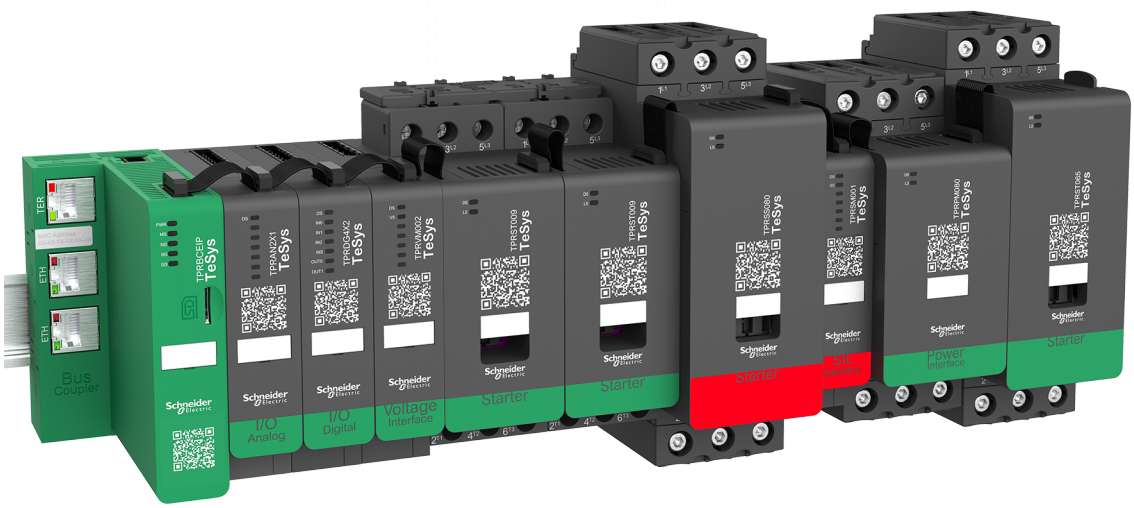
# TeSys Active

## TeSys™ island – Digital Motor Management Solution

## Third Party Function Block Guide

**TeSys** offers innovative and connected solutions for motor starters.

**8536IB1905EN-05**
**08/2023**



# Legal Information

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# Safety Information

## Important Information

Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, service, or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of this symbol to a “Danger” or “Warning” safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

**⚠ DANGER**

**DANGER** indicates a hazardous situation which, if not avoided, **will result in** death or serious injury.

**⚠ WARNING**

**WARNING** indicates a hazardous situation which, if not avoided, **could result in** death or serious injury.

**⚠ CAUTION**

**CAUTION** indicates a hazardous situation which, if not avoided, **could result** in minor or moderate injury.

***NOTICE***

***NOTICE*** is used to address practices not related to physical injury.

## Please Note

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

A qualified personnel is one who has skills and knowledge related to the construction and operation of electrical equipment and its installation, and has received safety training to recognize and avoid the hazards involved.

# About the Book

## Document Scope

Use this document to do the following:

- Create Function Blocks, save them, and use them to program your PLC
- Directly program the PLC from the register map

**⚠⚠DANGER**

**HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

Read and understand this guide and all related documents before installing, operating, or maintaining your TeSys island. Installation, adjustment, repair, and maintenance must be performed by qualified personnel.

**Failure to follow these instructions will result in death or serious injury.**

## Validity Note

This guide is valid for all TeSys island configurations. The availability of some functions described in this guide depends on the communication protocol used and the physical modules installed on the TeSys island.

For product compliance with environmental directives such as RoHS, REACH, PEP, and EOLI, go to www.se.com/green-premium.

For technical characteristics of the physical modules described in this guide, go to www.se.com.

The technical characteristics presented in this guide should be the same as those that appear online. We may revise content over time to improve clarity and accuracy. If you see a difference between the information contained in this guide and online information, use the online information.

# Related Documentation

| Document title | Description | Document number |
|---|---|---|
| TeSys island – System, Installation, and Operation Guide | Describes main functions, mechanical installation, wiring, commissioning of the TeSys island, and how to operate and maintain TeSys island. | DOCA0270EN |
| TeSys island – EtherNet/IP™ – Quick Start and Function Block Library Guide | Describes how to integrate the TeSys island and the information of TeSys island library used in the Rockwell Software® Studio 5000® EtherNet/IP environment. | DOCA0271EN |
| TeSys island – Functional Safety Guide | Describes the Functional Safety features of TeSys island. | 8536IB1904 |
| TeSys island – Third Party Function Block Guide | Contains the information needed to create function blocks for third party hardware. | 8536IB1905 |
| TeSys island – DTM Online Help Guide | Describes how to install and use various functions of TeSys island configuration software and how to configure the parameters of TeSys island. | 8536IB1907 |
| TeSys island – Product Environmental Profile | Describes constituent materials, recyclability potential, and environmental impact information for the TeSys island. | ENVPEP1904009 |
| TeSys island – Product End of Life Instructions | Contains end of life instructions for the TeSys island. | ENVEOLI1904009 |
| TeSys island – Instruction Sheet, Bus Coupler, TPRBCEIP | Describes how to install the TeSys island Ethernet/IP bus coupler. | MFR44097 |
| TeSys island – Instruction Sheet, Bus Coupler, TPRBCPFN | Describes how to install the TeSys island PROFINET bus coupler. | MFR44098 |
| TeSys island – Instruction Sheet, Bus Coupler, TPRBCPFB | Describes how to install the TeSys island PROFIBUS DP bus coupler. | GDE55148 |
| TeSys island – Instruction Sheet, Starters and Power Interface Modules, Size 1 and 2 | Describes how to install size 1 and 2 TeSys island starters and power interface modules. | MFR77070 |
| TeSys island – Instruction Sheet, Starters and Power Interface Modules, Size 3 | Describes how to install size 3 TeSys island starters and power interface modules. | MFR77085 |
| TeSys island – Instruction Sheet: Input/Output Modules | Describes how to install the TeSys island analog and digital I/O modules. | MFR44099 |
| TeSys island – Instruction Sheet: SIL Interface and Voltage Interface Modules | Describes how to install the TeSys island voltage interface modules and SIL[1] interface modules. | MFR44100 |

1. Safety Integrity Level according to standard IEC 61508.

# Precautions

Read and understand the following precautions before performing any procedures in this guide.

**⚠⚠DANGER**

**HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**

- This equipment must only be installed and serviced by qualified electrical personnel.
- Turn off all power supplying this equipment before working on or inside this equipment.
- Use only the specified voltage when operating this equipment and any associated products.
- Always use a properly rated voltage sensing device to confirm power is off.
- Use appropriate interlocks where personnel and/or equipment hazards exist.
- Power line circuits must be wired and protected in compliance with local and national regulatory requirements.
- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices per NFPA 70E, NOM-029-STPS, or CSA Z462 or local equivalent.

**Failure to follow these instructions will result in death or serious injury.**

**⚠WARNING**

**UNINTENDED EQUIPMENT OPERATION**

- For complete instructions about functional safety, refer to the TeSys™ island Functional Safety Guide, 8536IB1904.
- Do not disassemble, repair, or modify this equipment. There are no user serviceable parts.
- Install and operate this equipment in an enclosure appropriately rated for its intended application environment.
- Each implementation of this equipment must be individually and thoroughly tested for proper operation before being placed into service.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

⚠ **WARNING:** This product can expose you to chemicals including Antimony oxide (Antimony trioxide), which is known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.

# Qualified Personnel

Only appropriately trained personnel who are familiar with and understand the content of this guide and all other related product documentation are authorized to work on and with this product.

The qualified personnel must be able to detect possible hazards that may arise from modifying parameter values and generally from mechanical, electrical, or electronic equipment. The qualified personnel must be familiar with the standards, provisions, and regulations for the prevention of industrial accidents, which they must observe when designing and implementing the system.

The use and application of the information contained in this guide requires expertise in the design and programming of automated control systems. Only you, the user, the machine builder, or the integrator, can be aware of all the conditions and factors present during installation, setup, operation, and maintenance of the machine or process, and can therefore determine the automation and associated equipment and the related safeties and interlocks which can be effectively and properly used.

When selecting automation and control equipment (and any other related equipment or software) for a particular application, you must also consider applicable local, regional, or national standards and/or regulations.

Pay particular attention to adhere to any safety information, electrical requirements, and normative standards that apply to your machine or process in the use of this equipment.

# Intended Use

The products described in this guide, together with software, accessories, and options, are starters for low-voltage electrical loads, intended for industrial use according to the instructions, directions, examples, and safety information contained in this document and other supporting documentation.

The product may only be used in compliance with all applicable safety regulations and directives, the specified requirements, and the technical data.

Before using the product, you must perform a hazard analysis and risk assessment of the planned application. Based on the results, appropriate safety-related measures must be implemented.

Since the product is used as a component of a machine or process, you must ensure the safety of persons by means of the overall system design.

Operate the product only with the specified cables and accessories. Use only genuine accessories and spare parts.

Any use other than the use explicitly permitted is prohibited and can result in unanticipated hazards.

# TeSys island Concept

TeSys island is a modular, multifunctional system providing integrated functions inside an automation architecture, primarily for the direct control and management of low-voltage loads. TeSys island can switch, help protect, and manage motors and other electrical loads up to 80 A (AC1) installed in an electrical control panel.

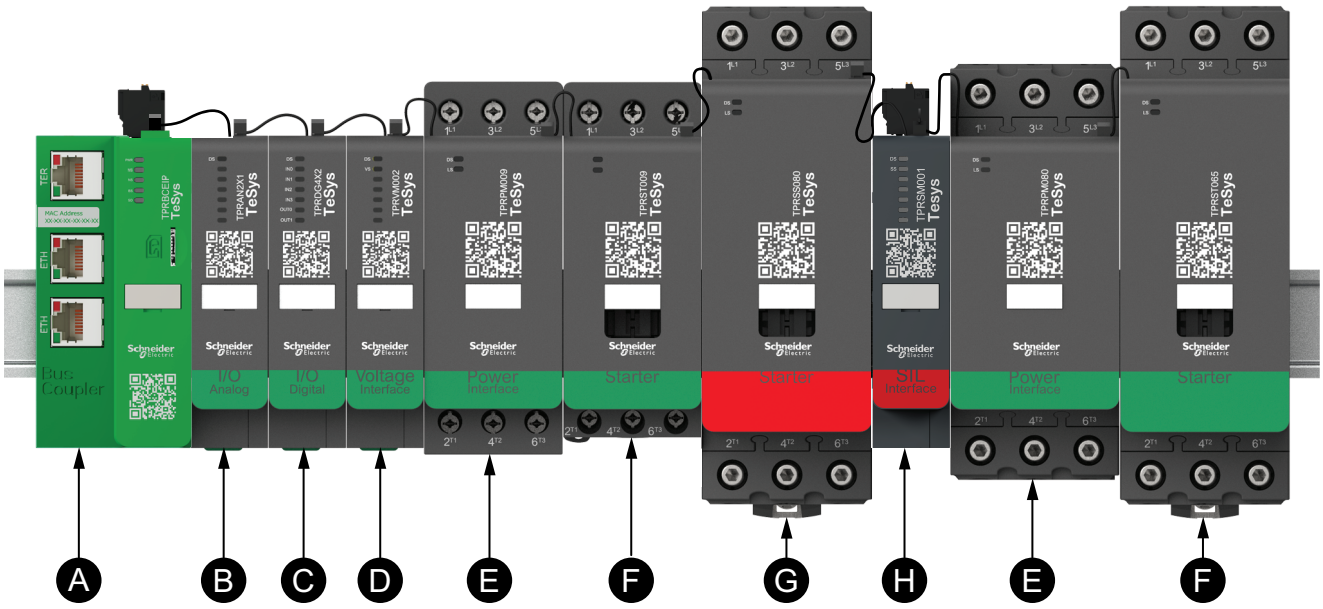
This system is designed around the concept of TeSys avatars. These avatars:

- Represent both the logical and physical aspects of the automation functions
- Determine the configuration of the TeSys island

The logical aspects of the TeSys island are managed with software tools, covering all phases of product and application lifecycle: design, engineering, commissioning, operation, and maintenance.

The physical TeSys island consists of a set of devices installed on a single DIN rail and connected together with flat cables providing the internal communication between modules. The external communication with the automation environment is made through a single bus coupler module, and the TeSys island is seen as a single node on the network. The other modules include starters, power interface modules, analog and digital I/O modules, voltage interface modules, and SIL (Safety Integrity Level according to standard IEC 61508) interface modules, covering a wide range of operational functions.

**Figure 1 - TeSys island Overview**




| | | | |
|---|---|---|---|
| A | Bus Coupler | E | Power Interface Module |
| B | Analog I/O Module | F | Standard Starter |
| C | Digital I/O Module | G | SIL Starter |
| D | Voltage Interface Module | H | SIL Interface Module |

# Master Range: TeSys

TeSys™ is an innovative motor control and management solution from the global market leader. TeSys offers connected, efficient products and solutions for switching and protection of motors and electrical loads in compliance with all major global electrical standards.

# Avatar Definition

TeSys avatars bring ready-to-use functions through their predefined logic and associated physical devices. The avatar logic is executed in the bus coupler. The bus coupler manages data exchanges internally within the TeSys island, and also externally with the PLC.

There are four types of TeSys avatars:

**System avatar**

Represents the whole island as a system. The System avatar allows setting the network configuration and computes TeSys island level data.

**Device avatars**

Represent functions performed by switches and I/O modules.

**Load avatars**

Represent functions related to specific loads, such as a forward-reverse motor. Load avatars include the appropriate modules and operating characteristics to serve the load type. For example, a Motor Two Directions avatar includes two starter modules, accessories, pre-programmed control logic, and a pre-configuration of the available protection functions.

Standard (non-SIL[2]) Load avatars provide the following:

- Local control

  **NOTE:** Local control is applicable for all Load avatars (except PIM avatar).
- Local trip reset (to allow an operator to use a local input to trigger the local trip reset on rising edge of the input. When the input changes from 0 to 1, then the trip reset of avatar is executed)

  **NOTE:** Local trip reset is applicable for all Load avatars (except PIM avatar).
- Bypass (to allow an operator to use a local command to temporarily bypass a trip condition and continue the operation of the avatar)
- Process variable monitoring

**Application avatars**

Represent functions related to specific user applications, such as a pump or conveyor. Application avatars provide the following:

- Local control
- Local trip reset (to allow an operator to use a local input to trigger the local trip reset on rising edge of the input. When the input changes from 0 to 1, then the trip reset of avatar is executed)
- Bypass (to allow an operator to use a local command to temporarily bypass a trip condition and continue the operation of the avatar)
- Manual mode override (to allow an operator to use a local input to override the configured control mode and control the avatar from a local command source)
- Process variable monitoring

2. Safety Integrity Level according to standard IEC 61508.

For example, a Pump avatar includes the following:

- One starter module
- One or more digital I/O modules for local control, local trip, and process variable (PV) switches
- Configurable control logic
- Pre-configuration of the load and electrical functions

PV inputs receive analog values from sensors such as a pressure meter, a flow meter, or a vibration meter. PV switches receive discrete signals from switches such as a flow switch or a pressure switch.

Operational control (Run and Stop command) of the avatar in autonomous mode is configurable for up to two PV inputs or PV switches. It includes settings for the threshold and hysteresis for analog inputs, and positive or negative logic for both analog and digital inputs for the Pump avatar.

The avatars installed on the TeSys island are controlled by the TeSys island bus coupler. Each avatar includes predefined logic for managing its physical modules, while also providing easy data exchange with PLCs through function blocks. Avatarsinclude pre-configuration of the available protection functions.

Information accessible through the avatar includes the following:

- Control data
- Advanced diagnostics data
- Asset management data
- Energy data

# List of TeSys Avatars

**Table 1 - TeSys Avatars**

| Name | Icon | Description |
|---|---|---|
| System avatar |  | A required avatar that enables a single point of communication to the TeSys island. |
| **Device** | | |
| Switch |  | To make or break a power line in an electrical circuit |
| Switch - SIL Stop, W. Cat 1/2[3] |  | To make or break a power line in an electrical circuit with Stop Category 0 or Stop Category 1[4] function compliance for Wiring Category 1 and Category 2. |
| Switch - SIL Stop, W. Cat 3/4[5] |  | To make or break a power line in an electrical circuit with Stop Category 0 or Stop Category 1 function compliance for Wiring Category 3 and Category 4. |

3. Safety Integrity Level according to standard IEC 61508. Wiring Category 1 and Category 2 according to ISO 13849.
4. Stop category according to EN/IEC 60204-1.
5. Safety Integrity Level according to standard IEC 61508. Wiring Category 3 and Category 4 according to ISO 13849.

**Table 1 - TeSys Avatars (Continued)**

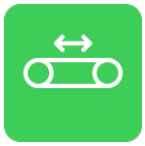
| Name | Icon | Description |
|---|---|---|
| Digital I/O |  | To provide control of 2 digital outputs and status of 4 digital inputs |
| Analog I/O |  | To provide control of 1 analog output and status of 2 analog inputs |
| **Load** | | |
| Power Interface without I/O (measure) |  | To monitor current supplied to an external device, such as a solid-state relay, soft starter, or variable speed drive |
| Power Interface with I/O (control) |  | To monitor current supplied to and to control an external device, such as a solid-state relay, soft starter, or variable speed drive |
| Motor One Direction |  | To manage[6] a motor in one direction |
| Motor One Direction - SIL Stop, W. Cat 1/2 |  | To manage a motor in one direction, with Stop Category 0 or Stop Category 1 function compliance for Wiring Category 1 and Category 2. |
| Motor One Direction - SIL Stop, W. Cat 3/4 |  | To manage a motor in one direction, with Stop Category 0 or Stop Category 1 function compliance for Wiring Category 3 and Category 4. |
| Motor Two Directions |  | To manage a motor in two directions (forward and reverse) |
| Motor Two Directions - SIL Stop, W. Cat 1/2 |  | To manage a motor in two directions (forward and reverse), with Stop Category 0 or Stop Category 1 function compliance for Wiring Category 1 and Category 2 |

6. “Manage” in this context encompasses energizing, controlling, monitoring, diagnosing, and protecting the load.

**Table 1 - TeSys Avatars (Continued)**

| Name | Icon | Description |
|---|---|---|
| Motor Two Directions - SIL Stop, W. Cat 3/4 |  | To manage a motor in two directions (forward and reverse), with Stop Category 0 or Stop Category 1 function compliance for Wiring Category 3 and Category 4 |
| Motor Y/D One Direction |  | To manage a wye-delta (star-delta) motor in one direction |
| Motor Y/D Two Directions |  | To manage a wye-delta (star-delta) motor in two directions (forward and reverse) |
| Motor Two Speeds |  | To manage a two-speed motor and two-speed motor with Dahlander option |
| Motor Two Speeds - SIL Stop, W. Cat 1/2 |  | To manage a two-speed motor, with Stop Category 0 or Stop Category 1 function compliance for Wiring Category 1 and Category 2 |
| Motor Two Speeds - SIL Stop, W. Cat 3/4 |  | To manage a two-speed motor, with Stop Category 0 or Stop Category 1 function compliance for Wiring Category 3 and Category 4 |
| Motor Two Speeds Two Directions |  | To manage a two-speed motor in two directions (forward and reverse) |
| Motor Two Speeds Two Directions - SIL Stop, W. Cat 1/2 |  | To manage a two-speed motor in two directions (forward and reverse), with Stop Category 0 or Stop Category 1 function compliance for Wiring Category 1 and Category 2 |
| Motor Two Speeds Two Directions - SIL Stop, W. Cat 3/4 |  | To manage a two-speed motor in two directions (forward and reverse), with Stop Category 0 or Stop Category 1 function compliance for Wiring Category 3 and Category 4 |
| Resistor |  | To manage a resistive load |

**Table 1 - TeSys Avatars (Continued)**

| Name | Icon | Description |
|---|---|---|
| Power Supply |  | To manage a power supply |
| Transformer |  | To manage a transformer |
| **Application** | | |
| Pump |  | To manage a pump |
| Conveyor One Direction |  | To manage a conveyor in one direction |
| Conveyor One Direction - SIL Stop, W. Cat 1/2 |  | To manage a conveyor in one direction, with Stop Category 0 or Stop Category 1 function compliance for Wiring Category 1 and Category 2 |
| Conveyor Two Directions |  | To manage a conveyor in two directions (forward and reverse) |
| Conveyor Two Directions - SIL Stop, W. Cat 1/2 |  | To manage a conveyor in two directions (forward and reverse), with Stop Category 0 or Stop Category 1 function compliance for Wiring Category 1 and Category 2 |

**NOTE:** For two speed two direction avatar disable current phase reversal trip.

# Modbus TCP Third Party Integration

## Modbus TCP Addressing

TeSys™ island applies the following Unit ID ranges for physical and virtual modularity.

**Table 2 - Unit ID Ranges**

| Item | Unit ID | Comment |
|---|---|---|
| Avatars | 1–99 | Device, Load, and Application Avatars |
| Bus Devices | 101–199 | Digital I/O Module (DIOM)<br>Analog I/O Module (AIOM)<br>Starters<br>SIL Starters<br>Power Interface Module (PIM)<br>SIL Interface Module (SIM)<br>Voltage Interface Module (VIM) |
| Bus Coupler/System Avatar | 255 | — |

**NOTE**:

- Bus devices are numbered sequentially, left to right.
- Avatars are numbered as defined in the Context File.
- Data larger than 16 bits is split into multiple registers, encoded in Big Endian. For example, a 32-bit integer value of decimal 305419896 (or 0x12345678 hexadecimal) is mapped onto two registers, 500 and 501, where register 500 contains the most significant word (0x1234) and register 501 contains the least significant word (0x5678).
- Modbus TCP manual integration is done without IO Scanning so that each piece of data or command is represented with a single register read/write. To maintain the ability to detect a communication loss and enter Degraded Mode, a heartbeat register is available for use at address 1098 of Unit ID 255. You can write any value to this register periodically within the Communication Loss Timeout period (by default is 2 seconds). If the island does not detect a write, it signifies a communication loss and the system enters Degraded Mode.
- See the table below for examples.

**Table 3 - Examples of Device and Avatar Numbering**

| Order of Avatar in Digital Tool | Avatar Unit ID | Description | Physical Order in island | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 1 | 255 | System | BC | — | — | VIM | — | — | SIM | — | — |
| 2 | 1 | AIOM | — | AIOM | — | — | — | — | — | — | — |
| 3 | 2 | Motor Two Directions — SIL Stop, W. Cat 1/2[7] | — | — | — | — | SIL Starter | SIL Starter | — | — | — |
| 4 | 3 | Motor One Direction | — | — | — | — | — | — | — | Starter | — |
| 5 | 4 | Power Interface with I/O (Control) | — | — | DIOM | — | — | — | — | — | PIM |
| Modbus/TCP Physical Device Unit ID | | | 255 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 |

7. Safety Integrity Level according to standard IEC 61508. Wiring Category 1 and Category 2 according to ISO 13849.

# Configure FLA through Modbus TCP/IP

FLA for avatars can be configured through Modbus TCP/IP using Register-9622 and Avatar ID as the server ID.

# TeSys island Modbus TCP Function Block Data

This section contains generic function block diagrams and register data that can be used to assist with PLC programming. For the I/O data and value ranges available at the system and avatar level, refer to Data Descriptions, page 112.

## System Avatar

The SystemAvatar function block returns the status of the System Avatar.

**Figure 2 - SystemAvatar Function Block**

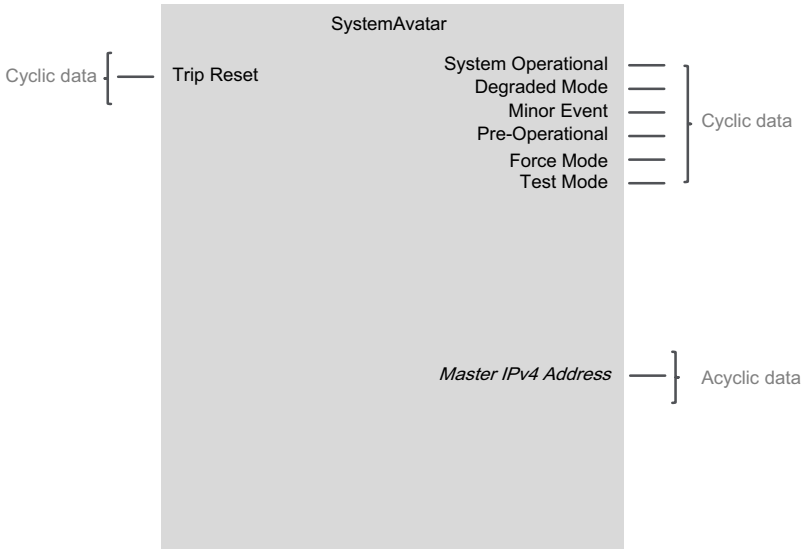



**Table 4 - Modbus TCP Inputs—System Avatar**

| Input Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Trip Reset | 8501 | 3 | 1 |

**Table 5 - Modbus TCP Outputs—System Avatar**

| Input Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| System Operational | 3201 | 1 | 1 |
| Force Mode | 3201 | 2 | 1 |
| Minor Event | 3201 | 3 | 1 |
| Pre-Operational | 3201 | 4 | 1 |
| Degraded Mode | 3201 | 5 | 1 |
| Test Mode | 3201 | 6 | 1 |
| IP Address | 64000 | 0 | 32 |

# Device Function Blocks

## Switch

This function block establishes or interrupts a power line in an electrical circuit.

**Figure 3 - Switch Function Block**

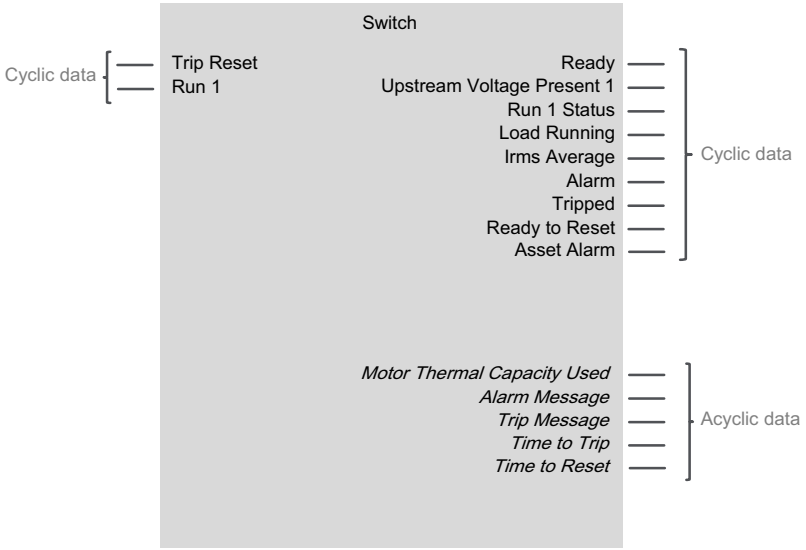



**Table 6 - Modbus TCP Inputs—Switch**

| Input Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Run 1 | 8501 | 0 | 1 |
| Trip Reset | 8501 | 3 | 1 |

**Table 7 - Modbus TCP Outputs—Switch**

| Output Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Thermal Overload Time To Reset | 450 | 0 | 16 |
| Protection Trip Message 1 | 452 | 0 | 16 |
| Protection Trip Message 2 | 453 | 0 | 16 |
| Protection Alarm Message 1 | 461 | 0 | 16 |
| Protection Alarm Message 2 | 462 | 0 | 16 |
| $I_{RMS}$ Average | 500 | 0 | 32 |
| Thermal Overload Time To Trip | 511 | 0 | 16 |
| Ready | 3201 | 0 | 1 |
| Run 1 Status | 3201 | 1 | 1 |
| Tripped | 3201 | 2 | 1 |
| Alarm | 3201 | 3 | 1 |
| Load Running | 3201 | 8 | 1 |
| Ready To Reset | 3201 | 9 | 1 |
| Asset Alarm | 3202 | 3 | 1 |
| Upstream Voltage Present 1 | 3202 | 12 | 1 |
| Motor Thermal Capacity Used | 9630 | 0 | 8 |

# Switch - SIL Stop, W. Cat 1/2

This function block establishes or interrupts a power line in an electrical circuit with Stop Category 0 or Stop Category 1 function compliance for Wiring Category 1 and Category 2.[8]

**Figure 4 - SwitchSILStopCat1and2 Function Block**

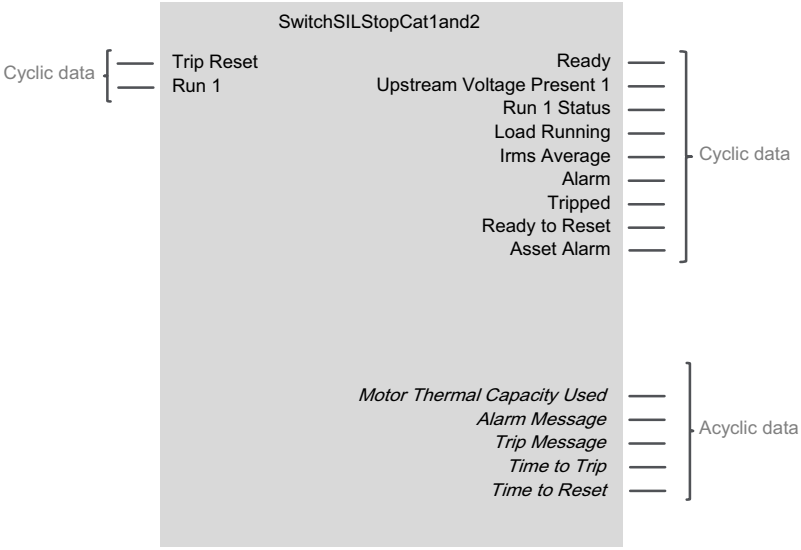



**Table 8 - Modbus TCP Inputs—Switch**

| Input Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Run 1 | 8501 | 0 | 1 |
| Trip Reset | 8501 | 3 | 1 |

**Table 9 - Modbus TCP Outputs—Switch**

| Output Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Thermal Overload Time To Reset | 450 | 0 | 16 |
| Protection Trip Message 1 | 452 | 0 | 16 |
| Protection Trip Message 2 | 453 | 0 | 16 |
| Protection Alarm Message 1 | 461 | 0 | 16 |
| Protection Alarm Message 2 | 462 | 0 | 16 |
| $I_{RMS}$ Average | 500 | 0 | 32 |
| Thermal Overload Time To Trip | 511 | 0 | 16 |
| Ready | 3201 | 0 | 1 |
| Run 1 Status | 3201 | 1 | 1 |
| Tripped | 3201 | 2 | 1 |
| Alarm | 3201 | 3 | 1 |
| Load Running | 3201 | 8 | 1 |
| Ready To Reset | 3201 | 9 | 1 |
| Asset Alarm | 3202 | 3 | 1 |
| Upstream Voltage Present 1 | 3202 | 12 | 1 |
| Motor Thermal Capacity Used | 9630 | 0 | 8 |

8. Safety Integrity Level according to standard IEC 61508. Stop categories according to EN/IEC 60204-1. Wiring Category 1 and Category 2 according to ISO 13849.

# Switch - SIL Stop, W. Cat 3/4

This function block establishes or interrupts a power line in an electrical circuit with Stop Category 0 or Stop Category 1 function compliance for Wiring Category 3 and Category 4.[9]

**Figure 5 - Switch — SIL Stop, W. Cat 3/4 Function Block**

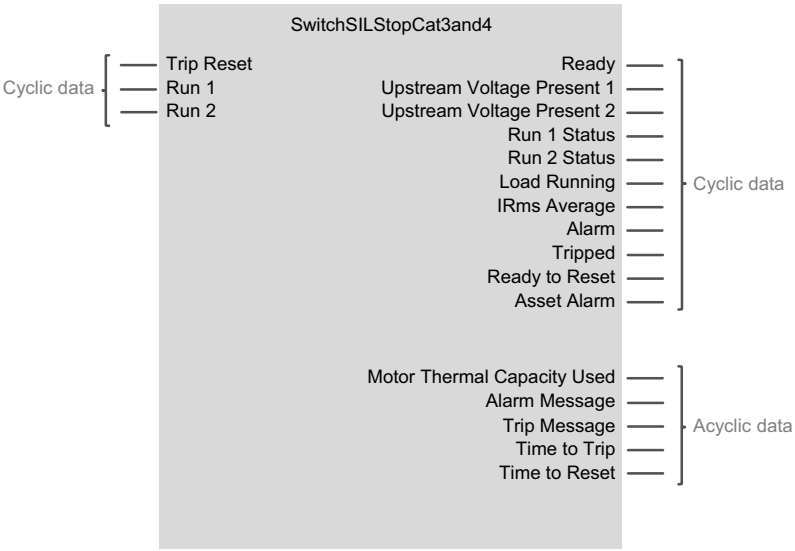



**Table 10 - Modbus TCP Inputs — Switch**

| Input Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Run 1 | 8501 | 0 | 1 |
| Trip Reset | 8501 | 3 | 1 |
| Run 2 | 8501 | 8 | 1 |

**Table 11 - Modbus TCP Outputs — Switch**

| Output Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Thermal Overload Time To Reset | 450 | 0 | 16 |
| Protection Trip Message 1 | 452 | 0 | 16 |
| Protection Trip Message 2 | 453 | 0 | 16 |
| Protection Alarm Message 1 | 461 | 0 | 16 |
| Protection Alarm Message 2 | 462 | 0 | 16 |
| $I_{RMS}$ Average | 500 | 0 | 32 |
| Thermal Overload Time To Trip | 511 | 0 | 16 |
| Ready | 3201 | 0 | 1 |
| Tripped | 3201 | 2 | 1 |
| Alarm | 3201 | 3 | 1 |
| Run 1 Status | 3201 | 6 | 1 |
| Run 2 Status | 3201 | 7 | 1 |
| Load Running | 3201 | 8 | 1 |
| Ready To Reset | 3201 | 9 | 1 |
| Asset Alarm | 3202 | 3 | 1 |
| Upstream Voltage Present 1 | 3202 | 12 | 1 |

9. Safety Integrity Level according to standard IEC 61508. Stop categories according to EN/IEC 60204-1. Wiring Category 3 and Category 4 according to ISO 13849.

**Table 11 - Modbus TCP Outputs — Switch (Continued)**

| Output Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Upstream Voltage Present 2 | 3202 | 13 | 1 |
| Motor Thermal Capacity Used | 9630 | 0 | 8 |

## Digital I/O

This function block provides information about the Digital I/O avatar. The Digital I/O avatar has four inputs and two outputs.

**Figure 6 - DigitalIO Function Block**

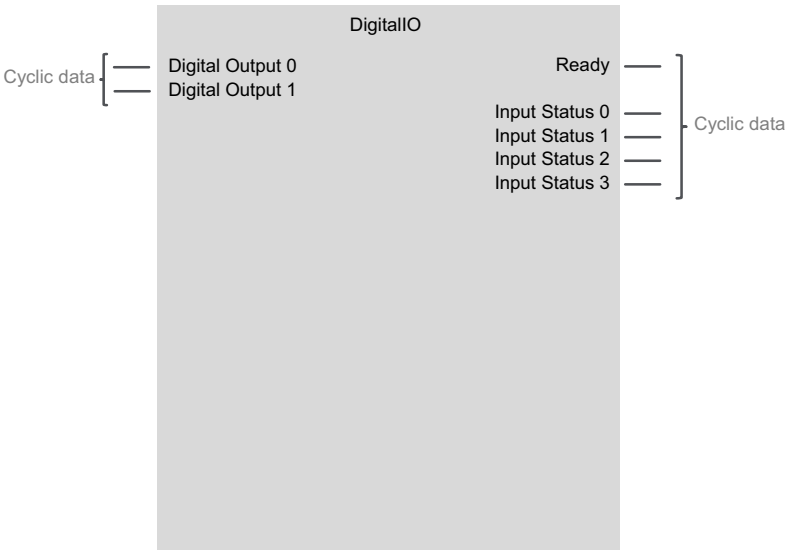



**Table 12 - Modbus TCP Inputs—Digital I/O**

| Input Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Digital Output 1 | 8501 | 8 | 1 |
| Digital Output 2 | 8501 | 9 | 1 |

**Table 13 - Modbus TCP Outputs—Digital I/O**

| Output Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Digital Input 0 Status | 3201 | 4 | 1 |
| Digital Input 1 Status | 3201 | 5 | 1 |
| Digital Input 2 Status | 3201 | 6 | 1 |
| Digital Input 3 Status | 3201 | 7 | 1 |

# Analog I/O

This function block provides information about the Analog I/O avatar. The Analog I/O avatar has two inputs and one output.

**Figure 7 - AnalogIO Function Block**

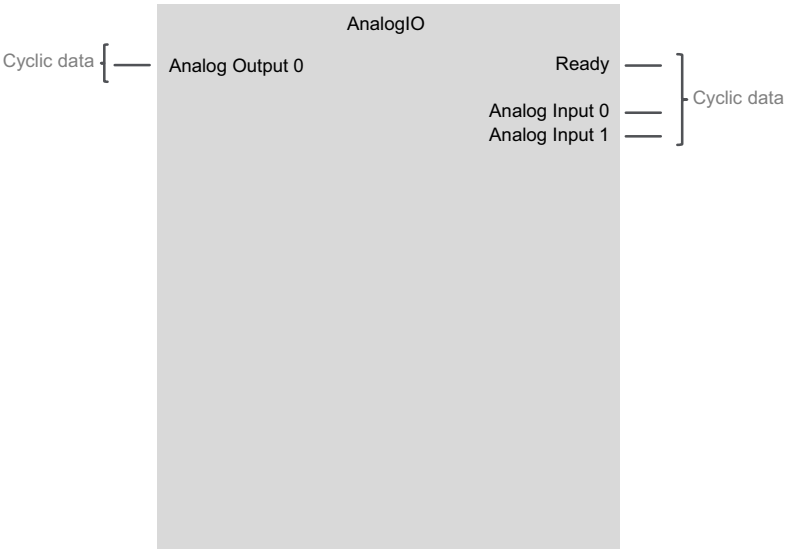



**Table 14 - Modbus TCP Inputs—Analog I/O**

| Input Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Analog Output 0 | 8504 | 0 | 16 |

**Table 15 - Modbus TCP Outputs—Analog I/O**

| Output Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Analog Input 0 | 3204 | 0 | 16 |
| Analog Input 1 | 3205 | 0 | 16 |

# Load Function Blocks

## Power Interface Module without I/O (Measure)

This function block is used to monitor current on an external power device, such as a solid-state relay, soft starter, or variable speed drive.

**Figure 8 - PowerInterface Function Block**

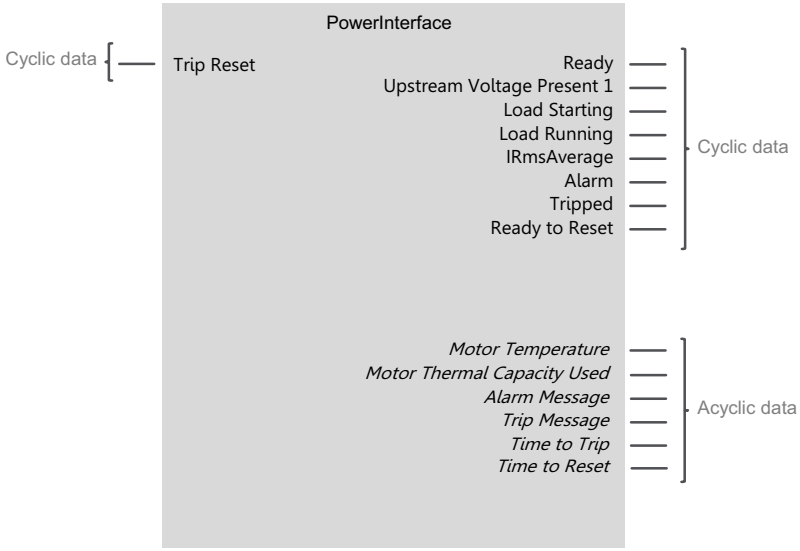



**Table 16 - Modbus TCP Inputs—PIM without I/O (Measure)**

| Input Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Trip Reset | 8501 | 3 | 1 |

**Table 17 - Modbus TCP Outputs—PIM without I/O (Measure)**

| Output Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Thermal Overload Time to Reset | 450 | 0 | 16 |
| Protection Trip Message 1 | 452 | 0 | 16 |
| Protection Trip Message 2 | 453 | 0 | 16 |
| Protection Alarm Message 1 | 461 | 0 | 16 |
| Protection Alarm Message 2 | 462 | 0 | 16 |
| Motor Temperature | 464 | 0 | 16 |
| $I_{RMS}$ Average | 500 | 0 | 32 |
| Thermal Overload Time to Trip | 511 | 0 | 16 |
| Ready | 3201 | 0 | 1 |
| Tripped | 3201 | 2 | 1 |
| Alarm | 3201 | 3 | 1 |
| Load Running | 3201 | 8 | 1 |
| Ready to Reset | 3201 | 9 | 1 |
| Load Starting | 3201 | 15 | 1 |
| Upstream Voltage Present 1 | 3202 | 12 | 1 |
| Motor Thermal Capacity Used | 9630 | 0 | 8 |

# Power Interface Module with I/O (Control)

This function block is used to monitor current and control an external power device, such as a solid-state relay, soft starter, or variable speed drive.

**Figure 9 - PowerInterfaceIO Function Block**

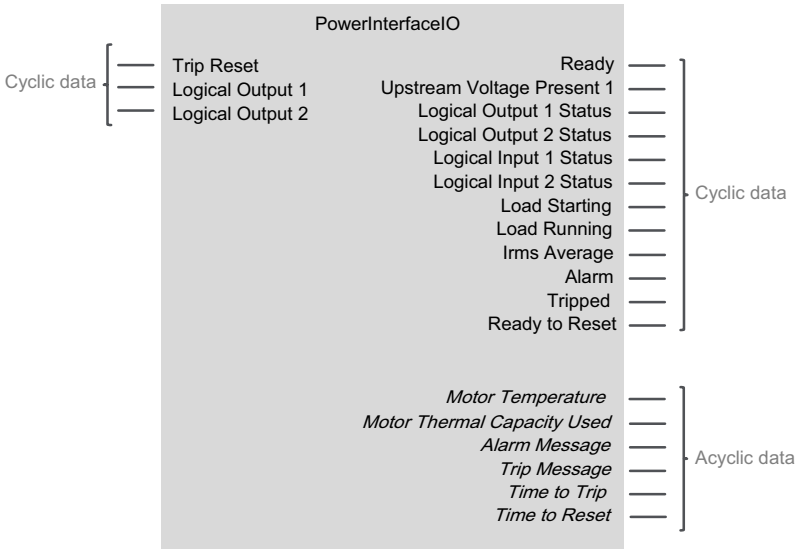



**Table 18 - Modbus TCP Inputs—Power Interface Module (PIM) with I/O (Control)**

| Input Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Trip Reset | 8501 | 3 | 1 |
| Logic Output 1 | 8501 | 8 | 1 |
| Logic Output 2 | 8501 | 9 | 1 |

**Table 19 - Modbus TCP Outputs—PIM with I/O (Control)**

| Output Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Thermal Overload Time To Reset | 450 | 0 | 16 |
| Protection Trip Message 1 | 452 | 0 | 16 |
| Protection Trip Message 2 | 453 | 0 | 16 |
| Protection Alarm Message 1 | 461 | 0 | 16 |
| Protection Alarm Message 2 | 462 | 0 | 16 |
| Motor Temperature | 464 | 0 | 16 |
| $I_{RMS}$ Average | 500 | 0 | 32 |
| Thermal Overload Time To Trip | 511 | 0 | 16 |
| Ready | 3201 | 0 | 1 |
| Tripped | 3201 | 2 | 1 |
| Alarm | 3201 | 3 | 1 |
| Logic Input 1 Status | 3201 | 4 | 1 |
| Logic Input 2 Status | 3201 | 5 | 1 |
| Load Running | 3201 | 8 | 1 |
| Ready To Reset | 3201 | 9 | 1 |
| Logical Output 1 Status | 3201 | 10 | 1 |
| Logical Output 2 Status | 3201 | 11 | 1 |
| Load Starting | 3201 | 15 | 1 |

**Table 19 - Modbus TCP Outputs—PIM with I/O (Control) (Continued)**

| Output Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Upstream Voltage Present 1 | 3202 | 12 | 1 |
| Motor Thermal Capacity Used | 9630 | 0 | 8 |

## Motor One Direction

This function block is used to manage a motor in one direction.

**Figure 10 - MotorOneDirection Function Block**

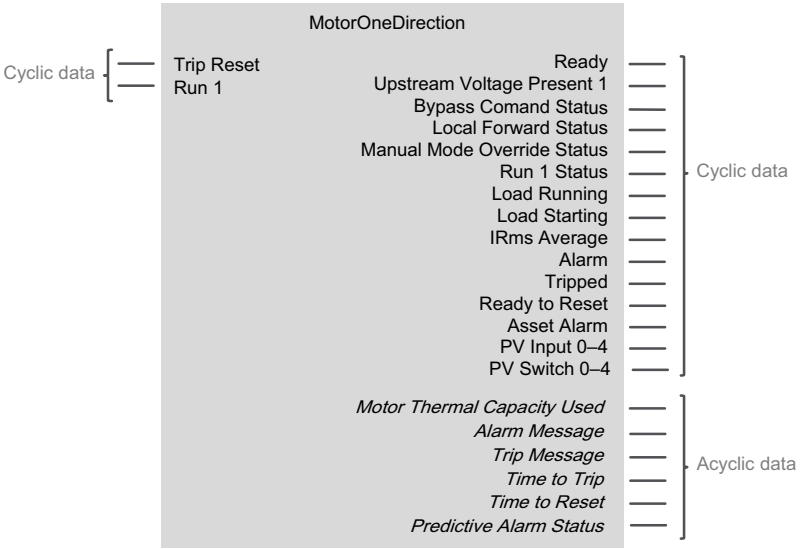



**Table 20 - Modbus TCP Inputs—Motor One Direction**

| Input Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Run Forward | 8501 | 0 | 1 |
| Trip Reset | 8501 | 3 | 1 |

**Table 21 - Modbus TCP Outputs—Motor One Direction**

| Output Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Thermal Overload Time To Reset | 450 | 0 | 16 |
| Protection Trip Message 1 | 452 | 0 | 16 |
| Protection Trip Message 2 | 453 | 0 | 16 |
| Protection Alarm Message 1 | 461 | 0 | 16 |
| Protection Alarm Message 2 | 462 | 0 | 16 |
| $I_{RMS}$ Average | 500 | 0 | 32 |
| Thermal Overload Time To Trip | 511 | 0 | 16 |
| Ready | 3201 | 0 | 1 |
| Run Forward Status | 3201 | 1 | 1 |
| Tripped | 3201 | 2 | 1 |
| Alarm | 3201 | 3 | 1 |
| Load Running | 3201 | 8 | 1 |
| Ready To Reset | 3201 | 9 | 1 |
| Load Starting | 3201 | 15 | 1 |

**Table 21 - Modbus TCP Outputs—Motor One Direction (Continued)**

| Output Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Asset Alarm | 3202 | 3 | 1 |
| Upstream Voltage Present 1 | 3202 | 12 | 1 |
| Bypass Command Status | 3215 | 0 | 1 |
| Local Forward Status | 3215 | 1 | 1 |
| Manual Mode Override Status | 3215 | 7 | 1 |
| Predictive Alarm Status | 3217 | 0 | 16 |
| PV Input 0 | 3224 | 0 | 16 |
| PV Input 1 | 3225 | 0 | 16 |
| PV Input 2 | 3226 | 0 | 16 |
| PV Input 3 | 3227 | 0 | 16 |
| PV Input 4 | 3228 | 0 | 16 |
| PV Switch 0 | 3230 | 0 | 1 |
| PV Switch 1 | 3230 | 1 | 1 |
| PV Switch 2 | 3230 | 2 | 1 |
| PV Switch 3 | 3230 | 3 | 1 |
| PV Switch 4 | 3230 | 4 | 1 |
| Motor Thermal Capacity Used | 9630 | 0 | 8 |

## Motor One Direction - SIL Stop, W. Cat 1/2

This function block is used to manage a motor in one direction with Stop Category 0 or Stop Category 1 function compliance for Wiring Category 1 and Category 2.[10]

**Figure 11 - MotorOneDirectionSILStopCat1and2 Function Block**

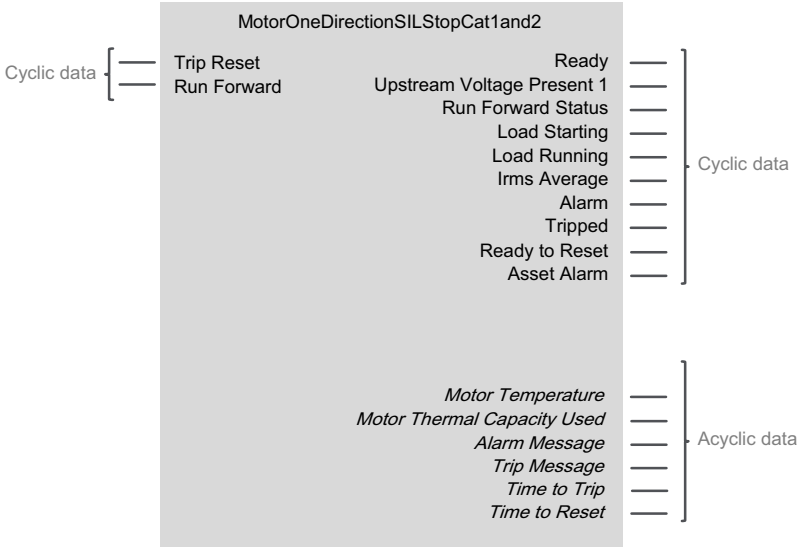



**Table 22 - Modbus TCP Inputs**

| Input Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Run Forward | 8501 | 0 | 1 |
| Trip Reset | 8501 | 3 | 1 |

10. Safety Integrity Level according to standard IEC 61508. Stop categories according to EN/IEC 60204-1. Wiring Category 1 and Category 2 according to ISO 13849.

### Table 23 - Modbus TCP Outputs

| Output Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Thermal Overload Time To Reset | 450 | 0 | 16 |
| Protection Trip Message 1 | 452 | 0 | 16 |
| Protection Trip Message 2 | 453 | 0 | 16 |
| Protection Alarm Message 1 | 461 | 0 | 16 |
| Protection Alarm Message 2 | 462 | 0 | 16 |
| $I_{RMS}$ Average | 500 | 0 | 32 |
| Thermal Overload Time To Trip | 511 | 0 | 16 |
| Ready | 3201 | 0 | 1 |
| Run Forward Status | 3201 | 1 | 1 |
| Tripped | 3201 | 2 | 1 |
| Alarm | 3201 | 3 | 1 |
| Load Running | 3201 | 8 | 1 |
| Ready To Reset | 3201 | 9 | 1 |
| Load Starting | 3201 | 15 | 1 |
| Asset Alarm | 3202 | 3 | 1 |
| Upstream Voltage Present 1 | 3202 | 12 | 1 |
| Motor Thermal Capacity Used | 9630 | 0 | 8 |

# Motor One Direction - SIL Stop, W. Cat 3/4

This function block is used to manage a motor in one direction with Stop Category 0 or Stop Category 1 function compliance for Wiring Category 3 and Category 4.[11]

**Figure 12 - MotorOneDirectionSILStopCat3and4 Function Block**

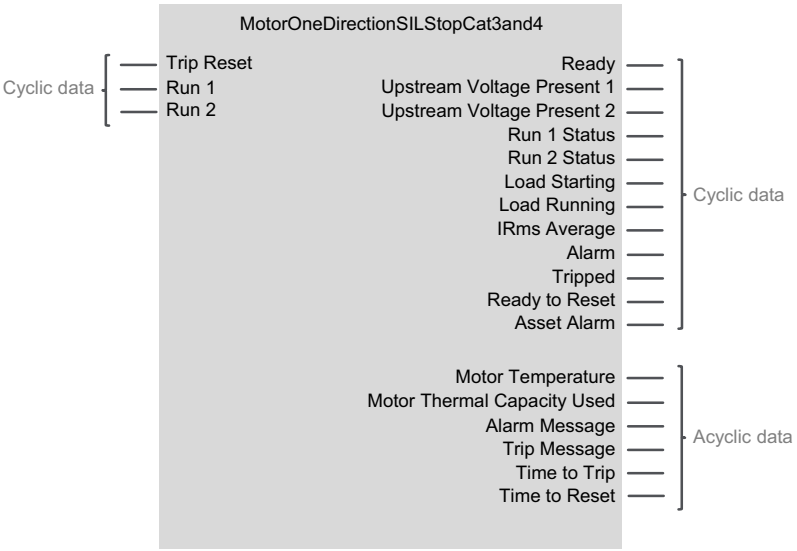



**Table 24 - Modbus TCP Inputs**

| Input Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Run 1 | 8501 | 0 | 1 |
| Trip Reset | 8501 | 3 | 1 |
| Run 2 | 8501 | 8 | 1 |

**Table 25 - Modbus TCP Outputs**

| Output Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Thermal Overload Time To Reset | 450 | 0 | 16 |
| Protection Trip Message 1 | 452 | 0 | 16 |
| Protection Trip Message 2 | 453 | 0 | 16 |
| Protection Alarm Message 1 | 461 | 0 | 16 |
| Protection Alarm Message 2 | 462 | 0 | 16 |
| $I_{RMS}$ Average | 500 | 0 | 32 |
| Thermal Overload Time To Trip | 511 | 0 | 16 |
| Ready | 3201 | 0 | 1 |
| Tripped | 3201 | 2 | 1 |
| Alarm | 3201 | 3 | 1 |
| Run 1 Status | 3201 | 6 | 1 |
| Run 2 Status | 3201 | 7 | 1 |
| Load Running | 3201 | 8 | 1 |
| Ready To Reset | 3201 | 9 | 1 |
| Asset Alarm | 3202 | 3 | 1 |
| Upstream Voltage Present 1 | 3202 | 12 | 1 |

11. Safety Integrity Level according to standard IEC 61508. Stop categories according to EN/IEC 60204-1. Wiring Category 3 and Category 4 according to ISO 13849.

**Table 25 - Modbus TCP Outputs (Continued)**

| Output Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Upstream Voltage Present 2 | 3202 | 13 | 1 |
| Motor Thermal Capacity Used | 9630 | 0 | 8 |

## Motor Two Directions

This function block is used to manage a motor in two directions (forward and reverse).

**Figure 13 - MotorTwoDirections Function Block**

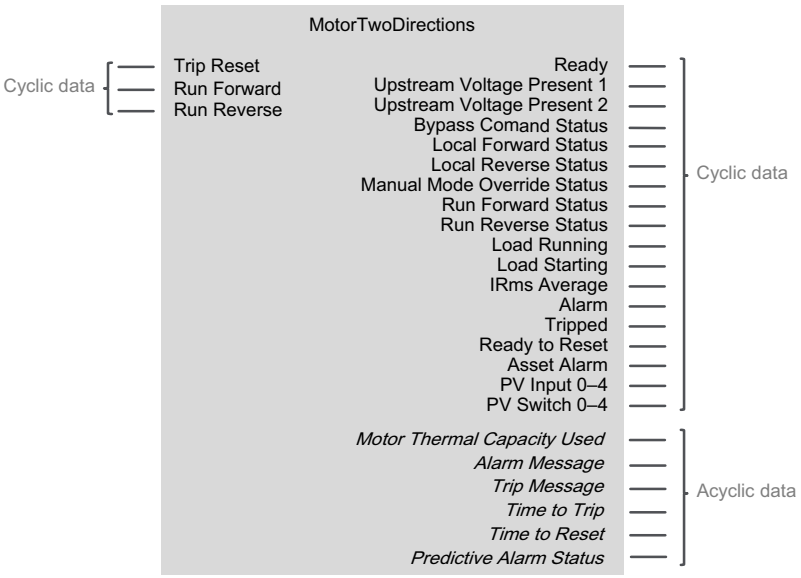



**Table 26 - Modbus TCP Inputs—Motor Two Directions**

| Input Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Run Forward | 8501 | 0 | 1 |
| Run Reverse | 8501 | 1 | 1 |
| Trip Reset | 8501 | 3 | 1 |

**Table 27 - Modbus TCP Outputs—Motor Two Directions**

| Output Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Thermal Overload Time to Reset | 450 | 0 | 16 |
| Protection Trip Message 1 | 452 | 0 | 16 |
| Protection Trip Message 2 | 453 | 0 | 16 |
| Protection Alarm Message 1 | 461 | 0 | 16 |
| Protection Alarm Message 2 | 462 | 0 | 16 |
| $I_{RMS}$ Average | 500 | 0 | 32 |
| Thermal Overload Time to Trip | 511 | 0 | 16 |
| Ready | 3201 | 0 | 1 |
| Run Forward Status | 3201 | 1 | 1 |
| Tripped | 3201 | 2 | 1 |
| Alarm | 3201 | 3 | 1 |
| Load Running | 3201 | 8 | 1 |

**Table 27 - Modbus TCP Outputs—Motor Two Directions (Continued)**

| Output Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Ready To Reset | 3201 | 9 | 1 |
| Load Starting | 3201 | 15 | 1 |
| Run Reverse Status | 3202 | 1 | 1 |
| Asset Alarm | 3202 | 3 | 1 |
| Upstream Voltage Present 1 | 3202 | 12 | 1 |
| Upstream Voltage Present 2 | 3202 | 13 | 1 |
| Bypass Command Status | 3215 | 0 | 1 |
| Local Forward Status | 3215 | 1 | 1 |
| Local Reverse Status | 3215 | 2 | 1 |
| Manual Mode Override Status | 3215 | 7 | 1 |
| Predictive Alarm Status | 3217 | 0 | 16 |
| PV Input 0 | 3224 | 0 | 16 |
| PV Input 1 | 3225 | 0 | 16 |
| PV Input 2 | 3226 | 0 | 16 |
| PV Input 3 | 3227 | 0 | 16 |
| PV Input 4 | 3228 | 0 | 16 |
| PV Switch 0 | 3230 | 0 | 1 |
| PV Switch 1 | 3230 | 1 | 1 |
| PV Switch 2 | 3230 | 2 | 1 |
| PV Switch 3 | 3230 | 3 | 1 |
| PV Switch 4 | 3230 | 4 | 1 |
| Motor Thermal Capacity Used | 9630 | 0 | 8 |

# Motor Two Directions - SIL Stop, W. Cat 1/2

This function block is used to manage a motor in two directions (forward and reverse) with Stop Category 0 or Stop Category 1 function compliance for Wiring Category 1 and Category 2.[12]

**Figure 14 - MotorTwoDirectionsSILStopCat1and2 Function Block**

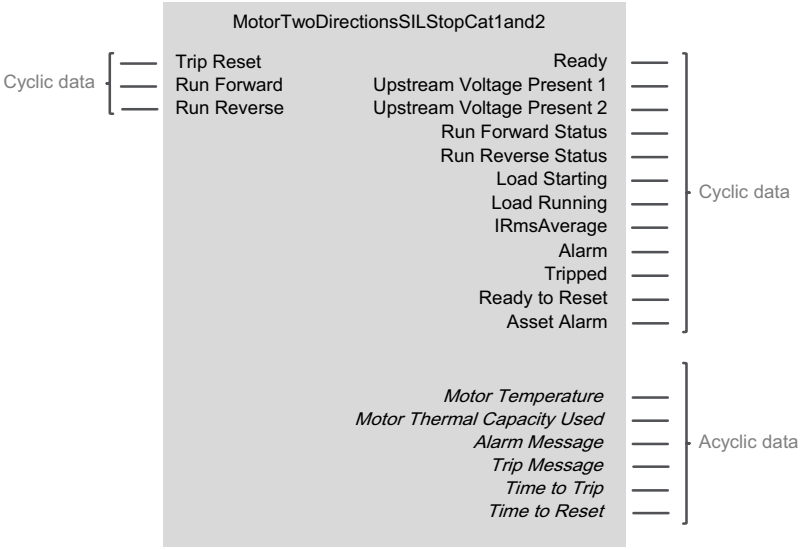



**Table 28 - Modbus TCP Inputs**

| Input Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Run Forward | 8501 | 0 | 1 |
| Run Reverse | 8501 | 1 | 1 |
| Trip Reset | 8501 | 3 | 1 |

**Table 29 - Modbus TCP Outputs**

| Output Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Thermal Overload Time to Reset | 450 | 0 | 16 |
| Protection Trip Message 1 | 452 | 0 | 16 |
| Protection Trip Message 2 | 453 | 0 | 16 |
| Protection Alarm Message 1 | 461 | 0 | 16 |
| Protection Alarm Message 2 | 462 | 0 | 16 |
| $I_{RMS}$ Average | 500 | 0 | 32 |
| Thermal Overload Time to Trip | 511 | 0 | 16 |
| Ready | 3201 | 0 | 1 |
| Run Forward Status | 3201 | 1 | 1 |
| Tripped | 3201 | 2 | 1 |
| Alarm | 3201 | 3 | 1 |
| Load Running | 3201 | 8 | 1 |
| Ready to Reset | 3201 | 9 | 1 |
| Load Starting | 3201 | 15 | 1 |
| Run Reverse Status | 3202 | 1 | 1 |
| Asset Alarm | 3202 | 3 | 1 |

12. Safety Integrity Level according to standard IEC 61508. Stop categories according to EN/IEC 60204-1. Wiring Category 1 and Category 2 according to ISO 13849.

**Table 29 - Modbus TCP Outputs (Continued)**

| Output Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Upstream Voltage Present 1 | 3202 | 12 | 1 |
| Upstream Voltage Present 2 | 3202 | 13 | 1 |
| Motor Thermal Capacity Used | 9630 | 0 | 8 |

## Motor Two Directions - SIL Stop, W. Cat 3/4

This function block is used to manage a motor in two directions (forward or reverse) with Stop Category 0 or Stop Category 1 function compliance for Wiring Category 3 and Category 4.[13]

**Figure 15 - MotorTwoDirectionsSILStopCat3and4 Function Block**

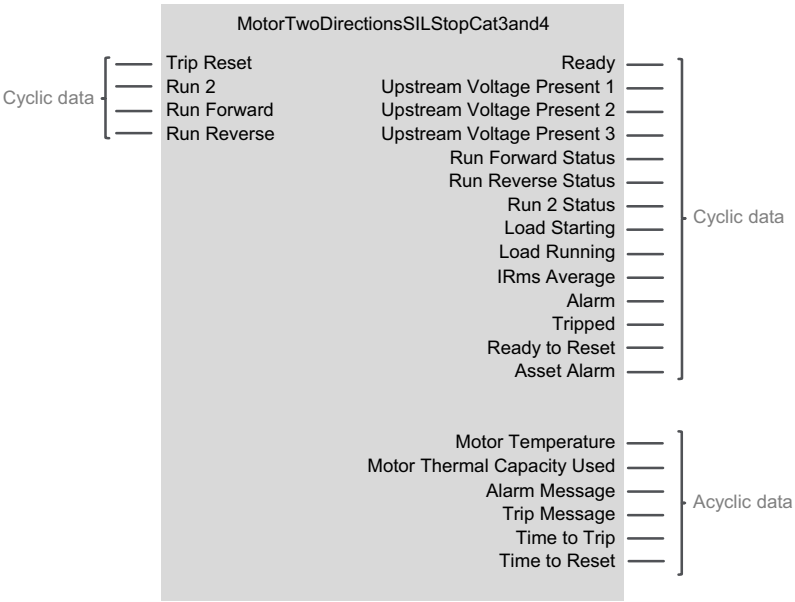



**Table 30 - Modbus TCP Inputs**

| Input Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Run Forward | 8501 | 0 | 1 |
| Run Reverse | 8501 | 1 | 1 |
| Trip Reset | 8501 | 3 | 1 |
| Run 2 | 8501 | 8 | 1 |

**Table 31 - Modbus TCP Outputs**

| Output Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Thermal Overload Time To Reset | 450 | 0 | 16 |
| Protection Trip Message 1 | 452 | 0 | 16 |
| Protection Trip Message 2 | 453 | 0 | 16 |
| Protection Alarm Message 1 | 461 | 0 | 16 |
| Protection Alarm Message 2 | 462 | 0 | 16 |
| $I_{RMS}$ Average | 500 | 0 | 32 |

13. Safety Integrity Level according to standard IEC 61508. Stop categories according to EN/IEC 60204-1. Wiring Category 3 and Category 4 according to ISO 13849.

**Table 31 - Modbus TCP Outputs (Continued)**

| Output Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Thermal Overload Time To Trip | 511 | 0 | 16 |
| Ready | 3201 | 0 | 1 |
| Tripped | 3201 | 2 | 1 |
| Alarm | 3201 | 3 | 1 |
| Run 2 Status | 3201 | 7 | 1 |
| Load Running | 3201 | 8 | 1 |
| Ready To Reset | 3201 | 9 | 1 |
| Load Starting | 3201 | 15 | 1 |
| Run Reverse Status | 3202 | 1 | 1 |
| Asset Alarm | 3202 | 3 | 1 |
| Upstream Voltage Present 1 | 3202 | 12 | 1 |
| Upstream Voltage Present 2 | 3202 | 13 | 1 |
| Upstream Voltage Present 3 | 3202 | 14 | 1 |
| Motor Thermal Capacity Used | 9630 | 0 | 8 |

## Motor Y/D One Direction

This function block is used to manage a wye-delta (star-delta) motor in one direction.

**Figure 16 - MotorYDOneDirection Function Block**

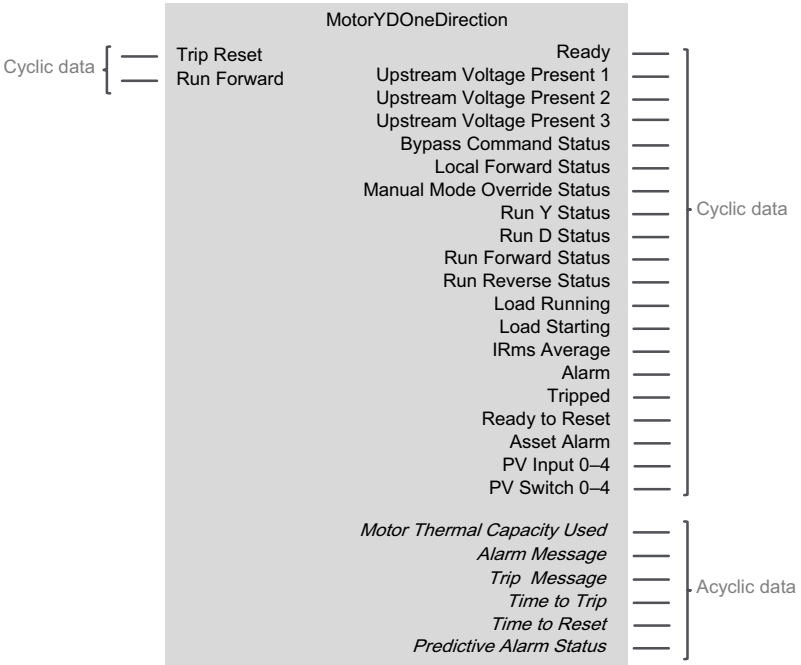



**Table 32 - Modbus TCP Inputs—Motor Y/D One Direction**

| Input Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Run Forward | 8501 | 0 | 1 |
| Trip Reset | 8501 | 3 | 1 |

### Table 33 - Modbus TCP Outputs—Motor Y/D One Direction

| Output Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Thermal Overload Time to Reset | 450 | 0 | 16 |
| Protection Trip Message 1 | 452 | 0 | 16 |
| Protection Trip Message 2 | 453 | 0 | 16 |
| Protection Alarm Message 1 | 461 | 0 | 16 |
| Protection Alarm Message 2 | 462 | 0 | 16 |
| $I_{RMS}$ Average | 500 | 0 | 32 |
| Thermal Overload Time to Trip | 511 | 0 | 16 |
| Ready | 3201 | 0 | 1 |
| Run Forward Status | 3201 | 1 | 1 |
| Tripped | 3201 | 2 | 1 |
| Alarm | 3201 | 3 | 1 |
| Run Y Status | 3201 | 6 | 1 |
| Run D Status | 3201 | 7 | 1 |
| Load Running | 3201 | 8 | 1 |
| Ready to Reset | 3201 | 9 | 1 |
| Load Starting | 3201 | 15 | 1 |
| Asset Alarm | 3202 | 3 | 1 |
| Upstream Voltage Present 1 | 3202 | 12 | 1 |
| Upstream Voltage Present 2 | 3202 | 13 | 1 |
| Upstream Voltage Present 3 | 3202 | 14 | 1 |
| Bypass Command Status | 3215 | 0 | 1 |
| Local Forward Status | 3215 | 1 | 1 |
| Manual Mode Override Status | 3215 | 7 | 1 |
| Predictive Alarm Status | 3217 | 0 | 16 |
| PV Input 0 | 3224 | 0 | 16 |
| PV Input 1 | 3225 | 0 | 16 |
| PV Input 2 | 3226 | 0 | 16 |
| PV Input 3 | 3227 | 0 | 16 |
| PV Input 4 | 3228 | 0 | 16 |
| PV Switch 0 | 3230 | 0 | 1 |
| PV Switch 1 | 3230 | 1 | 1 |
| PV Switch 2 | 3230 | 2 | 1 |
| PV Switch 3 | 3230 | 3 | 1 |
| PV Switch 4 | 3230 | 4 | 1 |
| Motor Thermal Capacity Used | 9630 | 0 | 8 |

# Motor Y/D Two Directions

This function block is used to manage a wye-delta (star-delta) motor in two directions (forward and reverse).

**Figure 17 - MotorYDTwoDirections Function Block**

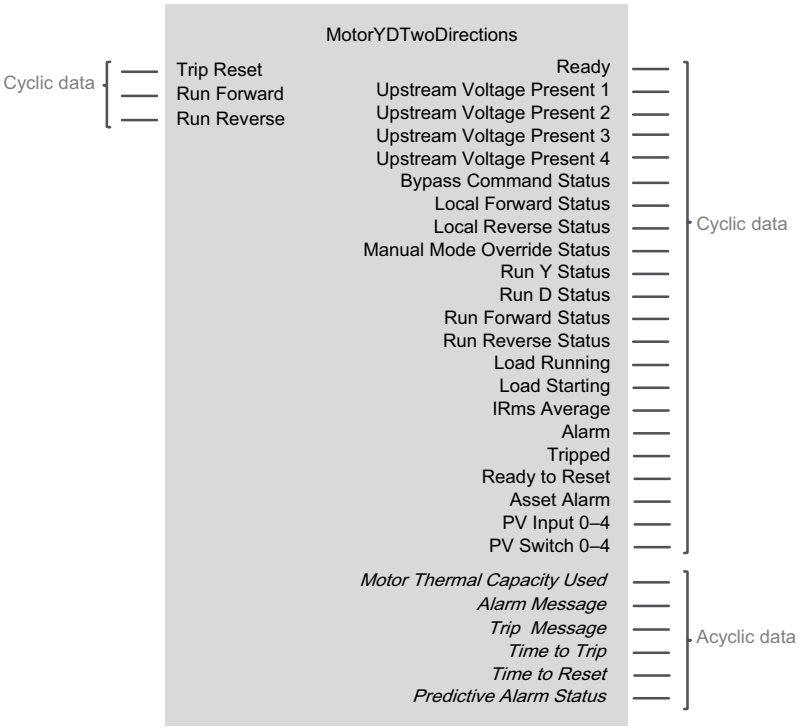



**Table 34 - Modbus TCP Inputs—Motor Y/D Two Directions**

| Input Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Run Forward | 8501 | 0 | 1 |
| Run Reverse | 8501 | 1 | 1 |
| Trip Reset | 8501 | 3 | 1 |

**Table 35 - Modbus TCP Outputs—Motor Y/D Two Directions**

| Output Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Thermal Overload Time to Reset | 450 | 0 | 16 |
| Protection Trip Message 1 | 452 | 0 | 16 |
| Protection Trip Message 2 | 453 | 0 | 16 |
| Protection Alarm Message 1 | 461 | 0 | 16 |
| Protection Alarm Message 2 | 462 | 0 | 16 |
| $I_{RMS}$ Average | 500 | 0 | 32 |
| Thermal Overload Time to Trip | 511 | 0 | 16 |
| Ready | 3201 | 0 | 1 |
| Run Forward Status | 3201 | 1 | 1 |
| Tripped | 3201 | 2 | 1 |
| Alarm | 3201 | 3 | 1 |
| Run Y Status | 3201 | 6 | 1 |
| Run D Status | 3201 | 7 | 1 |
| Load Running | 3201 | 8 | 1 |
| Ready to Reset | 3201 | 9 | 1 |

**Table 35 - Modbus TCP Outputs—Motor Y/D Two Directions (Continued)**

| Output Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Load Starting | 3201 | 15 | 1 |
| Run Reverse Status | 3202 | 1 | 1 |
| Asset Alarm | 3202 | 3 | 1 |
| Upstream Voltage Present 1 | 3202 | 12 | 1 |
| Upstream Voltage Present 2 | 3202 | 13 | 1 |
| Upstream Voltage Present 3 | 3202 | 14 | 1 |
| Upstream Voltage Present 4 | 3202 | 15 | 1 |
| Bypass Command Status | 3215 | 0 | 1 |
| Local Forward Status | 3215 | 1 | 1 |
| Manual Mode Override Status | 3215 | 7 | 1 |
| Local Reverse Status | 3216 | 1 | 1 |
| Predictive Alarm Status | 3217 | 0 | 16 |
| PV Input 0 | 3224 | 0 | 16 |
| PV Input 1 | 3225 | 0 | 16 |
| PV Input 2 | 3226 | 0 | 16 |
| PV Input 3 | 3227 | 0 | 16 |
| PV Input 4 | 3228 | 0 | 16 |
| PV Switch 0 | 3230 | 0 | 1 |
| PV Switch 1 | 3230 | 1 | 1 |
| PV Switch 2 | 3230 | 2 | 1 |
| PV Switch 3 | 3230 | 3 | 1 |
| PV Switch 4 | 3230 | 4 | 1 |
| Motor Thermal Capacity Used | 9630 | 0 | 8 |

# Motor Two Speeds

This function block is used to manage a two speed motor.

**Figure 18 - MotorTwoSpeeds Function Block**

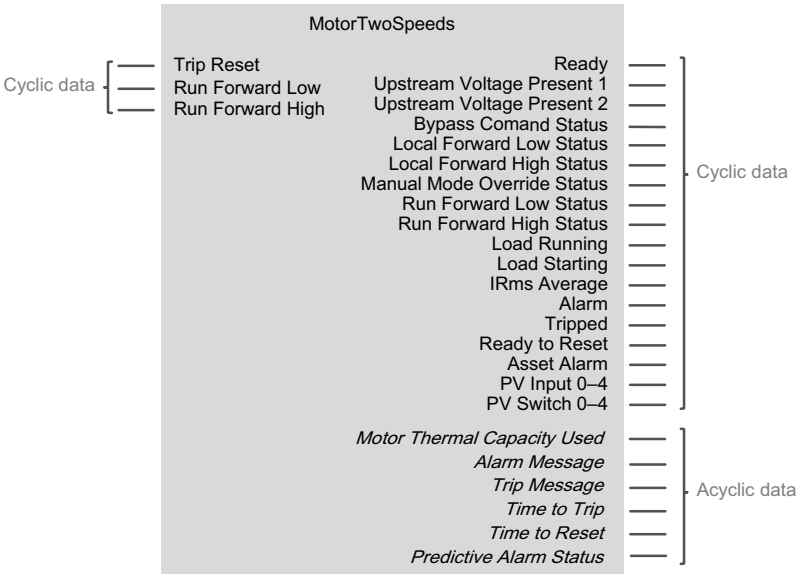



**Table 36 - Modbus TCP Inputs—Motor Two Speeds**

| Input Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Run Forward High | 8501 | 0 | 1 |
| Trip Reset | 8501 | 3 | 1 |
| Run Forward Low | 8501 | 6 | 1 |

**Table 37 - Modbus TCP Outputs—Motor Two Speeds**

| Output Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Thermal Overload Time to Reset | 450 | 0 | 16 |
| Protection Trip Message 1 | 452 | 0 | 16 |
| Protection Trip Message 2 | 453 | 0 | 16 |
| Protection Alarm Message 1 | 461 | 0 | 16 |
| Protection Alarm Message 2 | 462 | 0 | 16 |
| $I_{RMS}$ Average | 500 | 0 | 32 |
| Thermal Overload Time to Trip | 511 | 0 | 16 |
| Ready | 3201 | 0 | 1 |
| Tripped | 3201 | 2 | 1 |
| Alarm | 3201 | 3 | 1 |
| Run Forward Low Status | 3201 | 5 | 1 |
| Run Forward High Status | 3201 | 6 | 1 |
| Load Running | 3201 | 8 | 1 |
| Ready To Reset | 3201 | 9 | 1 |
| Load Starting | 3201 | 15 | 1 |
| Asset Alarm | 3202 | 3 | 1 |
| Upstream Voltage Present 1 | 3202 | 12 | 1 |
| Upstream Voltage Present 2 | 3202 | 13 | 1 |

**Table 37 - Modbus TCP Outputs—Motor Two Speeds (Continued)**

| Output Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Bypass Command Status | 3215 | 0 | 1 |
| Local Forward Low Speed Status | 3215 | 3 | 1 |
| Local Forward High Speed Status | 3215 | 4 | 1 |
| Manual Mode Override Status | 3215 | 7 | 1 |
| Predictive Alarm Status | 3217 | 0 | 16 |
| PV Input 0 | 3224 | 0 | 16 |
| PV Input 1 | 3225 | 0 | 16 |
| PV Input 2 | 3226 | 0 | 16 |
| PV Input 3 | 3227 | 0 | 16 |
| PV Input 4 | 3228 | 0 | 16 |
| PV Switch 0 | 3230 | 0 | 1 |
| PV Switch 1 | 3230 | 1 | 1 |
| PV Switch 2 | 3230 | 2 | 1 |
| PV Switch 3 | 3230 | 3 | 1 |
| PV Switch 4 | 3230 | 4 | 1 |
| Motor Thermal Capacity Used | 9630 | 0 | 8 |

## Motor Two Speeds - SIL Stop, W. Cat 1/2

This function block is used to manage a two speed motor with Stop Category 0 or Stop Category 1 function compliance for Wiring Category 1 and Category 2.[14]

**Figure 19 - MotorTwoSpeedsSILStopCat1and2 Function Block**

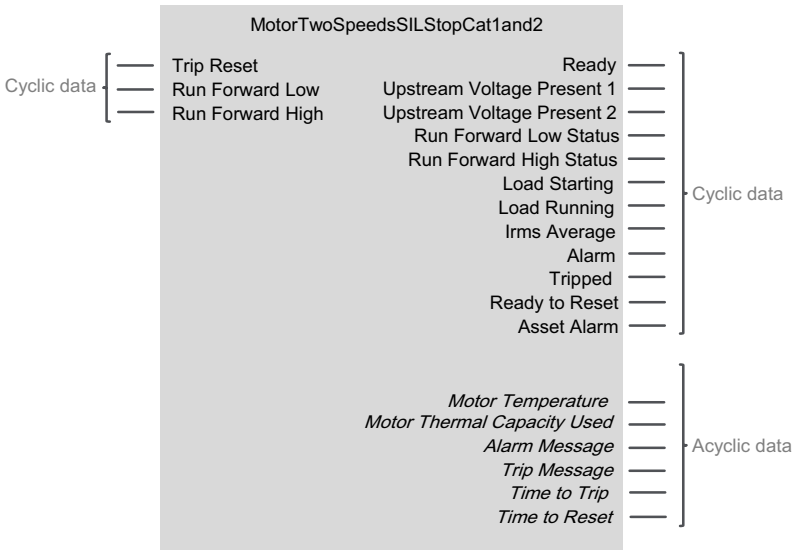



**Table 38 - Modbus TCP Inputs**

| Input Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Run Forward High | 8501 | 0 | 1 |
| Trip Reset | 8501 | 3 | 1 |
| Run Forward Low | 8501 | 6 | 1 |

14. Safety Integrity Level according to standard IEC 61508. Stop categories according to EN/IEC 60204-1. Wiring Category 1 and Category 2 according to ISO 13849.

### Table 39 - Modbus TCP Outputs

| Output Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Thermal Overload Time to Reset | 450 | 0 | 16 |
| Protection Trip Message 1 | 452 | 0 | 16 |
| Protection Trip Message 2 | 453 | 0 | 16 |
| Protection Alarm Message 1 | 461 | 0 | 16 |
| Protection Alarm Message 2 | 462 | 0 | 16 |
| $I_{RMS}$ Average | 500 | 0 | 32 |
| Thermal Overload Time to Trip | 511 | 0 | 16 |
| Ready | 3201 | 0 | 1 |
| Tripped | 3201 | 2 | 1 |
| Alarm | 3201 | 3 | 1 |
| Run Forward Low Status | 3201 | 5 | 1 |
| Run Forward High Status | 3201 | 6 | 1 |
| Load Running | 3201 | 8 | 1 |
| Ready to Reset | 3201 | 9 | 1 |
| Load Starting | 3201 | 15 | 1 |
| Asset Alarm | 3202 | 3 | 1 |
| Upstream Voltage Present 1 | 3202 | 12 | 1 |
| Upstream Voltage Present 2 | 3202 | 13 | 1 |
| Motor Thermal Capacity Used | 9630 | 0 | 8 |

# Motor Two Speeds - SIL Stop, W. Cat 3/4

This function block is used to manage a two speed motor with Stop Category 0 or Stop Category 1 function compliance for Wiring Category 3 and Category 4.[15]

**Figure 20 - MotorTwoSpeedsSILStopCat3and4 Function Block**

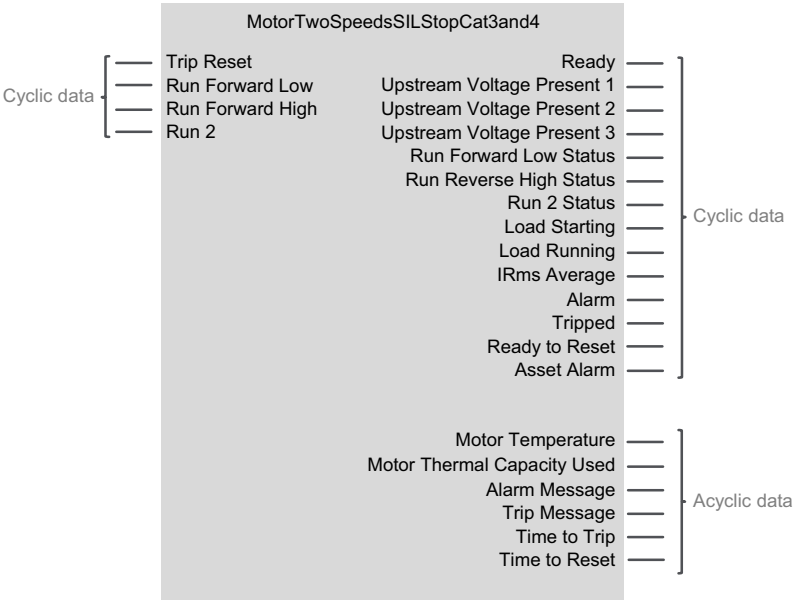



**Table 40 - Modbus TCP Inputs**

| Input Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Run Forward High | 8501 | 0 | 1 |
| Trip Reset | 8501 | 3 | 1 |
| Run Forward Low | 8501 | 6 | 1 |
| Run 2 | 8501 | 8 | 1 |

**Table 41 - Modbus TCP Outputs**

| Output Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Thermal Overload Time To Reset | 450 | 0 | 16 |
| Protection Trip Message 1 | 452 | 0 | 16 |
| Protection Trip Message 2 | 453 | 0 | 16 |
| Protection Alarm Message 1 | 461 | 0 | 16 |
| Protection Alarm Message 2 | 462 | 0 | 16 |
| $I_{RMS}$ Average | 500 | 0 | 32 |
| Thermal Overload Time To Trip | 511 | 0 | 16 |
| Ready | 3201 | 0 | 1 |
| Tripped | 3201 | 2 | 1 |
| Alarm | 3201 | 3 | 1 |
| Run Forward Low Status | 3201 | 5 | 1 |
| Run Forward High Status | 3201 | 6 | 1 |
| Run 2 Status | 3201 | 7 | 1 |
| Load Running | 3201 | 8 | 1 |

15. Safety Integrity Level according to standard IEC 61508. Stop categories according to EN/IEC 60204-1. Wiring Category 3 and Category 4 according to ISO 13849.

**Table 41 - Modbus TCP Outputs (Continued)**

| Output Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Ready To Reset | 3201 | 9 | 1 |
| Load Starting | 3201 | 15 | 1 |
| Asset Alarm | 3202 | 3 | 1 |
| Upstream Voltage Present 1 | 3202 | 12 | 1 |
| Upstream Voltage Present 2 | 3202 | 13 | 1 |
| Upstream Voltage Present 3 | 3202 | 14 | 1 |
| Motor Thermal Capacity Used | 9630 | 0 | 8 |

## Motor Two Speeds Two Directions

This function block is used to manage a two speed motor in two directions (forward and reverse).

**Figure 21 - MotorTwoSpeedsTwoDirections Function Block**

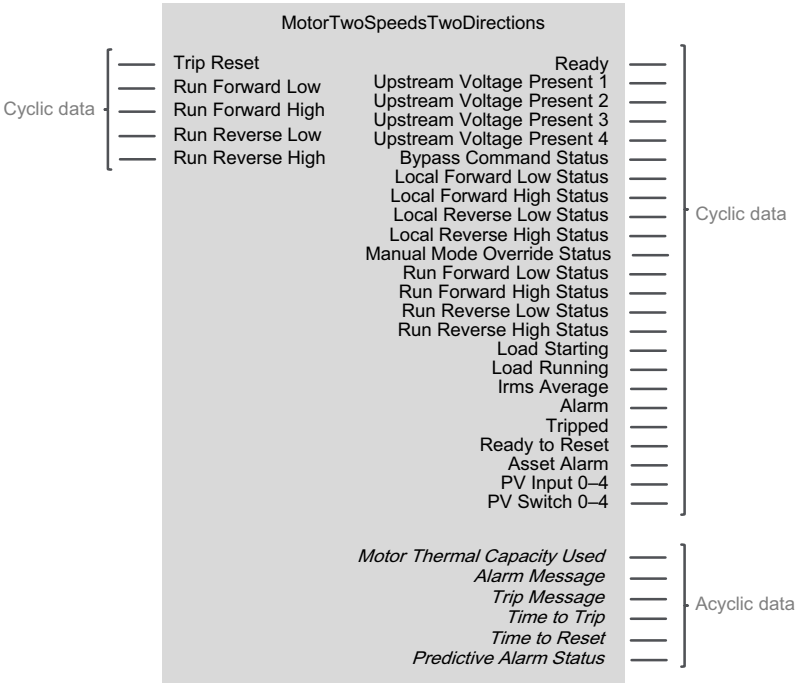



**Table 42 - Modbus TCP Inputs—Motor Two Speeds Two Directions**

| Input Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Run Forward High | 8501 | 0 | 1 |
| Run Reverse High | 8501 | 1 | 1 |
| Trip Reset | 8501 | 3 | 1 |
| Run Forward Low | 8501 | 6 | 1 |
| Run Reverse Low | 8501 | 7 | 1 |

**Table 43 - Modbus TCP Outputs—Motor Two Speeds Two Directions**

| Output Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Thermal Overload Time to Reset | 450 | 0 | 16 |
| Protection Trip Message 1 | 452 | 0 | 16 |
| Protection Trip Message 2 | 453 | 0 | 16 |

**Table 43 - Modbus TCP Outputs—Motor Two Speeds Two Directions (Continued)**

| Output Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Protection Alarm Message 1 | 461 | 0 | 16 |
| Protection Alarm Message 2 | 462 | 0 | 16 |
| $I_{RMS}$ Average | 500 | 0 | 32 |
| Thermal Overload Time to Trip | 511 | 0 | 16 |
| Ready | 3201 | 0 | 1 |
| Tripped | 3201 | 2 | 1 |
| Alarm | 3201 | 3 | 1 |
| Run Forward Low Status | 3201 | 5 | 1 |
| Run Forward High Status | 3201 | 6 | 1 |
| Load Running | 3201 | 8 | 1 |
| Ready to Reset | 3201 | 9 | 1 |
| Run Reverse Low Status | 3201 | 12 | 1 |
| Run Reverse High Status | 3201 | 13 | 1 |
| Load Starting | 3201 | 15 | 1 |
| Asset Alarm | 3202 | 3 | 1 |
| Upstream Voltage Present 1 | 3202 | 12 | 1 |
| Upstream Voltage Present 2 | 3202 | 13 | 1 |
| Upstream Voltage Present 3 | 3202 | 14 | 1 |
| Upstream Voltage Present 4 | 3202 | 15 | 1 |
| Bypass Command Status | 3215 | 0 | 1 |
| Local Forward Low Speed Status | 3215 | 3 | 1 |
| Local Forward High Speed Status | 3215 | 4 | 1 |
| Local Reverse Low Speed Status | 3215 | 5 | 1 |
| Local Reverse High Speed Status | 3215 | 6 | 1 |
| Manual Mode Override Status | 3215 | 7 | 1 |
| Predictive Alarm Status | 3217 | 0 | 16 |
| PV Input 0 | 3224 | 0 | 16 |
| PV Input 1 | 3225 | 0 | 16 |
| PV Input 2 | 3226 | 0 | 16 |
| PV Input 3 | 3227 | 0 | 16 |
| PV Input 4 | 3228 | 0 | 16 |
| PV Switch 0 | 3230 | 0 | 1 |
| PV Switch 1 | 3230 | 1 | 1 |
| PV Switch 2 | 3230 | 2 | 1 |
| PV Switch 3 | 3230 | 3 | 1 |
| PV Switch 4 | 3230 | 4 | 1 |
| Motor Thermal Capacity Used | 9630 | 0 | 8 |

# Motor Two Speeds Two Directions - SIL Stop, W. Cat 1/2

This function block is used to manage a two speed motor in two directions (forward and reverse) with Stop Category 0 or Stop Category 1 function compliance for Wiring Category 1 and Category 2.[16]

**Figure 22 - MotorTwoSpeedsTwoDirectionsSILStopCat1and2 Function Block**

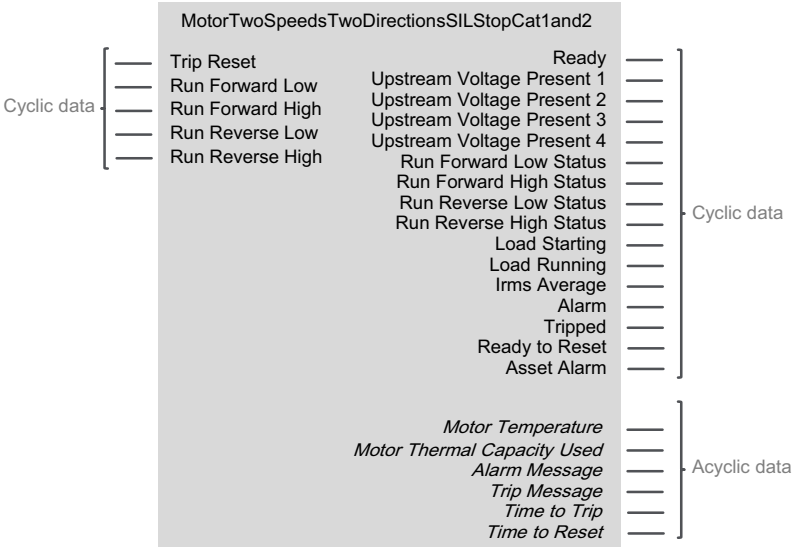



**Table 44 - Modbus TCP Inputs**

| Input Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Run Forward High | 8501 | 0 | 1 |
| Run Reverse High | 8501 | 1 | 1 |
| Trip Reset | 8501 | 3 | 1 |
| Run Forward Low | 8501 | 6 | 1 |
| Run Reverse Low | 8501 | 7 | 1 |

**Table 45 - Modbus TCP Outputs**

| Output Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Thermal Overload Time to Reset | 450 | 0 | 16 |
| Protection Trip Message 1 | 452 | 0 | 16 |
| Protection Trip Message 2 | 453 | 0 | 16 |
| Protection Alarm Message 1 | 461 | 0 | 16 |
| Protection Alarm Message 2 | 462 | 0 | 16 |
| $I_{RMS}$ Average | 500 | 0 | 32 |
| Thermal Overload Time to Trip | 511 | 0 | 16 |
| Ready | 3201 | 0 | 1 |
| Tripped | 3201 | 2 | 1 |
| Alarm | 3201 | 3 | 1 |
| Run Forward Low Status | 3201 | 5 | 1 |
| Run Forward High Status | 3201 | 6 | 1 |
| Load Running | 3201 | 8 | 1 |
| Ready to Reset | 3201 | 9 | 1 |

16. Safety Integrity Level according to standard IEC 61508. Stop categories according to EN/IEC 60204-1. Wiring Category 1 and Category 2 according to ISO 13849.

**Table 45 - Modbus TCP Outputs (Continued)**

| Output Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Run Reverse Low Status | 3201 | 12 | 1 |
| Run Reverse High Status | 3201 | 13 | 1 |
| Load Starting | 3201 | 15 | 1 |
| Asset Alarm | 3202 | 3 | 1 |
| Upstream Voltage Present 1 | 3202 | 12 | 1 |
| Upstream Voltage Present 2 | 3202 | 13 | 1 |
| Upstream Voltage Present 3 | 3202 | 14 | 1 |
| Upstream Voltage Present 4 | 3202 | 15 | 1 |
| Motor Thermal Capacity Used | 9630 | 0 | 8 |

## Motor Two Speeds Two Directions - SIL Stop, W. Cat 3/4

This function block is used to manage a two speed motor in two directions (forward and reverse) with Stop Category 0 or Stop Category 1 function compliance for Wiring Category 3 and Category 4.[17]

**Figure 23 - MotorTwoSpeedsTwoDirectionsSILStopCat3and4 Function Block**

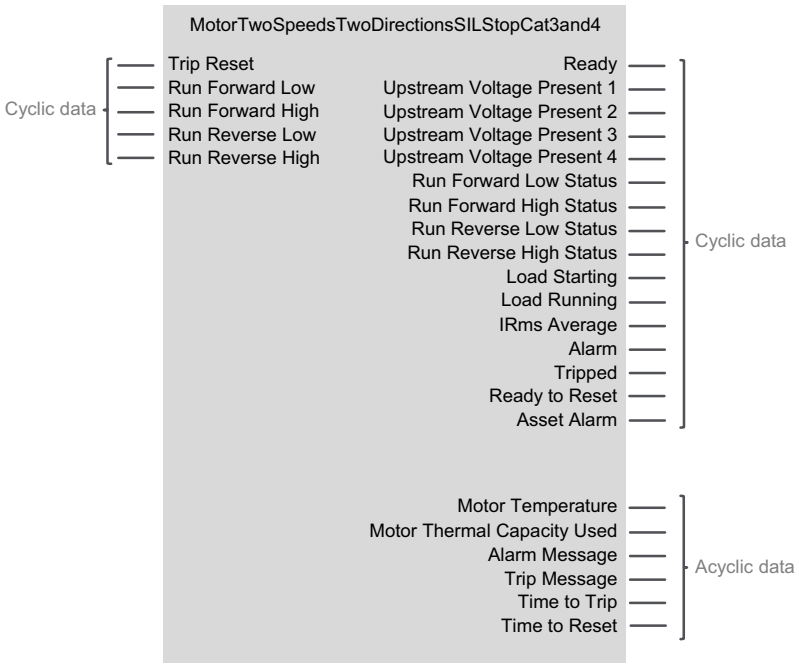



**Table 46 - Modbus TCP Inputs**

| Input Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Run Forward High | 8501 | 0 | 1 |
| Run Reverse High | 8501 | 1 | 1 |
| Trip Reset | 8501 | 3 | 1 |
| Run Forward Low | 8501 | 6 | 1 |
| Run Reverse Low | 8501 | 7 | 1 |

17. Safety Integrity Level according to standard IEC 61508. Stop categories according to EN/IEC 60204-1. Wiring Category 3 and Category 4 according to ISO 13849.

### Table 47 - Modbus TCP Outputs

| Output Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Thermal Overload Time To Reset | 450 | 0 | 16 |
| Protection Trip Message 1 | 452 | 0 | 16 |
| Protection Trip Message 2 | 453 | 0 | 16 |
| Protection Alarm Message 1 | 461 | 0 | 16 |
| Protection Alarm Message 2 | 462 | 0 | 16 |
| $I_{RMS}$ Average | 500 | 0 | 32 |
| Thermal Overload Time To Trip | 511 | 0 | 16 |
| Ready | 3201 | 0 | 1 |
| Tripped | 3201 | 2 | 1 |
| Alarm | 3201 | 3 | 1 |
| Run Forward Low Status | 3201 | 5 | 1 |
| Run Forward High Status | 3201 | 6 | 1 |
| Load Running | 3201 | 8 | 1 |
| Ready To Reset | 3201 | 9 | 1 |
| Run Reverse Low Status | 3201 | 12 | 1 |
| Run Reverse High Status | 3201 | 13 | 1 |
| Load Starting | 3201 | 15 | 1 |
| Asset Alarm | 3202 | 3 | 1 |
| Upstream Voltage Present 1 | 3202 | 12 | 1 |
| Upstream Voltage Present 2 | 3202 | 13 | 1 |
| Upstream Voltage Present 3 | 3202 | 14 | 1 |
| Upstream Voltage Present 4 | 3202 | 15 | 1 |
| Motor Thermal Capacity Used | 9630 | 0 | 8 |

# Resistor

This function block is used to manage a resistive load.

**Figure 24 - Resistor Function Block**

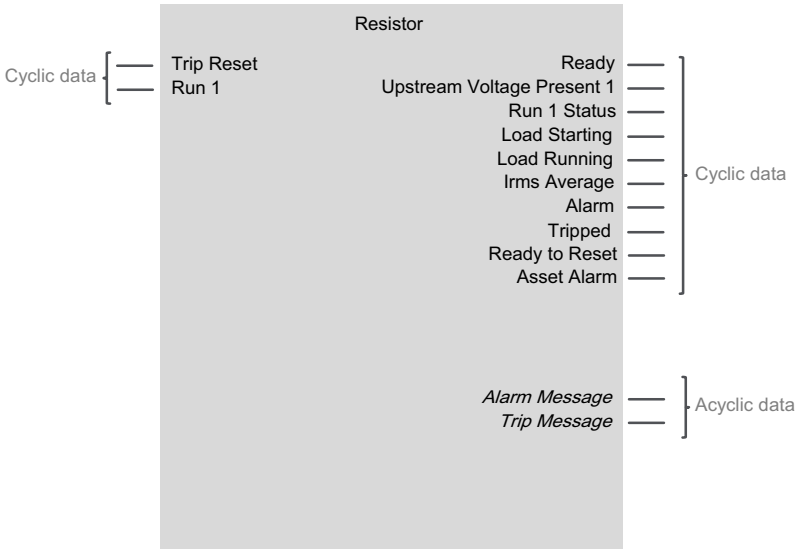



**Table 48 - Modbus TCP Inputs—Resistor**

| Input Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Run 1 | 8501 | 0 | 1 |
| Trip Reset | 8501 | 3 | 1 |

**Table 49 - Modbus TCP Outputs—Resistor**

| Output Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Protection Trip Message 1 | 452 | 0 | 16 |
| Protection Trip Message 2 | 453 | 0 | 16 |
| Protection Alarm Message 1 | 461 | 0 | 16 |
| Protection Alarm Message 2 | 462 | 0 | 16 |
| $I_{RMS}$ Average | 500 | 0 | 32 |
| Ready | 3201 | 0 | 1 |
| Run 1 Status | 3201 | 1 | 1 |
| Tripped | 3201 | 2 | 1 |
| Alarm | 3201 | 3 | 1 |
| Load Running | 3201 | 8 | 1 |
| Ready to Reset | 3201 | 9 | 1 |
| Load Starting | 3201 | 15 | 1 |
| Asset Alarm | 3202 | 3 | 1 |
| Upstream Voltage Present 1 | 3202 | 12 | 1 |

# Power Supply

This function block is used to manage a power supply.

**Figure 25 - Power Supply Function Block**

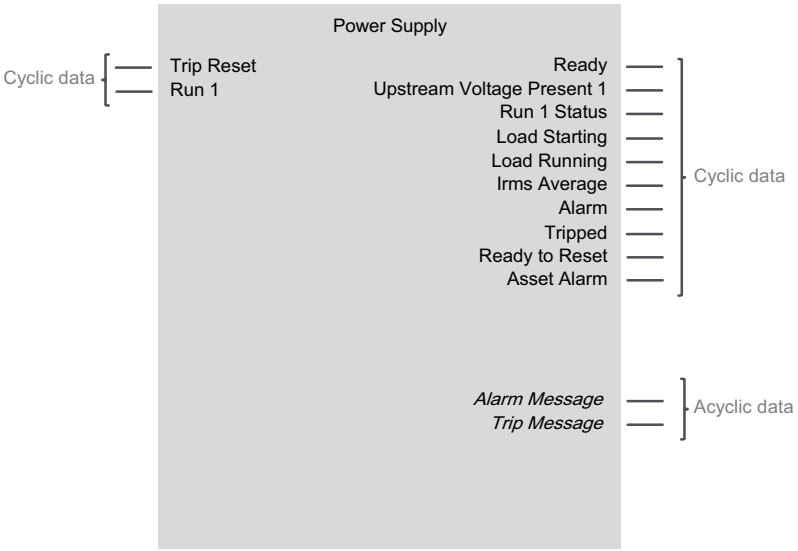



**Table 50 - Modbus TCP Inputs—Power Supply**

| Input Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Run 1 | 8501 | 0 | 1 |
| Trip Reset | 8501 | 3 | 1 |

**Table 51 - Modbus TCP Outputs—Power Supply**

| Output Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Protection Trip Message 1 | 452 | 0 | 16 |
| Protection Trip Message 2 | 453 | 0 | 16 |
| Protection Alarm Message 1 | 461 | 0 | 16 |
| Protection Alarm Message 2 | 462 | 0 | 16 |
| $I_{RMS}$ Average | 500 | 0 | 32 |
| Ready | 3201 | 0 | 1 |
| Run 1 Status | 3201 | 1 | 1 |
| Tripped | 3201 | 2 | 1 |
| Alarm | 3201 | 3 | 1 |
| Load Running | 3201 | 8 | 1 |
| Ready to Reset | 3201 | 9 | 1 |
| Load Starting | 3201 | 15 | 1 |
| Asset Alarm | 3202 | 3 | 1 |
| Upstream Voltage Present 1 | 3202 | 12 | 1 |

# Transformer

This function block is used to manage a transformer.

**Figure 26 - Transformer Function Block**

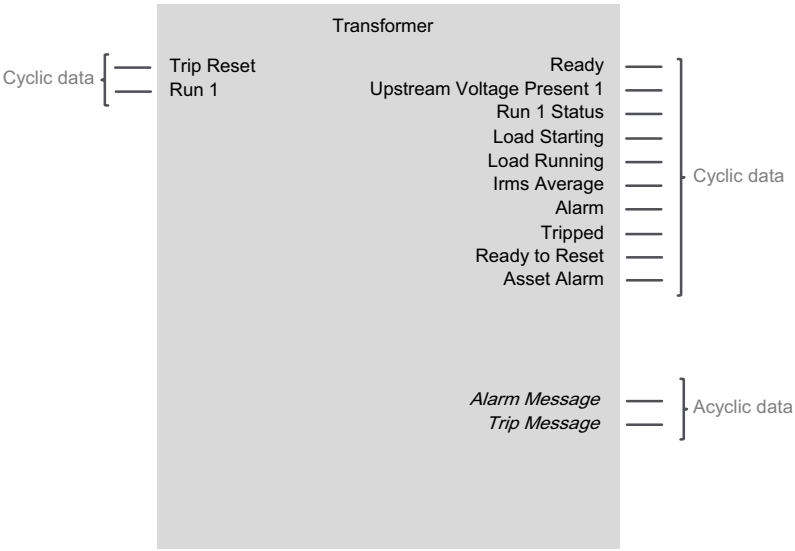



**Table 52 - Modbus TCP Inputs—Transformer**

| Input Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Run 1 | 8501 | 0 | 1 |
| Trip Reset | 8501 | 3 | 1 |

**Table 53 - Modbus TCP Outputs—Transformer**

| Output Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Protection Trip Message 1 | 452 | 0 | 16 |
| Protection Trip Message 2 | 453 | 0 | 16 |
| Protection Alarm Message 1 | 461 | 0 | 16 |
| Protection Alarm Message 2 | 462 | 0 | 16 |
| $I_{RMS}$ Average | 500 | 0 | 32 |
| Ready | 3201 | 0 | 1 |
| Run 1 Status | 3201 | 1 | 1 |
| Tripped | 3201 | 2 | 1 |
| Alarm | 3201 | 3 | 1 |
| Load Running | 3201 | 8 | 1 |
| Ready to Reset | 3201 | 9 | 1 |
| Load Starting | 3201 | 15 | 1 |
| Asset Alarm | 3202 | 3 | 1 |
| Upstream Voltage Present 1 | 3202 | 12 | 1 |

# Application Function Blocks

## Pump

This function block is used to manage a pump.

**Figure 27 - Pump Function Block**

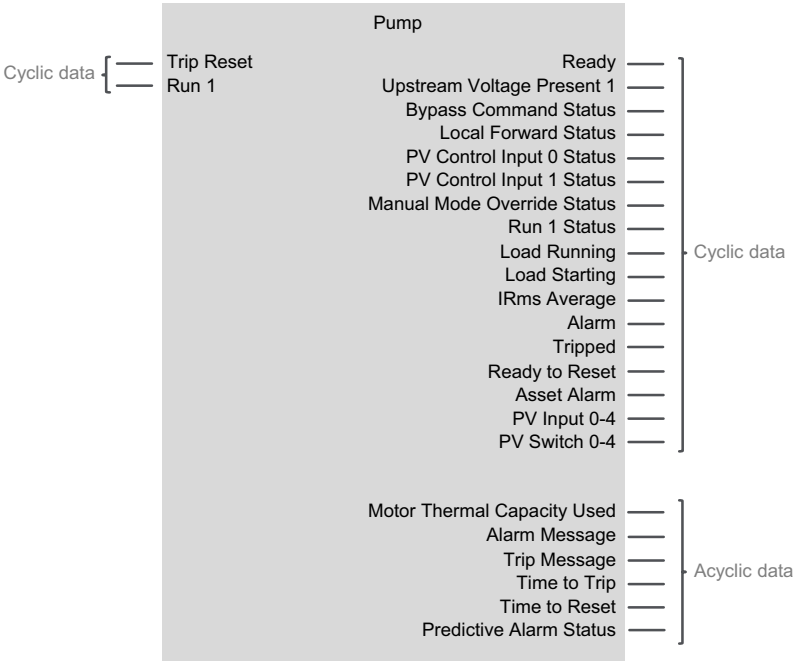



**Table 54 - Modbus TCP Inputs — Pump**

| Input Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Run 1 | 8501 | 0 | 1 |
| Trip Reset | 8501 | 3 | 1 |

**Table 55 - Modbus TCP Outputs — Pump**

| Output Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Thermal Overload Time To Reset | 450 | 0 | 16 |
| Protection Trip Message 1 | 452 | 0 | 16 |
| Protection Trip Message 2 | 453 | 0 | 16 |
| Protection Alarm Message 1 | 461 | 0 | 16 |
| Protection Alarm Message 2 | 462 | 0 | 16 |
| $I_{RMS}$ Average | 500 | 0 | 32 |
| Thermal Overload Time To Trip | 511 | 0 | 16 |
| Ready | 3201 | 0 | 1 |
| Run 1 Status | 3201 | 1 | 1 |
| Tripped | 3201 | 2 | 1 |
| Alarm | 3201 | 3 | 1 |
| Load Running | 3201 | 8 | 1 |
| Ready To Reset | 3201 | 9 | 1 |
| Load Starting | 3201 | 15 | 1 |
| Asset Alarm | 3202 | 3 | 1 |

**Table 55 - Modbus TCP Outputs — Pump (Continued)**

| Output Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Upstream Voltage Present 1 | 3202 | 12 | 1 |
| Bypass Command Status | 3215 | 0 | 1 |
| Local Forward Status | 3215 | 1 | 1 |
| PV Control Input 0 Status | 3215 | 5 | 1 |
| PV Control Input 1 Status | 3215 | 6 | 1 |
| Manual Mode Override Status | 3215 | 7 | 1 |
| Predictive Alarm Status | 3217 | 0 | 16 |
| PV Input 0 | 3224 | 0 | 16 |
| PV Input 1 | 3225 | 0 | 16 |
| PV Input 2 | 3226 | 0 | 16 |
| PV Input 3 | 3227 | 0 | 16 |
| PV Input 4 | 3228 | 0 | 16 |
| PV Switch 0 | 3230 | 0 | 1 |
| PV Switch 1 | 3230 | 1 | 1 |
| PV Switch 2 | 3230 | 2 | 1 |
| PV Switch 3 | 3230 | 3 | 1 |
| PV Switch 4 | 3230 | 4 | 1 |
| Motor Thermal Capacity Used | 9630 | 0 | 8 |

## Conveyor One Direction

This function block is used to manage a conveyor in one direction.

**Figure 28 - Conveyor One Direction Function Block**

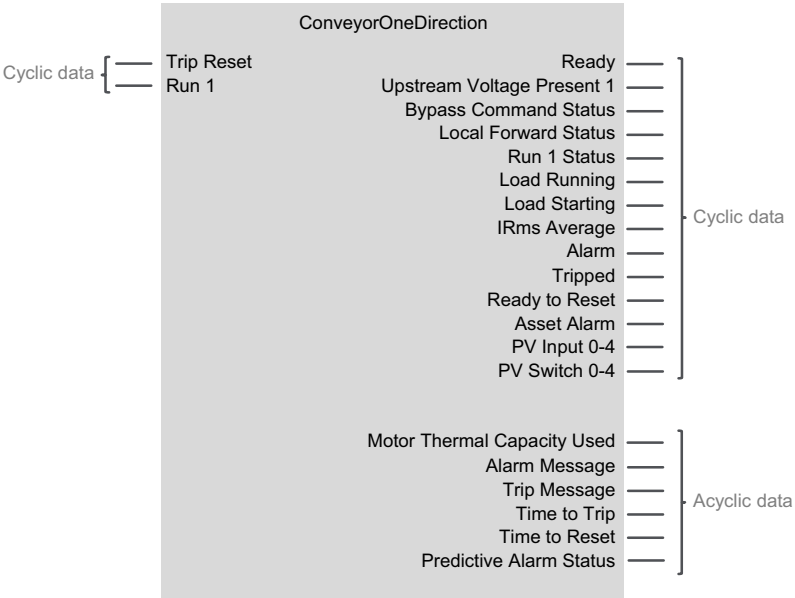



**Table 56 - Modbus TCP Inputs — Conveyor One Direction**

| Input Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Run 1 | 8501 | 0 | 1 |
| Trip Reset | 8501 | 3 | 1 |

### Table 57 - Modbus TCP Outputs — Conveyor One Direction

| Output Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Thermal Overload Time To Reset | 450 | 0 | 16 |
| Protection Trip Message 1 | 452 | 0 | 16 |
| Protection Trip Message 2 | 453 | 0 | 16 |
| Protection Alarm Message 1 | 461 | 0 | 16 |
| Protection Alarm Message 2 | 462 | 0 | 16 |
| $I_{RMS}$ Average | 500 | 0 | 32 |
| Thermal Overload Time To Trip | 511 | 0 | 16 |
| Ready | 3201 | 0 | 1 |
| Run 1 Status | 3201 | 1 | 1 |
| Tripped | 3201 | 2 | 1 |
| Alarm | 3201 | 3 | 1 |
| Load Running | 3201 | 8 | 1 |
| Ready To Reset | 3201 | 9 | 1 |
| Load Starting | 3201 | 15 | 1 |
| Asset Alarm | 3202 | 3 | 1 |
| Upstream Voltage Present 1 | 3202 | 12 | 1 |
| Bypass Command Status | 3215 | 0 | 1 |
| Local Forward Status | 3215 | 1 | 1 |
| Predictive Alarm Status | 3217 | 0 | 16 |
| PV Input 0 | 3224 | 0 | 16 |
| PV Input 1 | 3225 | 0 | 16 |
| PV Input 2 | 3226 | 0 | 16 |
| PV Input 3 | 3227 | 0 | 16 |
| PV Input 4 | 3228 | 0 | 16 |
| PV Switch 0 | 3230 | 0 | 1 |
| PV Switch 1 | 3230 | 1 | 1 |
| PV Switch 2 | 3230 | 2 | 1 |
| PV Switch 3 | 3230 | 3 | 1 |
| PV Switch 4 | 3230 | 4 | 1 |
| Motor Thermal Capacity Used | 9630 | 0 | 8 |

# Conveyor One Direction - SIL Stop, W. Cat 1/2

This function block is used to manage a conveyor in one direction, with Stop Category 0 or Stop Category 1 function compliance for Wiring Category 1 and Category 2.[18]

**Figure 29 - Conveyor One Direction — SIL Stop, W. Cat 1/2 Function Block**

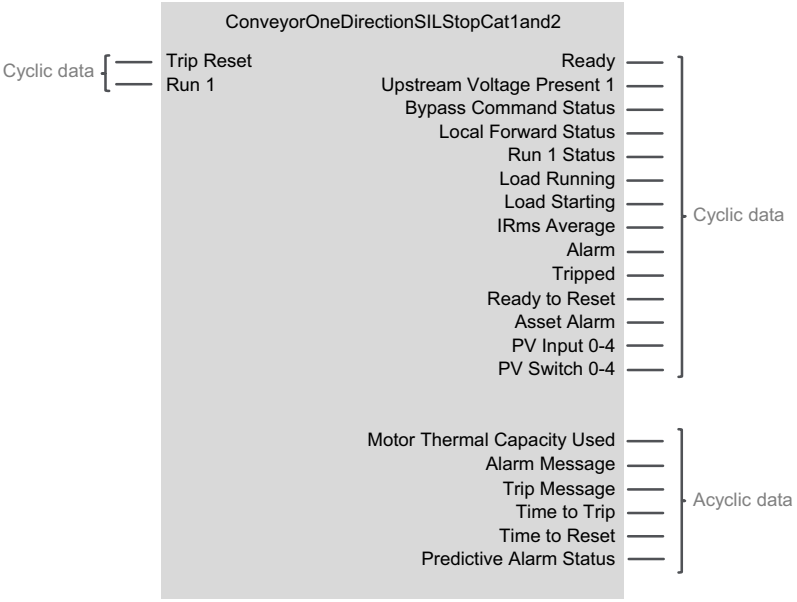



**Table 58 - Modbus TCP Inputs**

| Input Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Run 1 | 8501 | 0 | 1 |
| Trip Reset | 8501 | 3 | 1 |

**Table 59 - Modbus TCP Outputs**

| Output Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Thermal Overload Time To Reset | 450 | 0 | 16 |
| Protection Trip Message 1 | 452 | 0 | 16 |
| Protection Trip Message 2 | 453 | 0 | 16 |
| Protection Alarm Message 1 | 461 | 0 | 16 |
| Protection Alarm Message 2 | 462 | 0 | 16 |
| $I_{RMS}$ Average | 500 | 0 | 32 |
| Thermal Overload Time To Trip | 511 | 0 | 16 |
| Ready | 3201 | 0 | 1 |
| Run 1 Status | 3201 | 1 | 1 |
| Tripped | 3201 | 2 | 1 |
| Alarm | 3201 | 3 | 1 |
| Load Running | 3201 | 8 | 1 |
| Ready To Reset | 3201 | 9 | 1 |
| Load Starting | 3201 | 15 | 1 |
| Asset Alarm | 3202 | 3 | 1 |

18. Safety Integrity Level according to standard IEC 61508. Stop categories according to EN/IEC 60204-1. Wiring Category 1 and Category 2 according to ISO 13849.

**Table 59 - Modbus TCP Outputs (Continued)**

| Output Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Upstream Voltage Present 1 | 3202 | 12 | 1 |
| Bypass Command Status | 3215 | 0 | 1 |
| Local Forward Status | 3215 | 1 | 1 |
| Predictive Alarm Status | 3217 | 0 | 16 |
| PV Input 0 | 3224 | 0 | 16 |
| PV Input 1 | 3225 | 0 | 16 |
| PV Input 2 | 3226 | 0 | 16 |
| PV Input 3 | 3227 | 0 | 16 |
| PV Input 4 | 3228 | 0 | 16 |
| PV Switch 0 | 3230 | 0 | 1 |
| PV Switch 1 | 3230 | 1 | 1 |
| PV Switch 2 | 3230 | 2 | 1 |
| PV Switch 3 | 3230 | 3 | 1 |
| PV Switch 4 | 3230 | 4 | 1 |
| Motor Thermal Capacity Used | 9630 | 0 | 8 |

## Conveyor Two Directions

This function block is used to manage a conveyor in two directions.

**Figure 30 - Conveyor Two Directions Function Block**

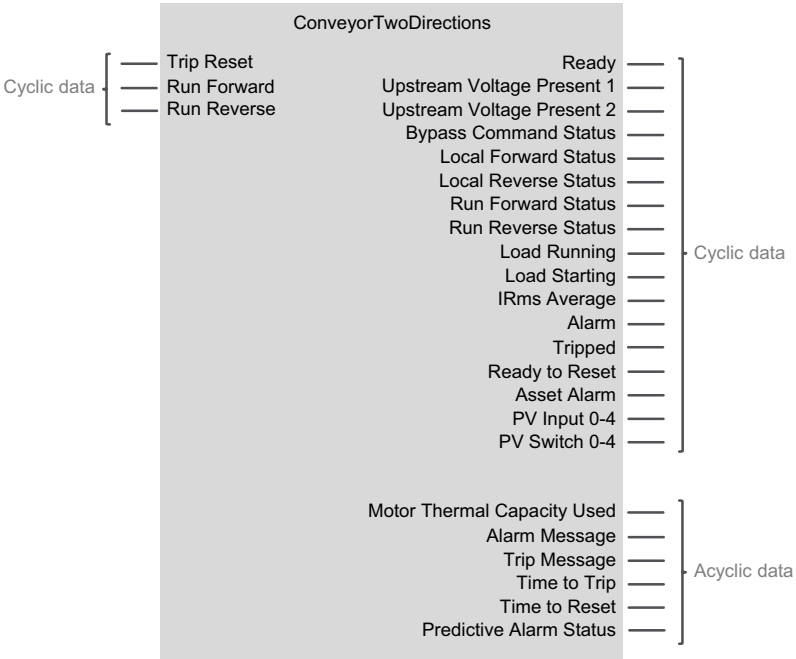



**Table 60 - Modbus TCP Inputs — Conveyor Two Directions**

| Input Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Run Forward | 8501 | 0 | 1 |
| Run Reverse | 8501 | 1 | 1 |
| Trip Reset | 8501 | 3 | 1 |

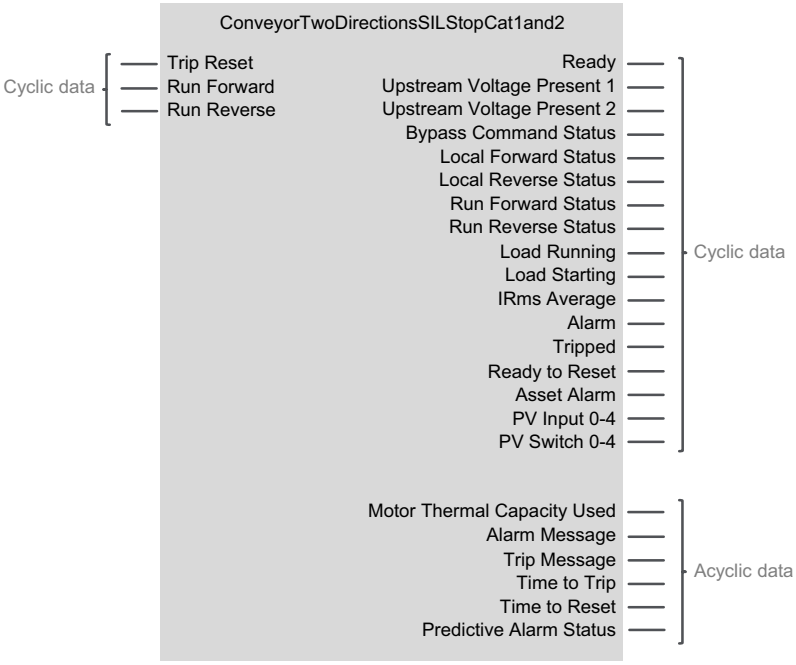
### Table 61 - Modbus TCP Outputs — Conveyor Two Directions

| Output Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Thermal Overload Time To Reset | 450 | 0 | 16 |
| Protection Trip Message 1 | 452 | 0 | 16 |
| Protection Trip Message 2 | 453 | 0 | 16 |
| Protection Alarm Message 1 | 461 | 0 | 16 |
| Protection Alarm Message 2 | 462 | 0 | 16 |
| $I_{RMS}$ Average | 500 | 0 | 32 |
| Thermal Overload Time To Trip | 511 | 0 | 16 |
| Ready | 3201 | 0 | 1 |
| Run Forward Status | 3201 | 1 | 1 |
| Tripped | 3201 | 2 | 1 |
| Alarm | 3201 | 3 | 1 |
| Load Running | 3201 | 8 | 1 |
| Ready To Reset | 3201 | 9 | 1 |
| Load Starting | 3201 | 15 | 1 |
| Run Reverse Status | 3202 | 1 | 1 |
| Asset Alarm | 3202 | 3 | 1 |
| Upstream Voltage Present 1 | 3202 | 12 | 1 |
| Upstream Voltage Present 2 | 3202 | 13 | 1 |
| Bypass Command Status | 3215 | 0 | 1 |
| Local Forward Status | 3215 | 1 | 1 |
| Local Reverse Status | 3215 | 2 | 1 |
| Predictive Alarm Status | 3217 | 0 | 16 |
| PV Input 0 | 3224 | 0 | 16 |
| PV Input 1 | 3225 | 0 | 16 |
| PV Input 2 | 3226 | 0 | 16 |
| PV Input 3 | 3227 | 0 | 16 |
| PV Input 4 | 3228 | 0 | 16 |
| PV Switch 0 | 3230 | 0 | 1 |
| PV Switch 1 | 3230 | 1 | 1 |
| PV Switch 2 | 3230 | 2 | 1 |
| PV Switch 3 | 3230 | 3 | 1 |
| PV Switch 4 | 3230 | 4 | 1 |
| Motor Thermal Capacity Used | 9630 | 0 | 8 |

# Conveyor Two Directions - SIL Stop, W. Cat 1/2

This function block is used to manage a conveyor in two directions with Stop Category 0 or Stop Category 1 function compliance for Wiring Category 1 and Category 2.[19]

**Figure 31 - Conveyor Two Directions — SIL Stop, W. Cat 1/2 Function Block**




### Table 62 - Modbus TCP Inputs

| Input Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Run Forward | 8501 | 0 | 1 |
| Run Reverse | 8501 | 1 | 1 |
| Trip Reset | 8501 | 3 | 1 |

### Table 63 - Modbus TCP Outputs

| Output Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Thermal Overload Time To Reset | 450 | 0 | 16 |
| Protection Trip Message 1 | 452 | 0 | 16 |
| Protection Trip Message 2 | 453 | 0 | 16 |
| Protection Alarm Message 1 | 461 | 0 | 16 |
| Protection Alarm Message 2 | 462 | 0 | 16 |
| $I_{RMS}$ Average | 500 | 0 | 32 |
| Thermal Overload Time To Trip | 511 | 0 | 16 |
| Ready | 3201 | 0 | 1 |
| Run Forward Status | 3201 | 1 | 1 |
| Tripped | 3201 | 2 | 1 |
| Alarm | 3201 | 3 | 1 |
| Load Running | 3201 | 8 | 1 |

19. Safety Integrity Level according to standard IEC 61508. Stop categories according to EN/IEC 60204-1. Wiring Category 1 and Category 2 according to ISO 13849.

**Table 63 - Modbus TCP Outputs (Continued)**

| Output Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Ready To Reset | 3201 | 9 | 1 |
| Load Starting | 3201 | 15 | 1 |
| Run Reverse Status | 3202 | 1 | 1 |
| Asset Alarm | 3202 | 3 | 1 |
| Upstream Voltage Present 1 | 3202 | 12 | 1 |
| Upstream Voltage Present 2 | 3202 | 13 | 1 |
| Bypass Command Status | 3215 | 0 | 1 |
| Local Forward Status | 3215 | 1 | 1 |
| Local Reverse Status | 3215 | 2 | 1 |
| Predictive Alarm Status | 3217 | 0 | 16 |
| PV Input 0 | 3224 | 0 | 16 |
| PV Input 1 | 3225 | 0 | 16 |
| PV Input 2 | 3226 | 0 | 16 |
| PV Input 3 | 3227 | 0 | 16 |
| PV Input 4 | 3228 | 0 | 16 |
| PV Switch 0 | 3230 | 0 | 1 |
| PV Switch 1 | 3230 | 1 | 1 |
| PV Switch 2 | 3230 | 2 | 1 |
| PV Switch 3 | 3230 | 3 | 1 |
| PV Switch 4 | 3230 | 4 | 1 |
| Motor Thermal Capacity Used | 9630 | 0 | 8 |

# System Energy

This function block performs the following functions:

- Returns the energy information of the System Avatar
- Resets the energy registers of the System Avatar
- Sets the energy preset values of the System Avatar

**Figure 32 - SystemEnergy Function Block**

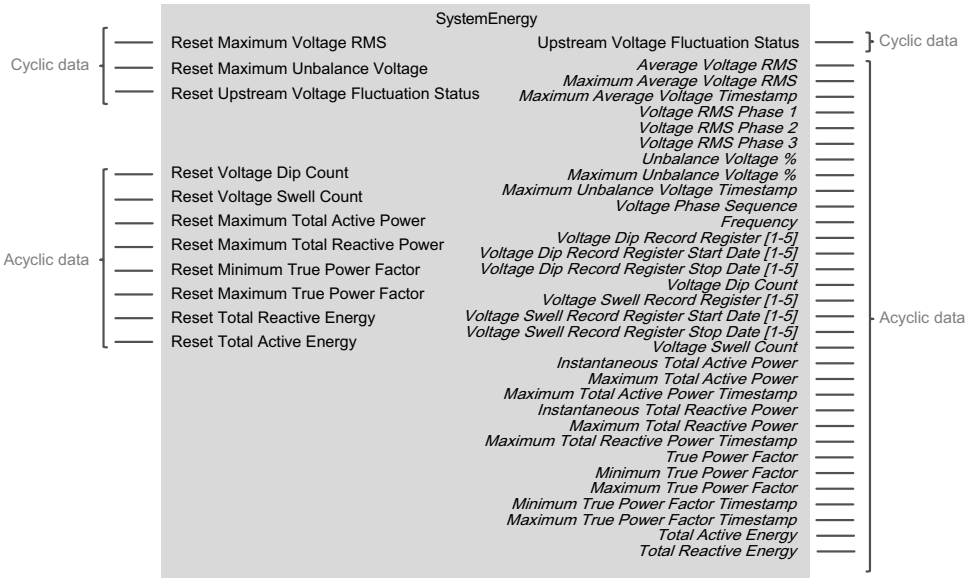



**Table 64 - Modbus TCP Inputs—System Energy**

| Input Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Reset Maximum Voltage RMS | 711 | 0 | 1 |
| Reset Maximum Unbalance Voltage | 711 | 1 | 1 |
| Reset Upstream Voltage Fluctuation Status | 711 | 2 | 1 |
| Reset Voltage Dip Count | 711 | 8 | 1 |
| Reset Voltage Swell Count | 711 | 9 | 1 |
| Reset Maximum Total Active Power | 712 | 0 | 1 |
| Reset Maximum Total Reactive Power | 712 | 1 | 1 |
| Reset Minimum True Power Factor | 712 | 8 | 1 |
| Reset Maximum True Power Factor | 712 | 9 | 1 |
| Reset Total Active Energy | 713 | 0 | 1 |
| Reset Total Reactive Energy | 713 | 1 | 1 |

**Table 65 - Modbus TCP Outputs—System Energy**

| Output Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Total Active Energy | 143 | 0 | 32 |
| Total Reactive Energy | 145 | 0 | 32 |
| Frequency (Hz) | 474 | 0 | 8 |
| Average Voltage RMS | 476 | 0 | 16 |
| Voltage RMS Phase 1 (V) | 477 | 0 | 16 |
| Voltage RMS Phase 2 (V) | 478 | 0 | 16 |
| Voltage RMS Phase 3 (V) | 479 | 0 | 16 |

**Table 65 - Modbus TCP Outputs—System Energy (Continued)**

| Output Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Percentage of Unbalance Voltage (%) | 480 | 0 | 8 |
| True Power Factor | 481 | 0 | 8 |
| Instantaneous Total Active Power | 482 | 0 | 32 |
| Instantaneous Total Reactive Power | 484 | 0 | 32 |
| Voltage Dip Count | 1550 | 0 | 16 |
| Voltage Swell Count | 1551 | 0 | 16 |
| Upstream Voltage Fluctuation Status | 1553 | 0 | 1 |
| Voltage Dip Record Register 1 (most recent) | 1600 | 0 | 16 |
| Voltage Dip Record 1 Start Date | 1601 | 0 | 64 |
| Voltage Dip Record 1 Stop Date | 1605 | 0 | 64 |
| Voltage Dip Record Register 2 | 1609 | 0 | 16 |
| Voltage Dip Record 2 Start Date | 1610 | 0 | 64 |
| Voltage Dip Record 2 Stop Date | 1614 | 0 | 64 |
| Voltage Dip Record Register 3 | 1618 | 0 | 16 |
| Voltage Dip Record 3 Start Date | 1619 | 0 | 64 |
| Voltage Dip Record 3 Stop Date | 1623 | 0 | 64 |
| Voltage Dip Record Register 4 | 1627 | 0 | 16 |
| Voltage Dip Record 4 Start Date | 1628 | 0 | 64 |
| Voltage Dip Record 4 Stop Date | 1632 | 0 | 64 |
| Voltage Dip Record Register 5 (least recent) | 1636 | 0 | 16 |
| Voltage Dip Record 5 Start Date | 1637 | 0 | 64 |
| Voltage Dip Record 5 Stop Date | 1641 | 0 | 64 |
| Voltage Swell Record Register 1 (most recent) | 1650 | 0 | 16 |
| Voltage Swell Record 1 Start Date | 1651 | 0 | 64 |
| Voltage Swell Record 1 Stop Date | 1655 | 0 | 64 |
| Voltage Swell Record Register 2 | 1659 | 0 | 16 |
| Voltage Swell Record 2 Start Date | 1660 | 0 | 64 |
| Voltage Swell Record 2 Stop Date | 1664 | 0 | 64 |
| Voltage Swell Record Register 3 | 1668 | 0 | 16 |
| Voltage Swell Record 3 Start Date | 1669 | 0 | 64 |
| Voltage Swell Record 3 Stop Date | 1673 | 0 | 64 |
| Voltage Swell Record Register 4 | 1677 | 0 | 16 |
| Voltage Swell Record 4 Start Date | 1678 | 0 | 64 |
| Voltage Swell Record 4 Stop Date | 1682 | 0 | 64 |
| Voltage Swell Record Register 5 (least recent) | 1686 | 0 | 16 |
| Voltage Swell Record 5 Start Date | 1687 | 0 | 64 |
| Voltage Swell Record 5 Stop Date | 1691 | 0 | 64 |
| Maximum Average Voltage Timestamp | 2120 | 0 | 64 |
| Maximum Average Voltage RMS | 2124 | 0 | 16 |
| Maximum Unbalance Voltage Timestamp | 2128 | 0 | 64 |
| Maximum Unbalance Voltage % | 2132 | 0 | 8 |

**Table 65 - Modbus TCP Outputs—System Energy (Continued)**

| Output Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Maximum Total Active Power Timestamp | 2140 | 0 | 64 |
| Maximum Total Active Power | 2144 | 0 | 32 |
| Maximum Total Reactive Power Timestamp | 2148 | 0 | 64 |
| Maximum Total Reactive Power | 2152 | 0 | 32 |
| Maximum True Power Factor Timestamp | 2160 | 0 | 64 |
| Maximum True Power Factor | 2164 | 0 | 8 |
| Minimum True Power Factor Timestamp | 2168 | 0 | 64 |
| Minimum True Power Factor | 2172 | 0 | 8 |
| Voltage Phase Sequence (ABC or ACB) | 3202 | 0 | 1 |

# System Diagnostics

This function block returns and resets the diagnostic information of the System Avatar.

**Figure 33 - SystemDiagnostics Function Block**

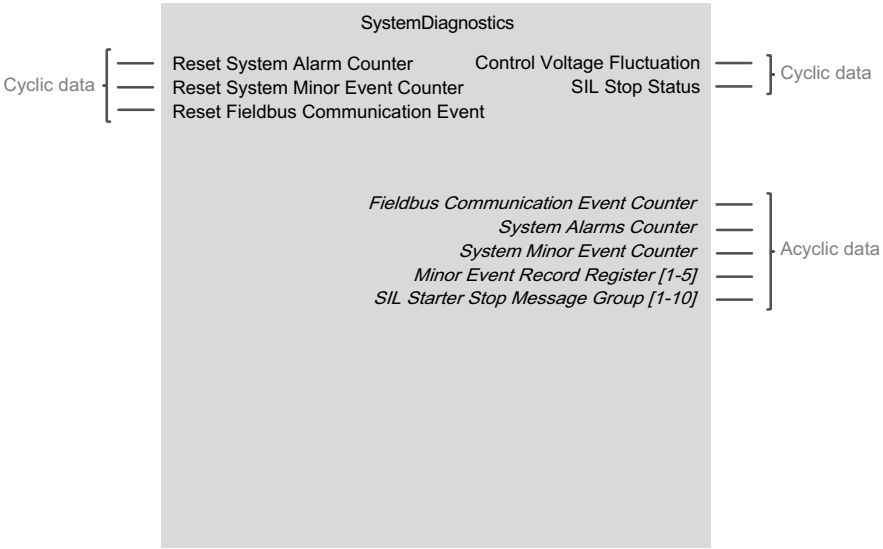



**Table 66 - Modbus TCP Inputs—System Diagnostics**

| Input Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Reset System Alarm Counter | 8502 | 0 | 1 |
| Reset System Minor Event Counter | 8502 | 1 | 1 |
| Reset Fieldbus Communication Event Counter | 8503 | 2 | 1 |

**Table 67 - Modbus TCP Outputs—System Diagnostics**

| Output Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| System Minor Event Counter | 90 | 0 | 16 |
| Fieldbus Communication Event Counter | 91 | 0 | 16 |
| System Alarms Counter | 92 | 0 | 16 |
| Minor Event Record Register 1 | 300 | 0 | 80 |
| Minor Event Record Register 2 | 310 | 0 | 80 |

**Table 67 - Modbus TCP Outputs—System Diagnostics (Continued)**

| Output Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Minor Event Record Register 3 | 320 | 0 | 80 |
| Minor Event Record Register 4 | 330 | 0 | 80 |
| Minor Event Record Register 5 | 340 | 0 | 80 |
| Control Voltage Fluctuation | 452 | 5 | 1 |
| SIL[20] Starter Stop Status | 3203 | 0 | 1 |
| SIL Starter Stop Message Group 1 | 3204 | 0 | 8 |
| SIL Starter Stop Message Group 2 | 3205 | 0 | 8 |
| SIL Starter Stop Message Group 3 | 3206 | 0 | 8 |
| SIL Starter Stop Message Group 4 | 3207 | 0 | 8 |
| SIL Starter Stop Message Group 5 | 3208 | 0 | 8 |
| SIL Starter Stop Message Group 6 | 3209 | 0 | 8 |
| SIL Starter Stop Message Group 7 | 3210 | 0 | 8 |
| SIL Starter Stop Message Group 8 | 3211 | 0 | 8 |
| SIL Starter Stop Message Group 9 | 3212 | 0 | 8 |
| SIL Starter Stop Message Group 10 | 3213 | 0 | 8 |

# System Asset Management

This function block returns maintenance and product-specific information of the system device.

**Figure 34 - SystemAssetManagement Function Block**

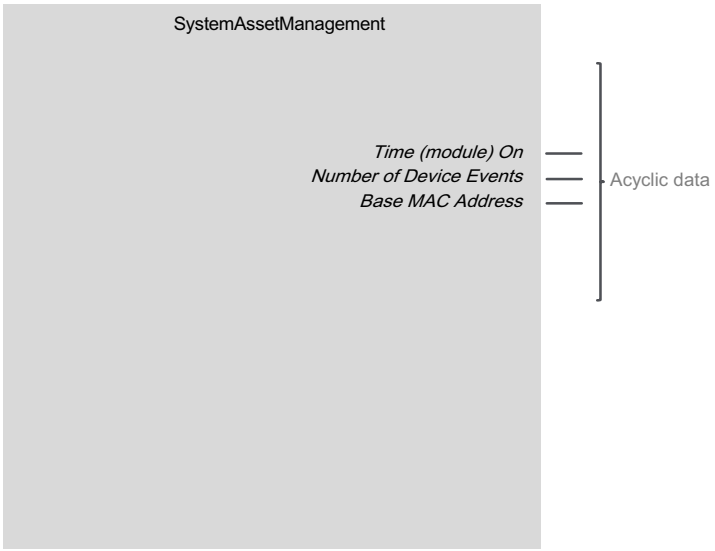



**Table 68 - Modbus TCP Outputs—System Asset Management**

| Output Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Time (module) On | 28 | 0 | 32 |
| Number of Device Events | 33 | 0 | 16 |
| Base MAC Address | 64267 | 0 | 48 |

20. Safety Integrity Level according to standard IEC 61508

# System Time

This function block returns the date and time of the system device.

**Figure 35 - System Time Function Block**

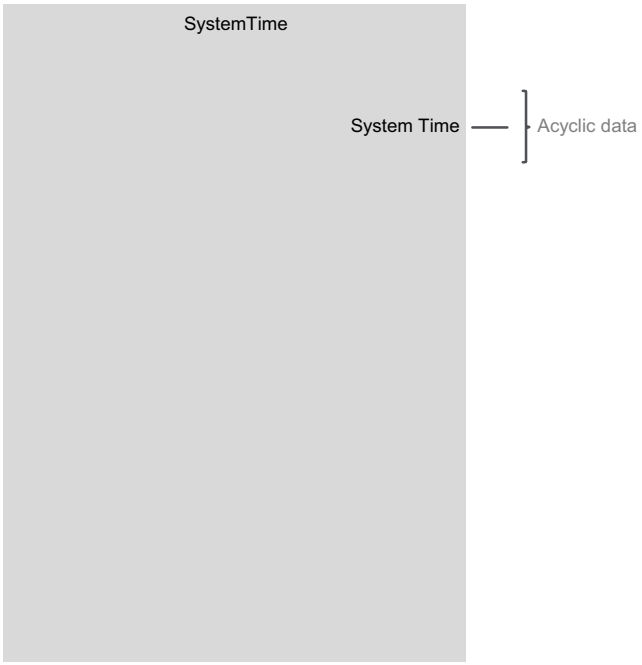



**Table 69 - Modbus TCP Outputs — System Time**

| Output Name | Address | Starting Bit | Size (Bit) |
|---|---|---|---|
| System Time | 2100 | 0 | 64 |

# Energy

This function block performs the following functions:

- Returns the energy and power information of the selected avatar
- Resets the energy registers of the selected avatar
- Sets the energy preset values of the selected avatar

**Figure 36 - Energy Function Block**

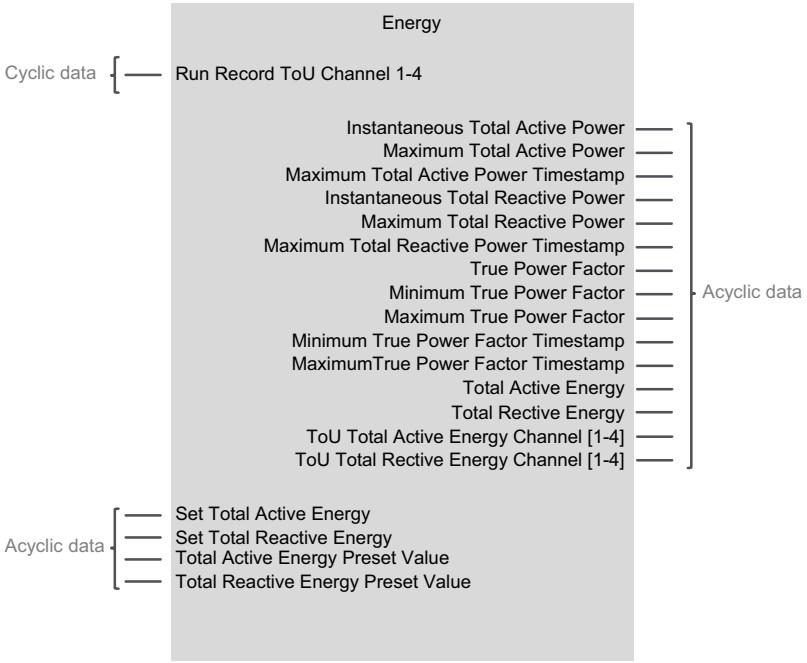



**Table 70 - Modbus TCP Inputs—Energy**

| Input Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Total Active Energy Preset Value | 680 | 0 | 32 |
| Total Reactive Energy Preset Value | 682 | 0 | 32 |
| Run Record ToU Channel 1 | 713 | 2 | 1 |
| Run Record ToU Channel 2 | 713 | 3 | 1 |
| Run Record ToU Channel 3 | 713 | 4 | 1 |
| Run Record ToU Channel 4 | 713 | 5 | 1 |
| Set Total Active Energy | 713 | 6 | 1 |
| Set Total Reactive Energy | 713 | 7 | 1 |

**Table 71 - Modbus TCP Outputs—Energy**

| Output Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Total Active Energy | 143 | 0 | 32 |
| Total Reactive Energy | 145 | 0 | 32 |
| True Power Factor | 481 | 0 | 8 |
| Instantaneous Total Active Power | 482 | 0 | 32 |
| Instantaneous Total Reactive Power | 484 | 0 | 32 |
| Maximum Total Active Power Timestamp | 2140 | 0 | 64 |
| Maximum Total Active Power | 2144 | 0 | 32 |
| Maximum Total Reactive Power Timestamp | 2148 | 0 | 64 |
| Maximum Total Reactive Power | 2152 | 0 | 32 |

**Table 71 - Modbus TCP Outputs—Energy (Continued)**

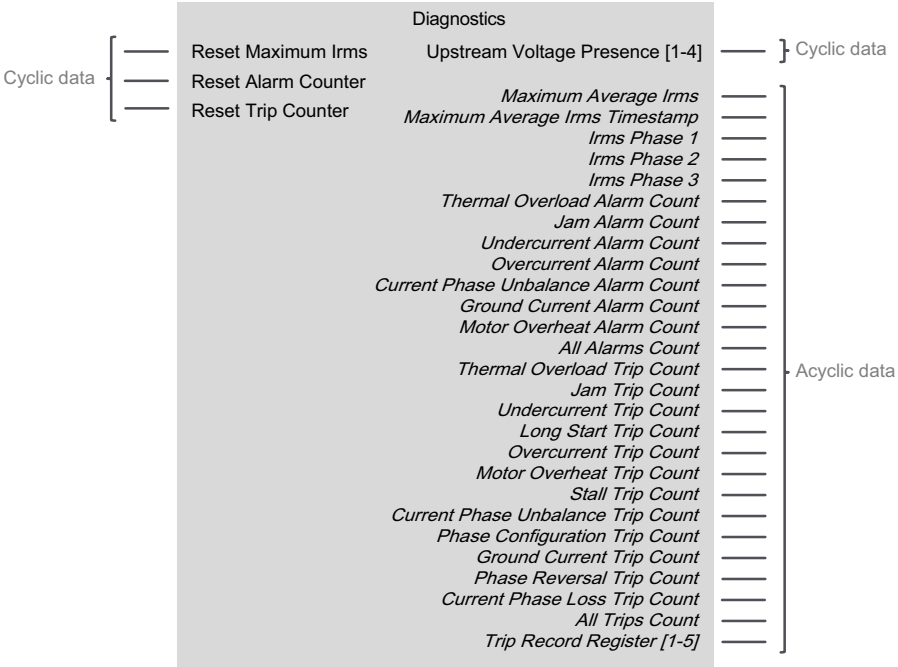
| Output Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Maximum True Power Factor Timestamp | 2160 | 0 | 64 |
| Maximum True Power Factor | 2164 | 0 | 8 |
| Minimum True Power Factor Timestamp | 2168 | 0 | 64 |
| Minimum True Power Factor | 2172 | 0 | 8 |
| ToU Total Active Energy Channel 1 | 2200 | 0 | 32 |
| ToU Total Reactive Energy Channel 1 | 2202 | 0 | 32 |
| ToU Total Active Energy Channel 2 | 2204 | 0 | 32 |
| ToU Total Reactive Energy Channel 2 | 2206 | 0 | 32 |
| ToU Total Active Energy Channel 3 | 2208 | 0 | 32 |
| ToU Total Reactive Energy Channel 3 | 2210 | 0 | 32 |
| ToU Total Active Energy Channel 4 | 2212 | 0 | 32 |
| ToU Total Reactive Energy Channel 4 | 2214 | 0 | 32 |

# Diagnostics

This function block performs the following functions for the selected avatar:

- Returns diagnostic information
- Resets the Maximum $I_{RMS}$ register
- Returns the values of the trip counters and resets all trip counters
- Returns the values of the trip registers
- Returns the values of the alarm counters and resets all alarm counters

**Figure 37 - Diagnostics Function Block**



### Table 72 - Modbus TCP Inputs—Diagnostics

| Input Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Reset Trip Counter | 710 | 0 | 1 |
| Reset Alarm Counter | 710 | 1 | 1 |
| Reset Maximum $I_{RMS}$ | 710 | 2 | 1 |

### Table 73 - Modbus TCP Outputs—Diagnostics

| Output Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Maximum Average $I_{RMS}$ | 32 | 0 | 16 |
| Ground Current Trip Count | 102 | 0 | 16 |
| Thermal Overload Trip Count | 103 | 0 | 16 |
| Long Start Trip Count | 104 | 0 | 16 |
| Jam Trip Count | 105 | 0 | 16 |
| Current Phase Unbalance Trip Count | 106 | 0 | 16 |
| Undercurrent Trip Count | 107 | 0 | 16 |
| Thermal Overload Alarm Count | 116 | 0 | 16 |
| All Trips Count | 122 | 0 | 16 |
| All Alarms Counter | 123 | 0 | 16 |
| Stall Trip Count | 129 | 0 | 16 |
| Overcurrent Trip Count | 130 | 0 | 16 |
| Current Phase Loss Trip Count | 131 | 0 | 16 |
| Motor Overheat Trip Count | 132 | 0 | 16 |
| Phase Reversal Trip Count | 135 | 0 | 16 |
| Trip Record Register 1 | 150 | 0 | 80 |
| Trip Record Register 2 | 180 | 0 | 80 |
| Trip Record Register 3 | 210 | 0 | 80 |
| Trip Record Register 4 | 240 | 0 | 80 |
| Trip Record Register 5 | 270 | 0 | 80 |
| $I_{RMS}$ Phase 1 | 502 | 0 | 32 |
| $I_{RMS}$ Phase 2 | 504 | 0 | 32 |
| $I_{RMS}$ Phase 3 | 506 | 0 | 32 |
| Phase Configuration Trip Count | 1500 | 0 | 16 |
| Ground Current Alarm Count | 1502 | 0 | 16 |
| Jam Alarm Count | 1505 | 0 | 16 |
| Current Phase Unbalance Alarm Count | 1506 | 0 | 16 |
| Undercurrent Alarm Count | 1507 | 0 | 16 |
| Overcurrent Alarm Count | 1530 | 0 | 16 |
| Motor Overheat Alarm Count | 1532 | 0 | 16 |
| Max Average $I_{RMS}$ Time Stamp | 2104 | 0 | 64 |
| Upstream Voltage Present 1 | 3202 | 12 | 1 |
| Upstream Voltage Present 2 | 3202 | 13 | 1 |
| Upstream Voltage Present 3 | 3202 | 14 | 1 |
| Upstream Voltage Present 4 | 3202 | 15 | 1 |

# Asset Management

This function block returns maintenance and product identification information of the devices.

**Figure 38 - AssetManagement Function Block**

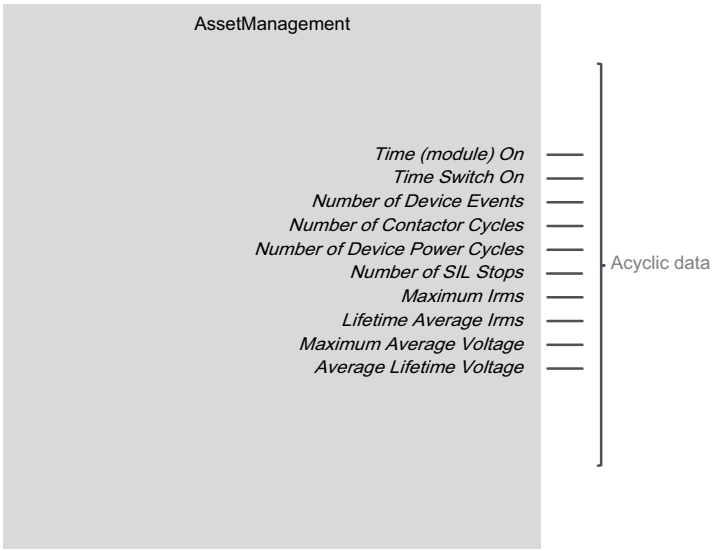



**Table 74 - Modbus TCP Outputs—Asset Management**

| Output Name | Address | Starting Bit | Size (Bits) |
|---|---|---|---|
| Number of Device Power Cycles | 24 | 0 | 32 |
| Number of Contactor Cycles | 26 | 0 | 32 |
| Time (module) On | 28 | 0 | 32 |
| Time Switch On | 30 | 0 | 32 |
| Lifetime Average $I_{RMS}$ | 35 | 0 | 32 |
| Maximum $I_{RMS}$ | 32 | 0 | 16 |
| Number of Device Events | 33 | 0 | 16 |
| Average Lifetime Voltage | 34 | 0 | 16 |
| Number of SIL[21] Starter Stops | 40 | 0 | 32 |
| Maximum Average Voltage | 32 | 0 | 16 |

21. Safety Integrity Level according to standard IEC 61508.

# EtherNet/IP Third Party Integration

## EtherNet/IP™ Addressing

**Table 75 - EtherNet/IP Addressing**

| Step | Action |
|---|---|
| 1 | Configure your island in the TeSys™ island DTM. |
| 2 | In the TeSys island DTM, click on **Device** from the drop-down menu and select the file format you wish to export. You can choose between an EDS file or Rockwell Software® L5X files. |
| | For L5X:<br>• Click **Export** then **EDS to L5X File Format**.<br>• Click **Save**. The file will be saved as a zip file in the format *island_name.zip*. |
| | For EDS:<br>• Click **Export** then **EDS File Format**.<br>• Click **Save**. The file will be saved as an EDS file in the format *island_name.eds*. |
| | You will receive a notification that the EDS file has been created. Click **OK**. |
| 3 | Consult the *EtherNet/IP™ Quick Start Guide*, document number 8536IB1906, for instructions on importing the L5X files into the Rockwell Software Studio 5000® environment. For instructions on importing the EDS file, consult the documentation provided for the programming environment and the following sections for tips on manual EDS file import. |

## Importing the EDS File into a Programming Tool

After exporting an EDS file, you can import the EDS file into your preferred programming tool. Follow the programming tool instructions to determine how to import and get access to the data. The following sections can also provide some additional information, depending on the application and programming environment used.

### Using Multiple TeSys™ island Devices in a Single Programming Tool

The EDS file export output is a file specific for the configured island. It contains information that is unique for the avatars and devices, and the order you chose. If you work with multiple islands on your PC or programming environment, you will have multiple EDS files. Generally, a programming tool will not allow conflicts in the product name or revision of multiple imported devices. For example, you cannot import two different EDS files for TeSyS™ island revision 1.1. To work around this and work with multiple island configurations (each island imported as a device in the programming tool), it is recommended that you edit the MinRev and ProdName in the EDS file with either a text editor or EZ-EDS software as shown below.

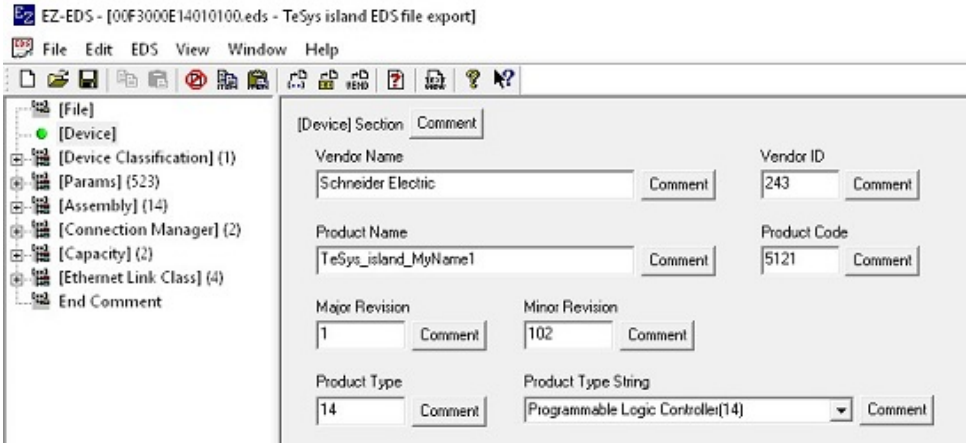
**Figure 39 - EZ-EDS Generated Electronic Data Sheet**

```
$ EZ-EDS Version 3.25.1.20181218 Generated Electronic Data Sheet

[File]
        DescText = "TeSys island EDS file export";
        CreateDate = 08-19-2019;
        CreateTime = 09:41:57;
        ModDate = 08-19-2019;
        ModTime = 09:41:57;
        Revision = 1.0;

[Device]
        VendCode = 243;
        VendName = "Schneider Electric";
        ProdType = 14;
        ProdTypeStr = "Programmable Logic Controller";
        ProdCode = 5121;
        MajRev = 1;
        MinRev = 102;
        ProdName = "TeSys_island_MyName1";
```

**Figure 40 - EZ-EDS TeSys island EDS File Export**

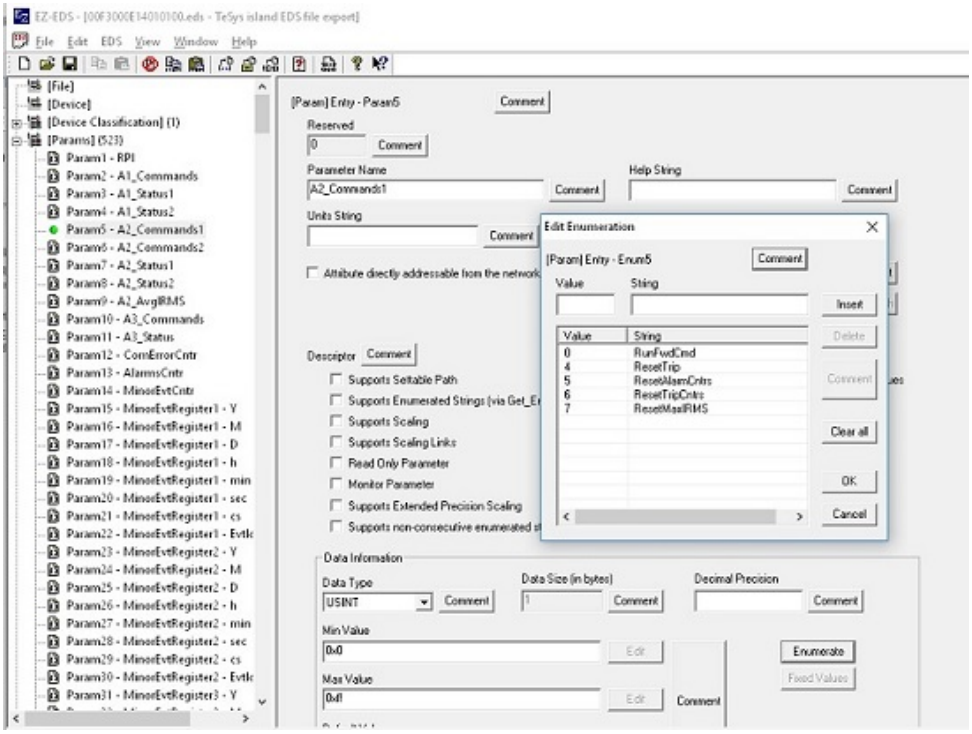



## Understanding Avatar Command and Status Bits

The EDS file contains details about the data for the various avatar commands and statuses. These are described as A1_Commands (Avatar 1 commands), A2_ Commands1 (first set of Avatar 2 commands), A2_Commands2 (last set of Avatar 2 commands), etc.

In many programming tools, the parameters are only described as full bytes. However, the EDS file contains the detailed descriptions of each bit. To access the information if your programming tool does not display it, open the EDS file with an EDS file viewer such as EZ-EDS. If you select the parameter (such as A2_ Commands1 shown below) and then select Enumerate, a full description of each bit displays.

**Figure 41 - EZ-EDS Enumerate**




# EtherNet/IP Cyclic Data

The TeSys island has the ability to use a single EtherNet/IP connection to exchange real-time data to/from all avatars with a single Input Cyclic Dataset and a single Output Cyclic Dataset.

**Table 76 - Output Cyclic Dataset**

| | | | | |
|---|---|---|---|---|
| Avatar 1 Output Dataset | Avatar 2 Output Dataset | Avatar 3 Output Dataset | … | Avatar N Output Dataset |

**Table 77 - Input Cyclic Dataset**

| | | | | |
|---|---|---|---|---|
| Avatar 1 Input Dataset | Avatar 2 Input Dataset | Avatar 3 Input Dataset | … | Avatar N Input Dataset |

The avatar dataset order matches the avatar order from the digital tool used to build the island configuration. See below table for example:

| Order of Avatar in Digital Tool | Order of Datasets in Input / Output Cyclic Dataset | Avatar (example) |
|---|---|---|
| 1 | 1 | System |
| 2 | 2 | IOM |
| 3 | 3 | Safe Reversing Starter Cat. 1 & 2 |
| 4 | 4 | DOL starter |
| 5 | 5 | DOL conveyor |

**Table 78 - EtherNet/IP Cyclic Data**

| Object Name | Object Class ID | Instance |
|---|---|---|
| Output Cyclic Dataset | 0x04 | 0x64 |
| Input Cyclic Dataset | 0x04 | 0x65 |

The TeSys island supports EtherNet/IP class 1 communication with a **cyclic** transport trigger.

# EtherNet/IP Acyclic Data

The TeSys™ island supports the following EtherNet/IP objects for Explicit Messaging:

**Table 79 - EtherNet/IP Acyclic Data**

| Object Name | Object Class ID | Instance | Comment |
|---|---|---|---|
| System Diagnostic | 0x67 | 1 | System is always 1. |
| System Energy | 0x68 | 1 | |
| System Asset Management | 0x69 | 1 | |
| System Time | 0x70 | 1 | |
| Control | 0x6A | 10-99 | Each avatar includes its own Control, Energy, and Diagnostic object. |
| Energy | 0x6B | 10-99 | |
| Diagnostic | 0x6C | 10-99 | |
| Asset Management | 0x6D | 101-199 | There is an instance of the Asset Management Object for each device. |
| System Combined Output | 0x6F | 1 | — |

# System Diagnostic Object

**Table 80 - System Diagnostic Object (0x67, instance 1)**

| Attribute ID | Name |
|---|---|
| 1 | Fieldbus Comm Error Counter |
| 2 | All Alarms Count |
| 3 | System Minor Event Counter |
| 4 | Minor Event Record Register 1 |
| 5 | Minor Event Record Register 2 |
| 6 | Minor Event Record Register 3 |
| 7 | Minor Event Record Register 4 |
| 8 | Minor Event Record Register 5 |
| 9 | SIL[22] Starter Stop Msg group 1 |
| 10 | SIL Starter Stop Msg group 2 |
| 11 | SIL Starter Stop Msg group 3 |
| 12 | SIL Starter Stop Msg group 4 |
| 13 | SIL Starter Stop Msg group 5 |
| 14 | SIL Starter Stop Msg group 6 |
| 15 | SIL Starter Stop Msg group 7 |
| 16 | SIL Starter Stop Msg group 8 |
| 17 | SIL Starter Stop Msg group 9 |

22. Safety Integrity Level according to standard IEC 61508.

**Table 80 - System Diagnostic Object (0x67, instance 1) (Continued)**

| Attribute ID | Name |
|---|---|
| 18 | SIL Starter Stop Msg group 10 |
| 19 | Function Block Interface Version |

# System Energy Object

**Table 81 - System Energy Object (0x68, instance 1)**

| Attribute ID | Description |
|---|---|
| 1 | Average Voltage RMS (V) |
| 2 | Maximum Average Voltage RMS (V) |
| 3 | Maximum Average Voltage Timestamp |
| 4 | Voltage RMS Phase 1 (V) |
| 5 | Voltage RMS Phase 2 (V) |
| 6 | Voltage RMS Phase 3 (V) |
| 7 | Voltage RMS L1-L2 (V) |
| 8 | Voltage RMS L2-L3 (V) |
| 9 | Voltage RMS L3-L1 (V) |
| 10 | Percentage of Unbalance Voltage (%) |
| 11 | Maximum Unbalance Voltage (%) |
| 12 | Maximum Unbalance Voltage Timestamp |
| 13 | Phase Sequence (ABC or ACB) |
| 14 | Frequency (Hz) |
| 15 | Voltage Dip Record register 1 (most recent) |
| 16 | Voltage Dip Record register 1 (most recent) |
| 17 | Voltage Dip Record register 1 (most recent) |
| 18 | Voltage Dip Record register 2 |
| 19 | Voltage Dip Record register 2 |
| 20 | Voltage Dip Record register 2 |
| 21 | Voltage Dip Record register 3 |
| 22 | Voltage Dip Record register 3 |
| 23 | Voltage Dip Record register 3 |
| 24 | Voltage Dip Record register 4 |
| 25 | Voltage Dip Record register 4 |
| 26 | Voltage Dip Record register 4 |
| 27 | Voltage Dip Record register 5 (least recent) |
| 28 | Voltage Dip Record register 5 (least recent) |
| 29 | Voltage Dip Record register 5 (least recent) |
| 30 | Voltage Dip Count |
| 31 | Voltage Swell Record register 1 (most recent) |
| 32 | Voltage Swell Record register 1 (most recent) |
| 33 | Voltage Swell Record register 1 (most recent) |

**Table 81 - System Energy Object (0x68, instance 1) (Continued)**

| Attribute ID | Description |
|---|---|
| 34 | Voltage Swell Record register 2 |
| 35 | Voltage Swell Record register 2 |
| 36 | Voltage Swell Record register 2 |
| 37 | Voltage Swell Record register 3 |
| 38 | Voltage Swell Record register 3 |
| 39 | Voltage Swell Record register 3 |
| 40 | Voltage Swell Record register 4 |
| 41 | Voltage Swell Record register 4 |
| 42 | Voltage Swell Record register 4 |
| 43 | Voltage Swell Record register 5 (least recent) |
| 44 | Voltage Swell Record register 5 (least recent) |
| 45 | Voltage Swell Record register 5 (least recent) |
| 46 | Voltage Swell Count |
| 47 | Instantaneous Total Active Power (kW) |
| 48 | Maximum Total Active Power (kW) |
| 49 | Maximum Total Active Power Timestamp |
| 50 | Instantaneous Total Reactive Power (kVAR) |
| 51 | Maximum Total Reactive Power (kVAR) |
| 52 | Maximum Total Reactive Power Timestamp |
| 53 | True Power Factor |
| 54 | Minimum True Power Factor |
| 55 | Maximum True Power Factor |
| 56 | Minimum True Power Factor Timestamp |
| 57 | Maximum True Power Factor Timestamp |
| 58 | Total Active Energy (kWh) |
| 59 | Total Reactive Energy (kVARh) |
| 60 | ToU_TotalActiveEnergyChannel1 |
| 61 | ToU_TotalActiveEnergyChannel2 |
| 62 | ToU_TotalActiveEnergyChannel3 |
| 63 | ToU_TotalActiveEnergyChannel4 |

# System Asset Management Object

**Table 82 - System Asset Management Object (0x69, instance 1)**

| Attribute ID | Description |
|---|---|
| 1 | VendorName |
| 2 | ProductCode |
| 3 | MajorMinorRev |
| 4 | VendorURL |
| 5 | ProductName |
| 6 | ModelName |

**Table 82 - System Asset Management Object (0x69, instance 1) (Continued)**

| Attribute ID | Description |
|---|---|
| 7 | Base MACAddress |
| 8 | SerialNumber |
| 9 | Time (module) ON |
| 10 | Number of events (Device Status) |
| 11 | Configuration Hash Value |

# System Time Object

**NOTE:** This object is unique in that it is both readable and writable.

**Table 83 - System Time Object (0x70, instance 1)**

| Attribute ID | Name |
|---|---|
| 1 | System Time |

# Control Object

**Table 84 - Control Object (0x6A, instance 10–99)**

| Attribute ID | Description |
|---|---|
| 1 | Motor Temperature |
| 2 | SIL Group |
| 3 | Motor Thermal Capacity Used |
| 4 | Alarm Message |
| 5 | Alarm Message |
| 6 | Trip Message |
| 7 | Trip Message |
| 8 | Time To Trip |
| 9 | Time To Reset |
| 10 | Predictive Alarms Status |

# Energy Object

**Table 85 - Energy Object (0x6B, instance 10–99)**

| Attribute ID (decimal) | Description (annex 3 data name) |
|---|---|
| 1 | Instantaneous Total Active Power (kW) |
| 2 | Maximum Total Active Power (kW) |
| 3 | Maximum Total Active Power Timestamp |
| 4 | Instantaneous Total Reactive Power (kVAR) |
| 5 | Maximum Total Reactive Power (kVAR) |
| 6 | Maximum Total Reactive Power Timestamp |
| 7 | True Power Factor |

**Table 85 - Energy Object (0x6B, instance 10–99) (Continued)**

| Attribute ID (decimal) | Description (annex 3 data name) |
|---|---|
| 8 | Minimum True Power Factor |
| 9 | Maximum True Power Factor |
| 10 | Minimum True Power Factor Timestamp |
| 11 | Maximum True Power Factor Timestamp |
| 12 | Total Active Energy (kWh) |
| 13 | Total Reactive Energy (kVARh) |
| 14 | ToU_TotalActiveEnergyChannel1 |
| 15 | ToU_TotalActiveEnergyChannel2 |
| 16 | ToU_TotalActiveEnergyChannel3 |
| 17 | ToU_TotalActiveEnergyChannel4 |
| 18 | ToU_TotalReactiveEnergyChannel1 |
| 19 | ToU_TotalReactiveEnergyChannel2 |
| 20 | ToU_TotalReactiveEnergyChannel3 |
| 21 | ToU_TotalReactiveEnergyChannel4 |

# Diagnostic Object

**Table 86 - Diagnostic Object (0x6C, instance 10–99)**

| Attribute ID | Description |
|---|---|
| 1 | Max Avg IRMS |
| 2 | Max Avg IRMS TimeStamp |
| 3 | IRMS Phase1 |
| 4 | IRMS Phase2 |
| 5 | IRMS Phase3 |
| 6 | Thermal Overload Alarm Count |
| 7 | Jam Alarm Count |
| 8 | Undercurrent Alarm Count |
| 9 | Overcurrent Alarm Count |
| 10 | Current Phase Unbalance Alarm Count |
| 11 | Ground Current Alarm Count |
| 12 | Motor Overheat Alarm Count |
| 13 | All Alarms Count |
| 14 | Thermal Overload Trip Count |
| 15 | Jam Trip Count |
| 16 | Undercurrent Trip Count |
| 17 | Long Start Trip Count |
| 18 | Overcurrent Trip Count |
| 19 | Motor Overheat Trip Count |
| 20 | Stall Trip Count |
| 21 | Current Phase Unbalance Trip Count |
| 22 | Phase Configuration Trip Count |

**Table 86 - Diagnostic Object (0x6C, instance 10–99) (Continued)**

| Attribute ID | Description |
|---|---|
| 23 | Ground Current Trip Count |
| 24 | Phase Reversal Trip Count |
| 25 | Current Phase Loss Trip Count |
| 26 | All Trips Count |
| 27 | Trip Record register 1 |
| 28 | Trip Record register 2 |
| 29 | Trip Record register 3 |
| 30 | Trip Record register 4 |
| 31 | Trip Record register 5 |

# Asset Management Object

**Table 87 - Asset Management (0x6D, instance 101–199)**

| Attribute ID | Name |
|---|---|
| 1 | VendorName |
| 2 | ProductCode |
| 3 | MajorMinorRev |
| 4 | VendorURL |
| 5 | ProductName |
| 6 | ModelName |
| 7 | SerialNumber |
| 8 | Time (module) ON |
| 9 | Time Switch ON |
| 10 | Number of event (Device Status) |
| 11 | Number of contactor cycles |
| 12 | Number of device power cycles |
| 13 | Number of SIL Stops[23] |
| 14 | Max I RMS |
| 15 | Average I RMS |
| 16 | Max Average Voltage |
| 17 | Average Lifetime Voltage |

23. Safety Integrity Level according to standard IEC 61508.

# System Combined Output Object

**Table 88 - System Combined Output Object (0x6F, instance 1)**

| Name | Comment |
|---|---|
| Reset Voltage Dip Count | Data exist once per System. |
| Reset Voltage Swell Count | |
| Reset Maximum Total Active Power | |
| Reset Maximum Total Reactive Power | |
| Reset Minimum True Power Factor | |
| Reset Maximum True Power Factor | |
| Reset Total Reactive Energy | |
| Reset Total Active Energy | |
| Set Total Active Energy | Data exist for each avatar. |
| Set Total Reactive Energy | |
| Total Active Energy Preset Value | |
| Total Reactive Energy Preset Value | |

# PROFINET Third Party Integration

## PROFINET Addressing

In PROFINET, the bus coupler is a modular field device. In the PROFINET environment, the system is constructed as a combination of modules and sub-modules defined in a General Station Description (GSD) file, and are assigned to the slots and sub-slots of the system.

PROFINET communications addresses modular field devices using slot and sub-slot addressing. It divides the slot addressing space into two regions, one for avatars and one for devices. Slot 0 is used for the bus coupler and System Avatar. Within each slot, sub-slot values are used to access the different datasets.

The TeSys island PROFINET interface represents the system as one module with multiple slots and sub-slots as follows:

- One Device Access Point (DAP), the bus coupler-This DAP is located in slot 0.
- A set of slots representing the avatars-Sub-slots for datasets associated with each avatar.
- A set of slots representing the devices-Sub-slots for the datasets associated with each device

**NOTE:** Empty slots also should be filled with empty slot.

After importing the General Station Description Markup Language (GSDML) file into your programming environment, add a TeSys island instance from the hardware catalog. The TeSys island is created with a System Avatar but no other modules.

Follow the instructions for your programming environment to populate the empty slots with avatars and devices using the information in PROFINET Slot Ranges, page 76 below. For example:

1. In CoDeSys v3.5, right click on an empty slot and choose Plug Device.
2. Select the appropriate avatar or device from the catalog.
3. When the island is fully defined, start creating tags for the data you need to access for each avatar.

TeSys island applies the following slot ranges for physical and virtual modularity:

**Table 89 - PROFINET Slot Ranges**

| Item | Slot | Comment |
|---|---|---|
| Bus Coupler / System Avatar | 0 | — |
| Avatars | 1–21 | Device, Load, and Application avatars |
| Bus Devices | 101–121 | Digital I/O Module (DIOM)<br>Analog I/O Module (AIOM)<br>Starters<br>SIL[24] Starters<br>Power Interface Module (PIM)<br>SIL Interface Module (SIM)<br>Voltage Interface Module (VIM) |
| Not Applicable | 22–100, 122–254 | These slots are not used with TeSys island. |

24. Safety Integrity Level according to standard IEC 61508.

**Table 90 - Example of Avatar Numbering**

| Order of Avatar in Digital Tool | PROFI-NET Avatar Slot | Description | Physical Order in island | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 1 | 0 | System | BC | — | — | VIM | — | — | SIM | — | — |
| 2 | 1 | AIOM | — | AIOM | — | — | — | — | — | — | — |
| 3 | 2 | Motor Two Directions – SIL Stop, W. Cat 1/ 2[25] | — | — | — | — | SIL Starter | SIL Starter | — | — | — |
| 4 | 3 | Motor One Direction | — | — | — | — | — | — | — | Starter | — |
| 5 | 4 | Power Interface with I/O (Control) | — | — | DIOM | — | — | — | — | — | PIM |

**Table 91 - Example of PROFINET Physical Device Slots**

| Physical Order in island | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| PROFINET Physical Device Slot | 0 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 |

A typical PROFINET IO-Controller is a PLC. It provides and consumes I/O (cyclic) data as well as configuration (acyclic) data and is comparable to a PROFIBUS Class 1 client. A PROFINET IO-Supervisor is used for diagnostic purposes and can be a programming device, personal computer, or an HMI device. The IO-Supervisor is comparable to a PROFIBUS Class 2 client.

Write arbitration between multiple clients is specified in PROFINET standard. The IO-Controller (the main client) has the exclusive write access by default. Other clients (by default only) have read access. If not restricted, the other clients (that is, the IO-Supervisor) can request write access on a per module (per avatar) basis. If the IO-Controller allows write access, the write access is transferred to the requesting client until it is released again.

The TeSys island limits the IO-Supervisor application relation (AR) to an IO-Supervisor Device Access AR. This means that only acyclic parameters can be accessed from the IO-Supervisor. Access to the cyclic data is not possible. However, it is possible to view the state of the cyclic process data values in an additional acyclic parameter (for read-only access).

# PROFINET Cyclic Data

When importing the General Station Description (GSD) or General Station Description Markup Language (GSDML) file into your programming environment and inserting each avatar into the appropriate slots, the information is displayed with input and output bytes. The following tables define the input and output data for each avatar and define the meaning of each byte.

**NOTE:**

- Cells or bytes highlighted in grey in the tables are only applicable to firmware versions where the Load Avatars Motor One Direction, Motor Two Direction, etc. have local control modes and PV inputs enabled.
- For firmware versions where the avatars do not have the local control modes and PV inputs features, ignore the cells highlighted in grey.
- If you have doubt, the programming tool will specify how many bytes are expected for each avatar.

25. Wiring Category 1 and Category 2 according to ISO 13849.

- If your avatar expects 6 bytes but the tables below show 17 bytes, ignore bytes 7-17 since they are applicable only to a future firmware version.
- Devices (slots 101 and above) do not allow cyclic data and do not have datasets. Their data is accessed via Acyclic data only.
- In PROFIBUS communication,16 units is the maximum size you can define in the Configuration Data Unit. For the larger datasets, word alignments must be used. For PROFIBUS only, a padding byte must be added to any datasets with an odd number of bytes.

# System Avatar Dataset

**Table 92 - System Avatar Dataset Input Data**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 0** | Reset System | — | 6 | Reset System Minor Fault Counter | Reset Fieldbus Comm Error Counter | Reset Max VRMS | Reset Max Voltage Unbalance | Reset Upstream Voltage Fluctuation Status |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

**Table 93 - System Avatar Dataset Output Data**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 0** | — | — | — | — | — | Control Voltage Fluctuation | SIL[26] Starter Stop Status | Upstream Voltage Fluctuation Status |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 1** | — | — | Degraded Mode | Forced Mode | Minor Fault | Test Mode | Operational | Pre-Operational |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

# Device Datasets

## Switch Dataset

**Table 94 - Switch Dataset Input Data**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 0** | Reset Max IRMS | Reset Trip Counter | Reset Alarm Counter | Trip Reset | — | — | — | ON / OFF Command |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

**Table 95 - Switch Dataset Output Data**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 0** | — | Asset Alarm | — | Upstream Voltage Present 1 | Alarm | Tripped | Open / Close Status | Ready |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 1** | — | — | — | — | — | — | Ready to Reset | Load Operating |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 2** | Irms Average [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 3** | Irms Average | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

26. Safety Integrity Level according to standard IEC 61508.

**Table 95 - Switch Dataset Output Data (Continued)**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 4** | Irms Average | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 5** | Irms Average [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

## Switch – SIL Stop, W. Cat 1/2 Dataset

**Table 96 - Switch – SIL Stop, W. Cat 1/2[27] Dataset Input Data**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 0** | Reset Max IRMS | Reset Trip Counter | Reset Alarm Counter | Trip Reset | — | — | — | ON/OFF Command |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

**Table 97 - Switch – SIL Stop, W. Cat 1/2 Dataset Output Data**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 0** | — | Asset Alarm | - | Upstream Voltage Present 1 | Alarm | Tripped | Open / Close Status | Ready |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 1** | — | — | — | — | — | — | Ready to Reset | Load Operating |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 2** | Irms Average [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 3** | Irms Average | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 4** | Irms Average | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 5** | Irms Average [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

## Switch – SIL Stop, W. Cat 3/4 Dataset

**Table 98 - Switch – SIL Stop, W. Cat 3/4[28] Dataset Input Data**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 0** | Reset Max IRMS | Reset Trip Counter | Reset Alarm Counter | Trip Reset | — | — | ON/OFF Switch 2 Command | ON/OFF Switch 1 Command |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

27. Safety Integrity Level according to standard IEC 61508. Wiring Category 1 and Category 2 according to ISO 13849.
28. Safety Integrity Level according to standard IEC 61508. Wiring Category 3 and Category 4 according to ISO 13849.

**Table 99 - Switch – SIL Stop, W. Cat 3/4 Dataset Output Data**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 0** | Open / Close Switch 2 Status | Asset Alarm | — | Upstream Voltage Present (Device 1) | Alarm | Tripped | Open / Close Switch 1 Status | Ready |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 1** | — | — | — | — | — | Upstream Voltage Present (Device 2) | Ready to Reset | Load Operating |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 2** | Irms Average [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 3** | Irms Average | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 4** | Irms Average | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 5** | Irms Average [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

## Digital I/O Dataset

**Table 100 - Digital I/O Dataset Input Data**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 0** | — | — | — | — | — | — | Output 1 Command | Output 0 Command |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

**Table 101 - Digital I/O Dataset Output Data**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 0** | — | — | — | Input Status 3 | Input Status 2 | Input Status 1 | Input Status 0 | Ready |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

## Analog IO Dataset

**Table 102 - Analog I/O Dataset Input Data**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 0** | Analog Output 0 [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 1** | Analog Output 0 [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

**Table 103 - Analog I/O Dataset Output Data**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 0** | — | — | — | — | — | — | — | Ready |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 1** | Analog Input 0 [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 2** | Analog Input 0 [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

**Table 103 - Analog I/O Dataset Output Data (Continued)**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 3** | Analog Input 1 [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 4** | Analog Input 1 [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

# Load Datasets

## Power Interface without I/O (Measure) Dataset

**Table 104 - Power Interface without I/O (Measure) Dataset Input Data**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 0** | Reset Max IRMS | Reset Trip Counter | Reset Alarm Counter | Trip Reset | — | — | — | — |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 1** | — | — | — | — | Run TOU Channel 4 | Run TOU Channel 3 | Run TOU Channel 2 | Run TOU Channel 1 |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

**Table 105 - Power Interface without I/O (measure) Dataset Output Data**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 0** | — | — | — | Upstream Voltage Present (Device 1) | Alarm | Tripped | — | Ready |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 1** | Load Starting | — | — | — | — | — | Ready to Reset | Load Operating |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 2** | Irms Average [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 3** | Irms Average | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 4** | Irms Average | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 5** | Irms Average [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

## Power Interface with I/O (Control) Dataset

**Table 106 - Power Interface with I/O (Control) Dataset Input Data**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 0** | Reset Max IRMS | Reset Trip Counter | Reset Alarm Counter | Trip Reset | — | — | Logical Output 2 ON/OFF Command | Logical Output 1 ON/OFF Command |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 1** | — | — | — | — | Run TOU Channel 4 | Run TOU Channel 3 | Run TOU Channel 2 | Run TOU Channel 1 |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

**Table 107 - Power Interface with I/O (control) Dataset Output Data**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 0** | Logical Output 2 ON/OFF Status | — | — | Upstream Voltage Present | Alarm | Tripped | Logical Output 1 ON/OFF Status | Ready |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 1** | Load Starting | Logical Input 2 Status | Logical Input 1 Status | — | — | — | Ready to Reset | Load Operating |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 2** | Irms Average [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 3** | Irms Average | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 4** | Irms Average | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 5** | Irms Average [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

## Motor One Direction Dataset

**Table 108 - Motor One Direction Dataset Input Data**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 0** | Reset Max IRMS | Reset Trip Counter | Reset Alarm Counter | Trip Reset | — | — | — | ON/OFF Command |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 1** | — | — | — | — | Run TOU Channel 4 | Run TOU Channel 3 | Run TOU Channel 2 | Run TOU Channel 1 |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

**Table 109 - Motor One Direction Dataset Output Data**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 0** | — | Asset Alarm | Manual Mode Override Status | Upstream Voltage Present | Alarm | Tripped | Open / Close Status | Ready |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 1** | Load Starting | Bypass Command Status | Local Forward Command Status | — | — | — | Ready to Reset | Load Operating |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 2** | Irms Average [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 3** | Irms Average | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 4** | Irms Average | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 5** | Irms Average [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 6** | PV Input 0 [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

**Table 109 - Motor One Direction Dataset Output Data (Continued)**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 7** | PV Input 0 [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 8** | PV Input 1 [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 9** | PV Input 1 [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 10** | PV Input 2 [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 11** | PV Input 2 [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 12** | PV Input 3 [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 13** | PV Input 3 [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 14** | PV Input 4 [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 15** | PV Input 4 [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 16** | — | — | — | PV Switch 4 | PV Switch 3 | PV Switch 2 | PV Switch 1 | PV Switch 0 |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

## Motor One Direction SIL Stop, W. Cat 1/2 Dataset

**Table 110 - Motor One Direction SIL Stop, W. Cat 1/2[29] Dataset Input Data**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 0** | Reset Max IRMS | Reset Trip Counter | Reset Alarm Counter | Trip Reset | — | — | — | ON/OFF Command |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 1** | — | — | — | — | Run TOU Channel 4 | Run TOU Channel 3 | Run TOU Channel 2 | Run TOU Channel 1 |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

**Table 111 - Motor One Direction SIL Stop, W. Cat 1/2 Dataset Output Data**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 0** | — | Asset Alarm | — | Upstream Voltage Present | Alarm | Tripped | Open / Close Status | Ready |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 1** | Load Starting | — | — | — | — | — | Ready to Reset | Load Operating |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 2** | Irms Average [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 3** | Irms Average | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 4** | Irms Average | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

29. Safety Integrity Level according to standard IEC 61508. Wiring Category 1 and Category 2 according to ISO 13849.

**Table 111 - Motor One Direction SIL Stop, W. Cat 1/2 Dataset Output Data (Continued)**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 5** | Irms Average [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

## Motor One Direction – SIL Stop, W. Cat 3/4 Dataset

**Table 112 - Motor One Direction SIL Stop, W. Cat 3/4[30] Dataset Input Data**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 0** | Reset Max IRMS | Reset Trip Counter | Reset Alarm Counter | Trip Reset | — | — | ON/OFF Switch 2 Command | ON/OFF Switch 1 Command |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 1** | — | — | — | — | Run TOU Channel 4 | Run TOU Channel 3 | Run TOU Channel 2 | Run TOU Channel 1 |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

**Table 113 - Motor One Direction SIL Stop, W. Cat 3/4 Dataset Output Data**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 0** | Open / Close Switch 2 Status | Asset Alarm | — | Upstream Voltage Present (Device 1) | Alarm | Tripped | Open / Close Switch 1 Status | Ready |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 1** | Load Starting | — | — | — | — | Upstream Voltage Present (Device 2) | Ready to Reset | Load Operating |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 2** | Irms Average [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 3** | Irms Average | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 4** | Irms Average | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 5** | Irms Average [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

## Motor Two Directions Dataset

**Table 114 - Motor Two Directions Dataset Input Data**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 0** | Reset Max IRMS | Reset Trip Counter | Reset Alarm Counter | Trip Reset | — | — | ON/OFF Reverse | ON/OFF Forward |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 1** | — | — | — | — | Run TOU Channel 4 | Run TOU Channel 3 | Run TOU Channel 2 | Run TOU Channel 1 |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

30. Safety Integrity Level according to standard IEC 61508. Wiring Category 3 and Category 4 according to ISO 13849.

**Table 115 - Motor Two Directions Dataset Output Data**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 0** | Open / Close Reverse Status | Asset Alarm | Manual Mode Override Status | Upstream Voltage Present (Device 1) | Alarm | Tripped | Open / Close Forward Status | Ready |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 1** | Load Starting | Bypass Command Status | Local Forward Command Status | Local Reverse Command Status | — | Upstream Voltage Present (Device 2) | Ready to Reset | Load Operating |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 2** | Irms Average [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 3** | Irms Average | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 4** | Irms Average | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 5** | Irms Average [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 6** | PV Input 0 [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 7** | PV Input 0 [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 8** | PV Input 1 [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 9** | PV Input 1 [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 10** | PV Input 2 [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 11** | PV Input 2 [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 12** | PV Input 3 [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 13** | PV Input 3 [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 14** | PV Input 4 [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 15** | PV Input 4 [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 16** | — | — | — | PV Switch 4 | PV Switch 3 | PV Switch 2 | PV Switch 1 | PV Switch 0 |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

# Motor Two Directions – SIL Stop, W. Cat 1/2 Dataset

### Table 116 - Motor Two Directions SIL Stop, W. Cat 1/2[31] Dataset Input Data

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 0** | Reset Max IRMS | Reset Trip Counter | Reset Alarm Counter | Trip Reset | — | — | ON/OFF Reverse | ON/OFF Forward |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 1** | — | — | — | — | Run TOU Channel 4 | Run TOU Channel 3 | Run TOU Channel 2 | Run TOU Channel 1 |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

### Table 117 - Motor Two Directions SIL Stop, W. Cat 1/2 Dataset Output Data

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 0** | Open / Close Reverse Status | Asset Alarm | — | Upstream Voltage Present (Device 1) | Alarm | Tripped | Open / Close Forward Status | Ready |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 1** | Load Starting | — | — | — | — | Upstream Voltage Present (Device 2) | Ready to Reset | Load Operating |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 2 | Irms Average [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 3** | Irms Average | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 4** | Irms Average | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 5** | Irms Average [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

# Motor Two Directions – SIL Stop, W. Cat 3/4 Dataset

### Table 118 - Motor Two Directions SIL Stop, W. Cat 3/4[32] Dataset Input Data

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 0** | Reset Max IRMS | Reset Trip Counter | Reset Alarm Counter | Trip Reset | — | On / Off Reverse | On / Off Forward | On / Off Command |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 1** | — | — | — | — | Run TOU Channel 4 | Run TOU Channel 3 | Run TOU Channel 2 | Run TOU Channel 1 |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

### Table 119 - Motor Two Directions SIL Stop, W. Cat 3/4 Dataset Output Data

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 0** | Open / Close Forward Status | Asset Alarm | — | Upstream Voltage Present (Device 1) | Alarm | Tripped | Open / Close Status | Ready |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 1** | Load Starting | — | Open / Close Reverse Status | — | Upstream Voltage Present (Device 3) | Upstream Voltage Present (Device 2) | Ready to Reset | Load Operating |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

31. Safety Integrity Level according to standard IEC 61508. Wiring Category 1 and Category 2 according to ISO 13849.
32. Safety Integrity Level according to standard IEC 61508. Wiring Category 3 and Category 4 according to ISO 13849.

**Table 119 - Motor Two Directions SIL Stop, W. Cat 3/4 Dataset Output Data (Continued)**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 2** | Irms Average [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 3** | Irms Average | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 4** | Irms Average | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 5** | Irms Average [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

## Motor Y/D One Direction Dataset

**Table 120 - Motor Y/D One Direction Dataset Input Data**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 0** | Reset Max IRMS | Reset Trip Counter | Reset Alarm Counter | Trip Reset | — | — | — | ON/OFF Command |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 1** | — | — | — | — | Run TOU Channel 4 | Run TOU Channel 3 | Run TOU Channel 2 | Run TOU Channel 1 |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

**Table 121 - Motor Y/D One Direction Dataset Output Data**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 0** | Open / Close Y Status | Asset Alarm | Manual Mode Override Status | Upstream Voltage Present (Device 1) | Alarm | Tripped | Open / Close Line Status | Ready |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 1** | Load Starting | Open / Close D Status | — | — | Upstream Voltage Present (Device 3) | Upstream Voltage Present (Device 2) | Ready to Reset | Load Operating |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 2** | Irms Average [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 3** | Irms Average | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 4** | Irms Average | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 5** | Irms Average [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 6** | PV Input 0 [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 7** | PV Input 0 [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 8** | PV Input 1 [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 9** | PV Input 1 [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 10** | PV Input 2 [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

**Table 121 - Motor Y/D One Direction Dataset Output Data (Continued)**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 11** | PV Input 2 [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 12** | PV Input 3 [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 13** | PV Input 3 [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 14** | PV Input 4 [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 15** | PV Input 4 [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 16** | Bypass Command Status | Local Forward Command Status | — | PV Switch 4 | PV Switch 3 | PV Switch 2 | PV Switch 1 | PV Switch 0 |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

## Motor Y/D Two Directions Dataset

**Table 122 - Motor Y/D Two Directions Dataset Input Data**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 0** | Reset Max IRMS | Reset Trip Counter | Reset Alarm Counter | Trip Reset | — | — | ON/OFF Reverse | ON/OFF Forward |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 1** | — | — | — | — | Run TOU Channel 4 | Run TOU Channel 3 | Run TOU Channel 2 | Run TOU Channel 1 |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

**Table 123 - Motor Y/D Two Directions Dataset Output Data**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 0** | Open / Close Y Status | Asset Alarm | Manual Mode Override Status | Upstream Voltage Present (Device 1) | Alarm | Tripped | Open / Close Forward Status | Ready |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 1** | Load Starting | Open / Close D Status | Open / Close Reverse Status | Upstream Voltage Present (Device 4) | Upstream Voltage Present (Device 3) | Upstream Voltage Present (Device 2) | Ready to Reset | Load Operating |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 2** | Irms Average [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 3** | Irms Average | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 4** | Irms Average | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 5** | Irms Average [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 6** | PV Input 0 [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 7** | PV Input 0 [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

**Table 123 - Motor Y/D Two Directions Dataset Output Data (Continued)**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 8** | PV Input 1 [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 9** | PV Input 1 [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 10** | PV Input 2 [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 11** | PV Input 2 [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 12** | PV Input 3 [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 13** | PV Input 3 [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 14** | PV Input 4 [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 15** | PV Input 4 [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 16** | Bypass Command Status | Local Forward Command Status | Local Reverse Command Status | PV Switch 4 | PV Switch 3 | PV Switch 2 | PV Switch 1 | PV Switch 0 |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

## Motor Two Speeds Dataset

**Table 124 - Motor Two Speeds Dataset Input Data**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 0** | Reset Max IRMS | Reset Trip Counter | Reset Alarm Counter | Trip Reset | — | — | ON/OFF High Speed | ON/OFF Low Speed |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 1** | — | — | — | — | Run TOU Channel 4 | Run TOU Channel 3 | Run TOU Channel 2 | Run TOU Channel 1 |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

**Table 125 - Motor Two Speeds Dataset Output Data**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 0** | Open / Close High Speed Status | Asset Alarm | Manual Mode Override Status | Upstream Voltage Present (Device 1) | Alarm | Tripped | Open / Close Low Speed Status | Ready |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 1** | Load Starting | — | — | — | — | Upstream Voltage Present (Device 2) | Ready to Reset | Load Operating |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 2** | Irms Average [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 3** | Irms Average | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 4** | Irms Average | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

**Table 125 - Motor Two Speeds Dataset Output Data (Continued)**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 5** | Irms Average [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 6** | PV Input 0 [MSB] | | | | | | | |
| | 7 | 6 | 7 | 4 | 7 | 2 | 7 | 0 |
| **Byte 7** | PV Input 0 [LSB] | | | | | | | |
| | 7 | 6 | 7 | 4 | 7 | 2 | 7 | 0 |
| **Byte 8** | PV Input 1 [MSB] | | | | | | | |
| | 7 | 6 | 7 | 4 | 7 | 2 | 7 | 0 |
| **Byte 9** | PV Input 1 [LSB] | | | | | | | |
| | 7 | 6 | 7 | 4 | 7 | 2 | 7 | 0 |
| **Byte 10** | PV Input 2 [MSB] | | | | | | | |
| | 7 | 6 | 7 | 4 | 7 | 2 | 7 | 0 |
| **Byte 11** | PV Input 2 [LSB] | | | | | | | |
| | 7 | 6 | 7 | 4 | 7 | 2 | 7 | 0 |
| **Byte 12** | PV Input 3 [MSB] | | | | | | | |
| | 7 | 6 | 7 | 4 | 7 | 2 | 7 | 0 |
| **Byte 13** | PV Input 3 [LSB] | | | | | | | |
| | 7 | 6 | 7 | 4 | 7 | 2 | 7 | 0 |
| **Byte 14** | PV Input 4 [MSB] | | | | | | | |
| | 7 | 6 | 7 | 4 | 7 | 2 | 7 | 0 |
| **Byte 15** | PV Input 4 [LSB] | | | | | | | |
| | 7 | 6 | 7 | 4 | 7 | 2 | 7 | 0 |
| **Byte 16** | — | — | — | PV Switch 4 | PV Switch 3 | PV Switch 2 | PV Switch 1 | PV Switch 0 |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 17** | Bypass Command Status | Local Low Speed Forward Command Status | Local High Speed Forward Command Status | — | — | — | — | — |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

## Motor Two Speeds – SIL Stop, W. Cat 1/2 Dataset

**Table 126 - Motor Two Speeds SIL Stop W. Cat 1/2[33] Dataset Input Data**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 0** | Reset Max IRMS | Reset Trip Counter | Reset Alarm Counter | Trip Reset | — | — | ON/OFF High Speed | ON/OFF Low Speed |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 1** | — | — | — | — | Run TOU Channel 4 | Run TOU Channel 3 | Run TOU Channel 2 | Run TOU Channel 1 |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

33. Safety Integrity Level according to standard IEC 61508. Wiring Category 1 and Category 2 according to ISO 13849.

**Table 127 - Motor Two Speeds SIL Stop W. Cat 1/2 Dataset Output Data**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 0** | Open / Close High Speed Status | Asset Alarm | — | Upstream Voltage Present (Device 1) | Alarm | Tripped | Open / Close Low Speed Status | Ready |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 1** | Load Starting | — | — | — | — | Upstream Voltage Present (Device 2) | Ready to Reset | Load Operating |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 2** | Irms Average [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 3** | Irms Average | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 4** | Irms Average | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 5** | Irms Average [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

## Motor Two Speeds – SIL Stop, W. Cat 3/4 Dataset

**Table 128 - Motor Two Speeds SIL Stop W. Cat 3/4[34] Dataset Input Data**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 0** | Reset Max IRMS | Reset Trip Counter | Reset Alarm Counter | Trip Reset | — | ON/OFF Low Speed | ON/OFF High Speed | ON/OFF Command |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 1** | — | — | — | — | Run TOU Channel 4 | Run TOU Channel 3 | Run TOU Channel 2 | Run TOU Channel 1 |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

**Table 129 - Motor Two Speeds SIL Stop W. Cat 3/4 Dataset Output Data**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 0** | Low Speed Status | Asset Alarm | — | Upstream Voltage Present (Device 1) | Alarm | Tripped | Open / Close Status | Ready |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 1** | Load Starting | High Speed Status | — | — | Upstream Voltage Present (Device 3) | Upstream Voltage present (Device 2) | Ready to Reset | Load Operating |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 2** | Irms Average [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 3** | Irms Average | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 4** | Irms Average | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 5** | Irms Average [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

34. Safety Integrity Level according to standard IEC 61508. Wiring Category 3 and Category 4 according to ISO 13849.

# Motor Two Speeds Two Directions Dataset

### Table 130 - Motor Two Speeds Two Directions Dataset Input Data

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 0** | Reset Max IRMS | Reset Trip Counter | Reset Alarm Counter | Trip Reset | ON/OFF High Speed Reverse | ON/OFF Low Speed Reverse | ON/OFF High Speed Forward | ON/OFF Low Speed Forward |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 1** | — | — | — | — | Run TOU Channel 4 | Run TOU Channel 3 | Run TOU Channel 2 | Run TOU Channel 1 |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

### Table 131 - Motor Two Speeds Two Directions Dataset Output Data

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 0** | High Speed Forward Status | Asset Alarm | Manual Mode Override Status | Upstream Voltage Present (Device 1) | Alarm | Tripped | Low Speed Forward Status | Ready |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 1** | Load Starting | High Speed Reverse Status | Low Speed Reverse Status | Upstream Voltage Present (Device 4) | Upstream Voltage Present (Device 3) | Upstream Voltage Present (Device 2) | Ready to Reset | Load Operating |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 2** | Irms Average [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 3** | Irms Average | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 4** | Irms Average | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 5** | Irms Average [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 6** | PV Input 0 [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 7** | PV Input 0 [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 8** | PV Input 1 [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 9** | PV Input 1 [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 10** | PV Input 2 [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 11** | PV Input 2 [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 12** | PV Input 3 [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 13** | PV Input 3 [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 14** | PV Input 4 [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 15** | PV Input 4 [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

**Table 131 - Motor Two Speeds Two Directions Dataset Output Data (Continued)**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 16** | — | — | — | PV Switch 4 | PV Switch 3 | PV Switch 2 | PV Switch 1 | PV Switch 0 |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 17** | Bypass Command Status | Local Low Speed Forward Command Status | Local High Speed Forward Command Status | Local Low Speed Reverse Command Status | Local High Speed Reverse Command Status | — | — | — |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

## Motor Two Speeds Two Directions – SIL Stop, W. Cat 1/2 Dataset

**Table 132 - Motor Two Speeds Two Directions SIL Stop W. Cat 1/2[35] Dataset Input Data**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 0** | Reset Max IRMS | Reset Trip Counter | Reset Alarm Counter | Trip Reset | ON/OFF High Speed Reverse | ON/OFF Low Speed Reverse | ON/OFF High Speed Forward | ON/OFF Low Speed Forward |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 1** | — | — | — | — | Run TOU Channel 4 | Run TOU Channel 3 | Run TOU Channel 2 | Run TOU Channel 1 |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

**Table 133 - Motor Two Speeds Two Directions SILStop W. Cat 1/2 Dataset Output Data**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 0** | High Speed Forward Status | Asset Alarm | — | Upstream Voltage Present (Device 1) | Alarm | Tripped | Low Speed Forward Status | Ready |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 1** | Load Starting | High Speed Reverse Status | Low Speed Reverse Status | Upstream Voltage Present (Device 4) | Upstream Voltage Present (Device 3) | Upstream Voltage Present (Device 2) | Ready to Reset | Load Operating |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 2** | Irms Average [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 3** | Irms Average | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 4** | Irms Average | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 5** | Irms Average [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

35. Safety Integrity Level according to standard IEC 61508. Wiring Category 1 and Category 2 according to ISO 13849.

# Motor Two Speeds Two Directions – SIL Stop, W. Cat 3/4 Dataset

### Table 134 - Motor Two Speeds Two Directions SIL Stop W. Cat 3/4[36] Dataset Input Data

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 0** | Reset Max IRMS | Reset Trip Counter | Reset Alarm Counter | Trip Reset | ON/OFF High Speed Reverse | ON/OFF Low Speed Reverse | ON/OFF High Speed Forward | ON/OFF Low Speed Forward |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 1** | — | — | — | — | Run TOU Channel 4 | Run TOU Channel 3 | Run TOU Channel 2 | Run TOU Channel 1 |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

### Table 135 - Motor Two Speeds Two Directions SIL Stop W. Cat 3/4 Dataset Output Data

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 0** | High Speed Forward Status | Asset Alarm | — | Upstream Voltage Present (Device 1) | Alarm | Tripped | Low Speed Forward Status | Ready |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 1** | Load Starting | High Speed Reverse Status | Low Speed Reverse Status | Upstream Voltage Present (Device 4) | Upstream Voltage Present (Device 3) | Upstream Voltage Present (Device 2) | Ready to Reset | Load Operating |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 2** | Irms Average [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 3** | Irms Average | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 4** | Irms Average | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 5** | Irms Average [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

# Power Supply Dataset

### Table 136 - Power Supply Dataset Input Data

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 0** | Reset Max IRMS | Reset Trip Counter | Reset Alarm Counter | Trip Reset | — | — | — | ON/OFF Command |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 1** | — | — | — | — | Run TOU Channel 4 | Run TOU Channel 3 | Run TOU Channel 2 | Run TOU Channel 1 |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

### Table 137 - Power Supply Dataset Output Data

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 0** | — | Asset Alarm | — | Upstream Voltage Present 1 | Alarm | Tripped | Open / Close Status | Ready |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 1** | Load Starting | — | — | — | — | — | Ready to Reset | Load Operating |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 2** | Irms Average [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

36. Safety Integrity Level according to standard IEC 61508. Wiring Category 3 and Category 4 according to ISO 13849.

**Table 137 - Power Supply Dataset Output Data (Continued)**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 3** | Irms Average | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 4** | Irms Average | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 5** | Irms Average [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

## Resistor Dataset

**Table 138 - Resistor Dataset Input Data**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 0** | Reset Max IRMS | Reset Trip Counter | Reset Alarm Counter | Trip Reset | — | — | — | ON/OFF Command |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 1** | — | — | — | — | Run TOU Channel 4 | Run TOU Channel 3 | Run TOU Channel 2 | Run TOU Channel 1 |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

**Table 139 - Resistor Dataset Output Data**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 0** | — | Asset Alarm | — | Upstream Voltage Present 1 | Alarm | Tripped | Open / Close Status | Ready |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 1** | Load Starting | — | — | — | — | — | Ready to Reset | Load Operating |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 2** | Irms Average [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 3** | Irms Average | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 4** | Irms Average | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 5** | Irms Average [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

## Transformer Dataset

**Table 140 - Transformer Dataset Input Data**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 0** | Reset Max IRMS | Reset Trip Counter | Reset Alarm Counter | Trip Reset | — | — | — | ON/OFF Command |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 1** | — | — | — | — | Run TOU Channel 4 | Run TOU Channel 3 | Run TOU Channel 2 | Run TOU Channel 1 |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

**Table 141 - Transformer Dataset Output Data**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 0** | — | Asset Alarm | — | Upstream Voltage Present 1 | Alarm | Tripped | Open / Close Status | Ready |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 1** | Load Starting | — | — | — | — | — | Ready to Reset | Load Operating |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 2** | Irms Average [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 3** | Irms Average | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 4** | Irms Average | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 5** | Irms Average [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

# Application Datasets

## Pump Dataset

**Table 142 - Pump Dataset Input Data**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 0** | Reset Max IRMS | Reset Trip Counter | Reset Alarm Counter | Trip Reset | — | — | — | ON/OFF Command |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 1** | — | — | — | — | Run TOU Channel 4 | Run TOU Channel 3 | Run TOU Channel 2 | Run TOU Channel 1 |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

**Table 143 - Pump Dataset Output Data**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 0** | — | Asset Alarm | Manual Mode Override Status | Upstream Voltage Present 1 | Alarm | Tripped | Open / Close Status | Ready |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 1** | Load Starting | Bypass Command Status | Local Forward Command Status | — | — | — | Ready to Reset | Load Operating |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 2** | Irms Average [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 3** | Irms Average | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 4** | Irms Average | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 5** | Irms Average [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 6** | PV Input 0 [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

**Table 143 - Pump Dataset Output Data (Continued)**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 7** | PV Input 0 [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 8** | PV Input 1 [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 9** | PV Input 1 [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 10** | PV Input 2 [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 11** | PV Input 2 [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 12** | PV Input 3 [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 13** | PV Input 3 [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 14** | PV Input 4 [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 15** | PV Input 4 [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 16** | PV Control Input 1 Status | PV Control Input 0 Status | — | PV Switch 4 | PV Switch 3 | PV Switch 2 | PV Switch 1 | PV Switch 0 |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

## Conveyor One Direction Dataset

**Table 144 - Conveyor One Direction Dataset Input Data**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 0** | Reset Max IRMS | Reset Trip Counter | Reset Alarm Counter | Trip Reset | — | — | — | ON/OFF Command |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 1** | — | — | — | — | Run TOU Channel 4 | Run TOU Channel 3 | Run TOU Channel 2 | Run TOU Channel 1 |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

**Table 145 - Conveyor One Direction Dataset Output Data**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 0** | — | Asset Alarm | — | Upstream Voltage Present 1 | Alarm | Tripped | Open / Close Status | Ready |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 1** | Load Starting | Bypass Command Status | Local Forward Command Status | — | — | — | Ready to Reset | Load Operating |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 2** | Irms Average [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 3** | Irms Average | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

**Table 145 - Conveyor One Direction Dataset Output Data (Continued)**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 4** | Irms Average | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 5** | Irms Average [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 6** | PV Input 0 [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 7** | PV Input 0 [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 8** | PV Input 1 [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 9** | PV Input 1 [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 10** | PV Input 2 [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 11** | PV Input 2 [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 12** | PV Input 3 [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 13** | PV Input 3 [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 14** | PV Input 4 [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 15** | PV Input 4 [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 16** | — | — | — | PV Switch 4 | PV Switch 3 | PV Switch 2 | PV Switch 1 | PV Switch 0 |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

## Conveyor One Direction – SIL Stop, W. Cat 1/2

**Table 146 - Conveyor One Direction SIL Stop W. Cat 1/2[37] Dataset Input Data**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 0** | Reset Max IRMS | Reset Trip Counter | Reset Alarm Counter | Trip Reset | — | — | — | ON/OFF Command |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 1** | — | — | — | — | Run TOU Channel 4 | Run TOU Channel 3 | Run TOU Channel 2 | Run TOU Channel 1 |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

37. Safety Integrity Level according to standard IEC 61508. Wiring Category 1 and Category 2 according to ISO 13849.

**Table 147 - Conveyor One Direction SIL Stop W. Cat 1/2 Dataset Output Data**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 0** | — | Asset Alarm | — | Upstream Voltage present 1 | Alarm | Tripped | Open / Close Status | Ready |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 1** | Load Starting | Bypass Command Status | Local Forward Command Status | — | — | — | Ready to Reset | Load Operating |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 2** | Irms Average [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 3** | Irms Average | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 4** | Irms Average | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 5** | Irms Average [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 6** | PV Input 0 [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 7** | PV Input 0 [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 8** | PV Input 1 [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 9** | PV Input 1 [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 10** | PV Input 2 [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 11** | PV Input 2 [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 12** | PV Input 3 [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 13** | PV Input 3 [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 14** | PV Input 4 [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 15** | PV Input 4 [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 16** | — | — | — | PV Switch 4 | PV Switch 3 | PV Switch 2 | PV Switch 1 | PV Switch 0 |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

# Conveyor Two Directions Dataset

### Table 148 - Conveyor Two Directions Dataset Input Data

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 0** | Reset Max IRMS | Reset Trip Counter | Reset Alarm Counter | Trip Reset | — | — | ON/OFF Reverse | ON/OFF Forward |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 1** | — | — | — | — | Run TOU Channel 4 | Run TOU Channel 3 | Run TOU Channel 2 | Run TOU Channel 1 |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

### Table 149 - Conveyor Two Directions Dataset Output Data

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 0** | Open / Close Reverse Status | Asset Alarm | — | Upstream Voltage Present (Device 1) | Alarm | Tripped | Open / Close Forward Status | Ready |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 1** | Load Starting | Bypass Command Status | Local Forward Command Status | Local Reverse Command Status | — | Upstream Voltage Present (Device 2) | Ready to Reset | Load Operating |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 2** | Irms Average [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 3** | Irms Average | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 4** | Irms Average | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 5** | Irms Average [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 6** | PV Input 0 [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 7** | PV Input 0 [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 8** | PV Input 1 [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 9** | PV Input 1 [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 10** | PV Input 2 [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 11** | PV Input 2 [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 12** | PV Input 3 [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 13** | PV Input 3 [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 14** | PV Input 4 [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 15** | PV Input 4 [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

**Table 149 - Conveyor Two Directions Dataset Output Data (Continued)**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 16** | — | — | — | PV Switch 4 | PV Switch 3 | PV Switch 2 | PV Switch 1 | PV Switch 0 |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

## Conveyor Two Directions – SIL Stop, W. Cat 1/2 Dataset

**Table 150 - Conveyor Two Directions SIL Stop W. Cat 1/2[38] Dataset Input Data**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 0** | Reset Max IRMS | Reset Trip Counter | Reset Alarm Counter | Trip Reset | — | — | ON/OFF Reverse | ON/OFF Forward |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 1** | — | — | — | — | Run TOU Channel 4 | Run TOU Channel 3 | Run TOU Channel 2 | Run TOU Channel 1 |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

**Table 151 - Conveyor Two Directions SIL Stop W. Cat 1/2 Dataset Output Data**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 0** | Open / Close Reverse Status | Asset Alarm | — | Upstream Voltage Present (Device 1) | Alarm | Tripped | Open / Close Forward Status | Ready |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 1** | Load Starting | Bypass Command Status | Local Forward Command Status | Local Reverse Command Status | - | Upstream Voltage Present (Device 2) | Ready to Reset | Load Operating |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 2** | Irms Average [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 3** | Irms Average | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 4** | Irms Average | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 5** | Irms Average [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 6** | PV Input 0 [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 7** | PV Input 0 [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 8** | PV Input 1 [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 9** | PV Input 1 [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 10** | PV Input 2 [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 11** | PV Input 2 [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 12** | PV Input 3 [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

38. Safety Integrity Level according to standard IEC 61508. Wiring Category 1 and Category 2 according to ISO 13849.

**Table 151 - Conveyor Two Directions SIL Stop W. Cat 1/2 Dataset Output Data (Continued)**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Byte 13** | PV Input 3 [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 14** | PV Input 4 [MSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 15** | PV Input 4 [LSB] | | | | | | | |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| **Byte 16** | — | — | — | PV Switch 4 | PV Switch 3 | PV Switch 2 | PV Switch 1 | PV Switch 0 |
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

# PROFINET Acyclic Data

Acyclic communication in PROFINET is handled as a low priority, typically one request at a time, while there is no cyclic communication on the bus coupler. If server device is not able to process an acyclic request right away, it signals the client that the response is delayed. The client waits for the response for a limited duration until the server has been able to process the request. This way, the server can reduce the number of requests it receives, if necessary.

TeSys™ island supports the following sub-slot and index ranges for PROFINET acyclic dataset exchange.

**Table 152 - PROFINET Acyclic Data**

| Dataset | Slot | Sub-slot | Index |
|---|---|---|---|
| System Diagnostic | 0 | 3 | 1 |
| System Energy 1 | 0 | 3 | 2 |
| System Energy 2 | 0 | 3 | 3 |
| System Asset Management | 0 | 3 | 4 |
| System Combined Output | 0 | 3 | 5 |
| System Time | 0 | 3 | 6 |
| Control | 1–21 | 3 | 0 |
| Energy | 1–21 | 3 | 1 |
| Diagnostic | 1–21 | 3 | 2 |
| Asset Management | 101–121 | 3 | 0 |

The following sections provide the acyclic datasets supported by TeSys™ island and applies to both PROFINET and PROFIBUS.

# System Combined Output Dataset

**Table 153 - System Combined Output Dataset**

| Length (bytes) | Name | Comment |
|---|---|---|
| 1 | Reset Voltage Dip Count | Dataset exist once per System |
| 1 | Reset Voltage Swell Count | |
| 1 | Reset Maximum Total Active Power | |
| 1 | Reset Maximum Total Reactive Power | |
| 1 | Reset Minimum True Power Factor | |
| 1 | Reset Maximum True Power Factor | |
| 1 | Reset Total Reactive Energy | |
| 1 | Reset Total Active Energy | |
| 1 | Set Total Active Energy | Data exist for each avatar |
| 1 | Set Total Reactive Energy | |
| 4 | Total Active Energy Preset Value | |
| 4 | Total Reactive Energy Preset Value | |
| … | For each additional avatar, add another instance of the data with the comment “Data exist for each avatar”. | |

# System Time Dataset

**Table 154 - System Time Dataset**

| Length (bytes) | Name |
|---|---|
| 12 | System Date and Time |

# System Diagnostic Dataset

**Table 155 - System Diagnostic Dataset**

| Length (bytes) | Name |
|---|---|
| 2 | Fieldbus Comm Error Counter |
| 2 | All Alarms Count |
| 2 | System Minor Event Counter |
| 14 | Minor Event Record Register 1 |
| 14 | Minor Event Record Register 2 |
| 14 | Minor Event Record Register 3 |
| 14 | Minor Event Record Register 4 |
| 14 | Minor Event Record Register 5 |
| 1 | SIL Starter Stop[39] Msg group 1 |
| 1 | SIL Starter Stop Msg group 2 |
| 1 | SIL Starter Stop Msg group 3 |
| 1 | SIL Starter Stop Msg group 4 |

39. Safety Integrity Level according to standard IEC 61508.

**Table 155 - System Diagnostic Dataset (Continued)**

| Length (bytes) | Name |
|---|---|
| 1 | SIL Starter Stop Msg group 5 |
| 1 | SIL Starter Stop Msg group 6 |
| 1 | SIL Starter Stop Msg group 7 |
| 1 | SIL Starter Stop Msg group 8 |
| 1 | SIL Starter Stop Msg group 9 |
| 1 | SIL Starter Stop Msg group 10 |

# System Energy 1 Dataset

**Table 156 - System Energy 1 Dataset**

| Length (bytes) | Name |
|---|---|
| 2 | Average Voltage RMS (V) |
| 2 | Maximum Average Voltage RMS (V) |
| 12 | Maximum Average Voltage Timestamp |
| 2 | Voltage RMS Phase 1 (V) |
| 2 | Voltage RMS Phase 2 (V) |
| 2 | Voltage RMS Phase 3 (V) |
| 2 | Voltage RMS L1-L2 (V) |
| 2 | Voltage RMS L2-L3 (V) |
| 2 | Voltage RMS L2-L1 (V) |
| 1 | Percentage of Unbalance Voltage (%) |
| 1 | Maximum Unbalance Voltage (%) |
| 12 | Maximum Unbalance Voltage Timestamp |
| 1 | Phase Sequence (ABC or ACB) |
| 1 | Frequency (Hz) |
| 2 | Voltage Dip Record register 1 (most recent) |
| 12 | Voltage Dip Record register 1 (most recent) |
| 12 | Voltage Dip Record register 1 (most recent) |
| 2 | Voltage Dip Record register 2 |
| 12 | Voltage Dip Record register 2 |
| 12 | Voltage Dip Record register 2 |
| 2 | Voltage Dip Record register 3 |
| 12 | Voltage Dip Record register 3 |
| 12 | Voltage Dip Record register 3 |
| 2 | Voltage Dip Record register 4 |
| 12 | Voltage Dip Record register 4 |
| 12 | Voltage Dip Record register 4 |
| 2 | Voltage Dip Record register 5 (least recent) |
| 12 | Voltage Dip Record register 5 (least recent) |

**Table 156 - System Energy 1 Dataset (Continued)**

| Length (bytes) | Name |
|---|---|
| 12 | Voltage Dip Record register 5 (least recent) |
| 2 | Voltage Dip Count |

# System Energy 2 Dataset

**Table 157 - System Energy 2 Dataset**

| Length (bytes) | Name |
|---|---|
| 2 | Voltage Swell Record register 1 (most recent) |
| 12 | Voltage Swell Record register 1 (most recent) |
| 12 | Voltage Swell Record register 1 (most recent) |
| 2 | Voltage Swell Record register 2 |
| 12 | Voltage Swell Record register 2 |
| 12 | Voltage Swell Record register 2 |
| 2 | Voltage Swell Record register 3 |
| 12 | Voltage Swell Record register 3 |
| 12 | Voltage Swell Record register 3 |
| 2 | Voltage Swell Record register 4 |
| 12 | Voltage Swell Record register 4 |
| 12 | Voltage Swell Record register 4 |
| 2 | Voltage Swell Record register 5 (least recent) |
| 12 | Voltage Swell Record register 5 (least recent) |
| 12 | Voltage Swell Record register 5 (least recent) |
| 2 | Voltage Swell Count |
| 4 | Instantaneous Total Active Power (kW) |
| 4 | Maximum Total Active Power (kW) |
| 12 | Maximum Total Active Power Timestamp |
| 4 | Instantaneous Total Reactive Power (kVAR) |
| 4 | Maximum Total Reactive Power (kVAR) |
| 12 | Maximum Total Reactive Power Timestamp |
| 1 | True Power Factor |
| 1 | Minimum True Power Factor |
| 1 | Maximum True Power Factor |
| 12 | Minimum True Power Factor Timestamp |
| 12 | Maximum True Power Factor Timestamp |
| 4 | Total Active Energy (kWh) |
| 4 | Total Reactive Energy (kVARh) |
| 4 | ToU_TotalActiveEnergyChannel1 |
| 4 | ToU_TotalActiveEnergyChannel2 |
| 4 | ToU_TotalActiveEnergyChannel3 |
| 4 | ToU_TotalActiveEnergyChannel4 |

# System Asset Management Dataset

**Table 158 - System Asset Management Dataset**

| Length (bytes) | Name |
|---|---|
| 20 | VendorName |
| 32 | ProductCode |
| 7 | MajorMinorRev |
| 64 | VendorURL |
| 32 | ProductName |
| 20 | ModelName |
| 6 | Base MACAddress |
| 20 | SerialNumber |
| 4 | Time (module) ON |
| 2 | Number of events (Device Status) |

# Control Dataset

**Table 159 - Control Dataset**

| Length (bytes) | Name |
|---|---|
| 2 | Motor Temperature |
| 1 | SIL Group |
| 1 | Motor Thermal Capacity Used |
| 2 | Alarm Message |
| 2 | Alarm Message |
| 2 | Trip Message |
| 2 | Trip Message |
| 2 | Time To Trip |
| 2 | Time To Reset |
| 2 | Predictive Alarms Status |

# Energy Dataset

**Table 160 - Energy Dataset**

| Length (bytes) | Name |
|---|---|
| 4 | Instantaneous Total Active Power (kW) |
| 4 | Maximum Total Active Power (kW) |
| 12 | Maximum Total Active Power Timestamp |
| 4 | Instantaneous Total Reactive Power (kVAR) |
| 4 | Maximum Total Reactive Power (kVAR) |
| 12 | Maximum Total Reactive Power Timestamp |
| 1 | True Power Factor |
| 1 | Minimum True Power Factor |
| 1 | Maximum True Power Factor |

**Table 160 - Energy Dataset (Continued)**

| Length (bytes) | Name |
|---|---|
| 12 | Minimum True Power Factor Timestamp |
| 12 | Maximum True Power Factor Timestamp |
| 4 | Total Active Energy (kWh) |
| 4 | Total Reactive Energy (kVARh) |
| 4 | ToU_TotalActiveEnergyChannel1 |
| 4 | ToU_TotalActiveEnergyChannel2 |
| 4 | ToU_TotalActiveEnergyChannel3 |
| 4 | ToU_TotalReactiveEnergyChannel4 |

# Diagnostic Dataset

**Table 161 - Diagnostic Dataset**

| Length (bytes) | Name |
|---|---|
| 4 | Max Avg IRMS |
| 12 | Max Avg IRMS TimeStamp |
| 4 | IRMS Phase1 |
| 4 | IRMS Phase2 |
| 4 | IRMS Phase3 |
| 2 | Thermal Overload Alarm Count |
| 2 | Jam Alarm Count |
| 2 | Undercurrent Alarm Count |
| 2 | Overcurrent Alarm Count |
| 2 | Current Phase Unbalance Alarm Count |
| 2 | Ground Current Alarm Count |
| 2 | Motor Overheat Alarm Count |
| 2 | All Alarms Count |
| 2 | Thermal Overload Trip Count |
| 2 | Jam Trip Count |
| 2 | Undercurrent Trip Count |
| 2 | Long Start Trip Count |
| 2 | Overcurrent Trip Count |
| 2 | Motor Overheat Trip Count |
| 2 | Stall Trip Count |
| 2 | Current Phase Unbalance Trip Count |
| 2 | Phase Configuration Trip Count |
| 2 | Ground Current Trip Count |
| 2 | Phase Reversal Trip Count |
| 2 | Current Phase Loss Trip Count |
| 2 | All Trips Count |
| 14 | Trip Record register 1 |
| 14 | Trip Record register 2 |

**Table 161 - Diagnostic Dataset (Continued)**

| Length (bytes) | Name |
|---|---|
| 14 | Trip Record register 3 |
| 14 | Trip Record register 4 |
| 14 | Trip Record register 5 |

# Asset Management Dataset

**Table 162 - Asset Management Dataset**

| Length (bytes) | Name |
|---|---|
| 20 | VendorName |
| 32 | ProductCode |
| 7 | MajorMinorRev |
| 64 | VendorURL |
| 32 | ProductName |
| 20 | ModelName |
| 20 | SerialNumber |
| 4 | Time (module) ON |
| 4 | Time Switch ON |
| 2 | Number of events (Device Status) |
| 4 | Number of contactor cycles |
| 4 | Number of device power cycles |
| 4 | Number of SIL Starter Stops |
| 2 | Max I RMS |
| 4 | Average I RMS |
| 2 | Max Average Voltage |
| 2 | Average Lifetime Voltage |

# PROFIBUS Third Party Integration

## PROFIBUS Addressing

In PROFIBUS, the bus coupler is a modular DP server. PROFIBUS addresses modular devices using slot and index addressing. TeSys™ island divides the slot addressing space into two regions, one for avatars and one for devices. Slot 1 is used for the bus coupler and System Avatar. Within each slot, index values are used to access the different datasets.

After importing the General Station Description Markup Language (GSDML) file into your programming environment, add a TeSys island instance from the hardware catalog. The TeSys island is created with a System Avatar but no other modules.

**NOTE:** Empty slots also should be filled with empty slot.

Follow the instructions for your programming environment to populate the empty slots with avatars and devices using the information in PROFIBUS Slot Ranges, page 109 below. For example:

1. In CoDeSys v3.5, right click on an empty slot and choose Plug Device.
2. Select the appropriate avatar or device from the catalog.
3. When the island is fully defined, start creating tags for the data you need to access for each avatar.

TeSys™ island applies the slot ranges for physical and virtual modularity shown in the following table:

**Table 163 - PROFIBUS Slot Ranges**

| Item | Slot | Comment |
|---|---|---|
| Bus Coupler / System Avatar | 1 | — |
| Avatars | 2–22 | Device, Load, and Application avatars |
| Bus Devices | 101–121 | Digital I/O Module (DIOM)<br>Analog I/O Module (AIOM)<br>Starters<br>SIL[40] Starters<br>Power Interface Module (PIM)<br>SIL Interface Module (SIM)<br>Voltage Interface Module (VIM) |
| Not Applicable | 0, 23–99, 122–254 | These slots are not used with TeSys island. |

40. Safety Integrity Level according to standard IEC 61508.

**Table 164 - Example of Avatar Numbering**

| Order of Avatar in Digital Tool | PROFI-BUS Avatar Slot | Description | Physical Order in island | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 1 | 1 | System | BC | — | — | VIM | — | — | SIM | — | — |
| 2 | 2 | AIOM | — | AIOM | — | — | — | — | — | — | — |
| 3 | 3 | Motor Two Directions – SIL Stop, W. Cat 1/ 2[41] | — | — | — | — | SIL Starter | SIL Starter | — | — | — |
| 4 | 4 | Motor One Direction | — | — | — | — | — | — | — | Starter | — |
| 5 | 5 | Power Interface with I/O (Control) | — | — | DIOM | — | — | — | — | — | PIM |

**Table 165 - Example of PROFIBUS Physical Device Slots**

| Physical Order in island | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| PROFIBUS Physical Device Slot | 0 | 101 | 102 | 103 | 104 | 105 | 106 | 107 | 108 |

DPV0 is used for configuration of the PROFIBUS connection, diagnostics related to the PROFIBUS communications, and for cyclic data exchange. DPV1 is used to exchange the acyclic datasets for avatars and devices.

As described in **IEC 61158-5-3 §6.1.3.2.3.2 Module**, slots not used by the configuration of the system are registered as empty slots and assigned Input and Output data lengths of 0, and identifier byte 0x00.

- Each module is addressed by a slot number (1 to 254). Numbering is without gaps, ascending, beginning with 1. If a slot is not occupied with a module, an empty slot is registered under the corresponding slot number in the configuration.
- For each module, a configuration identifier has to be assigned. Numbering is without gaps, ascending, beginning with 0. If a slot is not occupied with a module, a configuration identifier with the Input and Output Data length of 0 has to be assigned in the configuration (empty slot).

The TeSys island PROFIBUS interface recognizes all unused slots as empty, with assigned Input and Output data lengths of 0 and identifier byte value of 0x00.

The following table provide the values for TeSys island PROFIBUS interface MS1 (DPV1) communication protocol (acyclic communication with PROFIBUS Class 1 client (controller)).

**Table 166 - PROFIBUS Interface MS1 DPV1 Protocol Values**

| Service Access Point (SAP) | Name |
|---|---|
| 72 | Idle |
| 94 | DPV1_Read |
| 95 | DPV1_ Write |

41. Safety Integrity Level according to standard IEC 61508. Wiring Category 1 and Category 2 according to ISO 13849.

# PROFIBUS Cyclic Data

When importing the General Station Description (GSD) or General Station Description Markup Language (GSDML) file into your programming environment and inserting each avatar into the appropriate slots, the information is displayed with input and output bytes.

The PROFIBUS cyclic data is structured similar to the PROFINET cyclic data and therefore, share the same input and output data for the avatars listed in the tables in PROFINET Cyclic Data, page 77.

# PROFIBUS Acyclic Data

TeSys™ island supports the following slot and index ranges for PROFIBUS acyclic dataset exchange. For PROFIBUS acyclic datasets supported by TeSys island, refer to PROFINET Acyclic Data, page 102 for more information. PROFIBUS and PROFINET share the same acyclic datasets for TeSys™ island.

**Table 167 - PROFIBUS Acyclic Data**

| Dataset | Slot | Index | Comment |
|---|---|---|---|
| (Reserved) | 0 | — | Reserved in PROFIBUS, not mapped to any avatar or device |
| | 1 | — | Index 0 reserved for System Control |
| System Diagnostic | 1 | 1 | — |
| System Energy 1 | 1 | 2 | Includes Voltage Basic and Voltage Enhanced |
| System Energy 2 | 1 | 3 | Includes Power Basic and Energy Basic |
| System Asset Management | 1 | 4 | — |
| System Combined Output | 1 | 5 | — |
| System Time | 1 | 6 | — |
| Control | 2–22 | 0 | — |
| Energy | 2–22 | 1 | — |
| Diagnostic | 2–22 | 2 | — |
| Asset Management | 101–121 | 0 | — |

# Data Descriptions

## Data Refresh Rates

When choosing the frequency of your fieldbus protocol (such as RPI or repetition rate) or the frequency of updating acyclic data in your PLC program, it is important to understand the frequency of the data updates on the island itself.

For instance, Active Energy data is updated every 100 ms. So it is not useful for the PLC program to update this acyclic data every 10 ms. However, all outputs (starters, digital outputs, analog outputs, trip resets, and other resets or presets) are updated at a frequency of <10 ms. Inputs are updated at various frequencies depending on their importance.

See the table below for more information.

**Table 168 - Data Refresh Rates**

| Data | Maximum update interval |
|---|---|
| Input and output status of power devices, digital I/O modules, and SIL[42] interface modules<br><br>*for example, Run commands, contactor status (RunFwd, Tripped), digital input (DI0, DI1…)* | 10 ms |
| Analog measurements of power devices, analog I/O modules, and voltage interface modules<br><br>*for example, phase current (AvgIRMS, PhaseXIRMS), phase voltage (VRMSPhaseX, AvgVRMS), power (InstActivePower, InstReactivePower, PowerFactor), energy (ActiveEnergy, ReactiveEnergy), analog inputs (MotorTemperature, AI0, AI1)* | 100 ms |
| Other data<br><br>*for example, asset data: ContactorCycleCntr, TimeModuleOn, AvgIRMS (lifetime)* | 10 ms |

## TeSys island I/O Data

TeSys™ island generates and sends advanced data to the PLC to enhance machine efficiency and improve asset management. I/O data is available at the system and the avatar level. Types of I/O data include control, diagnostics, energy, and asset management. The following tables describe the inputs and outputs available for the avatars. The following tables can be used to assist in third party PLC function block programming when pre-defined function blocks are not available.

## System I/O

The tables in this section describe the inputs and outputs available for the System Avatar.

42. Safety Integrity Level according to standard IEC 61508.

# Control

### Table 169 - System Control Inputs

| I/O Name | Datatype | Size (Bits) | Scale | Value | Description |
|---|---|---|---|---|---|
| Trip Reset | BOOL | 1 | 1 | 0, 1 | Command to reset an Avatar Trip Event.<br>0 = Off, 1 = On |

### Table 170 - System Control Outputs

| I/O Name | Datatype | Size (Bits) | Scale | Value | Description |
|---|---|---|---|---|---|
| System Operational | BOOL | 1 | 1 | 0, 1 | Indicates that the System Avatar is in Operational mode.<br>0 = Off, 1 = On |
| Degraded Mode | BOOL | 1 | 1 | 0, 1 | Indicates that the System Avatar is in Degraded mode.<br>0 = Off, 1 = On |
| Minor Event | BOOL | 1 | 1 | 0, 1 | Indicates that the System Avatar is in Minor Event mode.<br>0 = Off, 1 = On |
| Pre-Operational | BOOL | 1 | 1 | 0, 1 | Indicates that the System Avatar is in Pre-operational mode.<br>0 = Off, 1 = On |
| Force Mode | BOOL | 1 | 1 | 0, 1 | Indicates whether the system is in Force mode.<br>0 = No, 1 = Yes |
| Test Mode | BOOL | 1 | 1 | 0, 1 | Returns a status indicating that the System Avatar is in Test mode.<br>0 = Off, 1 = On |
| IP Address | UDINT | 32 | — | Max.:<br>0xFFFFFFFF | IP address of the Bus Coupler controlling the island. |

# Diagnostics

### Table 171 - System Diagnostics Inputs

| I/O Name | Datatype | Size (Bits) | Scale | Value | Description |
|---|---|---|---|---|---|
| Reset System Alarm Counter | BOOL | 1 | 1 | 0, 1 | Resets System Alarm Counter to 0.<br>0 = Off, 1 = On |
| Reset System Minor Event Counter | BOOL | 1 | 1 | 0, 1 | Resets System Minor Event Counter to 0.<br>0 = Off, 1 = On |
| Reset Fieldbus Communication Event Counter | BOOL | 1 | 1 | 0, 1 | Resets Fieldbus Communication Events Counter to 0.<br>0 = Off, 1 = On |

### Table 172 - System Diagnostics Outputs

| I/O Name | Datatype | Size (Bits) | Scale | Value | Description |
|---|---|---|---|---|---|
| Control Voltage Fluctuation | BOOL | 1 | 1 | 0, 1 | If this output is set to TRUE, a control voltage fluctuation is detected. |
| SIL[43] Starter Stop Status | BOOL | 1 | 1 | 0, 1 | 0 = All SIL Groups have SIL Starter Stop status 5 (normal operation, no SIL Starter Stop Command received)<br>1 = Any SIL Group has received a SIL Starter Stop command |
| Fieldbus Communication Event Counter | UINT | 16 | 1 | 0–65535<br>in steps of 1 | Counts the number of Fieldbus communication events |

43. Safety Integrity Level according to standard IEC 61508.

**Table 172 - System Diagnostics Outputs (Continued)**

| I/O Name | Datatype | Size (Bits) | Scale | Value | Description |
|---|---|---|---|---|---|
| System Alarms Counter | UINT | 16 | 1 | 0– 65535 in steps of 1 | Counts the number of alarms on the system |
| System Minor Event Counter | UINT | 16 | 1 | 0–65535 in steps of 1 | Counts the number of minor events on the system |
| Minor Event Record Register 1 | MINEVENTREC | 80 | — | 0, — | Record of most recent Minor Event 1 |
| Minor Event Record Register 2 | MINEVENTREC | 80 | — | 0, — | Record of Minor Event 2 |
| Minor Event Record Register 3 | MINEVENTREC | 80 | — | 0, — | Record of Minor Event 3 |
| Minor Event Record Register 4 | MINEVENTREC | 80 | — | 0, — | Record of Minor Event 4 |
| Minor Event Record Register 5 | MINEVENTREC | 80 | — | 0, — | Record of Minor Event 5 |
| SIL Starter Stop Message Group 1 | USINT | 8 | — | 0–5 | Status for SIL Group 1<br>0 = SIL Group not present in system configuration<br>1 = SIL Group impacted by Avatar Device Event<br>2 = SIL Group Stop Command received, SIL starters not open yet<br>3 = SIL Group Stop Command successfully issued, all SIL starters are open<br>4 = SIL Group Stop Command issued to only one SIM input channel (jumper or SIM input wiring is causing an issue), but SIL starters did successfully open.<br>5 = Normal operation, SIL starters can be open or closed |
| SIL Starter Stop Message Group 2 | USINT | 8 | — | 0–5 | Status for SIL Group 2<br>0 = SIL Group not present in system configuration<br>1 = SIL Group impacted by Avatar Device Event<br>2 = SIL Group Stop Command received, SIL starters not open yet<br>3 = SIL Group Stop Command successfully issued, all SIL starters are open<br>4 = SIL Group Stop Command issued to only one SIM input channel (jumper or SIM input wiring is causing an issue), but SIL starters did successfully open.<br>5 = Normal operation, SIL starters can be open or closed |
| SIL Starter Stop Message Group 3 | USINT | 8 | — | 0–5 | Status for SIL Group 3<br>0 = SIL Group not present in system configuration<br>1 = SIL Group impacted by Avatar Device Event<br>2 = SIL Group Stop Command received, SIL starters not open yet<br>3 = SIL Group Stop Command successfully issued, all SIL starters are open<br>4 = SIL Group Stop Command issued to only one SIM input channel (jumper or SIM input wiring is causing an issue), but SIL starters did successfully open.<br>5 = Normal operation, SIL starters can be open or closed |
| SIL Starter Stop Message Group 4 | USINT | 8 | — | 0–5 | Status for SIL Group 4<br>0 = SIL Group not present in system configuration<br>1 = SIL Group impacted by Avatar Device Event<br>2 = SIL Group Stop Command received, SIL starters not open yet<br>3 = SIL Group Stop Command successfully issued, all SIL starters are open<br>4 = SIL Group Stop Command issued to only one SIM input channel (jumper or SIM input wiring is causing an issue), but SIL starters did successfully open.<br>5 = Normal operation, SIL starters can be open or closed |

**Table 172 - System Diagnostics Outputs (Continued)**

| I/O Name | Datatype | Size (Bits) | Scale | Value | Description |
|---|---|---|---|---|---|
| SIL Starter Stop Message Group 5 | USINT | 8 | — | 0–5 | Status for SIL Group 5<br>0 = SIL Group not present in system configuration<br>1 = SIL Group impacted by Avatar Device Event<br>2 = SIL Group Stop Command received, SIL starters not open yet<br>3 = SIL Group Stop Command successfully issued, all SIL starters are open<br>4 = SIL Group Stop Command issued to only one SIM input channel (jumper or SIM input wiring is causing an issue), but SIL starters did successfully open.<br>5 = Normal operation, SIL starters can be open or closed |
| SIL Starter Stop Message Group 6 | USINT | 8 | — | 0–5 | Status for SIL Group 6<br>0 = SIL Group not present in system configuration<br>1 = SIL Group impacted by Avatar Device Event<br>2 = SIL Group Stop Command received, SIL starters not open yet<br>3 = SIL Group Stop Command successfully issued, all SIL starters are open<br>4 = SIL Group Stop Command issued to only one SIM input channel (jumper or SIM input wiring is causing an issue), but SIL starters did successfully open.<br>5 = Normal operation, SIL starters can be open or closed |
| SIL Starter Stop Message Group 7 | USINT | 8 | — | 0–5 | Status for SIL Group 7<br>0 = SIL Group not present in system configuration<br>1 = SIL Group impacted by Avatar Device Event<br>2 = SIL Group Stop Command received, SIL starters not open yet<br>3 = SIL Group Stop Command successfully issued, all SIL starters are open<br>4 = SIL Group Stop Command issued to only one SIM input channel (jumper or SIM input wiring is causing an issue), but SIL starters did successfully open.<br>5 = Normal operation, SIL starters can be open or closed |
| SIL Starter Stop Message Group 8 | USINT | 8 | — | 0–5 | Status for SIL Group 8<br>0 = SIL Group not present in system configuration<br>1 = SIL Group impacted by Avatar Device Event<br>2 = SIL Group Stop Command received, SIL starters not open yet<br>3 = SIL Group Stop Command successfully issued, all SIL starters are open<br>4 = SIL Group Stop Command issued to only one SIM input channel (jumper or SIM input wiring is causing an issue), but SIL starters did successfully open.<br>5 = Normal operation, SIL starters can be open or closed |

### Table 172 - System Diagnostics Outputs (Continued)

| I/O Name | Datatype | Size (Bits) | Scale | Value | Description |
|---|---|---|---|---|---|
| SIL Starter Stop Message Group 9 | USINT | 8 | — | 0–5 | Status for SIL Group 9<br>0 = SIL Group not present in system configuration<br>1 = SIL Group impacted by Avatar Device Event<br>2 = SIL Group Stop Command received, SIL starters not open yet<br>3 = SIL Group Stop Command successfully issued, all SIL starters are open<br>4 = SIL Group Stop Command issued to only one SIM input channel (jumper or SIM input wiring is causing an issue), but SIL starters did successfully open.<br>5 = Normal operation, SIL starters can be open or closed |
| SIL Starter Stop Message Group 10 | USINT | 8 | — | 0–5 | Status for SIL Group 10<br>0 = SIL Group not present in system configuration<br>1 = SIL Group impacted by Avatar Device Event<br>2 = SIL Group Stop Command received, SIL starters not open yet<br>3 = SIL Group Stop Command successfully issued, all SIL starters are open<br>4 = SIL Group Stop Command issued to only one SIM input channel (jumper or SIM input wiring is causing an issue), but SIL starters did successfully open.<br>5 = Normal operation, SIL starters can be open or closed |

## Energy

### Table 173 - System Voltage Basic Inputs

| I/O Name | Datatype | Size (Bits) | Scale | Value | Description |
|---|---|---|---|---|---|
| Reset Maximum Voltage RMS | BOOL | 1 | 1 | 0, 1 | Reset the Max. Voltage RMS value and associated timestamps.<br>0 = No, 1 = Yes |
| Reset Maximum Unbalance Voltage | BOOL | 1 | 1 | 0, 1 | Reset Max. Unbalance Voltage to zero, and associated timestamp.<br>0 = No, 1 = Yes |
| Reset Upstream Voltage Fluctuation Status | BOOL | 1 | 1 | 0, 1 | Command to reset Voltage Fluctuation Status.<br>0 = No, 1 = Yes |

### Table 174 - System Voltage Basic Outputs

| I/O Name | Datatype | Size (Bits) | Scale | Value | Description |
|---|---|---|---|---|---|
| Upstream Voltage Fluctuation Status | BOOL | 1 | 1 | 0, 1 | On when a Voltage Dip or Swell has occurred. Reset by command.<br>0 = Off, 1 = On |
| Average Voltage RMS | UINT | 16 | 1 | 0–1,000<br>in steps of 1 | Average RMS Voltage (**V**) on 3 phases |
| Maximum Average Voltage RMS | UINT | 16 | 1 | 0–65,535<br>in steps of 1 | Maximum voltage (**V**) measured by the system |
| Maximum Average Voltage Timestamp | DT | 64 | — | — | **Date** and **Time** of the maximum average voltage |
| Voltage RMS Phase 1 (V) | UINT | 16 | 1 | 0–65,535<br>in steps of 1 | Average RMS voltage (**V**) between L1 and neutral |
| Voltage RMS Phase 2 (V) | UINT | 16 | 1 | 0–65,535<br>in steps of 1 | Average RMS voltage (**V**) between L2 and neutral |

### Table 174 - System Voltage Basic Outputs (Continued)

| I/O Name | Datatype | Size (Bits) | Scale | Value | Description |
|---|---|---|---|---|---|
| Voltage RMS Phase 3 (V) | UINT | 16 | 1 | 0–65,535 in steps of 1 | Average RMS voltage (**V**) between L3 and neutral |
| Percentage of Unbalance Voltage (%) | USINT | 8 | 1 | 0–100 in steps of 1 | **%** of unbalance voltage |
| Maximum Unbalance Voltage % | USINT | 8 | 1 | 0–100 in steps of 1 | Maximum unbalance voltage in **%** |
| Maximum Unbalance Voltage Timestamp | DT | 64 | — | — | **Date** and **Time** of the maximum unbalance voltage |
| Voltage Phase Sequence (ABC or ACB) | BOOL | 1 | 1 | 0, 1 | Measured voltage phase sequence (ABC or ACB)<br>0 = Phase order ABC<br>1 = Phase order ACB |
| Frequency (Hz) | USINT | 8 | 1 | 0–255 in steps of 1 | Main power voltage frequency (**Hz**). This register returns the line frequency as measured on phase 1. |

### Table 175 - System Voltage Enhanced Inputs

| I/O Name | Datatype | Size (Bits) | Scale | Value | Description |
|---|---|---|---|---|---|
| Reset Voltage Dip Count | BOOL | 1 | 1 | 0, 1 | Command to reset the Voltage Dip counter to 0.<br>0 = No, 1 = Yes |
| Reset Voltage Swell Count | BOOL | 1 | 1 | 0, 1 | Command to reset the Voltage Swell counter to 0.<br>0 = No, 1 = Yes |

### Table 176 - System Voltage Enhanced Outputs

| I/O Name | Datatype | Size (Bits) | Scale | Value | Description |
|---|---|---|---|---|---|
| Voltage Dip Record Register 1 (most recent) | UINT | 16 | 1 | 0–65,335 in steps of 1 | Minimum voltage magnitude (**V**) for Voltage Dip Record 1 |
| Voltage Dip Record Register 2 | UINT | 16 | 1 | 0–65,335 in steps of 1 | Minimum voltage magnitude (**V**) for Voltage Dip Record 2 |
| Voltage Dip Record Register 3 | UINT | 16 | 1 | 0–65,335 in steps of 1 | Minimum voltage magnitude (**V**) for Voltage Dip Record 3 |
| Voltage Dip Record Register 4 | UINT | 16 | 1 | 0–65,335 in steps of 1 | Minimum voltage magnitude (**V**) for Voltage Dip Record 4 |
| Voltage Dip Record Register 5 (least recent) | UINT | 16 | 1 | 0–65,335 in steps of 1 | Minimum voltage magnitude (**V**) for Voltage Dip Record 5 |
| Voltage Dip Record 1 Start Date | DT | 64 | — | — | Voltage Dip Record Register 1 Start Timestamp (**Date**, **Time**) |
| Voltage Dip Record 2 Start Date | DT | 64 | — | — | Voltage Dip Record Register 2 Start Timestamp (**Date**, **Time**) |
| Voltage Dip Record 3 Start Date | DT | 64 | — | — | Voltage Dip Record Register 3 Start Timestamp (**Date**, **Time**) |
| Voltage Dip Record 4 Start Date | DT | 64 | — | — | Voltage Dip Record Register 4 Start Timestamp (**Date**, **Time**) |
| Voltage Dip Record 5 Start Date | DT | 64 | — | — | Voltage Dip Record Register 5 Start Timestamp (**Date**, **Time**) |
| Voltage Dip Record 1 Stop Date | DT | 64 | — | — | Voltage Dip Record Register 1 Stop Timestamp (**Date**, **Time**) |
| Voltage Dip Record 2 Stop Date | DT | 64 | — | — | Voltage Dip Record Register 2 Stop Timestamp (**Date**, **Time**) |

**Table 176 - System Voltage Enhanced Outputs (Continued)**

| I/O Name | Datatype | Size (Bits) | Scale | Value | Description |
|---|---|---|---|---|---|
| Voltage Dip Record 3 Stop Date | DT | 64 | — | — | Voltage Dip Record Register 3 Stop Timestamp (**Date**, **Time**) |
| Voltage Dip Record 4 Stop Date | DT | 64 | — | — | Voltage Dip Record Register 4 Stop Timestamp (**Date**, **Time**) |
| Voltage Dip Record 5 Stop Date | DT | 64 | — | — | Voltage Dip Record Register 5 Stop Timestamp (**Date**, **Time**) |
| Voltage Dip Count | UINT | 16 | 1 | 0–65,335 in steps of 1 | Voltage Dip counter |
| Voltage Swell Record Register 1 (most recent) | UINT | 16 | 1 | 0–65,335 in steps of 1 | Maximum voltage magnitude (**V**) for Voltage Swell Record 1 |
| Voltage Swell Record Register 2 | UINT | 16 | 1 | 0–65,335 in steps of 1 | Maximum voltage magnitude (**V**) for Voltage Swell Record 2 |
| Voltage Swell Record Register 3 | UINT | 16 | 1 | 0–65,335 in steps of 1 | Maximum voltage magnitude (**V**) for Voltage Swell Record 3 |
| Voltage Swell Record Register 4 | UINT | 16 | 1 | 0–65,335 in steps of 1 | Maximum voltage magnitude (**V**) for Voltage Swell Record 4 |
| Voltage Swell Record Register 5 (least recent) | UINT | 16 | 1 | 0–65,335 in steps of 1 | Maximum voltage magnitude (**V**) Voltage Swell Record 5 |
| Voltage Swell Record 1 Start Date | DT | 64 | — | — | Voltage Swell Record Register 1 Start Timestamp (**Date**, **Time**) |
| Voltage Swell Record 2 Start Date | DT | 64 | — | — | Voltage Swell Record Register 2 Start Timestamp (**Date**, **Time**) |
| Voltage Swell Record 3 Start Date | DT | 64 | — | — | Voltage Swell Record Register 3 Start Timestamp (**Date**, **Time**) |
| Voltage Swell Record 4 Start Date | DT | 64 | — | — | Voltage Swell Record Register 4 Start Timestamp (**Date**, **Time**) |
| Voltage Swell Record 5 Start Date | DT | 64 | — | — | Voltage Swell Record Register 5 Start Timestamp (**Date**, **Time**) |
| Voltage Swell Record 1 Stop Date | DT | 64 | — | — | Voltage Swell Record Register 1 Stop Timestamp (**Date**, **Time**) |
| Voltage Swell Record 2 Stop Date | DT | 64 | — | — | Voltage Swell Record Register 2 Stop Timestamp (**Date**, **Time**) |
| Voltage Swell Record 3 Stop Date | DT | 64 | — | — | Voltage Swell Record Register 3 Stop Timestamp (**Date**, **Time**) |
| Voltage Swell Record 4 Stop Date | DT | 64 | — | — | Voltage Swell Record Register 4 Stop Timestamp (**Date**, **Time**) |
| Voltage Swell Record 5 Stop Date | DT | 64 | — | — | Voltage Swell Record Register 5 Stop Timestamp (**Date**, **Time**) |
| Voltage Swell Count | UINT | 16 | 1 | 0–65,335 in steps of 1 | Voltage Swell counter |

**Table 177 - System Power Basic Inputs**

| I/O Name | Datatype | Size (Bits) | Scale | Value | Description |
|---|---|---|---|---|---|
| Reset Maximum Total Active Power | BOOL | 1 | 1 | 0, 1 | Reset the Active Power Max. value and associated timestamp.<br>0 = No, 1 = Yes |
| Reset Maximum Total Reactive Power | BOOL | 1 | 1 | 0, 1 | Reset the Reactive Power Max. value and associated timestamp.<br>0 = No, 1 = Yes |

### Table 177 - System Power Basic Inputs (Continued)

| I/O Name | Datatype | Size (Bits) | Scale | Value | Description |
|---|---|---|---|---|---|
| Reset Minimum True Power Factor | BOOL | 1 | 1 | 0, 1 | Reset the true Power Factor Min. value to 1 and associated timestamp.<br>0 = No, 1 = Yes |
| Reset Maximum True Power Factor | BOOL | 1 | 1 | 0, 1 | Reset the true Power Factor Max. value to 0 and associated timestamp.<br>0 = No, 1 = Yes |

### Table 178 - System Power Basic Outputs

| I/O Name | Datatype | Size (Bits) | Scale | Value | Description |
|---|---|---|---|---|---|
| Instantaneous Total Active Power | DINT | 32 | 0.001 | –2,147,483,648 to 2,147,483,647 in steps of 1 | Returns the total Active Power (**kW**) for the avatar. |
| Maximum Total Active Power | DINT | 32 | 0.001 | –9,999,999 to 9,999,999 in steps of 1 | Returns the maximum value of total active power (**kW**) for the avatar. |
| Maximum Total Active Power Timestamp | DT | 64 | — | — | Provide **date** and **time** when maximum total Active Power value has been recorded. |
| Instantaneous Total Reactive Power | DINT | 32 | 0.001 | –9,999,999 to 9,999,999 in steps of 1 | Returns the total Reactive Power value (**kVAR**) for the avatar. |
| Maximum Total Reactive Power | DINT | 32 | 0.001 | –9,999,999 to 9,999,999 in steps of 1 | Returns the maximum value of Reactive Power (**kVAR**) for the avatar. |
| Maximum Total Reactive Power Timestamp | DT | 64 | — | — | Provides **date** and **time** when total maximum total Reactive Power value has been recorded. |
| True Power Factor | USINT | 8 | 0.01 | 0–100 in steps of 1 | Returns the true Power factor value. |
| Minimum True Power Factor | USINT | 8 | 0.01 | 0–100 in steps of 1 | Returns the true Power factor minimum value. |
| Maximum True Power Factor | USINT | 8 | 0.01 | 0–100 in steps of 1 | Returns the true Power factor maximum value. |
| Minimum True Power Factor Timestamp | DT | 64 | — | — | Provide **date** and **time** when Minimum Power Factor value has been recorded. |
| Maximum True Power Factor Timestamp | DT | 64 | — | — | Provide **date** and **time** when Maximum Power Factor value has been recorded. |

### Table 179 - System Energy Basic Inputs

| I/O Name | Datatype | Size (Bits) | Scale | Value | Description |
|---|---|---|---|---|---|
| Reset Total Reactive Energy | BOOL | 1 | 1 | 0, 1 | Resets System Avatar accumulation of reactive energy to zero, does not affect load or application level energy data.<br>0 = No, 1 = Yes |
| Reset Total Active Energy | BOOL | 1 | 1 | 0, 1 | Command to set the Total Active Energy value to Total Active Energy Preset value.<br>0 = No, 1 = Yes |

### Table 180 - System Energy Basic Outputs

| I/O Name | Datatype | Size (Bits) | Scale | Value | Description |
|---|---|---|---|---|---|
| Total Active Energy | UDINT | 32 | 0.001 | 0–4,294,967,295 in steps of 1 | Returns the Total Active Energy value (kWh). |
| Total Reactive Energy | UDINT | 32 | 0.001 | 0–999,999,999 in steps of 1 | Returns the Total Reactive Energy value (kVARh). |

# Asset Management

### Table 181 - System Product Data Outputs

| I/O Name | Datatype | Size (Bits) | Scale | Unit | Min. | Max. | Step | Description |
|---|---|---|---|---|---|---|---|---|
| Base MAC Address | DT_MAC | 48 | — | — | — | — | — | MAC address of Fieldbus Ethernet port 1. |

### Table 182 - System Maintenance Data Outputs

| I/O Name | Datatype | Size (Bits) | Scale | Unit | Min. | Max. | Step | Description |
|---|---|---|---|---|---|---|---|---|
| Time (module) ON | UDINT | 32 | 1 | Hour | 0 | 4,294,967,295 | 1 | This register indicates the time that the module has been powered on in its lifetime. |
| Number of Events (Device Events) | UINT | 16 | 1 | — | 0 | 65,535 | 1 | This register attempts to indicate number of times this module has experienced a device event. This value does not include device event which prevent the saving or corruption of the NVM. |

# Time

### Table 183 - System Time Outputs

| I/O Name | Datatype | Size (Bits) | Scale | Value | Description |
|---|---|---|---|---|---|
| System Time | DT | 64 | — | — | Provide date and time for the system. |

# Avatar I/O

The tables in this section describe the inputs and outputs available for the avatars.

# Control

### Table 184 - Avatar Control Inputs

| I/O Name | Datatype | Size (Bits) | Scale | Value | Description |
|---|---|---|---|---|---|
| Trip Reset | BOOL | 1 | 1 | 0, 1 | Command to reset an avatar trip event<br>0 = Off, 1 = On |
| Run 1 | BOOL | 1 | 1 | 0, 1 | Command to Avatar Forward Switch.<br>0 = Off, 1 = On |
| Run 2 | BOOL | 1 | 1 | 0, 1 | Command to Avatar Forward redundant Switch for Wiring Category 3 and Wiring Category 4 avatars.<br>0 = Off, 1 = On |
| Run Forward | BOOL | 1 | 1 | 0, 1 | Command to Avatar Forward Switch.<br>0 = Off, 1 = On |
| Run Reverse | BOOL | 1 | 1 | 0, 1 | Command to close the Reverse switch with Reverser Avatar<br>0 = Off, 1 = On |
| Run Forward Low | BOOL | 1 | 1 | 0, 1 | Command to start Motor forward with Low Speed<br>0 = Off, 1 = On |
| Run Forward High | BOOL | 1 | 1 | 0, 1 | Command to start Motor forward with High Speed<br>0 = Off, 1 = On |

**Table 184 - Avatar Control Inputs (Continued)**

| I/O Name | Datatype | Size (Bits) | Scale | Value | Description |
|---|---|---|---|---|---|
| Run Reverse Low | BOOL | 1 | 1 | 0, 1 | Run Reverse Low Speed command<br>0 = Off, 1 = On |
| Run Reverse High | BOOL | 1 | 1 | 0, 1 | Run Reverse High Speed command<br>0 = Off, 1 = On |
| Logic Output 1 | BOOL | 1 | 1 | 0, 1 | Command to Close Logical output 1<br>0 = Off, 1 = On |
| Logic Output 2 | BOOL | 1 | 1 | 0, 1 | Command to Close Logical output 2<br>0 = Off, 1 = On |
| Digital Output 0 | BOOL | 1 | 1 | 0, 1 | Command to close Digital output 0<br>0 = Off, 1 = On |
| Digital Output 1 | BOOL | 1 | 1 | 0, 1 | Command to close Digital output 1<br>0 = Off, 1 = On |
| Analog Output 0 | INT | 16 | 1 | –32,768 to 32,767 in steps of 1 | Value to be written to Analog output 0 |

**Table 185 - Avatar Control Outputs**

| I/O Name | Datatype | Size (Bits) | Scale | Value | Description |
|---|---|---|---|---|---|
| Ready | BOOL | 1 | 1 | 0, 1 | The avatar is ready to be controlled (all Devices in the avatar are Ready).<br>0 = Off, 1 = On |
| Upstream Voltage Present 1 | BOOL | 1 | 1 | 0, 1 | The avatar has detected that Upstream main power of its first Device is present (Breaker closed).<br>0 = no voltage presence detected<br>1 = voltage presence detected |
| Upstream Voltage Present 2 | BOOL | 1 | 1 | 0, 1 | The avatar has detected that Upstream main power of its second Device (if available) is present.<br>0 = no voltage presence detected<br>1 = voltage presence detected |
| Upstream Voltage Present 3 | BOOL | 1 | 1 | 0, 1 | The avatar has detected that Upstream main power of its third Device (if available) is present.<br>0 = no voltage presence detected<br>1 = voltage presence detected |
| Upstream Voltage Present 4 | BOOL | 1 | 1 | 0, 1 | The avatar has detected that Upstream main power of its fourth Device (if available) is present.<br>0 = no voltage presence detected<br>1 = voltage presence detected |
| Run 1 Status | BOOL | 1 | 1 | 0, 1 | Status of the primary switch for Wiring Category 3 and Category 4.<br>0 = switch is open, 1 = switch is closed |
| Run 2 Status | BOOL | 1 | 1 | 0, 1 | Status of the primary switch for Wiring Category 3 and Category 4.<br>0 = switch is open, 1 = switch is closed |
| Run Forward Status | BOOL | 1 | 1 | 0, 1 | Avatar Forward Switch Feedback,<br>0 = switch is open, 1 = switch is closed |
| Run Reverse Status | BOOL | 1 | 1 | 0, 1 | Avatar Reverse Switch Feedback,<br>0 = switch is open, 1 = switch is closed |
| Run Y Status | BOOL | 1 | 1 | 0, 1 | Position of the Y switch for Y/D avatars.<br>0 = Off, 1 = On |
| Run D Status | BOOL | 1 | 1 | 0, 1 | Position of the D Switch for Y/D avatars.<br>0 = Off, 1 = On |
| Run Forward Low Status | BOOL | 1 | 1 | 0, 1 | Motor is running in Speed1<br>0 = Motor stopped or in Speed1<br>1 = Motor running in Speed2 |
| Run Forward High Status | BOOL | 1 | 1 | 0, 1 | Motor is running in Speed2<br>0 = Motor stopped or in Speed1<br>1 = Motor running in Speed2 |

**Table 185 - Avatar Control Outputs (Continued)**

| I/O Name | Datatype | Size (Bits) | Scale | Value | Description |
|---|---|---|---|---|---|
| Run Reverse Low Status | BOOL | 1 | 1 | 0, 1 | Position of the Low Speed Reverser switch.<br>0 = Off, 1 = On |
| Run Reverse High Status | BOOL | 1 | 1 | 0, 1 | Position of the High Speed Reverser switch.<br>0 = Off, 1 = On |
| Logic Output 1 Status | BOOL | 1 | 1 | 0, 1 | Position of the Output 1.<br>0 = Off, 1 = On |
| Logic Output 2 Status | BOOL | 1 | 1 | 0, 1 | Position of the Output 2.<br>0 = Off, 1 = On |
| Logic Input 1 Status | BOOL | 1 | 1 | 0, 1 | State of Digital Input 1 of the avatar.<br>0 = Off, 1 = On |
| Logic Input 2 Status | BOOL | 1 | 1 | 0, 1 | State of Digital Input 1 of the avatar.<br>0 = Off, 1 = On |
| Digital Input Status 0 | BOOL | 1 | 1 | 0, 1 | State of Digital Input 0 of DIOM Avatar<br>0 = Off, 1 = On |
| Digital Input Status 1 | BOOL | 1 | 1 | 0, 1 | State of Digital Input 1 of DIOM Avatar<br>0 = Off, 1 = On |
| Digital Input Status 2 | BOOL | 1 | 1 | 0, 1 | State of Digital Input 2 of DIOM Avatar<br>0 = Off, 1 = On |
| Digital Input Status 3 | BOOL | 1 | 1 | 0, 1 | State of Digital Input 3 of DIOM Avatar<br>0 = Off, 1 = On |
| Bypass Command Status | BOOL | 1 | 1 | 0, 1 | State of avatar if the bypass command has been issued to continue operation and not stop due to a trip.<br>0 = Off, 1 = On |
| Local Forward Status | BOOL | 1 | 1 | 0, 1 | The avatar logic is controlled by commands received on digital inputs and PLC commands are ignored during local mode.<br><br>Avatar Local Forward Switch Feedback,<br>0 = switch is open, 1 = switch is closed |
| Local Reverse Status | BOOL | 1 | 1 | 0, 1 | The avatar logic is controlled by commands received on digital inputs and PLC commands are ignored during local mode.<br><br>Avatar Reverse Forward Switch Feedback,<br>0 = switch is open, 1 = switch is closed |
| Local Forward Low Speed Status | BOOL | 1 | 1 | 0, 1 | The avatar logic is controlled by commands received on digital inputs and PLC commands are ignored during local mode.<br><br>Avatar Local Forward Low Speed Switch Feedback,<br>0 = switch is open, 1 = switch is closed |
| Local Forward High Speed Status | BOOL | 1 | 1 | 0, 1 | The avatar logic is controlled by commands received on digital inputs and PLC commands are ignored during local mode.<br><br>Avatar Local Forward High Speed Switch Feedback,<br>0 = switch is open, 1 = switch is closed |
| Local Reverse Low Speed Status | BOOL | 1 | 1 | 0, 1 | The avatar logic is controlled by commands received on digital inputs and PLC commands are ignored during local mode.<br><br>Avatar Local Reverse Low Speed Switch Feedback,<br>0 = switch is open, 1 = switch is closed |
| Local Reverse High Speed Status | BOOL | 1 | 1 | 0, 1 | The avatar logic is controlled by commands received on digital inputs and PLC commands are ignored during local mode.<br><br>Avatar Local Reverse High Speed Switch Feedback,<br>0 = switch is open, 1 = switch is closed |

**Table 185 - Avatar Control Outputs (Continued)**

| I/O Name | Datatype | Size (Bits) | Scale | Value | Description |
|---|---|---|---|---|---|
| Manual Mode Override Status | BOOL | 1 | 1 | 0, 1 | The avatar is controlled by local command and PV control when in manual mode.<br>0 = Off, 1 = On |
| PV Control Input 0 Status | BOOL | 1 | 1 | 0, 1 | Status of PV Control Input 0 (command to avatar after input processing).<br>0 = Off, 1 = On |
| PV Control Input 1 Status | BOOL | 1 | 1 | 0, 1 | Status of PV Control Input 1 (command to avatar after input processing).<br>0 = Off, 1 = On |
| PV Input 0 | INT | 16 | 1 | –32, 768 to 32,767 in steps of 1 | Returns the measured value of the PV input. |
| PV Input 1 | INT | 16 | 1 | –32, 768 to 32,767 in steps of 1 | |
| PV Input 2 | INT | 16 | 1 | –32, 768 to 32,767 in steps of 1 | |
| PV Input 3 | INT | 16 | 1 | –32, 768 to 32,767 in steps of 1 | |
| PV Input 4 | INT | 16 | 1 | –32, 768 to 32,767 in steps of 1 | |
| PV Switch 0 | BOOL | 1 | 1 | 0,1 | Positive Logic – A PV Switch input ON or a PV Input above the PV Control Level represents an ON command.<br>Negative Logic – A PV Switch input OFF or a PV Input below the PV Control Level represents an ON command.<br>0 = Off, 1 = On |
| PV Switch 1 | BOOL | 1 | 1 | 1,0 | |
| PV Switch 2 | BOOL | 1 | 1 | 1,0 | |
| PV Switch 3 | BOOL | 1 | 1 | 1,0 | |
| PV Switch 4 | BOOL | 1 | 1 | 1,0 | |
| Predictive Alarm Status | UINT | 16 | 1 | 1,0 | Predictive Alarms are triggered by combinations of protection functions alarms and PV Input conditions. The avatars support up to 10 Predictive Alarms. |
| Analog Input 0 | INT | 16 | 1 | –32,768 to 32,767 in steps of 1 | Value read from the Analog input 0 |
| Analog Input 1 | INT | 16 | 1 | –32,768 to 32,767 in steps of 1 | Value read from the Analog input 1 |
| Load Starting | BOOL | 1 | 1 | 0, 1 | Returns 1 if the load is in start phase.<br>0 = Off, 1 = On |
| Load Running | BOOL | 1 | 1 | 0, 1 | Set to 1 when a Run or Close command has been executed and current is flowing in the poles (equivalent to Motor Running but also for non-motor avatars).<br>0 = Off, 1 = On |
| Motor Temperature | INT | 16 | 1 | –200 to 850 in steps of 1 | Returns the motor temperature in **°C**. Depending on the Temperature Sensor type, the range is:<br>• –200 to 850 °C for PT100<br>• –200 to 600 °C for PT1000<br>• –60 to 180 °C for NI 100/1000 |
| $I_{RMS}$ Average | UDINT | 32 | 0.001 | 0–4,294,967,295 in steps of 1 | Calculate the average of the most recent phase current RMS values (**A**). |
| Alarm | BOOL | 1 | 1 | 0, 1 | Avatar has detected a protection alarm event.<br>0 = Off, 1 = On |
| Tripped | BOOL | 1 | 1 | 0, 1 | Avatar has detected a trip event.<br>0 = Off, 1 = On |
| Ready to Reset | BOOL | 1 | 1 | 0, 1 | 0 = Off, 1 = On |
| Asset Alarm | BOOL | 1 | 1 | 0, 1 | Triggered when a Power Device or SIM references within the avatar has reached or exceeded 90% of expected durability (per Avatar Parameter).<br>0 = Off, 1 = On |

### Table 185 - Avatar Control Outputs (Continued)

| I/O Name | Datatype | Size (Bits) | Scale | Value | Description |
|---|---|---|---|---|---|
| Motor Thermal Capacity Used | USINT | 8 | 1 | 0–255<br>in steps of 1 | Returns the percentage (**%**) of the motor's thermal capacity which has been used. |
| Protection Alarm Message 1 | UINT | 16 | — | 0 to max. 0xFFFF | 1st Modbus register protection alarm bits:<br>Bit 2: Ground Current Alarm<br>Bit 3: Thermal Overload Alarm<br>Bit 5: Jam Alarm<br>Bit 6: Current Phase Unbalance Alarm<br>Bit 7: Undercurrent Alarm |
| Protection Alarm Message 2 | UINT | 16 | — | 0 to max. 0xFFFF | 2nd Modbus register protection alarm bits:<br>Bit 3: Overcurrent Alarm<br>Bit 6: Motor Overheat Alarm |
| Protection Trip Message 1 | UINT | 16 | — | 0 to max. 0xFFFF | 1st Modbus register protection trip bits:<br>Bit 2: Ground Current Trip<br>Bit 3: Thermal Overload Trip<br>Bit 4: Long Start Trip<br>Bit 5: Jam Trip<br>Bit 6: Current Phase Unbalance Trip<br>Bit 7: Undercurrent Trip<br>Bit 8: Stall Trip |
| Protection Trip Message 2 | UINT | 16 | — | 0 to max. 0xFFFF | 2nd Modbus register protection trip bits:<br>Bit 2: Phase Configuration Trip<br>Bit 3: Overcurrent Trip<br>Bit 4: Current Phase Loss Trip<br>Bit 5: Current Phase Reversal Trip<br>Bit 6: Motor Overheat Trip |
| Thermal Overload Time To Trip | UINT | 16 | 1 | 0–65535<br>in steps of 1 | Estimated time (in **seconds**) before a Thermal Overload trip. |
| Thermal Overload Time To Reset | UINT | 16 | 1 | 0–65535<br>in steps of 1 | Estimated time (in **seconds**) to wait before a reset could acknowledge a Thermal Overload trip. |

## Energy

### Table 186 - Avatar Power Outputs

| I/O Name | Datatype | Size (Bits) | Scale | Unit | Minimum | Maximum | Step | Description |
|---|---|---|---|---|---|---|---|---|
| Instantaneous Total Active Power | DINT | 32 | 0.001 | kW | -2,147,483,648 | 2,147,483,647 | 1 | Returns the total Active Power for the avatar. |
| Maximum Total Active Power | DINT | 32 | 0.001 | kW | -9,999,999 | 9,999,999 | 1 | Returns the maximum value of total active power for the avatar. |
| Maximum Total Active Power Timestamp | DT | 64 | — | Date, Time | — | — | — | Provide date and time when maximum total active Power value has been recorded. |

**Table 186 - Avatar Power Outputs (Continued)**

| I/O Name | Datatype | Size (Bits) | Scale | Unit | Minimum | Maximum | Step | Description |
|---|---|---|---|---|---|---|---|---|
| Instantaneous Total Reactive Power | DINT | 32 | 0.001 | kVAR | -9,999,999 | 9,999,999 | 1 | Returns the total Reactive Power value for the avatar. |
| Maximum Total Reactive Power | DINT | 32 | 0.001 | kVAR | -9,999,999 | 9,999,999 | 1 | Returns the maximum value of Reactive Power for the avatar. |
| Maximum Total Reactive Power Timestamp | DT | 64 | — | Date, Time | — | — | — | Provide date and time when total maximum total Reactive Power value has been recorded |
| True Power Factor | USINT | 8 | 0.01 | — | 0 | 100 | 1 | Returns the true Power factor value. |
| Minimum True Power Factor | USINT | 8 | 0.01 | — | 0 | 100 | 1 | Returns the true Power factor minimum value. |
| Maximum True Power Factor | USINT | 8 | 0.01 | — | 0 | 100 | 1 | Returns the true Power factor maximum value. |
| Minimum True Power Factor Timestamp | DT | 64 | — | Date, Time | — | — | — | Provide date and time when Minimum Power Factor value has been recorded. |
| Maximum True Power Factor Timestamp | DT | 64 | — | Date, Time | — | — | — | Provide date and time when Maximum Power Factor value has been recorded. |

**Table 187 - Avatar Energy Inputs**

| I/O Name | Data-type | Size (Bits) | Scale | Unit | Minimum | Maximum | Step | Description |
|---|---|---|---|---|---|---|---|---|
| Set Total Active Energy | BOOL | 1 | 1 | — | 0 | 1 | 1 | Command to set the Total Active Energy value to Total Active Energy Preset value.<br><br>0 = no, 1 = yes |
| Set Total Reactive Energy | BOOL | 1 | 1 | — | 0 | 1 | 1 | Command to set the Total Reactive Energy value to Total Reactive Energy Preset value.<br><br>0 = no, 1 = yes |
| Total Active Energy Preset Value | UDINT | 32 | 0.001 | kWh | 0 | 4,294,967,295 | 1 | Preset the Total Active Energy value. |
| Total Reactive Energy Preset Value | UDINT | 32 | 0.001 | kVARh | 0 | 4,294,967,295 | 1 | Preset the Total Reactive Energy value. |
| Run Record ToU Channel 1 | BOOL | 1 | 1 | — | 0 | 1 | 1 | Record Time of Use Channel 1 start command. 0 = no, 1 = yes |
| Run Record ToU Channel 2 | BOOL | 1 | 1 | — | 0 | 1 | 1 | Record Time of Use Channel 2 start command. 0 = no, 1 = yes |
| Run Record ToU Channel 3 | BOOL | 1 | 1 | — | 0 | 1 | 1 | Record Time of Use Channel 3 start command. 0 = no, 1 = yes |
| Run Record ToU Channel 4 | BOOL | 1 | 1 | — | 0 | 1 | 1 | Record Time of Use Channel 4 start command. 0 = no, 1 = yes |

### Table 188 - Avatar Energy Outputs

| I/O Name | Data-type | Size (Bits) | Scale | Unit | Minimum | Maximum | Step | Description |
|---|---|---|---|---|---|---|---|---|
| Total Active Energy | UDINT | 32 | 0.001 | kWh | 0 | 4,294,967,295 | 1 | Returns the Total Active Energy value. |
| Total Reactive Energy | UDINT | 32 | 0.001 | kVARh | 0 | 999,999,999 | 1 | Returns the Total Reactive Energy value |
| ToU Total Active Energy Channel 1 | UDINT | 32 | 0.001 | kWh | 0 | 999,999,999 | 1 | Returns the Total Active Energy Value that has been accumulated while the Channel is enabled/ active. |
| ToU Total Active Energy Channel 2 | UDINT | 32 | 0.001 | kWh | 0 | 999,999,999 | 1 | |
| ToU Total Active Energy Channel 3 | UDINT | 32 | 0.001 | kWh | 0 | 999,999,999 | 1 | |
| ToU Total Active Energy Channel 4 | UDINT | 32 | 0.001 | kWh | 0 | 999,999,999 | 1 | |
| ToU Total Reactive Energy Channel 1 | UDINT | 32 | 0.001 | kVARh | 0 | 999,999,999 | 1 | Returns the Total Reactive Energy Value that has been accumulated while the Channel is enabled/ active. |
| ToU Total Reactive Energy Channel 2 | UDINT | 32 | 0.001 | kVARh | 0 | 999,999,999 | 1 | |
| ToU Total Reactive Energy Channel 3 | UDINT | 32 | 0.001 | kVARh | 0 | 4,294,967,295 | 1 | |
| ToU Total Reactive Energy Channel 4 | UDINT | 32 | 0.001 | kVARh | 0 | 4,294,967,295 | 1 | |

## Diagnostics

### Table 189 - Avatar Diagnostics Inputs

| I/O Name | Datatype | Size (Bits) | Scale | Value | Description |
|---|---|---|---|---|---|
| Reset Max $I_{RMS}$ | BOOL | 1 | 1 | 0, 1 | Command to reset the Maximum Average $I_{RMS}$ current value and Time Stamp.<br>0 = Off, 1 = On |

### Table 190 - Avatar Diagnostics Outputs

| I/O Name | Datatype | Size (Bits) | Scale | Value | Description |
|---|---|---|---|---|---|
| Upstream Voltage Present 1 | BOOL | 1 | 1 | 0, 1 | The avatar has detected that Upstream main power of its first Device is present (Breaker closed).<br>0 = no voltage presence detected<br>1 = voltage presence detected |
| Upstream Voltage Present 2 | BOOL | 1 | 1 | 0, 1 | the avatar has detected that Upstream main power of its second Device (if available) is present.<br>0 = no voltage presence detected<br>1 = voltage presence detected |
| Upstream Voltage Present 3 | BOOL | 1 | 1 | 0, 1 | The avatar has detected that Upstream main power of its third Device (if available) is present.<br>0 = no voltage presence detected<br>1 = voltage presence detected |

**Table 190 - Avatar Diagnostics Outputs (Continued)**

| I/O Name | Datatype | Size (Bits) | Scale | Value | Description |
|---|---|---|---|---|---|
| Upstream Voltage Present 4 | BOOL | 1 | 1 | 0, 1 | The avatar has detected that Upstream main power of its fourth Device (if available) is present.<br>0 = no voltage presence detected<br>1 = voltage presence detected |
| Max Average $I_{RMS}$ | UINT | 16 | 0.1 | 0–65,535<br>in steps of 1 | Indicates the maximum current (**A**) measured by the device in its lifetime. |
| Max Average $I_{RMS}$ Time Stamp | DT | 64 | — | — | Provides the **date** and **time** when Maximum average $I_{RMS}$ current value has been recorded. |
| $I_{RMS}$ Phase 1 | UDINT | 32 | 0.001 | 0 to<br>4,294,967,295<br>in steps of 1 | Phase L1 $I_{RMS}$ value (**A**) |
| $I_{RMS}$ Phase 2 | UDINT | 32 | 0.001 | 0 to<br>4,294,967,295<br>in steps of 1 | Phase L2 $I_{RMS}$ value (**A**) |
| $I_{RMS}$ Phase 3 | UDINT | 32 | 0.001 | 0 to<br>4,294,967,295<br>in steps of 1 | Phase L3 $I_{RMS}$ value (**A**) |

**Table 191 - Avatar Read Alarm Counters Inputs**

| I/O Name | Datatype | Size (Bits) | Scale | Value | Description |
|---|---|---|---|---|---|
| Reset Alarm Counter | BOOL | 1 | 1 | 0, 1 | Resets all alarm counters to 0.<br>0 = Off, 1 = On |

**Table 192 - Avatar Read Alarm Counters Outputs**

| I/O Name | Datatype | Size (Bits) | Scale | Value | Description |
|---|---|---|---|---|---|
| Thermal Overload Alarm Count | UINT | 16 | 1 | 0–65,535<br>in steps of 1 | Counter of alarms related to Thermal Overload protection. |
| Jam Alarm Count | UINT | 16 | 1 | 0–65,535<br>in steps of 1 | Counter of alarms related to Jam protection. |
| Undercurrent Alarm Count | UINT | 16 | 1 | 0–65,535<br>in steps of 1 | Counter of alarms related to Undercurrent protection. |
| Overcurrent Alarm Count | UINT | 16 | 1 | 0–65,535<br>in steps of 1 | Counter of alarms related to Overcurrent protection. |
| Current Phase Unbalance Alarm Count | UINT | 16 | 1 | 0–65,535<br>in steps of 1 | Counter of alarms related to Phase Unbalance protection. |
| Ground Current Alarm Count | UINT | 16 | 1 | 0–65,535<br>in steps of 1 | Counter of alarms related to Ground Current protection. |
| Motor Overheat Alarm Count | UINT | 16 | 1 | 0–65,535<br>in steps of 1 | Counter of Motor Overheat Alarm events. |
| All Alarms Count | UINT | 16 | 1 | 0–65,535<br>in steps of 1 | Counter of all alarms related to protections. |

**Table 193 - Avatar Read Trip Counters Inputs**

| I/O Name | Datatype | Size (Bits) | Scale | Value | Description |
|---|---|---|---|---|---|
| Reset Trip Counter | BOOL | 1 | 1 | 0, 1 | Reset all trip counters.<br>0 = Off, 1 = On |

### Table 194 - Avatar Read Trip Counters Outputs

| I/O Name | Datatype | Size (bits) | Scale | Value | Description |
|---|---|---|---|---|---|
| Thermal Overload Trip Count | UINT | 16 | 1 | 0–65,535 in steps of 1 | Counter of trips related to Thermal Overload protection. |
| Jam Trip Count | UINT | 16 | 1 | 0–65,535 in steps of 1 | Counter of trips related to Jam protection. |
| Undercurrent Trip Count | UINT | 16 | 1 | 0–65,535 in steps of 1 | Counter of trips related to Undercurrent protection. |
| Long Start Trip Count | UINT | 16 | 1 | 0–65,535 in steps of 1 | Counter of trips related to Long Start protection. |
| Overcurrent Trip Count | UINT | 16 | 1 | 0–65,535 in steps of 1 | Counter of trips related to Overcurrent protection. |
| Motor Overheat Trip Count | UINT | 16 | 1 | 0–65,535 in steps of 1 | Counter of Motor Overheat trip events. |
| Stall Trip Count | UINT | 16 | 1 | 0–65,535 in steps of 1 | Counter of trips related to Stall protection. |
| Current Phase Unbalance Trip Count | UINT | 16 | 1 | 0–65,535 in steps of 1 | Counter of trips related to Phase Unbalance protection. |
| Phase Configuration Trip Count | UINT | 16 | 1 | 0–65,535 in steps of 1 | Counter of trips related to Phase Configuration protection. |
| Ground Current Trip Count | UINT | 16 | 1 | 0–65,535 in steps of 1 | Counter of trips related to Ground Current protection. |
| Phase Reversal Trip Count | UINT | 16 | 1 | 0–65,535 in steps of 1 | Counter of trips related to Phase Reversal protection. |
| Current Phase Loss Trip Count | UINT | 16 | 1 | 0–65,535 in steps of 1 | Counter of trips related to Phase Loss protection. |
| All Trips Count | UINT | 16 | 1 | 0–65,535 in steps of 1 | Counter of all trips related to protections. |

### Table 195 - Avatar Trip Register Outputs

| I/O Name | Datatype | Size (bits) | Scale | Value | Description |
|---|---|---|---|---|---|
| Trip Record Register 1 | TRIPREC | 80 | — | 0, — | Date and Trip reason record 1 |
| Trip Record Register 2 | TRIPREC | 80 | — | 0, — | Date and Trip reason record 2 |
| Trip Record Register 3 | TRIPREC | 80 | — | 0, — | Date and Trip reason record 3 |
| Trip Record Register 4 | TRIPREC | 80 | — | 0, — | Date and Trip reason record 4 |
| Trip Record Register 5 | TRIPREC | 80 | — | 0, — | Date and Trip reason record 5 |

## Asset Management

### Table 196 - Avatar Maintenance Data Outputs

| I/O Name | Datatype | Size (Bits) | Scale | Value | Description |
|---|---|---|---|---|---|
| Time (module) On | UDINT | 32 | 1 | 0 to 4,294,967,295 in steps of 1 | Indicates the time that the module has been powered on in its lifetime (in **hours**). |
| Time Switch On | UDINT | 32 | 1 | 0 to 4,294,967,295 in steps of 1 | Indicates the time (in **hours**) that the contactor has been in the closed state. |
| Number of Events (Device Events) | UINT | 16 | 1 | 0 to 65,535 in steps of 1 | Indicates the number of times this module has experienced a device event. This value does not include device events which corrupt or prevent the saving of the non-volatile memory. |

**Table 196 - Avatar Maintenance Data Outputs (Continued)**

| I/O Name | Datatype | Size (Bits) | Scale | Value | Description |
|---|---|---|---|---|---|
| Number of Contactor Cycles | UDINT | 32 | 1 | 0 to 4,294,967,295 in steps of 1 | Indicates number of times the contactor has been commanded to the closed state from the open state. |
| Number of Device Power Cycles | UDINT | 32 | 1 | 0 to 4,294,967,295 in steps of 1 | Indicates number of times the device has been powered on. |
| Number of SIL Starter Stops[44] | UDINT | 32 | 1 | 0 to 4,294,967,295 in steps of 1 | Indicates the number of mirror relay operations. |
| Max. $I_{RMS}$ | UINT | 16 | 0.1 | 0 to 65,535 in steps of 1 | Indicates maximum current (**A**) the device has measured in its lifetime. |
| Lifetime Average $I_{RMS}$ | UDINT | 32 | 0.001 | 0 to 4,294,967,295 in steps of 1 | Lifetime average current (**A**) measured by the device (Total Current / Time Current ON). |
| Max. Average Voltage | UINT | 16 | 1 | 0 to 65,535 in steps of 1 | Indicates maximum voltage (**V**) the device has measured in its lifetime. |
| Average Lifetime Voltage | UNIT | 16 | 1 | 0 to 65,535 in steps of 1 | Indicates average lifetime voltage (**V**) measured. |

# Data Types

Data types are in conformance with IEC 61131-3.

**Table 197 - Data Types**

| Keyword | Description | Size (Bits) | Value Range |
|---|---|---|---|
| BOOL | Boolean | 1 | Range [0,1], where [0,1] represents [False, True] or [Off, On] |
| INT | Integer | 16 | Range [-32768, 32767] |
| DINT | Double Integer | 32 | Range [$-2^{31}$, $2^{31}-1$] |
| USINT | Unsigned Short Integer | 8 | Range [0, 255] |
| UINT | Unsigned Integer | 16 | Range [0, 65535] |
| UDINT | Unsigned Double Integer | 32 | Range [0, $2^{32}-1$] |
| STRING | Variable-length (N) single-byte Character | 8*N | — |
| DT | Date and Time of Day | 64 | Format: YYYYMMDDhhmmsscc, where:<br>• YYYY: Year coded on a UINT<br>• MM: Month coded on a USINT, Range [1, 12]<br>• DD: Day coded on a USINT, Range [1, 31]<br>• hh: hour coded on a USINT, Range [0, 23]<br>• mm: minute coded on a USINT, Range [0, 59]<br>• ss: second coded on a USINT, Range [0, 59]<br>• cc: hundredth of second coded on a USINT, Range [0,99] |

44. Safety Integrity Level according to standard IEC 61508.

**Table 197 - Data Types (Continued)**

| Keyword | Description | Size (Bits) | Value Range |
|---|---|---|---|
| TRIPREC | Record for a trip event | 80 | Format YYYMMDDhhmmssccTTTT, where<br>• YYYY: Year coded on a UINT<br>• MM: Month coded on a USINT, Range [1, 12]<br>• DD: Day coded on a USINT, Range [1, 31]<br>• hh: hour coded on a USINT, Range [0, 23]<br>• mm: minute coded on a USINT, Range [0, 59]<br>• ss: second coded on a USINT, Range [0, 59]<br>• cc: hundredth of second coded on a USINT, Range [0,99]<br>• TTTT = Trip event identifier. See following list for values.<br>And where TTTT=Trip event identifier:<br>• TTTT = 0000 No Event<br>• TTTT = 0001 Thermal Overload<br>• TTTT = 0002 Motor Overheat<br>• TTTT = 0003 Jam<br>• TTTT = 0004 Undercurrent<br>• TTTT = 0005 Long Start<br>• TTTT = 0006 Overcurrent<br>• TTTT = 0007 Stall<br>• TTTT = 0008 Ground Current<br>• TTTT = 0009 Current Phase Reversal<br>• TTTT = 0010 Phase Configuration<br>• TTTT = 0011 Current Phase Unbalance<br>• TTTT = 0012 Current Phase Loss |
| DT_MAC | MAC Address | 48 | Format XXYYZZUUVVWW, where:<br>• XX = 0x00<br>• YY = 0x80<br>• ZZ = 0xF4<br>• UU = Product MAC address high byte<br>• VV = Product MAC Address middle byte<br>• WW = Product MAC address low byte |
| MINEVENTREC | Record for a Minor Event | 80 | Format YYYMMDDhhmmssccFFFF, where:<br>• YYYY: Year coded on a UINT<br>• MM: Month coded on a USINT, Range [1, 12]<br>• DD: Day coded on a USINT, Range [1, 31]<br>• hh: hour coded on a USINT, Range [0, 23]<br>• mm: minute coded on a USINT, Range [0, 59]<br>• ss: second coded on a USINT, Range [0, 59]<br>• cc: hundredth of second coded on a USINT, Range [0,99]<br>• TTTT = Trip event identifier. See following list for values.<br>And where FFFF=Minor Event event identifier<br>• FFFF = 0000 No Minor Event<br>• FFFF = 0001 No module in the island<br>• FFFF = 0002 Number of physical devices detected in the island is beyond the limit allowed<br>• FFFF = 0003 Modules mismatch<br>• FFFF = 0004 Island control power supply voltage fluctuation |

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