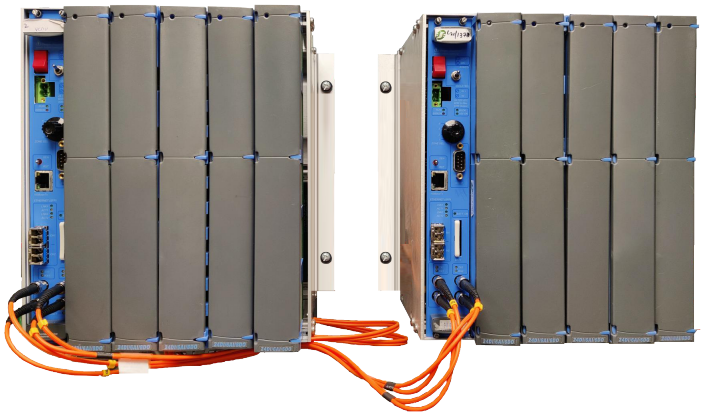
Foxboro™ DCS

Electrodynamic Controller (EDC6000)

PSS 41S-2EDC

Product Specification

February 2025



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Overview

The EcoStruxure™ Electrodynamic Controller (EDC6000) is a control station that is part of the EcoStruxure Power and Process Control System 2.0, which bridges the EcoStruxure Foxboro™ Distributed Control System (DCS) and external high-speed electrical networks that support the EcoStruxure Power Automation System (EPAS).

The EcoStruxure Power and Process Control System combines the process control domain and the electrical control domain, allowing operators to see conditions that might compromise the electrical distribution network before a process is started and identify how power management applications, such as Intelligent Fast Load Shedding (iFLS), might impact a process. The Electrodynamic Controller is at the center of this system, facilitating the integration of power systems, process systems, and Intelligent Electronic Devices (IEDs).

Device integration includes interfacing IEDs, gathering IED data, and sending that data to user interfaces (UI). During this process, the Electrodynamic Controller performs internal regulatory, logic, timing, and sequential control, supports alarm detection and notification, and allows for sequence of events (SOE) notification. The Electrodynamic Controller also acts as a compound block processor, integrates with multi-protocol data feeds, and incorporates key power load control and integration strategies.

The Electrodynamic Controller can be used in both simplex and high availability configurations. While these configurations provide similar monitoring and control functionality, high availability also provides redundant control mechanisms that support Foxboro DCS Control Network redundancy and various forms of electrical network redundancy. High availability also allows for softwired load management on the DCS through TCP/IP connectivity instead of hardwired input/output (I/O).

The Electrodynamic Controller requires a host workstation with Foxboro DCS Control Core Services software v9.7 and Control Software v7.5, and it is configured and deployed to standard Foxboro SCADA™ SCD6000 hardware.

For information on how the Electrodynamic Controller is installed and configured, see *EcoStruxure™ Electrodynamic Controller User's Guide* (B0700JB).

For information on the cybersecurity approach, see *EcoStruxure™ Foxboro™ SCADA SCD6000 Cybersecurity User's Guide* (B0780ES) and *EcoStruxure™ Foxboro™ DCS Cybersecurity Reference Guide* (B0700HZ).

Features

- Supports up to 214 low voltage (LV) Modbus devices or up to 59 medium voltage (MV) IEC 61850 devices (including 8 Intelligent Fast Load Shedding (iFLS) and Generator Management System (GMS) controllers) and 22 LV Modbus devices, and up to 8,000 I/O blocks.
- Supports select Foxboro DCS control blocks. This includes CALCA block application support for custom logic sequences and state machines within the DCS domain. For more information, see *EcoStruxure™ Foxboro™ DCS Integrated Control Block Descriptions for Electrodynamic Controller Reference Guide* (B0700JA).
- Supports high availability configurations that can help maintain the ability to monitor and control LV and MV devices, monitor hardwired I/O data, and help prevent data and control loss when an event occurs in the system.
- Supports the integration of EcoStruxure Power Automation System intelligent Fast Load Shedding (iFLS), which helps stabilize the MV network by shedding load if there is a sudden loss of spinning reserve capacity. As part of this system, the Electrodynamic Controller sends required data to the iFLS controller and subscribes load inhibit signals to process control strategies.
- Supports State and Logic Language (SALL) to implement individual control and data processing logic, which supports control queues, accumulated points, floating point arithmetic, local vector array programming, and more. For more information on the SALL functions that the Electrodynamic Controller supports, see *EcoStruxure™ Foxboro™ SCADA RTU Programming: State and Logic Language (SALL) Reference Guide* (B0780DK).
- Supports Intrinsic Database Functions (IDF) to provide data-driven infix functions for simple logical relations between database points and deriving new results. These functions are configured as part of the integrating database on the electrical side. For more information, see *EcoStruxure™ Foxboro™ SCADA Intrinsic Database Functions (Foxboro SCADA Remote Devices and RTU50) User's Guide* (B0780DR).
- Supports array-based reference types for group control processing and interaction within state machines.
- Supports diagnosing communication link issues with Ethernet and without physically disrupting device interfaces. For more information, see *EcoStruxure™ Foxboro™ SCADA RTU Station, RTV, and RTU Connect Secure Software* (PSS 41S-2S6KSWR).
- Supports multiple types of LV and MV Modbus and IEC 61850 devices (softwired I/O). For more information, see Validated Devices, page 34.
- Integrates hierarchical vertical and horizontal IEC 61850 for both Integrated Control and Safety System (ICSS) and Energy Management and Control System (EMCS) domains.
- Supports IEC 61850 server for LV and EMCS republication, and IEC 61850 client for MV and Distributed Control System (DCS) republication.
- Supports hardwired I/O for these modules:
  - 4 Channel Analog Output Module (SY-60399016R)
  - Multi Input Output Module 48 V 8 Mini Pilot Relay (SY-0399094R)
  - Multi Input Output Module 129 V DI, 8 Mini Pilot Relay (SY-0399095R)
- Supports online upgrades, which allows you to update Electrodynamic Controller pairs in high availability configurations with new firmware and configuration files without interrupting system operations.
- Performs regulatory, logic, timing, and sequential control internally.
- Performs data acquisition and alarm detection and notification.
- Supports force I/O functionality, in which you can override, or force, the input value of an I/O point in the Electrodynamic Controller.

- Supports service in/out functionality, which allows you to change the service status of an IED to in or out, which enables (Service In) or disables (Service Out) communication between the Electrodynamic Controller and an IED. In high availability configurations, the service states are synchronized between the active and standby controllers.
- Supports Automatic Transfer Switch (ATS) functionality to help control electrical distribution. The Electrodynamic Controller receives ATS data from the ATS IED and provides that data to the control network, it also receives ATS control requests from the DCS operator, then sends those requests to the ATS IED for execution.
- Supports self-hosting mode, which allows the Electrodynamic Controller to boot itself with a hosted control database even without its host workstation being online.
- Connects to the control network via standard fiber optic 100 Mbps Ethernet cables.
- DNV certified for quality and interoperability of IEC 61850 devices and implementations.
- CE certified for field mounting in enclosures.
- Uses versatile control algorithms to provide control capabilities for a broad range of process and electrical applications.
- Supports time synchronization using external time from Simple Network Time Protocol (SNTP) servers. A Meinberg time server can retrieve GPS time from the Foxboro DCS.
- Certain EDC6000 hardware modules are certified for marine environments when they are installed in a suitably modified G128 enclosure. For more information on the required enclosure, contact your local Schneider Electric sales office.

Dual-Ported Controller

The Electrodynamic Controller is a dual-ported controller, which allows it to simultaneously interact on both the control network and electrical network. At the same time, the Electrodynamic Controller is able to consistently publish data in the relevant protocol, for example Modbus or IEC 61850. These multi-functional features help reduce the need for cascaded gateways and protocol converters.

On the control network side, the Electrodynamic Controller’s communications are regulated by the Block Processor Cycle (BPC) times and phases. On the electrical network side, the controller’s communications are event-driven to align with various protocols. The fast, asynchronously coupled control ports help enable low-latency communications through the control database according to the rules and states of each protocol.

Compatible Ethernet Protocols

The Electrodynamic Controller communicates with IEDs that support these Ethernet protocols:

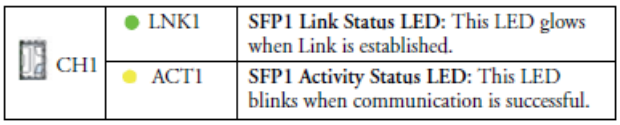
- IEC 61850 Edition 2.1 (client and server)
- IEC 61850 GOOSE publisher and subscriber
- Modbus TCP client
- Role-based Access Diagnostic Utility over TCP/IP
- SNTP (client and server)

Fiber Optic Communications

The Electrodynamic Controller supports both half- and full-duplex Ethernet communications. Dual 100 Mbps fixed SFP ports support 100Base-FX. They provide a cost-effective and versatile fiber-optic Ethernet interface, which maintains high electrical isolation characteristics. Diagnostic LEDs provide link and activity indications for each fiber optic channel.

The 100Base-FX option is the 100 Mbps fiber link IEEE 802.3 Ethernet standard. Each fiber optic channel uses 1310 nm wavelength. You can use either the 50/125 µm or the 62.5/125 µm multi-mode cable (2000m).

Figure 1 - Example Fiber Optic Channel



Time Synchronization

The Electrodynamic Controller supports SNTP v4 for time synchronization. Its time is updated by the SNTP client and server, depending on how the time synchronization architecture is configured.

Time stamping is used for alarm messages, values sent to the Historian, and optionally for the input data from the field when received from the field devices that cannot support time stamping.

Although the Electrodynamic Controller supports time synchronization using an externally maintained optional source of Universal Coordinated Time (UTC) from GPS satellites, for EcoStruxure Power and Process Control Systems we recommend using a Meinberg SNTP server that sources time from a GPS time signal on the Foxboro DCS. The GPS antenna is connected to a Master Timekeeper (MTK), which feeds time data to the electrical network via the Meinberg server. This method helps ensure that all systems receive common time synchronization.

In high availability configurations, the Electrodynamic Controller can act as a client, server, or both client and server. If the Electrodynamic Controller acts as a client, the active controller receives time data from the server. The active controller synchronizes to the standby controller using the OptoNet protocol. If the Electrodynamic Controller acts as an SNTP server, the active controller updates the time to the LV IEDs.

SNTP time synchronization sets coordinated universal time (UTC) time in the Electrodynamic Controller. The UTC offset is used for alarm time stamping, SOE time stamping, station block displays, or calculating the last checkpoint time. Although RTV always displays time without UTC offset, the UTC offset time can be found within the SMON dialog in System Manager. For information about configuring UTC in the Electrodynamic Controller, see *EcoStruxure™ Foxboro™ SCADA RTU Station (Foxboro SCADA Remote Devices and RTU50) User's Guide* (B0780DQ).

For more information about time synchronization, see *EcoStruxure™ Foxboro™ DCS Time Synchronization User's Guide* (B0700AQ). For information about configuring the Electrodynamic Controller for time synchronization, see *EcoStruxure™ Foxboro™ SCADA RTU Station (Foxboro SCADA Remote Devices and RTU50) User's Guide* (B0780DQ) and *EcoStruxure™ Foxboro™ SCADA TCP/IP (Foxboro SCADA Remote Devices and RTU50) User's Guide* (B0780DN).

Control Features

The Electrodynamic Controller performs regulatory, logic, timing, and sequential control, as well as data acquisition, alarm detection, and alarm notification. The controller supports Foxboro DCS control block strategies, hardwired I/O and softwired I/O (IEC 61850 and Modbus) data, and Intrinsic Database Functions (IDF) and State and Logic Language (SALL) data.

On the Foxboro DCS control network side, process variables are controlled using algorithms contained in functional Foxboro DCS control blocks, which can be used to implement control strategies. A strategy consists of one or more interconnected blocks and I/O variables that help connect the strategy to other control elements. A strategy can also include other strategies connected to blocks or other embedded strategies via their I/O variables. This interconnectivity also allows for peer-to-peer block interaction over the control network.

A strategy is assigned to a compound, which is then assigned to a controller. After the strategies have been configured, the compound and the blocks in the strategy are deployed to the control environment. The Electrodynamic Controller supports a limited block set, which allows for extensive analog and discrete functions that are implemented with the CALCA block. Common applications include start-stop strategies with interlock timer integrators, differentiators, and basic load sequencing logic. In an EcoStruxure Power and Process Control System, the Electrodynamic Controller hosts blocks that help transfer data to the DCS, while the FCP280 hosts blocks that support control logic.

For more information on Electrodynamic Controller-supported blocks, see *EcoStruxure™ Foxboro™ DCS Integrated Control Block Descriptions for Electrodynamic Controllers (EDC6000) Reference Guide* (B0700JA).

On the LV Modbus network and hardwired I/O sides, the Electrodynamic Controller supports hardwired and softwired I/O data, as well as IDF and SALL logic engines. The IDF engine provides predefined functions for control and data processing logic, while SALL implements individual control and data processing logic. The SALL environment is a structured text language that helps handle the segmented logic required in electrical control systems. Key features of using SALL include a control queueing, which allows controls to be queued and executed as a set, accumulated points, floating point arithmetic, local vector array programming, and timers for type logic delays and callbacks.

The Electrodynamic Controller stores and checks control blocks and strategies based on the deployed configuration, while it also retrieves and processes hardwired I/O, softwired I/O, IDF, and SALL data. The controller's execution engine processes and executes the deployed strategies and controls via a protocol or hardwired output.

For more information on SALL and the features that the Electrodynamic Controller supports, see *EcoStruxure™ Foxboro™ SCADA RTU Programming: State and Logic Language (SALL) Reference Guide* (B0780DK). For more information on IDF, see *EcoStruxure™ Foxboro™ SCADA Intrinsic Database Functions (Foxboro SCADA Remote Devices and RTU50) User's Guide* (B0780DR).

The Electrodynamic Controller also supports self-hosting mode, which allows the device to start up, run, and execute its configured control scheme using the checkpoint file stored in flash memory. This allows the controller to boot itself with a hosted control database even if its host workstation is not present.

Overriding Point Values with Force I/O

Using RTV, you can override or force the input value of an I/O point in the Electrodynamic Controller. Any input point within the controller database can be forced or unforced. Forcing I/O values can be beneficial in many scenarios. For example, during the commissioning process, you can force values to simulate

equipment that has not yet been connected so that you can evaluate how the strategy or system behaves.

In high availability configurations, this feature is available in the active controller only. Any changes made in the active controller are synched to the standby controller.

Applicable protocols include:

- Modbus Client
- IEC 61850 Client and Server
- SALL
- IDF
- Hardwired I/O

Applicable point types include:

- AI (Analog Input)
- DI (Digital Input)
- DISOE (Digital Input Sequence of Events)
- PackedIn (Packed Input)
- FPAi (Function Point Analysis Indicative)

For more information on point types and how to force values, see *EcoStruxure™ Foxboro™ SCADA Remote Terminal Viewer (Foxboro SCADA Remote Devices and RTU50) User's Guide* (B0780DY).

Changing IED Service Status

Using RTV, you can change the service status of an IED to in or out, which enables (Service In) or disables (Service Out) communication between the Electrodynamic Controller and an IED.

In high availability configurations, this feature is available in the active controller only. All service in/out statuses set in the active controller are synched to the standby controller when it resets.

Applicable protocols and functions include:

- IEC 61850 Client and IEDs
- IEC 61850 IEDs
- Modbus Client

This feature can be accessed in several ways:

- From a device group in RTV. This controls service to/from a group of IEDs.
- From a single device in RTV. This controls service to/from a single IED.
- From a service point. This controls service to/from IEDs using OM objects (COUT block).

  For more information on configuring blocks for the Electrodynamic Controller, see *EcoStruxure™ Foxboro™ DCS Integrated Control Block Descriptions for Electrodynamic Controller Reference Guide* (B0700JA). For more information on deploying blocks, see *EcoStruxure™ Foxboro™ DCS Control Database Deployment User's Guide* (B0750AJ).
- From a SALL equation.

  See *EcoStruxure™ Foxboro™ SCADA RTU Programming: State and Logic Language (SALL) Reference Guide* (B0780DK).
- From an IDF equation.

  See *EcoStruxure™ Foxboro™ SCADA Intrinsic Database Functions (Foxboro SCADA Remote Devices and RTU50) User's Guide* (B0780DR).

When a device's service is changed to **Out**, its health is indicated as **Bad**. When a device's service is changed to **In**, its health is indicated as **Good**.

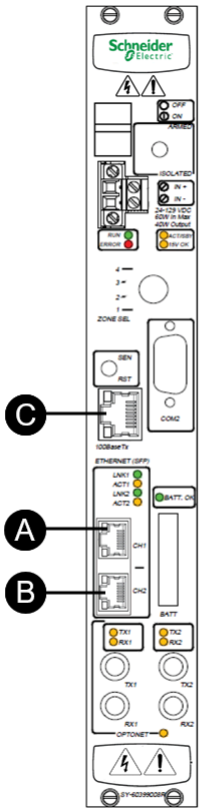
For more information on service in/out, see *EcoStruxure™ Foxboro™ SCADA Remote Terminal Viewer (Foxboro SCADA Remote Devices and RTU50) User's Guide* (B0780DY).

Electrodynamic Controller Communication and Configurations

The Electrodynamic Controller supports various communication protocols and network configurations to connect with supported field devices. The controller is connected directly to field devices via an Ethernet channel interface, to another Electrodynamic Controller, or to other Foxboro DCS controllers, such as FCP280 and FDC280, via control network Ethernet channels. The Electrodynamic Controller supports peer-to-peer connectivity with Foxboro DCS controllers.

These Electrodynamic Controller Ethernet channels can be configured for communications:

Figure 2 - Electrodynamic Controller Ethernet Channels

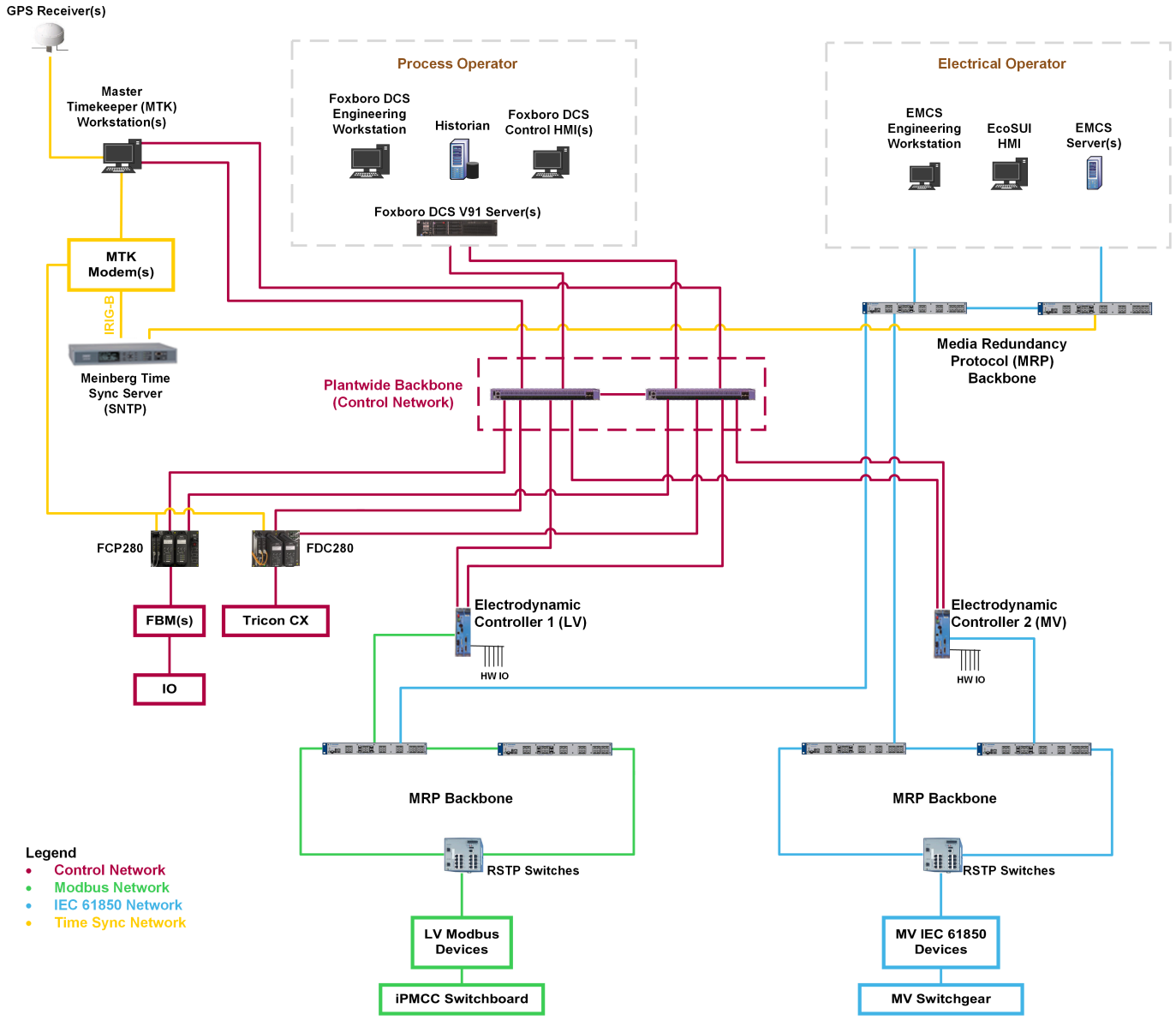


Channel	Description
A and B	• Channel A and Channel B are redundant and used for Foxboro DCS Control Network communications. • Use fiber SFP modules (SY-6038090) to establish communication with the control network. • Share diagnostics data via Remote Terminal Viewer (RTV).
C	• Supports IEC 61850 and Modbus TCP protocols for communication with IEDs and SNTP protocol for time synchronization. • Allows the active and standby controllers to communicate and synchronize data, including diagnostics. • Share diagnostics data via RTV.

Simplex Electrodynamic Controller Configuration

A single Electrodynamic Controller can support simplex monitoring and control mechanisms. A simplex configuration can support the monitoring and control of plants that can be separated into distributed components or of systems that do not require the standards of a high availability configuration.

Figure 3 - Simplex Electrodynamic Controller Configuration



A unique letterbug and MAC address is assigned to each Electrodynamic Controller to identify or detect the controller in the control network.

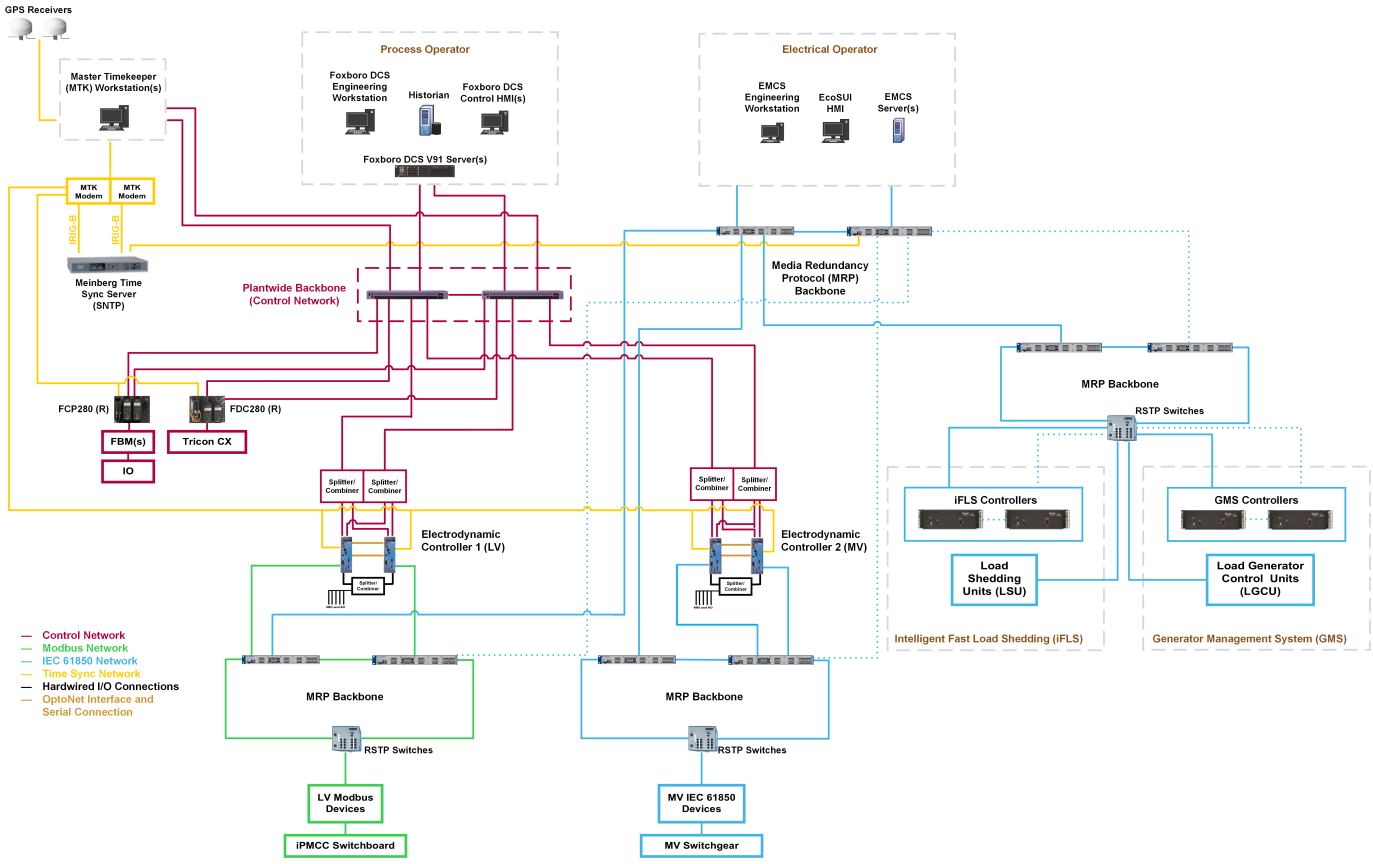
High Availability Electrodynamic Controller Configuration

A pair of Electrodynamic Controllers, one active and one standby, in a high availability configuration can support redundant control mechanisms. A high availability configuration can help maintain the ability to monitor and control LV and MV devices, monitor hardwired I/O data, and help prevent data and control loss when an event occurs in the system.

In this configuration, the Electrodynamic Controller pairs have a dual connection to the control network via splitter/combiners so that the controllers can share all DCS related data. On the LV Modbus side, the controllers collect device data using a hot-warm architecture approach. On the MV IEC 61850 side, the controllers collect device data using a hot-hot architecture approach. On the hardwired I/O side, the controllers use splitter/combiners to integrate local hardwired I/O. For more information on these operations, see High Availability Operations, page 14. The controllers also support SNTP time syncing, intelligent fast load shedding, and generator management systems.

For information on the cybersecurity architecture, see *EcoStruxure™ Foxboro™ SCADA SCD6000 Cybersecurity User's Guide* (B0780ES) and *EcoStruxure™ Foxboro™ DCS Cybersecurity Reference Guide* (B0700HZ).

Figure 4 - High Availability Electrodynamic Controller Configuration



A unique MAC address is assigned to each Electrodynamic Controller and a unique letterbug is assigned to each Electrodynamic Controller pair to identify or detect the controllers in the control network.

Controller Synchronization and Switchover

A high availability configuration includes at least one pair of Electrodynamic Controllers. The active controller is the primary controller that manages LV and MV subsystem automation. The active controller monitors and controls devices, monitors the I/O, and synchronizes with the standby controller. The standby controller is the backup controller that takes over and maintains operations when the active controller is not operational. This redundant operation helps prevent data and control loss when an event, for example, a controller is unavailable, occurs within the system.

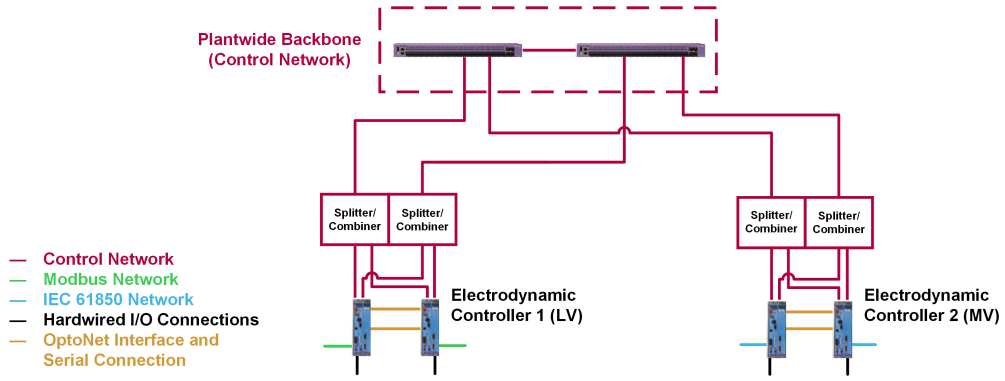
To determine which controller is in active mode and which controller is in standby mode, the controllers communicate over high-speed, point-to-point communication interfaces. This communication is based on diagnostics data that indicates whether or not each controller is operational. The standby controller monitors the health of the active controller every 330 milliseconds (ms) and IEDs every 500ms by sending diagnostic messages. All diagnostics data, which includes cable statuses, OptoNet and serial communication interface status, overall health status, and equipment information, is periodically synchronized between the active and hot standby controllers. The active controller reports this data to System Manager and Remote Terminal Viewer (RTV).

Data synchronization helps ensure redundancy so that the standby controller can take over for the active controller at any time. The types of data that are synchronized include real-time, SOE, I/O, and other communications structure data. The takeover process can also be called a switchover. If either controller goes offline, the controller reboots and synchronizes using a cold recovery mechanism over Channel C.

High Availability Operations

Control Network

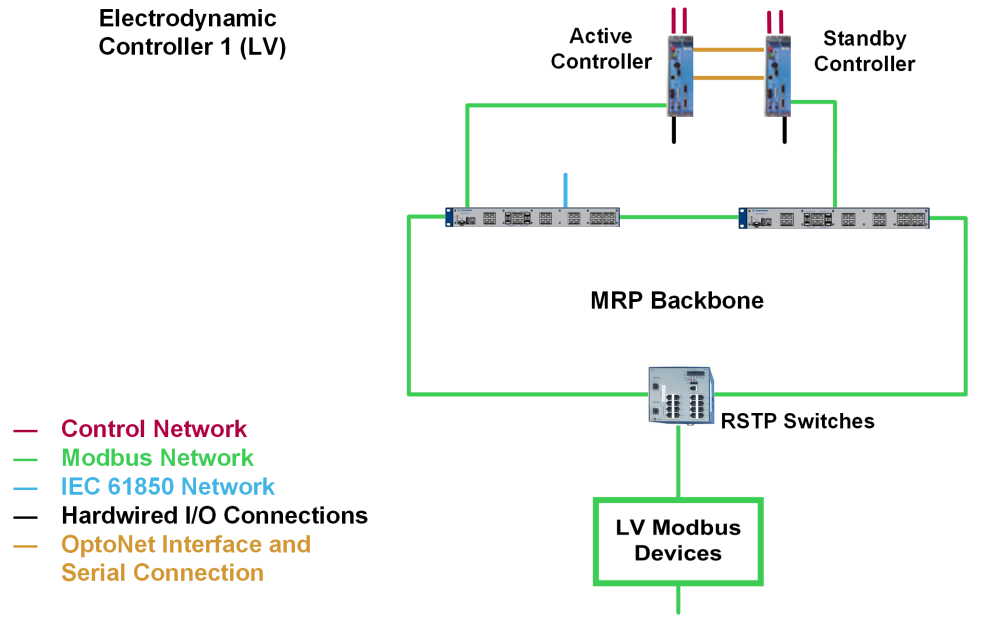
Figure 5 - Foxboro DCS Control Network Configuration



On the Foxboro DCS control network side, the active controller continuously synchronizes all data with the standby controller over the OptoNet. Synchronization data includes all data associated with DCS related objects and communications structures, such as Object Manager (OM) messages, SOE and alarms, application processor information (including block information), and SMAT database for System Monitor connection.

LV Modbus Network

Figure 6 - LV Modbus Configuration

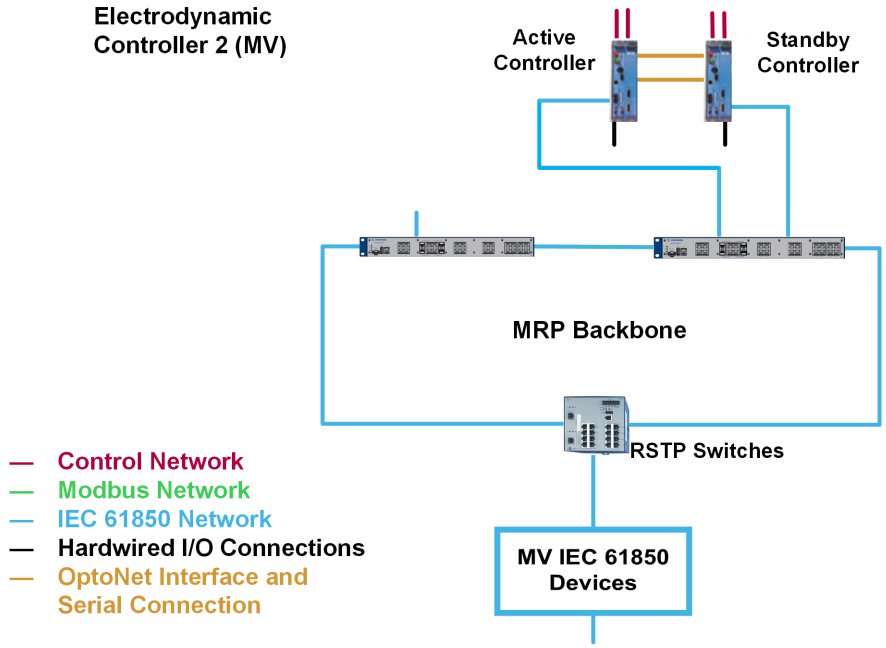


The LV Modbus device data is collected using a hot-warm architecture approach. The active controller sends control functions to and collects input from the LV Modbus devices. The standby controller is connected to the IEDs, but it does not send control functions or collect input. The active controller synchronizes the LV Modbus data to the standby controller. Under normal operation, the active and standby controllers

each maintain a TCP connection to the LV devices, and the LV devices simultaneously support multiple clients.

MV IEC 61850 Network

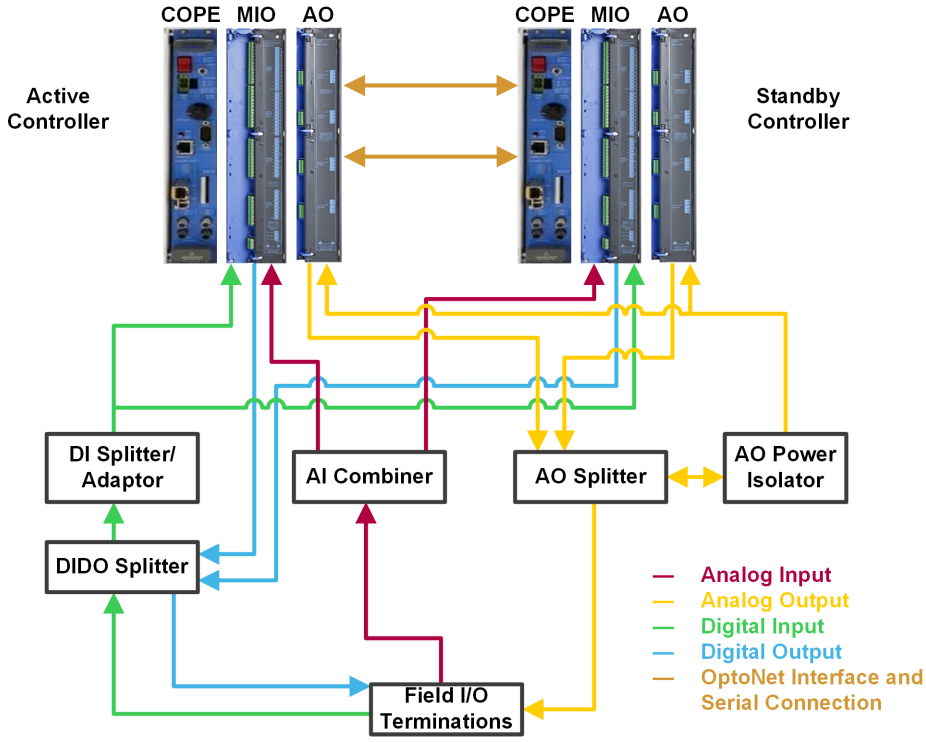
Figure 7 - MV IEC 61850 Configuration



The MV IEC 61850 device data is collected using a hot-hot architecture approach. Both the active and standby controllers are fully functional for functional data updates, however the standby controller cannot execute controls. Because both controllers are concurrent and subscribed to the same time-stamped data, the data can be collected and subscribed concurrently. The controllers do not have to synchronize data.

Hardwired I/O Network

Figure 8 - Hardwired I/O Configuration



High availability is also established for Multi Input Output (MIO) and Analog Output (AO) modules, which integrate local hardwired I/O. Both the active and standby controllers receive analog input, digital input, and SOE data. Only the active controller scans the received data, then it synchronizes the data to the standby controller over the serial connection. Active and standby controllers execute controls, then the splitter/combiner combines those controls and issues them to the field devices. If one module in the active controller is inhibited, and all configured modules in the standby controller are functional, the standby controller takes over for the active controller.

For more information on I/O modules, see Input/Output (I/O) Modules, page 23.

For more information on splitter/combiners and cabling, see Splitter/Combiner Equipment for Hardwired I/O in High Availability Configurations, page 32.

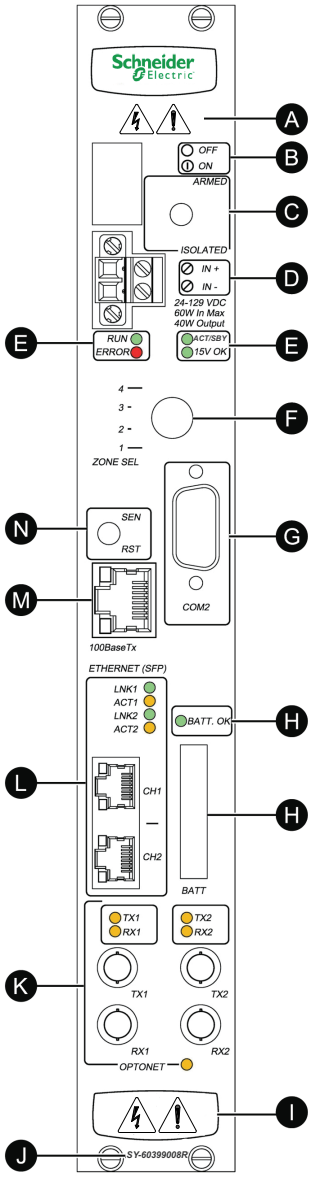
Hardware Components

CPU Modules

Module	Part Number	Memory
SCD6000 COPE TYPE II	SY-60399008R	1 GB DDR3
SCD6000 COE TYPE II	SY-60399009R	1 GB DDR3

For more information on these modules, see *EcoStruxure™ Foxboro™ SCADA SCD6000 Hardware User's Guide* (B0780DW).

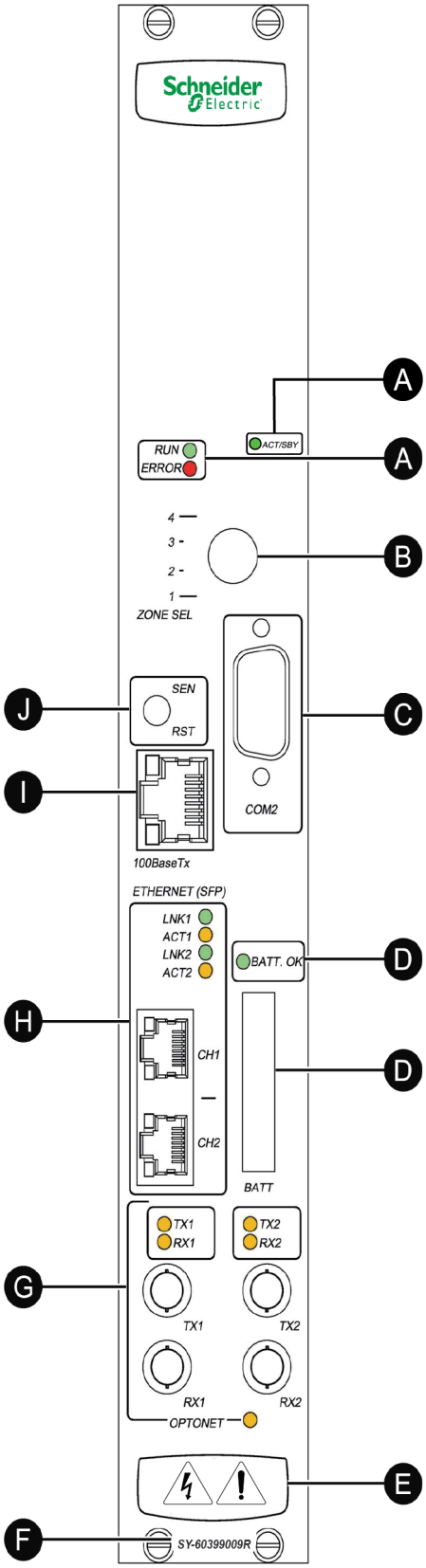
Figure 9 - SCD6000 CPU COPE Module (SY-60399008R)



SY-60399008R

A	Safety Labels
B	ON/OFF Switch
C	Control Isolate Switch (Isolated/Armed)
D	Power Supply Terminals
E	Diagnostic LEDs (for more information, see Indication LEDs, page 20 and Active/Standby (ACT/SBY) LED Status for High Availability Configurations, page 20)
F	Control Zone 4-position Zone Sel Switch
G	Serial (COM2) Communication Port (High Availability Interconnection Port)
H	Clock Battery and Backup Battery OK Indication
I	Safety Labels
J	Part Identification Number (SY-60399008R)
K	OptoNet Port 1 and Port 2 (High Availability, High Speed Connectivity Port)
L	Dual Ethernet Ports (Channel A and channel B connections to the control network)
M	Diagnostic Ethernet Interface on RJ-45 Connector (Channel C connection to electrical network)
N	Sense/Reset Momentary Toggle Switch

Figure 10 - SCD6000 CPU COE Module (SY-60399009R)



SY-60399009R

A	Diagnostic LEDs (see Indication LEDs, page 20 and Active/ Standby (ACT/SBY) LED Status for High Availability Configurations, page 20)
B	Control Zone 4-position Rotary Switch
C	Serial (COM2) Communication Port (High Availability Interconnection Port)
D	Clock Battery and Backup Battery OK Indication
E	Safety Labels
F	Part Identification Number (SY-60399009R)
G	OptoNet Port 1 and Port 2 (High Availability, High Speed Connectivity Port)
H	Dual Ethernet Ports (Channel A and channel B connections to the control network)
I	Diagnostic Ethernet Interface (Channel C connection to electrical network)
J	Sense/Reset Momentary Toggle Switch

Table 1 - Indication LEDs

Indication	Status	Description
● RUN (green) ○ ERROR	RUN ON ERROR OFF	The CPU started normal operations
○ RUN ● ERROR (red)	RUN OFF ERROR ON	The CPU is in the reset condition at an incomplete initialization stage or in bootstrap mode
● 15V OK	ON	The +15 V and –15 V regulated power supply rails are within their under voltage limits
● ACT/STBY	See Active/Standby (ACT/SBY) LED Status for High Availability Configurations, page 20.	

Table 2 - Active/Standby (ACT/SBY) LED Status for High Availability Configurations

Operating State	Active Controller	Standby Controller
During power ON	ON	ON
Loading and active/standby role determination process (immediately after power ON)	Fast blink (200ms on, 200ms off)	Fast blink
Active/standby role determined, normal operation	ON	Slow blink (1s on, 1s off)
Reset standby controller through Remote Terminal Viewer (RTV)	ON	Fast blink

Table 2 - Active/Standby (ACT/SBY) LED Status for High Availability Configurations (Continued)

Operating State	Active Controller	Standby Controller
Reset active controller through RTV	Fast blink	ON
Switchover in progress	ON	Fast blink
After switchover, active controller might be unavailable	Slow blink	ON
In manual bootstrap	ON	ON
In auto bootstrap	ON	ON

SFP Module and Splitter/Combiner for Control Network

Module	Part Number
100Base-FX Small Form-Factor Pluggable (SFP) Module	SY-6038090
Splitter/Combiner Installation Components Kit (for control network):	P0926MX
Splitter/Combiner Case	P0926MY
Splitter/Combiner	P0926AH
Screw, M4 x 15mm Pan Head	X0179LJ
Spring Clip	X0175GD
Washer, Lock	X0143SB
Screw, 10–32x1/2 Hex Cap	X0133YF

100Base-FX is the 100 Mbps fiber link IEEE 802.3 Ethernet standard. Each fiber optic channel uses 1310 nm wavelength. You can use either the 50/125 µm or the 62.5/125 µm multimode cable. For more information, see Switches and Cables for Control Network, page 32.

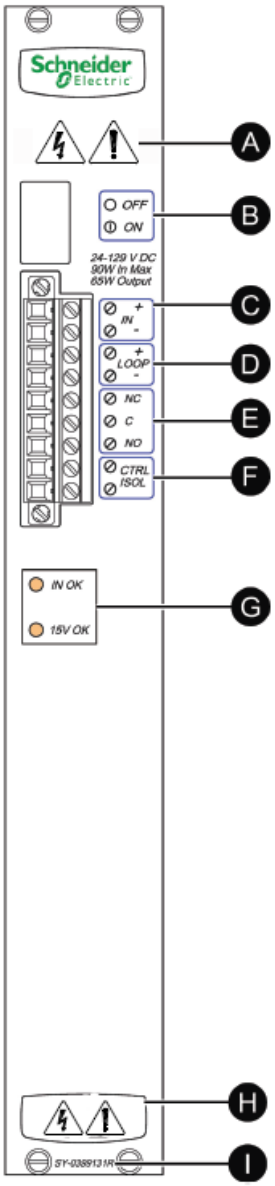
Power Supply Module

This optional, standalone power supply module can power the I/O modules and provide field supply in a 10-I/O module card file setup. These modules operate from 19.2 VDC to 148 VDC.

Module	Part Number
Wide Input Range Power Supply Module	SY-0399131R

For more information on this module, see *EcoStruxure™ Foxboro™ SCADA SCD6000 Hardware User's Guide* (B0780DW).

Figure 11 - SCD6000 Power Supply Module (SY-0399131R)



A	Safety labels
B	On/off switch
C	Power in terminals
D	Loop power terminals
E	System fail alarm contacts
F	Control isolate terminals
G	Diagnostic LEDs • (Green On): The input voltage is high enough for operation  • (Green On): The +15V and -15V outputs are above the under-voltage limit 
H	Safety labels
I	Part Identification Number (SY-0399131R)

Input/Output (I/O) Modules

For more information on these modules, see *EcoStruxure™ Foxboro™ SCADA SCD6000 Hardware User's Guide* (B0780DW).

Table 3 - Multi I/O Modules

Module	Part Number
24 Digital Input 48 V 6 Analog Input/8 Mini-Pilot Relay Output Module	SY-0399094R
24 Digital Input 129 V 6 Analog Input/8 Mini-Pilot Relay Output Module	SY-0399095R

Figure 12 - Multi Input/Output Module (24DI/6AI/8DO)

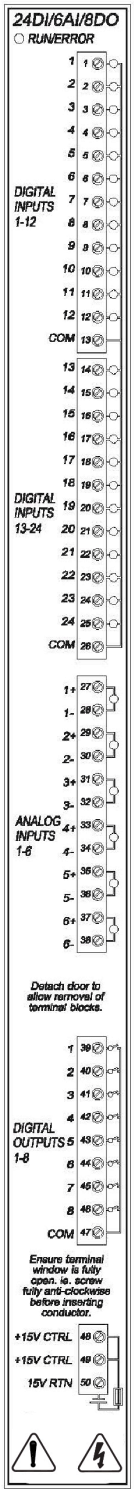


Table 4 - Analog Output

Module	Part Number
4 Channel Analog Output Module (for simplex configurations only)	SY-0399084R
4 Channel Analog Output Module for Electrodynamic Controllers [a]	SY-60399016R
[a] For more information on this module's operating modes, jumper settings, and connecting pins, see *EcoStruxure™ Foxboro™ DCS Electrodynamic Controller User's Guide* (B0700JB) and *EcoStruxure™ Foxboro™ SCADA SCD6000 Hardware User's Guide* (B0780DW).	

Figure 13 - 4 Channel Analog Output Module (4 AO)

Card Files

Type	Part Number	Description
10 I/O slot card file	SY-2003098R	The largest assembly, which consists of a 19-inch rack-mounted file with a CPU, Power Supply, and Ethernet (COPE) module and up to 10 I/O modules. This file supports one Electrodynamic Controller. For high availability configurations, use two 10 I/O card slot files.
2 x 5 I/O slot card file	SY-2003092R	Two 5 I/O slot backplanes in one ten I/O slot card file on a 19-inch rack. Each backplane has one COPE module and five I/O modules. For high availability configurations, use two 5 I/O card slot files.
1 I/O slot card file	SY-2003104R	Each backplane has one COPE module and one I/O module. This file supports one Electrodynamic Controller. For high availability configurations, use two 1 I/O slot card files.
6 x 1 I/O slot card file	SY-2003110R	Six 1 I/O slot backplanes in one ten I/O slot card file on a 19-inch rack. Each backplane has one COPE module and one I/O module. In high availability configurations, this card file can support up to three Electrodynamic Controller pairs.

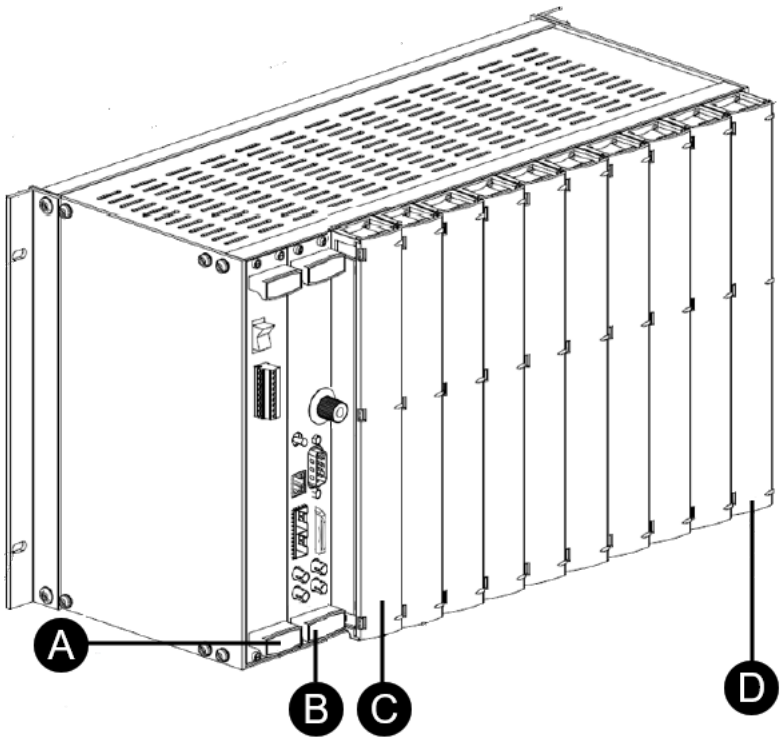
For more information on this SCD6000 hardware that can be used for the EDC6000, see *EcoStruxure™ Foxboro™ SCADA SCD6000 Hardware User's Guide* (B0780DW).

Ten I/O Slot Card File

The ten I/O slot card file is the largest assembly. It consists of a 19-inch rack mounted file with a CPU, OptoNet, Power Supply, and Ethernet (COPE) module, and up to ten I/O modules.

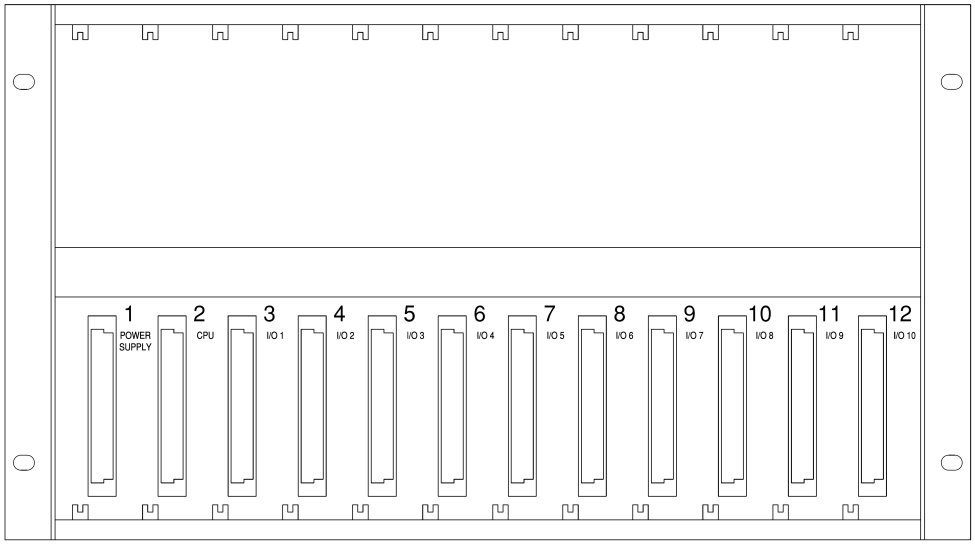
NOTE: The 19-inch ten I/O slot card file requires the Power Supply Modules (SY-0399131R) to power up appropriately.

Figure 14 - Ten-I/O Slot Card File Example



A	65W Power Supply Module in first slot
B	COE (CPU//OptoNet/Ethernet) Module in second slot
C	I/O Modules can go from slot 1 to slot 10
D	I/O Slot 10

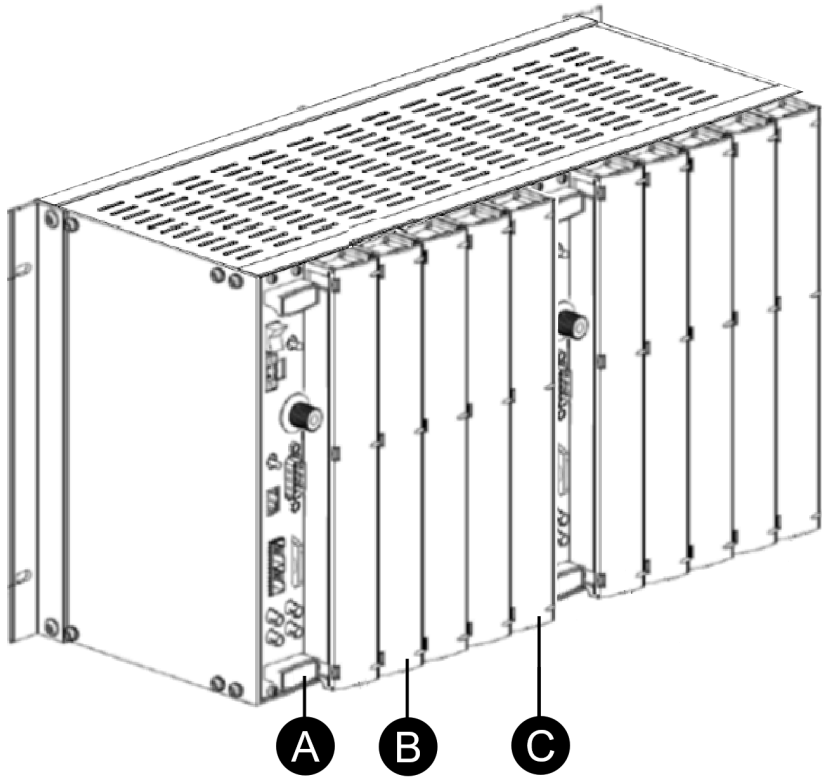
Figure 15 - Ten I/O Slot File SY-2003098R



2 x 5 I/O Slot Card File

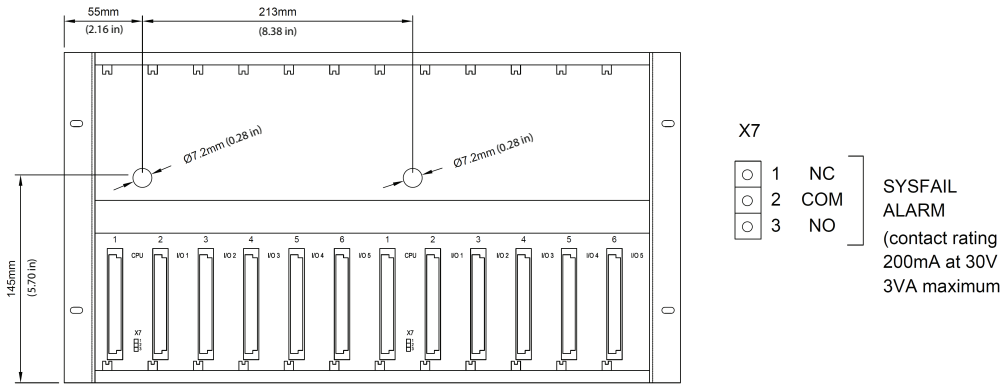
The 2 x 5 five I/O slot card file has two 5 I/O slot backplanes in one ten I/O slot card file. It supports two processors and includes 10 slots for I/O modules. For high availability configurations, use two 5 I/O card slot files.

Figure 16 - 2 x 5 I/O Slot File Example



A	COPE (CPU/Optonet/Power Supply/Ethernet) Module in first slot
B	I/O Modules (5 maximum)
C	I/O Slot 5

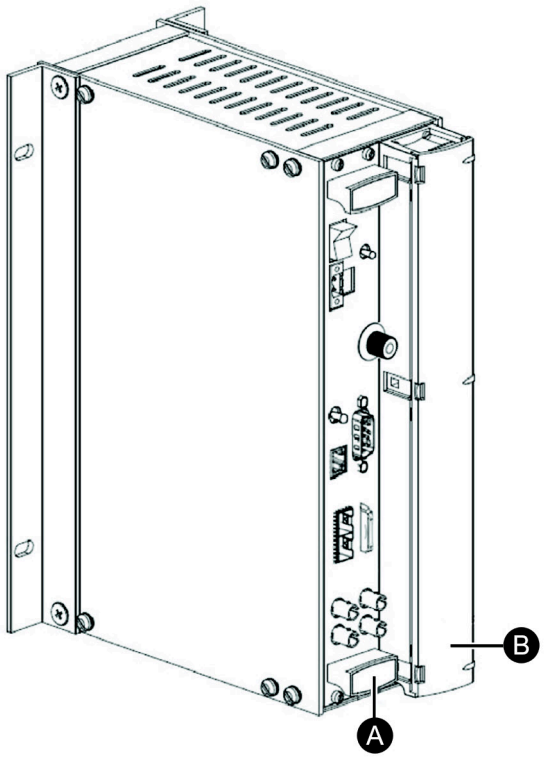
Figure 17 - 2 x 5 I/O Slot File SY-2003092R



One I/O Slot Card File

The one I/O slot card file has one processor slot and one slot for an I/O module.

Figure 18 - One I/O Slot File Example

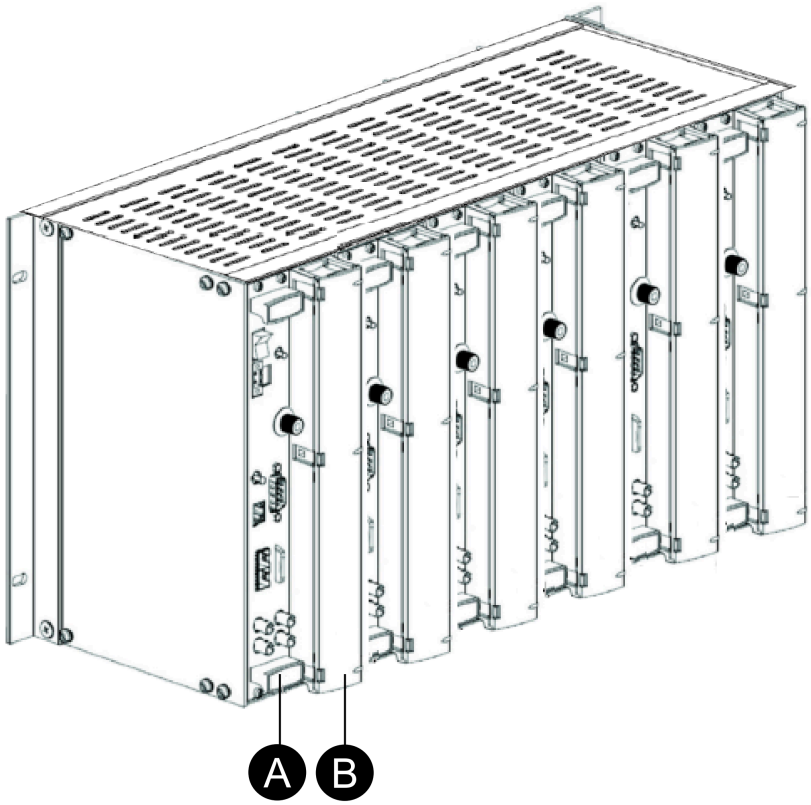


A	COPE (CPU/Optonet/Power Supply/Ethernet) Module in first slot
B	I/O Module

6 x 1 I/O Slot Card File

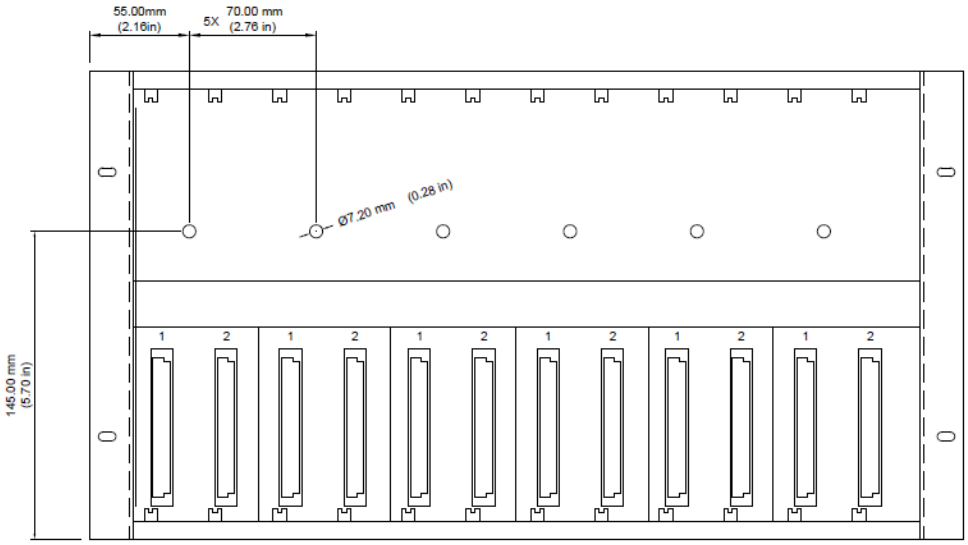
The 6 x 1 I/O slot file includes six 1 I/O slot backplanes in one ten I/O slot card file. Each backplane has one COPE module and one I/O module. It can support up to three high availability Electrodynamic Controller pairs.

Figure 19 - 6 x 1 I/O Slot File Example



A	COPE (CPU/Optonet/Power Supply/Ethernet) Module in first slot
B	I/O Module

Figure 20 - 6 x 1 I/O Slot File SY-2003110R



Switches and Cables for Control Network

To establish connections to the control network, use these switches and cabling:

Part Description	Part Number
Fiber optic cable from Electrodynamic Controller to splitter/combiner (0.25m) LC-LC (multimode or single mode)	RH972ZQ
Fiber optic cable from splitter/combiner (RH972ZQ) to switch (3m) LC-LC (multimode or single mode)	P0972TN
Fiber optic cable (MT-RJ to LC Cable) (multimode or single mode)	P0972TR
LC to LC fiber optic cable (15m) (multimode or single mode)	P0972TP
LC to LC fiber optic cable (50m) (multimode or single mode)	P0972TQ
Foxboro DCS control network switch (Extreme Switch x440)	RH102AP/RH102AN
24-port copper managed switch (x440G2-24t-GE4)	RH102AM
24-port fiber managed switch (x440G2-24fx-GE4)	RH102AN
12-port copper/8-port fiber (x440G2-12t8fx-GE4)	RH102AP

Splitter/Combiner Equipment for Hardwired I/O in High Availability Configurations

To maintain connections with hardwired I/O in high availability configurations, the Electrodynamic Controller uses these splitter/combiners and their associated parts:

Table 5 - MIO Module to Hardwired I/O Equipment

Part Description	Part Number
SCD6000 Splitter/Combiner HA MIO	SY-6006251
MIO DI Module “to Terminal” Cable	SY-6039060
MIO DI Module “to input SubBase” Cable	SY-6039060
MIO DI DIN Rail (160 mm)	Phoenix 1206599 (NS 35/15) or equivalent
Signal Splitter for AI Inputs	SUNYUANSZ DIN1X2 ISOEM A7-P1-O9O9(Current Output) or DIN1X2 ISOEM U5-P1-O7O7 (Voltage Output)
MIO AI Combiner DIN Rail (250 mm)	Phoenix 1206599 (NS 35/15) or equivalent
MIO DO Module "to Termination" Cable	Alpha Wire 5100C
Redundant Input Sub Base	SY-6006252

Table 6 - AO Module to Hardwired I/O Equipment

Part Description	Part Number
SCD6000 Splitter/Combiner HA AO	SY-6006253
AO Module to Terminal Cable (Active)	Belden 3084F
AO Module to Terminal Cable (Standby)	Belden 88641
AO Power Isolator	MEAN WELL DDR-15G-24
AO DIN Rail (160 mm)	Phoenix 1206599 (NS 35/15) or equivalent

High Availability Interconnection Cables

The OptoNet interface and serial connections allow the active and standby controllers to communicate, synchronize, and share data. To establish these connections, use this cabling:

Part Description	Part Number
HA Link 1 — OptoNet Cable (1m)	SY-6051037
HA Link 1 — OptoNet Cable (5m)	SY-6051034
High Speed Interconnect Cable (0.2m)	SY-6500176R
High Speed Interconnect Cable (0.5m)	SY-6500177R
High Speed Interconnect Cable (1m)	SY-6500178R
High Speed Interconnect Cable (5m)	SY-6500180R

Validated Devices

The Electrodynamic Controller has built-in control strategies for these devices:

- TeSys T Motor Management Controller
- LV Altivar Process ATV630
- MV Altivar Process ATV600
- ComPact NSX
- MasterPact™ MTZ (for Modbus and IEC 61850)
- PowerLogic™ P5M30 (Motor)
- PowerLogic P5V20 (Voltage)
- PowerLogic P5F30 (Feeder)
- PowerLogic P5U20 (Universal)
- PowerLogic P3T32 (Transformer)
- PowerLogic P3M32 (Motor)
- PowerLogic P3G32 (Generator)

The Electrodynamic Controller does not have built-in control strategies for these devices. However, the signals from these devices can be mapped to I/O blocks available in the Electrodynamic Controller so that the controller can read device data or write to devices:

- Easergy MiCOM P343
- PowerLogic PM Series (PM8243)
- PowerLogic ION9000 Series
- Uninterruptible Power Supplies (UPS) AC and DC supplies
- HVAC (hardwired monitored)

For other devices, you can define your control strategies based on I/O signals and requirements. The Electrodynamic Controller is interoperable with any Modbus or IEC 61850 device that is implemented to protocol standards.

Software Components

The software used to install, configure, and manage the Electrodynamic Controller includes:

Software	Description
RTU Software and Utilities version S and later	Includes RTU software executable files, RTU utility programs, embedded firmware for RTU I/O Modules, and release notes.
Remote Terminal Viewer (RTV)	A diagnostic and remote file management tool. RTV connects to multiple controllers through a Graphical User Interface (GUI) and presents a real-time view of the operation of each controller. For more information, see *EcoStruxure™ Foxboro™ SCADA Remote Terminal Viewer (Foxboro SCADA Remote Devices and RTU50) User's Guide* (B0780DY).
RTU Station	A configuration tool for Electrodynamic Controllers that runs under the Microsoft Windows® operating system. RTU Station supports configuration of hardware and protocols. For more information, see *EcoStruxure™ Foxboro™ SCADA RTU Station (Foxboro SCADA Remote Devices and RTU50) User's Guide* (B0780DQ).
RTU Connect Secure	A configuration tool used to implement a password-based authentication mechanism for the Electrodynamic Controller, which helps prevent unauthorized access to the controller through RTV. You can configure users and their privilege levels for Electrodynamic Controllers, then generate a Security Configuration File (SCF) with this information. After downloading the SCF file into Electrodynamic Controller through RTV, only authorized and authenticated users can access the controller. For more information, see *EcoStruxure™ Foxboro™ SCADA RTU Connect Secure (Foxboro SCADA Remote Devices and RTU50) User's Guide* (B0780DP).
EcoStruxure Power Automation System Engineering (EPAS-E) (formerly Grid Engineering Advisor (GEA))	An IEC 61850-based system specification and configuration tool used to design and configure multi-vendor protection automation and control systems. For information on using this tool, see the EPAS-E Online Help. To access the help, install the tool, open the application, and select the help feature, which opens in your browser
DBVU Tool	An inspection tool for controller checkpoint files. For more information on installing this tool for the Electrodynamic Controller (DBVUSCD), see *EcoStruxure Electrodynamic Controller User's Guide* (B0700JB).
Control Core Services (CCS) v9.7	The base software platform for the Foxboro DCS, it hosts Electrodynamic Controllers and other process controller types, such as FCP280 and FDC280, on the control network. For more information, see *Control Core Services v9.7 Release Notes* (B0700TN).
Control Software v7.5	Control Software includes: • Control HMI For more information, see *Control HMI User's Guide* (B0750AQ). • Control Editors For more information, see *Control Editors* (PSS 41S-10EDITOR). • Bulk Data Editor For more information, see *Bulk Data Editor User's Guide* (B0750AF).

Software	Description
System Definition v3.7	A configuration tool used to specify the components of a Foxboro DCS. It identifies all software to be installed and configured as part of the Foxboro DCS Control Core Services installation. System Definition produces Commit installation media that specifies the system configuration. Information from Commit media is also provided to the Control Editors and to RTU Station. For more information, see *System Definition User's Guide* (B0193WQ).
System Manager v2.16	A distributed application for monitoring the health and performance of the components of a Foxboro DCS Control Core Services system and managing network operations. For more information, see *System Manager User's Guide* (B0750AP).

For more information on the software used to configure and manage the Electrodynamic Controller, see Related Documents, page 50.

Functional Specifications

Processor Type	Control Processor: Dual core ARM® System on a Chip (SOC) with stored programs, using high-speed communication capability. Error Detection: Error correction code (ECC) providing single-bit error detection and correction as well as double-bit error detection.
Memory System	1 GB DDR3 SDRAM 16 MB Flash BIOS 64 MB Flash file storage 256 KB Non-volatile RAM
Process I/O Capacity for Single Electrodynamic Controller	214 LV Modbus devices or 59 MV IEC 61850 devices and 22 LV Modbus devices. Scan up to 8,000 objects.
Maximum Number of Foxboro DCS Blocks Configured	Supports a maximum of 8,000 blocks.
Maximum Number of DCS Blocks Processed	The number of blocks that can be processed per block processing cycle (BPC) time interval depends on scan periods and block type selection. These blocks include all types (for example, control blocks, compounds, data blocks).
Maximum Number of IPC Connections	• Controller source point and sink point connection: 35 source and 25 sink • Total IPC connections tested: 60 An IPC connection provides the means to exchange continuous process control information. A source point is defined as a connection to a destination device that can have data sourced by a given CP. A sink point is defined as an external point to which the Electrodynamic Controller can connect to acquire process control data.
Maximum Number of OM Sink Points	1,250 points for current tests The OM sink point limitations refer to the number of points that can be received from outside sources.
Maximum Number of OM Sink Lists	75 lists A sink list is a list of items to be delivered to a particular destination. These lists provide an efficient way to group updates to a given destination.
Maximum OM Scanner Database	28,000 maximum points 18,000 points/second, maximum rate of OM scanner change before ignition of throttling mechanism The Object Manager (OM) scanner database is the total of all points in the control scheme for which the Electrodynamic Controller is scanning and providing updates to other stations.
Configurable Block Periods in DCS	0.2, 0.5, 0.6, 1, 2, 5, 10, 30 seconds 1, 10, 60 minutes
Block Processing Cycle	0.2, 0.5 and 1.0 seconds, selectable at system configuration time
Internal Diagnostics	Self-checking performed at power-up. Run-time diagnostics performed during normal operations.

Power Consumption Specifications

For more information on power requirements, see *EcoStruxure™ Foxboro™ SCADA SCD6000 Hardware User's Guide* (B0780DW).

Table 7 - Power Supply Module Output Capacity

Power Supply		Output Capacity		
Part Number	**Description**	**+5 V**	**+15 V**	**-15 V**
SY-0399131R	65 W Power Supply Module	9.00	1.00	0.35
SY-60399008R	40 W Power Supply Module (optional power supply attached to COPE)	3.30	0.97	0.12

Table 8 - CPU Module Power Consumption Details

Modules		Output Capacity		
Part Number	**Description**	**+5 V**	**+15 V**	**-15 V**
SY-60399008R	CPU, OptoNet, PS, Ethernet (COPE) TYPE II ASSEMBLY	2.12	0.0056	0.015
SY-60399009R	CPU, OptoNet, Ethernet (COE) TYPE II ASSEMBLY	2.10	0.0016	0.0003

Table 9 - I/O Module Power Consumption Details

Modules		Output Capacity		
Part Number	**Description**	**+5 V**	**+15 V**	**-15 V**
SY-60399016R	4 Channel Analog Output Module	0.33	0.00	0.00
SY-0399094R	Multi IO 24DI 6AI 8DO 48 V	0.22	0.00	0.01
SY-0399095R	Multi IO 24DI 6AI 8DO 129 V	0.22	0.00	0.01

Environmental Specifications

	Operating	Storage
Temperature	-4°F to +158°F (-20°C to +70°C)	-40°F to +185°F (-40°C to +85°C)
Relative Humidity	5% to 95% (non-condensing)	5% to 95% RH (non-condensing)
Altitude	-300 m to +2,000 m (-1,000 ft to +6,500 ft)	
Vibration	1 g (10 Hz to 150 Hz)	
Shock	5 g (18 Pulses for 11 ms each)	
Bump	10 g (6000 Pulses for 16 ms each)	

Physical Specifications

Module Size	Each module is the size of a double Eurocard: • Board: 233.4 mm x 160 mm • Module: 261.8 mm x 185 mm x 35.3 mm
Connection	Plugs into a backplane (Electrobus) using a DIN 41612 connector.
Required Frame Space	35 mm
Carrier Board Dimensions	160 mm x 145.48 mm ±0.2 mm
Power Supply Board Dimensions	160 mm x 85.7 mm ±0.2 mm

Dimensions

Figure 21 - Ten I/O Slot File Rear Mount Dimensions

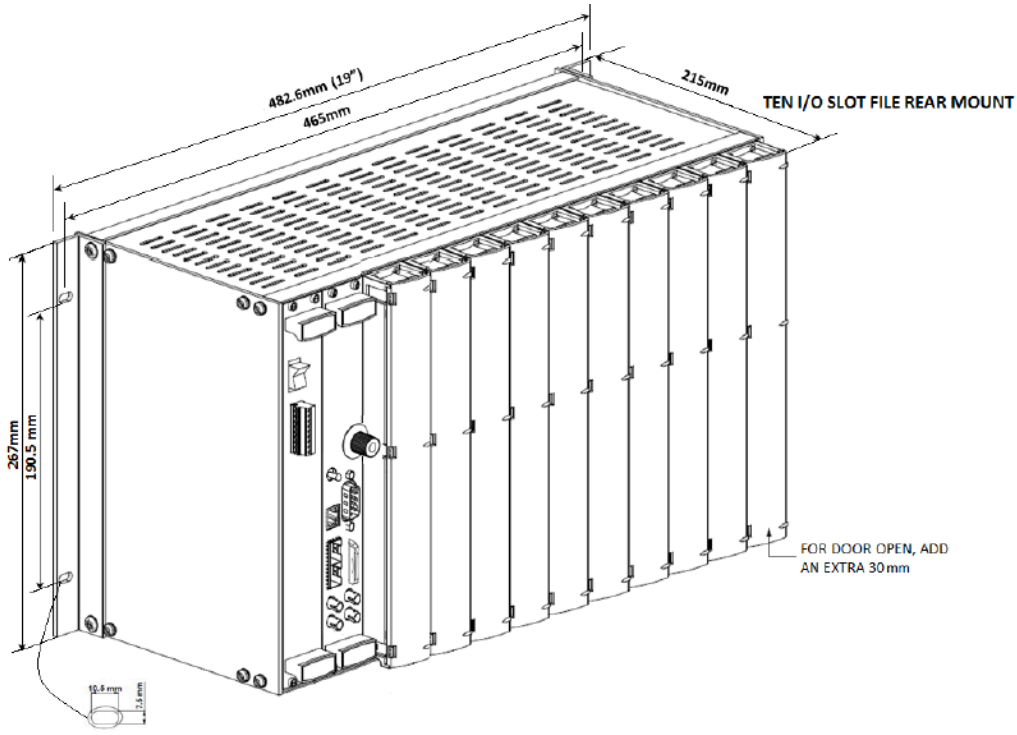


Figure 22 - 2x5 I/O Slot File Pattern and Dimensions

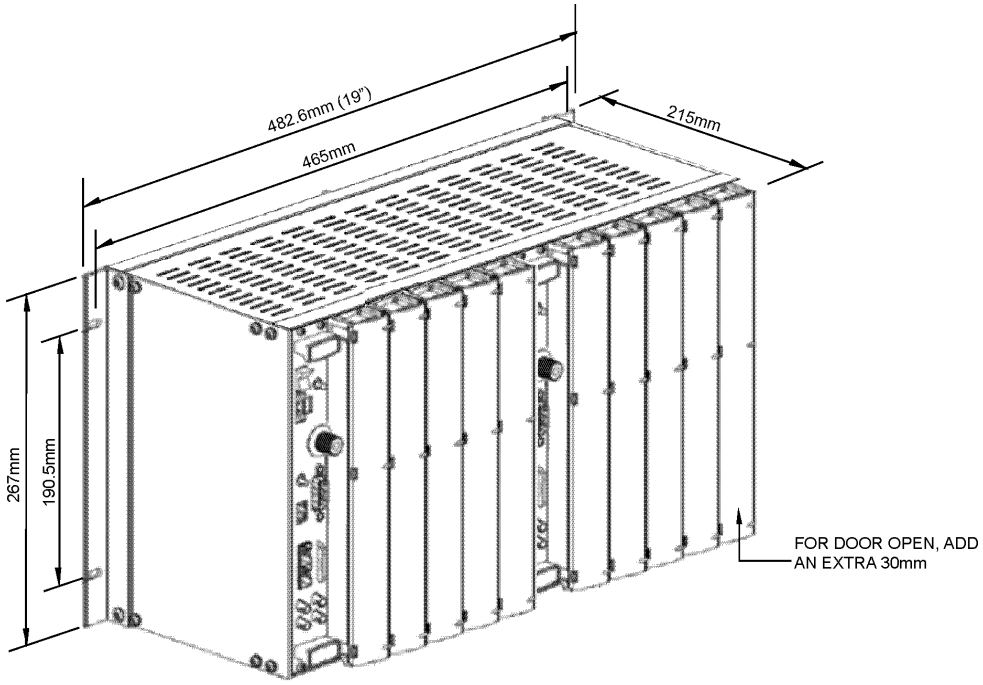


Figure 23 - 6x1 I/O Slot File Dimensions

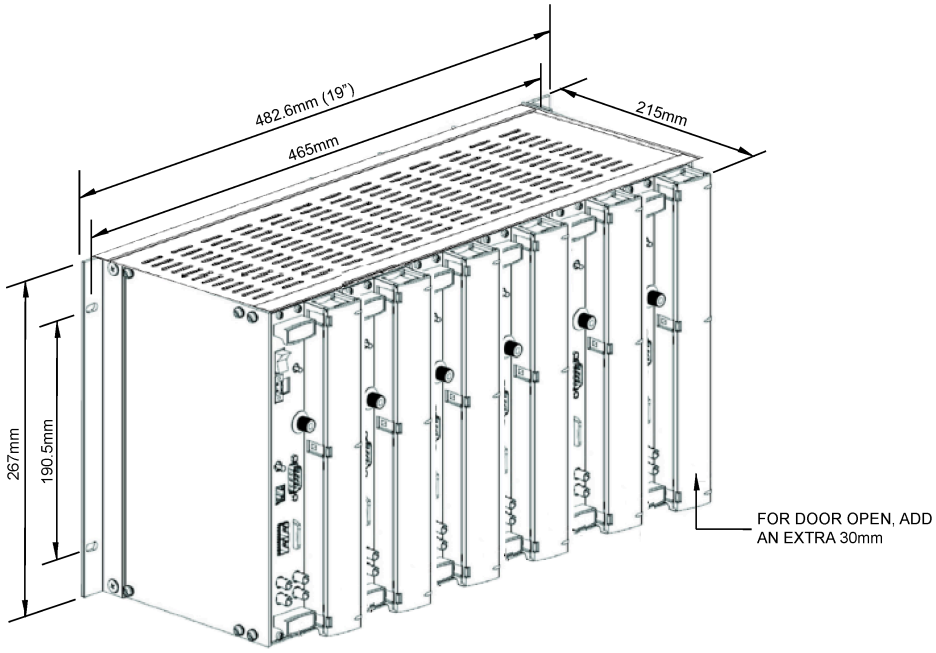


Figure 24 - One I/O Slot File Dimensions

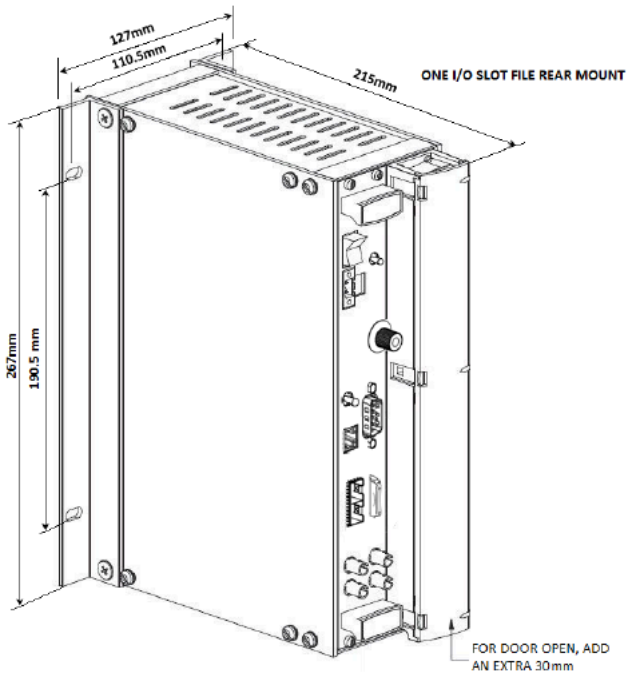
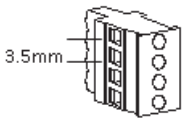


Figure 25 - Screw Terminal Block



Performance Use Cases

These use cases indicate the performance expected of the Electrodynamic Controller in either simplex or high availability (HA) configurations. These cases include a mix of softwired I/O, hardwired I/O, and connected devices (for example, TeSys T, Altivar, ComPact NSX, MasterPact, Easergy P5 protection relays) with varied functionality. Because of these and several other factors, such as variation in network connectivity, DCS clients, and EMCS clients, performance measurements can vary. For a more detailed review of specific use cases, contact your Schneider Electric sales representative.

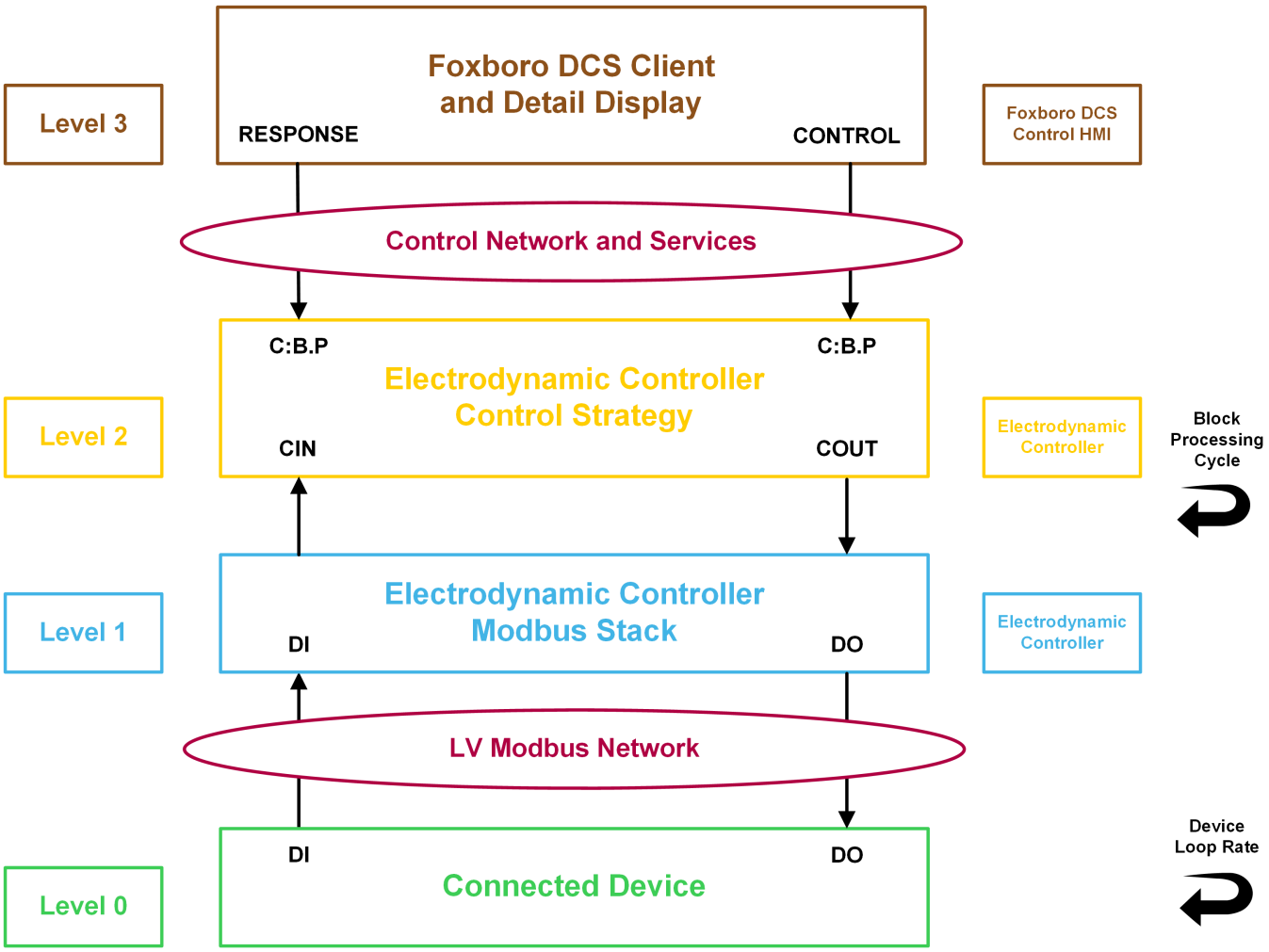
In these use cases, a large low voltage (LV) network contains more than 200 connected devices, and a large medium voltage (MV) network contains more than 25 IEC 61850 IEDs.

Tested System Use Case for Electrodynamic Controllers Configured in a Foxboro DCS	**Large LV network, TeSys T dominant**	**Large MV IEC 61850 Network with Modbus TCP Devices for Large LV Motors**	**Medium LV Network, Altivar Dominant**	**MV HA Power Management System with Redundant I/O**	**Large MV IEC 61850 Network with Modbus TCP Devices for Large LV Motors**	**Large LV Network, TeSys T Dominant**	**Large LV Network, TeSys T Dominant**	**Large MV IEC 61850 Network with Modbus TCP Devices for Large LV Motors**
Configuration (Block Processing Cycle (BPC) in ms)	**LV Simplex (500 BPC)**	**MV Simplex (200 BPC)**	**LV HA (200 BPC)**	**MV HA with I/O (200 BPC)**	**MV HA (200 BPC)**	**LV HA (500 BPC)**	**LV HA (500 BPC)**	**MV HA (500 BPC)**
Configured Connected Networks								
IEC 61850 IEDs (MMS)	0	59	0	0	59	0	0	59
Connected Devices (Modbus TCP)	200	22	40	0	22	200	120	22
Modbus Scanning (scan groups per second)	251	153	280	0	63	251	120	63
Total Hardwired I/O (mixed type)	0	0	0	240	0	0	0	0
Typical Foxboro DCS Control Network Setup								
BPC (ms)	500	200	200	200	200	500	200	500
Total DCS OM Blocks (function objects)	7,106	2,285	1,600	240	2,285	7,106	4,200	2,285
Total DCS Compounds (collection)	200	81	40	10	81	200	120	81
History Collector Points (configured)	4,160	1,900	1,640	10	1,900	4,160	2,496	1,900
Foxboro DCS Clients Setup								
Historian Server and Collector (workstations)	1	1	1	1	1	1	1	1
Engineering Server, Galaxy, and CSA (workstation)	1	1	1	1	1	1	1	1
Engineering Client, Control Operator (workstations with	2	2	1	1	2	2	2	2

Tested System Use Case for Electrodynamic Controllers Configured in a Foxboro DCS	Large LV network, TeSys T dominant	Large MV IEC 61850 Network with Modbus TCP Devices for Large LV Motors	Medium LV Network, Altivar Dominant	MV HA Power Management System with Redundant I/O	Large MV IEC 61850 Network with Modbus TCP Devices for Large LV Motors	Large LV Network, TeSys T Dominant	Large LV Network, TeSys T Dominant	Large MV IEC 61850 Network with Modbus TCP Devices for Large LV Motors
Configuration (Block Processing Cycle (BPC) in ms)	**LV Simplex (500 BPC)**	**MV Simplex (200 BPC)**	**LV HA (200 BPC)**	**MV HA with I/O (200 BPC)**	**MV HA (200 BPC)**	**LV HA (500 BPC)**	**LV HA (500 BPC)**	**MV HA (500 BPC)**
medium density displays)								
Engineering Server, Galaxy (workstations)	1	1	0	0	1	1	1	1
DCS Client (total)	5	5	2	3	5	5	5	5
IEC 61850 Network Server Setup for Electrodynamic Controller								
IEC 61850 Server LV Point Republication (points configured)	3,871	421	120	240	538	3,871	2,700	538
iFLS, GMS, EMCS (IEC 61850 clients)	6	6	6	6	6	6	6	6
Normal Average Rates Configured								
Analog Input Change (per minute)	836	203	200	4,320	201	836	570	201
Discrete Input Change (per minute)	21	12	2	48	12	21	14	12
Measured Alarm rate (per minute)	62	17	20	10	17	62	52	17
Performance								
Average CPU Load, Multi-Core Max (percent)	63%	28%	68%	16%	29%	63%	54%	29%
Round Trip Time (ms) [(a)] Target 600 ms	480	200	473	72	205	580	569	532
Approximate Failover Time (seconds)	N/A	N/A	0.50	0.84	0.96	0.48	0.81	0.75

[(a)] In these use cases, the RTT refers to the total response time from the DCS COUT block (control) to the corresponding CIN block (response), as shown at Level 2 in Round Trip Time (RTT) Measurement Strategy, page 45. The RTT is a measure of the potential delay that can occur through the protocol stack levels and external network to and from the connected device.

Figure 26 - Round Trip Time (RTT) Measurement Strategy



Regulatory Compliance

Electromagnetic Compatibility (EMC)	
European EMC Directive 2014/30/EU	Complies with: • EN 61326-1 - Electrical equipment for measurement, control and laboratory use – EMC requirements, Class A Emissions limits, and Immunity requirements for Industrial locations • EN 61000-6-5 - Part 6-5: Generic Standards – Immunity Power Station and Substation Environments
CISPR 11, Industrial Scientific and Medical (ISM) Radio-Frequency Equipment - Electromagnetic Disturbance Characteristics - Limits and Methods of Measurement	Radiated emissions meet Class "A" limits Conducted emissions meet Class "A" limits
IEC 61000-4-2 ESD Immunity	Contact ±6 kV, air ±8 kV
IEC 61000-4-3 Radiated Field Immunity	• 10 V/m at 80 MHz to 1000 MHz • 3 V/m at 1 GHz to 6 GHz
IEC 61000-4-4 Electrical Fast Transient/Burst Immunity	±2 kV at 100 kHz for Signal Lines ±4 kV at 100 kHz for Power Lines
IEC 61000-4-5 Surge Immunity	±2 kV
IEC 61000-4-6 Immunity to Conducted Disturbances Induced by Radio Frequency Fields	10 Vrms at 150 KHz to 80 MHz
IEC 61000-4-16 Conducted, Common Mode Disturbances Immunity	For Power Lines: • 10 Vrms to 1 Vrms 15 Hz to 150 Hz • 1 Vrms 150 Hz to 1.5 kHz • 1 Vrms to 10 Vrms 1.5 kHz to 15 kHz • 10 Vrms 15 kHz to 150 kHz For Signal Lines: • 30 Vrms to 3 Vrms 15 Hz to 150 Hz • 3 Vrms 150 Hz to 1.5 kHz • 3 Vrms to 30 Vrms 1.5 kHz to 15 KHz • 30 Vrms 15 kHz to 150 kHz • 300 Vrms for 1 second short duration
IEC 61000-4-18 Damped Oscillatory Wave	• Common mode ±1 kV @1 MHz • Differential mode ±0.5 kV @1 MHz
Marine Type Approval Certification	Bureau Veritas Marine certified for Environmental Category EC31 and Det Norske Veritas Marine certified for control and monitoring systems. This certification is applicable for SCD6000 and Electrodynamic Controller only. For the list of modules certified for marine environments, see Ordering Information, page 48.

Product Safety

This product complies with these safety standards:

- UL 61010-1 - Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use - Part 1: General Requirements
- CSA C22.2 NO. 61010-1 - Safety requirements for Electrical equipment for measurement, control, and laboratory use
- EN 61010-1:2010 + A1:2019 - Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements

Ordering Information

EDC6000 Supported Modules

Part Number	Description
SY-60399008R[a]	SCD6000 COPE TYPE II ASSEMBLY
SY-60399009R[a]	SCD6000 COE TYPE II ASSEMBLY
SY-0399094R[a]	24 Digital Input (48 V)/6 Analog Input/8 Mini-Pilot Relay Output Module
SY-0399095R[a]	24 Digital Input (129 V)/6 Analog Input/8 Mini-Pilot Relay Output Module
SY-0399084R[a]	4 Channel Analog Output Module
SY-60399016R[a]	SCD6000 4 Channel Analog Output Module
SY-0399131R[a]	Wide Input Range Power Supply Module
SY-6038090[a]	100Base-FX SFP Module
SY-2003098R[a]	Ten I/O slot card file
SY-2003092R[a]	2x5 I/O slot card file
SY-2003104R[a]	One I/O slot card file
SY-2003110R[a]	6x1 slot card file
P0926MX	Splitter/Combiner Installation Components Kit
P0926MY	Splitter/Combiner Case
P0926AH[a]	Splitter/Combiner
RH972ZQ[a]	Fiber Optic Cable from Electrodynamic Controller to Splitter/Combiner (0.25m) LC-LC (Multimode or Single Mode)
P0972TN[a]	Fiber Optic Cable from Splitter/Combiner (RH972ZQ) to Switch (3m) LC-LC (Multimode or Single Mode)
P0972TR[a]	Fiber Optic Cable (MT-RJ to LC Cable) (Multimode or Single Mode)
P0972TP[a]	LC to LC Fiber Optic Cable (15m) (Multimode or Single Mode)
P0972TQ[a]	LC to LC Fiber Optic Cable (50m) (Multimode or Single Mode)
RH102AP/RH102AN	Foxboro DCS control network switch (Extreme Switch x440)
RH102AM	24-port copper managed switch (x440G2-24t-GE4)
RH102AN	24-port fiber managed switch (x440G2-24fx-GE4)
RH102AP	12-port copper/8-port fiber (x440G2-12t8fx-GE4)
SY-6006251[a]	SCD6000 DIDO Splitter for HA Hardwired
SY-6039060[a]	SCD6000 DI Cable for HA Hardwired
SY-6006252[a]	SCD6000 DI Adaptor for HA Hardwired

Part Number	Description
SY-6006253[a]	SCD6000 4AO Splitter for HA Hardwired 180
SY-6051037[a]	HA Link 1 — OptoNet Cable (1m)
SY-6051034[a]	HA Link 1 — OptoNet Cable (5m)
SY-6500176R[a]	High Speed Interconnect Cable (0.2m)
SY-6500177R[a]	High Speed Interconnect Cable (0.5m)
SY-6500178R[a]	High Speed Interconnect Cable (1m)
SY-6500180R[a]	High Speed Interconnect Cable (5m)
(a) This module is certified for marine environments when it is installed in a suitably modified G128 enclosure. For more information on the required enclosure, contact your local Schneider Electric sales office.	

OEM Parts Certified for Marine Environments

The OEM parts mentioned in this table are certified for marine environments when they are installed in a suitably modified G128 enclosure. For more information on the required enclosure, contact your local Schneider Electric sales office..

Part Number	Description
Phoenix 1206599 (NS 35/15) or equivalent	MIO DI DIN Rail (160 mm)
SUNYUANSZ DIN1X2 ISOEM A7-P1-O9O9 (Current Output) or DIN1X2 ISOEM U5-P1-O7O7 (Voltage Output)	Signal Splitter for AI Inputs
Phoenix 1206599 (NS 35/15) or equivalent	MIO AI Combiner DIN Rail (250 mm)
Alpha Wire 5100C	MIO DO Module "to Termination" Cable
Belden 3084F	AO Module to Terminal Cable
Belden 88641	AO Module to Terminal Cable
MEAN WELL DDR-15G-24	AO Power Isolator
Phoenix 1206599 (NS 35/15) or equivalent	AO DIN Rail (160 mm)

Related Documents

Description	Document Number
EcoStruxure™ Electrodynamic Controller User's Guide	B0700JB
EcoStruxure™ Electrodynamic Controller Release Notes	B0925AG
Control Software v7.5 Installation Guide	B0750RA
Control Software v7.5 Release Notes	B0750SZ
Bulk Data Editor User's Guide	B0750AF
Control HMI User's Guide	B0750AQ
Control HMI Application User's Guide	B0750AR
Control Database Deployment User's Guide	B0750AJ
Integrated Control Block Descriptions for Electrodynamic Controller	B0700JA
Configuration Utilities User's Guide	B0750AZ
Control Core Services v9.7 Software Installation Guide	B0700TM
Control Core Services v9.7 Release Notes	B0700TN
System Definition User's Guide	B0193WQ
System Definition Release Notes	B0700GT
System Manager User's Guide	B0750AP
System Manager v2.16 Release Notes	B0750RS
Time Synchronization User's Guide	B0700AQ
The Foxboro DCS Control Network Architecture Guide	B0700AZ
The Foxboro DCS Control Network Ethernet Equipment	PSS 41H-7NWEQUIP
Cybersecurity Reference Guide	B0700HZ
EcoStruxure™ Foxboro™ SCADA TCP/IP (Foxboro SCADA Remote Devices and RTU50) User's Guide	B0780DN
EcoStruxure™ Foxboro™ SCADA IEC 61850 Client (Foxboro SCADA Remote Devices and RTU50) User's Guide	B0780DE
EcoStruxure™ Foxboro™ SCADA IEC 61850 Server (Foxboro SCADA Remote Devices and RTU50) User's Guide	B0780DF
EcoStruxure™ Foxboro™ SCADA IEC 61850 Protocol Implementation Conformance Statements (Foxboro SCADA Remote Devices and RTU50) Reference Guide	B0780EC
EcoStruxure™ Foxboro™ SCADA IEC 61850 Protocol Implementation eXtra Information for Testing (Foxboro SCADA Remote Devices and RTU50) Reference Guide	B0780ED
EcoStruxure™ Foxboro™ SCADA Modbus Slave (Foxboro SCADA Remote Devices and RTU50) User's Guide	B0780DG
EcoStruxure™ Foxboro™ SCADA Modbus Master (Foxboro SCADA Remote Devices and RTU50) User's Guide	B0780DJ
EcoStruxure™ Foxboro™ SCADA Modbus Communication Protocol Specification (Foxboro SCADA Remote Devices and RTU50) Reference Guide	B0780DH

Description	Document Number
EcoStruxure™ Foxboro™ SCADA RTU Station (Foxboro SCADA Remote Devices and RTU50) User's Guide	B0780DQ
EcoStruxure™ Foxboro™ SCADA RTU Station Release Notes	B0780SB
EcoStruxure™ Foxboro™ SCADA RTU Station, RTV, and RTU Connect Secure Software	PSS 41S-2S6KSWR
EcoStruxure™ Foxboro™ SCADA SCD6000 RTU Architectural Overview	PSS 41H-8S6KAOV
EcoStruxure™ Foxboro™ SCADA RTU Programming: State and Logic Language (SALL) Reference Guide	B0780DK
EcoStruxure™ Foxboro™ SCADA Intrinsic Database Functions (Foxboro SCADA Remote Devices and RTU50) User's Guide	B0780DR
EcoStruxure™ Foxboro™ SCADA Remote Terminal Viewer (Foxboro SCADA Remote Devices and RTU50) User's Guide	B0780DY
EcoStruxure™ Foxboro™ SCADA Remote Terminal Viewer Release Notes	B0780SD
EcoStruxure™ Foxboro™ SCADA RTU Connect Secure (Foxboro SCADA Remote Devices and RTU50) User's Guide	B0780DP
EcoStruxure™ Foxboro™ SCADA RTU Connect Secure Release Notes	B0780SC
EcoStruxure™ Foxboro™ SCADA SCD6000 and SCD6000-SVX Software Release Notes	B0780SF
EcoStruxure™ Foxboro™ SCADA SCD6000 Hardware User's Guide	B0780DW
EcoStruxure™ Foxboro™ SCADA SCD6000 Cybersecurity User's Guide	B0780ES
EcoStruxure™ Foxboro™ SCADA System Messages (Foxboro SCADA Remote Devices and RTU50) Reference Guide	B0780DZ

For the latest revision of these documents, see Global Customer Support at https://pasupport.se.com (registration required).

Proposition 65

WARNING: This product can expose you to chemicals including lead and lead compounds, which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

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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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