

Reference Topology SE03

Schneider Electric Modicon M580 and EtherNet/IP plus
PROFIBUS PA for Mining Industry



Supported by:



Table of Contents

1	Document Information.....	4
1.1	Purpose and Scope	4
1.2	Document History	4
1.3	Related Documents	4
2	Target Market.....	4
2.1	Industry Application	4
2.2	Fieldbus Technology	4
3	Reference Topology	5
3.1	Overview	5
3.2	Process Control System	5
3.3	Asset Management System.....	6
3.4	Field Network Infrastructure.....	6
3.4.1	EtherNet/IP IO Network.....	6
3.4.2	EtherNet/IP to PROFIBUS Gateways.....	7
3.4.3	PROFIBUS PA Power Conditioning and Field Barriers	8
3.5	Field Devices.....	9
3.5.1	EtherNet/IP devices.....	9
3.5.2	PROFIBUS PA devices	10

1 Document Information

1.1 Purpose and Scope

This document specifies the Open Integration Reference Topology SE03. All content of this document is jointly developed, reviewed and approved by Schneider Electric and Endress+Hauser as a common deliverable of Open Integration.

1.2 Document History

This is version 1.00.00 of this document. Version history:

Version	Released	Description
1.00.00	2021-03	Initial version

1.3 Related Documents

Please refer to related documents as listed below:

Document	Description
SD02679S/04/EN/01.20	Integration Tutorial SE03
SD02680S/04/EN/01.20	Integration Test Summary SE03
SD02681S/04/EN/01.20	List of Tested Devices and Versions SE03

2 Target Market

2.1 Industry Application

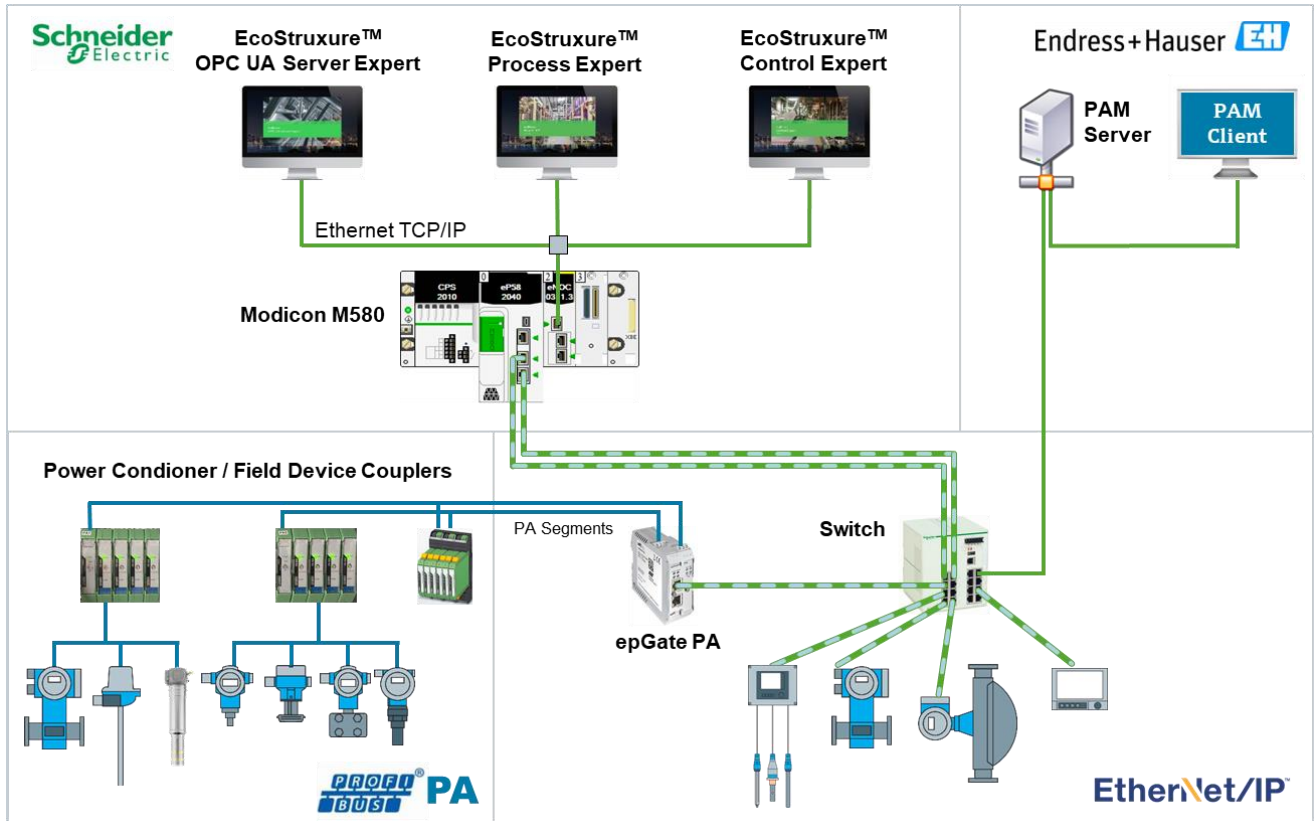
This reference topology is designed to serve applications in Mining industry.

2.2 Fieldbus Technology

This reference topology is designed for instrumentation with EtherNet/IP and PROFIBUS PA. Optionally it may be complemented with PROFIBUS DP.

3 Reference Topology

3.1 Overview




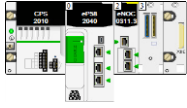
3.2 Process Control System

The process control system part top left in the overview is provided by Schneider Electric:

The Schneider Electric M580 controller is connected to two separate Ethernet networks: The Supervisory Network connects to system servers and workstations. The EtherNet/IP based I/O Network uses a ring topology to connect field level switches and gateway devices with increased availability. Underlying EtherNet/IP devices are connected in star topology via field level switches. Complementary PROFIBUS PA devices are integrated via Softing gateways and powered with Phoenix Contact power conditioners and field barriers.

Core element on top of the system backbone is an Engineering Station for control engineering with EcoStruxure™ Control Expert, complemented with EcoStruxure™ OPC UA Server Expert and EcoStruxure™ Process Expert for process visualization.

Reference hardware:

	Article	Description
	BME XBP 0400	Ethernet and X-bus backplane, 4 slots
	BMX CPS 2010	Power supply module 24 V DC, 16.8W
	BME P58 2040	Processor module M580
	BMX NOC 0311	Ethernet communication module M580, 3 ports

3.3 Asset Management System

The asset management system part top right in the overview is provided by Endress+Hauser:

FieldCare Gateway Server and Clients may access the underlying EtherNet/IP and PROFIBUS devices via an independent connection to the EtherNet/IP based I/O Network. The connection may be established via Ethernet switch ports or ETAPs as listed in chapter 3.4.1.



3.4 Field Network Infrastructure

3.4.1 EtherNet/IP IO Network

The EtherNet/IP based I/O Network is mandatory for this reference topology, with relevant impact to integration tests.

The EtherNet/IP based I/O Network may be built in star, linear bus or ring topology, as well as any hybrid network topology composed of those. For increased plant availability, this topology assumes applying a ring topology as field level backbone for controllers, switches and gateways.




Reference hardware:

	Article	Description
	TCSESM163F23F1	Extended Managed Ethernet Switch

3.4.2 EtherNet/IP to PROFIBUS Gateways

EtherNet/IP to PROFIBUS Gateways are mandatory for this reference topology, with decisive impact to integration tests. Schneider Electric and Endress+Hauser recommend using Softing epGate PA or epGate PB for integration of PROFIBUS devices.






Reference hardware:

		Article	Description
epGate PA 		GCA-CL-024702	epGate PA, 2 channel, EtherNet/IP to PROFIBUS-PA Gateway. Supports up to 2 PROFIBUS PA segments (up to 32 PA devices).
		GCA-CL-024704	epGate PA, 4 channel, EtherNet/IP to PROFIBUS-PA Gateway. Supports up to 4 PROFIBUS PA segments (up to 64 PA devices).
epGate PB 		GCA-CL-024705	epGate PB, EtherNet/IP to PROFIBUS Gateway. Supports 2 PA segments (up to 32 PA devices, MBP physical layer) and 1 PROFIBUS DP segment (RS485).

3.4.3 PROFIBUS PA Power Conditioning and Field Barriers

Power conditioners and barriers for PROFIBUS PA are mandatory for this reference topology, with limited impact to integration tests but relevant for reliable operation. This topology has been successfully tested with components from Phoenix Contact.

Reference hardware:






 Power Supply	Article	Description
	FB-PS-PLUG-24DC/28DC/0.5/EX	Power supply plug for fieldbus system in hazardous locations. Provides 500 mA @ 28 V DC to couplers along the trunk
	FB-PS-MB-25DSUB/EX	Four-channel redundant fieldbus power supply base.
	Fieldbus Terminator	The fieldbus terminator plug is pre-installed in the trunk out connection of device couplers.
Trunk Module 	FB-ET	Trunk module for PROFIBUS PA expansions with terminator
Device Coupler 	FB-ISO	Device coupler for PROFIBUS PA. Provides intrinsically safe FISCO connection to a single end device
Device Coupler 	FB-2SP	Device coupler for PROFIBUS PA expansions with terminal connections for 2 spurs connected to fieldbus end devices

3.5 Field Devices

Open Integration reference topologies are tested versus a selection of most relevant field devices for the target market defined in chapter 2.1. This serves to verify that the system under test is capable to handle a necessary variety of certified field devices. This chapter defines only a basic set of mandatory field devices for verification of this reference topology, as agreed by Schneider Electric and Endress+Hauser. For more details, please refer to latest list of tested devices and versions for this reference topology, referenced in chapter 1.3.

3.5.1 EtherNet/IP devices

Reference hardware:

Endress+Hauser 	Article	Description	Device Type
Liquiline 	CM44x CPS11D CYK10	Liquid Analyzer Transmitter Memosens Digital pH Sensor Memosens Digital Data Cable	0x109C
Promag P 300 	5P3B	Electromagnetic Flow Transmitter	0x103C
Promass 300 	8F3B	Coriolis Flow Transmitter	0x103B
Memograph M 	RSG45	Advanced Data Manager	0x107A

3.5.2 PROFIBUS PA devices

Reference hardware:

Endress+Hauser  <small>People for Process Automation</small>		Article	Description	Device Type
Promag 55 		55S	Electromagnetic Flow Transmitter	0x1527
Cerabar M 		PMC51	Absolute and Gauge Pressure Transmitter	0x1553
Deltabar S 		PMD75	Differential Pressure Transmitter	0x1542
iTHERM 		TM131+TM T84	Temperature Transmitter	0x1551
Micropilot 		FMR57	Radar Level Transmitter	0x1559
Prosonic M 		FMU40	Ultrasonic Level Transmitter	0x152C
Levelflex 		FMP57	Guided Radar Level Transmitter	0x1558
Gammapilot M 		FMG60	Radiometric Level Transmitter	0x1548

www.endress.com/open-integration
