

Saitel DR

Part of EasyLogic



Catalog 2024

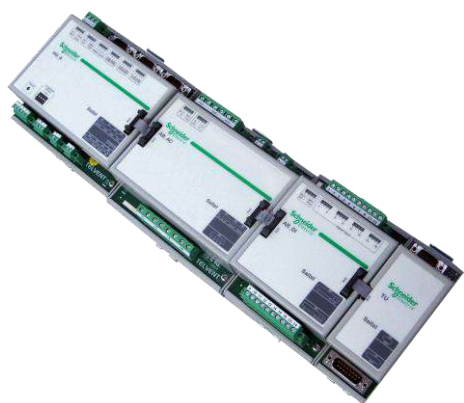
Substation Controller

se.com

Life Is On

Schneider
Electric

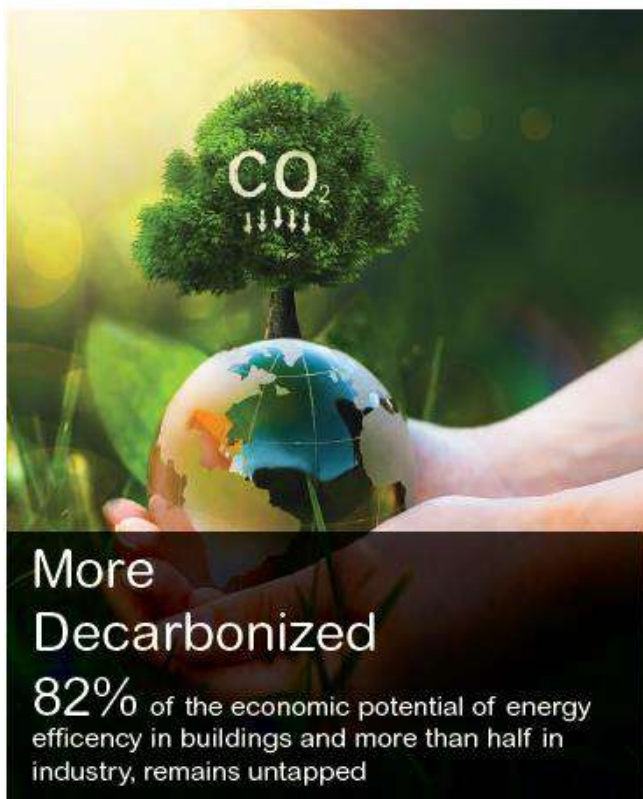
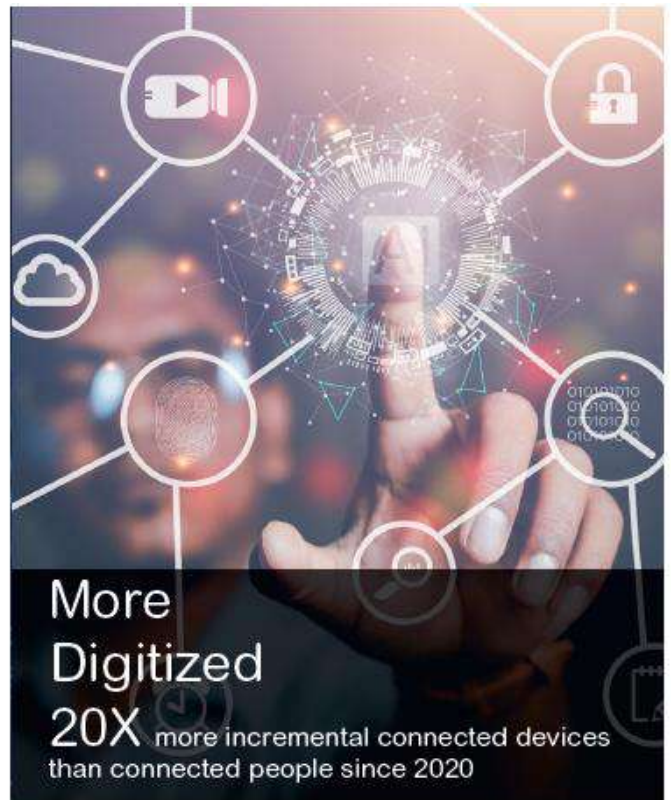
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We Have an Opportunity to Co-Create the Future



Power Industry is Facing Unprecedented Changes

Increasing Complexity and Challenges Ahead

DER Integration



Impact on planning and operations
New regulations and practices:
Grid codes, Cybersecurity, and IEC 61850

New Power Grid Design



National/Interco-regional
Intermediate Microgrids (municipal, regional)

Operational Efficiency



Reliability (SAIDI...), losses, customer satisfaction, affordability, investment, and OPEX

Digital Transformation



IT/OT integration readiness, IoT enablement, and Cyber Security

Digitization Presents Tremendous Opportunities to Enhance Grid Efficiency

Self-immune

Digital substation improves energy supply reliability and quality.

Streamlined

Digital tool suite optimizes all steps from design, build to operate and maintain.

Predictive

Collecting and analyzing right asset data is the foundation of efficient maintenance operations.

Future-proof

An open and modular digital infrastructure is crucial to support the forthcoming active network challenges.



Digitization Presents Tremendous Opportunities to Enhance Grid Efficiency

Manage increasing complexity: integrate with specialized IEDs and systems

- Integrate devices from multiple vendors and protocols.
- Communicate simultaneously with several upstream systems.
- Advanced remote monitoring of system performance.

Increase availability: improve control system uptime

- Minimize downtime with hot-swappable hardware modules and extensive redundancy options.
- Deploy customized network reconfiguration schemes.

Manage costs: reduce installation, operation, and maintenance

- Optimize investment thanks to the modular approach.
- Perform maintenance tasks and diagnostics remotely.
- Deploy different applications - RTUs, gateways, and controllers - using the same offer and tools.

Deliver efficiency: optimize network control

- Reduce control system power consumption by using state of the art embedded electronic products.
- Tailor solution hardware footprint to your needs.

Improve cybersecurity: help defend against malware and unauthorized access

- Leverage embedded firewall.
- Apply RBAC policies as recommended by IEC 62351, IEC 62443, and IEEE 1686.



Saitel DR – part of EasyLogic

Just-enough solution for substation control

Flexible platform with a modular hardware, firmware, and software for common needs!

Saitel DR Key features

Easy to install

- DIN-rail assembly with integrated I/O terminal blocks
- Simple connection and cabling

Easy to integrate

- Client/server for IEC 61850.
- SCADA protocols: DNP3 and IEC101/4
- IED protocols: IEC 103, Modbus & Spabus
- Embedded logic engines: formulae and IEC61131

Easy to expand

- Upto 512 hardwired I/O
- Upto 15k datapoints
- 256 concurrent TCP connections

Easy to use

- Easergy Builder: configuration software (PC software tool)
- webApp: device maintenance and diagnostics
- webUI: optional lightweight substation HMI



General Presentation

General Presentation

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Saitel DR Utility Customers

Power Distribution operators worldwide

Core Applications

- Substation gateway
- Smart RTUs
- Remote I/O
- IED integration: IEC 61850 or legacy

Upstream Interfaces

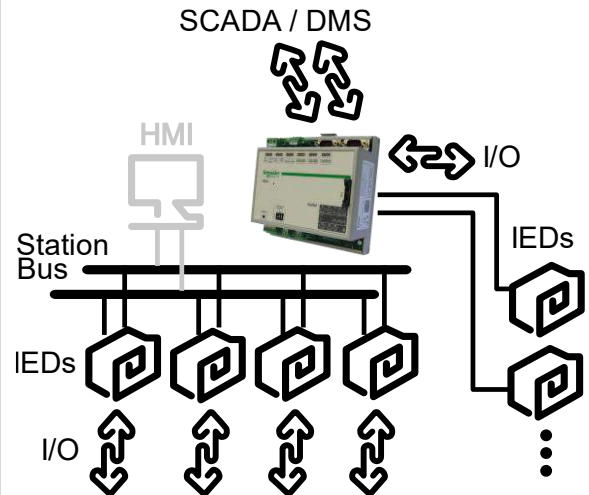
- Local SCADA: IEC 61850 or DNP3/IEC101/IEC104
- Regional SCADA: DNP3/IEC101/IEC104

Advanced features

- HSR/PRP with IEEE1588 (PTP)
- Integrated web HMI

Current market trends

- Cybersecurity – IEC 62351



Saitel DR Industrial customers

Electro-intensive infrastructure: Railways, Industrial plants, etc.

Core Applications

- Substation gateway
- Smart RTUs
- IED integration: IEC 61850 or Modbus

Upstream Interfaces

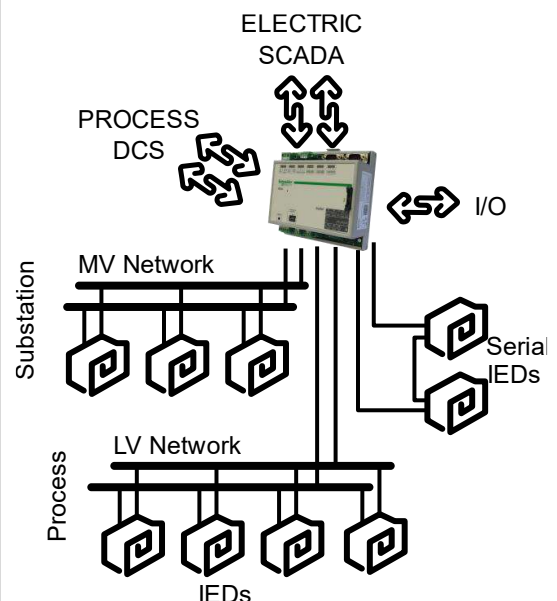
- Plant DCS: IEC 61850 or Modbus/TCP
- Regional SCADA: DNP3/IEC101/IEC104

Advanced features

- HSR/PRP with IEEE1588 (PTP)

Current market trends

- Cybersecurity – IEC 62351

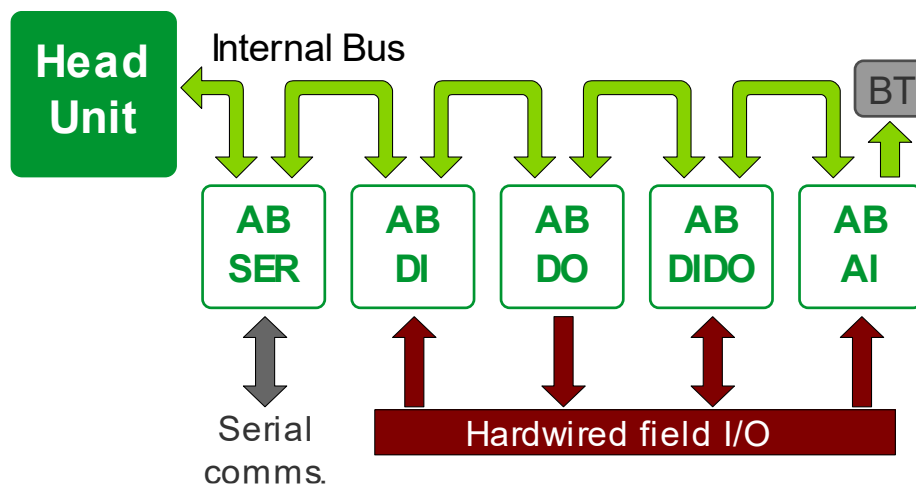


Modular Architecture

Saitel DR is a substation controller range conceived to provide a flexible & easy to use solution for distribution automation applications. Designed to address real-time control and automation applications. Saitel DR offers a robust and powerful platform in DIN-rail form factor.

A configuration of Saitel DR modules always requires a **Head Unit** that can be expanded using dedicated hardware modules ('**Acquisition Blocks**' or '**AB**'). The Maximum number of ABs that can be managed by a Head Unit is 32. The resulting configuration is often referred to as *Intelligent Terminal Block*.

- Communications between Head Unit and the Acquisition Blocks is carried by a daisy chain internal bus.
 - All I/O data processed – filtering, timestamping, etc. – is performed by the AB modules.
 - Acquisition blocks are configured & synchronized the HU.
 - All modules offer visual status indications.
- Communications with IEDs, station peers or upstream systems are managed by the Head Unit.
- All Acquisition Blocks integrate terminal blocks for field-connection.



Saitel DR modules are designed to operate in aggressive industrial environments, meeting the most demanding immunity requirements to reduce electromagnetic disturbances. The low-consumption design allows modules to operate without forced ventilation, which widens the application range considerably.

All Saitel DR modules are designed for installation on DIN rail and inside rugged substation-grade cabinets.



Saitel DR HUE – Head Unit

HUE manages all communications with substation equipment and control systems using serial or Ethernet channels.

- Communication channels can be configured individually to fit application needs (DMS, local automation, etc.).
- Channels can be created and setup using Easergy builder.
- Configuration settings - for example, IP addresses - can be modified using the embedded webApp.
- Embedded firewall can be configured to improve overall security.
- Saitel DR is delivered with no default protocols or channels preconfigured.

Characteristics

- Processor: TI Sitara AM335x @600MHz
- Memory:
 - RAM: 256 MB (DDR3).
 - NVRAM: 2 MB – backed up by supercapacitor
- Storage:
 - FLASH: 32 MB (NOR) and 256 MB (NAND).
 - USB 2.0 (host) & SD ports
- Communications:
 - Console: mini USB (type C)
 - Serial: 1xRS485 (3-way terminal), 2xRS-232 (DB9)
 - 3xEthernet (10/100baseT): LAN1 & 2 support FO & PRP/HSR & IEEE1588.
- Synchronisation: GPS, IRIG-B, SNTP, PTP.
- Cybersecurity: Secured access, RBAC, Logging, cryptography...
- Typical power consumption: 6 W



Saitel DR AB_SER – Serial Expansion module

AB_SER adds to the system 4 serial ports for communications with legacy IEDs or remote control systems. Each port can be configured individually to fit application needs - RS232/485, baud rate, etc.

Characteristics

- Channels: 4
 - Asynchronous communications upto 38.400 bps per channel
 - Connection: 4x RS-232/485 (DB9)
- Typical power consumption: 1.1 W



Saitel DR AB_DI – Digital Input module

AB_DI expansions offer 16 configurable and high-precision digital input and distributed in two 8-signal blocks.

Characteristics

- Number of inputs: 16
 - Inputs per common: 8
 - Max. Inputs as counters: 16 (upto 10 Hz)
 - Input current per channel: < 5.5 mA
- Polarization voltage: 24 / 48 / 110 V_{DC}
- Polarization range: From 80% PV to 120% PV
- Time-stamping resolution: 1 ms
- Galvanic isolation (optocouplers): 2.5 kV_{RMS}
- Point types:
 - Single & Double indications
 - Slow Counters: 32 bits, 45 Hz
- Typical consumption: 0.55 W (idle)



Saitel DR AB_DO – Digital Output module

AB_DO expansions offer 8 configurable digital outputs distributed in two 4-signal blocks.

Characteristics

- Number of outputs: 8
 - Switching mechanism power input: 24 / 48 V_{DC}
 - Power input range: From 80% PV to 120% PV
 - Maximum current per output: 5 A
- Output types:
 - Pulsing, Preset, Simple, Double
 - Select-Before-Operate
 - Configurable per output
- Galvanic isolation (optocouplers): 2.5 kV_{RMS}
- Typical consumption
 - Idle: 0.75 W
 - Active: 210 mW per active output



Saitel DR AB_DIDO – Digital Input & Output module

AB_DIDO expansions offer 8 digital inputs and 4 digital outputs.

Characteristics

- Number of inputs: 16
 - Polarization voltage: 24 / 48 / 110 V_{DC}
 - Polarization range: From 80% PV to 120% PV
 - Time-stamping resolution: 1 ms
 - Point types: Single, double & 32-bit counters (45 Hz)
- Number of outputs: 8
 - Switching mechanism power input: 24 / 48 V_{DC}
 - Maximum current per output: 5 A
- Output types:
 - Pulse, latch, simple, double, Select-Before-Operate
- Galvanic isolation (optocouplers): 2.5 kV_{RMS}
- Typical consumption: 1 W (idle)



Saitel DR AB_AI – Analog Input module

AB_AI expansions offer 8 configurable analog inputs for DC signals.

Characteristics

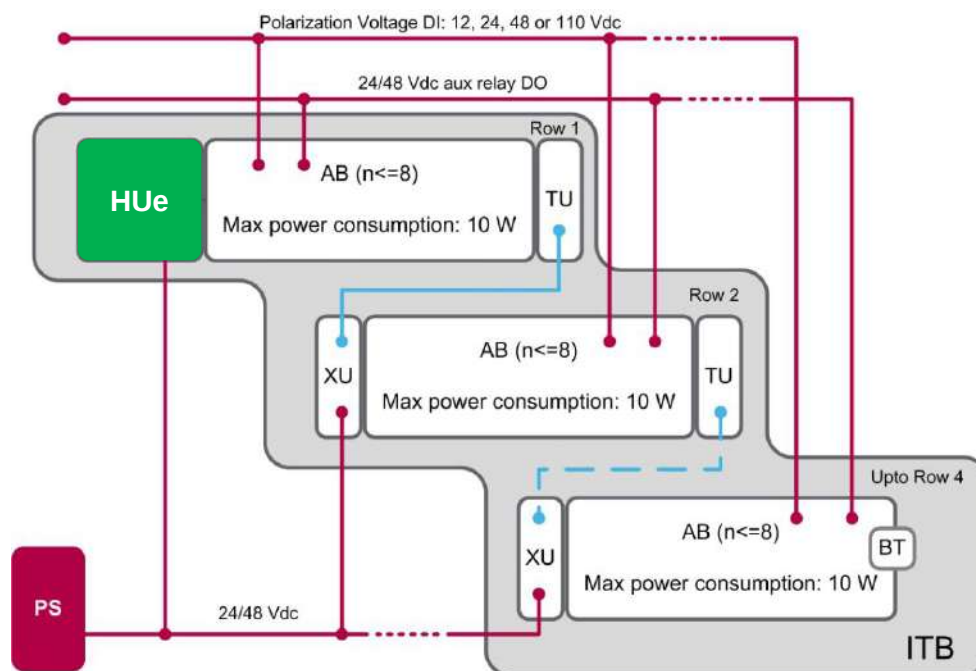
- Number of inputs: 8 (differential, ± 10 V)
- Accuracy: $>0.1\%$ @ 25 °C
- Input impedance: > 200 k Ω
- Common-mode voltage tolerance: >15 V
- Configurable input range per channel:
 - Voltage: 0..5; ± 5 V
 - Current: ± 20 ; 0..20; 4..20 mA
- Conversion type:
 - 8-channel multiplexer
 - 16-bit Sigma-Delta converter
- Processing: Range limits, thresholds, scaling, filtering, ...
- Overvoltage Protection & 1 kVAC isolation
- Power consumption: 0.6 W (idle)

Quick and easy installation. Combine different types of modules to suit your needs.

Modules are designed to be installed on DIN-rail and interconnected using a daisy chain of flat ribbon cables (each module is shipped with its corresponding ribbon cable). This simplifies installation, since only the flat ribbon cables & detachable field terminals need to be connected or disconnected from each module.

Once installed, a combination of Head Unit and Acquisition Blocks is also known as an ITB (Intelligent Terminal Block). To define an ITB, the user should consider that the Saitel DR internal bus is expandable with some limitations:

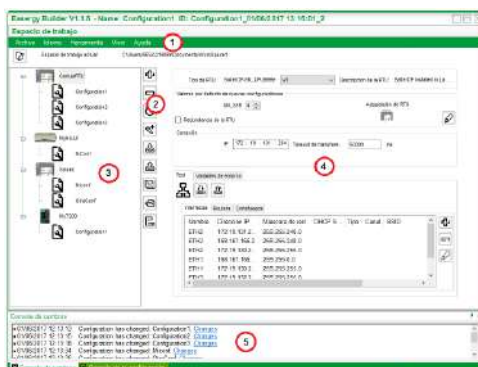
- A Head Unit can manage a maximum of 32 ABs
- An ITB can be expanded over several “rows”
 - Each ITB row can contain a maximum of 8 ABs.
 - Each ITB row can drive a maximum power to ABs of 10 W
 - ITB rows expansions can be added using an accessory kit: TU (Termination Unit) XU (Extension Unit) & XC (Extension Cable).
 - Each expanded ITB row must start with an XU unit and power (24/48 V_{DC}) supplied to it.
 - Maximum distance between expansion rows is 1.5 meters.
- The last module in an ITB must terminate the internal bus with a BT (one included with each HU).
- The physical support of each row is a DIN rail.



Saitel DR offers several tools to manage the different stages of the product's lifecycle.

Saitel DR is supplied with an empty database and configuration. Setting up a solution requires the use of Easergy Builder to setup the solution.

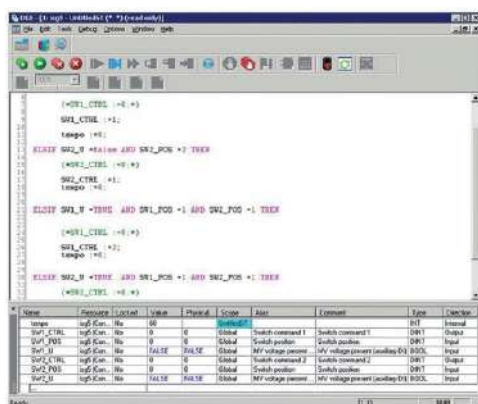
Commissioning, operation & maintenance do not require special tools, only a web browser on a PC, tablet or smartphone.



Easergy Builder for Configuration

Easergy Builder is Windows® UI tool to setup: hardware configuration, I/O database & parameters.

- Communication channels & protocols
- Creation & re-use of device templates
- Mapping of IEC 61850 data
- Synchronization parameters
- Access to the device is restricted – via RBAC



ISaGRAF for Programming

ISaGRAF Workbench is used as Saitel DR logic programming environment:

- Support for all IEC 61131-3 languages
- User friendly interface (OS Windows®)
- C supported as programming language
- Tightly integrated with Easergy Builder

Functions and Description

Functions and Description

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Saitel DR HUe

Head Unit Communication

Saitel DR HUe is a powerful and flexible communication gateway for all Saitel DR configurations.

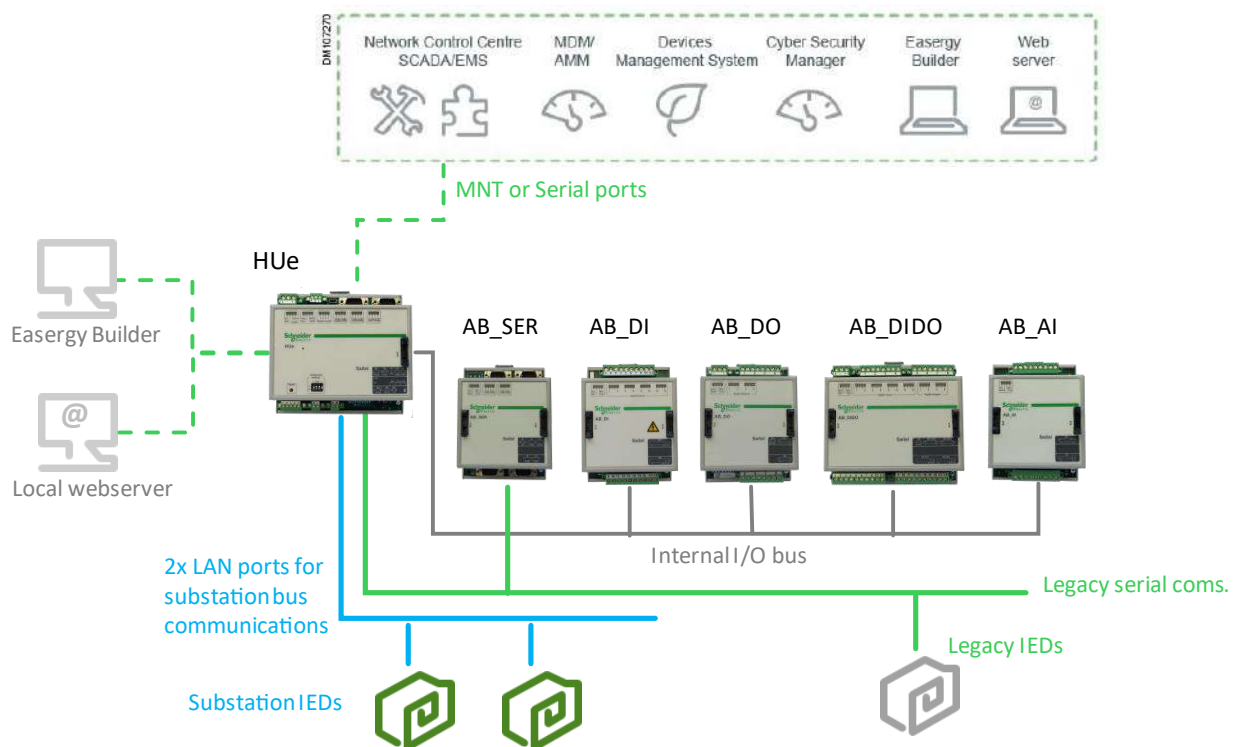
- Saitel DR HUe can be used as a standalone or redundant gateway for substation IEDs.
- Interoperable with open communication systems and protocols
- Compliant with Cybersecurity standards
- Advanced configuration tools
- Web server for easy commissioning, maintenance, and operation
- Open to IEC 61131 applications
- Easy remote and local firmware updates

Saitel DR HUe is the main processor module of Saitel DR.

Saitel DR HUe Manages:

- Communications with control center
- Communication with other substations (peer-to-peer communication)
- Configure and manage Saitel DR AB modules
- Local network communication with third-party IEDs
- Local and remote configuration access
- Web server with local and remote access
- Automation system with programmable logic control
- Global function as remote/local operation, automation enable/disable

The figure shows an example of the communication architecture and the capabilities of Saitel DR.



Saitel DR HUE can communicate with peers (SCADA and other devices) on one or several communication channels.

- Communication channels can be configured individually to fit application needs (DMS, local automation, etc.)
- Channels can be created and setup using Easergy builder.
- Configuration settings – e.g., IP addresses – can be modified using the embedded webApp.
- Embedded firewall can be configured to improve overall security.
- HUE is delivered with no default protocols or channels preconfigured.

Protocols

Saitel DR HUE communicates with IEDs and control systems using open protocols. HUE can also be used to act as data concentrator or protocol converter for downstream devices.

Saitel DR HUE can manage several communication channels and protocols concurrently.

IEC 60870-5-101 client and server

- UDP and Serial (RS232/485)
- Supports secure authentication as per IEC 62351-5
- Redundant connections with several controlling stations

IEC 60870-5-103 client

IEC 60870-5-104 client and server

- TCP only
- Supports secure authentication as per IEC 62351-5
- Redundant connections with several controlling station IPs

For more information on the IEC 60870-5 protocol, visit www.iec.ch

DNP3.0 client and server

- Supports secure authentication as per IEC 62351-5
- UDP, TCP (including dual end point), and Serial (RS232/485)

For more information on the DNP3 protocol, visit www.dnp.org

Modbus client and server

- TCP and Serial (RS232/485)

For more information on the Modbus protocol, visit www.modbus.org

IEC 61850 client and server

- IEC 61850-8-1 ed.1 client
- IEC 61850-8-1 ed.2.0 client and server
- MMS RCB publish and subscribe
- GOOSE publish and subscribe

For more information on IEC 61850, visit www.iec.ch

Other protocols

- HTTPs for embedded webserver access
- SNTP for time synchronization
- SNMP client and agent *
- RADIUS and LDAP client
- IEEE1588 (PTP) client and server

() Please contact Schneider Electric representative for availability*

Cybersecurity features implemented in Saitel DR HUE help to mitigate cyber threats as per IEC 62443 standard.

Cybersecurity requirements are designed to meet the international cybersecurity standards and support the security systems necessary to fulfill NERC and IEC 62351 requirements.

Cybersecurity log

Saitel DR supports advanced logging and monitoring features for cybersecurity implementations. Logs are protected against unauthorized access, modification and deletion and are preserved in the security events log.

Port Hardening

All unused Saitel DR physical ports (Ethernet and Serial) are disabled on device startup.

At least one of the Ethernet ports of the HUE module must be enabled to give the possibility to connect to the unit.

Firewall

For each Ethernet interface, the firewall can be configured to:

- Block TCP ports
- Block IP addresses (blocklist)
- Allow only IP addresses (allowlist)

Protocols

Saitel DR HUE includes as standard and without external devices, the following cybersecurity features:

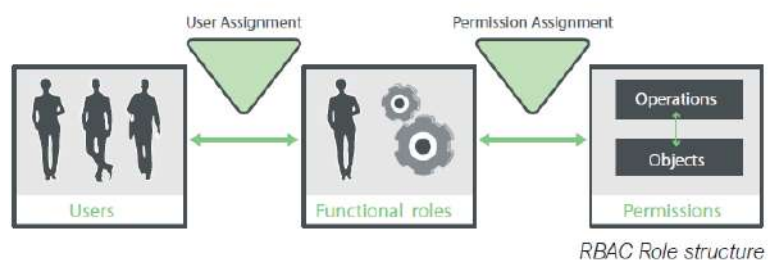
- Secure communication between Saitel DR HUE and local or remote connections using HTTPS, SSH, SFTP
- User identification and authentication as per IEC 62351-8
- Communication authentication as per IEC 62351-5 when using DNP3 and IEC 60870-5-104 protocols.
- Port hardening management.
- IP communication filter
- Security events log storage and transmission according to Syslog protocol

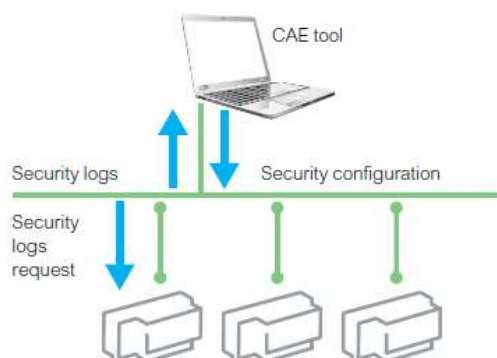
Local and Remote Access Control (RBAC)

The device uses Role-Based-Access-Control (RBAC) to provide defined levels of access for users. RBAC is predefined as per IEC 62351-8.

Saitel DR HUE is provided with a pre-defined RBAC. It can be customized with the Cybersecurity manager tool CAE or HUE webApp.

Role	Right								
	DATA BASE	FIRMWARE	WEB Services	BUILDER	TOOLS	LOG & SOE	SECURITY	DATA	RESET
VIEWER			•					•	
OPERATOR	•		•			•		•	
ENGINEER	•	•	•	•	•	•		•	•
INSTALLER	•	•	•	•	•	•		•	•
SECADM			•				•		





Cybersecurity Administration Expert Tool (CAE)

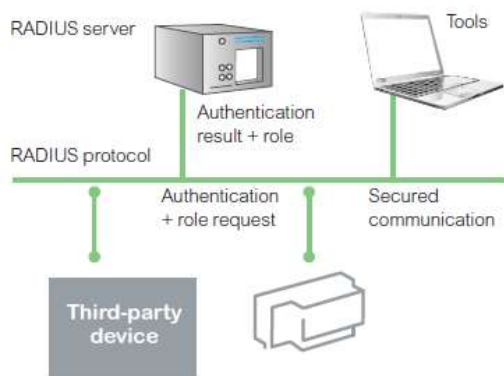
The EcoStruxure Cybersecurity CAE and/or EcoStruxure™ Power Automation System Maintenance is a windows-based tool that allows a central management of Security configuration and access to security logs of each PowerLogic™ T500.

Security configuration includes:

- Security policy, including for example: password complexity or password strategy.
- Define rules for security logs, choose between various standards.
- Roles and permissions: Role Base Access Control (RBAC).
- Users with associated roles.

Local Authentication and Authorization

Local authentication and authorization can be achieved without any external servers. Security configuration is stored locally in each PowerLogic™ T500. Users authentication and authorization using associated role are performed locally (RBAC). CAE is used to update globally the security configuration of all the PowerLogic™ T500 located inside the substation, so that users, associated passwords, and other parameters are consistent on all devices. Centralized authentication and authorization can be achieved also with one or two Radius and LDAP server, with IEC 62351-8 extension. In order to coordinate the authentication from a unique customer security policy management system.



Radius and LDAP Server

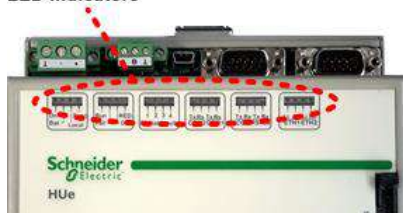
This allows to use Unified Account management system shared across heterogenous solutions. The same credentials are used for each PowerLogic™ T500, at tools and at third party devices.

Radius server is in charge of authenticating users and providing associated role. Then PowerLogic™ T500 allows access based on this role and the internal security configuration (RBAC).

Saitel DR offers intuitive user interfaced to simplify the overall user experience across the different stages of the product's lifecycle.

Saitel DR HUE offers both physical and virtual user interfaces to adequately inform the user of the system status and quickly diagnose potential issues.

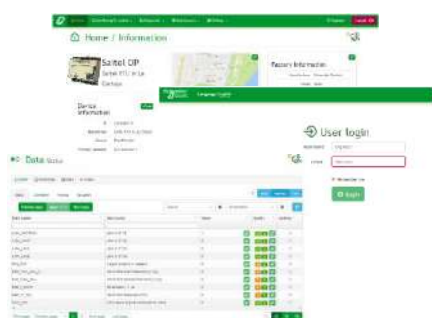
LED Indicators



Saitel DR HUE – Visual indications

Quickly identify device status and option to recover from abnormal states.

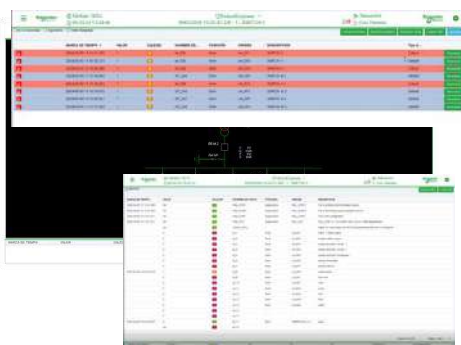
- Multi-color LED indicators linked to device activity and health
- USB serial console port for advanced troubleshooting



Saitel DR webApp – Maintenance & diagnostics

Embedded web interface to the device enabling authorized users to:

- Monitor device configuration
- View current state of all the processed signals
- Manage firmware version
- Check device log
- Analyze protocol frames



Saitel DR webUI

Optional feature that can be configured using Easergy Builder, webUI is a lightweight web-based substation HMI that leverages the real-time database and embedded webserver technology offering just-enough features to allow local control of a substation.

- System view
- Single Line Diagram
- Manage alarms & events
- Use same RBAC model defined for HUE

Functions and Description

Saitel DR HUe

Characteristics



HUe M588 x x 0 0 0 y zz

Power (Ax):

2: 24 – 48 V_{DC}

Ethernet Ports (Bx):

- 1: 3 copper ports
- 2: 2 fiber optic ports + 1 copper port

Revision:
(Revision code)

Coating:

2: AVR80 coating by ABchimie)

Main

Range of Product	EasyLogic
Device short name	Saitel DR HUe

Hardware Specifications

Processing unit	Sitara™ AM3356BZCZD60
	Technology: ARM® Cortex™-A8
	Data bus: 32-bits
	Clock frequency: Up to 720 MHz
External RTC	DS3232 controlled by I2C
RTC Accuracy	±2 ppm (0°C to +40°C)
	±3.5 ppm (-40°C to +70°C)
Flash memory (NOR)	32 MB
Flash memory (NAND)	256 MB
Static RAM memory	2 MB
Dynamic RAM memory (DDR3)	256 MB
Assurance for static RAM	Integrated supercapacitor
Autonomy in power down	Up to 8 hours (+25 °C)
Power input	24 - 48 V ± 20%
Consumption	5 W Maximum

Hardware Specifications

Weight	600 g
Dimensions	134 mm x 129 mm x 60 mm
Coating	AVR80 (Depending on P/N)
Protection degree	IP20
Range of temperature	Operation: From -40° C to +70° C (See warning note below) Storage: From -40° C to +85° C

Interfaces

Power supply (POWER)	3-pole terminal block Wire: 2.5 mm² (13 AWG)
Console port (CON)	Bluetooth connection Mini-USB connector
Serial port (RS-485)	RS-485 communications 3-pole connector, with isolation Wire: 1.5 mm² (15 AWG)
Serial port (COM1)	RS-232 communications Male DB9 connector, without isolation Modem control (full) GPS port
Serial port (COM2)	RS-232 communications Male DB9 connector, without isolation Modem control (only RTS and CTS)
USB port	2.0 (Host)
SD card	Up to 32 GB
Auxiliary digital inputs (AUX DI)	5-pole terminal block with isolation 4 digital inputs for general purpose
IRIG-B	2-pole terminal block with isolation 1.5 mm² (15 AWG)
External watchdog (WD)	Maximum capacity of current: 20 mA 2-pole terminal block with isolation 1.5 mm² (15 AWG)

Ethernet

Ethernet port (MNT)	Fast-Ethernet 10/100BaseT RJ-45 connector
Ethernet ports (LAN1 and LAN2)	Fast-Ethernet 10/100BaseT RJ-45 connector
Communication with other modules	Internal bus (power, data, synchronization, ...)

Software

Operating System	RTLinux
External synchronization	GPS / IRIG-B / Protocol / SNTP / PTP
IRIG-B	TTL input signal Protocols: IRIG-B002, IRIG-B003, IRIG-B006 and IRIG-B007
Discrimination time for events	1 ms
Watchdog software	Internal
Security control	Secure authentication for DNP3 and IEC 60870 Embedded firewall Secured interfaces User management based on a RBAC model

Cybersecurity

Based on	IEC62351 IEC62443 (Level 1)
Security Engine	SEC 3.3.2 (XOR acceleration)
Supported cryptographic algorithms	3DES, AES, MD5/SHA, RSA/ECC, & FIPS (determinist generator)
Processing	Single pass encryption and authentication
Security protocols	SSL 3.0, SSL 3.1 / TLS 1.0

CE Mark

Directives	LVD – Low Voltage Directive	2014/35/EU
	EMC – Electromagnetic Compatibility	2014/30/EU
	RoHS 3 – Restriction of Hazardous Substances	2015/863/EU
	WEEE – Waste Electrical and Electronic Equipment	2012/19/EU
Electrical Safety	General requirements IEC-EN 60950-1:2006 + A11:2009 + A1:2010 + AC:2011 + A12:2011+ A2:2013	
EMC Product Standards	IEC-EN 60870-2-1 (1996)	
	IEC/TS-EN 61000-6-5 (2015)	
	EN 50121-5:2017 /A1:2019	
Emission	Radiated emissions EN 55022:2006 + A1:2007	From 30 to 6000 MHz (Class A)
	Conducted emissions EN 55022:2006 + A1:2007	From 0.15 to 30 MHz (Class A)
Immunity	Electrostatic discharges (ESD) IEC-EN 61000-4-2:2009	By air ± 8 kV and by contact (direct and indirect) ± 6 kV (Level 3)
	Radiated, radiofrequency, electromagnetic field IEC-EN 61000-4-3:2006 + A2:2010	From 80 to 6000 MHz (Level 3)
	Fast transient common mode IEC-EN 61000-4-4:2012	Power port: ± 4 kV, 5kHz. Communications ports: ± 2 kV 5kHz and ± 4 kV 2.5kHz. I/O ports: ± 2 kV 5kHz and ± 4 kV 2.5kHz.
	Surges, line to line and line to ground IEC-EN 61000-4-5:2006	Power port: ± 4 kV common and differential mode Other ports: ± 2 kV differential mode, ± 4 kV common mode
	RF common mode IEC-EN 61000-4-6:1996 + A1:2001	10 V _{RMS} 0.15-80MHz 80% AM (Level 3)
	Power frequency magnetic field IEC-EN 61000-4-8:2010.	100 A/m, 1000 A/m 3s (Level 4) 300 A/m, > 10s
	Power frequency common mode disturbances IEC-EN 61000-4-16:1998	30V 50Hz, 300V 50Hz 1s (Level 4)
	Damped Oscillatory wave IEC-EN 61000-4-18:2007 + A1:2010	1kV symmetrical, 2.5kV asymmetrical, (f=1MHz)
Environmental	Cold – IEC-EN 60068-2-1:2007	-40°C during 16h
	Dry heat – IEC-EN 60068-2-2:2007	+70°C during 16h
	Damp heat – IEC-EN 60068-2-30:2005	(12h+12h cycle) (+55°C / 2 cycles)

Saitel DR AB

Acquisition Block Characteristics



AB_SER M567 x 0 0 0 0 y zz

Version (Ax):

- 1: Without auxiliary power + 4 RS-232/RS-485 ports
- 2: With auxiliary power + 4 RS-232/RS-485 ports
- 3: Without auxiliary power + 2 RS-232/RS-485 ports + 2 650 nm FO ports (Versatile Link)
- 4: Without auxiliary power + 2 RS-232/RS-485 ports + 2 820 nm FO ports (ST)

Revision:

(Revision code)

Coating:

- 2: AVR80 coating by ABchimie)

Main

Range of product	EasyLogic
Device short name	Saitel DR AB_SER

Hardware Specifications

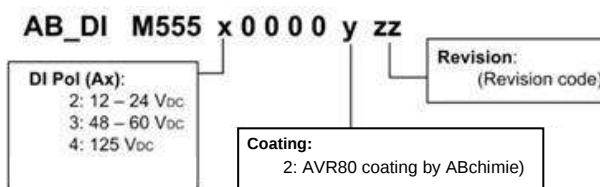
Channels	Number	4
	Type	2 channels only for asynchronous communication 2 channels configurable for asynchronous (by default) or synchronous communication
Communications	Level	RS-232 / RS-485 (2 wires) / RS-422 (4 wires).
	Signals	Rx, Tx, RTS and CTS
Type of compatible CPU	HUe, HU_A and HU_AF	
Maximum number of AB_SER	4	
Galvanic isolation (per block)	500 V	
Typical consumption	1.1 W	
Electric features of serial port (Only for P/N A2)	Power supplied by serial port (pin 1)	5 VDC
	Current limiting resistor	100 mA
	External power for serial port	24 VDC ±20%
Mechanical Data	Dimensions	94 mm x 129 mm x 60 mm
	Weight	408 g

Interfaces

Channel connector	Communications Ports	4 DB9 male connectors
(*) Consult AB_SER user manual for information about legacy versions.		

Functional Specifications

Transmission characteristics	Configurable for each channel	
Transmission / Reception	By complete streams	
Transmission rate	Synchronous communications	Up to 9600 bps (communication)
	Asynchronous communications	Up to 115200 bps
	Other transmission rates are available with special configurations	



Main

Range of Product	Saitel DR
Device short name	AB_DI

Hardware Specifications

Consumption	0.55 W
Dimensions	94mm x 129mm x 60mm
Net Weight	420 g
Coating	AVR80 (Depending on P/N)
I/O Signals	Number of digital inputs: 16 Max. Number of counter inputs: 16 Inputs per common: 4
Polarization voltage (PV)	24 V _{DC} / 48-60 V _{DC} / 125 V _{DC} , ±20%
Isolation (Inputs)	2 kV
Logic voltage levels	< 5.5 mA at nominal PV
Input current per signal	High level "1": From 80 % (PV) Low level "0": Up to 30 % (PV)
Connectivity	Two 10-pole terminal blocks for digital inputs 2.5 mm / 13 AWG
Polarization Type (DI POL)	M5722x000yzz -> 12-24 V Max. - 7 mA / signal M5723x000yzz -> 48-60 V Max. - 4 mA / signal M5724x000yzz -> 125 V Max. - 3 mA / signal

Software

Type	Simple / Double / Slow counter
Processing	Status indication (simple and double)
	Memorized indication
	32-bit pulse counters, 45 Hz (single or double edge)
	Digital Filtering / Settling time / Change memory / Antichattering / Inversion
Timestamp for events	1 ms
Filtering time	0 – 255 ms
Setting time	0 – 25500 ms
Change memory	0 – 2550 ms
Anti-chattering window	0 – 255 s
Events for chattering	1 – 255 changes

CE Mark

Directives	LVD – Low Voltage Directive	2014/35/EU
	EMC – Electromagnetic Compatibility	2014/30/EU
	RoHS 3 – Restriction of Hazardous Substances	2015/863/EU
	WEEE – Waste Electrical and Electronic Equipment	2012/19/EU
EMC Product Standards	Power supply and EMC IEC-EN 60870-2-1:1996	
	Immunity for equipment in power station and substation environment - IEC 61000-6-5 and EN 50121-5:2017 /A1:2019	
	Immunity standard for industrial environments - IEC 61000-6-2 and EN 50121-5:2017 /A1:2019	
	Emission standard for industrial environments - IEC 61000-6-4 and EN 50121-5:2017 /A1:2019	
Emission	Radiated emissions EN 55022:2006 + A1:2007	From 30 to 6000 MHz (Class A)
	Conducted emissions EN 55022:2006 + A1:2007	From 0.15 to 30 MHz (Class A)
Immunity	Electrostatic discharges (ESD) IEC-EN 61000-4-2:2009	By air ±8 kV and by contact (direct and indirect) ±6 kV (Level 3)
	RF electromagnetic field IEC-EN 61000-4-3:2006 + A2:2010	From 80 to 6000 MHz (Level 3)
	Fast transient common mode IEC-EN 61000-4-4:2012	Power port: ±4 kV, 5kHz. Communications ports: ±4 kV 5kHz and 2.5kHz.
		I/O ports: ±4 kV 5kHz and 2.5kHz

CE mark (cont.)

Immunity (cont.)	Surge IEC-EN 61000-4-5:2006	Power port: ± 4 kV common and differential mode Other ports: ± 2 kV differential mode, ± 4 kV common mode
	RF common mode IEC-EN 61000-4-6:2009	10 VRMS 0.15-80 MHz 80% AM (Level 3)
	Power frequency magnetic field IEC-EN 61000-4-8:2010	100 A/m, 1000 A/m 3s (Level 4). 300 A/m >10s
	Power frequency common mode disturbances. IEC-EN 61000-4-16:1998	30 V 50 Hz, 300V 50 Hz 1 s (Level 4)
	Damped oscillatory wave IEC-EN 61000-4-18:2007 + A1:2010	Power, Communications, and I/O: 1kV symmetrical, 2.5kV asymmetrical, (f=1MHz)
Safety	General requirements IEC-IEC 61010-1: 2010 + CORR.1: 2011 IEC-EN 61010-1:2010 IEC-EN 61010-1: 2011	Meets all the requirements indicated in the normative
	Insulation, dielectric rigidity, and impulse voltage IEC-EN 60255-5:2001 IEC-EN 60255-5:2002	Isolation >100 M Ω Electric strength: 2 kV _{DC} Impulse voltage: 5 kV
Environmental	Cold IEC-EN 60068-2-1:2007	-40°C during 16h
	Dry heat IEC-EN 60068-2-2:2007	+70°C during 16h
	Damp heat IEC-EN 60068-2-30:2005	From 25 °C up to 55 °C / 95% RH 2 cycles of 24 h



AB_DO M554 x 0 0 0 0 y zz

Switching power (Vx):
2: 24 V_{DC}
3: 48 V_{DC}

Revisión:
(Código de revisión)

Coating:
2: AVR80 coating by ABchimie)

Main

Range of Product	EasyLogic
Device short name	Saitel DR AB_DO

Hardware Specifications

Consumption		0.75W
Dimensions		94mm x 129mm x 60mm
Net Weight		530g
Coating		AVR80 (Depending on the P/N)
Field connection		Terminal blocks
Range of temperature		Operation: From -40° C to +70° C Storage: From -40° C to +125° C
Digital Outputs	Number of DO	8
	Max. output current	5 A
	Connectivity (power input)	3-pole terminal block / 2.5 mm² / 13 AWG
	Connectivity (signals)	2-8 pole terminal block / 2.5 mm² / 13 AWG
	Output switching capacity	L/R = 20 ms: 220 V _{DC} / 300 mA 110 V _{DC} / 400 mA 48 V _{DC} / 500 mA 24 V _{DC} / 2 A 12 V _{DC} / 5 A L/R = 40 ms: 48 V _{DC} / 400 mA 24 V _{DC} / 1.2 A 12 V _{DC} / 5 A
	Power input options (switching mechanism)	24 V Max. 17 mA/relay (M554x2000yzz) 48 V Max. 9 mA/relay (M554x3000yzz)

Software

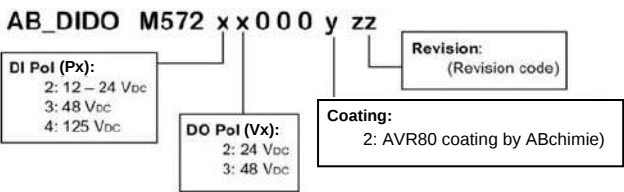
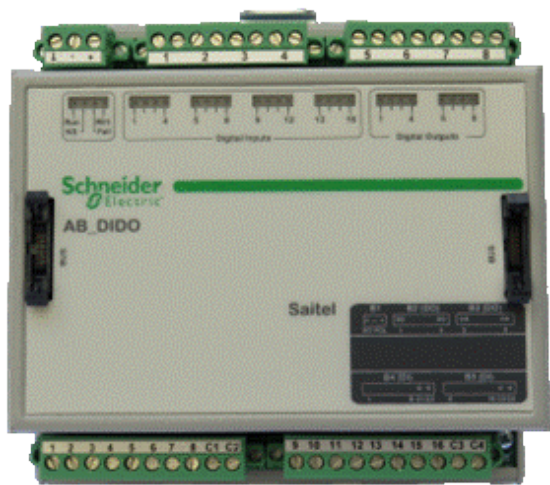
Type	Simple / Double
Processing	Pulsing (fixed time) / Latching
Security mechanism	SBO (Select Before Operate) and Feedback on the output coil's relay
Output actuation timing	1 – 65535 ms
Power input test	Automatic

CE Mark

Directives	LVD – Low Voltage Directive	2014/35/EU
	EMC – Electromagnetic Compatibility	2014/30/EU
	RoHS 3 – Restriction of Hazardous Substances	2015/863/EU
	WEEE – Waste Electrical and Electronic Equipment	2012/19/EU
EMC Product Standards	Power supply and EMC IEC-EN 60870-2-1:1996	
	Immunity for equipment in power station and substation environment - IEC 61000-6-5 and EN 50121-5:2017 /A1:2019	
	Immunity standard for industrial environments - IEC 61000-6-2 and EN 50121-5:2017 /A1:2019	
	Emission standard for industrial environments - IEC 61000-6-4 and EN 50121-5:2017 /A1:2019	
Emission	Radiated emissions EN 55022:2006 + A1:2007	From 30 to 6000 MHz (Class A)
	Conducted emissions EN 55022:2006 + A1:2007	From 0.15 to 30 MHz (Class A)
Immunity	Electrostatic discharges (ESD) IEC-EN 61000-4-2 (1995) / A1 (1998) / A2 (2001)	By air ± 8 kV and by contact (direct and indirect) ± 6 kV (Level 3)
	Radiated, RF, EMC field IEC-EN 61000-4-3:2006	From 80 to 6000 MHz (Level 3)
	Fast transient common mode IEC-EN 61000-4-4:2012	Power port: ± 4 kV, 5kHz. Communications ports: ± 4 kV 5kHz and 2.5kHz. I/O ports: ± 4 kV 5kHz and 2.5kHz
	Surge, line to line and line to ground IEC-EN 61000-4-5:2006	Power port: ± 4 kV common and differential mode Other ports: ± 2 kV differential mode, ± 4 kV common mode

CE mark (cont.)

Immunity (cont.)	RF common mode IEC-EN 61000-4-6:1996 + A1:2001	10 VRMS 0.15-80MHz 80% AM (Level 3)
	Power frequency magnetic field IEC-EN 61000-4-8:2010	100 A/m, 1000 A/m 3s (Level 4). 300 A/m >10s
	Damped oscillatory wave IEC-EN 61000-4-18:2007 + A1:2010	Power, Communications, and I/O: 1kV symmetrical, 2.5kV asymmetrical, (f=1MHz)
Environmental tests	Cold – IEC-EN 60068-2-1:2007	-40°C during 16h (100h)
	Dry heat – IEC-EN 60068-2-2:2007	+70°C during 16h (100h)
	Damp heat – IEC-EN 60068-2-30:2005	(12h+12h cycle) (+55°C / 2 cycles)
Safety	IEC 60950-1 / EN 61010-1: 2011 General requirements	Meets all the requirements indicated in the normative
	IEC-EN 60255-5 Insulation and dielectric rigidity	Isolation >100 MΩ, 2 kV _{AC}



Main

Range of Product	EasyLogic
Device short name	Saitel DR AB_DIDO

Hardware Specifications

Consumption		1W
Dimensions		134mm x 129mm x 60mm
Net Weight		705g
Coating		AVR80 (Depending on the P/N)
Field connection		Terminal blocks
Digital Inputs	Number of DI	16
	Input current per signal	< 5.5 mA at nominal PV
	Input per common	4
	Connectivity	2 10-pole terminal blocks / 2.5 mm² / 13 AWG
	Logic voltage levels	High level “1”: From 80% (PV) Low level “0”: Up to 30% (PV)
	Polarization options (DI)	24 V Max. 7 mA / signal (M5722x000yzz) 48-60 V Max. 4 mA / signal (M5723x000yzz) 125 V Max. 3 mA / signal (M5724x000yzz)

Hardware Specifications

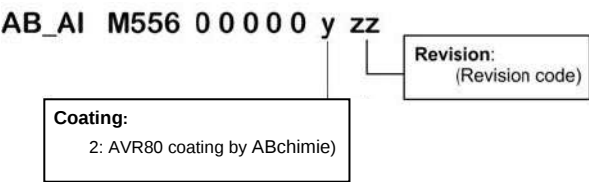
Digital Outputs	Number of DO	8
	Max. output current	5 A
	Connectivity (polarization)	3-pole terminal block / 2.5 mm ² / 13 AWG
	Connectivity (signals)	2-8 pole terminal block / 2.5 mm ² / 13 AWG
	Output switching capacity	L/R = 20 ms: 220 V _{DC} / 300 mA 110 V _{DC} / 400 mA 48 V _{DC} / 500 mA 24 V _{DC} / 2 A 12 V _{DC} / 5 A L/R = 40 ms: 48 V _{DC} / 400 mA 24 V _{DC} / 1.2 A 12 V _{DC} / 5 A
	Power input options (switching mechanism)	24 V Max. 17 mA/relay (M572x2000yzz) 48 V Max. 9 mA/relay (M572x3000yzz)

Software

Type	Simple / Double / Slow counter
Processing	Status indication (simple and double) Memorized indication 32-bit pulse counters, 45 Hz (single or double edge) Digital Filtering Settling time Change memory Antichattering Inversion
Timestamp for events	1 ms
Filtering time	0 – 255 ms
Setting time	0 – 25500 ms
Change memory	0 – 2550 ms
Anti-chattering window	0 – 255 s
Events for chattering	1 – 255 changes
Type	Simple / Double
Processing	Pulsing (fixed time) / Latching
Security mechanism	SBO (Select Before Operate) and Feedback on the output coil's relay
Output actuation timing	1 – 65535 ms
Polarization test	Automatic

CE Mark

Directives	LVD – Low Voltage Directive	2014/35/EU
	EMC – Electromagnetic Compatibility	2014/30/EU
	RoHS 3 – Restriction of Hazardous Substances	2015/863/EU
	WEEE – Waste Electrical and Electronic Equipment	2012/19/EU
EMC	EN 60870-2-1:1996	
	EN 61000-6-5: 2015	
Emission	Radiated emissions EN 55022:2006 + A1:2007	From 30 to 1000 MHz (Class A)
	Conducted emissions EN 55022:2006 + A1:2007	From 0.15 to 30 MHz (Class A)
Immunity	Electrostatic discharges (ESD) EN 61000-4-2 (1995) / A1 (1998) / A2 (2001)	By air ± 8 kV and by contact ± 6 kV (Level 3)
	Radiated, RF, EMC field EN 61000-4-3:2006	From 80 to 2700 MHz (Level 3)
	Fast transient common mode EN 61000-4-4:2012	Power port: ± 4 kV, 5kHz. Communications ports: ± 2 kV 5kHz I/O ports: ± 2 kV 5kHz
	Surge, line to line and line to ground EN 61000-4-5:2006	± 1 kV symmetric, ± 2 kV asymmetric
	RF common mode EN 61000-4-6:1996 + A1:2001	10 V _{RMS} 0.15-80MHz 80% AM (Level 3)
	Power frequency magnetic field EN 61000-4-8:2010	30 A/m 50Hz
Environmental tests	Cold – EN 60068-2-1:2007	-30°C during 16h (100h)
	Dry heat – EN 60068-2-2:2007	+70°C during 16h (100h)
	Damp heat – EN 60068-2-30:2005	(12h+12h cycle) (+55°C / 2 cycles)
Safety	IEC 60950-1 / UNE-EN 61010-1: 2011 General requirements	Meets all the requirements indicated in the normative
	IEC 60255-5 Insulation and dielectric rigidity	Isolation >100 M Ω , 2 kV _{AC}



Main

Range of Product	EasyLogic
Device short name	Saitel DR AB_AI

Hardware Specifications

Consumption	0.6 W
Dimensions	94 mm x 129 mm x 60 mm
Net Weight	427 g
Signal type	Differential
Input type	Voltage from factory
	Current, using an external resistor (250 Ω)
Converter	16-bits sigma-delta
Accuracy	Better than 0.1% at 25°C
Input impedance	200 kΩ
Voltage tolerance in common mode	>15 V

Software

Common mode rejection ratio	90 dB
Parameterization	Configurable range by channel: ±5 Vdc / 0 - 5 Vdc ±20 mA / 0 - 20 mA / 4 - 20 mA
Processing	Digital filtering
	Scaling to engineering units
	Range limits detection
	Value change detection
	Zero value cancellation

CE Mark

Directives	LVD – Low Voltage Directive	2014/35/EU
	EMC – Electromagnetic Compatibility	2014/30/EU
	RoHS 3 – Restriction of Hazardous Substances	2015/863/EU
	WEEE – Waste Electrical and Electronic Equipment	2012/19/EU
EMC	EN 60870-2-1 (1996)	
	IEC/TS 61000-6-5 (2015)	
Emission	Radiated emissions EN 55022:2006 + A1:2007	From 30 to 1000 MHz (Class A)
	Conducted emissions EN 55022:2006 + A1:2007	From 0.15 to 30 MHz (Class A)
Immunity	Electrostatic discharges (ESD) EN 61000-4-2:2009	By air ± 8 kV and by contact ± 6 kV (Level 3)
	Radiated, RF, EMC field EN 61000-4-3:2006 + A2:2010	From 80 to 2700 MHz (Level 3)
	Fast transient common mode EN 61000-4-4:2012	Power port: ± 4 kV, 5kHz. Communications ports: ± 4 kV 5kHz and 2.5kHz. I/O ports: ± 4 kV 5kHz and 2.5kHz
	Surges, line to line and line to ground EN 61000-4-5:2006	Power port: ± 4 kV symmetric and asymmetric Other ports: ± 2 kV symmetric, ± 4 kV asymmetric
	RF common mode EN 61000-4-6:1996 + A1:2001	10 V _{RMS} 0.15-80MHz 80% AM (Level 3)
	Power frequency magnetic field EN 61000-4-8:2010	100 A/m, 1000 A/m 3s (Level 4)
	Power frequency common mode disturbances EN 61000-4-16:1998	30V 50Hz, 300V 50Hz 1s (Level 4)
	Damped Oscillatory wave EN 61000-4-18:2007 + A1:2010	Power, Communications and I/O: 1kV DM, 2.5kV CM (Level 4), (f=1MHz)
Environmental tests	Cold – EN 60068-2-1:2007	-40°C during 16h (100h)
	Dry heat – EN 60068-2-2:2007	+70°C during 16h (100h)
	Damp heat – EN 60068-2-30:2005	(12h+12h cycle) (+55°C / 2 cycles)

Commercial References

Saitel DR HUE – High-performance Head Unit

Comm. Ref.	Description	
M588210002	Saitel DR HUE/A2.B1	Saitel DR High-performance head unit

Saitel DR AB_SER – Saitel DR serial expansion module

Comm. Ref.	Description	
M567100002	Saitel DR AB_SER/F1	Saitel DR Serial expansion module

Saitel DR AB_DI – Saitel DR digital inputs

Comm. Ref.	Description	
M555200002	Saitel DR AB_DI/P2	Saitel DR 16x Digital inputs (12-24 V _{DC})
M555300002	Saitel DR AB_DI/P3	Saitel DR 16x Digital inputs (48-60 V _{DC})
M555400002	Saitel DR AB_DI/P4	Saitel DR 16x Digital inputs (110-125 V _{DC})

Saitel DR AB_DO – Saitel DR digital outputs

Comm. Ref.	Description	
M554200002	Saitel DR AB_DO/V2	Saitel DR 8x Digital outputs (powered 24 V _{DC})
M554300002	Saitel DR AB_DO/V3	Saitel DR 8x Digital outputs (powered 48 V _{DC})

Saitel DR AB_DIDO – Saitel DR digital inputs and outputs

Comm. Ref.	Description	
M572220002	Saitel DR AB_DIDO/P2.V2	Saitel DR 16x DI (24 V _{DC}) + 8 DO (@ 24 V _{DC})
M572330002	Saitel DR AB_DIDO/P3.V3	Saitel DR 16x DI (48 V _{DC}) + 8 DO (@ 48 V _{DC})
M572420002	Saitel DR AB_DIDO/P4.V2	Saitel DR 16x DI (110 V _{DC}) + 8 DO (@ 24 V _{DC})

Saitel DR AB_AI – Saitel DR analog inputs

Comm. Ref.	Description	
M556000002	Saitel DR AB_AI	Saitel DR 8x Analog Inputs (DC)

Saitel DR accessories

Comm. Ref.	Description	
M570000002	Saitel DR TU	Saitel DR Row Termination Unit
M568200002	Saitel DR XU/V2	Saitel DR Row Expansion Unit (24 V _{DC} power)
M568200002	Saitel DR XU/V3	Saitel DR Row Expansion Unit (48 V _{DC} power)
TE36000422	Saitel DR XC	Saitel DR Row Expansion Cable
M569000002	Saitel DR BT (x5)	Saitel DR Basic terminator (5x - spares)
TE36000243	Saitel DR FC (x10)	Saitel DR Flat ribbon cable (10x - spares)



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April 2024

EasyLogic Saitel DR

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