

Series PM172 Powermeters

PML-DTE Communications Protocol Reference Guide

Every effort has been made to ensure that the material herein is complete and accurate. However, the manufacturer is not responsible for any mistakes in printing or faulty instructions contained in this book. Notification of any errors or misprints will be received with appreciation.

For further information regarding a particular installation, operation or maintenance of equipment, contact the manufacturer or your local representative or distributor.

This document is applicable to the devices PM172P/E with firmware versions 15.71.XX.

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1 General

This document specifies a subset of the 3710 ACM PML-DTE serial communications protocol implemented in the PM172. The document is based on the protocol documents “3710 ACM, Serial Communications Protocol, Version 2.1” and “3710 ACM, Detroit Edison Serial Communications Protocol, 28-Mar-91”.

Additional information concerning communications operation, configuring the communications parameters, and communications connections is found in "Series PM172 Powermeters, Installation and Operation Manual".

IMPORTANT

In 3-wire connection schemes, the unbalanced (neutral) current and phase readings for power factor, active power, and reactive power will be zeros, because they have no meaning. Only the total three-phase power values will be shown.

2 Protocol Implementation

For detailed information about the 3710 ACM protocol, refer to the protocol document “3710 ACM, Serial Communications Protocol, Version 2.1”

The PM172 implements a subset of the 3710 ACM protocol commands indicated in Table 2-1.

Table 2-1

Message Type	Command Description
0x03	Read Long Real-Time Packet
0x04	Read Short Real-Time Packet
0x07	Set Time
0x0A	Read Setup
0x0C	Read Status
0x0D	Read Time
0x16	Clear kWh (clears all energies)
0x1A	Control Relays
0x1E	Read DTE 12-bit Real-Time Packet
0x1F	Read DTE 12-bit Demand and Accumulator Packet

Broadcast Packets

The broadcast packets are supported for the 0x07 “Set time” request only.

Response Time

The PM172 response time to the master requests is indicated in Table 2-2.

Table 2-2

Baud Rate, bps	Response Time, ms		
	Min	Max	Typical
9600	13	15	13
19200	11	12	11
57600	9	10	9
115200	9	10	9

DTE 12-bit Scaled Data

In the DTE 12-bit data packets 0x1E and 0x1F, analog data is scaled to the range of -2047 to 2047 for bi-directional parameters (such as active and reactive powers and power factor), and to the range of 0 to 2047 for single-ended positive parameters (voltage, current, frequency, etc.). To get a true reading, a reverse conversion should be done using the following formula:

$$Y = ((X - 12_LO) \times (HI - LO)) / (12_HI - 12_LO) + LO$$

where:

- Y - True reading in engineering units
- X - Raw input data in the range of 12_LO – 12_HI
- LO, HI - Data low and high scales in either secondary, or primary engineering units (see Section 4 for data scales)
- 12_LO - 12-bit low conversion scale: 12_LO = -2047 for a point with a negative LO scale, 12_LO = 0 for a point with a zero or positive LO scale
- 12_HI - 12-bit high conversion scale: 12_HI = 2047

3 Command Description

3.1 Read Data Packets

Offset	Description	Range ²	Units	Type	R/W	Notes
Long Real-Time Data						
Request Packet						
+0	Master to Slave	0x14		UINT8		
+1	Device Family	0xFD		UINT8		
+2	Message Type	0x03		UINT8		
+3	Packet Length	0x04		UINT8		
+4-5	Master Address			UINT16		
+6-7	Slave Address			UINT16		
+8	LRC			UINT8		
Response Packet						
+0	Slave to Master	0x27		UINT8		
+1	Device Family	0xFD		UINT8		
+2	Message Type	0x03		UINT8		
+3	Packet Length	0xB8		UINT8		
+4-5	Slave Address			UINT16		
+6-7	Master Address			UINT16		
+8-9	Device Type	0x0E7E		UINT16		
+10-11	Software Revision Code	0x2310		UINT16		
+12	Feature Code	0x04		UINT8		
+13	Input Mode	0=4-wire Wye, 1=Delta, 4=3-wire Wye		UINT8		
+14	Year (minus 1900)	100-255		UINT8		
+15	Month	1-12		UINT8		
+16	Day	1-31		UINT8		
+17	Hour	0-23		UINT8		
+18	Minute	0-59		UINT8		
+19	Second	0-59		UINT8		
+20-23	V1/V12	0-Vmax	V	UINT32		1
+24-27	V2/V23	0-Vmax	V	UINT32		1
+28-31	V3/V31	0-Vmax	V	UINT32		1
+32-35	Average voltage	0-Vmax	V	UINT32		1
+36-39	V12	0-Vmax	V	UINT32		
+40-43	V23	0-Vmax	V	UINT32		
+44-47	V31	0-Vmax	V	UINT32		
+48-51	I1	0-Imax	A	UINT32		
+52-55	I2	0-Imax	A	UINT32		
+56-59	I3	0-Imax	A	UINT32		
+60-63	Average current	0-Imax	A	UINT32		

Offset	Description	Range ²	Units	Type	R/W	Notes
+64-67	kVA total	0 to Pmax	kVA	UINT32		
+72-75	kW L1	-Pmax to Pmax	kW	INT32		
+76-79	kW L2	-Pmax to Pmax	kW	INT32		
+68-79	kW L3	-Pmax to Pmax	kW	INT32		
+80-83	kW total	-Pmax to Pmax	kW	INT32		
+84-87	Reserved	0				
+88-91	kvar total	-Pmax to Pmax	kvar	INT32		
+92-95	Present kW demand	0 to Pmax	kW	UINT32		
+96-97	Total power factor	-100-100	×0.01	INT16		
+98-99	Frequency	0-4000	×0.1	UINT16		
+100-103	kWh total	0-10 ⁹ -1	kWh	UINT32		
+104-107	kWh export	0-10 ⁹ -1	kWh	UINT32		
+108-111	kvarh total	0-10 ⁹ -1	kvarh	UINT32		
+112-115	Alarm status bytes	0		UINT32		Unused
+116-119	V aux	0		UINT32		Unused
+120-123	Present Amp demand	0		UINT32		Unused
+124-127	kVA L1	0 to Pmax	kVA	INT32		
+128-131	kVA L2	0 to Pmax	kVA	INT32		
+132-135	kVA L3	0 to Pmax	kVA	INT32		
+136-139	kvar L1	-Pmax to Pmax	kvar	INT32		
+140-143	kvar L2	-Pmax to Pmax	kvar	INT32		
+144-147	kvar L3	-Pmax to Pmax	kvar	INT32		
+148	Relay #1 status byte	F1		UINT8		
+149	Relay #2 status byte	F1		UINT8		
+150	Reserved	0		UINT8		
+151	Status input status byte	F2		UINT8		
+152	Setpoint #1 status byte	F3		UINT8		
+153	Setpoint #2 status byte	F3		UINT8		
+154	Setpoint #3 status byte	F3		UINT8		
+155	Setpoint #4 status byte	F3		UINT8		
+156	Setpoint #5 status byte	F3		UINT8		
+157	Setpoint #6 status byte	F3		UINT8		
+158	Setpoint #7 status byte	F3		UINT8		
+159	Setpoint #8 status byte	F3		UINT8		
+160	Setpoint #9 status byte	F3		UINT8		
+161	Setpoint #10 status byte	F3		UINT8		
+162	Setpoint #11 status byte	F3		UINT8		
+163	Setpoint #12 status byte	F3		UINT8		
+164	Setpoint #13 status byte	F3		UINT8		
+165	Setpoint #14 status byte	F3		UINT8		
+166	Setpoint #15 status byte	F3		UINT8		
+167	Setpoint #16 status byte	F3		UINT8		
+168	Reserved	0		UINT8		

Offset	Description	Range ²	Units	Type	R/W	Notes
+169	Reserved	0		UINT8		
+170-171	Reserved	0		UINT16		
+172-173	Reserved	0		UINT16		
+174-175	Reserved	0		UINT16		
+176-177	Reserved	0		UINT16		
+178-179	I neutral	0-Imax	A	UINT16		
+180-183	kvarh export (reverse)	0-10 ⁹ -1	kvarh	UINT32		
+184-187	kVAh	0-10 ⁹ -1	kVAh	UINT32		
+188	LRC			UINT8		
Short Real-Time Data						
Request Packet						
+0	Master to Slave	0x14		UINT8		
+1	Device Family	0xFD		UINT8		
+2	Message Type	0x04		UINT8		
+3	Packet Length	0x04		UINT8		
+4-5	Master Address			UINT16		
+6-7	Slave Address			UINT16		
+8	LRC			UINT8		
Response Packet						
+0	Slave to Master	0x27		UINT8		
+1	Device Family	0xFD		UINT8		
+2	Message Type	0x04		UINT8		
+3	Packet Length	0xB8		UINT8		
+4-5	Slave Address	0x3C		UINT16		
+6-7	Master Address			UINT16		
+8-9	Device Type	0x0E7E		UINT16		
+10-11	Software Revision Code	0x2310		UINT16		
+12	Feature Code	0x04		UINT8		
+13	Input Mode	0=4-wire Wye, 1=Delta, 4=3-wire Wye		UINT8		
+14	Year (minus 1900)	100-255		UINT8		
+15	Month	1-12		UINT8		
+16	Day	1-31		UINT8		
+17	Hour	0-23		UINT8		
+18	Minute	0-59		UINT8		
+19	Second	0-59		UINT8		
+20-23	Average voltage	0-Vmax	V	UINT32		¹
+24-23	Average current	0-Imax	A	UINT32		
+28-31	kVA total	0 to Pmax	kVA	UINT32		
+32-35	kW total	-Pmax to Pmax	kW	INT32		
+36-39	kvar total	-Pmax to Pmax	kvar	INT32		
+40-43	Present kW demand	0 to Pmax	kW	UINT32		
+44-45	Reserved	0		UINT16		
+46-47	Total power factor	-100-100	×0.01	INT16		

Offset	Description	Range ²	Units	Type	R/W	Notes
+48-51	Alarm status bytes	0		UINT32		Unused
+52-55	V aux	0		UINT32		Unused
+56-59	Present Amp demand	0		UINT32		Unused
+60-61	I neutral	0-Imax	A	UINT16		
+62-63	Reserved	0		UINT16		
+64	LRC			UINT8		
DTE 12-bit Real-Time Data Packet						
Request Packet						
+0	Master to Slave	0x14		UINT8		
+1	Device Family	0xFD		UINT8		
+2	Message Type	0x1E		UINT8		
+3	Packet Length	0x04		UINT8		
+4-5	Master Address			UINT16		
+6-7	Slave Address			UINT16		
+8	LRC			UINT8		
Response Packet						
+0	Slave to Master	0x27		UINT8		
+1	Device Family	0xFD		UINT8		
+2	Message Type	0x1E		UINT8		
+3	Packet Length	0x36		UINT8		
+4-5	Slave Address			UINT16		
+6-7	Master Address			UINT16		
+8-9	Device Type	0x0E7E		UINT16		
+10-11	Software Revision Code	0x2310		UINT16		
+12	Feature Code	0x04		UINT8		
+13	Input Mode	0=4-wire Wye, 1=Delta, 4=3-wire Wye		UINT8		
+14	Year (minus 1900)	100-255		UINT8		
+15	Month	1-12		UINT8		
+16	Day	1-31		UINT8		
+17	Hour	0-23		UINT8		
+18	Minute	0-59		UINT8		
+19	Second	0-59		UINT8		
+20-21	V1/V12	0-Vmax	V	UINT16		¹
+22-23	I1	0-Imax	A	UINT16		
+24-25	kW L1/total for Delta	-Pmax to Pmax	kW	INT16		
+26-27	kvar L1/total for Delta	-Pmax to Pmax	kvar	INT16		
+28-29	Power factor L1/total for Delta	-100-100	×0.01	INT16		
+30-31	V2/V23	0-Vmax	V	UINT16		¹
+32-33	I2	0-Imax	A	UINT16		
+34-35	kW L2/-FS for Delta	-Pmax to Pmax	kW	INT16		
+36-37	kvar L2/-FS for Delta	-Pmax to Pmax	kvar	INT16		
+38-39	Power factor L2/total for Delta	-100-100	×0.01	INT16		
+40-41	V3/V31	0-Vmax	V	UINT16		¹

Offset	Description	Range ²	Units	Type	R/W	Notes
+42-43	I3	0-Imax	A	UINT16		
+44-45	kW L3/-FS for Delta	-Pmax to Pmax	kW	INT16		
+46-47	kvar L3/-FS for Delta	-Pmax to Pmax	kvar	INT16		
+48-49	Power factor L3/total for Delta	-100-100	×0.01	INT16		
+50-51	I neutral	0-Imax	A	UINT16		
+52-53	V aux	0		UINT16		Unused
+54	Setpoints #1-8 status (bitmap)	0=inactive, 1=active		UINT8		
+55	Setpoints #9-16 status (bitmap)	0=inactive, 1=active		UINT8		
+56	Relay/Status inputs status (bitmap)	F4		UINT8		
+57	Unused			UINT8		
+58	LRC			UINT8		
DTE 12-bit Demand and Accumulator Data Packet						
Request Packet						
+0	Master to Slave	0x14		UINT8		
+1	Device Family	0xFD		UINT8		
+2	Message Type	0x1F		UINT8		
+3	Packet Length	0x04		UINT8		
+4-5	Master Address			UINT16		
+6-7	Slave Address			UINT16		
+8	LRC			UINT8		
Response Packet						
+0	Slave to Master	0x27		UINT8		
+1	Device Family	0xFD		UINT8		
+2	Message Type	0x1F		UINT8		
+3	Packet Length	0x30		UINT8		
+4-5	Slave Address			UINT16		
+6-7	Master Address			UINT16		
+8-9	Device Type	0x0E7E		UINT16		
+10-11	Software Revision Code	0x2310		UINT16		
+12	Feature Code	0x04		UINT8		
+13	Input Mode	0=4-wire Wye, 1=Delta, 4=3-wire Wye		UINT8		
+14	Year (minus 1900)	100-255		UINT8		
+15	Month	1-12		UINT8		
+16	Day	1-31		UINT8		
+17	Hour	0-23		UINT8		
+18	Minute	0-59		UINT8		
+19	Second	0-59		UINT8		
+20-21	V1/V12 demand	0-Vmax	V	UINT16		¹
+22-23	I1 demand	0-Imax	A	UINT16		
+24-25	kW demand total	-Pmax to Pmax	kW	INT16		
+26-27	kvar demand total	-Pmax to Pmax	kvar	INT16		
+28-29	V2/V23 demand	0-Vmax	V	UINT16		¹
+30-31	I2 demand	0-Imax	A	UINT16		

Offset	Description	Range ²	Units	Type	R/W	Notes
+32-33	0 for Wye/-FS for Delta	-Pmax to Pmax	kW	INT16		Unused
+34-35	0 for Wye/-FS for Delta	-Pmax to Pmax	kvar	INT16		Unused
+36-37	V3/V31 demand	0-Vmax	V	UINT16		¹
+38-39	I3 demand	0-Imax	A	UINT16		
+40-41	0 for Wye/-FS for Delta	-Pmax to Pmax	kW	INT16		Unused
+42-43	0 for Wye/-FS for Delta	-Pmax to Pmax	kvar	INT16		Unused
+44-45	kWh import (forward)	0-65535	kWh	UINT16		
+46-47	kvarh import (forward)	0-65535	kvarh	UINT16		
+48-49	kWh export (reverse)	0-65535	kWh	UINT16		
+50-51	kvarh export (reverse)	0-65535	kvarh	UINT16		
+52	LRC			UINT8		

NOTES:

Energy and Power demand readings are only available in the meters with suffix E.

¹ Voltage Readings:

When the 4LN3, 3LN3 or 3BLN3 wiring mode is selected, the voltages will be line-to-neutral; for any other wiring mode, they will be line-to-line voltages.

² All analog readings are 1-second average values. The volts, amps and power readings in long and short real-time data packets 0x03 and 0x04 are given in primary units. In the DTE 12-bit data packets, volts and amps readings can be converted to either secondary, or primary units. For volts, amps and power scales refer to Section 4 "Data Scales".

3.2 Device Control and Status

Offset	Description	Range	Units	Type	R/W	Notes
Read Status Information						
Request Packet						
+0	Master to Slave	0x14		UINT8		
+1	Device Family	0xFD		UINT8		
+2	Message Type	0x0C		UINT8		
+3	Packet Length	0x04		UINT8		
+4-5	Master Address			UINT16		
+6-7	Slave Address			UINT16		
+8	LRC			UINT8		
Response Packet						
+0	Slave to Master	0x27		UINT8		
+1	Device Family	0xFD		UINT8		
+2	Message Type	0x0C		UINT8		
+3	Packet Length	0x24		UINT8		
+4-5	Slave Address			UINT16		
+6-7	Master Address			UINT16		
+8-9	Device Type	0x0E7E		UINT16		
+10-11	Software Revision Code	0x2310		UINT16		

Offset	Description	Range	Units	Type	R/W	Notes
+12	Feature Code	0x04		UINT8		
+13	Input Mode	0=4-wire Wye, 1=Delta, 4=3-wire Wye		UINT8		
+14-15	Reserved	0		UINT16		
+16	Relay #1 status byte	F1		UINT8		
+17	Relay #1 status byte	F1		UINT8		
+18	Reserved	0		UINT8		
+19	Status input status byte	F2		UINT8		
+20	Setpoint #1 status byte	F3		UINT8		
+21	Setpoint #2 status byte	F3		UINT8		
+22	Setpoint #3 status byte	F3		UINT8		
+23	Setpoint #4 status byte	F3		UINT8		
+24	Setpoint #5 status byte	F3		UINT8		
+25	Setpoint #6 status byte	F3		UINT8		
+26	Setpoint #7 status byte	F3		UINT8		
+27	Setpoint #8 status byte	F3		UINT8		
+28	Setpoint #9 status byte	F3		UINT8		
+29	Setpoint #10 status byte	F3		UINT8		
+30	Setpoint #11 status byte	F3		UINT8		
+31	Setpoint #12 status byte	F3		UINT8		
+32	Setpoint #13 status byte	F3		UINT8		
+33	Setpoint #14 status byte	F3		UINT8		
+34	Setpoint #15 status byte	F3		UINT8		
+35	Setpoint #16 status byte	F3		UINT8		
+36	Reserved	0		UINT8		
+37	Reserved	0		UINT8		
+38-39	Reserved	0		UINT16		
+40	LRC			UINT8		
Device Setup Information						
Request Packet						
+0	Master to Slave	0x14		UINT8		
+1	Device Family	0xFD		UINT8		
+2	Message Type	0x0A		UINT8		
+3	Packet Length	0x04		UINT8		
+4-5	Master Address			UINT16		
+6-7	Slave Address			UINT16		
+8	LRC			UINT8		
Response Packet						
+0	Slave to Master	0x27		UINT8		
+1	Device Family	0xFD		UINT8		
+2	Message Type	0x0A		UINT8		
+3	Packet Length	0x46		UINT8		
+4-5	Slave Address			UINT16		
+6-7	Master Address			UINT16		

Offset	Description	Range	Units	Type	R/W	Notes
+8-9	Device Type	0x0E7E		UINT16		
+10-11	Software Revision Code	0x2310		UINT16		
+12	Feature Code	0x04		UINT8		
+13	Input Mode	0=4-wire Wye, 1=Delta, 4=3-wire Wye		UINT8		
+14-15	Reserved	0		UINT16		
+16-19	Voltage scale (PT primary voltage)	120-1,150,000	V	UINT32		Relative to 120V secondary
+20-21	Reserved			UINT16		
+22-23	Current scale (CT primary current)	5-10,000	A	UINT16		Relative to 5A secondary
+24-25	Baud rate	1-9		UINT16		
+26-27	Voltage mode	0=4-wire Wye, 1=Delta, 4=3-wire Wye		UINT16		
+28-29	Present password	0		UINT16		
+30-31	Phase sequence	0=ABC		UINT16		
+32-35	Unused	0		UINT32		
+36-37	Demand period	1, 2, 5, 10, 15, 20,30, 60	min	UINT16		
+38-39	Number of demand periods	1-15		UINT16		
+40	Unused	0		UINT8		
+41	Unused	0		UINT8		
+42-43	Standard frequency	25, 50, 60 ,400	Hz	UINT16		
+44-47	Unused	0		UINT32		
+48-49	Serial communications mode	0=RS-232, 1=RS-485		UINT16		
+50-51	Reserved	0		UINT16		
+52-53	Unused	0		UINT16		
+54-55	Reserved	0		UINT16		
+56-59	Unused	0		UINT32		
+60-61	Neutral current scale (CT primary current)	5-10,000	A	UINT16		Relative to 5A secondary
+62-63	Unused			UINT16		
+64-65	Unused			UINT16		
+66-67	Unused			UINT16		
+68-69	Unused			UINT16		
+70-71	Unused			UINT16		
+72-73	Unused			UINT16		
+74	LRC			UINT8		
Read Time						
	Request Packet					
+0	Master to Slave	0x14		UINT8		
+1	Device Family	0xFD		UINT8		
+2	Message Type	0x0D		UINT8		
+3	Packet Length	0x04		UINT8		
+4-5	Master Address			UINT16		
+6-7	Slave Address			UINT16		
+8	LRC			UINT8		
	Response Packet					
+0	Slave to Master	0x27		UINT8		

Offset	Description	Range	Units	Type	R/W	Notes
+1	Device Family	0xFD		UINT8		
+2	Message Type	0x0D		UINT8		
+3	Packet Length	0x10		UINT8		
+4-5	Slave Address			UINT16		
+6-7	Master Address			UINT16		
+8-9	Device Type	0x0E7E		UINT16		
+10-11	Software Revision Code	0x2310		UINT16		
+12	Feature Code	0x04		UINT8		
+13	Input Mode	0=4-wire Wye, 1=Delta, 4=3-wire Wye		UINT8		
+14	Year (minus 1900)	100-255		UINT8		
+15	Month	1-12		UINT8		
+16	Day	1-31		UINT8		
+17	Hour	0-23		UINT8		
+18	Minute	0-59		UINT8		
+19	Second	0-59		UINT8		
+20	LRC			UINT8		
Set Time						
	Request Packet					
+0	Master to Slave	0x14		UINT8		
+1	Device Family	0xFD		UINT8		
+2	Message Type	0x07		UINT8		
+3	Packet Length	0x10		UINT8		
+4-5	Master Address			UINT16		
+6-7	Slave Address			UINT16		
+8-9	Reserved			UINT16		
+10	Year (minus 1900)	100-255		UINT8		
+11	Month	1-12		UINT8		
+12	Day	1-31		UINT8		
+13	Hour	0-23		UINT8		
+14	Minute	0-59		UINT8		
+15	Second	0-59		UINT8		
+16-19	Number of seconds since 0:00 Jan 1, 1970			UINT32		
+20	LRC			UINT8		
	Response Packet					
+0	Slave to Master	0x27		UINT8		
+1	Device Family	0xFD		UINT8		
+2	Message Type	0x07		UINT8		
+3	Packet Length	0x0C		UINT8		
+4-5	Slave Address			UINT16		
+6-7	Master Address			UINT16		
+8-9	Device Type	0x0E7E		UINT16		
+10-11	Software Revision Code	0x2310		UINT16		
+12	Feature Code	0x04		UINT8		

Offset	Description	Range	Units	Type	R/W	Notes
+13	Input Mode	0=4-wire Wye, 1=Delta, 4=3-wire Wye		UINT8		
+14-15	Acknowledgement	0=NAK, 1=ACK		UINT16		
+16	LRC			UINT8		
Clear Energies						
	Request Packet					
+0	Master to Slave	0x14		UINT8		
+1	Device Family	0xFD		UINT8		
+2	Message Type	0x16		UINT8		
+3	Packet Length	0x04		UINT8		
+4-5	Master Address			UINT16		
+6-7	Slave Address			UINT16		
+8	LRC			UINT8		
	Response Packet					
+0	Slave to Master	0x27		UINT8		
+1	Device Family	0xFD		UINT8		
+2	Message Type	0x16		UINT8		
+3	Packet Length	0x0C		UINT8		
+4-5	Slave Address			UINT16		
+6-7	Master Address			UINT16		
+8-9	Device Type	0x0E7E		UINT16		
+10-11	Software Revision Code	0x2310		UINT16		
+12	Feature Code	0x04		UINT8		
+13	Input Mode	0=4-wire Wye, 1=Delta, 4=3-wire Wye		UINT8		
+14-15	Acknowledgement	0=NAK, 1=ACK		UINT16		
+16	LRC			UINT8		
Control Relays						
	Request Packet					
+0	Master to Slave	0x14		UINT8		
+1	Device Family	0xFD		UINT8		
+2	Message Type	0x1A		UINT8		
+3	Packet Length	0x08		UINT8		
+4-5	Master Address			UINT16		
+6-7	Slave Address			UINT16		
+8-9	Relay number	1=RO1, 2=RO2		UINT16		
+10-11	Relay command	0=normal, 1=operate, 2=release		UINT16		
+12	LRC			UINT8		
	Response Packet					
+0	Slave to Master	0x27		UINT8		
+1	Device Family	0xFD		UINT8		
+2	Message Type	0x1A		UINT8		
+3	Packet Length	0x0C		UINT8		
+4-5	Slave Address			UINT16		
+6-7	Master Address			UINT16		

Offset	Description	Range	Units	Type	R/W	Notes
+8-9	Device Type	0x0E7E		UINT16		
+10-11	Software Revision Code	0x2310		UINT16		
+12	Feature Code	0x04		UINT8		
+13	Input Mode	0=4-wire Wye, 1=Delta, 4=3-wire Wye		UINT8		
+14-15	Acknowledgement	0=NAK, 1=ACK		UINT16		
+16	LRC			UINT8		

4 Data Scales

Code	Condition	Value/Range	Notes
Data Scales			
Vmax		In secondary units: 204.7 V In primary units: $204.7 \times \text{PT Ratio}$, V	
I _{max}		In secondary units: 8.191 A In primary units: $8.191 \times \text{CT ratio}$, A	1
P _{max}	All wirings	In secondary units: 1,023 W In primary units: $1,023 \times \text{PT Ratio} \times \text{CT Ratio}$, W	1

¹ CT Ratio = CT Primary current/CT Secondary current, assuming CT Secondary current = 5A

5 Data Formats

Format Code	Value	Description	Notes
Relay Status			
F1	Bit 0 – Relay status	0=released, 1=operated	
	Bit 1 – Remote latch	0=normal, 1=forced	
	Bits 2-7	Unused	
Status Inputs Status			
F2	Bit 0 – Status Input #1	0=normal, 1=active	
	Bit 1 – Status Input #2	0=normal, 1=active	
	Bits 2-7	Unused	
Setpoint Status			
F3	Bits 0-6	Unused	
	Bit 7 = 0	Normal	
	Bit 7 = 1	Active	
DTE Relay/Status Inputs Status			
F4	Bits 0-1	Unused	
	Bit 2 – Relay #1	0=inactive, 1=active	
	Bit 3 – Relay #2	0=inactive, 1=active	
	Bit 4	Unused	
	Bit 5 – Status input #1	0=inactive, 1=active	
	Bit 6 – Status input #2	0=inactive, 1=active	
	Bit 7	Unused	