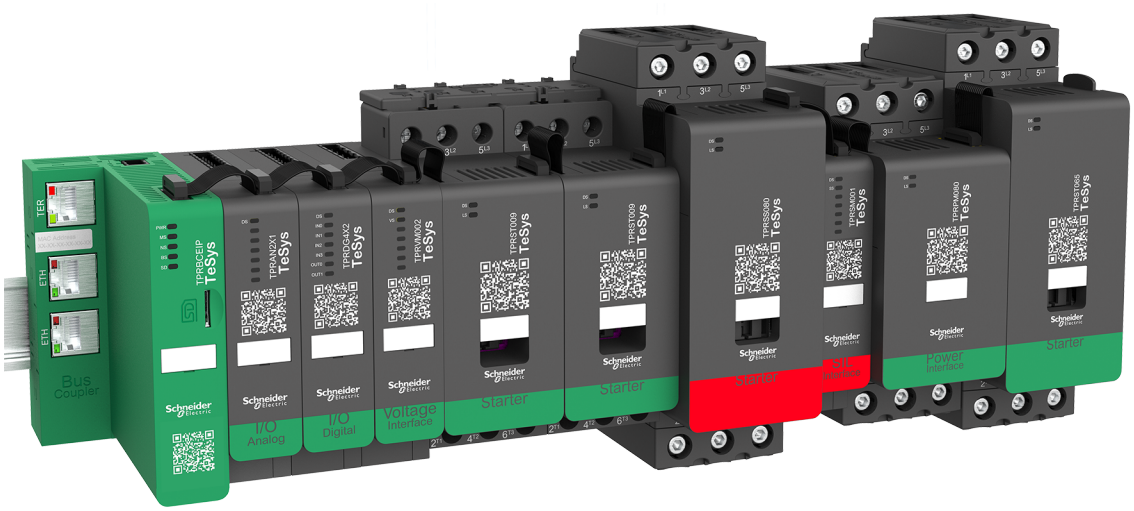
TeSys™ island

EtherNet/IP™ Function Block Library Guide

Instruction Bulletin

This instruction bulletin describes the library of add-on instructions referred to as function blocks for the Rockwell Software® Studio 5000® environment version 30.0 or greater.

8536IB1914
Release date: 06/2019



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Legal Information

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Hazard Categories and Special Symbols

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 bulletin or on the equipment to warn of hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of either 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 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.

NOTE: Provides additional information to clarify or simplify a procedure.

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

About the Book

Document Scope

- This document describes the add-on instructions for TeSys™ island and is valid for use with Rockwell Software® Studio 5000® environment version 30.0 or greater.
- The add-on instructions, referred to as function blocks for the Studio 5000 environment, control the Avatar and device modules of a TeSys island.

Validity Note

This instruction bulletin is valid for all TeSys™ island configurations. The availability of some functions described in this bulletin depends on the communication protocol used and the physical modules installed on the 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 bulletin, go to *www.se.com*.

The technical characteristics presented in this bulletin 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 bulletin and online information, use the online information.

Related Documentation

Table 1 - Related Documentation

Document Title	Description	Document Number
TeSys™ island System Guide	Introduces and describes the main functions of TeSys island	8536IB1901
TeSys™ island Installation Guide	Describes the mechanical installation, wiring, and commissioning of TeSys island	8536IB1902
TeSys™ island Operating Guide	Describes how to operate and maintain TeSys island	8536IB1903
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 EtherNet/IP™ Function Block Library Guide	Describes the TeSys island library used in the Rockwell Software® Studio 5000® environment	8536IB1914
TeSys™ island EtherNet/IP™ Quick Start Guide	Describes how to quickly integrate TeSys island into the Rockwell Software Studio 5000 environment	8536IB1906
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	Describes how to install the TeSys island bus coupler	MFR44097
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 interface modules	MFR44100

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 persons 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 person must be able to detect possible hazards that may arise from modifying parameter values and generally from mechanical, electrical, or electronic equipment. The qualified person 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 instruction bulletin, 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.

Island Concept

TeSys™ island is an innovative digital load management solution—providing data for higher machine efficiency and ease of service, and allowing faster time to market.

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.

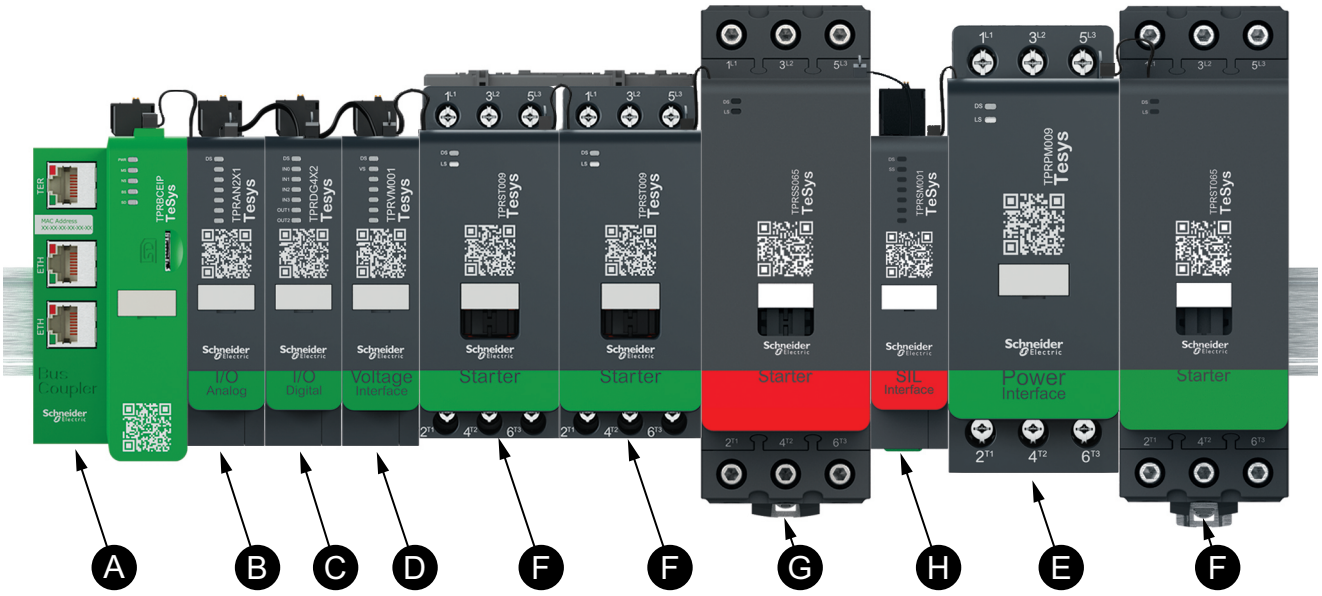
This system is designed around the concept of TeSys Avatars. These Avatars

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

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

The physical 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 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

General Information

TeSys™ island add-on instructions provide function blocks to support developing applications and to control Avatar modules. Avatar modules are digital function objects managed by the TeSys island system. The system interacts with power devices and accessories such as the analog I/O devices. The Avatar modules are configured on the TeSys island, and the bus coupler (via the System Avatar) manages fieldbus communication with the controller.

The configuration of the TeSys island modules is managed by the TeSys island Device Type Manager (DTM). For further information, refer to the TeSys island DTM Library Online Help.

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 island, and also externally with the PLC.

The TeSys Avatars include three types:

System Avatar

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

Application Avatars

Represent functions related to specific user applications such as a pump or conveyor. Application avatars provide: local control, bypass (for bypassing a trip condition), manual mode override (to force using the local control command without needing a digital tool), and process variable monitoring.

For example, a Pump Avatar includes one starter module, Digital I/O module(s) for Process Variable (PV) switches, Analog I/O module(s) for PV inputs, configurable control logic, pre-configuration of the load and electrical functions.

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

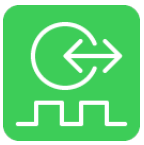
Operational control (run and stop command) of the avatar in autonomous mode is configurable from up to 2 PV inputs or PV switches, with settings for the threshold and hysteresis for analog inputs, and positive or negative logic for both analog and digital inputs for the Pump Avatar.

The Avatars installed on the TeSys island are controlled by the island's bus coupler. Each Avatar includes predefined logic for managing its physical modules, while also providing easy data exchange with PLCs through function blocks. Avatars include pre-configuration of the available protection functions. Data exchanges between PLCs and all the Avatars on the island are managed through the bus coupler.

Information accessible through the Avatar includes:

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

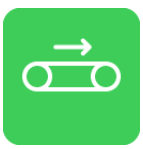
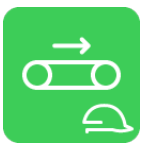
List of TeSys™ Avatars

Name	Icon	Description
System Avatar		A required Avatar that enables a single point of communication to the island.
Switch		To make or break a power line in an electrical circuit
Switch - Safe Stop, W. Cat 1/2[1]		To make or break a power line in an electrical circuit with Safe Stop, Wiring Category 1 and Category 2. Safe Stop according to EN 61800-5-2.
Switch — Safe Stop, W. Cat 3/4[1]		To make or break a power line in an electrical circuit with Safe Stop, Wiring Category 3 and Category 4. Safe Stop according to EN 61800–5–2.
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

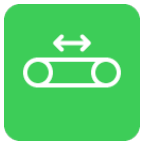
1. Safe Stop, Wiring Category 1 and Category 2. Safe Stop according to EN 61800-5-2.

Name	Icon	Description
Motor One Direction		To manage[2] a motor in one direction
Motor One Direction - Safe Stop, W. Cat 1/2 [3]		To manage a motor in one direction, with Safe Stop, Wiring Category 1 and Category 2. Safe Stop according to EN 61800-5-2.
Motor One Direction - Safe Stop, W. Cat 3/4 [3]		To manage a motor in one direction, with Safe Stop, Wiring Category 3 and 4. Safe Stop according to EN 61800–2.
Motor Two Directions		To manage a motor in two directions (forward and reverse)
Motor Two Directions - Safe Stop, W. Cat 1/2[3]		To manage a motor in two directions (forward and reverse), with Safe Stop, Wiring Category 1 and Category 2. Safe Stop according to EN 61800-5-2.
Motor Two Directions - Safe Stop, W. Cat 3/4 [3]		To manage a motor in two directions (forward and reverse), with Safe Stop, Wiring Category 3 and Category 4. Safe Stop according to EN 61800–5–2.
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
Motor Two Speeds - Safe Stop, W. Cat 1/2[3]		To manage a two-speed motor, with Safe Stop, Wiring Category 1 and Category 2. Safe Stop according to EN 61800-5-2.

2. “Manage” in this context encompasses energizing, controlling, monitoring, diagnosing, and protecting the load.
3. Safe Stop, Wiring Category 1, Category 2, Category 3 and Category 4. Safe Stop according to EN 61800-5-2.

Name	Icon	Description
Motor Two Speeds - Safe Stop, W. Cat 3/4 [4]		To manage a two-speed motor, with Safe Stop, Wiring Category 3 and Category 4. Safe Stop according to EN 61800–5–2.
Motor Two Speeds Two Directions		To manage a two-speed motor in two directions (forward and reverse)
Motor Two Speeds Two Directions - Safe Stop, W. Cat 1/2[4]		To manage a two-speed motor in two directions (forward and reverse), with Safe Stop, Wiring Category 1 and Category 2. Safe Stop according to EN 61800-5-2.
Motor Two Speeds Two Directions - Safe Stop, W. Cat 3/4 [4]		To manage a two-speed motor in two directions (forward and reverse), with Safe Stop, Wiring Category 3 and Category 4. Safe Stop according to EN 61800–5–2.
Resistor		To manage a resistive load
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 - Safe Stop, W. Cat 1/2 [4]		To manage a conveyor in one direction, with Safe Stop, Wiring Category 1 and Category 2. Safe Stop according to EN 61800–5–2.

4. Safe Stop, Wiring Category 1, Category 2, Category 3 and Category 4. Safe Stop according to EN 61800-5-2.

Name	Icon	Description
Conveyor Two Directions		To manage a conveyor in two directions (forward and reverse).
Conveyor Two Directions - Safe Stop, W. Cat 1/2 [5]		To manage a conveyor in two directions (forward and reverse), with Safe Stop, Wiring Category 1 and Category 2. Safe Stop according to EN 61800–5–2.

5. Safe Stop, Wiring Category 1, Category 2, Category 3 and Category 4. Safe Stop according to EN 61800-5-2.

Function Blocks

TeSys™ island function blocks integrated with Studio 5000 are fieldbus independent and have no logic instructions. The inputs and outputs of the function blocks are linked to the process image (cyclic data) without any modifications. Inputs and outputs, which are not part of the process image, are exchanged via acyclic communication methods.

Data Types

The following data types are supported by Studio 5000® software. A data type is a definition of the size and layout of the memory allocated for the created tag. Data types define how many bits, bytes, or words of data a tag uses.

Table 2 - Data Types

Data Type	Abbreviation	Memory Bits	Range
Boolean	BOOL	1	0–1
Short Integer	SINT	8	-128 to 127
Integer	INT	16	-32,768 to 32,767
Double Integer	DINT	32	-2,147,483,648 to 2,147,483,647
Real Number	REAL	32	+/-3.402823E38 to +/-1.1754944E-38

TeSys™ island supports unsigned data types. However, Studio 5000 software supports only signed data types. These data types use a bit to indicate that the software only handles signed integers. For this reason, the maximum positive value that can be displayed for 32-bit unsigned integers is 2,147,483,647. To enforce this, logic exists within AOIs (add-on instructions) to max out UDINT registers if the sign bit is used. For these TeSys island registers, a flag exists as an exposed parameter to indicate overflow. These flags are data type BOOL with the naming convention *{TagName}_O*.

Table 3 - Overflow Example

AvgIRMS	DINT
AvgIRMS_O	BOOL

Timestamps

Some outputs that are part of a function block, including registers, timestamps, start dates, and stop dates, provide timestamp information such as the date and time when the value was recorded. The function block includes a unique output for each criteria to present the date and timestamp data as shown below:

- **cs**: centisecond
- **D**: day
- **h**: hour
- **M**: month
- **min**: minute
- **sec**: second
- **Y**: year

Example: The following outputs are available for the Voltage DipStartDate1 timestamp:

- VoltageDipStartDate1_cs
- VoltageDipStartDate1_D
- VoltageDipStartDate1_h
- VoltageDipStartDate1_M
- VoltageDipStartDate1_min
- VoltageDipStartDate1_sec
- VoltageDipStartDate1_Y

Registers, timestamps, start dates, and stop dates that provide timestamp information that end in **1** indicate the most recent output and, depending on the number of available outputs, the output with the higher number indicates the least recent entry. So, in the case of the outputs shown as VoltageDipStartDate1 and VoltageDipStartDate5, **1** indicates the most recent entry and **5** indicates the least recent entry.

Avatar Function Blocks

General Description

There are two basic types of function blocks:

- System Avatar function blocks
- Standard Avatar function blocks

System Avatar Function Blocks

The System Avatar is unique in the TeSys island and supported by specific function block implementations, indicated by the string **System** in the function block name.

Standard Avatar Function Blocks

The Standard Avatars are supported by two types of function blocks:

- Avatar Cyclic function blocks
- Avatar Acyclic function blocks (read/write)

Each Avatar cyclic function block is supported by its own function block implementation, which can be instantiated for multiple usages of the same Avatar type in one TeSys island. Create one function block instance for each Avatar in your application.

There is only one implementation for the Avatar acyclic function blocks (read/write). The same set of Diagnostic and Energy acyclic data is available for all Avatars, not including the System Avatar, Analog I/O, and the Digital I/O. The same set of Asset acyclic data is available for each device on the island.

Executing the function block for a non-supported Avatar stops the function block with a detected error. For multiple usages of the same function block with different Avatars, you have to create an instance of the function block for each Avatar. You will need to create an instance of the Asset Management function block for each device on the island.

The function blocks have no logic operations and do not modify or interpret the Avatar data. The function blocks copy the values of their inputs into the cyclic output data frame and copy the data of the cyclic input frame to their outputs. If the function block requires acyclic data exchange, the read and write requests are managed by the function block.

The system provides one acyclic connection per TeSys™ island bus coupler. For this reason, the acyclic communication requests must be handled sequentially. A new request can only be sent if the response to the previous request was received.

If a detected error occurs during the execution, the function block stops and provides the detected error information. You cannot stop the function block by the application (for example, cancel input).

Some function blocks provide inputs to reset or preset parameters of the function block. When executing the function block, if one of these inputs is TRUE, the update of the outputs is delayed until the reset or preset command is executed in the Avatar.

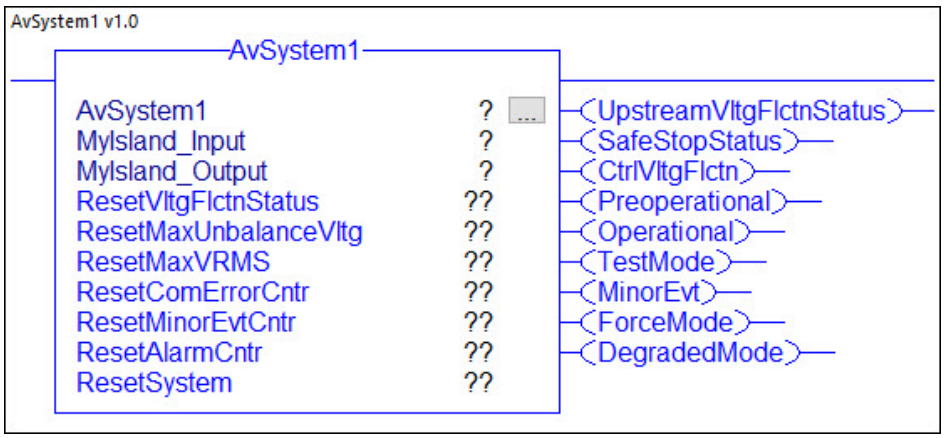
All the data exposed by an AOI exists within the main body, except for data exposed with output parameters of type BOOL. This data exists on the right side of the AOI.

System Function Blocks

System

The **AvSystem** function block returns the status and resets the cyclic diagnostic and energy data of the System Avatar.

Table 4 - AvSystem Function Block



NOTE: Safe Stop according to EN 61800-5-2

Table 5 - AvSystem Input Interface

Input	Data Type	Description
ResetVltgFlctnStatus	BOOL	If this input is set to TRUE, the value and of the parameter ResetVltgFlctnStatus is reset.
ResetMaxUnbalanceVltg	BOOL	If this input is set to TRUE, the value and of the parameter ResetMaxUnbalanceVltg is reset.

Table 5 - AvSystem Input Interface (Continued)

Input	Data Type	Description
ResetMaxVRMS	BOOL	If this input is set to TRUE, the value and of the parameter ResetMaxVRMS is reset.
ResetComErrorCntr	BOOL	If this input is set to TRUE, the counter of detected errors for the fieldbus communication is set to 0.
ResetMinorEvtCntr	BOOL	If this input is set to TRUE, the counter of detected minor events for the system is set to 0.
ResetAlarmCntr	BOOL	If this input is set to TRUE, the counter of detected alarms for the system is set to 0.
ResetSystem	BOOL	If this input is set to TRUE, the system is reset.

Table 6 - AvSystem Output Interface

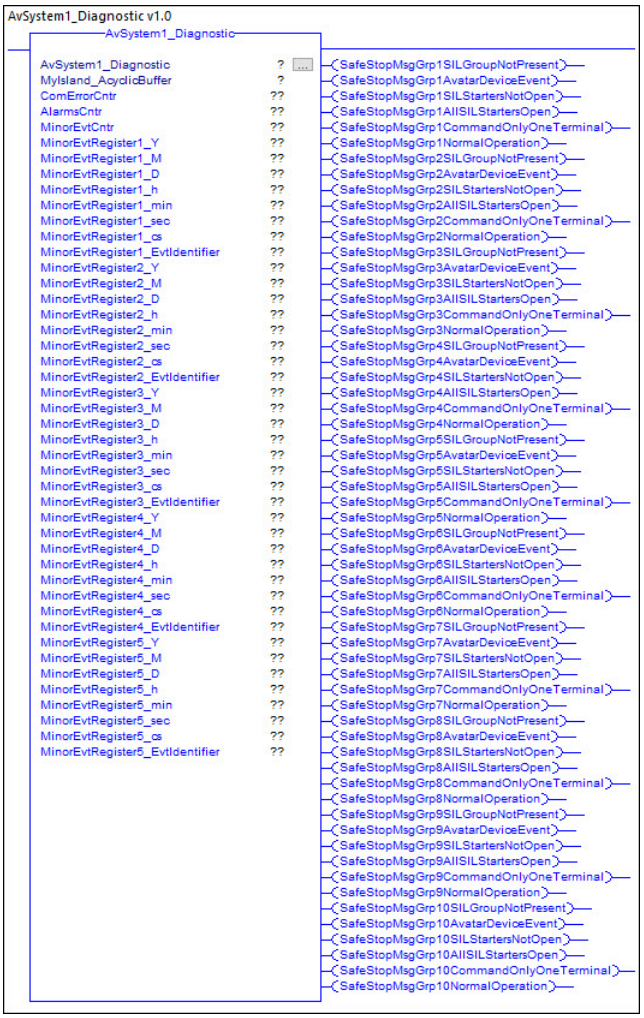
Output	Data Type	Description
UpstreamVltgFlctnStatus	BOOL	If this output is set to TRUE, a voltage dip or swell is detected. Can be reset with ResetVltgFlctnStatus.
SafeStopStatus	BOOL	Status of Safe Stop 0 function[6]. If this output is set to FALSE, no SIL group has received a Safe Stop command[6].
CtrlVltgFlctn	BOOL	If this output is set to TRUE, a control voltage fluctuation is detected.
Preoperational	BOOL	If this output is set to TRUE, the System Avatar is in Preoperational mode.
Operational	BOOL	If this output is set to TRUE, the System Avatar is in Operational mode. For detailed information on machine states, refer to the TeSys island Operating Guide (document no. 8536IB1903).
TestMode	BOOL	If this output is set to TRUE, the System Avatar is in Test mode.
MinorEvt	BOOL	If this output is set to TRUE, the System Avatar is in Minor Event mode.
ForceMode	BOOL	If this output is set to TRUE, the System Avatar is in Force mode.
DegradedMode	BOOL	If this output is set to TRUE, the System Avatar is in Degraded mode.

6. Safe Stop according to EN 61800-5-2

System Diagnostic

The **AvSystem1_Diagnostic** function block returns the status of the acyclic diagnostic data of the System Avatar.

Table 7 - AvSystem1_Diagnostic Function Block



NOTE: Safe Stop according to EN 61800-5-2

Table 8 - AvSystem1_Diagnostic Output Interface

Output	Data Type	Description
ComErrorCntr	DINT	Number of detected errors for the fieldbus communication.
AlarmsCntr	DINT	Number of detected alarms for the system.
MinorEvtCntr	DINT	Number of detected minor events for the system.
MinorEvtRegister1_Y	DINT	Information on a detected minor event. MinorEvtRegister1_ = most recent.
MinorEvtRegister1_M	SINT	
MinorEvtRegister1_D	SINT	
MinorEvtRegister1_h	SINT	
MinorEvtRegister1_min	SINT	
MinorEvtRegister1_sec	SINT	
MinorEvtRegister1_cs	SINT	
MinorEvtRegister1_EventIdentifier	DINT	
. . .	. . .	. . .

Table 8 - AvSystem1_Diagnostic Output Interface (Continued)

Output	Data Type	Description
MinorEvtRegister5_Y	DINT	Information on a detected minor event.
MinorEvtRegister5_M	SINT	
MinorEvtRegister5_D	SINT	
MinorEvtRegister5_h	SINT	
MinorEvtRegister5_min	SINT	
MinorEvtRegister5_sec	SINT	
MinorEvtRegister5_cs	SINT	
MinorEvtRegister5_EventIdentifier	DINT	
SafeStopMsgGrp1NotPresent	BOOL	Status for Safe Stop 0 function[7] for SIL Groups 1– 10: • NotPresent = SIL Group not present in system configuration • Reserved = SIL Group impacted by Avatar device event • CmdReceived = Safe Stop command received; SIL starters not open yet • CmdIssued = Safe Stop command successfully issued; all SIL starters are open • CmdIssuedOneTerminal = Safe Stop command issued to only one SIM input channel (jumper or SIM input wiring is causing an issue), but SIL starters did successfully open • NormalOperation = Normal operation; SIL starters can be open or closed
SafeStopMsgGrp1Reserved	BOOL	
SafeStopMsgGrp1CmdReceived	BOOL	
SafeStopMsgGrp1CmdIssued	BOOL	
SafeStopMsgGrp1CmdIssuedOne-Terminal	BOOL	
SafeStopMsgGrp1NormalOperation	BOOL	
. . .	. . .	
SafeStopMsgGrp10NotPresent	BOOL	
SafeStopMsgGrp10Reserved	BOOL	
SafeStopMsgGrp10CmdReceived	BOOL	
SafeStopMsgGrp10CmdIssued	BOOL	
SafeStopMsgGrp10CmdIssuedOne-Terminal	BOOL	
SafeStopMsgGrp10NormalOperation	BOOL	

7. Safe Stop according to EN 61800-5-2

System Energy Management

The **AvSystem1_Energy** function block returns the status of the acyclic energy data of the System Avatar.

Table 9 - AvSystem1_Energy Function Block

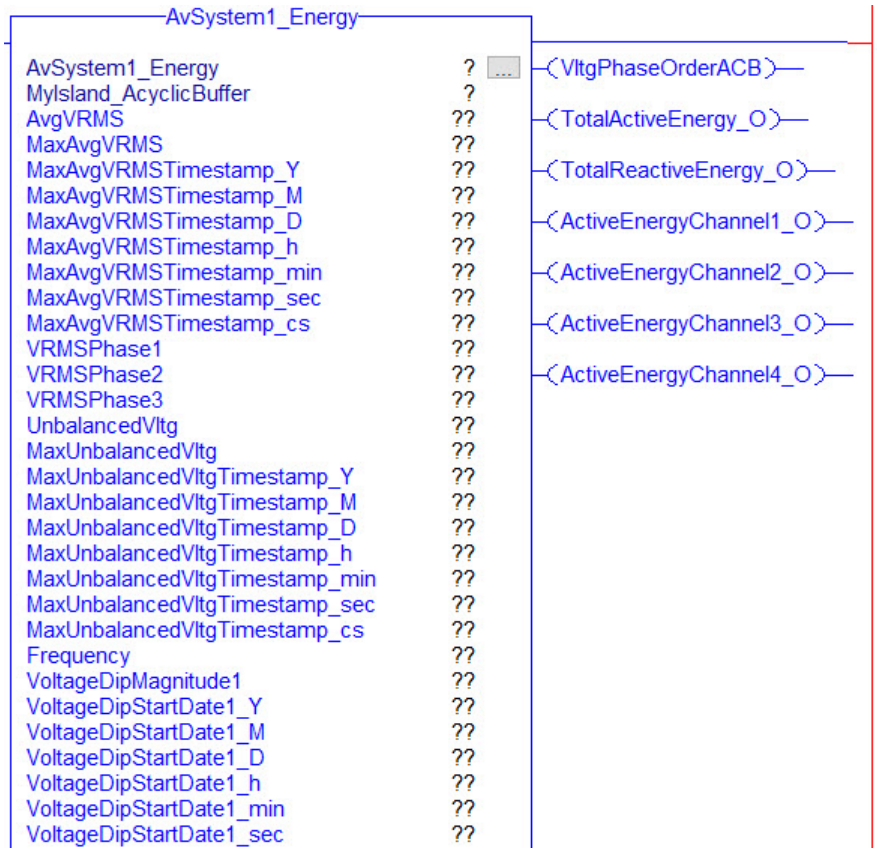


Table 10 - AvSystem1_Energy Output Interface

Output	Data Type	Description
ActiveEnergyChannel1	DINT	Channel 1: ToU (Time of Use) total active energy value. NOTE: Not used in this version of function block (will return all 0 s).
ActiveEnergyChannel1_O	BOOL	Channel 1: ToU (Time of Use) total active energy **overflow** value. NOTE: Not used in this version of function block (will return all 0 s).
ActiveEnergyChannel2	DINT	Channel 2 :ToU (Time of Use) total active energy value. NOTE: Not used in this version of function block (will return all 0 s).
ActiveEnergyChannel2_O	BOOL	Channel 2: ToU (Time of Use) total active energy **overflow** value. NOTE: Not used in this version of function block (will return all 0 s).
ActiveEnergyChannel3	DINT	Channel 3: ToU (Time of Use) total active energy value. NOTE: Not used in this version of function block (will return all 0 s).
ActiveEnergyChannel3_O	BOOL	Channel 3: ToU (Time of Use) total active energy **overflow** value. NOTE: Not used in this version of function block (will return all 0 s).
ActiveEnergyChannel4	DINT	Channel 4: ToU (Time of Use) total active energy value. NOTE: Not used in this version of function block (will return all 0 s).
ActiveEnergyChannel4_O	BOOL	Channel 4: ToU (Time of Use) total active energy **overflow** value. NOTE: Not used in this version of function block (will return all 0 s).
AvgVRMS	INT	Average Vrms voltage on three phases (Unit: V)
Frequency	INT	Main power voltage frequency (line frequency as measured on phase 1). (Unit: Hertz)
InstActivePower	DINT	Total active power for the system. (Unit: W)
InstReactivePower	DINT	Total reactive power for the system. (Unit: VAR)

Table 10 - AvSystem1_Energy Output Interface (Continued)

Output	Data Type	Description
MaxActivePower	DINT	Maximum value of the active power for the system. (Unit: W)
MaxActivePowerTimestamp_cs	SINT	Date and time when the maximum active power value was recorded.
MaxActivePowerTimestamp_D	SINT	
MaxActivePowerTimestamp_h	SINT	
MaxActivePowerTimestamp_M	SINT	
MaxActivePowerTimestamp_min	SINT	
MaxActivePowerTimestamp_sec	SINT	
MaxActivePowerTimestamp_Y	DINT	
MaxAvgVRMS	DINT	Maximum voltage the system measured. (Unit: V)
MaxAvgVRMSTimestamp_cs	SINT	Date and time when maximum average voltage value was recorded.
MaxAvgVRMSTimestamp_D	SINT	
MaxAvgVRMSTimestamp_h	SINT	
MaxAvgVRMSTimestamp_M	SINT	
MaxAvgVRMSTimestamp_min	SINT	
MaxAvgVRMSTimestamp_sec	SINT	
MaxAvgVRMSTimestamp_Y	DINT	
MaxPowerFactor	SINT	True maximum power factor value.
MaxPowerFactorTimestamp_cs	SINT	Date and time when the maximum power factor value was recorded.
MaxPowerFactorTimestamp_D	SINT	
MaxPowerFactorTimestamp_h	SINT	
MaxPowerFactorTimestamp_M	SINT	
MaxPowerFactorTimestamp_min	SINT	
MaxPowerFactorTimestamp_sec	SINT	
MaxPowerFactorTimestamp_Y	DINT	
MaxReactivePower	DINT	Maximum value of the reactive power for the system. (Unit: VAR)
MaxReactivePowerTimestamp_cs	SINT	Date and time when the maximum reactive power value was recorded.
MaxReactivePowerTimestamp_D	SINT	
MaxReactivePowerTimestamp_h	SINT	
MaxReactivePowerTimestamp_M	SINT	
MaxReactivePowerTimestamp_min	SINT	
MaxReactivePowerTimestamp_sec	SINT	
MaxReactivePowerTimestamp_Y	DINT	
MaxUnbalancedVltg	SINT	Maximum unbalance voltage in percent (%).
MaxUnbalancedVltgTimestamp_cs	SINT	Date and time of maximum unbalance voltage.
MaxUnbalancedVltgTimestamp_D	SINT	
MaxUnbalancedVltgTimestamp_h	SINT	
MaxUnbalancedVltgTimestamp_M	SINT	
MaxUnbalancedVltgTimestamp_min	SINT	
MaxUnbalancedVltgTimestamp_sec	SINT	
MaxUnbalancedVltgTimestamp_Y	DINT	
MinPowerFactor	SINT	True minimum power factor value.

Table 10 - AvSystem1_Energy Output Interface (Continued)

Output	Data Type	Description
MinPowerFactorTimestamp_cs	SINT	Date and time when the minimum power factor value was recorded.
MinPowerFactorTimestamp_D	SINT	
MinPowerFactorTimestamp_h	SINT	
MinPowerFactorTimestamp_M	SINT	
MinPowerFactorTimestamp_min	SINT	
MinPowerFactorTimestamp_sec	SINT	
MinPowerFactorTimestamp_Y	DINT	
PowerFactor	SINT	True power factor value.
TotalActiveEnergy	DINT	Total active energy value for all Avatars in the system with Energy Monitoring Enabled. (Unit: Watt-hours)
TotalActiveEnergy_O	BOOL	Total active energy **overflow** value for all Avatars in the system with Energy Monitoring Enabled.
TotalReactiveEnergy	DINT	Total reactive energy value for all Avatars in the system with Energy Monitoring Enabled. (Unit: VAR-hours)
TotalReactiveEnergy_O	BOOL	Total reactive energy **overflow** value for all Avatars in the system with Energy Monitoring Enabled.
UnbalancedVltg	SINT	Unbalance voltage in percent (%).
VltgDipCntr	DINT	Voltage dip counter
VltgPhaseOrderACB	BOOL	If this output is set to TRUE, the phase order is ACB (FALSE = phase order ABC).
VltgSwellCntr	DINT	Voltage swell counter
VoltageDipMagnitude1	DINT	Maximum voltage magnitude for a voltage dip. (Unit: V)
. . .	. . .	. . .
VoltageDipMagnitude5	DINT	Maximum voltage magnitude for a voltage dip. (Unit: V)
VoltageDipStartDate1_cs	SINT	Start time stamp of the voltage dip.
VoltageDipStartDate1_D	SINT	
VoltageDipStartDate1_h	SINT	
VoltageDipStartDate1_M	SINT	
VoltageDipStartDate1_min	SINT	
VoltageDipStartDate1_sec	SINT	
VoltageDipStartDate1_Y	DINT	
. . .	. . .	. . .
VoltageDipStartDate5_cs	SINT	Start time stamp of the voltage dip.
VoltageDipStartDate5_D	SINT	
VoltageDipStartDate5_h	SINT	
VoltageDipStartDate5_M	SINT	
VoltageDipStartDate5_min	SINT	
VoltageDipStartDate5_sec	SINT	
VoltageDipStartDate5_Y	DINT	
VoltageDipStopDate1_cs	SINT	Stop time stamp of the voltage dip.
VoltageDipStopDate1_D	SINT	
VoltageDipStopDate1_h	SINT	
VoltageDipStopDate1_M	SINT	

Table 10 - AvSystem1_Energy Output Interface (Continued)

Output	Data Type	Description
VoltageDipStopDate1_min	SINT	
VoltageDipStopDate1_sec	SINT	
VoltageDipStopDate1_Y	DINT	
. . .	. . .	. . .
VoltageDipStopDate5_cs	SINT	Stop time stamp of the voltage dip.
VoltageDipStopDate5_D	SINT	
VoltageDipStopDate5_h	SINT	
VoltageDipStopDate5_M	SINT	
VoltageDipStopDate5_min	SINT	
VoltageDipStopDate5_sec	SINT	
VoltageDipStopDate5_Y	DINT	
VoltageSwellMagnitude1	DINT	Maximum voltage magnitude for a voltage swell. (Unit: V)
. . .	. . .	
VoltageSwellMagnitude5	DINT	
VoltageSwellStartDate1_cs	SINT	Start time stamp of the voltage swell.
VoltageSwellStartDate1_D	SINT	
VoltageSwellStartDate1_h	SINT	
VoltageSwellStartDate1_M	SINT	
VoltageSwellStartDate1_min	SINT	
VoltageSwellStartDate1_sec	SINT	
VoltageSwellStartDate1_Y	DINT	
. . .	. . .	
VoltageSwellStartDate5_cs	SINT	
VoltageSwellStartDate5_D	SINT	
VoltageSwellStartDate5_h	SINT	
VoltageSwellStartDate5_M	SINT	
VoltageSwellStartDate5_min	SINT	
VoltageSwellStartDate5_sec	SINT	
VoltageSwellStartDate5_Y	DINT	
VoltageSwellStopDate1_cs	SINT	Stop time stamp of the voltage swell.
VoltageSwellStopDate1_D	SINT	
VoltageSwellStopDate1_h	SINT	
VoltageSwellStopDate1_M	SINT	
VoltageSwellStopDate1_min	SINT	
VoltageSwellStopDate1_sec	SINT	
VoltageSwellStopDate1_Y	DINT	
. . .	. . .	
VoltageSwellStopDate5_cs	SINT	
VoltageSwellStopDate5_D	SINT	
VoltageSwellStopDate5_h	SINT	
VoltageSwellStopDate5_M	SINT	

Table 10 - AvSystem1_Energy Output Interface (Continued)

Output	Data Type	Description
VoltageSwellStopDate5_min	SINT	
VoltageSwellStopDate5_sec	SINT	
VoltageSwellStopDate5_Y	DINT	
VRMSPhase1	DINT	Average Vrms voltage between L1 and neutral. (Unit: V)
VRMSPhase2	DINT	Average Vrms voltage between L2 and neutral. (Unit: V)
VRMSPhase3	DINT	Average Vrms voltage between L3 and neutral. (Unit: V)

System Asset Management

The **AvSystem1_AssetManagement** function block returns the status of the acyclic asset management data of the System Avatar.

Table 11 - AvSystem1_AssetManagement Function Block

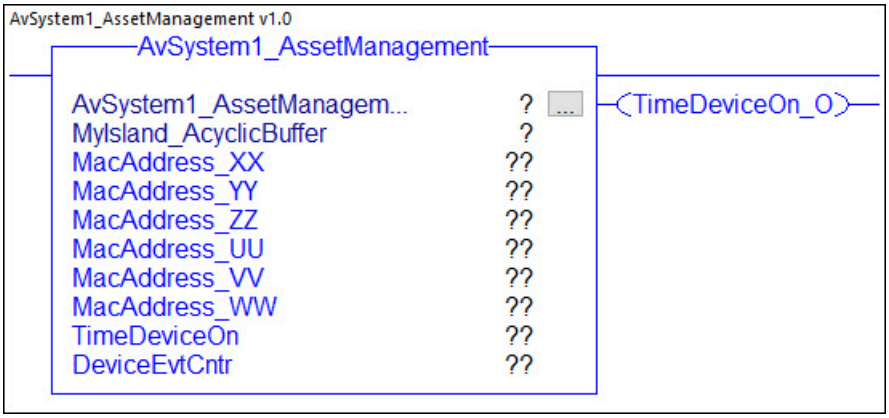


Table 12 - AvSystem1_AssetManagement Output Interface

Output	Data Type	Description
MacAddress_XX	INT	MAC address of the device XX.
MacAddress_YY	INT	MAC address of the device YY.
MacAddress_ZZ	INT	MAC address of the device ZZ.
MacAddress_UU	INT	MAC address of the device UU.
MacAddress_VV	INT	MAC address of the device VV.
MacAddress_WW	INT	MAC address of the device WW.
TimeModuleOn	DINT	This register indicates the time that the module has been powered on in its lifetime (Unit: h).
TimeModuleOn_O	BOOL	This register indicates the **overflow** time that the module has been powered on in its lifetime.
EventCntr	DINT	This register indicates number of times this module has experienced a detected device error (Unit: h). This value does not include detected device events which corrupt or prevent the saving of the non-volatile memory.

System Combined Output

The **CombinedSystemOutput** function block returns the energy information of the System Avatar, resets the energy registers of the System Avatar, and sets the energy preset values of the Avatars (A2, A3, etc.).

Table 13 - CombinedSystemOutput Function Block

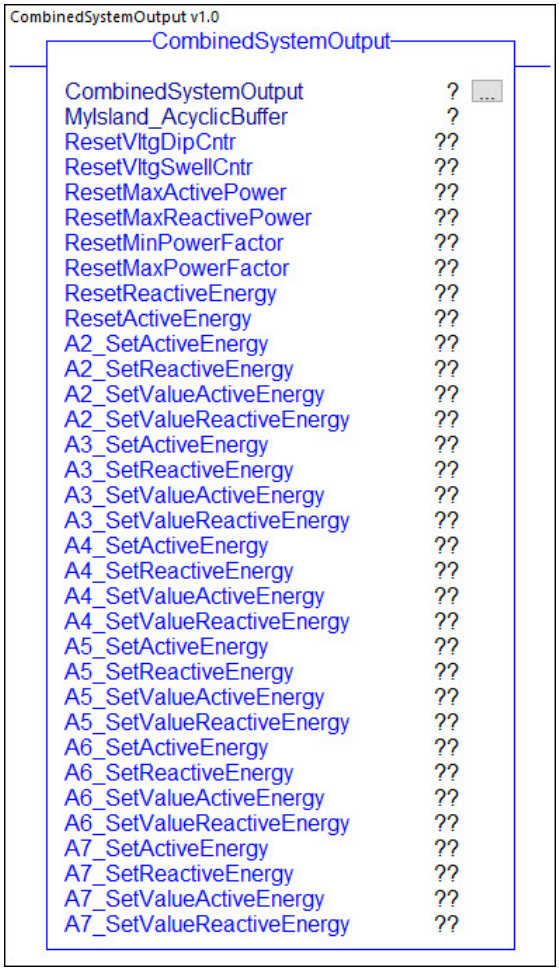


Table 14 - CombinedSystemOutput Input Interface

Input	Data Type	Description
ResetVltgDipCntr	BOOL	If this input is set to TRUE, the value of the parameter ResetVltgDipCntr is reset.
ResetVltgSwellCntr	BOOL	If this input is set to TRUE, the value of the parameter ResetVltgSwellCntr is reset.
ResetMaxActivePower	BOOL	If this input is set to TRUE, the value of the parameter MaxActivePower and the associated time stamp MaxActivePowerTimestamp are reset.
ResetMaxReactivePower	BOOL	If this input is set to TRUE, the value of the parameter MaxReactivePower and the associated time stamp MaxReactivePowerTimestamp are reset.
ResetMinPowerFactor	BOOL	If this input is set to TRUE: • The true value of the parameter MinPowerFactor is reset to 1. • The associated time stamp MinPowerFactorTimestamp is reset.
ResetMaxPowerFactor	BOOL	If this input is set to TRUE: • The true value of the parameter MaxPowerFactor is reset to 0. • The associated time stamp MaxPowerFactorTimestamp is reset.
ResetReactiveEnergy	BOOL	If this input is set to TRUE, the value of the parameter ReactiveEnergy is reset.

Table 14 - CombinedSystemOutput Input Interface (Continued)

Input	Data Type	Description
ResetActiveEnergy	BOOL	If this input is set to TRUE, the value of the parameter ActiveEnergy is reset.
A2_SetActiveEnergy	BOOL	Command to set the TotalActiveEnergy value to TotalActiveEnergyPreset value.
A2_SetReactiveEnergy	BOOL	Command to set the TotalReactiveEnergy value to TotalReactiveEnergyPreset value.
A2_SetValueActiveEnergy	DINT	Value to preset the TotalActiveEnergy, will take effect on a TRUE command to SetActiveEnergy (Unit: Watt-hours)
A2_SetValueReactiveEnergy	DINT	Value to preset the TotalReactiveEnergy, will take effect on a TRUE command to SetReactiveEnergy (Unit: VAR-hours)
. . .	. . .	. . .
A7_SetActiveEnergy	BOOL	Command to set the TotalActiveEnergy value to TotalActiveEnergyPreset value.
A7_SetReactiveEnergy	BOOL	Command to set the TotalReactiveEnergy value to TotalReactiveEnergyPreset value.
A7_SetValueActiveEnergy	DINT	Value to preset the TotalActiveEnergy, will take effect on a TRUE command to SetActiveEnergy (Unit: Watt-hours)
A7_SetValueReactiveEnergy	DINT	Value to preset the TotalReactiveEnergy, will take effect on a TRUE command to SetReactiveEnergy (Unit: VAR-hours)

Avatar Acyclic Function Blocks

The **Avatar_Control** function block returns the status of the acyclic data for the individual Avatar. In the example below, the **AvMotorOneDirection_Control** function block is displayed. The same set of acyclic data is available for all Avatars, not including the System Avatar, Analog I/O, and the Digital I/O.

Table 15 - AvMotorOneDirection_Control Function Block

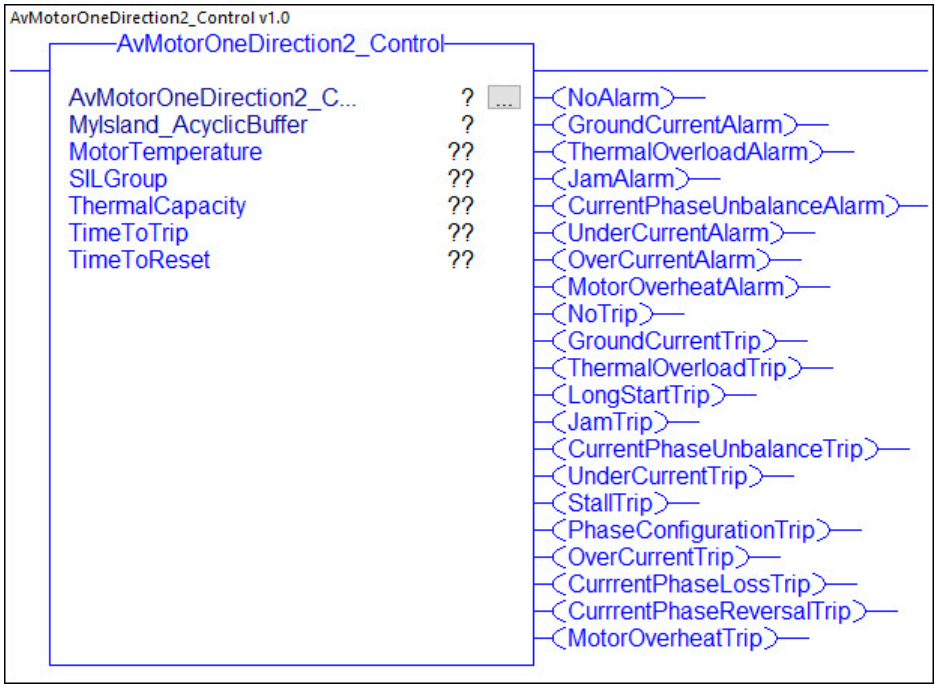


Table 16 - Avatar Control Output Interface

Output	Data Type	Description
CurrentPhaseUnbalanceTrip	BOOL	The Avatar has detected the conditions to cause a current phase unbalance trip event.
CurrentPhaseUnbalanceAlarm	BOOL	The Avatar has detected the conditions to cause a current phase unbalance event.
CurrrentPhaseLossTrip	BOOL	The Avatar has detected the conditions to cause a current phase loss trip event.
CurrrentPhaseReversalTrip	BOOL	The Avatar has detected the conditions to cause a current phase reversal trip event.
GroundCurrentTrip	BOOL	The Avatar has detected the conditions to cause a ground current trip event.
GroundCurrentAlarm	BOOL	The Avatar has detected the conditions to cause a ground current event.
JamTrip	BOOL	The Avatar has detected the conditions to cause a jam trip event.
JamAlarm	BOOL	The Avatar has detected the conditions to cause a jam event.
LongStartTrip	BOOL	The Avatar has detected the conditions to cause a long start trip event.
MotorOverheatTrip	BOOL	The motor temperature has increased above the motor overheat trip level.
MotorOverheatAlarm	BOOL	The motor temperature has increased above the motor overheat level.
MotorTemperature	INT	Indicates the temperature of the motor in 0.1 °C scaling unit. Depending on temperature sensor type, the range is: • -200–850°C (-328–1562°F) (for PT100) • -200–600°C (-328–1112°F) (for PT1000) • -60–180°C (-76–356°F) (for NI 100/1000)
NoTrip	BOOL	No trip has been detected.

Table 16 - Avatar Control Output Interface (Continued)

Output	Data Type	Description
NoAlarm	BOOL	No advisory condition has been detected.
OverCurrentTrip	BOOL	The Avatar has detected the conditions to cause an overcurrent trip event.
OverCurrentAlarm	BOOL	The Avatar has detected the conditions to cause an overcurrent event.
PhaseConfigurationTrip	BOOL	The Avatar has detected the conditions to cause a phase configuration trip event.
SILGroup	SINT	Indicates the number of the SIL group.
StallTrip	BOOL	The Avatar has detected the conditions to cause a stall trip event.
ThermalCapacity	INT	Provides the percentage (%) of the thermal capacity of the motor which has been used.
ThermalOverloadTrip	BOOL	The Avatar thermal capacity has increased above 100%.
ThermalOverloadAlarm	BOOL	The Avatar thermal capacity has increased above the thermal overload level.
TimeToReset	DINT	Estimated time to wait before being able to reset a thermal overload trip. (Unit: s)
TimeToTrip	DINT	Estimated time before a thermal overload trip will occur given the current conditions. (Unit: s)
UnderCurrentTrip	BOOL	The Avatar has detected the conditions to cause an undercurrent trip event.
UnderCurrentAlarm	BOOL	The Avatar has detected the conditions to cause an undercurrent event.

Avatar Cyclic Function Blocks

Analog I/O

The **AvAnalogIO** function block provides information about the analog I/O Avatar with two inputs and one output.

Table 17 - AvAnalogIO Function Block

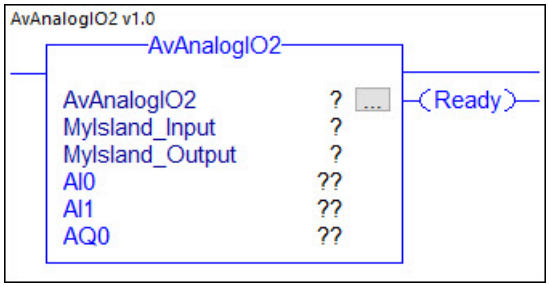


Table 18 - AvAnalogIO Input Interface

Input	Data Type	Description
AQ0	INT	Value to be written to analog output 0. Unit and scaling depends on the analog output type configured. • Type 0 (Unit: mV) • Type 1 (Unit: mV) • Type 2 (Unit: µA) • Type 3 (Unit: µA)

Table 19 - AvAnalogIO Output Interface

Output	Data Type	Description
Ready	BOOL	Indicates TRUE if the function block is ready to receive an execute command.
AI0	INT	Indicates the value read from the analog input 0. Unit and scaling depends on the analog output type configured. • Type 0 to 12 (Unit: 0.1 deg C) • Type 13 (Unit: mV) • Type 14 (Unit: mV) • Type 15 (Unit: µA) • Type 16 (Unit: µA)
AI1	INT	Indicates the value read from the analog input 1.

Digital I/O

The **AvDigitalIO** function block provides information about the digital I/O Avatar with four inputs and two outputs.

Table 20 - AvDigitalIO Function Block

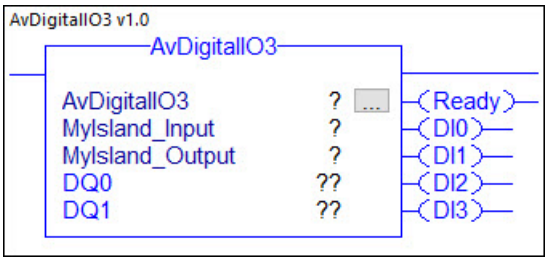


Table 21 - AvDigitalIO Input Interface

Input	Data Type	Description
DQ0	BOOL	If this input is set to TRUE, the digital output 0 is set to TRUE.
DQ1	BOOL	If this input is set to TRUE, the digital output 1 is set to TRUE.

Table 22 - AvDigitalIO Output Interface

Output	Data Type	Description
Ready	BOOL	Indicates TRUE if the function block is ready to receive an execute command.
DI0	BOOL	If this output is set to TRUE, the digital input 0 of the Digital I/O Avatar is set to TRUE.
DI1	BOOL	If this output is set to TRUE, the digital input 1 of the Digital I/O Avatar is set to TRUE.
DI2	BOOL	If this output is set to TRUE, the digital input 2 of the Digital I/O Avatar is set to TRUE.
DI3	BOOL	If this output is set to TRUE, the digital input 3 of the Digital I/O Avatar is set to TRUE.

Motor One Direction

The **AvMotorOneDirection** function block is used to manage a motor in one direction.

Table 23 - AvMotorOneDirection Function Block

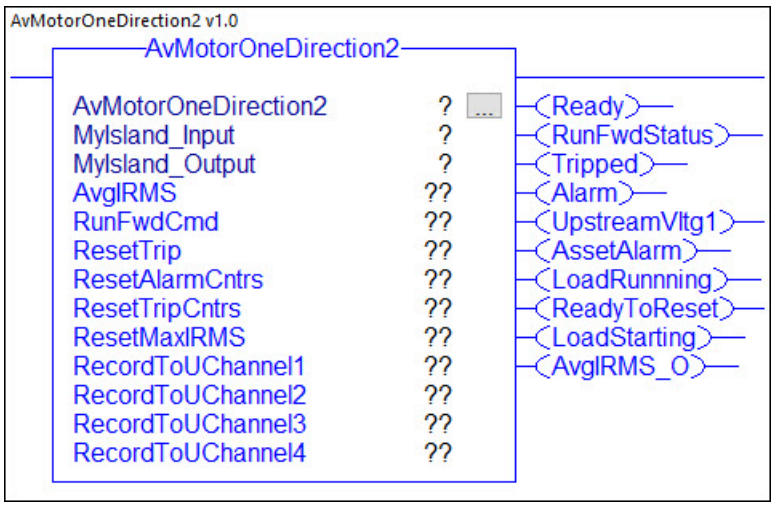


Table 24 - AvMotorOneDirection Input Interface

Input	Data Type	Description
RecordToUChannel1	BOOL	NOTE: Not used in this version of function block (will return all 0 s).
RecordToUChannel2	BOOL	
RecordToUChannel3	BOOL	
RecordToUChannel4	BOOL	
ResetMaxIRMS	BOOL	If this input is set to TRUE, the maximum average Irms current value and the timestamp are reset.
ResetTrip	BOOL	If this input is set to TRUE, detected trips whose trip reset conditions have been met will reset for this Avatar.
ResetTripCntrs	BOOL	If this input is set to TRUE, all trip counters are reset for this Avatar.
ResetAlarmCntrs	BOOL	If this input is set to TRUE, all alarm counters are reset for this Avatar.
RunFwdCmd	BOOL	If this input is set to TRUE, the Avatar forward switch is closed.

Table 25 - AvMotorOneDirection Output Interface

Output	Data Type	Description
AssetAlarm	BOOL	If this output is set to TRUE, a power device or Safety Integrity Level (SIL) [8] Starter within the Avatar have reached or exceeded 90% of the expected durability (per Avatar parameter).
AvgIRMS	DINT	Indicates the average of the most recent phase current Irms values. (Unit: mA)
AvgIRMS_O	BOOL	Indicates the average of the most recent phase current Irms **overflow** values.
LoadRunnning	BOOL	If this output is set to TRUE, 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). (Unit: mA)
LoadStarting	BOOL	If this output is set to TRUE, the motor is in start phase.
Ready	BOOL	Indicates TRUE if the function block is ready to receive an execute command.
ReadyToReset	BOOL	If this output is set to TRUE, the Avatar meets the trip reset conditions and can be reset with a trip reset command.
RunFwdStatus	BOOL	If this output is set to TRUE, the Avatar forward switch is closed.
Tripped	BOOL	If this output is set to TRUE, a protection trip event has been detected by the Avatar.
UpstreamVltg1	BOOL	If this output is set to TRUE, the Avatar has detected that upstream main power of the first starter/power device in this Avatar is present (breaker closed).
Alarm	BOOL	If this output is set to TRUE, a protection alarm has been detected by the Avatar.

8. Safety Integrity Level according to standard IEC 61508)

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

The **AvMotorOneDirectionSafe** function block is used to manage a motor in one direction with Safe Stop function[9] compliance for wiring category 1 and category 2.

NOTE: Safe Stop according to EN 61800-5-2

Table 26 - AvMotorOneDirectionSafe Function Block

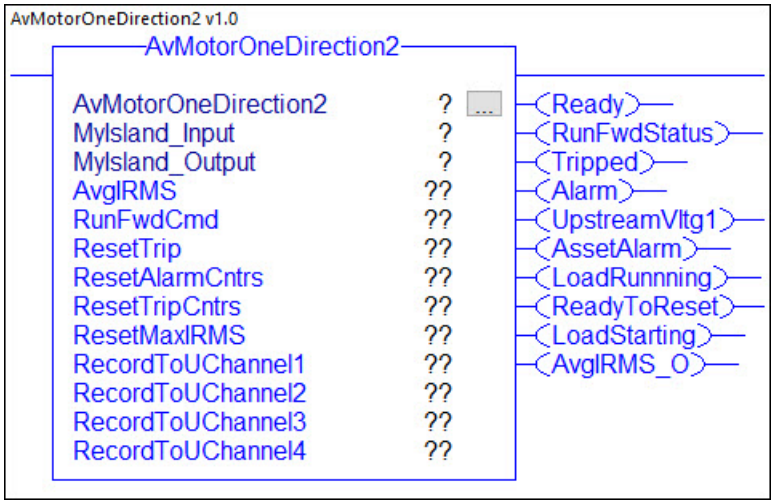


Table 27 - AvMotorOneDirectionSafe Input Interface

Input	Data Type	Description
RecordToUChannel1	BOOL	NOTE: Not used in this version of function block (will return all 0 s).
RecordToUChannel2	BOOL	
RecordToUChannel3	BOOL	
RecordToUChannel4	BOOL	
ResetMaxIRMS	BOOL	If this input is set to TRUE, the maximum average Irms current value and the timestamp are reset.
ResetTrip	BOOL	If this input is set to TRUE, detected trips whose trip reset conditions have been met will reset for this Avatar.
ResetTripCntrs	BOOL	If this input is set to TRUE, all trip counters are reset for this Avatar.
ResetAlarmCntrs	BOOL	If this input is set to TRUE, all alarm counters are reset for this Avatar.
RunFwdCmd	BOOL	If this input is set to TRUE, the Avatar forward switch is closed.

Table 28 - AvMotorOneDirectionSafe Output Interface

Output	Data Type	Description
AssetAlarm	BOOL	If this output is set to TRUE, a power device or SIL Starter within the Avatar have reached or exceeded 90% of the expected durability (per Avatar parameter).
AvgIRMS	DINT	Indicates the average of the most recent phase current Irms values. (Unit: mA)
AvgIRMS_O	BOOL	Indicates the average of the most recent phase current Irms **overflow** values.
LoadRunnning	BOOL	If this output is set to TRUE, 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). (Unit: mA)
LoadStarting	BOOL	If this output is set to TRUE, the motor is in start phase.
Ready	BOOL	Indicates TRUE if the function block is ready to receive an execute command.

9. Safe Stop according to EN 61800-5-2

Table 28 - AvMotorOneDirectionSafe Output Interface (Continued)

Output	Data Type	Description
ReadyToReset	BOOL	If this output is set to TRUE, the Avatar meets the trip reset conditions and can be reset with a trip reset command.
RunFwdStatus	BOOL	If this output is set to TRUE, the Avatar forward switch is closed.
Tripped	BOOL	If this output is set to TRUE, a protection trip event has been detected by the Avatar.
UpstreamVltg1	BOOL	If this output is set to TRUE, the Avatar has detected that upstream main power of the first starter/power device in this Avatar is present (breaker closed).
Alarm	BOOL	If this output is set to TRUE, a protection alarm has been detected by the Avatar.

Motor Two Directions

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

Table 29 - AvMotorTwoDirection Function Block

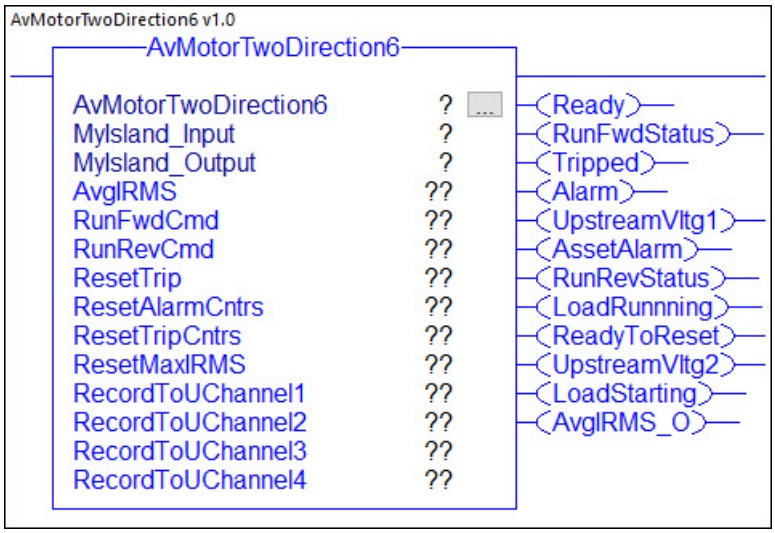


Table 30 - AvMotorTwoDirection Input Interface

Input	Data Type	Description
RunFwdCmd	BOOL	If this input is set to TRUE, the Avatar forward switch is closed.
RunRevCmd	BOOL	If this input is set to TRUE, the Avatar reverse switch is closed.
ResetTrip	BOOL	If this input is set to TRUE, detected trips whose trip reset conditions have been met will reset for this Avatar.
ResetAlarmCntrs	BOOL	If this input is set to TRUE, all alarm counters are reset for this Avatar.
ResetTripCntrs	BOOL	If this input is set to TRUE, all trip counters are reset for this Avatar.
ResetMaxIRMS	BOOL	If this input is set to TRUE, the maximum average Irms current value and the timestamp are reset.
RecordToUChannel1	BOOL	NOTE: Not used in this version of function block (will return all 0 s).
RecordToUChannel2	BOOL	
RecordToUChannel3	BOOL	
RecordToUChannel4	BOOL	

Table 31 - AvMotorTwoDirection Output Interface

Output	Data Type	Description
Ready	BOOL	Indicates TRUE if the function block is ready to receive an execute command.
RunFwdStatus	BOOL	If this output is set to TRUE, the Avatar forward switch is closed.
Tripped	BOOL	If this output is set to TRUE, a protection trip event has been detected by the Avatar.
Alarm	BOOL	If this output is set to TRUE, a protection alarm has been detected by the Avatar.
UpstreamVltg1	BOOL	If this output is set to TRUE, the Avatar has detected that upstream main power of the first starter/power device in this Avatar is present (breaker closed).
AssetAlarm	BOOL	If this output is set to TRUE, a power device or SIL Starter within the Avatar have reached or exceeded 90% of the expected durability (per Avatar parameter).
RunRevStatus	BOOL	If this output is set to TRUE, the Avatar reverse switch is closed.
LoadRunnning	BOOL	If this output is set to TRUE, 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). (Unit: mA)
ReadyToReset	BOOL	If this output is set to TRUE, the Avatar meets the trip reset conditions and can be reset with a trip reset command.
UpstreamVltg2	BOOL	If this output is set to TRUE, the Avatar has detected that upstream main power of the starter/power device in this Avatar is present.
LoadStarting	BOOL	If this output is set to TRUE, the motor is in start phase.
AvgIRMS	DINT	Indicates the average of the most recent phase current Irms values. (Unit: mA)
AvgIRMS_O	BOOL	Indicates the average of the most recent phase current Irms **overflow** values.

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

The **AvMotorTwoDirectionSafe** function block is used to manage a motor in two directions (forward and reverse) with Safe Stop function[10] compliance for wiring category 1 and category 2.

NOTE: Safe Stop according to EN 61800-5-2

Table 32 - AvMotorTwoDirectionSafe Function Block

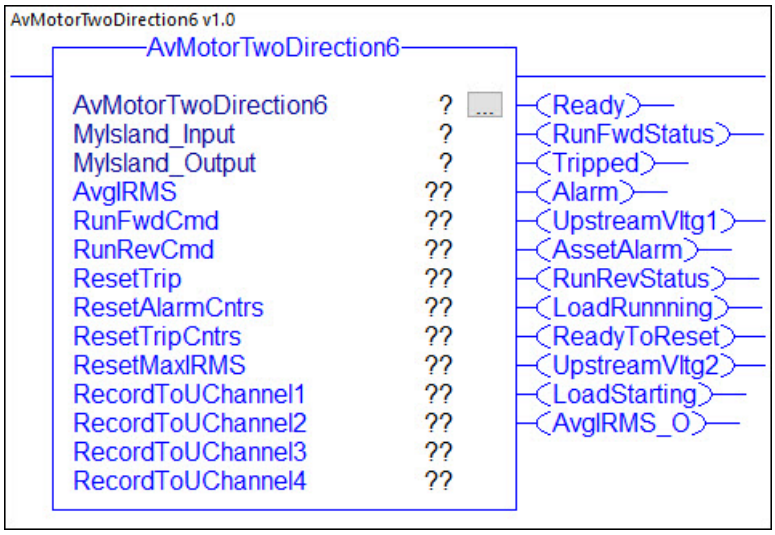


Table 33 - AvMotorTwoDirectionSafe Input Interface

Input	Data Type	Description
RunFwdCmd	BOOL	If this input is set to TRUE, the Avatar forward switch is closed.
RunRevCmd	BOOL	If this input is set to TRUE, the Avatar reverse switch is closed.
ResetTrip	BOOL	If this input is set to TRUE, detected trips whose trip reset conditions have been met will reset for this Avatar.
ResetAlarmCntrs	BOOL	If this input is set to TRUE, all alarm counters are reset for this Avatar.
ResetTripCntrs	BOOL	If this input is set to TRUE, all trip counters are reset for this Avatar.
ResetMaxIRMS	BOOL	If this input is set to TRUE, the maximum average Irms current value and the timestamp are reset.
RecordToUChannel1	BOOL	NOTE: Not used in this version of function block (will return all 0 s).
RecordToUChannel2	BOOL	
RecordToUChannel3	BOOL	
RecordToUChannel4	BOOL	

Table 34 - AvMotorTwoDirectionSafe Output Interface

Output	Data Type	Description
Ready	BOOL	Indicates TRUE if the function block is ready to receive an execute command.
RunFwdStatus	BOOL	If this output is set to TRUE, the Avatar forward switch is closed.
Tripped	BOOL	If this output is set to TRUE, a protection trip event has been detected by the Avatar.
Alarm	BOOL	If this output is set to TRUE, a protection alarm has been detected by the Avatar.
UpstreamVltg1	BOOL	If this output is set to TRUE, the Avatar has detected that upstream main power of the first starter/power device in this Avatar is present (breaker closed).

10. Safe Stop according to EN 61800-5-2

Table 34 - AvMotorTwoDirectionSafe Output Interface (Continued)

Output	Data Type	Description
AssetAlarm	BOOL	If this output is set to TRUE, a power device or SIL Starter within the Avatar have reached or exceeded 90% of the expected durability (per Avatar parameter).
RunRevStatus	BOOL	If this output is set to TRUE, the Avatar reverse switch is closed.
LoadRunnning	BOOL	If this output is set to TRUE, 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). (Unit: mA)
ReadyToReset	BOOL	If this output is set to TRUE, the Avatar meets the trip reset conditions and can be reset with a trip reset command.
UpstreamVltg2	BOOL	If this output is set to TRUE, the Avatar has detected that upstream main power of the second starter/power device in this Avatar is present.
LoadStarting	BOOL	If this output is set to TRUE, the motor is in start phase.
AvgIRMS	DINT	Indicates the average of the most recent phase current Irms values. (Unit: mA)
AvgIRMS_O	BOOL	Indicates the average of the most recent phase current Irms **overflow** values.

Motor Two Speeds

The **AvMotorTwoSpeeds** function block is used to manage a two speed motor.

Table 35 - AvMotorTwoSpeeds Function Block

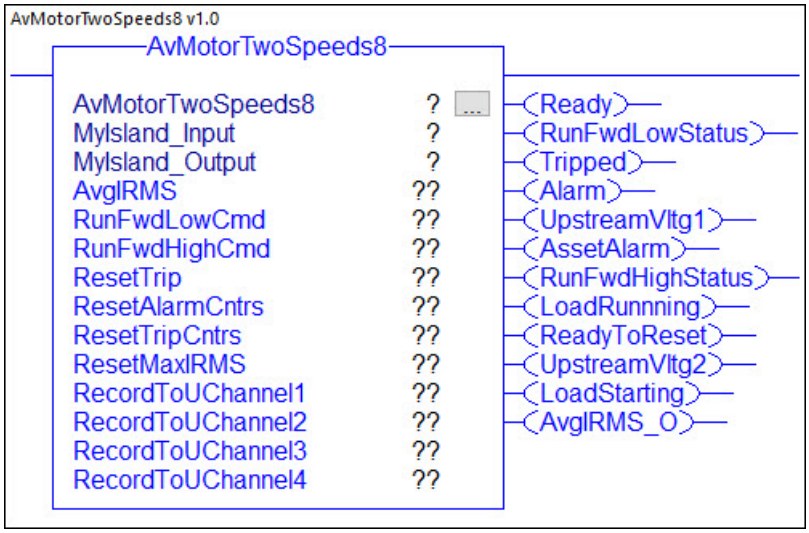


Table 36 - AvMotorTwoSpeeds Input Interface

Input	Data Type	Description
RunFwdLowCmd	BOOL	If this input is set to TRUE, the motor starts in forward direction with low speed.
RunFwdHighCmd	BOOL	If this input is set to TRUE, the motor starts in forward direction with high speed.
ResetTrip	BOOL	If this input is set to TRUE, detected trips whose trip reset conditions have been met will reset for this Avatar.
ResetAlarmCntrs	BOOL	If this input is set to TRUE, all alarm counters are reset for this Avatar.
ResetTripCntrs	BOOL	If this input is set to TRUE, all trip counters are reset for this Avatar.
ResetMaxIRMS	BOOL	If this input is set to TRUE, the maximum average Irms current value and the timestamp are reset.
RecordToUChannel1	BOOL	NOTE: Not used in this version of function block (will return all 0 s).
RecordToUChannel2	BOOL	
RecordToUChannel3	BOOL	
RecordToUChannel4	BOOL	

Table 37 - AvMotorTwoSpeeds Output Interface

Output	Data Type	Description
Ready	BOOL	Indicates TRUE if the function block is ready to receive an execute command.
RunFwdLowStatus	BOOL	If this output is set to TRUE, the motor is running in low speed. If this output is set to FALSE, the motor is stopped or is running in high speed.
Tripped	BOOL	If this output is set to TRUE, a protection trip event has been detected by the Avatar.
Alarm	BOOL	If this output is set to TRUE, a protection alarm has been detected by the Avatar.
UpstreamVltg1	BOOL	If this output is set to TRUE, the Avatar has detected that upstream main power of the first starter/power device in this Avatar is present (breaker closed).

Table 37 - AvMotorTwoSpeeds Output Interface (Continued)

Output	Data Type	Description
AssetAlarm	BOOL	If this output is set to TRUE, a power device or SIL Starter within the Avatar have reached or exceeded 90% of the expected durability (per Avatar parameter).
RunFwdHighStatus	BOOL	If this output is set to TRUE, the motor is running in high speed. If this output is set to FALSE, the motor is stopped or is running in low speed.
LoadRunnning	BOOL	If this output is set to TRUE, 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). (Unit: mA)
ReadyToReset	BOOL	If this output is set to TRUE, the Avatar meets the trip reset conditions and can be reset with a trip reset command.
UpstreamVltg2	BOOL	If this output is set to TRUE, the Avatar has detected that upstream main power of the second starter/power device in this Avatar is present.
LoadStarting	BOOL	If this output is set to TRUE, the motor is in start phase.
AvgIRMS	DINT	Indicates the average of the most recent phase current Irms values. (Unit: mA)
AvgIRMS_O	BOOL	Indicates the average of the most recent phase current Irms **overflow** values.

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

The **AvMotorTwoSpeedsSafe** function block is used to manage a two speed motor with Safe Stop function[11] compliance for wiring category 1 and category 2.

NOTE: Safe Stop according to EN 61800-5-2

Table 38 - AvMotorTwoSpeedsSafe Function Block

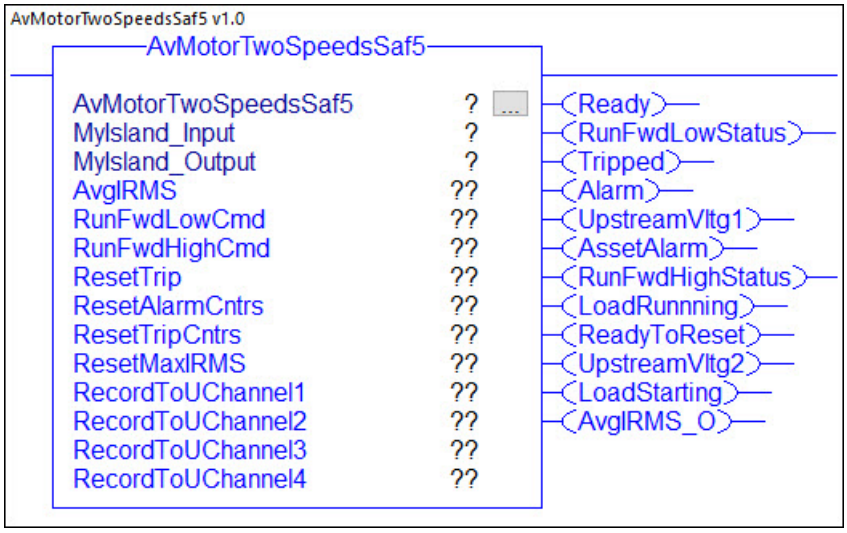


Table 39 - AvMotorTwoSpeedsSafe Input Interface

Input	Data Type	Description
RunFwdCmd	BOOL	If this input is set to TRUE, the Avatar forward switch is closed.
RunRevCmd	BOOL	If this input is set to TRUE, the Avatar reverse switch is closed.
ResetTrip	BOOL	If this input is set to TRUE, detected trips whose trip reset conditions have been met will reset for this Avatar.
ResetAlarmCntrs	BOOL	If this input is set to TRUE, all alarm counters are reset for this Avatar.
ResetTripCntrs	BOOL	If this input is set to TRUE, all trip counters are reset for this Avatar.
ResetMaxIRMS	BOOL	If this input is set to TRUE, the maximum average Irms current value and the timestamp are reset.
RecordToUChannel1	BOOL	NOTE: Not used in this version of function block (will return all 0 s).
RecordToUChannel2	BOOL	
RecordToUChannel3	BOOL	
RecordToUChannel4	BOOL	

Table 40 - AvMotorTwoSpeedsSafe Output Interface

Output	Data Type	Description
Ready	BOOL	Indicates TRUE if the function block is ready to receive an execute command.
RunFwdStatus	BOOL	If this output is set to TRUE, the Avatar forward switch is closed.
Tripped	BOOL	If this output is set to TRUE, a protection trip event has been detected by the Avatar.
Alarm	BOOL	If this output is set to TRUE, a protection alarm has been detected by the Avatar.
UpstreamVltg1	BOOL	If this output is set to TRUE, the Avatar has detected that upstream main power of the first starter/power device in this Avatar is present (breaker closed).

11. Safe Stop according to EN 61800-5-2

Table 40 - AvMotorTwoSpeedsSafe Output Interface (Continued)

Output	Data Type	Description
AssetAlarm	BOOL	If this output is set to TRUE, a power device or SIL Starter within the Avatar have reached or exceeded 90% of the expected durability (per Avatar parameter).
RunRevStatus	BOOL	If this output is set to TRUE, the Avatar reverse switch is closed.
LoadRunnning	BOOL	If this output is set to TRUE, 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). (Unit: mA)
ReadyToReset	BOOL	If this output is set to TRUE, the Avatar meets the trip reset conditions and can be reset with a trip reset command.
UpstreamVltg2	BOOL	If this output is set to TRUE, the Avatar has detected that upstream main power of the second starter/power device in this Avatar is present.
LoadStarting	BOOL	If this output is set to TRUE, the motor is in start phase.
AvgIRMS	DINT	Indicates the average of the most recent phase current Irms values. (Unit: mA)
AvgIRMS_O	BOOL	Indicates the average of the most recent phase current Irms **overflow** values.

Motor Two Speeds, Two Direction

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

Table 41 - AvMotorTwoSpeedsTwo Function Block

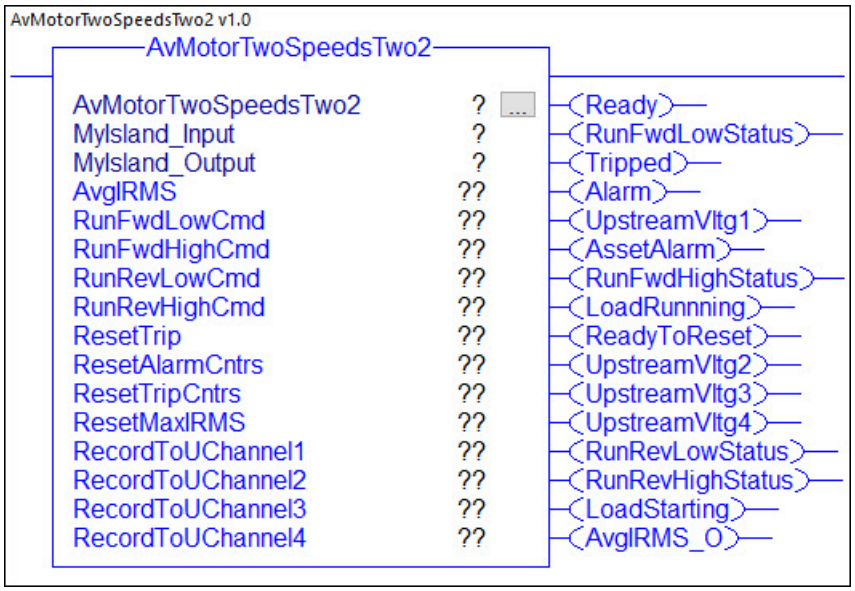


Table 42 - AvMotorTwoSpeedsTwo Input Interface

Input	Data Type	Description
RunFwdLowCmd	BOOL	If this input is set to TRUE, the motor starts in forward direction with low speed.
RunFwdHighCmd	BOOL	If this input is set to TRUE, the motor starts in forward direction with high speed.
RunRevLowCmd	BOOL	If this input is set to TRUE, the motor starts in reverse direction with low speed.
RunRevHighCmd	BOOL	If this input is set to TRUE, the motor starts in reverse direction with high speed.

Table 42 - AvMotorTwoSpeedsTwo Input Interface (Continued)

Input	Data Type	Description
ResetTrip	BOOL	If this input is set to TRUE, detected trips whose trip reset conditions have been met will reset for this Avatar.
ResetAlarmCntrs	BOOL	If this input is set to TRUE, all alarm counters are reset for this Avatar.
ResetTripCntrs	BOOL	If this input is set to TRUE, all trip counters are reset for this Avatar.
ResetMaxIRMS	BOOL	If this input is set to TRUE, the maximum average Irms current value and the timestamp are reset.
RecordToUChannel1	BOOL	NOTE: Not used in this version of function block (will return all 0 s).
RecordToUChannel2	BOOL	
RecordToUChannel3	BOOL	
RecordToUChannel4	BOOL	

Table 43 - AvMotorTwoSpeedsTwo Output Interface

Output	Data Type	Description
Ready	BOOL	Indicates TRUE if the function block is ready to receive an execute command.
RunFwdLowStatus	BOOL	If this output is set to TRUE, the motor is running in low speed. If this output is set to FALSE, the motor is stopped or is running in high speed.
Tripped	BOOL	If this output is set to TRUE, a protection trip event has been detected by the Avatar.
Alarm	BOOL	If this output is set to TRUE, a protection alarm has been detected by the Avatar.
UpstreamVltg1	BOOL	If this output is set to TRUE, the Avatar has detected that upstream main power of the first starter/power device in this Avatar is present (breaker closed).
AssetAlarm	BOOL	If this output is set to TRUE, a power device or SIL Starter within the Avatar have reached or exceeded 90% of the expected durability (per Avatar parameter).
RunFwdHighStatus	BOOL	If this output is set to TRUE, the motor is running in high speed. If this output is set to FALSE, the motor is stopped or is running in low speed.
LoadRunnning	BOOL	If this output is set to TRUE, 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). (Unit: mA)
ReadyToReset	BOOL	If this output is set to TRUE, the Avatar meets the trip reset conditions and can be reset with a trip reset command.
UpstreamVltg2	BOOL	If this output is set to TRUE, the Avatar has detected that upstream main power of the second starter/power device in this Avatar is present.
UpstreamVltg3	BOOL	If this output is set to TRUE, the Avatar has detected that upstream main power of the third starter/power device in this Avatar is present.
UpstreamVltg4	BOOL	If this output is set to TRUE, the Avatar has detected that upstream main power of the fourth starter/power device in this Avatar is present.
RunRevLowStatus	BOOL	If this output is set to TRUE, the low speed reverser switch is closed.
RunRevHighStatus	BOOL	If this output is set to TRUE, the high speed reverser switch is closed.
LoadStarting	BOOL	If this output is set to TRUE, the motor is in start phase.
AvgIRMS	DINT	Indicates the average of the most recent phase current Irms values. (Unit: mA)
AvgIRMS_O	BOOL	Indicates the average of the most recent phase current Irms **overflow** values.

Motor Two Speeds, Two Direction - Safe Stop, W. Cat 1/2

The **AvMotorTwoSpeedsTwoSafe** function block is used to manage a two speed motor in two directions (forward and reverse) with Safe Stop function[12] compliance for wiring category 1 and category 2.

NOTE: Safe Stop according to EN 61800-5-2

Table 44 - AvMotorTwoSpeedsTwoSafe Function Block

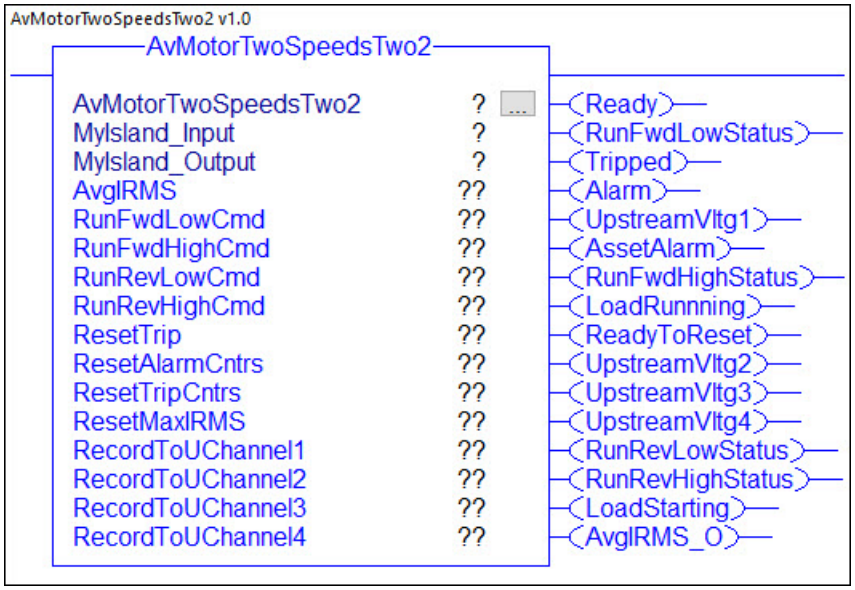


Table 45 - AvMotorTwoSpeedsTwoSafe Input Interface

Input	Data Type	Description
RunFwdLowCmd	BOOL	If this input is set to TRUE, the motor starts in forward direction with low speed.
RunFwdHighCmd	BOOL	If this input is set to TRUE, the motor starts in forward direction with high speed.
RunRevLowCmd	BOOL	If this input is set to TRUE, the motor starts in reverse direction with low speed.
RunRevHighCmd	BOOL	If this input is set to TRUE, the motor starts in reverse direction with high speed.
ResetTrip	BOOL	If this input is set to TRUE, detected trips whose trip reset conditions have been met will reset for this Avatar.
ResetAlarmCntrs	BOOL	If this input is set to TRUE, all alarm counters are reset for this Avatar.
ResetTripCntrs	BOOL	If this input is set to TRUE, all trip counters are reset for this Avatar.
ResetMaxIRMS	BOOL	If this input is set to TRUE, the maximum average Irms current value and the timestamp are reset.
RecordToUChannel1	BOOL	NOTE: Not used in this version of function block (will return all 0 s).
RecordToUChannel2	BOOL	
RecordToUChannel3	BOOL	
RecordToUChannel4	BOOL	

12. Safe Stop according to EN 61800-5-2

Table 46 - AvMotorTwoSpeedsTwoSafe Output Interface

Output	Data Type	Description
Ready	BOOL	Indicates TRUE if the function block is ready to receive an execute command.
RunFwdLowStatus	BOOL	If this output is set to TRUE, the motor is running in low speed. If this output is set to FALSE, the motor is stopped or is running in high speed.
Tripped	BOOL	If this output is set to TRUE, a protection trip event has been detected by the Avatar.
Alarm	BOOL	If this output is set to TRUE, a protection alarm has been detected by the Avatar.
UpstreamVltg1	BOOL	If this output is set to TRUE, the Avatar has detected that upstream main power of the first starter/PIM device is present (breaker closed).
AssetAlarm	BOOL	If this output is set to TRUE, a power device or SIL Starter within the Avatar have reached or exceeded 90% of the expected durability (per Avatar parameter).
RunFwdHighStatus	BOOL	If this output is set to TRUE, the motor is running in high speed. If this output is set to FALSE, the motor is stopped or is running in low speed.
LoadRunnning	BOOL	If this output is set to TRUE, 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). (Unit: mA)
ReadyToReset	BOOL	If this output is set to TRUE, the Avatar meets the trip reset conditions and can be reset with a trip reset command.
UpstreamVltg2	BOOL	If this output is set to TRUE, the Avatar has detected that upstream main power of the second starter/power device in this Avatar is present.
UpstreamVltg3	BOOL	If this output is set to TRUE, the Avatar has detected that upstream main power of the third starter/power device in this Avatar is present.
UpstreamVltg4	BOOL	If this output is set to TRUE, the Avatar has detected that upstream main power of the fourth starter/power device in this Avatar is present.
RunRevLowStatus	BOOL	If this output is set to TRUE, the low speed reverser switch is closed.
RunRevHighStatus	BOOL	If this output is set to TRUE, the high speed reverser switch is closed.
LoadStarting	BOOL	If this output is set to TRUE, the motor is in start phase.
AvgIRMS	DINT	Indicates the average of the most recent phase current Irms values. (Unit: mA)
AvgIRMS_O	BOOL	Indicates the average of the most recent phase current Irms **overflow** values.

Motor Y/D One Direction

The **AvMotorYDOneDirection** function block is used to manage a wye/delta (star/triangle) motor in one direction.

Table 47 - AvMotorYDOneDirection Function Block

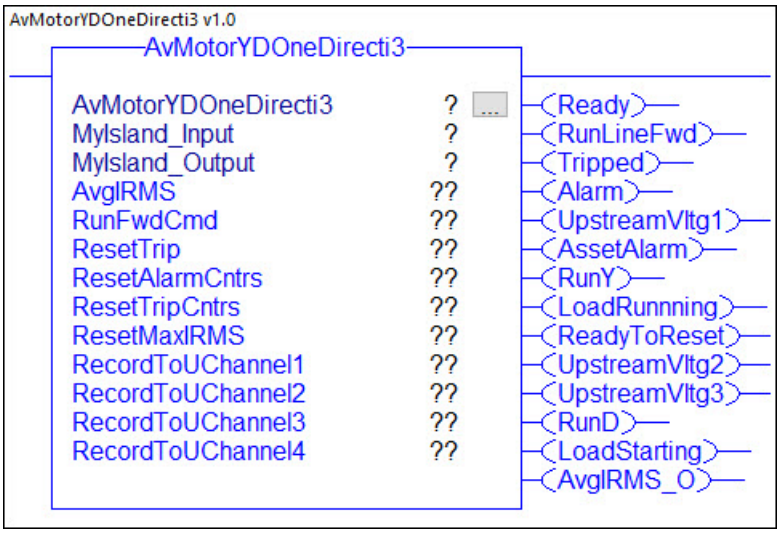


Table 48 - AvMotorYDOneDirection Input Interface

Input	Data Type	Description
RunFwdCmd	BOOL	If this input is set to TRUE, the Avatar forward switch is closed.
ResetTrip	BOOL	If this input is set to TRUE, detected trips whose trip reset conditions have been met will reset for this Avatar.
ResetAlarmCntrs	BOOL	If this input is set to TRUE, all alarm counters are reset for this Avatar.
ResetTripCntrs	BOOL	If this input is set to TRUE, all trip counters are reset for this Avatar.
ResetMaxIRMS	BOOL	If this input is set to TRUE, the maximum average Irms current value and the timestamp are reset.
RecordToUChannel1	BOOL	NOTE: Not used in this version of function block (will return all 0 s).
RecordToUChannel2	BOOL	
RecordToUChannel3	BOOL	
RecordToUChannel4	BOOL	

Table 49 - AvMotorYDOneDirection Output Interface

Output	Data Type	Description
Ready	BOOL	Indicates TRUE if the function block is ready to receive an execute command.
RunLineFwd	BOOL	If this output is set to TRUE, the Avatar forward switch is closed.
Tripped	BOOL	If this output is set to TRUE, a protection trip event has been detected by the Avatar.
Alarm	BOOL	If this output is set to TRUE, a protection alarm has been detected by the Avatar.
UpstreamVltg1	BOOL	If this output is set to TRUE, the Avatar has detected that upstream main power of the first starter/power device in this Avatar is present (breaker closed).
AssetAlarm	BOOL	If this output is set to TRUE, a power device or SIL Starter within the Avatar have reached or exceeded 90% of the expected durability (per Avatar parameter).
RunY	BOOL	If this output is set to TRUE, the Y switch for Motor Y/D Avatar is closed.
LoadRunnning	BOOL	If this output is set to TRUE, 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). (Unit: mA)
ReadyToReset	BOOL	If this output is set to TRUE, the Avatar meets the trip reset conditions and can be reset with a trip reset command.

Table 49 - AvMotorYDOneDirection Output Interface (Continued)

Output	Data Type	Description
UpstreamVltg2	BOOL	If this output is set to TRUE, the Avatar has detected that upstream main power of the second starter/power device in this Avatar is present.
UpstreamVltg3	BOOL	If this output is set to TRUE, the Avatar has detected that upstream main power of the third starter/power device in this Avatar is present.
RunD	BOOL	If this output is set to TRUE, the D switch for Motor Y/D Avatar is closed.
LoadStarting	BOOL	If this output is set to TRUE, the motor is in start phase.
AvgIRMS	DINT	Indicates the average of the most recent phase current Irms values. (Unit: mA)
AvgIRMS_O	BOOL	Indicates the average of the most recent phase current Irms **overflow** values.

Motor Y/D Two Directions

The **AvMotorYDTwoDirection** function block is used to manage a wye/delta (star/triangle) motor in two directions (forward and reverse).

Table 50 - AvMotorYDTwoDirection Function Block

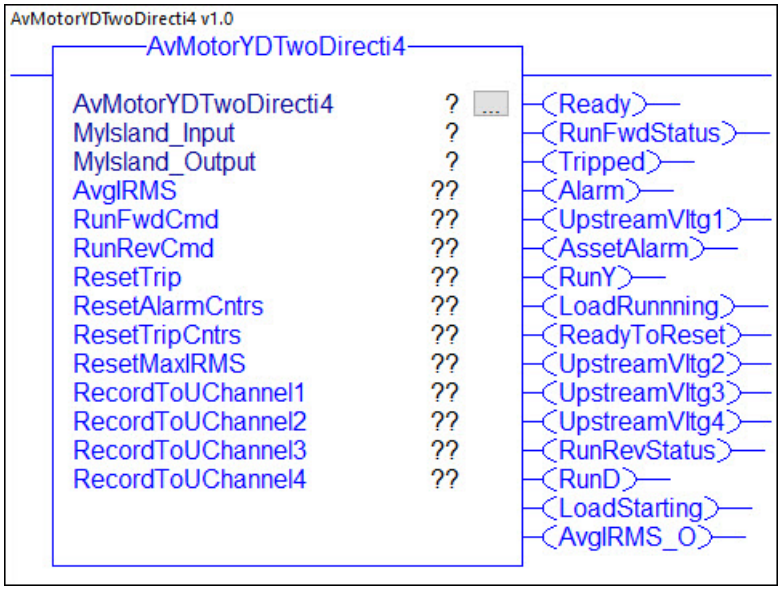


Table 51 - AvMotorYDTwoDirection Input Interface

Input	Data Type	Description
RunFwdCmd	BOOL	If this input is set to TRUE, the Avatar forward switch is closed.
RunRevCmd	BOOL	If this input is set to TRUE, the Avatar reverse switch is closed.
ResetTrip	BOOL	If this input is set to TRUE, detected trips whose trip reset conditions have been met will reset for this Avatar.
ResetAlarmCntrs	BOOL	If this input is set to TRUE, all alarm counters are reset for this Avatar.
ResetTripCntrs	BOOL	If this input is set to TRUE, all trip counters are reset for this Avatar.
ResetMaxIRMS	BOOL	If this input is set to TRUE, the maximum average Irms current value and the timestamp are reset.
RecordToUChannel1	BOOL	NOTE: Not used in this version of function block (will return all 0 s).
RecordToUChannel2	BOOL	
RecordToUChannel3	BOOL	
RecordToUChannel4	BOOL	

Table 52 - AvMotorYDTwoDirection Output Interface

Output	Data Type	Description
Ready	BOOL	Indicates TRUE if the function block is ready to receive an execute command.
RunFwdStatus	BOOL	If this output is set to TRUE, the Avatar forward switch is closed.
Tripped	BOOL	If this output is set to TRUE, a protection trip event has been detected by the Avatar.
Alarm	BOOL	If this output is set to TRUE, a protection alarm has been detected by the Avatar.
UpstreamVltg1	BOOL	If this output is set to TRUE, the Avatar has detected that upstream main power of the first starter/power device in this Avatar is present (breaker closed).
AssetAlarm	BOOL	If this output is set to TRUE, a power device or SIL Starter within the Avatar have reached or exceeded 90% of the expected durability (per Avatar parameter).
RunY	BOOL	If this output is set to TRUE, the Y switch for Motor Y/D Avatars is closed.
LoadRunnning	BOOL	If this output is set to TRUE, 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). (Unit: mA)
ReadyToReset	BOOL	If this output is set to TRUE, the Avatar meets the trip reset conditions and can be reset with a trip reset command.
UpstreamVltg2	BOOL	If this output is set to TRUE, the Avatar has detected that upstream main power of the second starter/power device in this Avatar is present.
UpstreamVltg3	BOOL	If this output is set to TRUE, the Avatar has detected that upstream main power of the third starter/power device in this Avatar is present.
UpstreamVltg4	BOOL	If this output is set to TRUE, the Avatar has detected that upstream main power of the fourth starter/power device in this Avatar is present.
RunRevStatus	BOOL	If this output is set to TRUE, the Avatar reverse switch is closed.
RunD	BOOL	If this output is set to TRUE, the D switch for Motor Y/D Avatars is closed.
LoadStarting	BOOL	If this output is set to TRUE, the motor is in start phase.
AvgIRMS	DINT	Indicates the average of the most recent phase current Irms values. (Unit: mA)
AvgIRMS_O	BOOL	Indicates the average of the most recent phase current Irms **overflow** values.

Power Interface without I/O (Measure)

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

Table 53 - AvPowerInterface Function Block

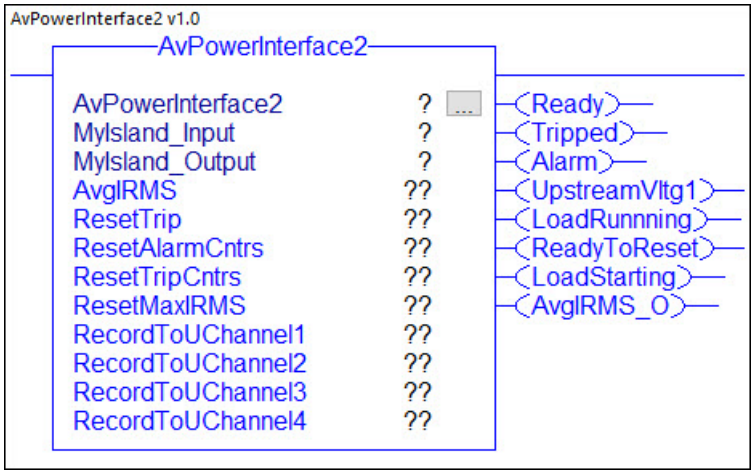


Table 54 - AvPowerInterface Input Interface

Input	Data Type	Description
ResetTrip	BOOL	If this input is set to TRUE, detected trips whose trip reset conditions have been met will reset for this Avatar.
ResetAlarmCntrs	BOOL	If this input is set to TRUE, all alarm counters are reset for this Avatar.
ResetTripCntrs	BOOL	If this input is set to TRUE, all trip counters are reset for this Avatar.
ResetMaxIRMS	BOOL	If this input is set to TRUE, the maximum average Irms current value and the timestamp are reset.
RecordToUChannel1	BOOL	NOTE: Not used in this version of function block (will return all 0 s).
RecordToUChannel2	BOOL	
RecordToUChannel3	BOOL	
RecordToUChannel4	BOOL	

Table 55 - AvPowerInterface Output Interface

Output	Data Type	Description
Ready	BOOL	Indicates TRUE if the function block is ready to receive an execute command.
Tripped	BOOL	If this output is set to TRUE, a protection trip event has been detected by the Avatar.
Alarm	BOOL	If this output is set to TRUE, a protection alarm has been detected by the Avatar.
UpstreamVltg1	BOOL	If this output is set to TRUE, the Avatar has detected that upstream main power of the first starter/power device in this Avatar is present (breaker closed).
LoadRunnning	BOOL	If this output is set to TRUE, 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). (Unit: mA)
ReadyToReset	BOOL	If this output is set to TRUE, the Avatar meets the trip reset conditions and can be reset with a trip reset command.
LoadStarting	BOOL	If this output is set to TRUE, the motor is in start phase.
AvgIRMS	DINT	Indicates the average of the most recent phase current Irms values. (Unit: mA)
AvgIRMS_O	BOOL	Indicates the average of the most recent phase current Irms **overflow** values.

Power Interface with I/O (Control)

The **AvPowerInterfacewit** 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.

Table 56 - AvPowerInterfacewit Function Block

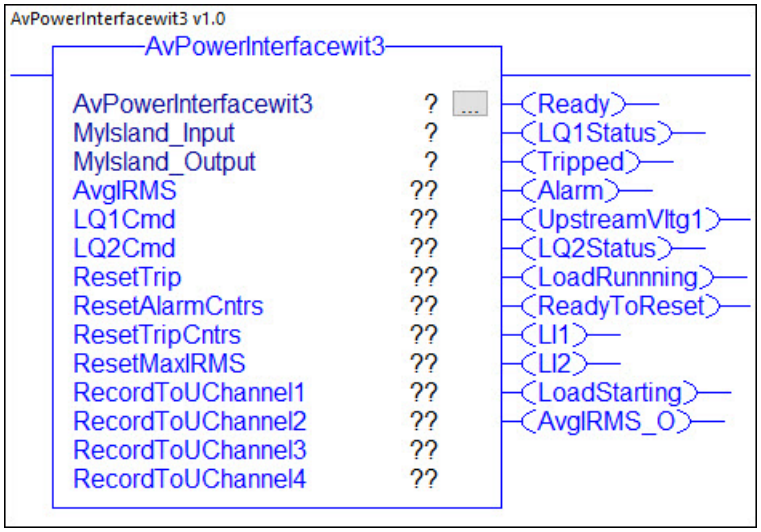


Table 57 - AvPowerInterfacewit Input Interface

Input	Data Type	Description
LQ1Cmd	BOOL	If this input is set to TRUE, the logical output 1 is set to TRUE.
LQ2Cmd	BOOL	If this input is set to TRUE, the logical output 2 is set to TRUE.
ResetTrip	BOOL	If this input is set to TRUE, detected trips whose trip reset conditions have been met will reset for this Avatar.
ResetAlarmCntrs	BOOL	If this input is set to TRUE, all alarm counters are reset for this Avatar.
ResetTripCntrs	BOOL	If this input is set to TRUE, all trip counters are reset for this Avatar.
ResetMaxIRMS	BOOL	If this input is set to TRUE, the maximum average Irms current value and the timestamp are reset.
RecordToUChannel1	BOOL	NOTE: Not used in this version of function block (will return all 0 s).
RecordToUChannel2	BOOL	
RecordToUChannel3	BOOL	
RecordToUChannel4	BOOL	

Table 58 - AvPowerInterfacewit Output Interface

Output	Data Type	Description
Ready	BOOL	Indicates TRUE if the function block is ready to receive an execute command.
LQ1Status	BOOL	If this output is set to TRUE, the logical output 1 is set to TRUE.
Tripped	BOOL	If this output is set to TRUE, a protection trip event has been detected by the Avatar.
Alarm	BOOL	If this output is set to TRUE, a protection alarm has been detected by the Avatar.
UpstreamVltg1	BOOL	If this output is set to TRUE, the Avatar has detected that upstream main power of the first starter/power device in this Avatar is present (breaker closed).
LQ2Status	BOOL	If this output is set to TRUE, the logical output 2 is set to TRUE.

Table 58 - AvPowerInterfacewit Output Interface (Continued)

Output	Data Type	Description
LoadRunnning	BOOL	If this output is set to TRUE, 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). (Unit: mA)
ReadyToReset	BOOL	If this output is set to TRUE, the Avatar meets the trip reset conditions and can be reset with a trip reset command.
LI1	BOOL	If this output is set to TRUE, the logical input 1 of the Avatar is set to TRUE.
LI2	BOOL	If this output is set to TRUE, the logical input 2 of the Avatar is set to TRUE.
LoadStarting	BOOL	If this output is set to TRUE, the motor is in start phase.
AvgIRMS	DINT	Indicates the average of the most recent phase current Irms values. (Unit: mA)
AvgIRMS_O	BOOL	Indicates the average of the most recent phase current Irms **overflow** values.

Power Supply

The **AvPowerSupply** function block is used to manage a power supply.

Table 59 - AvPowerSupply Function Block

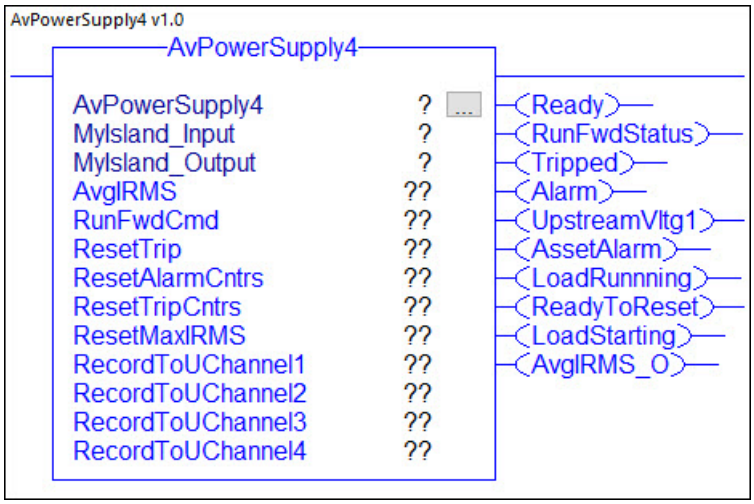


Table 60 - AvPowerSupply Input Interface

Input	Data Type	Description
RunFwdCmd	BOOL	If this input is set to TRUE, the Avatar forward switch is closed.
ResetTrip	BOOL	If this input is set to TRUE, detected trips whose trip reset conditions have been met will reset for this Avatar.
ResetAlarmCntrs	BOOL	If this input is set to TRUE, all alarm counters are reset for this Avatar.
ResetTripCntrs	BOOL	If this input is set to TRUE, all trip counters are reset for this Avatar.
ResetMaxIRMS	BOOL	If this input is set to TRUE, the maximum average Irms current value and the timestamp are reset.
RecordToUChannel1	BOOL	NOTE: Not used in this version of function block (will return all 0 s).
RecordToUChannel2	BOOL	
RecordToUChannel3	BOOL	
RecordToUChannel4	BOOL	

Table 61 - AvPowerSupply Output Interface

Output	Data Type	Description
Ready	BOOL	Indicates TRUE if the function block is ready to receive an execute command.
RunFwdStatus	BOOL	If this output is set to TRUE, the Avatar forward switch is closed.
Tripped	BOOL	If this output is set to TRUE, a protection trip event has been detected by the Avatar.
Alarm	BOOL	If this output is set to TRUE, a protection alarm has been detected by the Avatar.
UpstreamVltg1	BOOL	If this output is set to TRUE, the Avatar has detected that upstream main power of the first starter/power device in this Avatar is present (breaker closed).
AssetAlarm	BOOL	If this output is set to TRUE, a power device or SIL Starter within the Avatar have reached or exceeded 90% of the expected durability (per Avatar parameter).
LoadRunnning	BOOL	If this output is set to TRUE, 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). (Unit: mA)
ReadyToReset	BOOL	If this output is set to TRUE, the Avatar meets the trip reset conditions and can be reset with a trip reset command.
LoadStarting	BOOL	If this output is set to TRUE, the motor is in start phase.
AvgIRMS	DINT	Indicates the average of the most recent phase current Irms values. (Unit: mA)
AvgIRMS_O	BOOL	Indicates the average of the most recent phase current Irms **overflow** values.

Resistor

The **AvResistor** function block is used to manage a resistive load.

Table 62 - AvResistor Function Block

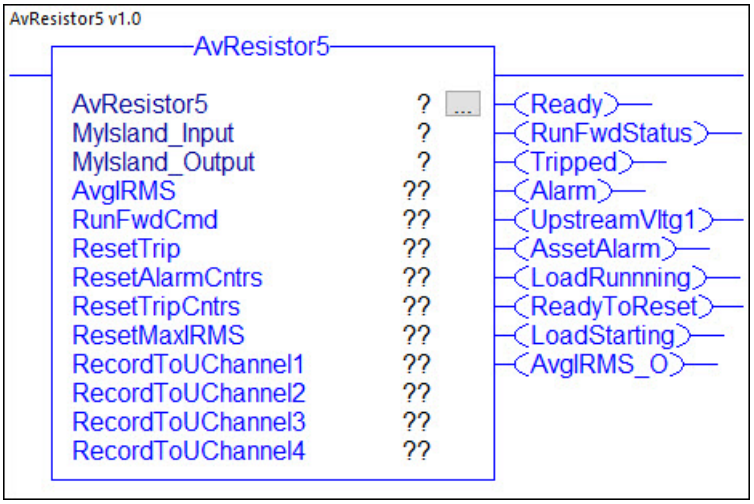


Table 63 - AvResistor Input Interface

Input	Data Type	Description
RunFwdCmd	BOOL	If this input is set to TRUE, the Avatar forward switch is closed.
ResetTrip	BOOL	If this input is set to TRUE, detected trips whose trip reset conditions have been met will reset for this Avatar.
ResetAlarmCntrs	BOOL	If this input is set to TRUE, all alarm counters are reset for this Avatar.
ResetTripCntrs	BOOL	If this input is set to TRUE, all trip counters are reset for this Avatar.

Table 63 - AvResistor Input Interface (Continued)

Input	Data Type	Description
ResetMaxIRMS	BOOL	If this input is set to TRUE, the maximum average Irms current value and the timestamp are reset.
RecordToUChannel1	BOOL	NOTE: Not used in this version of function block (will return all 0 s).
RecordToUChannel2	BOOL	
RecordToUChannel3	BOOL	
RecordToUChannel4	BOOL	

Table 64 - AvResistor Output Interface

Output	Data Type	Description
Ready	BOOL	Indicates TRUE if the function block is ready to receive an execute command.
RunFwdStatus	BOOL	If this output is set to TRUE, the Avatar forward switch is closed.
Tripped	BOOL	If this output is set to TRUE, a protection trip event has been detected by the Avatar.
Alarm	BOOL	If this output is set to TRUE, a protection alarm has been detected by the Avatar.
UpstreamVltg1	BOOL	If this output is set to TRUE, the Avatar has detected that upstream main power of the first starter/power device in this Avatar is present (breaker closed).
AssetAlarm	BOOL	If this output is set to TRUE, a power device or SIL Starter within the Avatar have reached or exceeded 90% of the expected durability (per Avatar parameter).
LoadRunnning	BOOL	If this output is set to TRUE, 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). (Unit: mA)
ReadyToReset	BOOL	If this output is set to TRUE, the Avatar meets the trip reset conditions and can be reset with a trip reset command.
LoadStarting	BOOL	If this output is set to TRUE, the motor is in start phase.
AvgIRMS	DINT	Indicates the average of the most recent phase current Irms values. (Unit: mA)
AvgIRMS_O	BOOL	Indicates the average of the most recent phase current Irms **overflow** values.

Switch

The **AvSwitch** function block establishes or interrupts a power line in an electric circuit.

Table 65 - AvSwitch Function Block

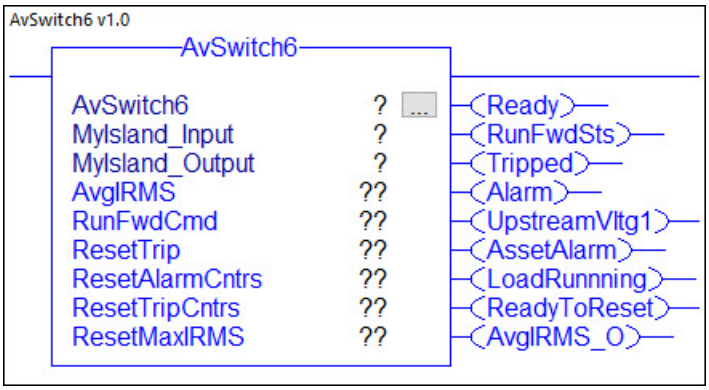


Table 66 - AvSwitch Input Interface

Input	Data Type	Description
RunFwdCmd	BOOL	If this input is set to TRUE, the Avatar forward switch is closed.
ResetTrip	BOOL	If this input is set to TRUE, detected trips whose trip reset conditions have been met will reset for this Avatar.
ResetAlarmCntrs	BOOL	If this input is set to TRUE, all alarm counters are reset for this Avatar.
ResetTripCntrs	BOOL	If this input is set to TRUE, all trip counters are reset for this Avatar.
ResetMaxIRMS	BOOL	If this input is set to TRUE, the maximum average Irms current value and the timestamp are reset.

Table 67 - AvSwitch Output Interface

Output	Data Type	Description
Ready	BOOL	Indicates TRUE if the function block is ready to receive an execute command.
RunFwdStatus	BOOL	If this output is set to TRUE, the Avatar forward switch is closed.
Tripped	BOOL	If this output is set to TRUE, a protection trip event has been detected by the Avatar.
Alarm	BOOL	If this output is set to TRUE, a protection alarm has been detected by the Avatar.
UpstreamVltg1	BOOL	If this output is set to TRUE, the Avatar has detected that upstream main power of the first starter/power device in this Avatar is present (breaker closed).
AssetAlarm	BOOL	If this output is set to TRUE, a power device or SIL Starter within the Avatar have reached or exceeded 90% of the expected durability (per Avatar parameter).
LoadRunnning	BOOL	If this output is set to TRUE, 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). (Unit: mA)
ReadyToReset	BOOL	If this output is set to TRUE, the Avatar meets the trip reset conditions and can be reset with a trip reset command.
AvgIRMS	DINT	Indicates the average of the most recent phase current Irms values. (Unit: mA)
AvgIRMS_O	BOOL	Indicates the average of the most recent phase current Irms **overflow** values.

Switch - Safe Stop, W. Cat 1/2

The **AvSwitchSafeStopCat** function block establishes or interrupts a power line in an electric circuit with Safe Stop function[13] compliance for wiring category 1 and category 2.

NOTE: Safe Stop according to EN 61800-5-2

Table 68 - AvSwitchSafeStopCat Function Block

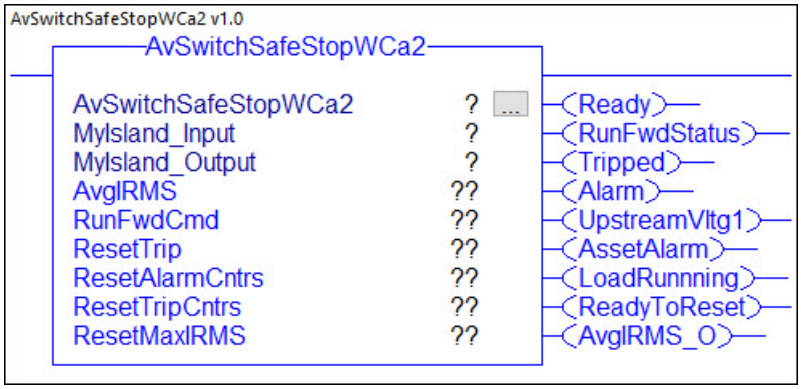


Table 69 - AvSwitchSafeStopCat Input Interface

Input	Data Type	Description
RunFwdCmd	BOOL	If this input is set to TRUE, the Avatar forward switch is closed.
ResetTrip	BOOL	If this input is set to TRUE, detected trips whose trip reset conditions have been met will reset for this Avatar.
ResetAlarmCntrs	BOOL	If this input is set to TRUE, all alarm counters are reset for this Avatar.
ResetTripCntrs	BOOL	If this input is set to TRUE, all trip counters are reset for this Avatar.
ResetMaxIRMS	BOOL	If this input is set to TRUE, the maximum average Irms current value and the timestamp are reset.

Table 70 - AvSwitchSafeStopCat Output Interface

Output	Data Type	Description
Ready	BOOL	Indicates TRUE if the function block is ready to receive an execute command.
RunFwdStatus	BOOL	If this output is set to TRUE, the Avatar forward switch is closed.
Tripped	BOOL	If this output is set to TRUE, a protection trip event has been detected by the Avatar.
Alarm	BOOL	If this output is set to TRUE, a protection alarm has been detected by the Avatar.
UpstreamVltg1	BOOL	If this output is set to TRUE, the Avatar has detected that upstream main power of the first starter/power device in this Avatar is present (breaker closed).
AssetAlarm	BOOL	If this output is set to TRUE, a power device or SIL Starter within the Avatar have reached or exceeded 90% of the expected durability (per Avatar parameter).
LoadRunnning	BOOL	If this output is set to TRUE, 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). (Unit: mA)
ReadyToReset	BOOL	If this output is set to TRUE, the Avatar meets the trip reset conditions and can be reset with a trip reset command.

13. Safe Stop according to EN 61800-5-2

Table 70 - AvSwitchSafeStopCat Output Interface (Continued)

Output	Data Type	Description
AvgIRMS	DINT	Indicates the average of the most recent phase current Irms values. (Unit: mA)
AvgIRMS_O	BOOL	Indicates the average of the most recent phase current Irms **overflow** values.

Transformer

The **AvTransformer** function block is used to manage a transformer.

Table 71 - AvTransformer Function Block

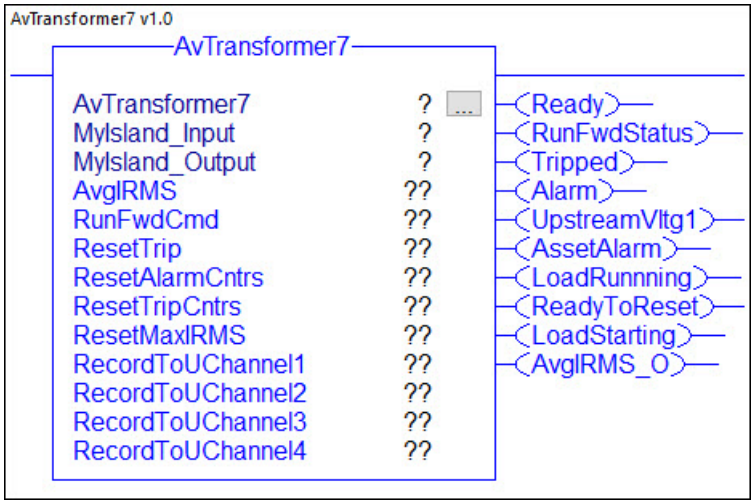


Table 72 - AvTransformer Input Interface

Input	Data Type	Description
RunFwdCmd	BOOL	If this input is set to TRUE, the Avatar forward switch is closed.
ResetTrip	BOOL	If this input is set to TRUE, detected trips whose trip reset conditions have been met will reset for this Avatar.
ResetAlarmCntrs	BOOL	If this input is set to TRUE, all alarm counters are reset for this Avatar.
ResetTripCntrs	BOOL	If this input is set to TRUE, all trip counters are reset for this Avatar.
ResetMaxIRMS	BOOL	If this input is set to TRUE, the maximum average Irms current value and the timestamp are reset.
RecordToUChannel1	BOOL	NOTE: Not used in this version of function block (will return all 0 s).
RecordToUChannel2	BOOL	
RecordToUChannel3	BOOL	
RecordToUChannel4	BOOL	

Table 73 - AvTransformer Output Interface

Output	Data Type	Description
Ready	BOOL	Indicates TRUE if the function block is ready to receive an execute command.
RunFwdStatus	BOOL	If this output is set to TRUE, the Avatar forward switch is closed.
Tripped	BOOL	If this output is set to TRUE, a protection trip event has been detected by the Avatar.
Alarm	BOOL	If this output is set to TRUE, a protection alarm has been detected by the Avatar.

Table 73 - AvTransformer Output Interface (Continued)

Output	Data Type	Description
UpstreamVltg1	BOOL	If this output is set to TRUE, the Avatar has detected that upstream main power of the first starter/power device in this Avatar is present (breaker closed).
AssetAlarm	BOOL	If this output is set to TRUE, a power device or SIL Starter within the Avatar have reached or exceeded 90% of the expected durability (per Avatar parameter).
LoadRunnning	BOOL	If this output is set to TRUE, 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). (Unit: mA)
ReadyToReset	BOOL	If this output is set to TRUE, the Avatar meets the trip reset conditions and can be reset with a trip reset command.
LoadStarting	BOOL	If this output is set to TRUE, the motor is in start phase.
AvgIRMS	DINT	Indicates the average of the most recent phase current Irms values. (Unit: mA)
AvgIRMS_O	BOOL	Indicates the average of the most recent phase current Irms **overflow** values.

Energy

The **Avatar_Energy** function block returns the status of the acyclic energy data of the specified Avatar.

Table 74 - Avatar_Energy Function Block

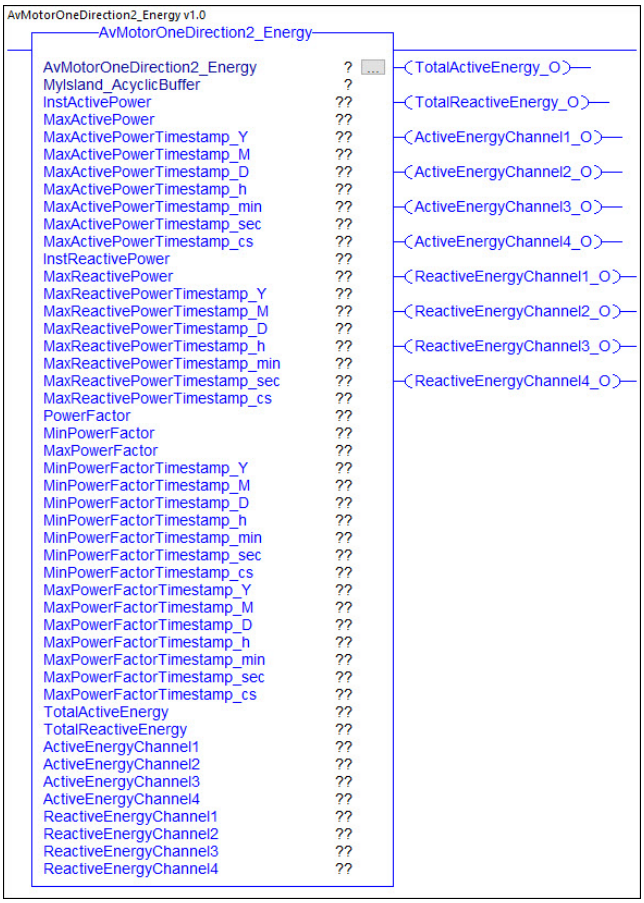


Table 75 - Avatar_Energy Output Interface

Output	Data Type	Description
InstActivePower	DINT	Total active power for the Avatar. (Unit: W)
MaxActivePower	DINT	Maximum value of the active power for the Avatar. (Unit: W)
MaxActivePowerTimestamp_Y	DINT	Date and time when the maximum active power value was recorded.
MaxActivePowerTimestamp_M	SINT	
MaxActivePowerTimestamp_D	SINT	
MaxActivePowerTimestamp_h	SINT	
MaxActivePowerTimestamp_min	SINT	
MaxActivePowerTimestamp_sec	SINT	
MaxActivePowerTimestamp_cs	SINT	
InstReactivePower	DINT	Total reactive power for the Avatar. (Unit: VAR)
MaxReactivePower	DINT	Maximum value of the reactive power for the Avatar. (Unit: VAR)
MaxReactivePowerTimestamp_Y	DINT	Date and time when the maximum reactive power value was recorded.
MaxReactivePowerTimestamp_M	SINT	
MaxReactivePowerTimestamp_D	SINT	
MaxReactivePowerTimestamp_h	SINT	

Table 75 - Avatar_Energy Output Interface (Continued)

Output	Data Type	Description
MaxReactivePowerTimestamp_min	SINT	
MaxReactivePowerTimestamp_sec	SINT	
MaxReactivePowerTimestamp_cs	SINT	
PowerFactor	SINT	True power factor value.
MinPowerFactor	SINT	True minimum power factor value.
MaxPowerFactor	SINT	True maximum power factor value.
MinPowerFactorTimestamp_Y	DINT	Date and time when the minimum power factor value was recorded.
MinPowerFactorTimestamp_M	SINT	
MinPowerFactorTimestamp_D	SINT	
MinPowerFactorTimestamp_h	SINT	
MinPowerFactorTimestamp_min	SINT	
MinPowerFactorTimestamp_sec	SINT	
MinPowerFactorTimestamp_cs	SINT	
MaxPowerFactorTimestamp_Y	DINT	
MaxPowerFactorTimestamp_M	SINT	
MaxPowerFactorTimestamp_D	SINT	
MaxPowerFactorTimestamp_h	SINT	
MaxPowerFactorTimestamp_min	SINT	
MaxPowerFactorTimestamp_sec	SINT	
MaxPowerFactorTimestamp_cs	SINT	
TotalActiveEnergy	DINT	Total active energy value for all Avatars in the system with Energy Monitoring Enabled. (Unit: Watt-hours)
TotalActiveEnergy_O	BOOL	Total active energy **overflow** value for all Avatars in the system with Energy Monitoring Enabled.
TotalReactiveEnergy	DINT	Total reactive energy value for all Avatars in the system with Energy Monitoring Enabled. (Unit: VAR-hours)
TotalReactiveEnergy_O	BOOL	Total reactive energy **overflow** value for all Avatars in the system with Energy Monitoring Enabled.
ActiveEnergyChannel1	DINT	Channel 1: ToU (Time of Use) total active energy value. NOTE: Not used in this version of function block (will return all 0 s).
ActiveEnergyChannel1_O	BOOL	Channel 1: ToU (Time of Use) total active energy **overflow** value. NOTE: Not used in this version of function block (will return all 0 s).
ActiveEnergyChannel2	DINT	Channel 2: ToU (Time of Use) total active energy value. NOTE: Not used in this version of function block (will return all 0 s).
ActiveEnergyChannel2_O	BOOL	Channel 2: ToU (Time of Use) total active energy **overflow** value. NOTE: Not used in this version of function block (will return all 0 s).
ActiveEnergyChannel3	DINT	Channel 3: ToU (Time of Use) total active energy value. NOTE: Not used in this version of function block (will return all 0 s).
ActiveEnergyChannel3_O	BOOL	Channel 3: ToU (Time of Use) total active energy **overflow** value. NOTE: Not used in this version of function block (will return all 0 s).
ActiveEnergyChannel4	DINT	Channel 4: ToU (Time of Use) total active energy value. NOTE: Not used in this version of function block (will return all 0 s).
ActiveEnergyChannel4_O	BOOL	Channel 4: ToU (Time of Use) total active energy **overflow** value. NOTE: Not used in this version of function block (will return all 0 s).
ReactiveEnergyChannel1	DINT	Channel 1: ToU (Time of Use) total reactive energy value. NOTE: Not used in this version of function block (will return all 0 s).
ReactiveEnergyChannel1_O	BOOL	Channel 1: ToU (Time of Use) total reactive energy **overflow** value. NOTE: Not used in this version of function block (will return all 0 s).

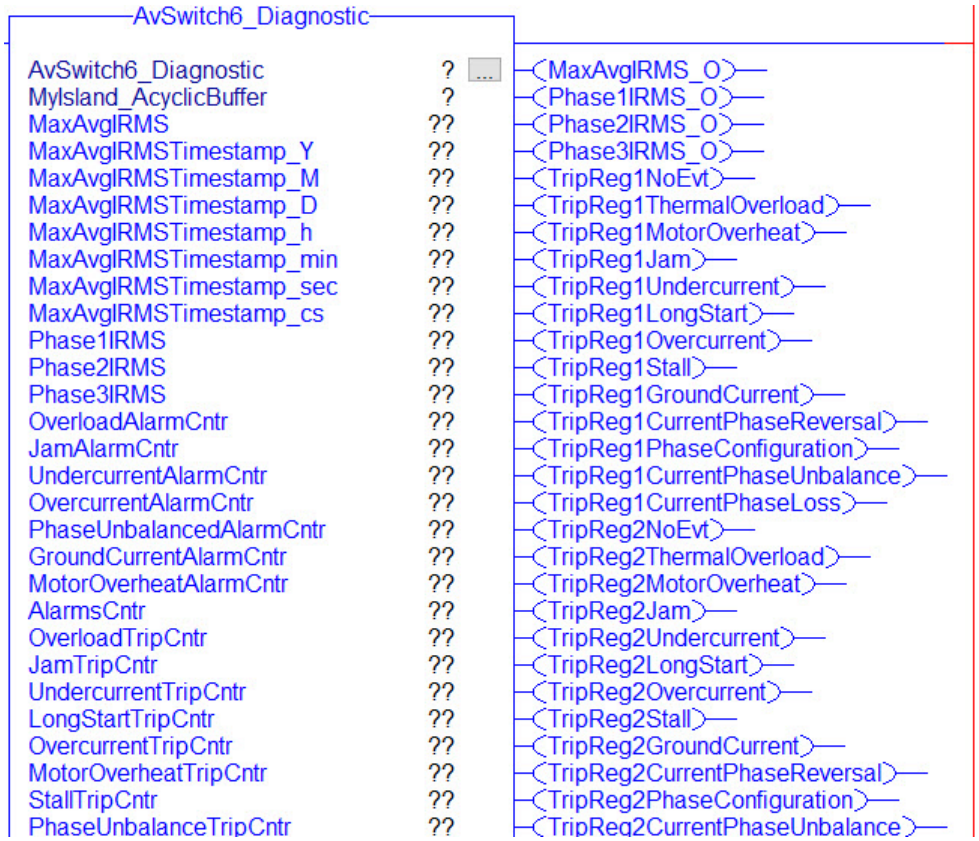
Table 75 - Avatar_Energy Output Interface (Continued)

Output	Data Type	Description
ReactiveEnergyChannel2	DINT	Channel 2: ToU (Time of Use) total reactive energy value. NOTE: Not used in this version of function block (will return all 0 s).
ReactiveEnergyChannel2_O	BOOL	Channel 2: ToU (Time of Use) total reactive energy **overflow** value. NOTE: Not used in this version of function block (will return all 0 s).
ReactiveEnergyChannel3	DINT	Channel 3: ToU (Time of Use) total reactive energy value. NOTE: Not used in this version of function block (will return all 0 s).
ReactiveEnergyChannel3_O	BOOL	Channel 3: ToU (Time of Use) total reactive energy **overflow** value. NOTE: Not used in this version of function block (will return all 0 s).
ReactiveEnergyChannel4	DINT	Channel 4: ToU (Time of Use) total reactive energy value. NOTE: Not used in this version of function block (will return all 0 s).
ReactiveEnergyChannel4_O	BOOL	Channel 4: ToU (Time of Use) total reactive energy **overflow** value. NOTE: Not used in this version of function block (will return all 0 s).

Diagnostic

The **Avatar_Diagnostic** function block returns the status of the acyclic diagnostic data of the specified Avatar.

Table 76 - Avatar_Diagnostic Function Block



NOTE: Not all the outputs listed in the following table are captured in the screen shot above.

Table 77 - Avatar_Diagnostic Output Interface

Output	Data Type	Description
MaxAvgIRMS	DINT	Maximum average Irms current value.
MaxAvgIRMS_O	BOOL	Maximum average Irms current **overflow** value.
MaxAvgIRMSTimestamp_Y	DINT	Date and time when the maximum average Irms current value was recorded.
MaxAvgIRMSTimestamp_M	SINT	
MaxAvgIRMSTimestamp_D	SINT	
MaxAvgIRMSTimestamp_h	SINT	
MaxAvgIRMSTimestamp_min	SINT	
MaxAvgIRMSTimestamp_sec	SINT	
MaxAvgIRMSTimestamp_cs	SINT	
Phase1IRMS	DINT	Value of the phase L1 Irms. (Unit: mA)
Phase1IRMS_O	BOOL	Overflow value of the phase L1 Irms.
Phase2IRMS	DINT	Value of the phase L2 Irms. (Unit: mA)
Phase2IRMS_O	BOOL	Overflow value of the phase L2 Irms.
Phase3IRMS	DINT	Value of the phase L3 Irms. (Unit: mA)
Phase3IRMS_O	BOOL	Overflow value of the phase L3 Irms.
OverloadAlarmCntr	DINT	Counter of advisories related to thermal overload protection.

Table 77 - Avatar_Diagnostic Output Interface (Continued)

Output	Data Type	Description
JamAlarmCntr	DINT	Counter of advisories related to jam protection.
UndercurrentAlarmCntr	DINT	Counter of advisories related to undercurrent protection.
OvercurrentAlarmCntr	DINT	Counter of advisories related to overcurrent protection.
PhaseUnbalancedAlarmCntr	DINT	Counter of advisories related to phase unbalance protection.
GroundCurrentAlarmCntr	DINT	Counter of advisories related to ground current protection.
MotorOverheatAlarmCntr	DINT	Counter of motor overheat events.
AlarmsCntr	DINT	Counter of advisories related to protections.
OverloadTripCntr	DINT	Counter of trips related to thermal overload protection.
JamTripCntr	DINT	Counter of trips related to jam protection.
UndercurrentTripCntr	DINT	Counter of trips related to undercurrent protection.
LongStartTripCntr	DINT	Counter of trips related to long start protection.
OvercurrentTripCntr	DINT	Counter of trips related to overcurrent protection.
MotorOverheatTripCntr	DINT	Counter of motor overheat trip events.
StallTripCntr	DINT	Counter of trips related to stall protection.
PhaseUnbalanceTripCntr	DINT	Counter of trips related to phase unbalance protection.
PhaseConfigTripCntr	DINT	Counter of trips related to phase configuration protection.
GroundCurrentTripCntr	DINT	Counter of trips related to ground current protection.
PhaseReversalTripCntr	DINT	Counter of trips related to phase reversal protection.
PhaseLossTripCntr	DINT	Counter of trips related to phase loss protection.
TripsCntr	DINT	Counter of trips related to protections.
TripReg1_Y	DINT	Date and trip reason register 1.
TripReg1_M	SINT	
TripReg1_D	SINT	
TripReg1_h	SINT	
TripReg1_min	SINT	
TripReg1_sec	SINT	
TripReg1_cs	SINT	
TripReg1NoEvent	BOOL	Identifier of the detected trip event.
TripReg1ThermalOverload	BOOL	
TripReg1MotorOverheat	BOOL	
TripReg1Jam	BOOL	
TripReg1Undercurrent	BOOL	
TripReg1LongStart	BOOL	
TripReg1Overcurrent	BOOL	
TripReg1Stall	BOOL	
TripReg1GroundCurrent	BOOL	
TripReg1CurrentPhaseReversal	BOOL	
TripReg1PhaseConfiguration	BOOL	
TripReg1CurrentPhaseUnbalance	BOOL	
TripReg1CurrentPhaseLoss	BOOL	
. . .	. . .	. . .

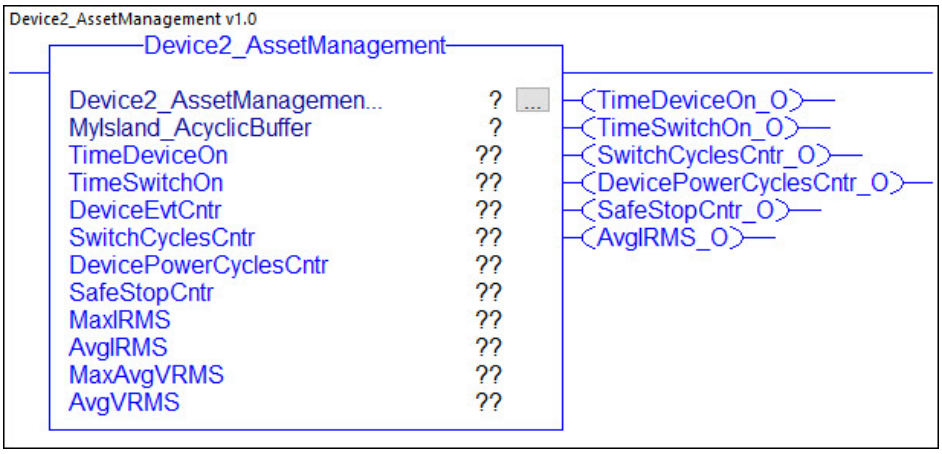
Table 77 - Avatar_Diagnostic Output Interface (Continued)

Output	Data Type	Description
TripReg5_Y	DINT	Date and trip reason register 5.
TripReg5_M	SINT	
TripReg5_D	SINT	
TripReg5_h	SINT	
TripReg5_min	SINT	
TripReg5_sec	SINT	
TripReg5_cs	SINT	
TripReg5NoEvent	BOOL	Identifier of the detected trip event.
TripReg5ThermalOverload	BOOL	
TripReg5MotorOverheat	BOOL	
TripReg5Jam	BOOL	
TripReg5Undercurrent	BOOL	
TripReg5LongStart	BOOL	
TripReg5Overcurrent	BOOL	
TripReg5Stall	BOOL	
TripReg5GroundCurrent	BOOL	
TripReg5CurrentPhaseReversal	BOOL	
TripReg5PhaseConfiguration	BOOL	
TripReg5CurrentPhaseUnbalance	BOOL	
TripReg5CurrentPhaseLoss	BOOL	

Asset Management

The **DeviceX_AssetManagement** function block returns the status of the acyclic asset management data of the specified device.

Table 78 - DeviceX_AssetManagement Function Block



NOTE: Safe Stop according to EN 61800-5-2

Table 79 - DeviceX_AssetManagement Output Interface

Output	Data Type	Description
TimeDeviceOn	DINT	This register indicates the time that the module has been powered on in its lifetime. (Unit: h)
TimeDeviceOn_O	BOOL	This register indicates the **overflow** time that the module has been powered on in its lifetime.
TimeSwitchOn	DINT	This register indicates the time the contactor has been in the closed state. (Unit: h)
TimeSwitchOn_O	BOOL	This register indicates the **overflow** time the contactor has been in the closed state.
EventCntr	DINT	This register indicates number of times this module has experienced a detected device error (Unit: h). This value does not include detected device errors which prevent the saving or corruption of the non-volatile memory.
ContactorCycleCntr	DINT	This register indicates number of times the contactor has been commanded to the closed state from the open state.
ContactorCycleCntr_O	BOOL	This register indicates **overflow** number of times the contactor has been commanded to the closed state from the open state.
DevicePowerCycleCntr	DINT	This register indicates number of times the device has been powered on.
DevicePowerCycleCntr_O	BOOL	This register indicates **overflow** number of times the device has been powered on.
SafeStopCntr	DINT	This value indicates the number of mirror relay operations.
SafeStopCntr_O	BOOL	This value indicates the **overflow** number of mirror relay operations.
MaxIRMS	DINT	This register indicates that maximum current the device has measured in its lifetime. (Unit: 100 mA)
AvgIRMS	DINT	Lifetime average current measured by the device (Total Current/Time Current ON). (Unit: mA)
AvgIRMS_O	BOOL	Lifetime average current measured by the device (Total Current/Time Current ON) **overflow** value. (Unit: mA)
MaxAvgVRMS	DINT	This register indicates maximum voltage the device has measured in its lifetime. (Unit: V)
AvgVRMS	DINT	Average Vrms voltage on three phases. (Unit: V)

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As standards, specifications, and design change from time to time, please ask for confirmation of the information given in this publication.

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