Life Is On

eliwell™

by Schneider Electric



Free Optima

The powerful PLC for compact machines

COMPATIBLE WITH NATURAL REFRIGERANTS

www.eliwell.com

Free Optima: the powerful PLC for compact machines

Free Optima is the latest addition to the Free Way logic controllers' family, developed with the aim of improving the existing Free Smart range.
It features an **increased memory, many connectivity options and an embedded Electronic Expansion Valve Driver**, all in the most compact 4 DIN form-factor.

Applications

Small and compact machines
- Heat pumps
- Process chillers
- Pumping
- Boilers/heaters/dryers

For more complex machines just add I/O expansions.



Low-GWP gas ready
Conform to EN/IEC 60335-2-40 related to **A3** refrigerants, such as R290
Suitable for **A2L**

Green Premium product
Sustainable performance, by Design
Compliance with environmental regulations

1MB to support simple and complex programs

Less is more
Insulation everywhere simplifying machine wiring diagram and reducing the number of components

Adaptive
One unit for super compact machines; for bigger ones, just add I/O expansions

Multiple connection capabilities
to the other devices inside the machine
Modbus RTU client and server,
CANopen, USB-C, Remote display bus

Decarbonization

Efficiency

Digitization



Small dimensions
4-DIN module
in three versions

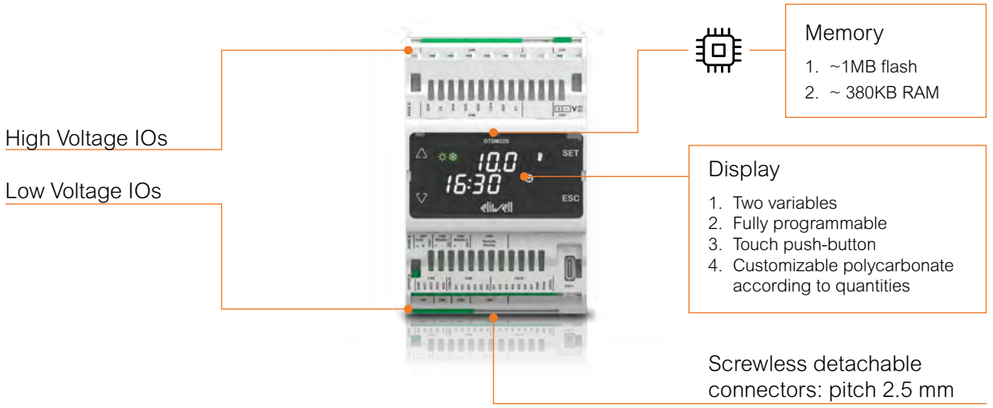
Flexible & Configurable
22 IOs to adapt to different machines
Inputs: NTC, PT1000, 0...5V, 0...10V, 4...20mA,voltage free, Pulse counter
Outputs: Relay, SSR, PWM, 0...10V, 4...20mA

Integrated EEVD
Integrated Unipolar Electronic Expansion valve driver

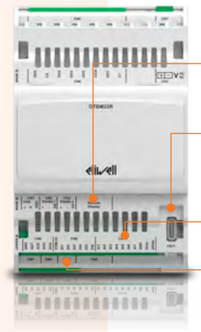
Ready-to-use assets
simplifying programming
IEC61131 - Many templates, libraries, function blocks available

IoT on deck
Straightforward connection to the Secure Interface: cybersecure IoT module

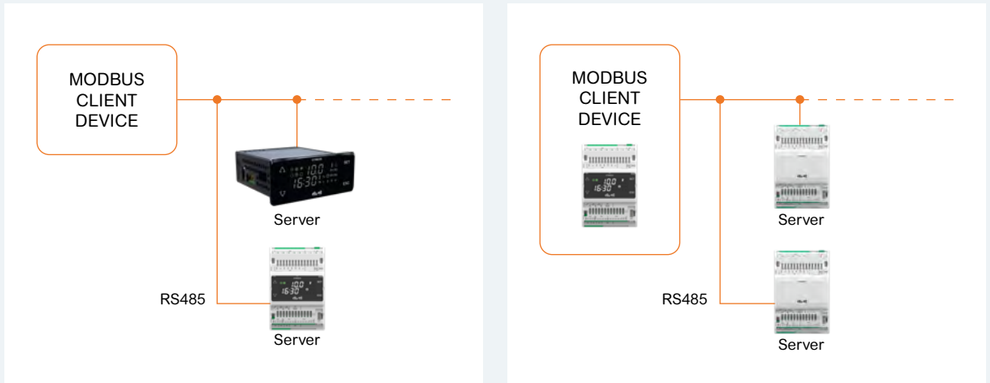
Connectivity



- Easy integration with system
- Controller resources accessible via Modbus communication
- Modbus client and server mode
- Expansion bus via CANopen
- Isolated RS485 and power supply



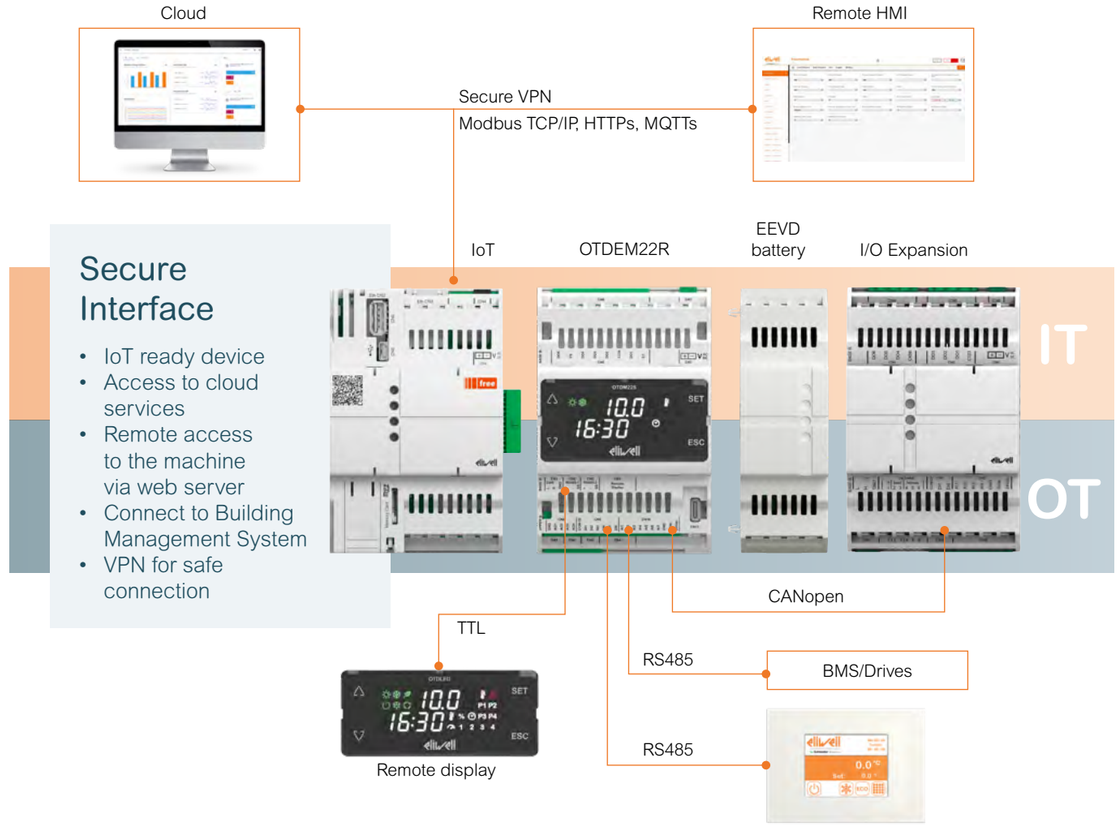
Modbus server or client mode example



Architecture

Two ports on the side of the device provide connection to secure interface plug-in and backup EEVD battery.





Secure Interface

- IoT ready device
- Access to cloud services
- Remote access to the machine via web server
- Connect to Building Management System
- VPN for safe connection

Free Optima models

Models are available in **both 4 DIN rail mount version** (OTD with display, OTB without display) **and in the standard 32x74mm panel mount version** (OTF); with either **24Vac/dc** or **230/110 Vac** power supply (OTD and OTB only).
OTD version come with integrated EEVD option (OTDE).



OTD



OTB



OTF

Free Optima 24 Vac/dc

R identifies units with 5x relay DO - S identifies units with 3x relay, 2x SSR DO

Model	DI	AI	DO	AO	RS485 port	CAN bus	TTL for remote display	IoT connector	USB Type c	EEVD
OTDM22**R**	6	7	5	4	2	1	1	1	1	-
OTDM22**S**	6	7	5	4	2	1	1	1	1	-
OTDEM22**R**	6	7	5	4	2	1	1	1	1	✓
OTBM22**R**	6	7	5	4	2	1	1	1	1	-
OTFM22**R**	6	7	5	4	2	-	-	1	1	-
OTFM22**S**	6	7	5	4	2	-	-	1	1	-

Free Optima 110...230 Vac

R identifies units with 5x relays DO - S identifies units with 3x relay, 2x SSR DO

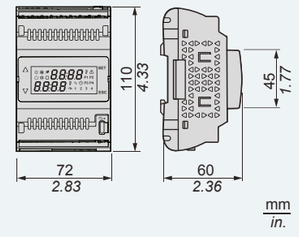
Model	DI	AI	DO	AO	RS485 port	CAN bus	TTL for remote display	IoT connector	USB Type c	EEVD
OTDM22RH	6	7	5	4	2	1	1	1	1	-
OTDM22SH	6	7	5	4	2	1	1	1	1	-
OTBM22RH	6	7	5	4	2	1	1	1	1	-

Technical data

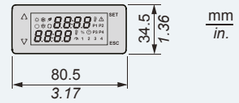
	OTDM22X	OTBM22X	OTFM22X
Dimension HxWxD	110x72x60 mm		34.5x80.5x82.7 mm
Digital Inputs	**2x** Voltage free or pulse reading - up to 2kHz		
	4x Voltage free		
Analog Inputs (6x configurable by pair, 1x configurable)	**1x** NTC(β3435 - 10 KW at 25 °C), PT1000, PTC, digital input, 0-10V		
	6x NTC(β3435 - 10 KW at 25 °C), PT1000, PTC, 4-20mA, 5 Vdc, 0...10 Vdc, digital input		
Digital Outputs	**3x** 5A SPST with the same common, 100k cycles - conforming to UL60730		
	2x 5A SPST with the same common, 100k cycles - conforming to UL60730 OR **2x** SSR with the same common 110/240 Vac and 24 Vac		
Analog Outputs	**1x** 0...10 V / 4...20 mA		
	3x 0-10V/PWM - 10Hz…2kHz		
Operating temperature	-20…65 °C		

Mount and dimensional diagrams

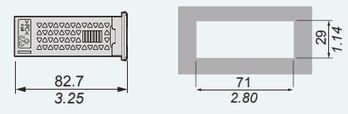
OTB•••• / OTD•••• DIN VERSION

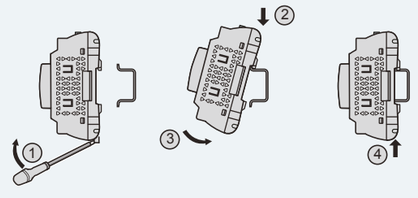


OTFM22• / OTDLED FLUSH MOUNTING VERSION

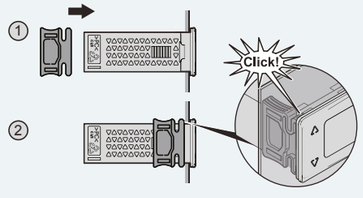


OTFM22•



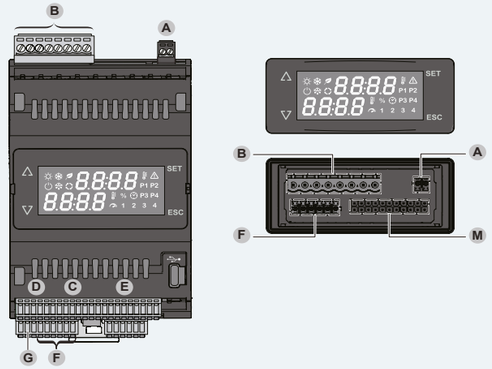


OTFM22•



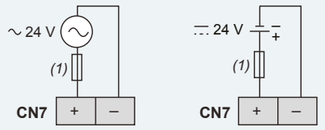
Schemi elettrici

OTDM22R
OTDM22S
OTBM22R
OTDEM22R
OTFM22R
OTFM22S

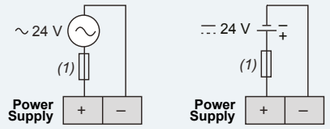


A Power supply

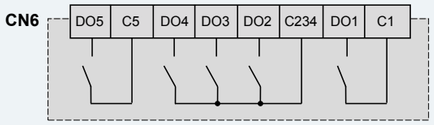
OTDM22S
OTDM22R
OTBM22R
OTDEM22R



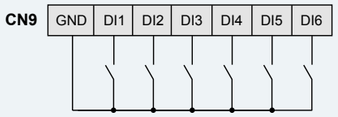
OTFM22R
OTFM22S



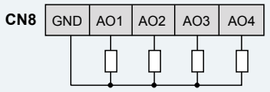
B Digital outputs



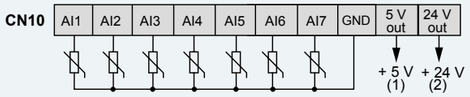
C Digital inputs



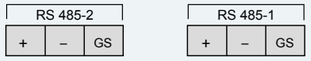
D Analog outputs



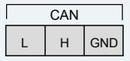
E Analog inputs



F RS485

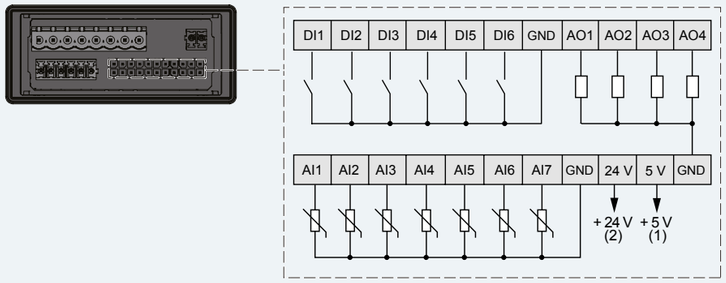


G CAN bus



M Microfit connectors (analog I/Os and digital inputs)

OTFM22•



Secure Interface

Secure Interface is an edge device for IoT connection
> Provides connection to **cloud services** based on AWS or MS Azure
> **VPN** enables cyber-secure connection to any device
> It is both a simple **ModBus gateway** and a **programmable device** for more complex connection and operation
> It provides secure protocols as FTPs, HTTPs, SMTPs, MQTTs, SNMP, ModBus TCP/IP, NTP
> It comes in two versions: **gateway** and **plug-in**

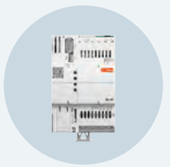
Gateway



Plug-In



	AVS00GW	AVS00PI
Size	4 DIN	
Mount	On DIN rail	
Power supply	24 Vac ± 10% 50/60 Hz 20…38 Vdc (UL/CSA) 24 Vdc (IEC)	
Communication interfaces	**1x** USB-A, **1x** USB-B mini **2x** Ethernet **1x** RS485	**1x** USB-A, **1x** USB-B mini **2x** Ethernet
Operating temperature	-20…55 °C	

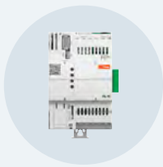


AVS00GW - Gateway

Can connect to several ModBus devices via the RS485 port located at the bottom of the device

Multiple device IoT connected:





AVS00PI - Plug-In

Intended to connect to Free Optima via the local bus located on the right-hand side of the device

Single machine IoT connected:



I/O Expansions

Free Optima offering is completed by various I/O expansions for additional connectivity options and larger machine applications.





	EVE7500	EVE4200
Size	8 DIN	4 DIN
Mount	DIN rail	DIN rail
Power supply	24Vac/dc - 48 Vdc isolated	24Vac/dc
DO	**2x** 8A 250 Vac **5x** 5A 250 Vac	**1x** 5A 250 Vac **3x** 3A 250 Vac
AO	**5x** 0-10V / 4…20mA / switch 0…20mA	**2x** 0-10V
DI	**8x** SELV **1x** voltage free fast counter 1 kHz	**4x** SELV
AI	**2x** NTC 103 AT / NTC NK103 / D.I. **4x** NTC 103 AT / NTC NK103 / D.I. / Pt1000 / 4...20 mA / 0-10 V / 0-5 V	**4x** NTC 103AT / NTC NK103 / D.I. / Pt1000 / PTC / 4...20 mA / 0-10 V / 0-5 V
Connectivity	CANBus isolated: CANopen RS485 isolated: Modbus RTU **1x** EVS Plugin (only EVS RS485, EVS CAN)	CANBus isolated: CANopen
Operating temperature	-10…+55 °C	-10…+55 °C









EVE6000	EVE10200	EP4S00LIV500	EP4S0024V500
4 DIN		4 DIN	
DIN rail		DIN rail	
24 Vac 20…38 Vdc		24 Vac 20…38 Vdc	
6x 3A 250 Vac	**10x** 3A 250 Vac	**4x** SPST 3A 250 Vac **3x** SSR 75...240 Vac	**4x** SPST 3A 250 Vac **3x** SSR 24 Vac/dc
-	**2x** 0-10 V, **2x** 0-10 V /4...20 mA / ON-OFF / PWM / O.C. 24 Vdc 30 mA max	**2**	
- **2x** pulse/frequency counters up to 2kHz	**4x** SELV **2x** pulse/frequency counters up to 2kHz	**6**	
4x NTC 103 AT / NTC NK103 / D.I. / PTC KTY81 / Pt1000 / 0...20 mA / 4...20 mA / 0-10 V / 0-5 V	**10x** NTC 103 AT / NTC NK103 / D.I. / PTC KTY81 / Pt1000 / 0...20 mA / 4...20 mA / 0-10 V / 0-5 V	**10**	
CANBus: CANopen		CANBus	
-20…+65 °C		-20…+65 °C	

Electronic Expansion Valve Drivers

OTDEM22R model comes with an **integrated EEVD**. For all the other models, **external drivers are available**.

The embedded EEVD on OTDEM22R can drive **1 unipolar valve** and works on a 6-wires connector structured as follows:
WMOT, WMOT, W1+, W1-, W2+, W2-

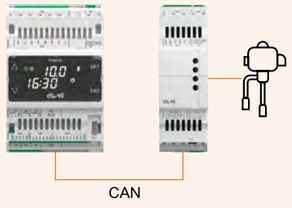
External valve drivers



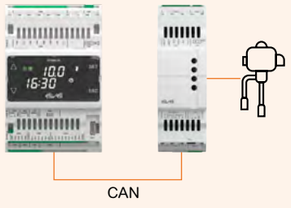
	EVEVD1U	EVEVD1B	EVEVD2B	EVEVDBAT
Size	2 DIN	2 DIN	4 DIN	2 DIN
Power supply	24 Vac ± 10% - 50/60 Hz / -20…38 Vdc functional insulation			
Valve control output	**1x** unipolar	**1x** bipolar	**2x** bipolar	-
Connectivity	CANBus			
Operating temperature	-20…+65 °C			

Architecture examples

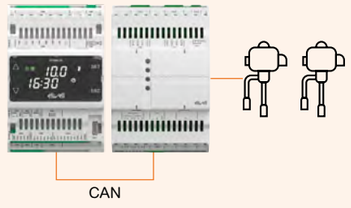
Unipolar Electronic Expansion Valve



Bipolar Electronic Expansion Valve



2x Bipolar Electronic Expansion Valve



Remote displays



	OTDLED
Size	74x32mm
Mount	Panel
Display	LED touchscreen - double variable display
Power supply	From controller
Connectivity	TTL
Operating temperature	-20…+65 °C



	AVP1000/P	AVP1100/C	AVP1200/C	AVP1300/C
Size	134x96x35mm	120x86x25mm		
Mount	Panel	Wall		
Display	320x240 3.5” touchscreen			
Power supply	24Vac/dc	24Vac/dc		
Connectivity	RS485, micro-USB (programming)			
Operating temperature	-20…+60 °C	0…+50 °C		
Built in probe	None	Temperature	Temperature, RH	Temperature, RH, presence

Accessories

In association with Free Optima, Eliwell supplies a vast range of accessories, from a protected transformer to temperature probes, pressure transducers and switches.

Temperature probes



CODE	DESCRIPTION	DETAILS
SN8DAC11502AV	Fast response NTC 4x40 1.5m IP67	-50...110 °C
SN8DED11502C0	NTC 103 AT 5X20 1.5m TP IP68	-50...110 °C
SN8DAE11502C0	NTC 103 AT 6X20 1.5m TP IP68	-50...110 °C
SN9DAE11502C6	Pt1000 6X20 1.5m IP68	-50...110 °C
SN9DED11502C6	Pt1000 5X20 1.5m IP68	-50...110 °C
SN400004	Wide range TCK 6x200 1.0m IP45	-40...1150 °C

Pressure transducers



CODE	DESCRIPTION	DETAILS
TD220050B	4…20mA / 0…667 psi / 0…50 bar IP54 2m cable	1/4 SAE PLUG
TD220007B	4…20mA / -7…101.5 psi / -0.5…7 bar IP54 2m cable	1/4 SAE PLUG
TD320050B	4…20mA / 0…667 psi / 0…50 bar IP54 2m cable	1/4 SAE SOCKET
TD320007B	4…20mA / -7…101.5 psi / -0.5…7 bar IP54 2m cable	1/4 SAE SOCKET

Ratiometric transducers



CODE	DESCRIPTION	DETAILS
TD420010B	0...145 psi / 0...10 bar IP67 2 m cable	Female connection
TD420030B	0...508 psi / 0...30 bar IP67 2 m cable	Female connection
TD420050B	0...667 psi / 0...50 bar IP67 2 m cable	Female connection

Demo case



CODE	DESCRIPTION	DETAILS
VAL0034	Demo Case for Free Optima	-

Transformers



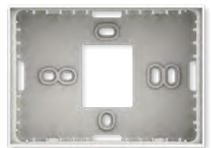
CODE	DESCRIPTION	DETAILS
TF111205	Transformer 230V~/24V 35 VA DIN rail mount	-

Converters



CODE	DESCRIPTION	DETAILS
SAR0RA00X701	USB/485 converter	3 kV opto-insulated
SAR0RN00XU00	USB/485 converter	No insulation

Base plates

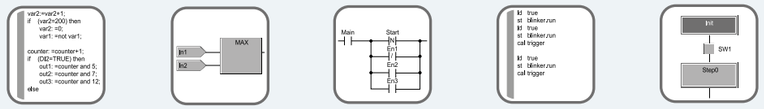


CODE	DESCRIPTION	DETAILS
AVA00WMRC0000	White base plate for wall mount	For AVP1000
AVA00WMRC0001	Gray base plate for wall mount	

Free Studio Plus

FREE Studio plus is the universal programming software for machines automated by the Free Way PLCs. It allows developers to program in various working environments and access to **constantly updated functions and optimizations**, available in the specific area of the Eliwell web site.

- Compatible with the 5 IEC 61131-3 standard programming languages (ST, FBD, LD, IL, SFC)
- Advanced debug and simulation options plus complete and effective online Help
- Advanced communication features such as remote control and download
- Webserver creation from the software
- Tools for easy commissioning



MINIMUM KIT FOR DEVELOPERS	AVAILABLE RESOURCES The IEC programmer includes the following resources:	
•FREE Studio Plus installation setup •1 Free Optima •USB-C cable for PC connection •Free Optima power transformer	**CPU**	160 MHz
	Available memory for **Programming**	1 MB
	RAM memory - automatic mapping for **Programming** and **Display**	378 kB
	Retain data space	8 kB
	RAM memory - ModBus mapping	10 kB
	Parameters area - ModBus mapping	10 kB

The USB port on Free Optima works both as host and device and allows for easy update and commissioning

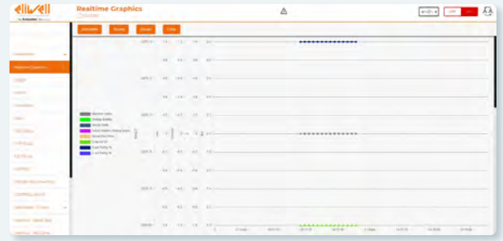
USB Host USB Drive → ← Free Optima		
		
Data download direction	→	←
Parameter map	✓	✓
IEC application	✓	-
BIOS	✓	-

Free Optima

The **Application Expert Center** constantly develops and updates additional contents to be integrated into Free Studio and fit any specific need customers might have for their application

Additional solutions for FREE Studio Plus are available for download at the dedicated area on the eliwell.com website and include:

- Always up-to-date application
- Function libraries add-ons
- New Application Function Blocks
- HMI templates
- Web templates and sample projects
- How-to guides
- Training
- Documentation.



Web server template

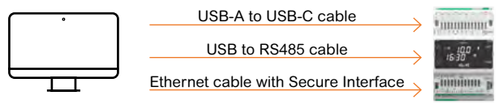


HMI user interface

Installation requirements

- **Operating Systems**: Windows 10/11 - 64 Bit
- **Hardware requirements**: 1GB hard disk space / 2 GB RAM (4 GB preferred) / 1.6 GHz processor or greater

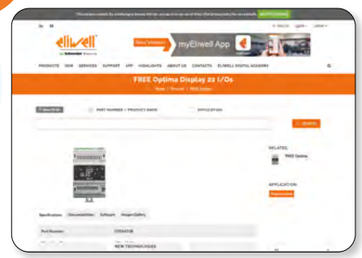
The installation setup, software updates, libraries and documentation are available on the eliwell.com website, after registration for access to the private area.

USB Device / RS485 / Ethernet PC → ← FREE Optima		
		
Data download direction	→	←
Parameter map	✓	✓
IEC application	✓	-
BIOS	✓	-

Access useful resources and increase your knowledge

DOCUMENTATION

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