

MPS PROFIBUS-DP INTERFACE

PRELIMINARY

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1. GENERAL

The Profibus-DP slave interface on the MPS-CTU is used to access meter data and provide starter control commands and reset functions. In order to stay within the 244-byte input and 244-byte output limitations of Profibus, only a select group of metering data is provided. Set-point access and Extended User Parameters are not implemented on the Profibus interface.

2. INTERFACE CONNECTOR

A D-SUB connector is used for the Profibus network.

| PIN | FUNCTION |
|-----|----------------|
| 1 | NC |
| 2 | NC |
| 3 | B-Line, RS-485 |
| 4 | RTS |
| 5 | GND |
| 6 | +5 |
| 7 | NC |
| 8 | A-Line, RS-485 |
| 9 | NC |

A network termination is required on both ends of the network as per the RS-484 specification. A 120- or 150-ohm resistor is used. Additional signals are provided on the D-SUB, however, in normal applications, only the A-line, B-line, and cable shield are used.

2.1 NETWORK SETTINGS

Automatic baud rate detection from 9.6 kilobits to 12 Megabits per second is provided. The MPS baud rate set point is not used.

The slave address is selected using the OPI *Setup / Hardware / Network Comms* menu. The address range is 1 to 125 and the default address is 125.

2.2 COMMUNICATION STATUS DISPLAY

The Profibus communication status can be viewed using the *Metering / Comm State* menu. This menu will indicate ON-LINE/OFF-LINE or an error code if there is an interface-module error. If the MPS indicates ON-LINE but the module LED is RED, verify that the slave address is correct. Module errors require the module to be reinitialized. The module is initialized on power up or can be initialized using the OPI. To initialize the module using the OPI, select *None* in the *Setup / Hardware / Network Type* menu, then select AnyBus. If the error persists, contact the factory.

The MPS can be configured to trip on network errors using the *Setup / Network Comms / Network Error* menu. If a module error occurs or if the module is OFF-LINE, the MPS will trip.

2.2.1 LED INDICATION

Module LED's can be viewed through access holes on the side of the MPS-CTU. Red indicates that the module is disabled, has an incorrect address, or not connected. Green indicates that the module is ON-LINE with a valid slave address and data exchange is possible.

2.3 GSD FILE

A configuration tool uses mps.gsd to configure the interface module on the MPS. The input and output area sizes defined by the MPS meter data and control commands must be setup within the configuration phase. The configuration tool must be set up with module byte sizes such that the total INPUT size is 228 bytes (meter data from the MPS into the network) and the total OUTPUT size is 4 bytes (commands out of the network to the MPS).

For the INPUT data, select METER module sizes of 128, 64, 32, and 4 for a total of 228 bytes. For the OUTPUT data, select the 4-byte COMMANDS modules.

2.4 METER DATA (INPUT)

The meter data consists of 228 bytes as defined by the Meter Data Table. Byte order is in MOTOROLA format where the high byte is followed by the low byte. Meter data starts at address offset 0.

METER DATA TABLE

| BYTE (High to Low) | DESCRIPTION | MPS TYPE |
|--------------------|---|----------|
| 0, 1 | Trip and Alarm Status | T30 |
| 2, 3 | Motor Status | T28 |
| 4, 5 | Starter Status | T29 |
| 6, 7 | Digital Inputs | T35 |
| 8, 9 | Relay Outputs | T36 |
| 10, 11 | Message 0 | T27 |
| 12, 13 | Message 1 | T27 |
| 14, 15 | Message 2 | T27 |
| 16, 17 | Message 3 | T27 |
| 18, 19 | Message 4 | T27 |
| 20, 21, 22, 23 | Phase A Current (A) | T1 |
| 24, 25, 26, 27 | Phase B Current (A) | T1 |
| 28, 29, 30, 31 | Phase C Current (A) | T1 |
| 32, 33, 34, 35 | Ground-Fault Current (A) | T1 |
| 36, 37, 38, 39 | Vab (V) | T1 |
| 40, 41, 42, 43 | Vbc (V) | T1 |
| 44, 45, 46, 47 | Vca (V) | T1 |
| 48, 49, 50, 51 | Apparent Power (S) (kVA) | T1 |
| 52, 53, 54, 55 | Reactive Power (Q) (kVAR) | T1 |
| 56, 57, 58, 59 | Real Power (P) (kW) | T1 |
| 60, 61, 62, 63 | Power Factor (± 1) | T1 |
| 64, 65, 66, 67 | Used Thermal Capacity (%) | T1 |
| 68, 69, 70, 71 | Analog Input (mA) | T1 |
| 72, 73, 74, 75 | Thermal Trend (%) | T1 |
| 76, 77, 78, 79 | Positive Sequence Current (pu) | T1 |
| 80, 81, 82, 83 | Negative Sequence Current (pu) | T1 |
| 84, 85, 86, 87 | Unbalance Current (pu) | T1 |
| 88, 89, 90, 91 | Positive Sequence Voltage (pu) | T1 |
| 92, 93, 94, 95 | Negative Sequence Voltage (pu) | T1 |
| 96, 97, 98, 99 | Unbalance Voltage (pu) | T1 |
| 100, 101, 102, 103 | Motor Speed From Tach (RPM) | T1 |
| 104, 105, 106, 107 | Running Time (Seconds) | T2 |
| 108 to 115 | kW Seconds | T4 |
| 116 to 123 | kVA Seconds | T4 |
| 124 to 131 | kVAR Seconds | T4 |
| 132, 133, 134, 135 | Module 1 #1 Temperature ($^{\circ}$ C) | T1 |
| 136, 137, 138, 139 | Module 1 #2 Temperature ($^{\circ}$ C) | T1 |
| 140, 141, 142, 143 | Module 1 #3 Temperature ($^{\circ}$ C) | T1 |
| 144, 145, 146, 147 | Module 1 #4 Temperature ($^{\circ}$ C) | T1 |
| 148, 149, 150, 151 | Module 1 #5 Temperature ($^{\circ}$ C) | T1 |
| 152, 153, 154, 155 | Module 1 #6 Temperature ($^{\circ}$ C) | T1 |
| 156, 157, 158, 159 | Module 1 #7 Temperature ($^{\circ}$ C) | T1 |
| 160, 161, 162, 163 | Module 1 #8 Temperature ($^{\circ}$ C) | T1 |
| 164, 165, 166, 167 | Module 2 #1 Temperature ($^{\circ}$ C) | T1 |
| 168, 169, 170, 171 | Module 2 #2 Temperature ($^{\circ}$ C) | T1 |
| 172, 173, 174, 175 | Module 2 #3 Temperature ($^{\circ}$ C) | T1 |
| 176, 177, 178, 179 | Module 2 #4 Temperature ($^{\circ}$ C) | T1 |
| 180, 181, 182, 183 | Module 2 #5 Temperature ($^{\circ}$ C) | T1 |
| 184, 185, 186, 187 | Module 2 #6 Temperature ($^{\circ}$ C) | T1 |
| 188, 189, 190, 191 | Module 2 #7 Temperature ($^{\circ}$ C) | T1 |
| 192, 193, 194, 195 | Module 2 #8 Temperature ($^{\circ}$ C) | T1 |
| 196, 197, 198, 199 | Module 3 #1 Temperature ($^{\circ}$ C) | T1 |
| 200, 201, 202, 203 | Module 3 #2 Temperature ($^{\circ}$ C) | T1 |
| 204, 205, 206, 207 | Module 3 #3 Temperature ($^{\circ}$ C) | T1 |
| 208, 209, 210, 211 | Module 3 #4 Temperature ($^{\circ}$ C) | T1 |
| 212, 213, 214, 215 | Module 3 #5 Temperature ($^{\circ}$ C) | T1 |
| 216, 217, 218, 219 | Module 3 #6 Temperature ($^{\circ}$ C) | T1 |
| 220, 221, 222, 223 | Module 3 #7 Temperature ($^{\circ}$ C) | T1 |
| 224, 225, 226, 227 | Module 3 #8 Temperature ($^{\circ}$ C) | T1 |

2.5 STARTER CONTROL AND RESET (OUTPUT)

Control commands are issued to the MPS using a 2-word command sequence. The first word is the Command Request Header. The second word is the MPS Command. The Command Request Header (word 1) must be zero except when the MPS Command action is to be taken. The Command Request Header must transition from 0 to 3 for the command sequence to be accepted. Once a valid command has been sent, the Command Request Header should be set to zero.

Byte order is in MOTOROLA format where the high byte is followed by the low byte.

MPS COMMAND TABLE

| COMMAND CODE | ACTION |
|--------------|---|
| 0x0000 | STOP |
| 0x0001 | START1 |
| 0x0002 | START2 |
| 0x0003 | Reset Trips |
| 0x0004 | Set Real-Time Clock |
| 0x0005 | Clear Data-Logging Records |
| 0x0006 | Clear Trip Counters |
| 0x0007 | Clear Energy Totals |
| 0x0008 | Clear Running Hours |
| 0x0009 | Emergency I ² t and Trip Reset |
| 0x000A | Select Local Control |
| 0x000B | De-select Local Control |
| 0x000C | Re-enable Temperature Protection |

MPS REQUEST MESSAGE

| BYTE NUMBER | DESCRIPTION |
|-------------|-------------------------------|
| 0 | Command Request Header (High) |
| 1 | Command Request Header (Low) |
| 2 | MPS Command (High) |
| 3 | MPS Command (Low) |