Scan interval must be adapted for multiple Map Descriptor scans to prevent a situation where not all Map Descriptors can be executed in a certain time. Take remote device response time into consideration here.

This value specifies the offset into the data array (RTU_Digital_Out) where the data fetched must be stored.

The data array name must be one found under Data_Arrays. Data from the scan will be stored into the array at Data_Array_Offset.

The function may be ...ad for read commands a... write for write typ... commands. Continuous operations are allowed.

Node name must be one found under Nodes, Node_name. Data will be fetched from this node and port during a scan. Use Node_0 with id of 0 to execute a broadcast command.

5. Configuring the FieldServer as a Russelectric Model 2000 Server

For a detailed discussion on FieldServer configuration, please refer to the FieldServer Configuration Manual. The information that follows describes how to expand upon the factory defaults provided in the configuration files included with the FieldServer (See ".csv" sample files provided with the FieldServer).

This section documents and describes the parameters necessary for configuring the FieldServer to communicate with a Russelectric Model 2000 Client

The configuration file tells the FieldServer about its interfaces, and the routing of data required. In order to enable the FieldServer for Russelectric Model 2000 communications, the driver independent FieldServer buffers need to be declared in the "Data Arrays" section, the FieldServer virtual node(s) needs to be declared in the "Server Side Nodes" section, and the data to be provided to the clients needs to be mapped in the "Server Side Map Descriptors" section. Details on how to do this can be found below.

Note that in the tables, * indicates an optional parameter, with the bold legal value being the default.

5.1. Server Side Connection Descriptors

Section Title		
Connections		
Column Title	**Function**	**Legal Values**
Port	Specify which port the device is connected to the FieldServer	P1-P8, R1-R2[2]
Protocol	Specify protocol used	Rus
Baud*	Specify baud rate	110 – 115200, standard baud rates only (set to same value as used on Model 2000)
Parity*	Specify parity	Even, Odd, **None,** Mark, Space (refer to Model 2000 setup)
Data_Bits*	Specify data bits	8
Stop_Bits*	Specify stop bits	1
Handshaking*	Specify hardware handshaking	**None**

Example

```
// Server Side Connections

Connections
Port,       Baud,       Parity,     Protocol,   Handshaking
P1,         9600,       None,       Rus,        None
```

[2] Not all ports shown are necessarily supported by the hardware. Consult the appropriate Instruction manual for details of the ports available on specific hardware.

5.2. Server Side Node Descriptors

Section Title		
Nodes		
Column Title	**Function**	**Legal Values**
Node_Name	Provide name for node	Up to 32 alphanumeric characters
Node_ID	Model 2000 station address to emulate	0-247 (Node 0 used exclusively to receive broadcast messages)
Protocol	Specify protocol used	Rus

Example

```
//  Server Side Nodes

Nodes
Node_Name,          Node_ID,          Protocol
Node_1,               1,                Rus
```

5.3. Server Side Map Descriptors

5.3.1. FieldServer Specific Map Descriptor Parameters

Column Title	Function	Legal Values
Map_Descriptor_Name	Name of this Map Descriptor	Up to 32 alphanumeric characters
Data_Array_Name	Name of Data Array where data is to be stored in the FieldServer	One of the Data Array names from “Data Array” section above
Data_Array_Offset	Starting location in Data Array	0 to maximum specified in “Data Array” section above
Function	Function of Server Map Descriptor	Server

5.3.2. Driver Specific Map Descriptor Parameters

Column Title	Function	Legal Values
Node_Name	Name of Node to fetch data from	One of the node names specified in “Client Node Descriptor” above
Data_Type	Used to emulate Model2000 Registers or Points (flags)	Register Flag
Address	The start register number or start point number	1-10,000
Length	The number of registers or points	1-10,000

5.3.3. Map Descriptor Example.

Map_Descriptor_Name,	Data_Array_Name,	Data_Array_Offset,	Function,	Node_Name,	Data_Type,	Address,	Length
RUS_SMB1,	RTU_Digital_Out,	0,	Server,	Node_1,	Flag,	1,	34