Driver Manual

FS-8700-67 Russelectric Model 2000

APPLICABILITY & EFFECTIVITY
Effective for all systems manufactured after March 2021.

Driver Revision: 1.04
Document Revision: 2.A

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Contents

1 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 must 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 MSA Safety

Part #	Description
FS-8917-02	RJ45 to DB9F connector adapter
	Driver Manual

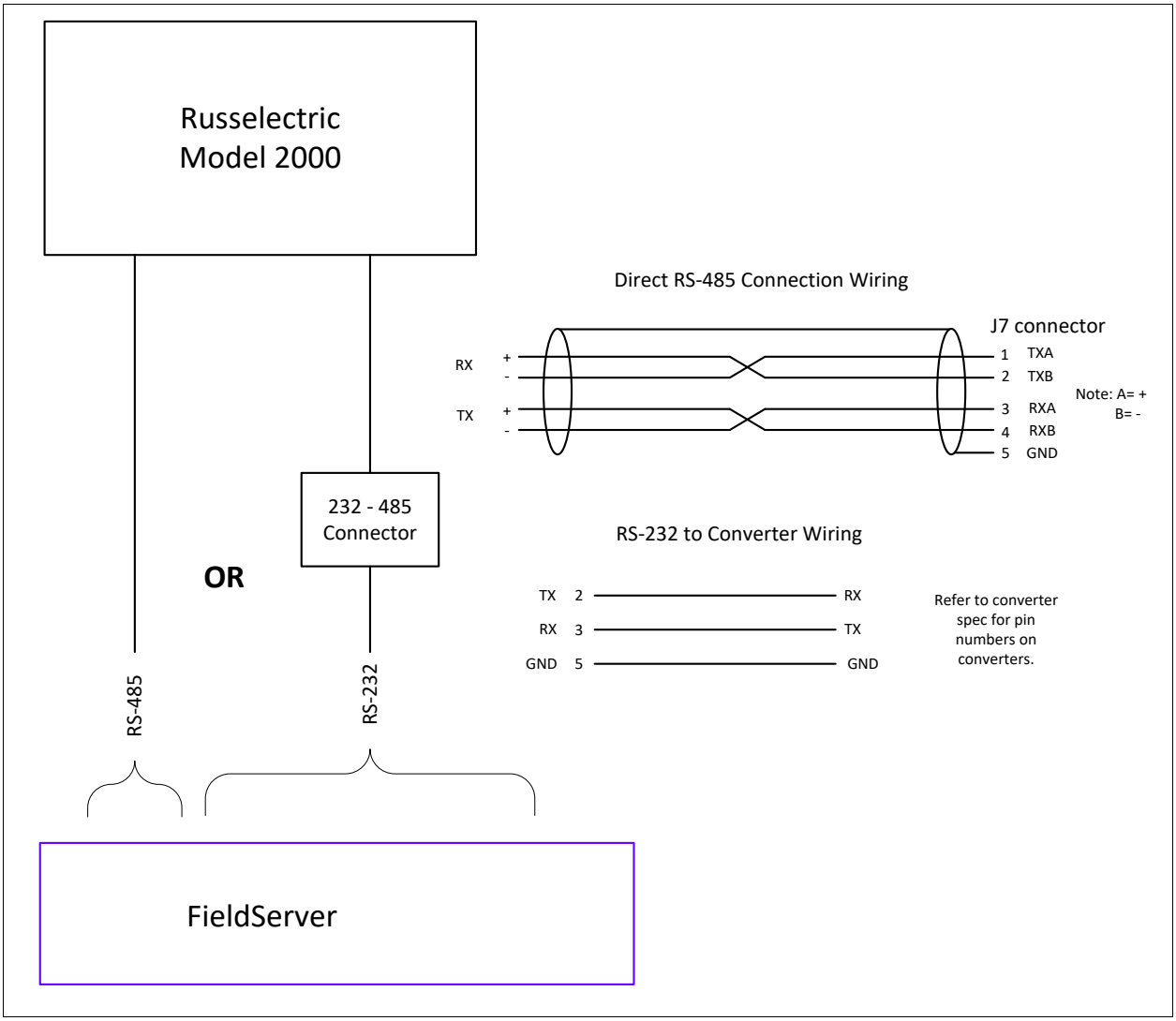
2.2 Provided by the Supplier of 3rd Party Equipment

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 Data Array Parameters

Data Arrays are “protocol neutral” data buffers for storage of data to be passed between protocols. It is necessary to declare the data format of each of the Data Arrays to facilitate correct storage of the relevant data.

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, Byte, Uint16, Uint32, Sint16, Sint32
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.	1-10000

Example

```
//    Data Arrays
Data_Arrays
Data_Array_Name    , Data_Array_Format    , Data_Array_Length
RTU_Registers      , Uint16               , 79
RTU_Digital_Out    , Bit                  , 34
```

5 Client Side Configuration

For detailed information on FieldServer configuration, 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.

NOTE: In the following tables, * indicates an optional parameter and bold legal values are default.

5.1 Client Side Connection Parameters

Section Title
Connections

Column Title	Function	Legal Values
Port	Specify which port the device is connected to the FieldServer.	P1-P2, R1-R2[1]
Protocol	Specify protocol used.	Rus, RussElectric, Model 2000
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 set up)
Data_Bits*	Specify data bits.	8
Stop_Bits*	Specify stop bits.	1
Poll_Delay*	Time between internal polls.	0.5 seconds

Example

```
//  Client Side Connections
Connections
Port                    , Protocol    , Baud    , Parity    , Poll_Delay
P1                      , Rus         , 9600    , None      , 1.0 s
```

5.2 Client Side Node Parameters

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
Port	Specify through which port the device is connected to the FieldServer.	P1-P2, R1-R2

Example

```
//  Client Side Nodes
Nodes
Node_Name    , Node_ID,    , Protocol    , Port
Node_1       , 1           , Rus         , P1
```

[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.

5.3 Client Side Map Descriptor Parameters

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 **Section 4**
Data_Array_Offset	Starting location in Data Array.	0 to (Data_Array_Length -1) as specified in **Section 4**
Function	Function of Client Map Descriptor.	Rdbc, Wrbc, Wrbx

5.3.2 Driver Related 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. Node_0 can be used to broadcast a command. Only write functions can be used with Node_0.
Data_Type	Indicates access to the Model 2000 Registers or Points (flags).	Register, Flag
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.
Address	The starting register or point number.	1-10000 1-10000

5.3.3 Timing Parameters

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

5.4 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

In the above example:

- Map_Descriptor_Name – This can be any name but each name must be unique. Name will appear in FieldServer Map Descriptor status information screens.
- Scan_Interval – 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.
- Data_Array_Name – 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.
- Data_Array_Offset – This value specifies the offset into the data array (RTU_Digital_Out) where the data fetched must be stored.
- Function – The function may be read for read commands and write for write type commands. Continuous operations are allowed.
- Node_Name – 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.
- Data_Type – Use Register to access Model 2000 registers or Flag to access the output table.

6 Server Side Configuration

For detailed information on FieldServer configuration, 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: In the tables below, * indicates an optional parameter with the bold legal value as default.

6.1 Server Side Connection Parameters

Section Title
Connections

Column Title	Function	Legal Values
Port	Specify which port the device is connected to the FieldServer.	P1-P2, 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

Example

```
//    Server Side Connections
Connections
Port              , Baud    , Parity    , Protocol
P1                , 9600    , None      , Rus
```

6.2 Server Side Node Parameters

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
```

[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.

6.3 Server Side Map Descriptor Parameters

6.3.1 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 **Section 4**
Data_Array_Offset	Starting location in Data Array.	0 to (Data_Array_Length-1) as specified in **Section 4**
Function	Function of Server Map Descriptor.	Server

6.3.2 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 **Section 6.2**
Data_Type	Used to emulate Model2000 Registers or Points (flags).	Register Flag
Address	The start register number or start point number.	1-10000
Length	The number of registers or points.	1-10000

6.4 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
```

In the above example:

- Map_Descriptor_Name – Any name but each name must be unique. The name will appear in FieldServer Map Descriptor status information screens.
- Data_Array_Name – The data array name must be one found under Data_ Arrays. Data from the forth script file will be stored into the array at Data_Array_ Offset. This data will be sent to a requesting client.
- Function – Function may not be read or write since it implements a server. Function may only be Server.
- Node_Name – Node name must be one found under Nodes, Node_name. This defines the data array for node name and polls from a client to this node will be answered with data from this data array.
- Data_Type – Use Register or Flag to emulate Model 2000 Registers or Digital Output Points.