Application Technique

Original Instructions

Integrating Low Voltage Motor Control Centers into Distributed Control Systems with Modbus TCP and Profibus DP Communication Protocols

Bulletins Numbers 2100 and 2500

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Summary of Changes

This publication contains the following new or updated information. This list includes substantive updates only and is not intended to reflect all changes.

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Added What is PROFIBUS DP and Why is it used?	2
Updated Target Industries to include PROFIBUS DP network information.	3
Added PROFIBUS DP network information to Modbus TCP and PROFIBUS DP Solutions within Low Voltage Motor Control Centers	3
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Distributed Control Systems and Low Voltage Motor Control Centers

Distributed Control Systems (DCS) are designed to control and manage large, complicated processes or plants that span across multiple locations and regions. A DCS controls multiple subsystems through a facility; from data acquisition and presentation to process control and report generation. These key components of a DCS are all connected via a communication protocol:

- Engineering Workstation (EWS),
- Operator Workstation (OWS) with Human Machine Interface (HMI),
- Process control unit
- Intelligent field devices

The communication system is a critical part of the DCS because it is responsible for reliably sending and receiving information that is used to control a motor or provide feedback to how a motor or system is operating.

Low Voltage Motor Control Centers (LVMCCs) distribute power as feeder circuits or package devices to control motors that are integral to the operation of a plant. Often, the LVMCC controls blower systems, pumps, or moves parts and packages on a conveyor system from a centralized location to provide safety and security. LVMCCs are integrated into the DCS so that the motors and applications that are being controlled are visible to maintenance and operations to drive productivity and reduce maintenance efforts. The process control and power distribution systems of the plan can be unified to enable real-time information, which leads to improved maintenance and decision-making capabilities.

What is Modbus and Modbus TCP?

Modbus is a protocol that has been available since 1979, when it was first developed by Modicon, Inc. The Modbus protocol is now open-sourced and managed by the Modbus-IDA User Organization. This open leader/follower application protocol can be used on many different physical layers. Modbus TCP was developed in 1999 and has a similar structure to Modbus RTU. The 'TCP' indicates that the Modbus protocol is used on top of Ethernet TCP and has been specified by the Modbus-IDA User Organization as an Industrial Ethernet protocol that plays an important role in Industrial Automation. Modbus TCP delivers a client/server communication relationship between devices that are connected on the network, such that the client is connected to a switch or series of switches and subsequent servers connected to the switch.

Why Modbus TCP?

An Ethernet network and Modbus protocol are both freely available and widely supported by industrial equipment manufacturers around the world. Because Modbus TCP is implemented over an Ethernet network, it is possible to design larger networks that are faster and expandable. It is this installed base, along with the common TCP physical layer, that makes the Modbus protocol fully compatible with an Ethernet infrastructure of connectors, media, network interface cards, and Ethernet switches.

What is PROFIBUS DP and Why is it used?

PROFIBUS is a fieldbus protocol that is primarily used to communicate between sensors and the control system. PROFIBUS DP represents Decentralized Periphery and refers to the type of I/O connections, which are decentralized high-speed serial communication to connect to a central controller. In addition to the PROFIBUS DP variant, PROFIBUS PA (Process Automation), is primarily used for both power and communication between field instrumentation that aren't connected directly to a controller. However, the PROFIBUS DP variant is more commonly used.

PROFIBUS DP offers several features for a serial protocol. It's plug-and-play and can include connection of up to 126 nodes with data transfer at speeds up to 12 Mbps faster than 1 microsecond for distances up to 10 kilometers. While most new installations are going to an Ethernet-based network design, PROFIBUS DP is one of the most installed fieldbus networks.

Target Industries

Modbus TCP communication is common in many industries. This communication type is found in pharmaceutical and packaging applications, but is strongest in water and wastewater treatment facilities and in heavy industries such as Oil and Gas, Chemical, and Mining.

Distributed Control Systems (DCS) are widely used in heavy industry process-based applications, such as Oil and Gas, due to the complex monitoring and continuous production characterization. The intelligent devices installed to control the motors throughout the facility are routinely packaged in Motor Control Centers to provide faster time to market, lower total cost of ownership, and improved asset utilization.

LVMCCs are specified and installed because of easy commissioning, maintenance, and repair; while providing safety and a reduced footprint. The motor control devices in the LVMCC can include the following:

- Variable-frequency drives to control pumps
- Direct-on-line starters to control motors
- Reduced voltage starters to control motors

The need for a Modbus TCP solution within an LVMCC is evident as this system of devices are integrated into a DCS.

A PROFIBUS DP network plays an important role in many heavy industries that rely on field instrumentation as input to the control system. PROFIBUS DP has gained worldwide acceptance in the mining industry and often connects weight controllers, accuracy encoders, and other instruments that aid in the processing of raw materials. Similarly, there are devices inside the Motor Control Center that also integrate into the control system that is responsible for controlling motors by using the data from the field sensors. So, it's important that the motor control devices communicate on the same protocol.

Modbus TCP and PROFIBUS DP Solutions within Low Voltage Motor Control Centers

The Modbus TCP and PROFIBUS DP solutions are available across the CENTERLINE® 2100 LVMCC portfolio. The CENTERLINE 2500 LVMCC portfolio supports the Modbus TCP solution. The solutions alleviate complicated integration and reduce hardware costs by minimizing the need for a Logix-based data concentrator or a gateway device to bridge the EtherNet/IP™ network to either Modbus TCP or PROFIBUS DP protocols. From fixed speed starters to variable-frequency drives, the devices inside the MCC can communicate natively on a Modbus TCP or PROFIBUS DP network to save commissioning time and effort when deploying into the control system.

The Modbus TCP solution uses the 600V rated Cat5e and Stratix® 5700 managed Ethernet switches that are standard with an IntelliCENTER® MCC. The PROFIBUS DP solution leverages additional network components such as active terminators, repeaters, and optical linking modules to interface between the MCC and the control system.

PowerFlex 750-Series Variable Frequency Drives

The PowerFlex® 750-Series variable-frequency drive requires the 20-COMM-M Modbus TCP network module to communicate on a Modbus TCP network. Additionally, the 20-750-20COMM-F1 card (for Frame 1 only) or the 20-750-20COMM card (for Frames 2 and higher) enables the 20-COMM-M Modbus TCP network module to install into the PowerFlex 750-series drive.

The PowerFlex 755T portfolio of variable-frequency drives can be installed in the LVMCC to provide a factory-installed power bus and control wiring to ease installation. The harmonic mitigation that is found in the PowerFlex 755TL and the ability to regenerate power back into the system with the design of the PowerFlex 755TR, make this portfolio important for Water/Wastewater and Metal, Mining, and Cement industry applications as overall energy costs can be decreased. The PowerFlex 755T provides predictive maintenance capabilities to enhance the lifecycle and performance of the drive.

When the PowerFlex 750-series VFD is communicating on a PROFIBUS DP network, the 20-750-PBUS option card is required, see publication 750COM-UM004.

SMC Soft Starters

The SMC™ Flex and SMC-50 soft starters require the 20-COMM-M module for native Modbus TCP communications. The reduced voltage starting characteristics of the SMC Flex or SMC-50 soft starters reduce the wear on an electric motor or other mechanical system while maintaining a simple starting procedure.

For configuration of the 20-COMM-M Modbus TCP network card that is used in both the PowerFlex 750-series drive or the SMC soft starter product line, see publication 20COMM-UM014.

When an SMC Flex or SMC-50 is communicating on a PROFIBUS DP network, the 20-COMM-P option card is required, see publication 20COMM-UM006.

E300 Electronic Overload Relays

Direct-on-line starters (DOL) are used to start loads that do not require the starting precision of a variable-frequency drive or do not have the high system inertia that is exhibited in certain applications. The E300™ Electronic Overload Relay is responsible for starting and stopping the motor, with a focus on helping protect it from thermal wear while providing meaningful diagnostics throughout the starting and run sequence.

The E300 Electronic Overload Relay incorporates the HMS Networks Anybus-E300-MBTCP Communication Module for native Modbus TCP. For configuration, see the Anybus-E300-MBTCP Modbus Register Mapping on page 4.

The E300 Electronic Overload Relay can also communicate on a PROFIBUS DP network by using the HMS Networks Anybus-E300-DPV1 communication module. For configuration, see the Anybus-E300-DPV1 PROFIBUS DP Parameter Mapping on page 10.

Stratix 5700 Managed Ethernet Switches

The network switches are the backbone of the LVMCC because they connect all devices and provide important diagnostics and control over the Modbus TCP network. The Stratix 5700 managed Ethernet switch that is installed in an LVMCC is connected in a ring-leveraging Resilient Ethernet Protocol (REP) to provide redundancy at the switch level. The PowerFlex drives, SMC soft starters, and E300 overloads are connected to the switch with a star topology to provide high availability and ease of maintenance or repair. An uplink from the managed switch architecture within the LVMCC can be connected to the plant-wide automation network to interface with the distributed control system.

Interfacing the MCC with a PROFIBUS DP Network

The devices inside the MCC can be networked together for convenient control but to connect the PROFIBUS DP network inside the MCC to the control system requires devices such as repeaters, active terminators, and serial-fiber optical linking modules if needed. The Rockwell Automation MCC Application Engineering Team can help develop a networked solution that fits various needs; whether that is providing just the daisy chaining of networking cable or powering a dedicated communication unit complete with repeaters and active terminators from the factory.

Anybus-E300-MBTCP Modbus Register Mapping

A Register is a term to indicate 16 bits, or 2 bytes, of data and can also be denoted with an INT data type.

Reference	Description
0xxxx	Read/write Discrete Outputs or Coils. A 0x reference address is used to drive output data to a digital output channel.
1xxxx	Read Discrete Inputs. The corresponding digital input channel controls the ON/OFF status of a 1x reference address.
3xxxx	Read Input Registers. A 3x reference register contains a 16-bit number that is received from an external source, for example, an analog signal.
4xxxx	Read/write Output or Holding Registers. A 4x register is used to store 16 bits of numerical data (binary or decimal), or to send the data from the CPU to an output channel.

Coils (0xxxx)

Modbus Register (Dec)	Modbus Address (Hex)	Modbus Data Type	Access Rights	Parameter Name
00001	0000	USINT	R/W	Network Trip Reset
00002	0001	BOOL	R/W	OutputPt00
00003	0002	BOOL	R/W	OutputPt01
00004	0003	BOOL	R/W	OutputPt02
00005	0004	BOOL	R/W	OutDigMod1Pt00
00006	0005	BOOL	R/W	OutDigMod1Pt01
00007	0006	BOOL	R/W	OutDigMod2Pt00
00008	0007	BOOL	R/W	OutDigMod2Pt01
00009	0008	BOOL	R/W	OutDigMod3Pt00
00010	0009	BOOL	R/W	OutDigMod3Pt01
00011	000A	BOOL	R/W	OutDigMod4Pt00
00012	000B	BOOL	R/W	OutDigMod4Pt01

Discrete Inputs (1xxxx)

No discrete inputs are mapped.

Input Registers (3xxxx)

Modbus Register (Dec)	Modbus Address (Hex)	CIP Data Type	Access Rights	Parameter Name	Parameter Number
30001	0000	USINT	R	%TCU	1
30002	0001	UINT	R	Time to Trip	2
30003	0002	UINT	R	Time to Reset	3
30004	0003	WORD	R	Current Trip Status	4
30005	0004	WORD	R	Voltage Trip Status	5
30006	0005	WORD	R	PTC Trip Input / Control Trip	7
30007	0006	WORD	R	Current Warning Status	10
30008	0007	WORD	R	Voltage Warning Status	11
30009	0008	WORD	R	Input Status 0	16
30010	0009	WORD	R	Input Status 1	17
30011	000A	WORD	R	Device Status 0	20
30012	000B	WORD	R	Device Status 1	21
30013	000C	DINT	R	Phase A current	47
30014	000D				
30015	000E	DINT	R	Phase B current	48
30016	000F				
30017	0010	DINT	R	Phase C current	49
30018	0011				
30019	0012	UINT	R	Average % FLA	50
30020	0013	UINT	R	Ground Current	51
30021	0014	UINT	R	Phase A-B voltage	53
30022	0015	UINT	R	Phase B-C voltage	54
30023	0016	UINT	R	Phase C-A voltage	55
30024	0017	UINT	R	Frequency	62
30025	0018	DINT	R	Real Power (P)	67
30026	0019				
30027	001A	DINT	R	Reactive Power (Q)	71
30028	001B				

Input Registers (3xxxx) (Continued)

Modbus Register (Dec)	Modbus Address (Hex)	CIP Data Type	Access Rights	Parameter Name	Parameter Number
30029	001C	DINT	R	Apparent Power (S)	75
30030	001D				
30031	001E	UINT	R	Last Fault Code	–

Holding Register (4xxxx)

Modbus Register (Dec)	Modbus Address (Hex)	CIP Data Type	Access Rights	Parameter Name	Parameter Number
40001	0000	USINT	R/W	Config Preset	164
40002	0001	USINT	R/W	Clear command	165
40003	0002	UDINT	R/W	FLA Setting	171
40004	0003				
40005	0004	WORD	R/W	Current Trip Enable	183
40006	0005	WORD	R/W	Voltage Trip Enable	184
40007	0006	WORD	R/W	Control Trip Enable	186
40008	0007	WORD	R/W	Current Warn Enable	189
40009	0008	WORD	R/W	Voltage Warn Enable	190
40010	0009	WORD	R/W	Control Warning Enable	192
40011	000A	USINT	R/W	Operating Mode	195
40012	000B	USINT	R/W	Input Pt00 assignment	196
40013	000C	USINT	R/W	Input Pt01 assignment	197
40014	000D	USINT	R/W	Input Pt02 assignment	198
40015	000E	USINT	R/W	Input Pt03 assignment	199
40016	000F	USINT	R/W	Input Pt04 assignment	200
40017	0010	USINT	R/W	Input Pt05 assignment	201
40018	0011	USINT	R/W	Output Pt00 assignment	202
40019	0012	USINT	R/W	Output Pt01 assignment	203
40020	0013	USINT	R/W	Output Pt02 assignment	204
40021	0014	USINT	R/W	Ground Fault Type	241
40022	0015	USINT	R/W	Ground Fault Inhibit Time	242
40023	0016	USINT	R/W	Ground Trip Delay	243
40024	0017	UINT	R/W	Ground Fault Trip Level	244
40025	0018	USINT	R/W	Ground Fault Warning Delay	245
40026	0019	UINT	R/W	Ground Fault Warning Level	246
40027	001A	BOOL	R/W	Ground Fault Filter	247
40028	001B	BOOL	R/W	Ground Fault Max Inhibit	248
40029	001C	USINT	R/W	Jam Inhibit Time	251
40030	001D	USINT	R/W	Jam Trip Delay	252
40031	001E	UINT	R/W	Jam Trip Level	253
40032	001F	UINT	R/W	Jam Warning Level	254
40033	0020	UINT	R/W	Current Transformer Primary	263
40034	0021	UINT	R/W	Current Transformer Secondary	264
40035	0022	UINT	R/W	Datalink 0	291
40036	0023	UINT	R/W	Datalink 1	292
40037	0024	UINT	R/W	Datalink 2	293
40038	0025	UINT	R/W	Datalink 3	294
40039	0026	UINT	R/W	Datalink 4	295
40040	0027	UINT	R/W	Datalink 5	296
40041	0028	UINT	R/W	Datalink 6	297
40042	0029	UINT	R/W	Datalink 7	298
40043	002A	UINT	R/W	Potential Transformer Primary	353

Holding Register (4xxxx) (Continued)

Modbus Register (Dec)	Modbus Address (Hex)	CIP Data Type	Access Rights	Parameter Name	Parameter Number
40044	002B	UINT	R/W	Potential Transformer Secondary	354
40045	002C	USINT	R/W	Undervoltage Inhibit Time	355
40046	002D	USINT	R/W	Undervoltage Trip Delay	356
40047	002E	UINT	R/W	Undervoltage Trip Level	357
40048	002F	UINT	R/W	Undervoltage Warning Level	358
40049	0030	USINT	R/W	Overvoltage Inhibit Time	359
40050	0031	USINT	R/W	Overvoltage Trip Delay	360
40051	0032	UINT	R/W	Overvoltage Trip Level	361
40052	0033	UINT	R/W	Overvoltage Warning Level	362
Default Consumed Assembly					
42001	07D0	UINT	R/W	Reserved	–
42002	07D1	UINT	R/W	Network Start 1 (0.LogicDefinedPt00Data) Network Start 2 (0.LogicDefinedPT01Data) Trip Reset Emergency Start Remote Trip Reserved HMILED 1 Green HMILED 2 Green HMILED 3 Yellow HMILED 3 Red HMILED 4 Red Reserved	–
42003	07D2	UINT	R/W	DLXPtDeviceIn	–
42004	07D3	UINT	R/W	DLXAnDeviceIn	–
All Diagnostics Produced Assembly					
44001	0FA0	–	–	Reserved for Logix	–
44002	0FA1				
44003	0FA2	UINT	R	Device Status 0	20
44004	0FA3	UINT	R	Device Status 1	21
44005	0FA4	UINT	R	Input Status 0	16
44006	0FA5	UINT	R	Input Status 1	17
44007	0FA6	UINT	R	Output Status	18
44008	0FA7	UINT	R	Op Station Status	19
44009	0FA8	UINT	R	Trip Sts Current	4
44010	0FA9	UINT	R	Warn Sts Current	10
44011	0FAA	UINT	R	Trip Sts Voltage	5
44012	0FAB	UINT	R	Warn Sts Voltage	11
44013	0FAC	UINT	R	Trip Sts Power	6
44014	0FAD	UINT	R	Warn Sts Power	12
44015	0FAE	UINT	R	Trip Sts Control	7
44016	0FAF	UINT	R	Warn Sts Control	13
44017	0FB0	UINT	R	Trip Sts Analog	8
44018	0FB1	UINT	R	Warn Sts Analog	14
44019	0FB2	UINT	R	Reserved	–
44020	0FB3	UINT	R	Reserved	–
44021	0FB4	UINT	R	Therm Utilized Pct	1
44022	0FB5	UINT	R	Avg Percent FLA	50
44023	0FB6	DINT	R	Average Current	46
44024	0FB7				
44025	0FB8	DINT	R	L1 Current	47
44026	0FB9				

Holding Register (4xxxx) (Continued)

Modbus Register (Dec)	Modbus Address (Hex)	CIP Data Type	Access Rights	Parameter Name	Parameter Number
44027	0FBA	DINT	R	L2 Current	48
44028	0FBB				
44029	0FBC	DINT	R	L3 Current	49
44030	0FBD				
Network Configuration					
46001	1770	UINT	R/W	Modbus Connection Timeout (Default = 120 seconds)	–
46002	1771	UINT	R/W	Word order 0 = little-endian (default) 1 = big-endian	–
46003	1772	UINT	R/W	IP Address Most Significant Octet	–
46004	1773	UINT	R/W	IP Address 2nd Most Significant Octet	–
46005	1774	UINT	R/W	IP Address 3rd Most Significant Octet	–
46006	1775	UINT	R/W	IP Address Least Significant Octet	–
46007	1776	UINT	R/W	Subnet Mask Most Significant Octet	–
46008	1777	UINT	R/W	Subnet Mask 2nd Most Significant Octet	–
46009	1778	UINT	R/W	Subnet Mask 3rd Most Significant Octet	–
46010	1779	UINT	R/W	Subnet Mask Least Significant Octet	–
46011	177A	UINT	R/W	Gateway Address Most Significant Octet	–
46012	177B	UINT	R/W	Gateway Address 2nd Most Significant Octet	–
46013	177C	UINT	R/W	Gateway Address 3rd Most Significant Octet	–
46014	177D	UINT	R/W	Gateway Address Least Significant Octet	–
46015		UINT	R/W	Ethernet Interface configuration 0 = DHCP (default) 1 = static	–
46016		UINT	R/W	Save configuration Save network	–

Supported Function Codes and Modbus Registers

A Function Code is a specific code that is used in a Modbus request that is used to tell the Modbus follower device what type of memory to access and the desired action to perform on the memory. This table indicates the function that is associated with a specific function code.

Function Code	Function Name
1	Read Coils
3	Read Multiple Holding Registers
4	Read Input Registers
5	Write Single Coil
6	Write Single Holding Register
15	Write Multiple Coils
16	Write Multiple Holding Registers
23	Read/write Multiple Registers

Function Code 1 (read coils)

Request:

- Address of first coil/discrete input to read (16-bit)
- Number of coils/discrete inputs to read (16-bit)

Normal response:

- Number of bytes of coil/discrete input values to follow (8-bit)
- Coil/discrete input values (8 coils/discrete inputs per byte)

Function Code 3 (read holding registers) and Function Code 4 (read input registers)

Request:

- Address of first register to read (16-bit)
- Number of registers to read (16-bit)

Normal response:

- Number of bytes of register values to follow (8-bit)
- Register values (16 bits per register)

Function Code 5 (force/write single coil)

Request:

- Address of coil (16-bit)
- Value to force/write: 0 for off and 65,280 (FF00 in hexadecimal) for on

Normal response: same as request.

- Number of bytes of coil values to follow (8-bit)
- Coil values (8 coil values per byte)

The value of each coil is binary (0 for off, 1 for on). The first requested coil is stored as the least significant bit of the first byte in the request. If the number of coils is not a multiple of 8, the most significant bits of the last byte are stuffed with zeros.

Normal response:

- Address of first coil (16-bit)
- number of coils (16-bit)

Function Code 6 (preset/write single holding register)

Request:

- Address of holding register to preset/write (16-bit)
- New value of the holding register (16-bit)

Normal response: same as request.

Function Code 15 (force/write multiple coils)

Request:

- Address of first coil to force/write (16-bit)
- Number of coils to force/write (16-bit)

Function Code 16 (preset/write multiple holding registers)

Request:

- Address of first holding register to preset/write (16-bit)
- Number of holding registers to preset/write (16-bit)
- Number of bytes of register values to follow (8-bit)
- New values of holding registers (16 bits per register)

Because register values are 2 bytes wide and only 127 bytes worth of values can be sent, only 63 holding registers can be preset/written at once.

Normal response:

- Address of first preset/written holding register (16-bit)
- Number of preset/written holding registers (16-bit)

Anybus-E300-DPV1 PROFIBUS DP Parameter Mapping

Anybus-E300-DPV1 PROFIBUS DP Parameter Mapping

PROFIBUS Slot, Index	CIP/PROFIBUS DP Data Type	Access rights	Parameter Name	Parameter Number
0, 1	USINT	R	%TCU	1
0, 1	UINT	R	Therm Utilized Pct / Current I_m balance	
0, 2	UINT	R	Time to Trip	2
0, 3	UINT	R	Time to Reset	3
0, 4	WORD	R	Current Trip Status	4
0, 4	UINT	R	Trip Sts Current	4
0, 5	WORD	R	Voltage Trip Status	5
0, 5	UINT	R	Trip Sts Voltage	5
0, 6	UINT	R	Trip Sts Power	6
0, 7	UINT	R	Trip Sts Control	7
0, 7	WORD	R	PTC Trip Input / Control Trip	
0, 8	UINT	R	Trip Sts Analog	8
0, 10	WORD	R	Current Warning Status	10
0, 10	UINT	R	Warn Sts Current	10
0, 11	WORD	R	Voltage Warning Status	11
0, 11	UINT	R	Warn Sts Voltage	11
0, 12	UINT	R	Warn Sts Power	12
0, 13	UINT	R	Warn Sts Control	13
0, 14	UINT	R	Warn Sts Analog	14
0, 16	WORD	R	Input Status 0	16
0, 16	UINT	R	Input Status 0	16
0, 17	WORD	R	Input Status 1	17
0, 17	UINT	R	Input Status 1	17
0, 18	UINT	R/W	Output Status 0	18
0, 18	UINT	R	Output Status	18
0, 19	UINT	R	Op Station Status	19
0, 20	WORD	R	Device Status 0	20
0, 20	UINT	R	Device Status 0	20
0, 21	WORD	R	Device Status 1	21
0, 21	UINT	R	Device Status 1	21
0, 40	UINT	R	Reserved	

Anybus-E300-DPV1 PROFIBUS DP Parameter Mapping (Continued)

PROFIBUS Slot, Index	CIP/PROFIBUS DP Data Type	Access rights	Parameter Name	Parameter Number
0, 43	DINT	R	Phase A current	47
0, 43	DINT	R	L1 Current	47
0, 44	DINT	R	Phase B current	48
0, 44	DINT	R	L2 Current	48
0, 45	DINT	R	Phase C current	49
0, 45	DINT	R	L3 Current	49
0, 46	DINT	R	Average Current	46
0, 50	UINT	R	Average % FLA	50
0, 50	UINT	R	Avg Percent FLA	50
0, 51	UINT	R	Ground Current	51
0, 52	UINT	R	Therm Utilized Pct / Current I_m balance	1
0, 53	UINT	R	Phase A-B voltage	53
0, 54	UINT	R	Phase B-C voltage	54
0, 55	UINT	R	Phase C-A voltage	55
0, 62	UINT	R	Frequency	62
0, 67	DINT	R	Real Power (P)	67
0, 71	DINT	R	Reactive Power (Q)	71
0, 75	DINT	R	Apparent Power (S)	75
0, 127	UINT	R	Last Fault Code	–
0, 163	USINT	R/W	Network Trip Reset	
0, 164	USINT	R/W	Config Preset	164
0, 165	USINT	R/W	Clear command	165
0, 171	UDINT	R/W	FLA Setting	171
0, 183	WORD	R/W	Current Trip Enable	183
0, 184	WORD	R/W	Voltage Trip Enable	184
0, 186	WORD	R/W	Control Trip Enable	186
0, 189	WORD	R/W	Current Warn Enable	189
0, 190	WORD	R/W	Voltage Warn Enable	190
0, 192	WORD	R/W	Control Warning Enable	192
0, 195	USINT	R/W	Operating Mode	195
0, 196	USINT	R/W	Input Pt00 assignment	196
0, 197	USINT	R/W	Input Pt01 assignment	197
0, 198	USINT	R/W	Input Pt02 assignment	198
0, 199	USINT	R/W	Input Pt03 assignment	199
0, 200	USINT	R/W	Input Pt04 assignment	200
0, 201	USINT	R/W	Input Pt05 assignment	201
0, 202	USINT	R/W	Output Pt00 assignment	202
0, 203	USINT	R/W	Output Pt01 assignment	203
0, 204	USINT	R/W	Output Pt02 assignment	204
0, 241	USINT	R/W	Ground Fault Type	241
0, 242	USINT	R/W	Ground Fault Inhibit Time	242
0, 243	USINT	R/W	Ground Trip Delay	243
0, 244	UINT	R/W	Ground Fault Trip Level	244
0, 245	USINT	R/W	Ground Fault Warning Delay	245
0, 246	UINT	R/W	Ground Fault Warning Level	246
0, 247	BOOL/USINT	R/W	Ground Fault Filter (PROFIBUS does not support BOOL)	247
0, 248	BOOL/USINT	R/W	Ground Fault Max Inhibit (PROFIBUS does not support BOOL)	248

Anybus-E300-DPV1 PROFIBUS DP Parameter Mapping (Continued)

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0, 251	USINT	R/W	Jam Inhibit Time	251
0, 252	USINT	R/W	Jam Trip Delay	252
0, 253	UINT	R/W	Jam Trip Level	253
0, 254	UINT	R/W	Jam Warning Level	254
1, 8	UINT	R/W	Current Transformer Primary	263
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1, 37	UINT/DUINT	R/W	Datalink 1	292
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1, 98	UINT	R/W	Potential Transformer Primary	353
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1, 100	USINT	R/W	Undervoltage Inhibit Time	355
1, 101	USINT	R/W	Undervoltage Trip Delay	356
1, 102	UINT	R/W	Undervoltage Trip Level	357
1, 103	UINT	R/W	Undervoltage Warning Level	358
1, 104	USINT	R/W	Overvoltage Inhibit Time	359
1, 105	USINT	R/W	Overvoltage Trip Delay	360
1, 106	UINT	R/W	Overvoltage Trip Level	361
1, 107	UINT	R/W	Overvoltage Warning Level	362
4, 75	UINT	R/W	Network Start 1 (0.LogicDefinedPt00Data) Network Start 2 (0.LogicDefinedPT01Data) Trip Reset Emergency Start Remote Trip Reserved HMILED 1 Green HMILED 2 Green HMILED 3 Green HMILED 3 Red HMILED 4 Red Reserved	—
4, 77	UINT	R/W	DLXPtDeviceIn	—
4, 78	UINT	R/W	DLXAnDeviceIn	—
4, 83	UINT	R	Reserved	—
4, 84	N/A	N/A	Reserved for Logix	—

Notes:

The following terms and abbreviations are used throughout this manual. For definitions of terms not listed here, refer to the Allen-Bradley Industrial Automation Glossary, publication AG-7.1.

TCP Transmission Control Protocol/ Internet Protocol. TCP is a set of standardized rules that allow computers and devices to communicate on a network.

Modbus TCP (also Modbus-TCP/IP) The Modbus RTU protocol with a TCP interface that runs on Ethernet. The Modbus messaging structure is the application protocol that defines the rules for organizing and interpreting the data independent of the data transmission medium.

Port 502 The protocol uses Port 502 as the local port in the Modbus server, by default.

Distributed Control System (DCS) A computerized control system for a process or plant usually with many control loops, in which autonomous controllers are distributed throughout the system, but there is no central operator supervisory control. The DCS concept increases reliability and reduces installation costs by localizing control functions near the process plant, with remote monitoring and supervision.

Coils A data type that can be altered by an application program in a single bit format.

Discrete Input A data type that can be provided by a control system in a single bit format.

Input Registers A data type that can be provided by a control system in a 16-bit word format.

Holding Registers A data type that can be altered by an application program in a 16-bit word format.

Additional Resources

These documents contain additional information concerning related products from Rockwell Automation.

Resource	Description
SMC-3, SMC Flex, and SMC-50 Smart Motor Controllers Technical Data, publication 150-TD009	Provides comprehensive selection and technical information for SMC-50, SMC-Flex, and accessories.
E300/E200 Electronic Overload Relay Technical Data, publication 193-TD006	Provides complete specifications for the E300 Electronic Overload Relay.
SMC-50 Soft Starters user manual, publication 150-UM011	Provides information to program and operate the SMC-50 soft starter.
20-COMM-M Modbus/TCP Adapter user manual, publication 20COMM-UM004	Provides information for installing, configuring, and using the Modbus/TCP adapter.
E300 Electronic Overload Relay user manual, publication 193-UM015	Provides information on how to install, configure, operate, and troubleshoot the E300 Electronic Overload Relay.
Stratix Managed Switches user manual, publication 1783-UM007	Provides information on how to set up, configure, and troubleshoot Stratix switches.
PowerFlex 750-Series Products with TotalFORCE Control installation instructions, publication 750-IN100	Provides information for the mechanical and electrical installation of PowerFlex 750-Series products with TotalFORCE® control.
Industrial Components Preventive Maintenance, Enclosures, and Contact Ratings Specifications, publication IC-TD002	Provides a quick reference tool for Allen-Bradley industrial automation controls and assemblies.
Safety Guidelines for the Application, Installation, and Maintenance of Solid-state Control, publication SGI-1.1	Designed to harmonize with NEMA Standards Publication No. ICS 1.1-1987 and provides general guidelines for the application, installation, and maintenance of solid-state control in the form of individual devices or packaged assemblies incorporating solid-state components.
Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1	Provides general guidelines for installing a Rockwell Automation industrial system.
Product Certifications website, rok.auto/certifications.	Provides declarations of conformity, certificates, and other certification details.

You can view or download publications at rok.auto/literature.

Rockwell Automation Support

Use these resources to access support information.

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Literature Library	Find installation instructions, manuals, brochures, and technical data publications.	rok.auto/literature
Product Compatibility and Download Center (PCDC)	Download firmware, associated files (such as AOP, EDS, and DTM), and access product release notes.	rok.auto/pcdc

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