ULTIMATE Controller

Multifunctional/multipurpose meter to monitor and safeguard your resources

ULTIMATE Controller from Terry Ferraris is a complete multifunctional/multipurpose system suitable for monitoring and safeguarding your resources and thus minimising the production/management costs of your installations.
The electronic control unit is equipped with a 5.7' TFT capacitive HMI (Human Interface Unit) colour touch screen display and can be supplied in both wall and panel mounting versions. As standard, it is equipped with analogue/digital inputs/outputs that can be expanded as required by means of special peripherals that double their number and increase their potential.
In addition, the Ultimate Controller is an economical, RTU (Radio Telemetry Unit) for the advanced control of many industrial processes, easily programmable, modular, with a dedicated remote Web Server, DNP(WITS) for data transmission and with a continuous recording of read values and commands sent on removable internal and external SD cards.
The Ultimate combines non-contact ultrasonic/radar measurement technology with patented features to reduce energy costs, aid asset management, reduce installation and maintenance costs and improve compliance.

Ultimate Controller is a complete system for:
- The control of a pumping station that combines ultrasonic level/radar measurement with flow measurement to optimise operation while reducing costs and increasing reliability through continuous control of pump power, battery back-up and interfacing with infrared cameras that allow remote viewing of the pumping station and/or process.
- Measurement and control of flow and differential flow measurements in both hydroelectric power stations and reclamation consortia for continuous control of the water balance
- Multi-point measurement and control of liquid and solid levels in tank farms with retransmission of monitored data and recording of measurements on removable 16GB SD.

The Ultimate controller can be supplied in two different executions:
- **ULTIMATEP00** for wall mounting
- **ULTIMATEF00** for fascia (panel) mounting

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The Ultimate electronics in standard execution is equipped with:

- 144.8mm (5.7") TFT capacitive colour touchscreen display
- power supply 85-264Vac or 22-28Vdc with 2A "T" fuse
- no. 8 SPDT relay digital outputs with 5A@240Vac non-inductive contacts
- no. 8 Digital Inputs, min. 5Vdc, max 30Vdc, max 3mA
- no. 2 Inputs x UTF/dBXM series ultrasonic / DBR series radar level transducers
- no. 2 4-20mA inputs (passive or active)
- no. 2 Isolated analogue outputs (mA) (floating 0/4mA, 150V isolation, max. load 1Kohm, resolution 0.1%)
- no. 1 Mini USB input (external)
- no. 1 USB socket input "A" (internal)
- no. 1 9-pin socket 'D' input (internal)
- no. 1 Ethernet port (TCP/IP)
- no. 1 Digital Camera Input
- 1 integrated Web Server
- no. 1 PBUS (MODBUS MASTER): RS485 Pulsar Expansion Bus
- no. 2 Memories of which one internal + one external on removable 4GB SD card (expandable up to max. 32GB)
- Electronic working temperature: - 30 < C° < + 55 - Suitable for Safe Zone only (Non-Flammable)
- Accuracy: 0.25% of measured value or 6mm of the largest two
- Resolution: 0.1% of measured value or 2mm of the largest two
- Measuring range: depending on type of transducer used (if ultrasonic max. 50 metres)
- Response speed: fully digitally adjustable
- Echo processing: DATEM (patented)
- Programming: via capacitive touch screen
- Security: via programmable access code on memory non-volatile
- Programmed data integrity on non-volatile memory

The following options over the basic model are available on request:

- no. 1 RS232 serial output
- no. 1 RS485 MODBUS RTU, ASCII serial output
- no. 1 Profibus V1 serial output
- no. 1 RS485 port for Speedy sensors
- no. 1 DNP3 level 4 (WITTS 1.1) output via Ethernet or Modem
- no. 1 3G GPRS MODEM output (excludes RS485 ModBus)
- no. 10 digital inputs (no analogue inputs)

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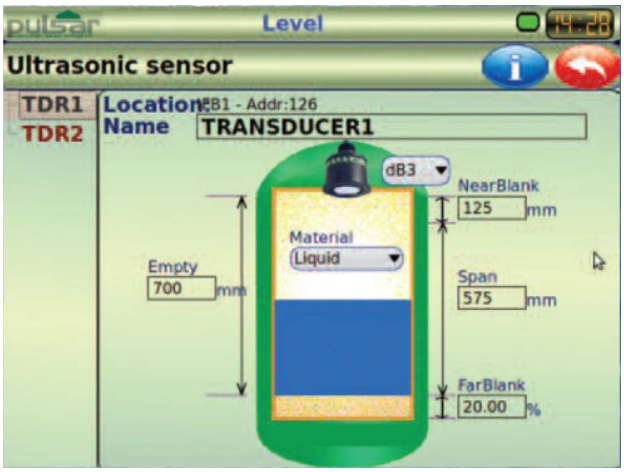
ULTIMATE Controller
It is an integrated, modular, flexible and compact control

1. *1. ULTIMATE Controller: Band Mounting*
2. *2. ULTIMATE Controller: Wall mounting*
3. *3. Transducer dB10 (UTF-10)*
4. *4. Infrared camera*
5. *5. CDP-G non-invasive flow switch*
6. *6. INTERFACE I/O module*
7. *7. BATTERY BACKUP module*
8. *8. POWER MONITOR module*

Simple and straightforward parameter configuration. A key strength of Terry Ferraris equipment has always been the logical and simple layout for a menu-driven approach to programming. ULTIMATE Controller is no different, and makes the concept even simpler, the visual configuration done through the touch-screen HMI (Human Machine Interface). It is, of course, possible to programme the unit and adjust parameters remotely. Set up the application, add a transducer and/or add peripherals with a few simple touches on the screen.
ULTIMATE Controller will automatically fill in the parameters in order to obtain immediate feedback on important elements such as maximum working range (Span), near dead zone (NearBlank) or far dead zone (FarBlank).



Transducer screen
A clear logical approach to basic application configuration and installation.

End to End Cost Savings

- Operating cost savings due to improved pump management resulting in energy cost savings (patented), pre-blocking detection, automatic reset, pump failure prediction and selection of the most efficient pump.
- Saving investment costs by combining HMI, PLC, RTU and level and flow control without expensive logic programming
- Remote flow and level monitoring with photo verification for increased compliance.
- Modular and expandable to suit both simple and complex applications
- With convenience and safety in mind the Power Monitor can be mounted away from the ICA section
- Asset Management data calculated by Ultimate that can be viewed locally and remotely
- Signals from existing peripherals or other instruments can be used or retransmitted where necessary.

ULTIMATE Controller is the world's most advanced instrument for pump control. with unique patented functions.

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Pump, Level and Flow Control

Based on the unique DATEM echo processing software, ULTIMATE Controller offers safe and reliable level measurements and is based on the most modern pump station control functions on the market.

The most advanced set of control tools is ready to be applied on every pumping station.

Advanced Controles

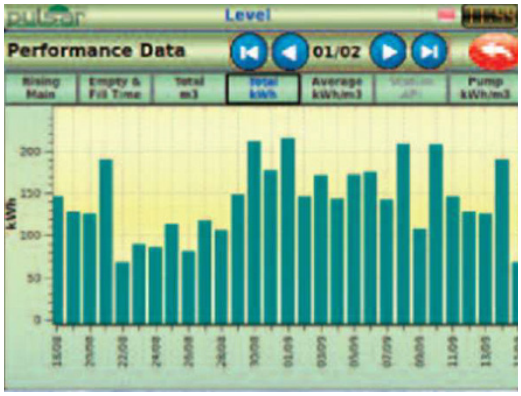
Ultimate Controller includes a number of sophisticated features built on tens of thousands of installations worldwide. Functions that save time and money, including automatic pump reset, pump priority to increase efficiency and thus avoid high energy costs.

The ULTIMATE Controller with a wide range of Advanced Functions ensures complete process control.

Resource Management, Compliance and Predictive Maintenance

Integrating pulse flow monitor, pump performance indicator and pre-block detection, Ultimate Controller provides all the data needed to proactively manage and maintain every aspect of the pumping station, reducing man-hours and calls and maximising efficiency.

ULTIMATE Controller can give priority to a more efficient pump, in this way energy consumption is minimised.



Pump, Level and Flow Control

Ultimate Controller saves money by combining all functions in one easily programmable unit, including a radio telemetry unit (RTU), with Wi-Fi and GPRS/3G options. Communication is via the industry standard DNP3 (WITS 1.1). A battery backup module with floating recharging power loss and level status notification is also available.

Vital information such as total energy used and KW/m^3 can be dynamically communicated.

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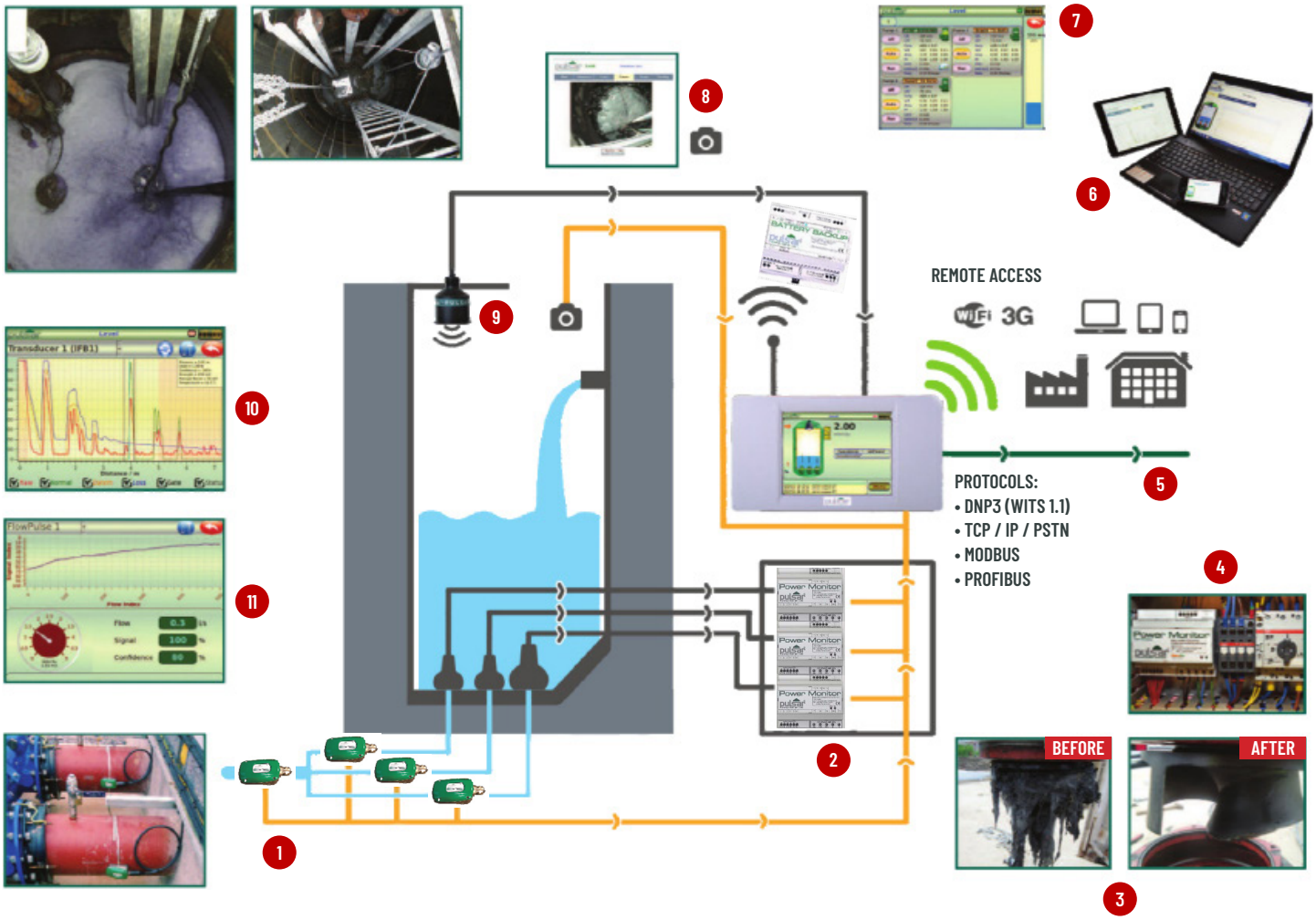

1. **CD** non-invasive flow switch.
Used to monitor flow rate and calculate pump and pump station efficiency during a storm condition for compliance reporting purposes

2. **Power monitor** modules must be installed close to high voltage or in the switchboard of the pump control. While the ultimate and the I/O interface modules are to be mounted with the instrumentation equipment

3. **Power monitor** module options, include (on request) patented retroflo® technology that can automatically clear sediment or block pumps, often before the problem is detected

4. The **power monitor** module provides important performance data on the pumps and on the power supply profile: current and voltage

5. Versatile communication protocols, including the industrial DNP3 protocol.
Used to monitor the operation of Ultimate via a dedicated web server.

6. Desktop, laptop, tablet or smartphone.
Access to data from any location: local and/or remote.

7. Detailed pump information available via the HMI (human machine interface) display and remotely.

8. Process monitoring, remotely, directly through the web server with the optional **infrared camera**.

9. Ultrasonic/radar level measurement.

10. Ecoprofile display directly on the Ultimate screen.

11. Instantaneous flow rates and trends can be viewed via the HMI (human machine interface) display of Ultimate when CD flow switches have been installed.

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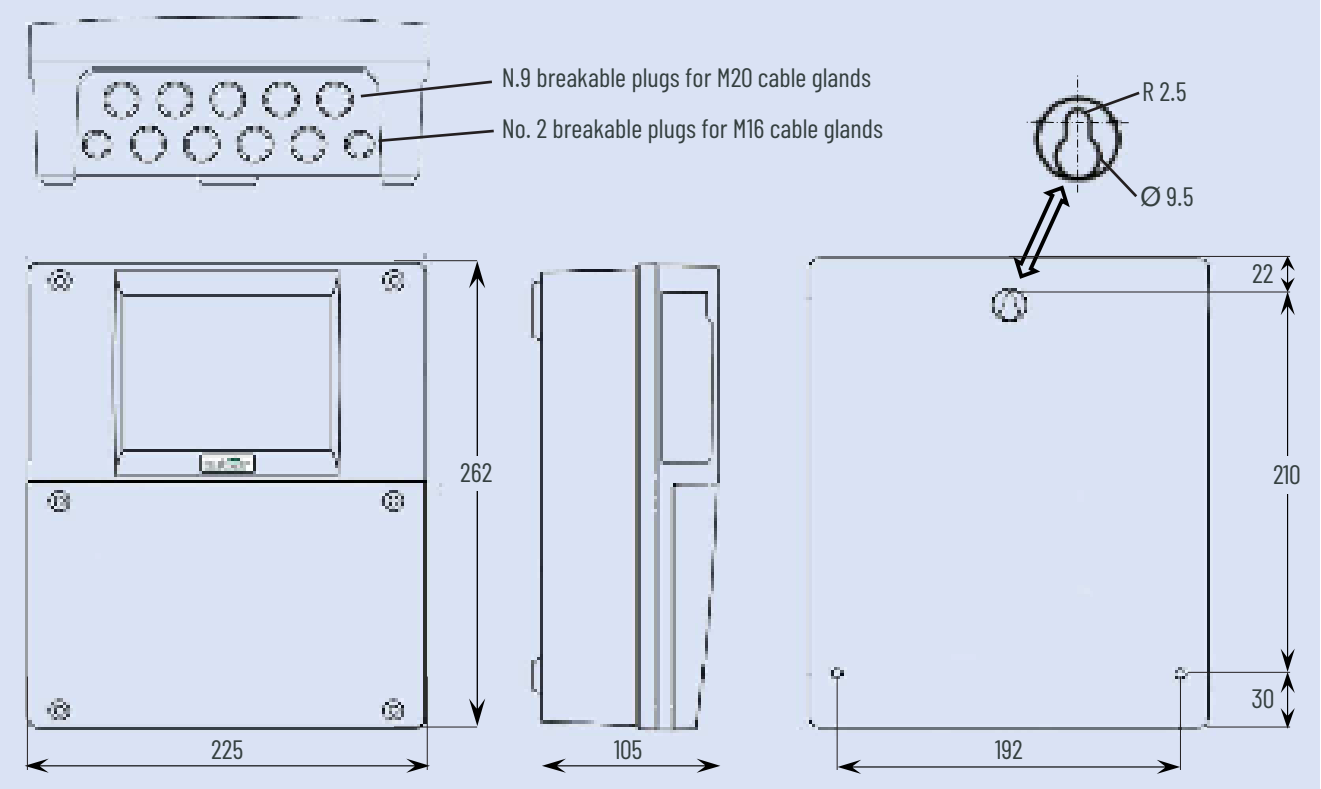
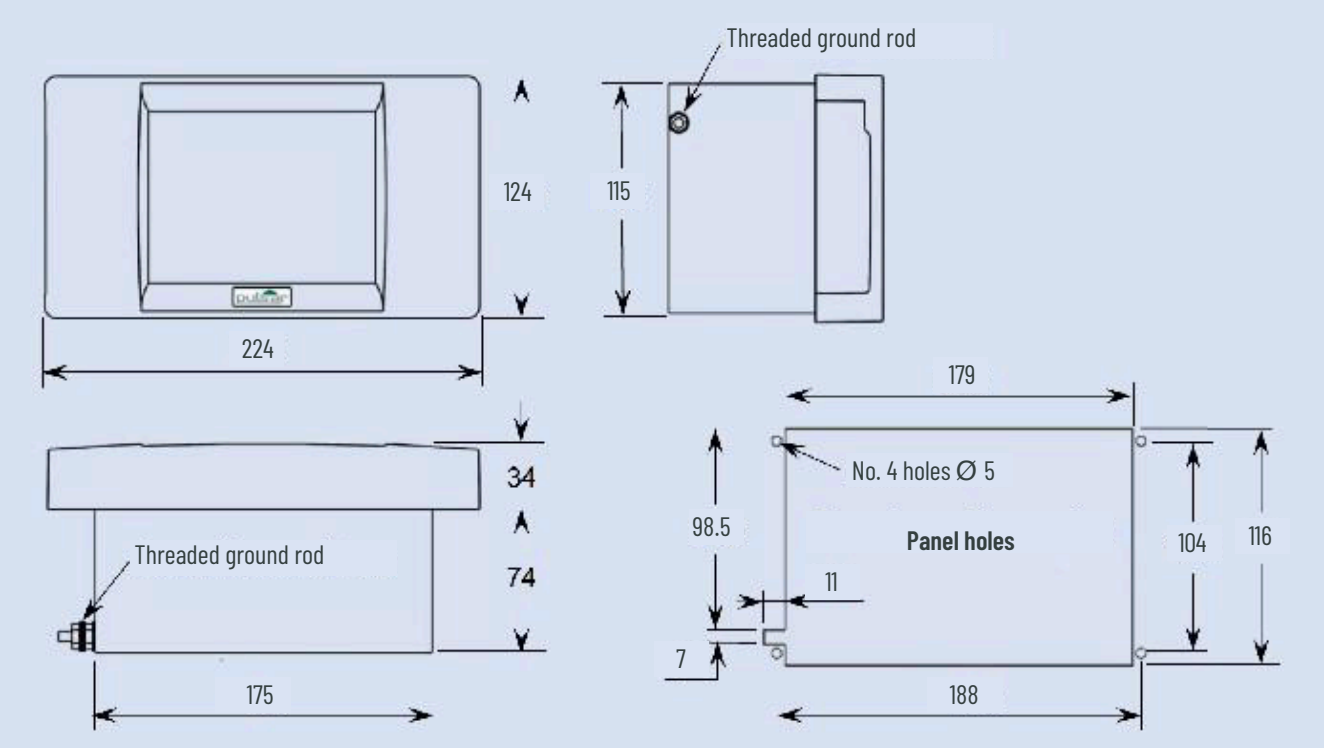
Dimensions

Wall mounting



Band mounting



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Technical specifications

Physical characteristics

External size	Wall mounting: 225mm x 262mm x 105mm (L x H x P) Band mounting: 124mm x 224mm x 114mm (L x H x P)
Weight	Wall mounting: 2Kg nominal Band mounting: 1.5Kg nominal
Material enclosure / description	Wall mounting: Polycarbonate Band mounting: Polycarbonate + Stainless Steel
Cable entry (wall mounting only)	No. 11 breakable caps: No.9 for M20 cable glands + No.2 for M16 cable glands
Transducer cable extension	Maximum 1000m (3-pole shielded cable)

Environmental characteristics

Assembly	Wall mounting: Interior / Exterior Band mounting: Inner
Enclosure protection	Wall mounting: IP65 Band mounting: IP64
Altitude	2000 m
Level of pollution	2 IK06 @ -20oC
Electronic temperature range	-30°C ÷ +55°C
EC approval	Conform to standards: • BS EN61326-1:2013 for emissions and immunity • BS EN61010-1:2010 for safety
Approval for explosion-proof zones	Compatible with dB xxx transducers (UTF xxx)

Performances

Accuracy	±0.25% of measuring range or 6mm (whichever is larger)
Solution	±0.1% of measuring range or 2mm (whichever is larger)
Measurement range	Depending on transducer type: Max 40m UTF 40 (dB40) min zero UTF 03HR (dBMach3)
Fast response times	Completely adjustable
Echo processing	DATEM (Digital Adaptive Tracking of Echo Movement)

Programming

Local Programming	±0.25% of measuring range or 6mm (whichever is larger)
Data security	±0.1% of measuring range or 2mm (whichever is larger)
Programmed data integrity	Depending on transducer type: Max 40m UTF 40 (dB40) min zero UTF 03HR (dBMach3)
Memory	Completely adjustable

Electrical

Mini USB port (external)	PC connection, located under the flap on the left side of the display
USB "A" port (internal)	For connecting modem-type peripherals
DB9 female connector (internal)	Connection of optional protocols (Modbus and Profibus)
Chamber door (internal)	Feeding and communication with the Chamber

RTU / Communications

Supported protocols	• DNP3 Level 4 (WITS 1.1) via Ethernet or modem (optional) • Modbus RTU, ASCII, TCP/IP (optional) • Profibus V1 (optional) • GSM/GPRS/PSTN • RS485 expansion bus
Firmware/application update	Locally via SD Card, USB, Wi-Fi, TCP/IP, Ethernet, remotely via Ethernet, Modem

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Technical specifications

Inputs

Digital inputs	No. 8 digital inputs, Vmin=5Vdc Vmax=30Vdc, max current 3mA, max total current 24mA @ 24Vdc
Analog inputs	No. 2 active or passive 4÷20mA or 0÷20mA inputs (user selectable and modifiable), 0.1% resolution 24Vdc no-load voltage for passive input, 22Vdc @ 4mA, 18Vdc @ 20mA

Outputs

Digital outputs	No. 8 SPDT relays, 5A at 240Vac non-inductive
Analog outputs	N.2 isolated (floating) 4÷20mA or 0÷20mA outputs, 150V isolation, max. load 1KΩ resolution 0.1%
Display	5.7" TFT colour with capacitive touch-screen

Power supply

Vac power supply	85÷265Vac 47÷400Hz 50W, fuse 5x20mm 2A "T" model
Vcc power supply	22÷28Vdc (internal fuse 2A model "T")

Remote communications

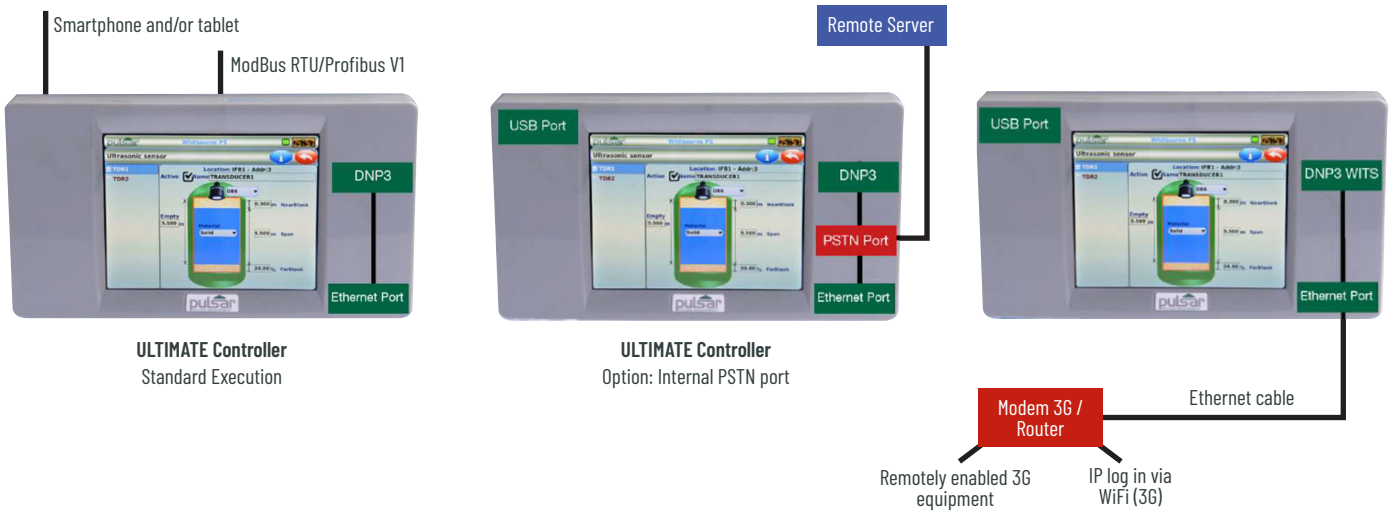
Dedicated TCP/IP, DNP3 and GPRS with battery backup, data logging and monitoring with ease

The ULTIMATE Controller can function as an RTU (Remote Terminal Unit), the ULTIMATE uses standard communication systems. Remotely via Ethernet, RS232, ModBus or via a dedicated Web Server (TCP/IP), which allows you to view, download and program the ULTIMATE from wherever the operator is located.
For maximum flexibility, the ULTIMATE can also integrate a 2G GPRS/GSM modem capable of communicating with a protocol industry standard DNP3 Level 4 (WITS Protocol 1.1 via Ethernet or modem) or external 3G modem so that you can view the data using a smartphone or tablet.
Unlike other RTUs, the ULTIMATE Controller can include an optional backup battery, so that the ULTIMATE will continue to measure the level even during a lack of supply voltage.
Data can also be downloaded locally via a removable SD memory card (4GB), there is also an internal SD memory card (4GB) that guarantees the security of recorded data.

The ULTIMATE also offers optional Wi-Fi connectivity, enabling to access, program and query the system in wireless mode.

Examples

- Integrated element in the standard unit
- Optional element supplied on request
- External item



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Chamber

The optional infrared camera for the ULTIMATE Controller allows the user to see the process from anywhere in the world.
The ULTIMATE can record up to 32 images, so that the recent process history can be displayed.

Technical specifications

Material	Valox 357
Assembly	1" Gas Cyl or M20x1.5 via adapter nipple
Weight	0.7Kg nominal
Cable	4-pole shielded Lmax=100m
Protection	IP68
Ambient temperature	-20 ° ÷ +70ºC
Approved by	CE Norma EN61326-1: 2013
Working range	20m max. (depending on ambient light) Max. 6m in the dark (no light)
Solution	320x240 (QVGA)
Communication protocol	RS485 and Modbus RTU
Power supply	10÷24Vcc (2.4W @ 24Vcc)

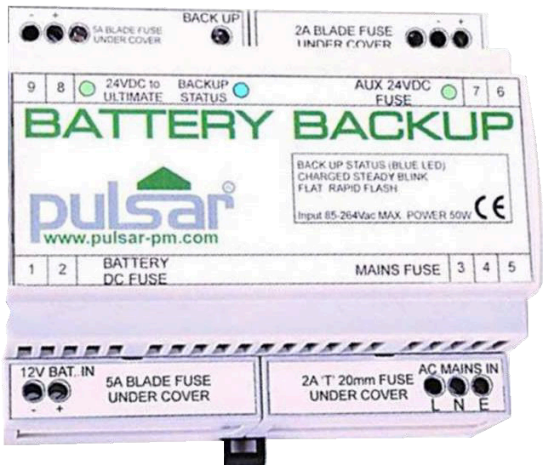
Battery backup

Il modulo BATTERY BACKUP è stato progettato per consentire l'uso continuo dell'ULTIMATE Controller e delle periferiche ad esso associate in caso di interruzioni di corrente (mancanza della tensione di alimentazione di rete). The battery backup duration depends on what is connected to the 24VDC backup terminals, and the capacity of the battery used.

When AC power is present, both the 24Vdc output for the ULTIMATE and the auxiliary output will be active, while the battery will be on trickle charge. When the Vac power supply is not present, the battery is used to supply only the 24VDC supply voltage to the ULTIMATE. Peripherals connected to the 24VDC auxiliary output will not be powered.

Technical specifications

Dimensions	106x91x62mm (LxHxP)
Assembly	DIN guide rail TS35
Weight	0.7Kg nominal
Cable input	Clamps
Cable size	0.5mm² ÷ 2.5mm²
Protection	IP44
Ambient temperature	-20 ° ÷ +55ºC
Power supply	85÷246Vca max 500W
24VDC auxiliary	Only when there is supply voltage Vac
24Vcc for backup	24VDC provided by the battery in the event of a power failure
Fuse	3A
Lead-acid battery	To be provided by the Customer
Battery input	12Vdc (battery capacity in Ah must be in accordance with the required duration of the backup)
Battery charger	13.8VDC, 1.2A max (with trickle charge)



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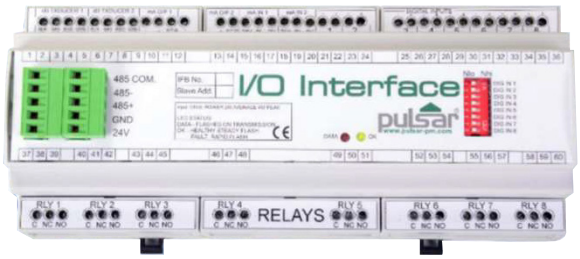
I/O Interface



NOTE: double terminal block for connection

The I/O Interface module is designed to give the possibility of duplicating the inputs and outputs of the ULTIMATE Controller. Up to a maximum of 3 interface cards can be used with the ULTIMATE. In addition to the devices that can be connected on the ULTIMATE, the I/O interface is designed to allow the following additional connections for each extra module installed:

- *2 x ultrasonic/radar level transducer inputs*
- *2 x analogue outputs mA*
- *2 x analogue inputs mA*
- *8 x digital inputs*
- *8 x digital relay outputs with SPDT contacts*
- *2 x PBUS inputs for Pulsar ModBus Master*

The I/O interface communicates with the ULTIMATE via the 5-wire RS485 connection at the top of the I/O unit. There are two RS485 connectors in parallel, so you can use other I/O interfaces to connect on the bus. The power supply for the I/O module can be taken from the ULTIMATE or a separate VDC supply.

Technical specifications

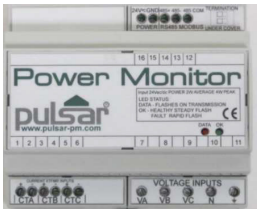
Dimensions	211x91x62mm (LxHxP)
Assembly	DIN guide rail TS35
Weight	0.5Kg nominal
Cable input	Clamps
Cable size	0.5mm² ÷ 2.5mm²
Connection cable	4-pole shielded Lmax=100m
Protection	IP44
Ambient temperature	-20 ° ÷ +55ºC
Power supply	10÷28Vcc, 5W nom. Max 8W
Communication	1 x RS485 and Modbus RTU
Analog outputs	2 x 0/4 to 20mA isolated Max. load 1Kohm Resolution 0.1%
Relay outputs	8 x SPDT 240Vca @ 5°
Analog inputs	2 x 0/4 to 20mA active or passive | Resolution 0.1%. No-load voltage for passive input 24Vdc
Digital inputs	8 x digital inputs Vmin 5Vdc Vmax 30Vdc Current max. 3mA 24mA max. total

Battery backup

The Power Monitor module can monitor the absorbed energy and various specific electrical parameters of a load, and is typically used to control a motor. Optional hardware and software enable performance and security monitoring.
The Power Monitor can work with both single-phase and three-phase systems.
The Power Monitor can be used by all "non-electronic" motors.
Variable speed drive (VSD) or variable frequency drive (VFD) motors operate outside the capabilities of most mains power monitors and monitoring data must be obtained directly from the motor controller.

The Power Monitor module can be used on the power supply input of the VSD/VFD, sufficient filtering must be ensured to guarantee low harmonics and noise.
The Power Monitor is designed to be controlled either by an external system (PLC) or by the ULTIMATE Controller.

There are two versions available: the standard model and the RetroFlo model (which can automatically clear sediment or pump blockage).
For safety, the external system bus and power supply are isolated.



Technical specifications

Dimensions	107x90x58mm (LxHxP)
Assembly	DIN guide rail TS35
Weight	0.5Kg nominal
Cable input	Clamps
Cable size	0.5mm² ÷ 2.5mm²
Connection cable	4-pole shielded Lmax=100m
Protection	IP44
Ambient temperature	-40 ° ÷ +55ºC
Power supply	20÷35Vcc, 15÷24Vca | 2W nom. Max 5W
Load capacity VA	depending on CT current transformer
Accuracy	Class 1, 1% over a working range of 20 to 100% Depending on the CT characteristics
Solution	0.01°, 0.1V typical

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