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XWIMPACC Driver Manual

Westinghouse IMPACC System Communications Protocol Driver

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XWIMPACC technical specifications

General information

XWIMPACC driver allows you to connect to any other Westinghouse Electric Corporation equipment using the IMPACC System Communications protocol (according to IL-17384, revision 1.4, June 1992 & July 1996). Communications are made through a RS-232 port. A special interface Westinghouse MINT (Master INCOM Network Translator) is required when more than one device must be connected. A multidrop of up to 999 devices can be connected. For point-to-point communications with a unique device, the use of a MINT interface is not required and the PC serial port can be connected directly with the PONI interface of the device. The communication cable between the PC and the MINT unit must have

the following pins assignment:

- PC PIN 2 --> MINT PIN 2
- PC PIN 3 --> MINT PIN 3
- PC PIN 7 --> MINT PIN 7

(Note that pins 2 and 3 are not inverted)

Command list

Addressable Relay Commands

Energize Relay

Description of this command:

This command requests the specifically addressed slave device to energize its relay.

Methods used to run this command:

Digital Output

Number of points accepted by this command:

1

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

0

Meaning of the DriverP2 parameter:

2048 (800h)

De-energize Relay

Description of this command:

This command requests the specifically addressed slave device to de-energize its relay.

Methods used to run this command:

Digital Output

Number of points accepted by this command:

1

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

0

Meaning of the DriverP2 parameter:

2304 (900h)

Read Status

Description of this command:

This command requests the specifically addressed slave device to transmit its status (ie. its two status bits/digital inputs).

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Methods used to run this command:

Digital Input

Number of points accepted by this command:

1-2

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

0

Meaning of the DriverP2 parameter:

5376 (1500h)

Values that are returned:

Value in PointValue (0) = Status of input #1

Value in PointValue (1) = Status of input #2

[Advantage Commands] All the reading operations must be performed using Analog Input type records, even when digital values may be part of the returned information. When digital values are read as part of the response, they will be presented as 0 or 1 values in the corresponding HMITalk1.PointValue() channels.

Important note:

If the least significant digit of the INCOM network address for the Advantage is in the range of Ah to Fh, the watchdog timer is enabled in the Advantage, and the product will trip/open if no communication messages are received for a 5-second period.

Advantage Commands

Read Fast Status

Description of this command:

This command retrieves information about the current status.

Methods used to run this command:

Analog Input

Number of points accepted by this command:

1-8

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

1

Meaning of the DriverP2 parameter:

768 (300h)

Values that are returned:

Value in PointValue (0) = Division Code.

Value in PointValue (1) = Communications Software Version.

Value in PointValue (2) = Product ID.

6 = Size 3, 4 Starter, 3 PH.

8 = Size 1, 2 Starter, 3 PH.

9 = Size 5, 6 Starter, 3 PH.

10 = Size 3, 4 Overload, 3 PH.

11 = Size 1, 2 Overload, 3 PH.

13 = Size 5, 6 Overload, 3 PH.

14 = Size 3, 4 Contactor.

23 = Size 5, 6 Contactor.

24 = Size 1, 2 Contactor.

25 = Size 1L Starter, 3 PH.

26 = Size 1L Starter, 1 PH.

27 = Size 1L Overload, 3 PH.

28 = Size 1, 2 Starter, 1 PH.

Value in PointValue (3) = Status.

0 = Opened, Off or Ready (Normal Inactive)

1 = Closed, On or Running (Normal Active)

2 = Tripped (Abnormal Inactive)

3 = Alarmed (Abnormal Active)

Value in PointValue (4) = If 1, tripped or opened by remote communications.

Value in PointValue (5) = If 1, powered on since last status read request.

Value in PointValue (6) = Set when trip detected, cleared when the trip buffer is read.

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Value in PointValue (7) = Set indicates PONI-Advantage communications is functional.

Read Current Buffer

Description of this command:

This command retrieves information about the current phases and current IX. Currents are expressed in amperes.

Methods used to run this command:

Analog Input

Number of points accepted by this command:

1-4

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

1

Meaning of the DriverP2 parameter:

773 (305h)

Values that are returned:

Value in PointValue (0) = Phase current IA (Amperes).

Value in PointValue (1) = Phase current IB (Amperes).

Value in PointValue (2) = Phase current IC (Amperes).

Value in PointValue (3) = Current IX (Amperes).

Important note:

Current IX will usually be ground current. For some products, this current may be either fourth pole current or neutral current. These latter cases will not have ground current.

Read Flags Buffer

Description of this command:

This command retrieves extended information about the current operating conditions.

Methods used to run this command:

Analog Input

Number of points accepted by this command:

1-13

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

1

Meaning of the DriverP2 parameter:

968 (3C8h)

Values that are returned:

Value in PointValue (0) = Run/Closed indication.

Value in PointValue (1) = Ready/Open indication.

Value in PointValue (2) = Trip indication.

Value in PointValue (3) = Overload.

Value in PointValue (4) = If 1, Run Permit Signal present.

Value in PointValue (5) = If 1, Start Signal present.

Value in PointValue (6) = Not If 1, Remote Reset present.

Value in PointValue (7) = Not If 1, Local Reset present.

Value in PointValue (8) = Trip type:

1 = Overload

2 = Ground Current Trip

3 = Phase Loss Trip

4 = Phase Unbalance Trip

16 = Ground. Current exceeds interrupt capacity.

32 = Control Voltage too low. Unit will open.

48 = Control Voltage too low to pick up.

64 = Control Voltage too high to pick up.

80 = Current too low to close.

112 = External Trip (via remote communications).

Value in PointValue (9) = Coil Voltage (units of volts).

Value in PointValue (10) = Maximum Coil Current on closing.

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Value in PointValue (11) = Time equivalent of the delay from the middle of each half cycle, to the beginning of holding pulse.
Value in PointValue (12) = The recorded holding current.

Read Setpoints Buffer

Description of this command:

This request gives a Setpoints Buffer description.

Methods used to run this command:

Analog Input

Number of points accepted by this command:

1-12

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

1

Meaning of the DriverP2 parameter:

969 (3C9h)

Values that are returned:

Dipheater:

Value in PointValue (0) = Heater number (0-31).

Value in PointValue (1) = Overload type:

0 = Class 10 Overload.

1 = Class 20 Overload.

2 = Class 30 Overload.

3 = No protection.

Value in PointValue (2) = If 1, Automatic Reset. Econfig:

Value in PointValue (3) = If 1, Ground Fault enabled.

Value in PointValue (4) = If 1, Phase Protection enabled.

Value in PointValue (5) = If 1, Thermal Overload enabled.

Value in PointValue (6) = If 1, unit is 50 Hz. If 0, unit is 60 Hz.

Value in PointValue (7) = If 1, Unit is an Overload. If 0, Unit is a Contactor/Starter.

Value in PointValue (8) = If 1, Ultrasonic holding enabled.

Value in PointValue (9) = If 1, Local Reset is disabled.

Value in PointValue (10) = If 1, Unit will not reset thermal trip on power up, even if reset conditions met.

Value in PointValue (11) = ROM version of the Sure chip.

Read Time Stamped Trip Data Buffer

Description of this command:

This request is for use with products that provide "time stamping" or trip data. When the product receives a Fast-Status request, it resets an on-board Trip Time Offset clock. Should the product perform a protective trip, the product records the value of the Trip Time Offset clock at the instant of the trip. The value of the Trip Time Offset clock then represents the elapsed time between the last time mark (Fast-Status) received from the master and the time at which the product tripped.

The resolution of the product Trip Time Offset clock is assumed to be 1/256 of a second. When a protective trip occurs, the product records the following

data into a TIME STAMPED TRIP DATA buffer:

- Trip Time Offset clock

- Metered values

- Flags

- Setpoints The Trip Time Offset clock continues to run. If a product has more than one TIME STAMPED TRIP DATA buffer, it will over-write the oldest buffer. If a product has only one TIME STAMPED TRIP DATA buffer, it will be over-written.

Methods used to run this command:

Analog Input

Number of points accepted by this command:

1-31

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

1

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Meaning of the DriverP2 parameter:

971 (3CBh)

Values that are returned:

Value in PointValue (0) = TRIP DATA Buffer number.

Value in PointValue (1) = Number of unread TRIP DATA Buffers.

Value in PointValue (2) = TRIP TIME OFFSET.

Value in PointValue (3) = Phase A Current.

Value in PointValue (4) = Phase B Current.

Value in PointValue (5) = Phase C Current. Flags Buffer (same as Read Flags Buffer command):

Value in PointValue (6) = Run/Closed indication.

Value in PointValue (7) = Ready/Open indication.

Value in PointValue (8) = Trip indication.

Value in PointValue (9) = Overload.

Value in PointValue (10) = If 1, Run Permit Signal present.

Value in PointValue (11) = If 1, Start Signal present.

Value in PointValue (12) = Not If 1, Remote Reset present.

Value in PointValue (13) = Not If 1, Local Reset present.

Value in PointValue (14) = Trip type:

1 = Overload

2 = Ground Current Trip

3 = Phase Loss Trip

4 = Phase Unbalance Trip

16 = Ground. Current exceeds interrupt capacity.

32 = Control Voltage too low. Unit will open.

48 = Control Voltage too low to pick up.

64 = Control Voltage too high to pick up.

80 = Current too low to close.

112 = External Trip (via remote communications).

Value in PointValue (15) = Coil Voltage (units of volts).

Value in PointValue (16) = Maximum Coil Current on closing.

Value in PointValue (17) = Time equivalent of the delay from the middle of each half cycle, to the beginning of holding pulse.

Value in PointValue (18) = The recorded holding current. Setpoints Buffer (same as Read Setpoints Buffer command): Dipheater:

Value in PointValue (19) = Heater number (0-31).

Value in PointValue (20) = Overload type:

0 = Class 10 Overload.

1 = Class 20 Overload.

2 = Class 30 Overload.

3 = No protection.

Value in PointValue (21) = If 1, Automatic Reset. Econfig:

Value in PointValue (22) = If 1, Ground Fault enabled.

Value in PointValue (23) = If 1, Phase Protection enabled.

Value in PointValue (24) = If 1, Thermal Overload enabled.

Value in PointValue (25) = If 1, unit is 50 Hz. If 0, unit is 60 Hz.

Value in PointValue (26) = If 1, Unit is an Overload. If 0, Unit is a Contactor/Starter.

Value in PointValue (27) = If 1, Ultrasonic holding enabled.

Value in PointValue (28) = If 1, Local Reset is disabled.

Value in PointValue (29) = If 1, Unit will not reset thermal trip on power up, even if reset conditions met.

Value in PointValue (30) = ROM version of the Sure chip.

Write Slave Action

Description of this command:

This command results in the device performing an action as detailed below. The value sent will be the current value contained in the HMITalk1.PointValue(0) property.

Methods used to run this command:

Analog Output

Number of points accepted by this command:

1

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

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Meaning of the DriverP1 parameter:

1

Meaning of the DriverP2 parameter:

976 (3D0h)

VALUE TO SEND:

0 = Reset Trip/Unit.

1 = Reset TRIP DATA Buffer.

2 = Start.

3 = Trip/Stop.

[Digitrip II Commands] All the reading operations must be performed using Analog Input type records, even when digital values can be part of the returned information. When digital values are read as part of the response, they will be presented as 0 or 1 values in the corresponding HMITalk1.PointValue() channels.

Digitrip II Commands

Read Fast Status

Description of this command:

This command retrieves information about the current status.

Methods used to run this command:

Analog Input

Number of points accepted by this command:

1-6

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

2

Meaning of the DriverP2 parameter:

768 (300h)

Values that are returned:

Value in PointValue (0) = Division Code.

Value in PointValue (1) = Communications Software Version.

Value in PointValue (2) = Product ID (= 1).

Value in PointValue (3) = Status.

0 = Opened, Off or Ready (Normal Inactive)

1 = Closed, On or Running (Normal Active)

2 = Tripped (Abnormal Inactive)

3 = Alarmed (Abnormal Active)

Value in PointValue (4) = If 1, opened by remote communications.

Value in PointValue (5) = If 1, powered on since last status read request.

Read Data Buffer

Description of this command:

This command retrieves all the device's information in a single request.

Methods used to run this command:

Analog Input

Number of points accepted by this command:

1-29

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

2

Meaning of the DriverP2 parameter:

784 (310h)

Values that are returned:

Value in PointValue (0) = If 1, Long Delay Trip.

Value in PointValue (1) = If 1, Short Delay Trip.

Value in PointValue (2) = If 1, Instantaneous Trip.

Value in PointValue (3) = If 1, Discriminator Trip.

Value in PointValue (4) = If 1, Ground Fault.

Value in PointValue (5) = If 1, Test Initiated.

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Value in PointValue (6) = If 1, Test Started.
Value in PointValue (7) = If 1, Phase Test Initiated.
Value in PointValue (8) = If 1, Breaker Trip.
Value in PointValue (9) = If 1, RAM Error.
Value in PointValue (10) = If 1, ROM Error.
Value in PointValue (11) = If 1, Open as a result of a remote communications shed command.
Value in PointValue (12) = If 1, High Load Alarm.
Value in PointValue (13) = If 1, Negative Power Reading.
Value in PointValue (14) = If 1, Override Trip.
Value in PointValue (15) = Hertz Flag (0 = 60 Hz, 1 = 50 Hz).
Value in PointValue (16) = If 1, Long Delay Protection (LDPU) in progress.
Value in PointValue (17) = If 1, Ground Test Initiated.
Value in PointValue (18) = Status of breaker (1 = open, 0 = closed).
Value in PointValue (19) = Plug Trip (1 = bad plug or no plug).
Value in PointValue (20) = Average Power.
Value in PointValue (21) = Peak Demand.
Value in PointValue (22) = Energy.
Value in PointValue (23) = Phase A Current.
Value in PointValue (24) = Phase B Current.
Value in PointValue (25) = Phase C Current.
Value in PointValue (26) = Ground Current.
Value in PointValue (27) = FRAME:
0 = Bad
1 = Reserved
2 = SPB3
3 = SPB5 4-5 = Reserved
6 = DS
7 = Hundt Weber 8-9 = Reserved
10 = RD-HW
11 = RD-CL 12-13 = Reserved 14-15 = Bad
Value in PointValue (28) = Plug Factor:
0 = 100
2 = 200
4 = 250
6 = 300
8 = 400
10 = 600
12 = 800
14 = 1000
16 = 1200
18 = 1600
20 = 2000
22 = 2500
24 = 3000
26 = 3200
28 = 4000
30 = 5000

Reset Peak Demand

Description of this command:

This command resets the peak demand. Supported only by communication software version of 1 or greater.

Methods used to run this command:

Digital Output

Number of points accepted by this command:

1

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

2

Meaning of the DriverP2 parameter:

800 (320h)

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Shed Load

Description of this command:

This command performs a shed load.

Methods used to run this command:

Digital Output

Number of points accepted by this command:

1

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

2

Meaning of the DriverP2 parameter:

816 (330h)

Restore Load

Description of this command:

This command performs a restore load.

Methods used to run this command:

Digital Output

Number of points accepted by this command:

1

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

2

Meaning of the DriverP2 parameter:

832 (340h)

Reset Energy

Description of this command:

This command performs an energy reset. Supported only by communication software version of 2 or greater.

Methods used to run this command:

Digital Output

Number of points accepted by this command:

1

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

2

Meaning of the DriverP2 parameter:

848 (350h)

[Advantage Control PONI Commands]

Advantage Control PONI Commands

Start

Description of this command:

This command requests the specifically addressed slave device to start.

Methods used to run this command:

Digital Output

Number of points accepted by this command:

1

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

3

Meaning of the DriverP2 parameter:

2048 (800h)

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Stop

Description of this command:

This command requests the specifically addressed slave device to stop.

Methods used to run this command:

Digital Output

Number of points accepted by this command:

1

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

3

Meaning of the DriverP2 parameter:

2304 (900h)

Read Status

Description of this command:

This command requests the specifically addressed slave device to transmit its status.

Methods used to run this command:

Analog Input

Number of points accepted by this command:

1

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

3

Meaning of the DriverP2 parameter:

5376 (1500h)

Values that are returned:

Value in PointValue (0) = Status

0 = Open.

1 = Closed.

2 = Tripped.

3 = Alarmed.

[IQ Energy Sentinel] All the reading operations must be performed using Analog Input type records, even when digital values can be part of the returned information. When digital values are read as part of the response, they will be presented as 0 or 1 values in the corresponding HMITalk1.PointValue() channels.

IQ Energy Sentinel

Read Fast Status

Description of this command:

This command retrieves information about the current status.

Methods used to run this command:

Analog Input

Number of points accepted by this command:

1-7

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

4

Meaning of the DriverP2 parameter:

768 (300h)

Values that are returned:

Value in PointValue (0) = Division Code.

Value in PointValue (1) = Communications Software Version.

Value in PointValue (2) = Product ID.

31 = F Frame Energy Monitor.

32 = J Frame Energy Monitor.

33 = K Frame Energy Monitor.

Value in PointValue (3) = Status.

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0 = Inactive
1 = Active
2 = Not Used
3 = Alarm (eg. Phase alarm)
Value in PointValue (4) = If 1, opened by remote communications.
Value in PointValue (5) = If 1, powered on since last Reset (sync) Demand Window.
Value in PointValue (6) = Unread Energy Snapshot Available.

Read Power Buffer

Description of this command:

This command retrieves information about power, power demand and energy.

Methods used to run this command:

Analog Input

Number of points accepted by this command:

1-3

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

4

Meaning of the DriverP2 parameter:

776 (308h)

Values that are returned:

Value in PointValue (0) = Instantaneous Power (Watts).
Value in PointValue (1) = 5-Minute Average of Power (Watts).
Value in PointValue (2) = Energy (Watt hours).

Read Energy Buffer

Description of this command:

This command retrieves the value for energy, in units of Kilowatts hour.

Methods used to run this command:

Analog Input

Number of points accepted by this command:

1

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

4

Meaning of the DriverP2 parameter:

778 (30Ah)

Values that are returned:

Value in PointValue (0) = Energy (Ranges from 0 to 16,777,215 KWH).

Read Flags Buffer

Description of this command:

This command retrieves flags information, temperature, average of power, etc.

Methods used to run this command:

Analog Input

Number of points accepted by this command:

1-17

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

4

Meaning of the DriverP2 parameter:

968 (3C8h)

Values that are returned:

Value in PointValue (0) = If 1, Demand for Phase A is zero.
Value in PointValue (1) = If 1, Demand for Phase B is zero.
Value in PointValue (2) = If 1, Demand for Phase C is zero.
Value in PointValue (3) = If 1, Energy for Phase A is negative.
Value in PointValue (4) = If 1, Energy for Phase A is negative.

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Value in PointValue (5) = If 1, Energy for Phase A is negative.
Value in PointValue (6) = If 1, Energy tally error (tally zeroed).
Value in PointValue (7) = If 1, EEPROM Error.
Value in PointValue (8) = If 1, RAM Error.
Value in PointValue (9) = If 1, ROM Error.
Value in PointValue (10) = If 1, Over temperature warning.
Value in PointValue (11) = If 1, Calibration factor error.
Value in PointValue (12) = If 1, Power failure first sample.
Value in PointValue (13) = If 1, Power failure second sample.
Value in PointValue (14) = Temperature.
Value in PointValue (15) = 5-Minute average power update counter (0-251). This counter resets to zero when the demand window is reset. It rolls over after 21 hours (after counting up to 251).
Value in PointValue (16) = 5-Minute average of power.

Write Slave Action

Description of this command:

This command results in the device performing an action as detailed below. The value sent will be the current value contained in the HMITalk1.PointValue(0) property.

Methods used to run this command:

Analog Output

Number of points accepted by this command:

1

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

4

Meaning of the DriverP2 parameter:

976 (3D0h)

VALUE TO SEND:

0 = No action.

1 = Reset Demand Window.

2 = Save Energy Buffer.

3 = Both actions.

Broadcast Save Energy Buffer

Description of this command:

This command informs all connected devices to save their energy buffers. HMITalk1.PointValue(0) is ignored.

Methods used to run this command:

Digital Output

Number of points accepted by this command:

1

Meaning of the DriverP0 parameter:

0

Meaning of the DriverP1 parameter:

4

Meaning of the DriverP2 parameter:

3328 (D00h)

Broadcast Reset Demand Window

Description of this command:

This command informs all connected devices to reset their demand windows. HMITalk1.PointValue(0) is ignored.

Methods used to run this command:

Digital Output

Number of points accepted by this command:

1

Meaning of the DriverP0 parameter:

0

Meaning of the DriverP1 parameter:

4

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Meaning of the DriverP2 parameter:

3329 (D01h)

[IQ 1000 II Commands] All the reading operations must be performed using Analog Input type records, even when digital values can be part of the returned information. When digital values are read as part of the response, they will be presented as 0 or 1 values in the corresponding HMITalk1.PointValue() channels.

IQ 1000 II Commands

Read Fast Status

Description of this command:

This command retrieves information about the current status.

Methods used to run this command:

Analog Input

Number of points accepted by this command:

1-6

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

5

Meaning of the DriverP2 parameter:

768 (300h)

Values that are returned:

Value in PointValue (0) = Division Code.

Value in PointValue (1) = Communications Software Version.

Value in PointValue (2) = Product ID (= 3).

Value in PointValue (3) = Status.

0 = Opened, Off or Ready (Normal Inactive)

1 = Closed, On or Running (Normal Active)

2 = Tripped (Abnormal Inactive)

3 = Alarmed (Abnormal Active)

Value in PointValue (4) = If 1, opened by remote communications.

Value in PointValue (5) = If 1, powered on since last status read request.

Read Current Buffer

Description of this command:

This command retrieves information about the current phases and current IX. Currents are expressed in amperes.

Methods used to run this command:

Analog Input

Number of points accepted by this command:

1-4

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

5

Meaning of the DriverP2 parameter:

773 (305h)

Values that are returned:

Value in PointValue (0) = Phase current IA (Amperes).

Value in PointValue (1) = Phase current IB (Amperes).

Value in PointValue (2) = Phase current IC (Amperes).

Value in PointValue (3) = Current IX (Amperes).

Important note:

Current IX will usually be ground current. For some products, this current may be either fourth pole current or neutral current. These latter cases will not have ground current.

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Read Temperature Buffer

Description of this command:

This command retrieves the temperature in degrees for six motor windings temperatures, two motor bearing temperatures, two load bearing temperatures and one ambient temperature. Temperatures range from 0 to 255 degrees centigrade.

Methods used to run this command:

Analog Input

Number of points accepted by this command:

1-13

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

5

Meaning of the DriverP2 parameter:

783 (30Fh)

Meaning of the DriverP3 parameter:

1

Values that are returned:

Value in PointValue (0) = Windind Temperature 1.
Value in PointValue (1) = Windind Temperature 2.
Value in PointValue (2) = Windind Temperature 3.
Value in PointValue (3) = Windind Temperature 4.
Value in PointValue (4) = Windind Temperature 5.
Value in PointValue (5) = Windind Temperature 6.
Value in PointValue (6) = Motor Bearing Temperature 1.
Value in PointValue (7) = Motor Bearing Temperature 2.
Value in PointValue (8) = Load Bearing Temperature 1.
Value in PointValue (9) = Load Bearing Temperature 2.
Value in PointValue (10) = Auxiliary Temperature.
Value in PointValue (11) = Temperature Validity 1.
Value in PointValue (12) = Temperature Validity 2.

Important note:

The Temperature Validity values are used to represent the presence of a selector sensor.

Read Flags Buffer

Description of this command:

This command retrieves extended information about the current operating conditions.

Methods used to run this command:

Analog Input

Number of points accepted by this command:

1-45

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

5

Meaning of the DriverP2 parameter:

968 (3C8h)

Values that are returned:

Value in PointValue (0) = If 1, Instantaneous Over Current Trip.
Value in PointValue (1) = If 1, I-Squared T Trip.
Value in PointValue (2) = If 1, Phase Unbalance Trip.
Value in PointValue (3) = If 1, Ground Fault Trip.
Value in PointValue (4) = If 1, Jam Trip.
Value in PointValue (5) = If 1, Under Load Trip.
Value in PointValue (6) = If 1, Trip Bypass.
Value in PointValue (7) = If 1, Remote Trip (via hardware input).
Value in PointValue (8) = If 1, Motor Bearing Temperature Trip.
Value in PointValue (9) = If 1, Load Bearing Temperature Trip.
Value in PointValue (10) = If 1, Winding Temperature Trip.
Value in PointValue (11) = If 1, Reverse Sequence Trip.
Value in PointValue (12) = If 1, Incomplete Sequence Trip.

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Value in PointValue (13) = If 1, A/D Converter Error.
Value in PointValue (14) = If 1, RAM Error.
Value in PointValue (15) = If 1, ROM Error.
Value in PointValue (16) = If 1, Opto-coupler Failure.
Value in PointValue (17) = If 1, Transition Not Completed.
Value in PointValue (18) = If 1, Full Load Amps/CT Value Error.
Value in PointValue (19) = If 1, Battery Low.
Value in PointValue (20) = If 1, External Trip (via INCOM).
Value in PointValue (21) = If 1, Differential Trip on AC Input.
Value in PointValue (22) = If 1, Ambient Temperature Trip.
Value in PointValue (23) = If 1, Phase Unbalance Alarm
Value in PointValue (24) = If 1, Winding Temperature Alarm.
Value in PointValue (25) = If 1, Motor Bearing Temperature Alarm.
Value in PointValue (26) = If 1, Load Bearing Temperature Alarm.
Value in PointValue (27) = If 1, Jam Alarm.
Value in PointValue (28) = If 1, Under Load Alarm.
Value in PointValue (29) = If 1, Ambient Temperature Alarm.
Value in PointValue (30) = If 1, I Squared T Alarm/Trip.
Value in PointValue (31) = If 1, Starts per Hour Alarm/Trip.
Value in PointValue (32) = Operations Count.
Value in PointValue (33) = Run Time.
Value in PointValue (34) = Remaining Starts.
Value in PointValue (35) = Oldest Start Time.
Value in PointValue (36) = Percent I2T.
Value in PointValue (37) = Highest Phase Current.
Value in PointValue (38) = Highest RTD Temperature.
Value in PointValue (39) = Number of I2T Trips.
Value in PointValue (40) = Number of Instantaneous Over Current Trips.
Value in PointValue (41) = Number of Under Load Trips.
Value in PointValue (42) = Number of Jam Trips.
Value in PointValue (43) = Number of Ground Fault Trips.
Value in PointValue (44) = Number of RTD Trips.

Read Setpoints Buffer

Description of this command:

This request gives a Setpoints Buffer description.

Methods used to run this command:

Analog Input

Number of points accepted by this command:

1-46

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

5

Meaning of the DriverP2 parameter:

969 (3C9h)

Values that are returned:

Value in PointValue (0) = If 1, auto reset for I2T. If 0, manual reset for I2T.
Value in PointValue (1) = If 1, 2 second trip delay on Phase Unbalance.
Value in PointValue (2) = If 1, transition on time out. Else trip on time out.
Value in PointValue (3) = If 1, unit is 50 Hz. If 0, unit is 60 Hz.
Value in PointValue (4) = If 1, Trip Mode 2. If 0, Trip Mode 1.
Value in PointValue (5) = If 1, reversing is allowed. If 0, non reversing mode.
Value in PointValue (6) = If 1, Single Phase Operation. If 0, 3 Phase.
Value in PointValue (7) = If 1, IOC Protection Disabled. If 0, IOC Enabled.
Value in PointValue (8) = Current Loop Out Prop.:
0 = Current Loop Out Prop. to 100% Full Load
1 = Current Loop Out Prop. to 125% Full Load
2 = Current Loop Out Prop. to Max Winding RTD
3 = Current Loop Out Prop. to I2T Trip Level
Value in PointValue (9) = Mode:
0 = Remote Reset

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1 = Remote Trip
2 = Remote Differential Trip
3 = Motor Stop
4 = Reset Disabled
Value in PointValue (10) = Winding Temperature Trip Setpoint.
Value in PointValue (11) = Motor Bearing Temp Trip Setpoint.
Value in PointValue (12) = Load Bearing Temp Trip Setpoint.
Value in PointValue (13) = Ambient Temp Trip Setpoint.
Value in PointValue (14) = Winding Temperature Alarm Setpoint.
Value in PointValue (15) = Motor Bearing Temp Alarm Setpoint.
Value in PointValue (16) = Load Bearing Temp Alarm Setpoint.
Value in PointValue (17) = Ambient Temp Alarm Setpoint.
Value in PointValue (18) = Ground Fault Trip Setpoint.
Value in PointValue (19) = Ground Fault Start Delay Setpoint.
Value in PointValue (20) = Ground Fault Run Delay Setpoint.
Value in PointValue (21) = Inst Over Current Trip Setpoint.
Value in PointValue (22) = Inst Over Current Start Delay Setpoint.
Value in PointValue (23) = Locked Rotor Current Setpoint.
Value in PointValue (24) = Locked Rotor Stall Time Setpoint.
Value in PointValue (25) = Ultimate Trip Current Setpoint.
Value in PointValue (26) = I Squared T Alarm Setpoint.
Value in PointValue (27) = Jam Alarm Setpoint.
Value in PointValue (28) = Jam Trip Setpoint.
Value in PointValue (29) = Jam Start Delay Setpoint.
Value in PointValue (30) = Jam Run Delay Setpoint.
Value in PointValue (31) = Under Load Alarm Setpoint.
Value in PointValue (32) = Under Load Trip Setpoint.
Value in PointValue (33) = Under Load Start Delay Setpoint.
Value in PointValue (34) = Under Load Run Delay Setpoint.
Value in PointValue (35) = Phase Unbalance Alarm Setpoint.
Value in PointValue (36) = Phase Unbalance Delay Setpoint.
Value in PointValue (37) = Starts per minute Setpoint.
Value in PointValue (38) = Starts time limit Setpoint.
Value in PointValue (39) = Transition Current Level Setpoint.
Value in PointValue (40) = Transition Time Setpoint.
Value in PointValue (41) = Incomplete Sequence Time Setpoint.
Value in PointValue (42) = Anti-backspin delay Setpoint.
Value in PointValue (43) = Full Load Amps Setpoint.
Value in PointValue (44) = Current Transformer Ratio.
Value in PointValue (45) = Aux. Trip Delay:
0 = Normal Trip
1 = Unstantaneous Over Current Only
2 = Squared T Only
3 = Ground Fault Only
4 = Jam Only
5 = Under Load Only
6 = Motor Bearing Temperature Only
7 = Load Bearing Temperature Only
8 = Winding Temperature Only
9 = Reversing Only

Read Time-Stamped Trip Data Buffer

Description of this command:

This request is for use with products that provide "time stamping" or trip data. When the product receives a Fast-Status request, it resets an on-board Trip Time Offset clock. Should the product perform a protective trip, the product records the value of the Trip Time Offset clock at the instant of the trip. The value of the Trip Time Offset clock then represents the elapsed time between the last time mark (Fast-Status) received from the master and the time at which the product tripped. The resolution of the product Trip Time Offset clock is assumed to be 1/256 of a second. When a protective trip occurs, the product records the following *data into a TIME STAMPED TRIP DATA buffer:*

- Trip Time Offset clock

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- Metered values
- Flags
- Setpoints The Trip Time Offset clock continues to run. If a product has more than one TIME STAMPED TRIP DATA buffer, it will over-write the oldest buffer. If a product has only one TIME STAMPED TRIP DATA buffer, it will be over-written.

Methods used to run this command:

Analog Input

Number of points accepted by this command:

1-111

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

5

Meaning of the DriverP2 parameter:

971 (3CBh)

Values that are returned:

- Value in PointValue (0) = TRIP DATA Buffer number.
- Value in PointValue (1) = Number of unread TRIP DATA Buffers.
- Value in PointValue (2) = TRIP TIME OFFSET.
- Value in PointValue (3) = Phase A Current.
- Value in PointValue (4) = Phase B Current.
- Value in PointValue (5) = Phase C Current.
- Value in PointValue (6) = Ground Fault Current.
- Value in PointValue (7) = Windind Temperature 1.
- Value in PointValue (8) = Windind Temperature 2.
- Value in PointValue (9) = Windind Temperature 3.
- Value in PointValue (10) = Windind Temperature 4.
- Value in PointValue (11) = Windind Temperature 5.
- Value in PointValue (12) = Windind Temperature 6.
- Value in PointValue (13) = Motor Bearing Temperature 1.
- Value in PointValue (14) = Motor Bearing Temperature 2.
- Value in PointValue (15) = Load Bearing Temperature 1.
- Value in PointValue (16) = Load Bearing Temperature 2.
- Value in PointValue (17) = Ambient Temperature.
- Value in PointValue (18) = Temperature Validity 1.
- Value in PointValue (19) = Temperature Validity 2. Flags Buffer (same as Read Flags Buffer command):
- Value in PointValue (20) = If 1, Instantaneous Over Current Trip.
- Value in PointValue (21) = If 1, I-Squared T Trip.
- Value in PointValue (22) = If 1, Phase Unbalance Trip.
- Value in PointValue (23) = If 1, Ground Fault Trip.
- Value in PointValue (24) = If 1, Jam Trip.
- Value in PointValue (25) = If 1, Under Load Trip.
- Value in PointValue (26) = If 1, Trip Bypass.
- Value in PointValue (27) = If 1, Remote Trip (via hardware input).
- Value in PointValue (28) = If 1, Motor Bearing Temperature Trip.
- Value in PointValue (29) = If 1, Load Bearing Temperature Trip.
- Value in PointValue (30) = If 1, Winding Temperature Trip.
- Value in PointValue (31) = If 1, Reverse Sequence Trip.
- Value in PointValue (32) = If 1, Incomplete Sequence Trip.
- Value in PointValue (33) = If 1, A/D Converter Error.
- Value in PointValue (34) = If 1, RAM Error.
- Value in PointValue (35) = If 1, ROM Error.
- Value in PointValue (36) = If 1, Opto-coupler Failure.
- Value in PointValue (37) = If 1, Transition Not Completed.
- Value in PointValue (38) = If 1, Full Load Amps/CT Value Error.
- Value in PointValue (39) = If 1, Battery Low.
- Value in PointValue (40) = If 1, External Trip (via INCOM).
- Value in PointValue (41) = If 1, Differential Trip on AC Input.
- Value in PointValue (42) = If 1, Ambient Temperature Trip.
- Value in PointValue (43) = If 1, Phase Unbalance Alarm
- Value in PointValue (44) = If 1, Winding Temperature Alarm.

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Value in PointValue (45) = If 1, Motor Bearing Temperature Alarm.
Value in PointValue (46) = If 1, Load Bearing Temperature Alarm.
Value in PointValue (47) = If 1, Jam Alarm.
Value in PointValue (48) = If 1, Under Load Alarm.
Value in PointValue (49) = If 1, Ambient Temperature Alarm.
Value in PointValue (50) = If 1, I Squared T Alarm/Trip.
Value in PointValue (51) = If 1, Starts per Hour Alarm/Trip.
Value in PointValue (52) = Operations Count.
Value in PointValue (53) = Run Time.
Value in PointValue (54) = Remaining Starts.
Value in PointValue (55) = Oldest Start Time.
Value in PointValue (56) = Percent I2T.
Value in PointValue (57) = Highest Phase Current.
Value in PointValue (58) = Highest RTD Temperature.
Value in PointValue (59) = Number of I2T Trips.
Value in PointValue (60) = Number of Instantaneous Over Current Trips.
Value in PointValue (61) = Number of Under Load Trips.
Value in PointValue (62) = Number of Jam Trips.
Value in PointValue (63) = Number of Ground Fault Trips.
Value in PointValue (64) = Number of RTD Trips. Setpoints Buffer (same as Read Setpoints Buffer command):
Value in PointValue (65) = If 1, auto reset for I2T. If 0, manual reset for I2T.
Value in PointValue (66) = If 1, 2 second trip delay on Phase Unbalance.
Value in PointValue (67) = If 1, transition on time out. Else trip on time out.
Value in PointValue (68) = If 1, unit is 50 Hz. If 0, unit is 60 Hz.
Value in PointValue (69) = If 1, Trip Mode 2. If 0, Trip Mode 1.
Value in PointValue (70) = If 1, reversing is allowed. If 0, non reversing mode.
Value in PointValue (71) = If 1, Single Phase Operation. If 0, 3 Phase.
Value in PointValue (72) = If 1, IOC Protection Disabled. If 0, IOC Enabled.
Value in PointValue (73) = Current Loop Out Prop.:
0 = Current Loop Out Prop. to 100% Full Load
1 = Current Loop Out Prop. to 125% Full Load
2 = Current Loop Out Prop. to Max Winding RTD
3 = Current Loop Out Prop. to I2T Trip Level
Value in PointValue (74) = Mode:
0 = Remote Reset
1 = Remote Trip
2 = Remote Differential Trip
3 = Motor Stop
4 = Reset Disabled
Value in PointValue (75) = Winding Temperature Trip Setpoint.
Value in PointValue (76) = Motor Bearing Temp Trip Setpoint.
Value in PointValue (77) = Load Bearing Temp Trip Setpoint.
Value in PointValue (78) = Ambient Temp Trip Setpoint.
Value in PointValue (79) = Winding Temperature Alarm Setpoint.
Value in PointValue (80) = Motor Bearing Temp Alarm Setpoint.
Value in PointValue (81) = Load Bearing Temp Alarm Setpoint.
Value in PointValue (82) = Ambient Temp Alarm Setpoint.
Value in PointValue (83) = Ground Fault Trip Setpoint.
Value in PointValue (84) = Ground Fault Start Delay Setpoint.
Value in PointValue (85) = Ground Fault Run Delay Setpoint.
Value in PointValue (86) = Inst Over Current Trip Setpoint.
Value in PointValue (87) = Inst Over Current Start Delay Setpoint.
Value in PointValue (88) = Locked Rotor Current Setpoint.
Value in PointValue (89) = Locked Rotor Stall Time Setpoint.
Value in PointValue (90) = Ultimate Trip Current Setpoint.
Value in PointValue (91) = I Squared T Alarm Setpoint.
Value in PointValue (92) = Jam Alarm Setpoint.
Value in PointValue (93) = Jam Trip Setpoint.
Value in PointValue (94) = Jam Start Delay Setpoint.
Value in PointValue (95) = Jam Run Delay Setpoint.
Value in PointValue (96) = Under Load Alarm Setpoint.

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Value in PointValue (97) = Under Load Trip Setpoint.
Value in PointValue (98) = Under Load Start Delay Setpoint.
Value in PointValue (99) = Under Load Run Delay Setpoint.
Value in PointValue (100) = Phase Unbalance Alarm Setpoint.
Value in PointValue (101) = Phase Unbalance Delay Setpoint.
Value in PointValue (102) = Starts per minute Setpoint.
Value in PointValue (103) = Starts time limit Setpoint.
Value in PointValue (104) = Transition Current Level Setpoint.
Value in PointValue (105) = Transition Time Setpoint.
Value in PointValue (106) = Incomplete Sequence Time Setpoint.
Value in PointValue (107) = Anti-backspin delay Setpoint.
Value in PointValue (108) = Full Load Amps Setpoint.
Value in PointValue (109) = Current Transformer Ratio.
Value in PointValue (110) = Aux. Trip Delay:
0 = Normal Trip
1 = Unstantaneous Over Current Only
2 = Squared T Only
3 = Ground Fault Only
4 = Jam Only
5 = Under Load Only
6 = Motor Bearing Temperature Only
7 = Load Bearing Temperature Only
8 = Winding Temperature Only
9 = Reversing Only

Write Slave Action

Description of this command:

This command results in the device performing an action as detailed below. The value sent will be the current value contained in the HMITalk1.PointValue(0) property.

Methods used to run this command:

Analog Output

Number of points accepted by this command:

1

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

5

Meaning of the DriverP2 parameter:

976 (3D0h)

VALUE TO SEND:

0 = Reset Trip/Alarm.

1 = Reset TRIP DATA Buffer.

2 = Reset (peak) demand current.

3 = Trip (Stop).

[IQ 500 Commands] All the reading operations must be performed using Analog Input type records, even when digital values can be part of the returned information. When digital values are read as part of the response, they will be presented as 0 or 1 values in the corresponding HMITalk1.PointValue() channels.

IQ 500 Commands

Read Fast Status

Description of this command:

This command retrieves information about the current status.

Methods used to run this command:

Analog Input

Number of points accepted by this command:

1-6

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

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Meaning of the DriverP1 parameter:

6

Meaning of the DriverP2 parameter:

768 (300h)

Values that are returned:

Value in PointValue (0) = Division Code.

Value in PointValue (1) = Communications Software Version.

Value in PointValue (2) = Product ID.

16 = Size 1/2 (IQ 502).

18 = Size 3/4 (IQ 504).

Value in PointValue (3) = Status.

0 = Opened, Off or Ready (Normal Inactive)

1 = Closed, On or Running (Normal Active)

2 = Tripped (Abnormal Inactive)

3 = Alarmed (Abnormal Active)

Value in PointValue (4) = If 1, opened by remote communications.

Value in PointValue (5) = If 1, powered on since last status read request.

Read Current Buffer

Description of this command:

This command retrieves information about the current phases and current IX. Currents are expressed in amperes.

Methods used to run this command:

Analog Input

Number of points accepted by this command:

1-4

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

6

Meaning of the DriverP2 parameter:

773 (305h)

Values that are returned:

Value in PointValue (0) = Phase current IA (Amperes).

Value in PointValue (1) = Phase current IB (Amperes).

Value in PointValue (2) = Phase current IC (Amperes).

Value in PointValue (3) = Current IX (Amperes).

Important note:

Current IX will usually be ground current. For some products, this current may be either fourth pole current or neutral current. These latter cases will not have ground current.

Read Flags Buffer

Description of this command:

This command retrieves extended information about the current operating conditions.

Methods used to run this command:

Analog Input

Number of points accepted by this command:

1-8

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

6

Meaning of the DriverP2 parameter:

968 (3C8h)

Values that are returned:

Value in PointValue (0) = If 1, Overload Trip.

Value in PointValue (1) = If 1, Phase Unbalance Trip.

Value in PointValue (2) = If 1, Ground Fault Trip.

Value in PointValue (3) = If 1, Jam Trip.

Value in PointValue (4) = If 1, ULM Trip.

Value in PointValue (5) = If 1, Remote Trip.

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Value in PointValue (6) = If 1, Remote Reset.
Value in PointValue (7) = If 1, O/L Alarm.

Read Setpoints Buffer

Description of this command:

This request gives a Setpoints Buffer description.

Methods used to run this command:

Analog Input

Number of points accepted by this command:

1-6

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

6

Meaning of the DriverP2 parameter:

969 (3C9h)

Values that are returned:

Value in PointValue (0) = Dip Switch 1.
Value in PointValue (1) = Dip Switch 2.
Value in PointValue (2) = Dip Switch 3.
Value in PointValue (3) = Dip Switch 4.
Value in PointValue (4) = Dip Switch 5.
Value in PointValue (5) = Dip Switch 6.

Important note:

Please refer to the IQ 500 User's Manual for information on the meaning of the Dip switches.

Read Time-Stamped Trip Data Buffer

Description of this command:

This request is for use with products that provide "time stamping" or trip data. When the product receives a Fast-Status request, it resets an on-board Trip Time Offset clock. Should the product perform a protective trip, the product records the value of the Trip Time Offset clock at the instant of the trip. The value of the Trip Time Offset clock then represents the elapsed time between the last time mark (Fast-Status) received from the master and the time at which the product tripped. The resolution of the product Trip Time Offset clock is assumed to be 1/256 of a second. When a protective trip occurs, the product records the following

data into a TIME STAMPED TRIP DATA buffer:

- Trip Time Offset clock
- Metered values
- Flags
- Setpoints The Trip Time Offset clock continues to run. If a product has more than one TIME STAMPED TRIP DATA buffer, it will over-write the oldest buffer. If a product has only one TIME STAMPED TRIP DATA buffer, it will be over-written.

Methods used to run this command:

Analog Input

Number of points accepted by this command:

1-21

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

6

Meaning of the DriverP2 parameter:

971 (3CBh)

Values that are returned:

Value in PointValue (0) = TRIP DATA Buffer number.
Value in PointValue (1) = Number of unread TRIP DATA Buffers.
Value in PointValue (2) = TRIP TIME OFFSET.
Value in PointValue (3) = Phase A Current.
Value in PointValue (4) = Phase B Current.
Value in PointValue (5) = Phase C Current.
Value in PointValue (6) = Ground Fault Current. Flags Buffer (same as Read Flags Buffer command):

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Value in PointValue (7) = If 1, Overload Trip.
Value in PointValue (8) = If 1, Phase Unbalance Trip.
Value in PointValue (9) = If 1, Ground Fault Trip.
Value in PointValue (10) = If 1, Jam Trip.
Value in PointValue (11) = If 1, ULM Trip.
Value in PointValue (12) = If 1, Remote Trip.
Value in PointValue (13) = If 1, Remote Reset.
Value in PointValue (14) = If 1, O/L Alarm. Setpoints Buffer (same as Read Setpoints Buffer command):
Value in PointValue (15) = Dip Switch 1.
Value in PointValue (16) = Dip Switch 2.
Value in PointValue (17) = Dip Switch 3.
Value in PointValue (18) = Dip Switch 4.
Value in PointValue (19) = Dip Switch 5.
Value in PointValue (20) = Dip Switch 6.

Write Slave Action

Description of this command:

This command results in the device performing an action as detailed below. The value sent will be the current value contained in the HMITalk1.PointValue(0) property.

Methods used to run this command:

Analog Output

Number of points accepted by this command:

1

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

6

Meaning of the DriverP2 parameter:

976 (3D0h)

VALUE TO SEND:

0 = Reset Trip/Unit.

1 = Reset TRIP DATA Buffer.

2 = Trip (open).

[IQ Data & IQ Generator Commands] All the reading operations must be performed using Analog Input type records, even when digital values can be part of the returned information. When digital values are read as part of the response, they will be presented as 0 or 1 values in the corresponding HMITalk1.PointValue() channels.

IQ Data & IQ Generator Commands

Read Fast Status

Description of this command:

This command retrieves information about the current status.

Methods used to run this command:

Analog Input

Number of points accepted by this command:

1-6

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

7

Meaning of the DriverP2 parameter:

768 (300h)

Values that are returned:

Value in PointValue (0) = Division Code.

Value in PointValue (1) = Communications Software Version.

Value in PointValue (2) = Product ID (= 20).

Value in PointValue (3) = Status.

0 = Opened, Off or Ready (Normal Inactive)

1 = Closed, On or Running (Normal Active)

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2 = Tripped (Abnormal Inactive)
3 = Alarmed (Abnormal Active)
Value in PointValue (4) = If 1, opened by remote communications.
Value in PointValue (5) = If 1, powered on since last status read request.

Read Current Buffer

Description of this command:

This command retrieves information about the current phases.

Methods used to run this command:

Analog Input

Number of points accepted by this command:

1-3

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

7

Meaning of the DriverP2 parameter:

773 (305h)

Values that are returned:

Value in PointValue (0) = Phase current IA (Amperes).
Value in PointValue (1) = Phase current IB (Amperes).
Value in PointValue (2) = Phase current IC (Amperes).

Read Line-to-Line Voltage Buffer

Description of this command:

This command retrieves information about the current line-to-line voltages. Voltages are expressed in volts.

Methods used to run this command:

Analog Input

Number of points accepted by this command:

1-3

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

7

Meaning of the DriverP2 parameter:

774 (306h)

Values that are returned:

Value in PointValue (0) = Line-to-line Voltage VAB (Volts).
Value in PointValue (1) = Line-to-line Voltage VBC (Volts).
Value in PointValue (2) = Line-to-line Voltage VCA (Volts).

Read Line-to-Neutral Voltage Buffer

Description of this command:

This command retrieves information about the current line-to-neutral voltages. Voltages are expressed in volts.

Methods used to run this command:

Analog Input

Number of points accepted by this command:

1-3

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

7

Meaning of the DriverP2 parameter:

775 (307h)

Values that are returned:

Value in PointValue (0) = Line-to-neutral Voltage VAN (Volts).
Value in PointValue (1) = Line-to-neutral Voltage VBN (Volts).
Value in PointValue (2) = Line-to-neutral Voltage VCN (Volts).

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Read Power Buffer

Description of this command:

This command retrieves information about the system's present frequency. Frequency is expressed in hertz.

Methods used to run this command:

Analog Input

Number of points accepted by this command:

1

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

7

Meaning of the DriverP2 parameter:

777 (309h)

Values that are returned:

Value in PointValue (0) = System Frequency (Hertz).

Read Flags Buffer

Description of this command:

This command retrieves extended information about the current operating conditions.

Methods used to run this command:

Analog Input

Number of points accepted by this command:

1-2

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

7

Meaning of the DriverP2 parameter:

968 (3C8h)

Values that are returned:

Value in PointValue (0) = If 1, RAM Failure.

Value in PointValue (1) = If 1, EE o CAL erro.

Read Setpoints Buffer

Description of this command:

This request gives a Setpoints Buffer description.

Methods used to run this command:

Analog Input

Number of points accepted by this command:

1-16

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

7

Meaning of the DriverP2 parameter:

969 (3C9h)

Values that are returned:

Value in PointValue (0) = JUMP1 (SW1), Switch 1.

Value in PointValue (1) = JUMP1 (SW1), Switch 2.

Value in PointValue (2) = JUMP1 (SW1), Switch 3.

Value in PointValue (3) = JUMP1 (SW1), Switch 4.

Value in PointValue (4) = JUMP1 (SW1), Switch 5.

Value in PointValue (5) = JUMP1 (SW1), Switch 6.

Value in PointValue (6) = JUMP1 (SW1), Switch 7.

Value in PointValue (7) = JUMP1 (SW1), Switch 8.

Value in PointValue (8) = JUMP2 (SW2), Switch 1.

Value in PointValue (9) = JUMP2 (SW2), Switch 2.

Value in PointValue (10) = JUMP2 (SW2), Switch 3.

Value in PointValue (11) = JUMP2 (SW2), Switch 4.

Value in PointValue (12) = JUMP2 (SW2), Switch 5.

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Value in PointValue (13) = JUMP2 (SW2), Switch 6.
Value in PointValue (14) = JUMP2 (SW2), Switch 7.
Value in PointValue (15) = JUMP2 (SW2), Switch 8.

Important note:

JUMPx refers to SWITCHx in IQ DATA/GENERATOR User's Manual. Refer to the IQ Data/IQ Generator User's Manual for information on the meaning of the Dip switches.

[IQ Data Plus II Commands] All the reading operations must be performed using Analog Input type records, even when digital values can be part of the returned information. When digital values are read as part of the response, they will be presented as 0 or 1 values in the corresponding HMITalk1.PointValue() channels.

IQ Data Plus II Commands

Read Trip Data Buffer

Description of this command:

This request retrieves Trip Data Buffer information.

Methods used to run this command:

Analog Input

Number of points accepted by this command:

1-24

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

8

Meaning of the DriverP2 parameter:

970 (3CAh)

Values that are returned:

Value in PointValue (0) = If 1, Trip.
Value in PointValue (1) = If 1, Alarm.
Value in PointValue (2) = If 1, External.
Value in PointValue (3) = If 1, Overvoltage.
Value in PointValue (4) = If 1, Undervoltage.
Value in PointValue (5) = If 1, Phase Unbalance.
Value in PointValue (6) = If 1, Phase Loss.
Value in PointValue (7) = If 1, Phase Reversal.
Value in PointValue (8) = If 1, RAM or ROM Failure.
Value in PointValue (9) = Phase A Current.
Value in PointValue (10) = Phase B Current.
Value in PointValue (11) = Phase C Current.
Value in PointValue (12) = Voltage A-B.
Value in PointValue (13) = Voltage B-C.
Value in PointValue (14) = Voltage C-A.
Value in PointValue (15) = Voltage A-N.
Value in PointValue (16) = Voltage B-N.
Value in PointValue (17) = Voltage C-N.
Value in PointValue (18) = Watts.
Value in PointValue (19) = Watts Demand.
Value in PointValue (20) = Watt Hours.
Value in PointValue (21) = Frequency.
Value in PointValue (22) = VARs.
Value in PointValue (23) = Power Factor.

Read Fast Status

Description of this command:

This command retrieves information about the current status.

Methods used to run this command:

Analog Input

Number of points accepted by this command:

1-6

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

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Meaning of the DriverP1 parameter:

8

Meaning of the DriverP2 parameter:

768 (300h)

Values that are returned:

Value in PointValue (0) = Division Code.

Value in PointValue (1) = Communications Software Version.

Value in PointValue (2) = Product ID.

2 = IQ Data Plus II (Communications Version >= 5 only).

22 = IQ Data Plus II HV (High Voltage).

Value in PointValue (3) = Status.

0 = Opened, Off or Ready (Normal Inactive)

1 = Closed, On or Running (Normal Active)

2 = Tripped (Abnormal Inactive)

3 = Alarmed (Abnormal Active)

Value in PointValue (4) = If 1, opened by remote communications.

Value in PointValue (5) = If 1, powered on since last status read request.

Read Current Buffer

Description of this command:

This command retrieves information about the current phases.

Methods used to run this command:

Analog Input

Number of points accepted by this command:

1-3

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

8

Meaning of the DriverP2 parameter:

773 (305h)

Values that are returned:

Value in PointValue (0) = Phase current IA (Amperes).

Value in PointValue (1) = Phase current IB (Amperes).

Value in PointValue (2) = Phase current IC (Amperes).

Read Line-to-Line Voltage Buffer

Description of this command:

This command retrieves information about the current line-to-line voltages. Voltages are expressed in volts.

Methods used to run this command:

Analog Input

Number of points accepted by this command:

1-3

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

8

Meaning of the DriverP2 parameter:

774 (306h)

Values that are returned:

Value in PointValue (0) = Line-to-line Voltage VAB (Volts).

Value in PointValue (1) = Line-to-line Voltage VBC (Volts).

Value in PointValue (2) = Line-to-line Voltage VCA (Volts).

Read Line-to-Neutral Voltage Buffer

Description of this command:

This command retrieves information about the current line-to-neutral voltages. Voltages are expressed in volts.

Methods used to run this command:

Analog Input

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Number of points accepted by this command:

1-3

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

8

Meaning of the DriverP2 parameter:

775 (307h)

Values that are returned:

Value in PointValue (0) = Line-to-neutral Voltage VAN (Volts).

Value in PointValue (1) = Line-to-neutral Voltage VBN (Volts).

Value in PointValue (2) = Line-to-neutral Voltage VCN (Volts).

Read Power Buffer 1

Description of this command:

This command retrieves information about the system's present power value (in watts), the power demand and the energy (in units of watt hours).

Methods used to run this command:

Analog Input

Number of points accepted by this command:

1-3

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

8

Meaning of the DriverP2 parameter:

776 (308h)

Values that are returned:

Value in PointValue (0) = Power (watts).

Value in PointValue (1) = Power Demand (watts).

Value in PointValue (2) = Energy (watt hours).

Read Power Buffer 2

Description of this command:

This command retrieves information about the system's present frequency, reactive power and power factor.

Methods used to run this command:

Analog Input

Number of points accepted by this command:

1-3

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

8

Meaning of the DriverP2 parameter:

777 (309h)

Values that are returned:

Value in PointValue (0) = System Frequency (Hertz).

Value in PointValue (1) = Reactive Power (vars).

Value in PointValue (2) = Power Factor.

Read Energy Buffer

Description of this command:

This command retrieves information about the value of energy in units of Kilowatt hours.

Methods used to run this command:

Analog Input

Number of points accepted by this command:

1

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

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Meaning of the DriverP1 parameter:

8

Meaning of the DriverP2 parameter:

778 (30Ah)

Values that are returned:

Value in PointValue (0) = Energy (Kilowatt hours).

Important note:

The maximum range for energy is 0 to 16,777,215 KWH.

Read Flags Buffer

Description of this command:

This command retrieves extended information about the current operating conditions.

Methods used to run this command:

Analog Input

Number of points accepted by this command:

1-9

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

8

Meaning of the DriverP2 parameter:

968 (3C8h)

Values that are returned:

Value in PointValue (0) = If 1, Trip.

Value in PointValue (1) = If 1, Alarm.

Value in PointValue (2) = If 1, External.

Value in PointValue (3) = If 1, Overvoltage.

Value in PointValue (4) = If 1, Undervoltage.

Value in PointValue (5) = If 1, Phase Unbalance.

Value in PointValue (6) = If 1, Phase Loss.

Value in PointValue (7) = If 1, Phase Reversal.

Value in PointValue (8) = If 1, RAM or ROM failure.

Read Setpoints Buffer

Description of this command:

This request gives a Setpoints Buffer description.

Methods used to run this command:

Analog Input

Number of points accepted by this command:

1-6

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

8

Meaning of the DriverP2 parameter:

969 (3C9h)

Values that are returned:

Value in PointValue (0) = Dip Switch SW1.

Value in PointValue (1) = Dip Switch SW2.

Value in PointValue (2) = Dip Switch SW3.

Value in PointValue (3) = Dip Switch SW4.

Value in PointValue (4) = Dip Switch SW5.

Value in PointValue (5) = Dip Switch SW6.

Important note:

Please refer to the IQ Data Plus II User's Manual for information on the meaning of the Dip switches.

Write Slave Action

Description of this command:

This command results in the device performing an action as detailed below. The value sent will be the current value contained in the HMITalk1.PointValue(0) property.

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Methods used to run this command:

Analog Output

Number of points accepted by this command:

1

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

8

Meaning of the DriverP2 parameter:

976 (3D0h)

VALUE TO SEND:

0 = Reset Trip/Alarm.

1 = Reset TRIP DATA Buffer.

2 = Reset demand.

3 = Reset Energy (KWH).

4 = External Trip.

5 = Reset external Trip

[AEM II Commands] All the reading operations must be performed using Analog Input type records, even when digital values can be part of the returned information. When digital values are read as part of the response, they will be presented as 0 or 1 values in the corresponding HMITalk1.PointValue() channels.

AEM II Commands

Read Fast Status

Description of this command:

This command retrieves information about the current status.

Methods used to run this command:

Analog Input

Number of points accepted by this command:

1-9

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

9

Meaning of the DriverP2 parameter:

768 (300h)

Values that are returned:

Value in PointValue (0) = Division Code.

Value in PointValue (1) = Communications Software Version.

1 = AEMII in AEMI compatibility mode. 3 or greater = AEMII in AEMII mode.

Value in PointValue (2) = Product ID (= 1).

Value in PointValue (3) = Status.

0 = Normal - Inactive (no devices detected on sub-network).

1 = Normal - Active.

2 = Tripped (a trip has occurred and has not been acknowledged).

3 = Alarm (Digitrip in high load).

Value in PointValue (4) = If 1, opened by remote communications.

Value in PointValue (5) = If 1, powered on since last status read request.

Value in PointValue (6) = If 1, was in learn mode.

Value in PointValue (7) = If 1, in learn mode.

Value in PointValue (8) = AEMII malfunction.

Read Setpoints Buffer

Description of this command:

This request gives a Setpoints Buffer description.

Methods used to run this command:

Analog Input

Number of points accepted by this command:

1-4

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Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

9

Meaning of the DriverP2 parameter:

969 (3C9h)

Values that are returned:

Value in PointValue (0) = If 1, Learn mode. If 0, operational.

Value in PointValue (1) = If 1, AEM II mode. If 0, AEM I mode.

Value in PointValue (2) = If 1, 9600 baud. If 0, 1200 baud.

Value in PointValue (3) = If 1, Test mode. If 0, operational.

Write Current Date and Time

Description of this command:

This request is used to send the real-time clock data (current date and time) to a slave. 7 channels are needed to fully specify date & time information. Missing channels will be provided internally by the driver according to current PC date & time information.

Methods used to run this command:

Analog Output

Number of points accepted by this command:

1-7

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

9

Meaning of the DriverP2 parameter:

984 (3D8h)

VALUES TO SEND:

Value in PointValue (0) = 1/100 second.

Value in PointValue (1) = Hour.

Value in PointValue (2) = Minute.

Value in PointValue (3) = Second.

Value in PointValue (4) = Month.

Value in PointValue (5) = Day.

Value in PointValue (6) = Year.

Write Slave Action

Description of this command:

This command results in the device performing an action as detailed below. The value sent will be the current value contained in the HMITalk1.PointValue(0) property.

Methods used to run this command:

Analog Output

Number of points accepted by this command:

1

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

9

Meaning of the DriverP2 parameter:

976 (3D0h)

VALUE TO SEND:

0 = Reset AEMII trip mode, acknowledge alarm.

1 = Reset device software (hardware reset).

2 = Reset trip buffer, purges all trips buffered.

[Universal RTD Commands] All the reading operations must be performed using Analog Input type records, even when digital values can be part of the returned information. When digital values are read as part of the response, they will be presented as 0 or 1 values in the corresponding HMITalk1.PointValue() channels.

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Universal RTD Commands

Read Fast Status

Description of this command:

This command retrieves information about the current status.

Methods used to run this command:

Analog Input

Number of points accepted by this command:

1-6

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

10

Meaning of the DriverP2 parameter:

768 (300h)

Values that are returned:

Value in PointValue (0) = Division Code.

Value in PointValue (1) = Communications Software Version.

Value in PointValue (2) = Product ID (= 19).

Value in PointValue (3) = Status.

0 = Failure.

1 = OK.

2 = Not used.

3 = Not used.

Value in PointValue (4) = If 1, opened by remote communications.

Value in PointValue (5) = If 1, powered on since last status read request.

Read Temperature Buffer

Description of this command:

This command retrieves the temperature in degrees for six motor windings temperatures, two motor bearing temperatures, two load bearing temperatures and one ambient temperature.

Temperatures range from 0 to 255 degrees centigrade.

Methods used to run this command:

Analog Input

Number of points accepted by this command:

1-13

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

5

Meaning of the DriverP2 parameter:

783 (30Fh)

Meaning of the DriverP3 parameter:

1

Values that are returned:

Value in PointValue (0) = Windind Temperature 1.

Value in PointValue (1) = Windind Temperature 2.

Value in PointValue (2) = Windind Temperature 3.

Value in PointValue (3) = Windind Temperature 4.

Value in PointValue (4) = Windind Temperature 5.

Value in PointValue (5) = Windind Temperature 6.

Value in PointValue (6) = Motor Bearing Temperature 1.

Value in PointValue (7) = Motor Bearing Temperature 2.

Value in PointValue (8) = Load Bearing Temperature 1.

Value in PointValue (9) = Load Bearing Temperature 2.

Value in PointValue (10) = Auxiliary Temperature.

Value in PointValue (11) = Temperature Validity 1.

Value in PointValue (12) = Temperature Validity 2.

Important note:

The Temperature Validity values are used to represent the presence of a selector sensor.

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Read Flags Buffer

Description of this command:

This command retrieves extended information about the current operating conditions.

Methods used to run this command:

Analog Input

Number of points accepted by this command:

1

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

10

Meaning of the DriverP2 parameter:

968 (3C8h)

Values that are returned:

Value in PointValue (0) = If 1, RAM failure.

Read Setpoints Buffer

Description of this command:

This request gives a Setpoints Buffer description.

Methods used to run this command:

Analog Input

Number of points accepted by this command:

1-8

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

10

Meaning of the DriverP2 parameter:

969 (3C9h)

Values that are returned:

Value in PointValue (0) = SW1, switch 1.

Value in PointValue (1) = SW1, switch 2.

Value in PointValue (2) = SW1, switch 3.

Value in PointValue (3) = SW1, switch 4.

Value in PointValue (4) = SW1, switch 5.

Value in PointValue (5) = SW1, switch 6.

Value in PointValue (6) = SW1, switch 7.

Value in PointValue (7) = SW1, switch 8.

Important note:

0 = On

1 = Off

[CMU (Central Monitoring Unit) Commands] All the reading operations must be performed using Analog Input type records, even when digital values can be part of the returned information. When digital values are read as part of the response, they will be presented as 0 or 1 values in the corresponding HMITalk1.PointValue() channels.

CMU (Central Monitoring Unit) Commands

Read Fast Status

Description of this command:

This command retrieves information about the current status.

Methods used to run this command:

Analog Input

Number of points accepted by this command:

1-9

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

11

Meaning of the DriverP2 parameter:

768 (300h)

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Values that are returned:

Value in PointValue (0) = Division Code.
Value in PointValue (1) = Communications Software Version.
Value in PointValue (2) = Product ID (= 29).
Value in PointValue (3) = Status.
0 = Normal - Inactive (no devices detected on sub-network).
1 = Normal - Active.
2 = Tripped (a trip has occurred and has not been acknowledged).
3 = Alarm (Advantage in overload).
Value in PointValue (4) = If 1, opened by remote communications.
Value in PointValue (5) = If 1, powered on since last status read request.
Value in PointValue (6) = If 1, was in learn mode.
Value in PointValue (7) = If 1, in learn mode.
Value in PointValue (8) = CMU malfunction.

Read Setpoints Buffer

Description of this command:

This request gives a Setpoints Buffer description.

Methods used to run this command:

Analog Input

Number of points accepted by this command:

1-3

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

11

Meaning of the DriverP2 parameter:

969 (3C9h)

Values that are returned:

Value in PointValue (0) = If 1, Learn mode. If 0, operational.
Value in PointValue (1) = If 1, 9600 baud. If 0, 1200 baud.
Value in PointValue (2) = If 1, Test mode. If 0, operational.

Write Current Date and Time

Description of this command:

This request is used to send the real-time clock data (current date and time) to a slave. 7 channels are needed to fully specify date & time information. Missing channels will be provided internally by the driver according to current PC date & time information.

Methods used to run this command:

Analog Output

Number of points accepted by this command:

1-7

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

11

Meaning of the DriverP2 parameter:

984 (3D8h)

VALUES TO SEND:

Value in PointValue (0) = 1/100 second.
Value in PointValue (1) = Hour.
Value in PointValue (2) = Minute.
Value in PointValue (3) = Second.
Value in PointValue (4) = Month.
Value in PointValue (5) = Day.
Value in PointValue (6) = Year.

Write Slave Action

Description of this command:

This command results in the device performing an action as detailed below. The value sent will be the current value contained in the HMITalk1.PointValue(0) property.

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Methods used to run this command:

Analog Output

Number of points accepted by this command:

1

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

11

Meaning of the DriverP2 parameter:

976 (3D0h)

VALUE TO SEND:

0 = Reset CMU trip mode, acknowledge alarm.

1 = Reset device software (hardware reset).

2 = Reset trip buffer, purges all trips buffered.

[ACM (Advantage Control Module) Commands] All the reading operations must be performed using Analog Input type records, even when digital values can be part of the returned information.

When digital values are read as part of the response, they will be presented as 0 or 1 values in the corresponding HMITalk1.PointValue() channels.

ACM (Advantage Control Module) Commands

Read Fast Status

Description of this command:

This command retrieves information about the current status.

Methods used to run this command:

Analog Input

Number of points accepted by this command:

1-8

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

12

Meaning of the DriverP2 parameter:

768 (300h)

Values that are returned:

Value in PointValue (0) = Division Code.

Value in PointValue (1) = Communications Software Version.

Value in PointValue (2) = Product ID.

35 = Full voltage, non-reversing.

36 = Forward/Reverse.

37 = Fast/Slow - 2 winding.

38 = Fast/Slow - constant horsepower.

39 = Fast/Slow - constant torque.

40 = Reduced voltage - primary resintance.

41 = Reduced voltage - part winding.

42 = Reduced voltage - auto transformer.

43 = Reduced voltage - Wye-Delta open transition.

44 = Reduced voltage - Wye-Delta close transition.

45 = Metering.

Value in PointValue (3) = Status.

0 = Open

1 = Closed

2 = Tripped

3 = Alarmed

Value in PointValue (4) = If 1, tripped or opened by remote communications.

Value in PointValue (5) = If 1, powered on since last status read request.

Value in PointValue (6) = Set when trip detected, cleared when the trip buffer is read.

Value in PointValue (7) = Set indicates W-PONI - ACM communications is functional.

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Read Current Buffer

Description of this command:

This command retrieves information about the current phases and current IX. Currents are expressed in amperes.

Methods used to run this command:

Analog Input

Number of points accepted by this command:

1-4

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

12

Meaning of the DriverP2 parameter:

773 (305h)

Values that are returned:

Value in PointValue (0) = Phase current IA (Amperes).

Value in PointValue (1) = Phase current IB (Amperes).

Value in PointValue (2) = Phase current IC (Amperes).

Value in PointValue (3) = Current IX (Amperes).

Important note:

Current IX will usually be ground current. For some products, this current may be either fourth pole current or neutral current. These latter cases will not have ground current.

Read Flags Buffer

Description of this command:

This command retrieves extended information about the current operating conditions.

Methods used to run this command:

Analog Input

Number of points accepted by this command:

1-13

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

12

Meaning of the DriverP2 parameter:

968 (3C8h)

Values that are returned:

Value in PointValue (0) = Run/Closed Indication.

Value in PointValue (1) = Ready/Open Indication.

Value in PointValue (2) = Trip Indication.

Value in PointValue (3) = If 1, Overload.

Value in PointValue (4) = If 1, Run Permit Signal Present.

Value in PointValue (5) = If 1, Start Signal Present.

Value in PointValue (6) = If 0, Remote Reset Present.

Value in PointValue (7) = If 0, Local Reset Present.

Value in PointValue (8) = Trip Type:

1 = Overload Trip

2 = Ground Current Trip

3 = Phase Loss Trip

4 = Phase Unbalance Trip

16 = Ground. Current exceeds interrupt capacity.

32 = Control Voltage too low. Unit will open.

48 = Control Voltage too low to pick up.

64 = Control Voltage too high to pick up.

80 = Current too low to close.

112 = External Trip (via remote communications).

Value in PointValue (9) = Coil Voltage (units of volts).

Value in PointValue (10) = Maximum Coil Current on closing.

Value in PointValue (11) = Time equivalent of the delay from the middle of each half-cycle, to the beginning of holding pulse.

Value in PointValue (12) = The recorded holding current.

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Read Setpoints Buffer

Description of this command:

This request gives a Setpoints Buffer description.

Methods used to run this command:

Analog Input

Number of points accepted by this command:

1-22

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

12

Meaning of the DriverP2 parameter:

969 (3C9h)

Values that are returned:

Dipheater:

Value in PointValue (0) = Heater number (0-31).

Value in PointValue (1) = Overload type:

0 = Class 10 Overload.

1 = Class 20 Overload.

2 = Class 30 Overload.

3 = No protection.

Value in PointValue (2) = If 1, Automatic Reset. Econfig:

Value in PointValue (3) = If 1, Ground Fault enabled.

Value in PointValue (4) = If 1, Phase Protection enabled.

Value in PointValue (5) = If 1, Thermal Overload enabled.

Value in PointValue (6) = If 1, unit is 50 Hz. If 0, unit is 60 Hz.

Value in PointValue (7) = If 1, Unit is an Overload. If 0, Unit is a Contactor/Starter.

Value in PointValue (8) = If 1, Ultrasonic holding enabled.

Value in PointValue (9) = If 1, Local Reset is disabled.

Value in PointValue (10) = If 1, Unit will not reset thermal trip on power up, even if reset conditions met. Surever:

Value in PointValue (11) = Rom Version of the sure chip.

Value in PointValue (12) = Product ID of starter #1 (at address 1).

Value in PointValue (13) = Product ID of starter #1 (at address 4). If the version is full voltage, forward/reverse or fast/slow. ACM Status:

Value in PointValue (14) = If 1, IMPACC Auto mode.

Value in PointValue (15) = Reserved

Value in PointValue (16) = Reserved

Value in PointValue (17) = If 1, Starter #4. If 0, Starter #0.

Value in PointValue (18) = If 1, Remote Auto mode.

Value in PointValue (19) = If 1, ACM sub-network comm OK. If 0, comm failure.

Value in PointValue (20) = Reserved If the version is reduced voltage. ACM Status:

Value in PointValue (14) = If 1, IMPACC Auto mode.

Value in PointValue (15) = If 1, Incomplete Sequence Trip.

Value in PointValue (16) = If 1, Start transition in progress.

Value in PointValue (17) = If 1, Anti-recycle lockout.

Value in PointValue (18) = If 1, Remote Auto mode.

Value in PointValue (19) = If 1, ACM sub-network comm OK. If 0, comm failure.

Value in PointValue (20) = If 1, Transition time out trip.

Read Time-Stamped Trip Data Buffer

Description of this command:

This request is for use with products that provide "time stamping" or trip data. When the product receives a Fast-Status request, it resets an on-board Trip Time Offset clock. Should the product perform a protective trip, the product records the value of the Trip Time Offset clock at the instant of the trip. The value of the Trip Time Offset clock then represents the elapsed time between the last time mark (Fast-Status) received from the master and the time at which the product tripped. The resolution of the product Trip Time Offset clock is assumed to be 1/256 of a second. When a protective trip occurs, the product records the following data into a *TIME STAMPED TRIP DATA* buffer:

- Trip Time Offset clock

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- Metered values
- Flags
- Setpoints The Trip Time Offset clock continues to run. If a product has more than one TIME STAMPED TRIP DATA buffer, it will over-write the oldest buffer. If a product has only one TIME STAMPED TRIP DATA buffer, it will be over-written.

Methods used to run this command:

Analog Input

Number of points accepted by this command:

1-44

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

12

Meaning of the DriverP2 parameter:

971 (3CBh)

Values that are returned:

Value in PointValue (0) = TRIP DATA Buffer number.

Value in PointValue (1) = Number of unread TRIP DATA Buffers.

Value in PointValue (2) = TRIP TIME OFFSET.

Value in PointValue (3) = Phase A Current.

Value in PointValue (4) = Phase B Current.

Value in PointValue (5) = Phase C Current. Flags Buffer (same as Read Flags Buffer command):

Value in PointValue (6) = Run/Closed Indication.

Value in PointValue (7) = Ready/Open Indication.

Value in PointValue (8) = Trip Indication.

Value in PointValue (9) = If 1, Overload.

Value in PointValue (10) = If 1, Run Permit Signal Present.

Value in PointValue (11) = If 1, Start Signal Present.

Value in PointValue (12) = If 0, Remote Reset Present.

Value in PointValue (13) = If 0, Local Reset Present.

Value in PointValue (14) = Trip Type:

1 = Overload Trip

2 = Ground Current Trip

3 = Phase Loss Trip

4 = Phase Unbalance Trip

16 = Ground. Current exceeds interrupt capacity.

32 = Control Voltage too low. Unit will open.

48 = Control Voltage too low to pick up.

64 = Control Voltage too high to pick up.

80 = Current too low to close.

112 = External Trip (via remote communications).

Value in PointValue (15) = Coil Voltage (units of volts).

Value in PointValue (16) = Maximum Coil Current on closing.

Value in PointValue (17) = Time equivalent of the delay from the middle of each half-cycle, to the beginning of holding pulse.

Value in PointValue (18) = The recorded holding current. Setpoints Buffer (same as Read Setpoints Buffer command): Dipheater:

Value in PointValue (19) = Heater number (0-31).

Value in PointValue (20) = Overload type:

0 = Class 10 Overload.

1 = Class 20 Overload.

2 = Class 30 Overload.

3 = No protection.

Value in PointValue (21) = If 1, Automatic Reset. Econfig:

Value in PointValue (22) = If 1, Ground Fault enabled.

Value in PointValue (23) = If 1, Phase Protection enabled.

Value in PointValue (24) = If 1, Thermal Overload enabled.

Value in PointValue (25) = If 1, unit is 50 Hz. If 0, unit is 60 Hz.

Value in PointValue (26) = If 1, Unit is an Overload. If 0, Unit is a Contactor/Starter.

Value in PointValue (27) = If 1, Ultrasonic holding enabled.

Value in PointValue (28) = If 1, Local Reset is disabled.

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Value in PointValue (29) = If 1, Unit will not reset thermal trip on power up, even if reset conditions met. Surever:

Value in PointValue (30) = Rom Version of the sure chip.

Value in PointValue (31) = Product ID of starter #1 (at address 1).

Value in PointValue (32) = Product ID of starter #1 (at address 4). If the version is full voltage, forward/reverse or fast/slow. ACM Status:

Value in PointValue (33) = If 1, IMPACC Auto mode.

Value in PointValue (34) = Reserved

Value in PointValue (35) = Reserved

Value in PointValue (36) = If 1, Starter #4. If 0, Starter #0.

Value in PointValue (37) = If 1, Remote Auto mode.

Value in PointValue (38) = If 1, ACM sub-network comm OK. If 0, comm failure.

Value in PointValue (39) = Reserved If the version is reduced voltage. ACM Status:

Value in PointValue (33) = If 1, IMPACC Auto mode.

Value in PointValue (34) = If 1, Incomplete Sequence Trip.

Value in PointValue (35) = If 1, Start transition in progress.

Value in PointValue (36) = If 1, Anti-recycle lockout.

Value in PointValue (37) = If 1, Remote Auto mode.

Value in PointValue (38) = If 1, ACM sub-network comm OK. If 0, comm failure.

Value in PointValue (39) = If 1, Transition time out trip.

Read ACM Status

Description of this command:

This request gives current ACM status information.

Methods used to run this command:

Analog Input

Number of points accepted by this command:

1-26

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

12

Meaning of the DriverP2 parameter:

972 (3CCh)

Meaning of the DriverP3 parameter:

Indicates the version of ACM.

- 0 = Forward/Reverse or Fast/Slow Version.

- 1 = Reduced Voltage Version.

Values that are returned:

If the version is full voltage, forward/reverse or fast/slow.

ACM Status:

Value in PointValue (0) = If 1, Trip.

Value in PointValue (1) = If 1, Alarm.

Value in PointValue (2) = If 1, Stop.

Value in PointValue (3) = If 1, Forward/Fast Run.

Value in PointValue (4) = If 1, Reverse/Slow Run.

Value in PointValue (5) = If 1, Off Mode.

Value in PointValue (6) = If 1, Auto mode.

Value in PointValue (7) = If 1, Hand Mode.

Value in PointValue (8) = If 1, IMPACC Auto mode.

Value in PointValue (9) = Reserved

Value in PointValue (10) = Reserved

Value in PointValue (11) = If 1, Starter #4. If 0, Starter #1.

- HMITalk1. HMITalk1.PointValue(12) = If 1, Remote Auto mode.

Value in PointValue (13) = If 1, ACM sub-network comm OK. If 0, comm failure.

Value in PointValue (14) = Reserved If the version is reduced voltage. ACM Status:

Value in PointValue (0) = If 1, Trip.

Value in PointValue (1) = If 1, Alarm.

Value in PointValue (2) = If 1, Hand Mode.

Value in PointValue (3) = Reserved

Value in PointValue (4) = If 1, Run. If 0, Stop.

Value in PointValue (5) = If 1, Off Mode.

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Value in PointValue (6) = If 1, Auto mode.
Value in PointValue (7) = Reserved
Value in PointValue (8) = If 1, IMPACC Auto mode.
Value in PointValue (9) = If 1, Incomplete Sequence Trip.
Value in PointValue (10) = If 1, Start transition in progress.
Value in PointValue (11) = If 1, Anti-recycle lockout.
Value in PointValue (12) = If 1, Remote Auto mode.
Value in PointValue (13) = If 1, ACM sub-network comm OK. If 0, comm failure.
Value in PointValue (14) = If 1, Transition time out trip. Definition for reduced voltage:
Value in PointValue (15) = If 1, Metering module connected. If the version is full voltage, forward/reverse or fast/slow. ACM Status:
Value in PointValue (16) = If 1, Three contactor fast/slow.
Value in PointValue (17) = If 1, Mandatory Time Stop.
Value in PointValue (18) = If 1, Compel Accel Enabled.
Value in PointValue (19) = If 1, Compel Decel Enabled.
Value in PointValue (20) = Timer Setting in Seconds. If the version is reduced voltage. ACM Status:
Value in PointValue (16) = Configuration Type.
0 = Primary Resistance - Setup #1.
1 = Part Winding.
2 = Auto Transformer - Setup #1.
3 = Whe-delta Open transition.
4 = Whe-delta Closed transition.
5 = Primary Resistance - Setup #2.
6 = Auto Transformer - Setup #2.
Value in PointValue (17) = If 1, Transition on Current.
Value in PointValue (18) = If 1, Transition on Time Out.
Value in PointValue (19) = Reserved
Value in PointValue (20) = Timer Setting in Seconds.

Write Slave Action

Description of this command:

This command results in the device performing an action as detailed below. The value sent will be the current value contained in the HMITalk1.PointValue(0) property.

Methods used to run this command:

Analog Output

Number of points accepted by this command:

1

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

12

Meaning of the DriverP2 parameter:

976 (3D0h)

VALUE TO SEND:

0 = Reset trip/unit.

1 = Reset trip buffer.

2 = Start fast forward.

3 = Start reverse.

4 = Stop.

5 = Start slow forward.

[IQ DP-4000 Commands] All the reading operations must be performed using Analog Input type records, even when digital values can be part of the returned information. When digital values are read as part of the response, they will be presented as 0 or 1 values in the corresponding HMITalk1.PointValue() channels.

IQ DP-4000 Commands

Read Current Buffer

Description of this command:

This request retrieves Current Buffer information.

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Methods used to run this command:

Analog Input

Number of points accepted by this command:

1-4

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

14

Meaning of the DriverP2 parameter:

773 (305h)

Values that are returned:

Value in PointValue (0) = Phase A Current.

Value in PointValue (1) = Phase B Current.

Value in PointValue (2) = Phase C Current.

Value in PointValue (3) = Ground Current.

Read Line-to-Line Voltage Buffer

Description of this command:

This request retrieves Line-to-Line Voltage Buffer information.

Methods used to run this command:

Analog Input

Number of points accepted by this command:

1-3

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

14

Meaning of the DriverP2 parameter:

774 (306h)

Values that are returned:

Value in PointValue (0) = Voltage A-B.

Value in PointValue (1) = Voltage B-C.

Value in PointValue (2) = Voltage C-A.

Read Line-to-Neutral Voltage Buffer

Description of this command:

This request retrieves Line-to-Neutral Voltage Buffer information.

Methods used to run this command:

Analog Input

Number of points accepted by this command:

1-3

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

14

Meaning of the DriverP2 parameter:

775 (307h)

Values that are returned:

Value in PointValue (0) = Voltage A-N.

Value in PointValue (1) = Voltage B-N.

Value in PointValue (2) = Voltage C-N.

Read Power Buffer

Description of this command:

This request retrieves Power Buffer information.

Methods used to run this command:

Analog Input

Number of points accepted by this command:

1-3

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

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Meaning of the DriverP1 parameter:

14

Meaning of the DriverP2 parameter:

776 (308h)

Values that are returned:

Value in PointValue (0) = Frequency (Hz).

Value in PointValue (1) = Reactive Power (VARs).

Value in PointValue (2) = Power Factor Apparent.

Read Expanded Power Buffer

Description of this command:

This request retrieves Expanded Power Buffer information.

Methods used to run this command:

Analog Input

Number of points accepted by this command:

1-6

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

14

Meaning of the DriverP2 parameter:

783 (30F)

Meaning of the DriverP3 parameter:

6

Values that are returned:

Value in PointValue (0) = Real Power (watts).

Value in PointValue (1) = Reactive Power (VARs).

Value in PointValue (2) = Volt-Amps 3 phase (VA).

Value in PointValue (3) = Power Factor Displacement.

Value in PointValue (4) = Power Factor Apparent.

Value in PointValue (5) = Frequency (Hz).

Read THD Buffer

Description of this command:

This request retrieves THD Buffer information.

Methods used to run this command:

Analog Input

Number of points accepted by this command:

1-9

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

14

Meaning of the DriverP2 parameter:

783 (30F)

Meaning of the DriverP3 parameter:

9

Values that are returned:

Value in PointValue (0) = % THD - Phase A Current (%).

Value in PointValue (1) = % THD - Phase B Current (%).

Value in PointValue (2) = % THD - Phase C Current (%).

Value in PointValue (3) = % THD - Voltage A-B (%).

Value in PointValue (4) = % THD - Voltage B-C (%).

Value in PointValue (5) = % THD - Voltage C-A (%).

Value in PointValue (6) = % THD - Voltage A-N (%).

Value in PointValue (7) = % THD - Voltage B-N (%).

Value in PointValue (8) = % THD - Voltage C-N (%).

Read Trip Data Buffer

Description of this command:

This request retrieves Trip Data Buffer information.

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Methods used to run this command:

Analog Input

Number of points accepted by this command:

1-27

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

14

Meaning of the DriverP2 parameter:

971 (3CBh)

Values that are returned:

Value in PointValue (0) = Phase A Current.
Value in PointValue (1) = Phase B Current.
Value in PointValue (2) = Phase C Current.
Value in PointValue (3) = Ground Current.
Value in PointValue (4) = Voltage A-B.
Value in PointValue (5) = Voltage B-C.
Value in PointValue (6) = Voltage C-A.
Value in PointValue (7) = Voltage A-N.
Value in PointValue (8) = Voltage B-N.
Value in PointValue (9) = Voltage C-N.
Value in PointValue (10) = Real Power (watts).
Value in PointValue (11) = Power Demand (watts).
Value in PointValue (12) = Energy (wh).
Value in PointValue (13) = Frequency (Hz).
Value in PointValue (14) = Reactive Power (VARs).
Value in PointValue (15) = Power Factor Apparent.
Value in PointValue (16) = % THD - Phase A Current (%).
Value in PointValue (17) = % THD - Phase B Current (%).
Value in PointValue (18) = % THD - Phase C Current (%).
Value in PointValue (19) = % THD - Voltage A-B (%).
Value in PointValue (20) = % THD - Voltage B-C (%).
Value in PointValue (21) = % THD - Voltage C-A (%).
Value in PointValue (22) = % THD - Voltage A-N (%).
Value in PointValue (23) = % THD - Voltage B-N (%).
Value in PointValue (24) = % THD - Voltage C-N (%).
Value in PointValue (25) = Volt-Amps 3 phase (VA).
Value in PointValue (26) = Power Factor Displacement.

Read Flags Buffer

Description of this command:

This command retrieves extended information about the current operating conditions.

Methods used to run this command:

Analog Input

Number of points accepted by this command:

1-25

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

14

Meaning of the DriverP2 parameter:

968 (3C8h)

Values that are returned:

Value in PointValue (0) = Relay 1 Activated
Value in PointValue (1) = Relay 1 IMPACC External Trip
Value in PointValue (2) = Relay 1 Overvoltage Trip
Value in PointValue (3) = Relay 1 Undervoltage Trip
Value in PointValue (4) = Relay 1 Voltage Phase Loss Trip
Value in PointValue (5) = Relay 1 Voltage Phase Unbalance Trip
Value in PointValue (6) = Relay 1 Voltage Phase Reversal Trip
Value in PointValue (7) = Relay 1 Current Phase Loss Trip
Value in PointValue (8) = Relay 2 Activated

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Value in PointValue (9) = Relay 2 IMPACC External Trip
Value in PointValue (10) = Relay 2 Overvoltage Trip
Value in PointValue (11) = Relay 2 Undervoltage Trip
Value in PointValue (12) = Relay 2 Voltage Phase Loss Trip
Value in PointValue (13) = Relay 2 Voltage Phase Unbalance Trip
Value in PointValue (14) = Relay 2 Voltage Phase Reversal Trip
Value in PointValue (15) = Relay 2 Current Phase Loss Trip
Value in PointValue (16) = TRIP RELAY STATE
Value in PointValue (17) = ALARM RELAY STATE
Value in PointValue (18) = PULSE INITIATOR RELAY STATE
Value in PointValue (19) = RAM Failure
Value in PointValue (20) = ROM Failure
Value in PointValue (21) = A/D Offset Error
Value in PointValue (22) = EEPROM Failure
Value in PointValue (23) = Deadman Timer Error
Value in PointValue (24) = Factory Calibration Mode

Read System Energy Buffer

Description of this command:

This request retrieves System Energy Buffer information.

Methods used to run this command:

Analog Input

Number of points accepted by this command:

1-7

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

14

Meaning of the DriverP2 parameter:

783 (30F)

Meaning of the DriverP3 parameter:

8

Values that are returned:

Value in PointValue (0) = Energy Forward
Value in PointValue (1) = Energy Reverse
Value in PointValue (2) = Energy Net
Value in PointValue (3) = VAR-h Forward
Value in PointValue (4) = VAR-h Reverse
Value in PointValue (5) = VAR-h Net
Value in PointValue (6) = VAR-h

Read Fast Status

Description of this command:

This command retrieves information about the current device status.

Methods used to run this command:

Analog Input

Number of points accepted by this command:

1

Meaning of the DriverP0 parameter:

Unit Address (0-4095)

Meaning of the DriverP1 parameter:

14

Meaning of the DriverP2 parameter:

768 (300h)

Values that are returned:

Value in PointValue (0) = Status.
0 = Inactive
1 = Normal
2 = Tripped (Alarm 1)
3 = Alarmed (Alarm 2)

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Error messages

The following list shows the possible error messages that can be returned by the driver during a failed communication in the 'Status' property.

[1005] DRIVER (Internal): Invalid driver stage
[1300] PROTOCOL (Timeout): No answer
[1400] PROTOCOL (Format): Acknowledge not received
[1433] PROTOCOL (Format): Validation error in device response
[2174] CONFIG (NumValues): Too many values (max=%u)
[3007] CONFIG (P0): Invalid device address
[3500] CONFIG (P1): Analog inputs are not supported for this device
[3501] CONFIG (P1): Analog outputs are not supported for this device
[3503] CONFIG (P1): Digital inputs are not supported for this device
[3504] CONFIG (P1): Digital outputs are not supported for this device
[3551] CONFIG (P1): Invalid device code
[4030] CONFIG (P2): Invalid command
[4570] CONFIG (P3): Invalid sub-command

Supported devices

This driver can communicate with these devices, but is not necessarily limited to this list:

CUTLER HAMMER WESTINGHOUSE Addressable Relay
CUTLER HAMMER WESTINGHOUSE Advantage
CUTLER HAMMER WESTINGHOUSE Digitrip-II
CUTLER HAMMER WESTINGHOUSE Advantage-Control PONI
CUTLER HAMMER WESTINGHOUSE IQ-Energy Sentinel
CUTLER HAMMER WESTINGHOUSE IQ-1000 II
CUTLER HAMMER WESTINGHOUSE IQ-500
CUTLER HAMMER WESTINGHOUSE IQ-Data & IQ-Generator
CUTLER HAMMER WESTINGHOUSE IQ-Data-Plus-II
CUTLER HAMMER WESTINGHOUSE AEM-II
CUTLER HAMMER WESTINGHOUSE Universal-RTD
CUTLER HAMMER WESTINGHOUSE CMU (Central Monitoring Unit)
CUTLER HAMMER WESTINGHOUSE ACM (Advantage Control Module)
CUTLER HAMMER WESTINGHOUSE DP-4000

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