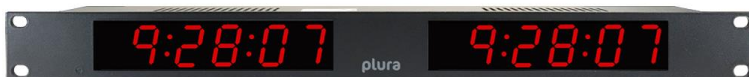




UD Series Displays



Installation and Operating Manual
Version: 5.1
June 26, 2024





CONTENTS

A1	REVISION HISTORY	
A2	COPYRIGHT	
A3	WARRANTY	
A4	UNPACKING/SHIPPING/REPACKAGING INFORMATION	
A5	SAFETY INSTRUCTIONS	
A6	CERTIFICATIONS & COMPLIANCES	
1.	FUNCTIONAL DESCRIPTION	13
1.1.	INTRODUCTION	13
1.2.	MODELS	15
	UD25	17
	UD25-C	17
	UD25-8	17
	UDD25	17
	UD25TT	17
	UD56	17
	UD56-8	17
	UD126	18
	UD178	18
	UD300	18
1.3.	ACCESSORIES AND OPTIONS	19
	EPSW: External AC/DC Power Supply	19
	UD-AP: Optional AC Power Inlet, attached	19
	UD-BP: Optional AC Power Inlet, integrated	19
	UD-BP3: Optional AC Power Inlet, integrated	19
	UD-PoE: Power over Ethernet	19
	UD25-W: Wall, Tripod, and Table Mount Kit for UD25	20
	UD56-W: Wall, Tripod, and Table Mount Kit for UD56	20
	UD56S, UD56LS and UD56ES: Integrated LED Seconds Ring for UD56	20
	UD300D, UD300LD and UD300ED: Appended Display for UD300	20
1.4.	INTERFACES	21
	LTC (MTD)	21
	IRIG	21
	RS485 (MTD)	21
	GPI	22
	RS232/RS422	22
	Ethernet	23
1.5.	STATUS AFTER POWER-ON	24
	Displays in LTC, IRIG or serial modes	24
	Displays in Ethernet mode	25
1.6.	FIRMWARE UPDATE	26
1.7.	CONFIGURATION	27
	The UD/SC Configuration Program	27
	“Profile” Tab: Store and Load a Complete Set-Up	28



“System” Tab: View and Change System Parameters	29
“Source” Tab: Select the Signal Source	30
“LTC” Tab: Set-Up of the LTC Reader	31
“Serial” Tab: Set-Up of the Serial Interface	32
“Ethernet” Tab: IP Addresses ...	34
“Real-Time” Tab: Set the Time Zone Parameters	36
“Display” Tab: Display Mode, Brightness, ...	38
“GPI” Tab: Programming GPI as Input or Output	40
1.8. SPECIAL FEATURES	45
Colour Changing Modes	45
Switching the Display Mode by a Button	46
2. TECHNICAL DATA	47
2.1. CONNECTIONS AT THE REAR	47
2.2. SPECIFICATIONS	49
2.3. AC/DC POWER SUPPLIES	52
EPSW: External Power Adapter	52
UD-AP: Attached AC Power Inlet	53
UD-BP: Integrated AC Power Inlet	54
UD-BP3: Integrated AC Power Inlet	54
PI: Ethernet Power Injector for UD-PoE	55
Notes on PoE Operation	56
Safety Precautions	57
3. APPLICATIONS	58
3.1. CONTROLLING MTD STOP TIMERS BY USE OF GPI COMMANDS	58
3.2. MTD SLAVE: LOCAL STOP TIMER AND EXTERNAL DISPLAYS	59
3.3. REAL-TIME DISPLAY WITH A GPS16/GPS17 REFERENCE	60
3.4. REAL-TIME DISPLAY WITH A RUB GPS 10 MHZ REFERENCE	62
4. INSTALLATION	64
4.1. TERMINAL BLOCK CONNECTIONS	64
4.2. LTC/MTD LOOP ADAPTER	65
4.3. STRAIN RELIEF FOR CONNECTING CABLES	66
Utilizing Cable Tie Holders	66
4.4. WALL, TRIPOD, AND TABLE MOUNT KITS	67
UD56-W	67
UD25-W	69
UD25TT TM	70
4.5. UD300: WALL MOUNTING	71
4.6. UD126, UD178: MOUNTING AND TECHNICAL DATA	72
4.7. UD25TT: SPACE SAVING HOUSING	73



A1 Revision History

No.	Date	Subject
0.x		Preliminary documents, changes without notice.
1.0	August 27, 2008	First released document.
1.1	September 04, 2008	UD56.
1.2	September 15, 2008	UD56E. Revised.
1.3	October 23, 2008	Operating mode "MTD Slave".
1.4	October 28, 2008	GPI features.
1.5	November 13, 2008	Operating mode "MTD Slave" extended. New: Chapter "Special Features – Colour Changing Modes".
1.6	March 02, 2009	Wall and table mount kit: UD56-W. UD300.
2.0	March 20, 2009	Completely revised.
2.1	April 29, 2009	Status after power-on and RS232/RS422 revised. New: Specification of free-run accuracy. New: Chapter "Real-Time Display with a GPS16/GPS17 Reference". New: Chapter "Real-Time Display with a RUB GPS 10 MHz Reference".
2.2	June 16, 2009	Revised. New feature "Set Clock" at the "Real-Time" tab. New feature "Reset+Continue" at the "GPI" tab. Housing UD25TT.
3.0	March 25, 2010	Revised. MTDoE and PoE versions.
3.1	April 16, 2010	Revised. UD-AP: Attached power supply. New rear with XLR connectors.
3.2	December 02, 2010	UD300LD and UD300ED. Installation: Cable tie holders.
3.3	December 21, 2010	UD126L (preliminary).
3.4	April 12, 2011	UD126L/UD126E. UD56 housing: Depth will change from 45 mm to 56 mm. UD-BP: Integrated power supply. New GPI functions. Special features: Switching the display mode by a button.
3.5	May 13, 2011	New GPI features.
3.6	May 30, 2011	Technical data revised. GPS connection changed regarding PPS input.
3.7	February 10, 2012	Changes at tab "Ethernet". New: Store and load "profiles". New serial protocols. New GPI modes. Description of a "Loop Adapter" for "L" version displays.
3.8	August 10, 2012	Page layout revised.
3.9	August 01, 2013	Tab "Ethernet": It is possible to enter an IP address of a "Secondary MTD Master". UD56-W: Now fitted with tripod screw thread.
3.A	October 23, 2013	UD178L/UD178E. Table of "Readability/Distance" added to Specifications.
3.B	April 02, 2014	Chapter "System Tab: View and Change System Parameters": added note if password is lost.
4.0	April 24, 2014	New chapter: "PI: Ethernet Power Injector for Option UD-PoE".
4.1	May 02, 2014	New chapter: "Notes on PoE Operation". Chapter revised: "UD56-W: Wall, Tripod, and Table Mont Kit". Chapter revised: "Real-Time Tab: Set the Time Zone Parameters".
4.2	July 31, 2014	Chapter revised: "Models". Chapter revised: "Connections at the Rear". Chapter revised: "UD56-W: Wall, Tripod, and Table Mont Kit".
4.3	May 28, 2015	Added "universal" display versions.
4.4	July 20, 2017	Added DC IN specifications to UD300 / UD300D.
4.5	September 25, 2019	Changed address of Plura Europe GmbH.



4.6	April 15, 2020	Added UD25-8.
4.7	December 3, 2020	Re-formatted in new design.
4.8	February 18, 2021	Added UD56-8.
4.9	September 8, 2021	Added UD25-C. Added UD25-W
4.10	September 23, 2021	Added Ethernet UDP ports for NTP and MTDoE.
4.11	February 25, 2022	Added UD-BP3: Integrated power supply for UD300 and UD300-D. Added UD25TT TM
4.12	December 14, 2023	Added Local Start / Stop / Reset commands.
5.0	January 9, 2024	Updated download links and update instructions.
5.1	June 26, 2024	Minor formatting fix.

Due to constant product development the features of **UD Series Displays** are subject to change. The current functional description always refers to the current firmware and the current configuration tool. You can download the latest version of the standard firmware from

<https://plurainc.com/products/ud25/>

Please be sure to use the latest configuration program after having done an update. You can download the latest version from the address above.

A2 Copyright

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For further information please contact your local dealer or:

Plura Europe GmbH
 Binger Weg 12
 D- 55437 Ockenheim
 Phone: +49 6725 918 006-70
 Fax: +49 6725 918 006-77
 E-Mail: info@plurainc.com
 Internet: <http://www.plurainc.com>



A3 Warranty

Plura warrants that their products will be free from defects in materials and workmanship for a period of two years from the date of shipment. If this product proves defective during the warranty period, Plura, at its option, will repair or replace the defective product without charge, provided this product is returned to Plura freight prepaid.

In order to obtain service under this warranty, Customer must notify Plura of the defect before expiration of the warranty period and make suitable arrangements for the performance of service. Customer shall be responsible for packaging and shipping the defective product to Plura, please notice the Shipping Information given below.

This warranty shall not apply to any defect, failure or damage caused by abuse, misuse, improper use, negligence, accident, modification, alteration, or improper or inadequate maintenance and care.

This warranty is given by Plura with respect to this product in lieu of any other warranties, express or implied. Plura and its vendors disclaim any implied warranties of merchantability or fitness for a particular purpose. Plura's responsibility to repair or replace defective products is the sole and exclusive remedy provided to the customer for breach of this warranty. Plura and its vendors will not be liable for any indirect, special, incidental, or consequential damages irrespective of whether Plura or the vendor has advance notice of the possibility of such damages.



A4 Unpacking/Shipping/Repackaging Information

This product has been carefully inspected, tested and calibrated before shipment to ensure years of stable and trouble-free service.

The shipping carton and pads provide protection for the product during transit. Retain the shipping cartons in case subsequent shipment becomes necessary.

Carefully unpack the product from its transit material and carefully check the product for signs of damage. In the event that the product has been damaged during transit, contact the carrier and your Plura dealer.

Please confirm that all items listed on the packing list have been received. Check the items against your original order to ensure that you have received the correct parts. If any item is missing, please contact your Plura dealer.

Ensure that all packaging material is removed from the product and its associated components before installing the unit.

Products returned to Plura for servicing or repair should have a tag attached showing:

- Name and complete address of the owner and the name of the person that can be contacted.
- Unit's serial number and a description of the service required, or failure detected.

Products returned should be shipped prepaid in the original packaging material if possible. If the original packaging is not available or is unfit for use, supply an adequate packaging which should meet the following criteria:

- Packaging must be able to withstand the product weight.
- Product must be held rigid within the packaging.
- Allow at least two inches of space between the product and the container.
- The corners of the product must be protected.
- Seal the carton with shipping tape or an industrial stapler.

If the product is still within the warranty period, the product will be returned by prepaid shipment after servicing.



A5 Safety Instructions

The general safety information in this part is for both operating and service personnel. Plura products are only to be used as directed. Specific warnings and cautions will be found throughout the manual where they apply.

Review the following safety instructions to avoid injury and prevent damage to this product or any products connected to it.

- Read these instructions.
- Keep these instructions.
- Heed all warnings.
- Follow all instructions.

Safety Terms and Symbols

Terms and Symbols in this manual:



WARNING: Warning statements identify conditions or practices that could result in injury or loss of life.



CAUTION: Caution statements identify conditions or practices that could result in damage to this product or other property.

Terms and Symbols which may be found on the product:



ATTENTION: Refer to the manual.



Observe precautions for handling electrostatic-sensitive devices.



Signal Ground.

Product Damage Precautions

PREVENT OVERHEATING



To prevent product overheating, position the unit only where sufficient air circulation can be maintained. Good air circulation is essential to prevent internal heat build-up, do not block any ventilation openings. Do not expose the unit to direct sun light or any other strong lights. Keep the unit away from heat sources.

PROVIDE PROPER ENVIRONMENT



Dust, humidity, shocks and strong electromagnetic fields must be avoided. Do not expose this apparatus to dripping or splashing water. Ensure that no objects filled with liquid are placed on the apparatus.



OBSERVE EMC REGULATIONS

The EMC regulations are observed only under the following condition: use high quality shielded cables at data inputs and outputs.

SUSPECTED FAILURES

Whenever it is likely that safe operation is impaired, the apparatus must be made inoperative and secured against unintended operation. The appropriate service authority must then be informed. Do not operate with suspected failures. Servicing is required when the apparatus has been damaged in any way, such as power-supply is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

PREVENTIVE MAINTENANCE: CLEANING

Qualified Service Personnel Only: The apparatus should be cleaned often enough to prevent dust or dirt from accumulating. Dust accumulating in the apparatus acts as an insulating blanket, preventing proper cooling, and possibly causing overheating and component breakdown. Under high humidity conditions, accumulated dust can also provide an electrical conduction path. Remove accumulated dust with a soft cloth or small paint brush. Remove hardened dirt with a soft cloth, dampened in a mild detergent and water solution. Do not use polish or abrasive cleaners or any other chemical cleaning agents.

PREVENTIVE MAINTENANCE: VISUAL INSPECTION

Qualified Service Personnel Only: Visually inspect the apparatus for signs of damage, scorched components, and loose or disconnected pin connectors. If you discover heat damaged parts, try to determine the cause of the overheating before replacing the damaged parts; otherwise, the damage may repeat.

ATTENTION:

Observe precautions for handling electrostatic-sensitive devices. See "Electrostatic Discharge (ESD) Precautions" below for details.



Electrostatic Discharge (ESD) Precautions



All semiconductor devices are sensitive to ESD. To prevent any damage or degradation on components of the product caused by ESD, observe these precautions when directed to do so (installing, removing sensitive components):

1. Use a Ground Strap. Wear a grounded anti-static wrist or heel strap to discharge the static voltage from your body.
2. Use a Safe Work Area. Avoid handling components in areas that have a floor or work surface covering capable of generating a static charge. Also, nothing capable of generating or holding a static charge should be allowed in the work area.
3. Handle ESD sensitive components carefully. Do not slide components over any surface. Do not touch exposed connector pins. Pick-up components by the body, never by the leads.
4. Transport and store sensitive components or assemblies in a static-protected bag or container.



A6 Certifications & Compliances

CE-Declaration

We,
Plura Europe GmbH
Binger Weg 12
D- 55437 Ockenheim

herewith declare under our sole responsibility that the

**UD Series Displays UD25, UD25-C, UD25-8, UD25L, UD25E, UD25TT, UD25TTL,
UD25TTE, UDD25, UDD25L, UDD25E**

meet the intent of the following directives, standards and specifications:

2004/108/EC EMC Directive

applying the following standards:

EN 55022:2006 Emission

EN 55024:1998 + A1:2001 + A2:2003 Immunity

CE-Declaration

We,
Plura Europe GmbH
Binger Weg 12
D- 55437 Ockenheim

herewith declare under our sole responsibility that the

**UD Series Displays UD126, UD126L, UD126E, UD178, UD178L, UD178E, UD56,
UD56-8, UD56L, UD56E, UD56S, UD56LS, UD56ES, UD300,
UD300L, UD300E, UD300D, UD300LD, UD300ED**

meet the intent of the following directives, standards and specifications:

2006/95/EC Low Voltage Directive

applying the following standard:

EN 60950-1:2006 Electrical and mechanical safety

2004/108/EC EMC Directive

applying the following standards:

EN 55022:2006 Emission

EN 55024:1998 + A1:2001 + A2:2003 Immunity



1. Functional Description

1.1. Introduction

These are the common features of our UD Series Displays:

- 6-digits time and date display.
- 8-digits time and date display (UD25-8 and UD56-8).
- Selectable colours for the LEDs: red / green / yellow. Exception: UD126, UD178.
- GPI (General Purpose Interface) inputs or outputs to connect external buttons or to program a trigger signal output. Each of the four GPI's is individually programmable.
- USB interface for setup and firmware flash updates.

Various interfaces are available.

UD displays of "universal" version (not "L" or "E"):

- can be integrated in the MTD system of type LTC(MTD)/RS485(MTD),
- can read LTC and use it as a reference for a real-time operating mode,
- can read IRIG and use it as a reference for a real-time operating mode,
- can receive display data via serial interface,
- can be integrated in the MTD system of type MTD_{oE},
- can operate as an NTP Client in a real-time operating mode.

UD displays of version "L":

- can be integrated in the MTD system of type LTC(MTD)/RS485(MTD),
- can read LTC and use this LTC as a reference for a real-time operating mode,
- can receive display data via serial interface.

UD displays of version "E":

- can be integrated in the MTD system of type MTD_{oE},
- can operate as an NTP Client in a real-time operating mode.

The MTD system:

Plura has developed a system called the Multiple Time Display (MTD) system. An MTD system consists of a central generator unit, control units, digital displays and/or studio clocks. The central MTD generator (RUB GT or RUB GL module) is the time & date reference and manages stop timers.

The MTD data of the central generator include six independent programmable timers (stop timers, time zones), real-time, date and status data.

The LTC(MTD)/RS485(MTD) system: The MTD generator outputs a specific LTC format which is referred to as **LTC(MTD)** in this document. LTC(MTD) fully complies to the SMPTE 12M specification for Linear Time Code. The time addresses can be decoded by every time code reader, only the binary groups (32 user bits) carry multiplexed data which can be decoded by Plura units only. The LTC(MTD) transfers data to UD displays of "universal" or "L" versions. Control units communicate with the central generator via an RS485 bus. This interface is referred to as **RS485(MTD)** in this document. As many control units as needed can be connected to the same RS485(MTD) interface. UD displays of "universal" or "L" versions can operate as a control unit using the GPI inputs.



The **MTDoE** system: This system utilizes the Ethernet to transport the MTD data as well as to communicate between control units and central generator. The central generator transmits the MTD data to the **RUB IE** (with **option M**) Ethernet module via the internal *TC_link* interface of the RUBIDIUM system, the RUB IE module then opens the gates to the local Ethernet. UD displays of “universal” or “E” versions read these data and communicate via Ethernet. Plura’s MTDoE devices have the property to perform an auto-installation within an Ethernet network, i.e. the units find them selves, assign them selves to a group and can be listed, named and configured centrally.

Please refer to “**The MTD System – Installation and Operation Manual**” to read about installation and basic set-up of UD displays in an MTD system.



1.2. Models

There are various models differing by their housings, interfaces, digits heights etc.:

Model	Housing	Interfaces				Display digits height	Power supply
		LTC MTD	Ethernet MTDoe	IRIG	GPI		
UD25	19"/1 RU	yes	yes	yes	yes	single 6-digit 25 mm/1.0 in	PoE DC: EPSW AC: UD-AP
UD25-C	19"/1 RU	yes	yes	yes	yes	single 6-digit 25 mm/1.0 in	PoE DC: EPSW AC: UD-AP
UD25-8	19"/1 RU	yes	yes	yes	yes	Single 8-digit 25 mm/1.0 in	PoE DC: EPSW AC: UD-AP
UD25TT	210 mm 1 RU	yes	yes	yes	yes	single 6-digit 25 mm/1.0 in	PoE DC: EPSW
UDD25	19"/1 RU	yes	yes	yes	yes	double 6-digit 25 mm/1.0 in	PoE DC: EPSW AC: UD-AP
UD25L	19"/1 RU	yes	no	no	yes	single 6-digit 25 mm/1.0 in	DC: EPSW AC: UD-AP
UD25TTL	210 mm 1 RU	yes	no	no	yes	Single 6-digit 25 mm/1.0 in	DC: EPSW
UDD25L	19"/1 RU	yes	no	no	yes	double 6-digit 25 mm/1.0 in	DC: EPSW AC: UD-AP
UD25E (+ UD-PoE)	19"/1 RU	no	yes	no	yes	single 6-digit 25 mm/1.0 in	DC: EPSW (UD-PoE) AC: UD-AP
UD25TTE (+ UD-PoE)	210 mm 1 RU	no	yes	no	no	single 6-digit 25 mm/1.0 in	DC: EPSW (UD-PoE)
UDD25E (+ UD-PoE)	19"/1 RU	no	yes	no	yes	double 6-digit 25 mm/1.0 in	DC: EPSW (UD-PoE) AC: UD-AP
UD56	19"/2 RU	yes	yes	yes	yes	single 6-digit 56 mm/2.2 in	PoE DC: EPSW AC: UD-BP
UD56-8	19"/2 RU	yes	yes	yes	yes	single 8-digit 56 mm/2.2 in	PoE DC: EPSW AC: UD-BP
UD56S	19"/2 RU	yes	yes	yes	yes	single 6-digit 56 mm/2.2 in + LED ring	PoE+ DC: EPSW AC: UD-BP
UD56L	19"/2 RU	yes	no	no	yes	single 6-digit 56 mm/2.2 in	DC: EPSW AC: UD-BP

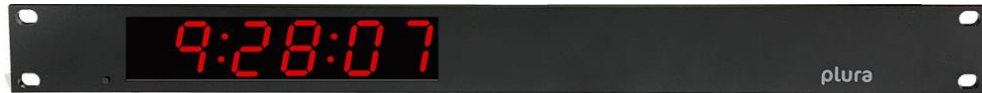


Model	Housing	Interfaces				Display digits height	Power supply
		LTC MTD	Ethernet MTD _o E	IRIG	GPI		
UD56LS	19"/2 RU	yes	no	no	yes	single 6-digit 56 mm/2.2 in + LED ring	DC: EPSW AC: UD-BP
UD56E (+ UD-PoE)	19"/2 RU	no	yes	no	yes	single 6-digit 56 mm/2.2 in	DC: EPSE (UD-PoE) AC: UD-BP
UD56ES (+ UD-PoE)	19"/2 RU	no	yes	no	yes	single 6-digit 56 mm/2.2 in + LED ring	DC: EPSW (UD-PoE) AC: UD-BP
UD300	square 324 mm/ 12.75 in	yes	yes	yes	yes	single 6-digit 56 mm/2.2 in	PoE DC: EPSW AC: UD-BP3
UD300D	324 mm x 382 mm	yes	yes	yes	yes	6-digit 56 mm/2.2 in + 6-digit 25 mm/1.0 in	PoE DC: EPSW AC: UD-BP3
UD300L	square 324 mm/ 12.75 in	yes	no	no	yes	single 6-digit 56 mm/2.2 in	AC
UD300LD	324 mm x 382 mm	yes	no	no	yes	6-digit 56 mm/2.2 in + 6-digit 25 mm/1.0 in	AC
UD300E (+ UD-PoE)	square 324 mm/ 12.75 in	no	yes	no	no	single 6-digit 56 mm/2.2 in	AC (UD-PoE)
UD300ED (+ UD-PoE)	324 mm x 382 mm	no	yes	no	no	6-digit 56 mm/2.2 in + 6-digit 25 mm/1.0 in	AC (UD-PoE)
UD126	808 x 237 x 90 mm	yes	yes	yes	yes	one colour (!) 6-digit 126 mm	AC
UD126L	808 x 237 x 90 mm	yes	no	no	yes	one colour (!) 6-digit 126 mm	AC
UD126E	808 x 237 x 90 mm	no	yes	no	no	one colour (!) 6-digit 126 mm	AC
UD178	808 x 237 x 90 mm	yes	yes	yes	yes	one colour (!) 6-digit 178 mm	AC
UD178L	808 x 237 x 90 mm	yes	no	no	yes	one colour (!) 6-digit 178 mm	AC
UD178E	808 x 237 x 90 mm	no	Yes	no	no	one colour (!) 6-digit 178 mm	AC



UD25

The UD25 device is equipped with a 25mm, 6-digits display, mounted on the left.

**UD25-C**

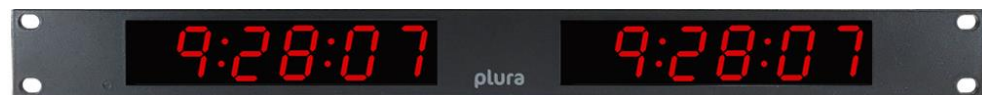
The UD25 device is equipped with a 25mm, 6-digits display, mounted in the middle.

**UD25-8**

The UD25-8 device is equipped with a 25mm, 8-digits display.

**UDD25**

The UDD25 device is equipped with two 25mm, 6-digits displays.

**UD25TT**

The UD25TT device is equipped with a 25mm, 6-digits display in a small housing.

**UD56**

The UD56 device is equipped with a 56mm, 6-digits display.

**UD56-8**

The UD56-8 device is equipped with a 25mm, 8-digits display.



UD126

The UD126 device is equipped with a 126mm, 6-digits display.

**UD178**

The UD178 device is equipped with a 178mm, 6-digits display.

**UD300**

The UD300 device is equipped with a 56mm, 6-digits display and a 300mm seconds ring.



1.3. Accessories and Options

EPSW: External AC/DC Power Supply

This is a 24V/20W AC/DC power adapter. This will be the right external AC/DC adapter for all displays equipped with the 2-pole DC connector.

Details in chapter: Technical Data → AC/DC Power Supplies
 → EPSW: External Power Adapter.

Please also observe: Technical Data → AC/DC Power Supplies → Safety Precautions.

For “universal” or “E” version displays please also observe:
 Technical Data → AC/DC Power Supplies → Notes on PoE Operation.

UD-AP: Optional AC Power Inlet, attached

With UD-AP an UD25 device receives an AC/DC adapter attached to the rear. This enables to directly connect an AC power cord.

Details in chapter: Technical Data → AC/DC Power Supplies
 → UD-AP: Attached AC Power Inlet.

Please also observe: Technical Data → AC/DC Power Supplies → Safety Precautions.

UD-BP: Optional AC Power Inlet, integrated

With UD-BP an UD56 device receives an integrated AC/DC adapter. This enables to directly connect an AC power cord.

Details in chapter: Technical Data → AC/DC Power Supplies
 → UD-BP: Integrated AC Power Inlet.

Please also observe: Technical Data → AC/DC Power Supplies → Safety Precautions.

UD-BP3: Optional AC Power Inlet, integrated

With UD-BP3 an UD300 or UD300-D device receives an integrated AC/DC adapter. This enables to directly connect an AC power cord.

Details in chapter: Technical Data → AC/DC Power Supplies
 → UD-BP3: Integrated AC Power Inlet.

Please also observe: Technical Data → AC/DC Power Supplies → Safety Precautions.

UD-PoE: Power over Ethernet

Power over Ethernet or PoE technology describes a system to pass electrical power, along with data, on Ethernet cabling. This feature is built-in with UD25, UD25-C, UD25-8, UDD25, UD56, UD56-8, UD56S, UD300 and UD300D displays and available as an option for most “E” version displays. PoE is not available for the models UD126, UD56E, UD178 and UD178E.

In the case your network devices cannot supply PoE it is possible to use a PoE injector. This keeps the advantage to have only one cable – carrying data and power - connected to your UD display.

Detailed description of our recommended power supply in chapter:

 Technical Data → AC/DC Power Supplies → PI: Ethernet Power Injector for UD-PoE.

Please also observe: Technical Data → AC/DC Power Supplies → Safety Precautions.

Please also observe: Technical Data → AC/DC Power Supplies → Notes on PoE Operation.



UD25-W: Wall, Tripod, and Table Mount Kit for UD25

The UD25-W mount kit is an option for UD25 displays. It serves to mount the display at a wall, to a tripod, or to a table. See chapter "Installation → UD25-W: Wall, Tripod, and Table Mount Kit" for detailed description.

It is not included in delivery, please order separately.

UD56-W: Wall, Tripod, and Table Mount Kit for UD56

The UD56-W mount kit is an option for UD56 displays. It serves to mount the display at a wall, to a tripod, or to a table. See chapter "Installation → UD56-W: Wall, Tripod, and Table Mount Kit" for detailed description.

It is not included in delivery, please order separately.

UD56S, UD56LS and UD56ES: Integrated LED Seconds Ring for UD56

The UD56 devices can be ordered as UD56S, UD56LS or UD56ES. These versions of UD56 are equipped with an additional LED ring. 60 LEDs arranged in a circle mark the seconds, 12 additional LEDs mark the 5-seconds intervals, and 4 additional LEDs mark the 15-seconds intervals.

**UD300D, UD300LD and UD300ED: Appended Display for UD300**

The UD300 devices can be ordered as UD300D, UD300LD or UD300ED. These versions of UD300 are equipped with a second display (HH:MM:SS). It can be attached to the bottom or top of the housing. This display can receive a set-up independently from the main display.

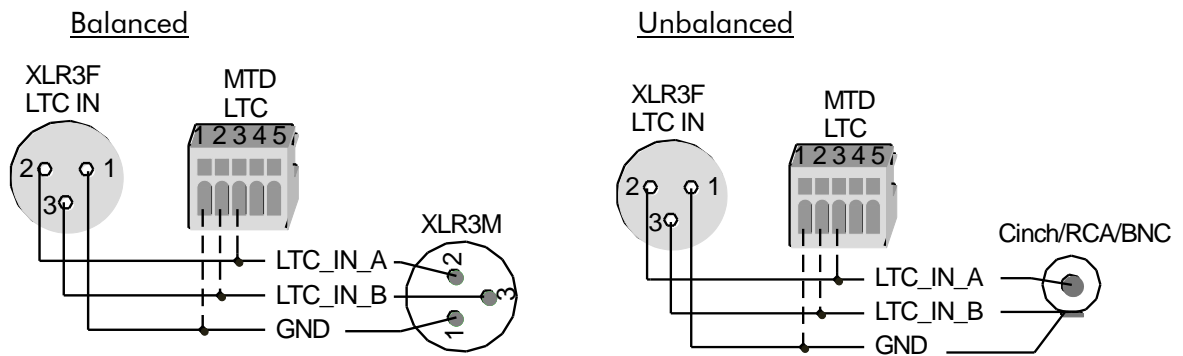


1.4. Interfaces

LTC (MTD)

Devices with this interface accept a standard LTC (SMPTE/EBU) signal. Refer to chapter "Technical Data" for LTC input specifications.

Connect a balanced or unbalanced signal:



Plura has developed a system called the (MTD) Multiple Time Display system. An MTD system consists of a central generator unit, user console(s), digital displays and/or analogue clocks. The central generator unit generates and outputs a special LTC format. This LTC will henceforth be denoted as **LTC(MTD)**. The LTC(MTD) contains real-time, date and various user selectable/configurable timers. Having the LTC(MTD) connected the device can be switched to various operating modes (please refer to chapter "Display Tab").

IRIG

"Universal" devices accept IRIG signals. Usually an unbalanced signal with BNC connector is used. It can be connected the same way as the unbalanced LTC signal above.

RS485 (MTD)

This denotes a RS485 serial interface with "MTD" protocol. Refer to chapter "Technical Data" for RS485 specifications.

Devices with this interface can be used in various applications:

- The UD Series Display can be a control unit of the MTD system, controlling an MTD timer by use of external keys (GPIs with e.g. START, STOP and RESET functionality). The RS485(MTD) has to be connected to the central timer unit, thus a communication between these units can be established.
- Selecting the "MTD Slave" mode the device receives and displays timer values from a "MTD Master" – please refer to chapter "MTD Slave: Local Stop Timer and External Displays".
- Selecting the "MTD Master" mode the device transmits the time of the local stop timer, thus external units ("MTD Slaves" as a display or a video character inserter) can display this timer as well.

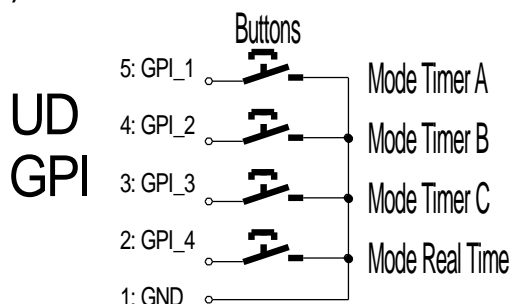


GPI

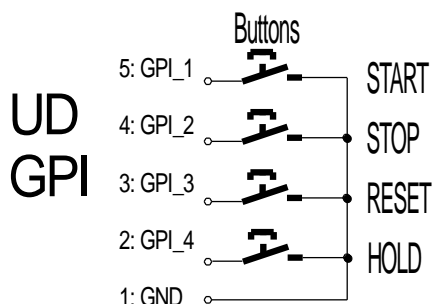
Four GPIs can get a function independently from each other, as an input or as an output. Select the function from the drop-down lists (chapter "GPI" Tab: Programming GPI as Input or Output'). For technical details please refer to the chapter "Specifications". The functionality determines the input or output characteristic of the GPI.

Examples:

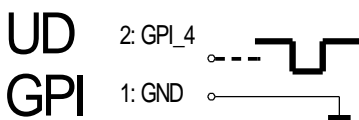
Switching the display mode by external buttons



Controlling the local stop timer or an MTD timer



Impulse output during zero-crossing of a down counter

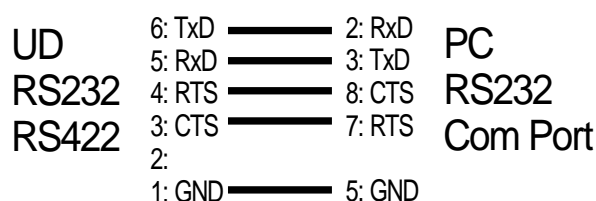


RS232/RS422

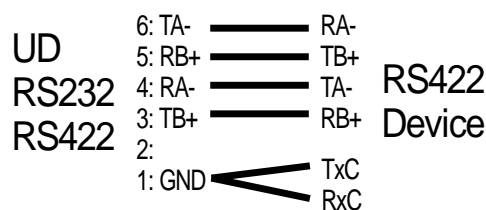
Serial interface, selectable as RS232 or RS422. Devices with this interface decode a time (HH:MM:SS) out of a serial data string. Various data formats can be selected (chapter "Serial" Tab: Set-Up of the Serial Interface').

Examples:

RS232



RS422



Ethernet

10/100Base-T Ethernet interface. Devices with this interface work either as an **NTP Client** or as a part of the **MTDoE System**.

NTP Client: The “Network Time Protocol” (NTP) is used for time synchronization within networks. NTP servers are queried by NTP clients, which then can synchronize their internal clocks accordingly. UD Series displays operating in this mode can connect to such a server and synchronize to it.

NTP uses UDP port 123.

MTDoE System: Plura has developed a system called the Multiple Time Display (MTD) system. An MTD system consists of a central generator unit, control units, digital displays and/or studio clocks. The central MTD generator (RUB GT or RUB GL module) is the time & date reference and manages the stop timers. The MTDoE system utilizes the Ethernet to transport the MTD data, UD Series displays operating in this mode can receive and display these data. UD displays can operate as a control unit of the MTDoE system using the GPI inputs.

MTDoE uses UDP port 8051. As an alternative UDP port 8052 can be used. UDP broadcasts are used for the “Automatic MTD Master IP Address” feature.



1.5. Status after Power-On

Displays in LTC, IRIG or serial modes

After power-on the device performs a display test and indicates some status information:

Example	Description																																																															
<div><div><div>Digit 1</div><div>Digit 2</div><div>Digit 3</div><div>Digit 4</div><div>Digit 5</div><div>Digit 6</div></div><div><div><div>8</div><div>8</div><div>:</div><div>8</div><div>8</div><div>:</div><div>8</div><div>8</div></div></div></div>	All LEDs will shortly light up with changing colours.																																																															
<div><div><div>Digit 1</div><div>Digit 2</div><div>Digit 3</div><div>Digit 4</div><div>Digit 5</div><div>Digit 6</div></div><div><div><div></div><div>1.</div><div>2</div><div>1</div><div></div><div></div></div></div></div>	<p>Displaying the revision number, e.g. „1.21“.</p> <p>Devices with two displays (for example of type “UDD” or UD300D/UD300LD/UD300ED) indicate a “1” at the first display and a “2” at the second display at the 6th digit’s place.</p>																																																															
<div><div><div>Digit 1</div><div>Digit 2</div><div>Digit 3</div><div>Digit 4</div><div>Digit 5</div><div>Digit 6</div></div><div><div><div>n</div><div>d</div><div></div><div></div><div>Γ</div><div>A</div></div></div></div>	<p>Indicating the current display mode at digits 5 and 6, e.g.:</p> <table><tr><th>Digits</th><th>Mode</th><th>Source</th></tr><tr><td>□ L</td><td>Local Timer</td><td></td></tr><tr><td>r Γ</td><td>Time</td><td>LTC(MTD)</td></tr><tr><td>r d</td><td>Date</td><td>LTC(MTD)</td></tr><tr><td>Γ A</td><td>Timer A</td><td>LTC(MTD)</td></tr><tr><td>Γ B</td><td>Timer B</td><td>LTC(MTD)</td></tr><tr><td>Γ C</td><td>Timer C</td><td>LTC(MTD)</td></tr><tr><td>Γ d</td><td>Timer D</td><td>LTC(MTD)</td></tr><tr><td>Γ E</td><td>Timer E</td><td>LTC(MTD)</td></tr><tr><td>Γ F</td><td>Timer F</td><td>LTC(MTD)</td></tr><tr><td>Γ L</td><td>LTC</td><td>LTC(MTD)</td></tr><tr><td>□ 1</td><td>Main Time 1</td><td>LTC(MTD)</td></tr><tr><td>□ 2</td><td>Main Time 2</td><td>LTC(MTD)</td></tr><tr><td>□ 3</td><td>Main Time 3</td><td>LTC(MTD)</td></tr><tr><td>L Γ</td><td>Time</td><td>LTC</td></tr><tr><td>L d</td><td>Date</td><td>LTC</td></tr><tr><td>L U</td><td>User</td><td>LTC</td></tr><tr><td>S Γ</td><td>Time</td><td>Serial</td></tr><tr><td>S d</td><td>Date</td><td>Serial</td></tr><tr><td>S S</td><td>Status</td><td>Serial</td></tr><tr><td>□ S</td><td>MTD Slave</td><td>MTD Slave</td></tr></table>	Digits	Mode	Source	□ L	Local Timer		r Γ	Time	LTC(MTD)	r d	Date	LTC(MTD)	Γ A	Timer A	LTC(MTD)	Γ B	Timer B	LTC(MTD)	Γ C	Timer C	LTC(MTD)	Γ d	Timer D	LTC(MTD)	Γ E	Timer E	LTC(MTD)	Γ F	Timer F	LTC(MTD)	Γ L	LTC	LTC(MTD)	□ 1	Main Time 1	LTC(MTD)	□ 2	Main Time 2	LTC(MTD)	□ 3	Main Time 3	LTC(MTD)	L Γ	Time	LTC	L d	Date	LTC	L U	User	LTC	S Γ	Time	Serial	S d	Date	Serial	S S	Status	Serial	□ S	MTD Slave	MTD Slave
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S d	Date	Serial																																																														
S S	Status	Serial																																																														
□ S	MTD Slave	MTD Slave																																																														



Displays in Ethernet mode

After power-on the device performs a display test and indicates some status information:

<div><div><div>Digit 1</div><div>Digit 2</div><div>Digit 3</div><div>Digit 4</div><div>Digit 5</div><div>Digit 6</div></div><div><div>88</div><div>:</div><div>88</div><div>:</div><div>88</div></div></div>	All LEDs will shortly light up with changing colours.																																																
<div><div><div>Digit 1</div><div>Digit 2</div><div>Digit 3</div><div>Digit 4</div><div>Digit 5</div><div>Digit 6</div></div><div><div></div><div>1.</div><div>21</div><div></div><div></div></div></div>	<p>Displaying the revision number, e.g. „1.21“.</p> <p>Devices with two displays (for example of type “UDD” or UD300D/UD300LD/UD300ED) indicate a “1” at the first display and a “2” at the second display at the 6th digit’s place.</p>																																																
<div><div><div>Digit 1</div><div>Digit 2</div><div>Digit 3</div><div>Digit 4</div><div>Digit 5</div><div>Digit 6</div></div><div><div>nd</div><div></div><div></div><div></div><div>rA</div></div></div>	<p>Indicating the current display mode at digits 5 and 6, e.g.:</p> <table><thead><tr><th>Digits</th><th>Mode</th><th>Source</th></tr></thead><tbody><tr><td>□ L</td><td>Local Timer</td><td></td></tr><tr><td>r Γ</td><td>MTD Time</td><td>MTD</td></tr><tr><td>r d</td><td>MTD Date</td><td>MTD</td></tr><tr><td>Γ A</td><td>Timer A</td><td>MTD</td></tr><tr><td>Γ B</td><td>Timer B</td><td>MTD</td></tr><tr><td>Γ C</td><td>Timer C</td><td>MTD</td></tr><tr><td>Γ d</td><td>Timer D</td><td>MTD</td></tr><tr><td>Γ E</td><td>Timer E</td><td>MTD</td></tr><tr><td>Γ F</td><td>Timer F</td><td>MTD</td></tr><tr><td>□ 1</td><td>Main Time 1</td><td>MTD</td></tr><tr><td>□ 2</td><td>Main Time 2</td><td>MTD</td></tr><tr><td>□ 3</td><td>Main Time 3</td><td>MTD</td></tr><tr><td>Γ L</td><td>MTD TC</td><td>MTD</td></tr><tr><td>n Γ</td><td>NTP Time</td><td>NTP</td></tr><tr><td>n d</td><td>NTP Date</td><td>NTP</td></tr></tbody></table>	Digits	Mode	Source	□ L	Local Timer		r Γ	MTD Time	MTD	r d	MTD Date	MTD	Γ A	Timer A	MTD	Γ B	Timer B	MTD	Γ C	Timer C	MTD	Γ d	Timer D	MTD	Γ E	Timer E	MTD	Γ F	Timer F	MTD	□ 1	Main Time 1	MTD	□ 2	Main Time 2	MTD	□ 3	Main Time 3	MTD	Γ L	MTD TC	MTD	n Γ	NTP Time	NTP	n d	NTP Date	NTP
Digits	Mode	Source																																															
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<div><div><div>Digit 1</div><div>Digit 2</div><div>Digit 3</div><div>Digit 4</div><div>Digit 5</div><div>Digit 6</div></div><div><div>1n</div><div>1r</div><div></div><div></div><div></div><div></div></div></div> <div><div><div>Digit 1</div><div>Digit 2</div><div>Digit 3</div><div>Digit 4</div><div>Digit 5</div><div>Digit 6</div></div><div><div>1n</div><div>1r</div><div></div><div></div><div></div><div>o</div></div></div>	<p>“Init” indicates that the Ethernet initialization is still in progress. After success “Init o” shortly will be displayed, then or after one minute at the latest the device switches to normal operating mode.</p>																																																
<div><div><div>Digit 1</div><div>Digit 2</div><div>Digit 3</div><div>Digit 4</div><div>Digit 5</div><div>Digit 6</div></div><div><div>FI</div><div>nd.</div><div>01</div></div></div>	<p>In case source = MTD:</p> <p>The device tries to find the RUB IE module responsible for the indicated MTD group.</p>																																																
<div><div><div>Digit 1</div><div>Digit 2</div><div>Digit 3</div><div>Digit 4</div><div>Digit 5</div><div>Digit 6</div></div><div><div>SY</div><div>nC.</div><div>01</div></div></div>	<p>In case source = MTD:</p> <p>The RUB IE module has been found, now the device synchronizes its internal clock with NTP commands.</p>																																																



1.6. Firmware Update

Firmware updates require a (Windows operating system) computer with a **USB** interface and the **UD SC Config.exe** program. "Universal" and "E" version displays can also be updated over Ethernet.

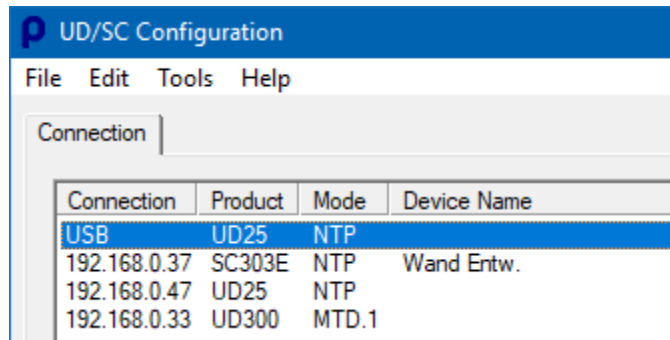
Important: Please make sure to always use the latest version of the program. You can download it from:

<https://plurainc.com/products/ud25/>

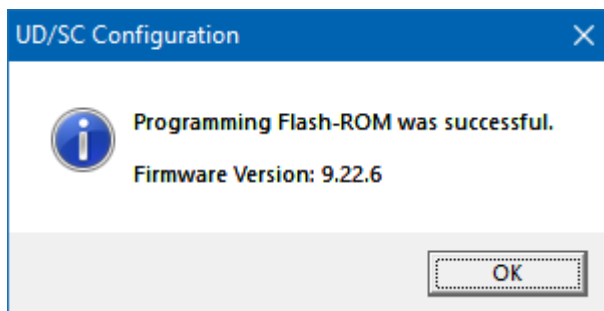
The new firmware should already be stored as a **.tcf** file at your computer.

Please now execute the following steps:

1. Connect the device to the computer with a standard **USB** cable (A – B type). It is recommended not to have more than one device connected to this USB port.
2. Execute **UD SC Config.exe** on your computer. The program gives a list of all devices found. Click (not a double click) on the device in the list which shows the **USB** connection.



3. Select "Flash Update" in the **File** menu.
4. Open the **.tcf** file. The program checks whether the new firmware matches the correct type of the device. In case there is no match an error message appears: "Incompatible Flash Update File". Update starts automatically if everything is ok. Click the OK button at the end.



5. Update is finished now. We recommend checking the configuration of the device.

During the flash update the operation of the device stops!

Displays in LTC mode:

It is recommended to disconnect an existing RS485(MTD) connection before starting the flash update. During the flash update the RS485 bus may be blocked!



1.7. Configuration

The UD/SC Configuration Program

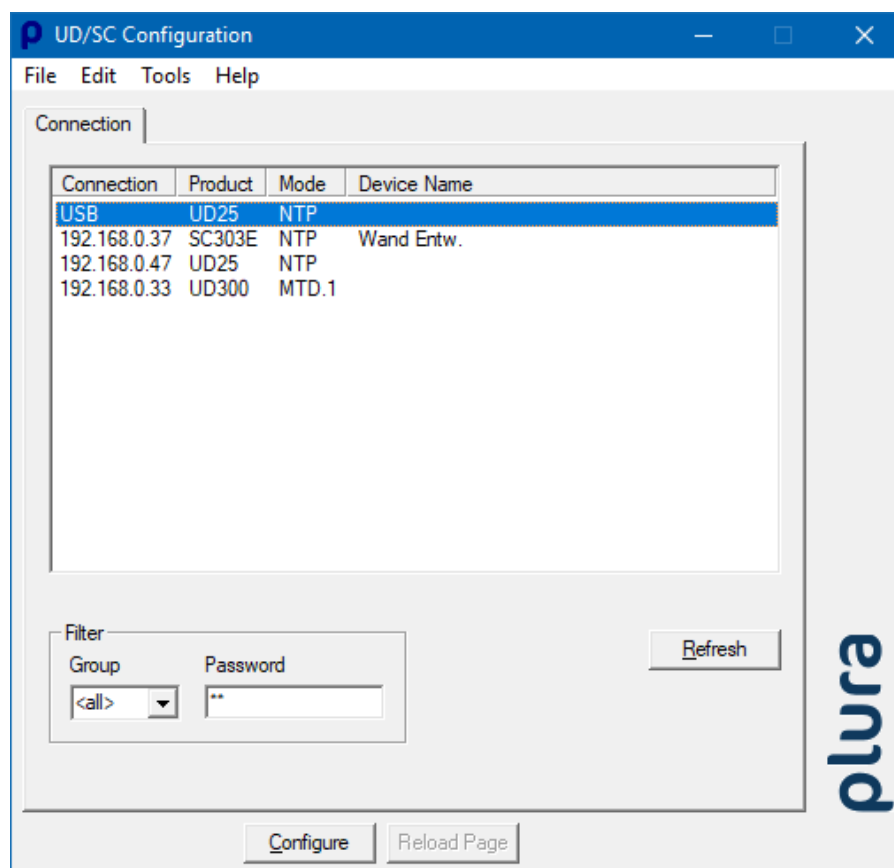
Configuration requires the **UD SC Config.exe** program running on a computer (32- or 64-bit Windows operating system 2000/XP/2003/Vista/2008/7). You can download the latest version of the program from:

<https://plurainc.com/products/ud25/>

Every UD device can be configured via a USB interface. “Universal” and “E” version displays can be configured via Ethernet as well; the computer then must be connected to the network. Access via Ethernet can be protected by a password (chapter “System Tab”). Firmware update is performed by this program as well, but this requires the USB connection (chapter “Firmware Update”).

USB connection requires a standard USB cable (A – B type). It is recommended but not needed to have the device connected to an external power supply. If no power supply is connected, the device can be configured as usual, but the device will stay in a shut-off mode, regardless of current set-up. The first time the device is plugged to the PC, Windows will install a driver for it. This driver is part of Windows, you don’t need a CD.

After program start a list is given of all devices found:



Open the configuration by marking the device on the list and pressing button “Configure”, or by a double click on a device in the list. Additional tabs will be shown. On these tabs you can check or change the configuration of the selected device as described in the following chapters.



“Profile” Tab: Store and Load a Complete Set-Up

This feature enables to easily change the complete set-up of the unit during normal operation. During installation, the current set-up can be stored as a “profile”. You can enter a name in the “name” entry before storing. Now choose a different set-up and store this as a different profile. Five profiles are available. Programming the GPI inputs with “Load Profile ...” functions (please refer to chapter “GPI Tab: ...”) enables you to change over from one set-up to the other during normal operation.

Five different set-ups can be stored into the non-volatile memory of the unit.

Click **Store**:

Profile: Select 1 – 5.

Info Operator: You may enter a text.
Comment: You may enter a text.

Click **OK** to store the current set-up.

Any set-up stored as a profile can replace the current set-up.

Click **Load**:

Profile: Select “Factory Settings” or 1 – 5.
“Factory Settings” installs the default set-up.

Click **OK** to replace the current set-up by the selected profile. If no valid set-up has been stored, an error message is given.



“System“ Tab: View and Change System Parameters

Unit

<u>N</u> ame	Give the device a significant name. This name appears wherever UD devices can be found, either via Browser or via USB. Enter a text (10 characters) in the <i>Name</i> field. Complete with <i>Enter</i> or <i>Tab</i> key.
<u>R</u> eboot	Warm boot of the unit.

Security – available only for “universal” and “E” version displays

It is provided to protect the unit against non permission or unintentional access via Ethernet. Any configuration with a USB connection ignores the password.

With a click on the **C**hange button the following entry opens:

Enter the password twice and press the **OK** button.

Clear an existing password by checking **No Password**.

Password forgotten? → Please read chapter “Passwords” of “The MTD System” manual.

Info

Indicates some device status, e.g. the version of the installed firmware.



“Source” Tab: Select the Signal Source

“L” version displays:

“E” version displays:

“Universal” displays:

“Universal” or “L” version displays:

LTC(MTD) Please refer to chapter “Interfaces – LTC(MTD)” as well. LTC(MTD) denotes a special LTC format which contains real-time, date and various user selectable/-configurable timers. Only this choice enables the device to use the extensive functionality of the Plura MTD system.

LTC Please refer to chapter “Interfaces – LTC(MTD)” as well. With this operating mode the device reads a standard LTC signal. The tabs “LTC” and “Real-Time” offer additional set-ups. Typical applications:

- Simple LTC reader.
- Real-time functionality with offset selection for different time zones.

Serial Please refer to chapter “Interfaces – RS232/RS422” as well. This operating mode enables the serial interface. The tabs “Serial” and “Real-Time” offer additional set-ups. Typical applications:

- Decoding a time out of a serial protocol and displaying HH:MM:SS.
- Real-time functionality with offset selection for different time zones.

MTD Slave This selection enables a special Master-Slave operating mode described in chapter “MTD Slave: Local Stop Timer and External Displays”.

“Universal” displays:

IRIG Please refer to chapter “Interfaces – IRIG” as well. With this operating mode the device reads a standard IRIG signal. The tabs “IRIG” and “Real-Time” offer additional set-ups. Typical applications:

- Simple IRIG reader.
- Real-time functionality with offset selection for different time zones.



“Universal” and “E” version displays:

- MTD** The unit is able to decode and display all the timers of the MTD data. The MTD data include six independent programmable timers, real-time, date, and a time of a time code. Each timer can show a stop timer, a remaining time, a time difference, a time of a time zone etc. UD displays can operate as a control unit of the MTD_oE system using the GPI inputs.
- NTP** The unit receives and displays a time & date. The received reference time can get a programmable offset. It is possible to enable a Daylight-Saving Time handling.

“LTC” Tab: Set-Up of the LTC Reader

“Universal” and “L” version displays only.

This tab is available in case of **source = LTC**.

- Framerate** Select the frame rate of the incoming LTC signal:
- Auto = automatic detection (24/25/30/30df).
 - 24 = 24 frames/second.
 - 25 = 25 frames/second.
 - 30 = 30 frames/second.
 - 30df = 29.97 frames/second with NTSC drop mode.
- User Mode** The real-time operating mode expects time & date from the external reference. Please select the format of the date so that the date can be decoded out of the user bits (binary groups) of the LTC.
- The date becomes important e.g. in a real-time operating mode if a Daylight-Saving Time [DST] switching should be done automatically.



“Serial” Tab: Set-Up of the Serial Interface

“Universal” and “L” version displays only.

This tab is available in case of **source = Serial**.

Interface	Electrical specification and connector of the interface:		
Off	Interface switched off.		
RS232	RS232 at terminal block RS232/RS422		
RS422 (MTD connector, r/o)	RS485 at terminal block LTC/MTD	*1	*2
	("r/o" = receive only)		
RS422	RS422 at terminal block RS232/RS422	*1	
RS485	RS485 at terminal block RS232/RS422	*1	
RS485 (MTD connector)	RS485 at terminal block LTC/MTD	*2	
<p>*1 UD Displays, delivered until November 2011, have a fault of RS422/RS485 hardware, so these interfaces cannot be used. Alternatively, RS422 transmit signals or RS485 signals can be connected to RS485 at terminal block LTC/MTD. "RS422 (MTD connector, r/o)" should be selected in this case.</p>			
<p>*2 This selection disables any RS485(MTD) communication to the central MTD generator.</p>			

Protocol Select the data protocol out of the drop-down list.

Data protocols can be divided into "real-time" and "display" protocols. Real-time protocols convey time & date with an always continuously up-counting time, e.g. "Meinberg", "NMEA", and "Wharton" protocols. These protocols are suitable for a real-time operation of the device.

Display protocols can convey an up-counting, a down-counting or a "frozen" time. Some display protocols contain an address. The device accepts data only if the address within the data string matches the serial address selection at the "Display" tab.

Please refer to document **"UD Series Displays: Serial Protocols"** for a detailed description. You can download this document from:

<https://plurainc.com/products/ud25/>



Baud rate Choose the baud rate:
2.400 / 4.800 / 9.600 / 19.200 / 38.400 / 57.600 / 115.200

Data Bits 7 or 8 data bits.

Parity Select the parity mode:
None Without parity
Even Even parity bit
Odd Odd parity bit

Stop Bits 1 or 2 stop bits.

Use Timeout ASCII based protocols in general use STX/ETX or similar control characters to synchronize the communication. Other protocols may use a timeout for this purpose. In this case, the receiver expects a start of a new data string if for the time of the timeout value [in milliseconds] no data has been received.

Select a suitable **Timeout** value dependent on baud rate and frequency of the data. Recommendation:

Baud rate	Timeout [ms]	Timeout [ms]
	Data string per second	Data string per frame
2400	100	-
4800	100	-
9600	100	6
19200	100	11
≥ 38400	100	14



“Ethernet” Tab: IP Addresses ...

“Universal” and “E” version displays only.

“Source = MTD”

The screenshot shows the 'Ethernet' configuration window with the 'Source' tab selected. The 'Current Settings' section includes: Use DHCP (Yes), IP Address (192.168.0.47), Subnet Mask (255.255.255.0), Gateway (192.168.0.254), MAC Address (00-60-35-32-B3-62), Host Name (av_32b362), and MTD Master IP Address (192.168.0.27). A 'Change...' button is next to the IP Address. The 'MTD' section includes: Automatic MTD Master IP Address (checked), Primary MTD Master IP Address (192.168.0.94), Secondary MTD Master IP Address (192.168.0.95), and Group (1).

“Source = NTP”:

The screenshot shows the 'Ethernet' configuration window with the 'Real-Time' tab selected. The 'Current Settings' section includes: Use DHCP (Yes), IP Address (192.168.0.47), Subnet Mask (255.255.255.0), Gateway (192.168.0.254), MAC Address (00-60-35-32-B3-62), Host Name (av_32b362), Primary NTP Server IP (192.168.0.94), and Secondary NTP Server IP (192.168.0.95). A 'Change...' button is next to the IP Address. The 'NTP Client' section includes: Primary Server IP Address (192.168.0.94) and Secondary Server IP Address (192.168.0.95).

Current Settings

This box indicates the current network parameters of the device.

A click on **Change...** enables to change parameters:

The screenshot shows the 'Ethernet' dialog box with the 'Interface' section. It includes: Use DHCP (unchecked), IP Address (192.168.0.100), Subnet Mask (255.255.255.0), and Gateway (192.168.0.254). There are 'OK' and 'Cancel' buttons at the bottom.

Use DHCP If checked, the device will automatically request its IP parameters (IP address, subnet mask, and gateway) from a DHCP server. In this case the “IP Address”, “Subnet Mask”, and “Gateway” boxes have no relevance.

Please let the device restart (power off – on) if you select this mode.



MTD - if "Source = MTD" has been selected

Automatic MTD Master IP Address If checked, the device will automatically find the MTDoe central unit responsible for the group number below. In a redundant system (two MTDoe central units), an automatic changeover can take place in case one central unit fails.

Restriction: The automatic mode requires that this unit and the MTDoe central unit are in the same local network. If the units are connected to different local networks, the IP addresses (of 'Primary MTD Master' and – if present – 'Secondary MTD Master') have to be entered manually.

Primary MTD Master IP Address If "Automatic MTD Master IP Address" is not checked, the IP address of the MTDoe central unit has to be entered manually.

Secondary MTD Master IP Address It is possible to have a redundancy of MTDoe central units. A second MTDoe central unit then is working in the same MTDoe system (it operates with the same MTDoe group number). If "Automatic MTD Master IP Address" is not checked, the IP address of the second MTDoe central unit has to be entered manually.

Group Indicates the MTDoe group number. Likewise, you can change this number here.

Click **Reload Page** at the bottom of the tab if the „Current Settings“ box does not show the new parameters.

NTP Client - if "Source = NTP" has been selected

Enter the IP addresses which the NTP client of the device uses to request time & date information of an NTP server.

Primary Server IP Address Address of the primary (1st) NTP server.

Secondary Server IP Address Address of a secondary (back-up) NTP Server.

Click **Reload Page** at the bottom of the tab if the „Current Settings“ box does not show a changed address.



“Real-Time“ Tab: Set the Time Zone Parameters

Working in a real-time operating mode the device receives an external time & date reference and calculates the UTC (Universal Time Coordinated = world time reference without a Daylight-Saving Time [DST]), to set the internal clock. Having the UTC as a time base any local time zone can be calculated and displayed. At this tab all the necessary settings for these calculations have to be done.

The **Reference Time Zone** and the **Local Time Zone** settings use the same principle: the time zone will be defined with respect to the UTC. You can preset all parameters choosing a time zone from a drop-down list. Devices with more than one display can be set to different local time zones, in this case settings for more than one local time zone are provided.


Enable Real-Time Enables or disables the time zone handling. If activated the real-time display switches to internal clock if the source fails.

Set Clock ... Pressing this button, the internal clock receives a hard set to the time of the PC clock. If no external reference source is available and the device should work in a free-running mode, we recommend the following set-up:

- Select **Serial** at the “Source” tab.
- Select **Interface = Off** at the “Serial” tab.
- Activate **Enable Real-Time** at the “Real-Time” tab.



Time zone parameters separately for **Reference Time Zone** and **Local Time Zone**



You can choose a time zone from this drop-down list. This will preset all parameters.

Offset from UTC Standard time (wintertime) = UTC ± offset (HH:MM).

Automatically set Daylight Saving Time
Check this box if the reference input has a DST period.

If the time zone has a DST period, the following parameters should be selected:

DST Bias Enter the DST correction value. Most of the cases the correction value will be (+) one hour.

DST Start Using these inputs (e.g. last Sunday of March at 2 o'clock) the device calculates the start of DST for the current year.

DST End Using these inputs (e.g. last Sunday of October at 3 o'clock) the device calculates the end of DST for the current year.



“Display” Tab: Display Mode, Brightness, ...

This tab enables to specify in detail which data will be displayed and how. Devices with two displays can be set separately; in this case two tabs will be shown:

At UDD25: **Left Display (1)** and **Right Display (2)**.

At UD300D/UD300LD/UD300ED: **Main Display (1)** and **Appended Display (2)**.

Mode Operating modes of the display – dependent on “Source” selection:

Mode	Description	available for „Source = ...“
Local	Local (internal) stop timer, controlled via GPI functions. No other external signal is required.	LTC(MTD) LTC, IRIG, Serial, MTD, NTP
(MTD) Time (MTD) Date	Unit displays real-time or date – decoded out of the MTD data.	LTC(MTD) MTD
(NTP) Time	Time display with selectable 12-hour or 24-hour format (see below). This mode can be extended to a “real-time” mode – see description of the Time Zone setting below.	LTC, IRIG, Serial, NTP
(NTP) Date	Date display with selectable Day/Month/Year format (see below).	LTC, IRIG, Serial, NTP
Timer A ... F	Display of time A (... time F) decoded out of the LTC(MTD), e.g. stop timer A (... F).	LTC(MTD) MTD
Main 1 ... 3	“Main Time 1” (... 3) decoded out of the LTC(MTD).	LTC(MTD) MTD
TC/LTC	Time addresses of the time code of the central MTD generator.	LTC(MTD) MTD
User	Binary groups (BG8/7, BG6/5, BG4/3) of the LTC signal.	LTC
Status	Display of status data – if available for the selected protocol.	Serial
MTD Slave	Master – Slave operating mode.	MTD Slave



Brightness

Digits	Brightness of the display: 7 steps, 7 = maximum brightness.
Ring	Units with a seconds ring only: brightness of the seconds ring. With lock clicked the brightness of the seconds ring follows the brightness of the digits.
Test Displays	All LEDs will light-up for test purposes.

Format

Color	LED colour: Auto Red/Yellow/Green	If "Source = LTC(MTD)" or "Source = MTD": The display decodes the colour out of the MTD data.
Delimiter	Separating sign between pairs of digits: Auto Off Decimal Points Colon	If "Source = LTC(MTD)" or "Source = MTD": The display decodes the separating sign out of the MTD data. No separating sign.
Time	HH:MM:SS 24h HH:MM:SS 12h	Time display in a 24-hour format. Time display in a 12-hour format.
Date	YY MM DD MM DD YY DD MM YY MM YYYY	Year / Month / Day. Month / Day / Year. Day / Month / Year. Month / Year 4-digits format.

Time Zone This set-up defines your real-time operating mode together with the set-up at the **Real-Time** tab.

Time Zone	Enable Real-Time at the Real-Time tab	Description
Off	Not checked	Displays the time of the source without offset calculation. Time display stops if the source fails.
Off	Checked	Displays the time of the source +/- offset according to "Reference Time Zone" set-up. Time display continues if the source fails.
Time Zone 1 Time Zone 2	Checked	The time of the source will be corrected with the offset according to "Reference Time Zone" set-up. This time base +/- offset according to „Local Time Zone“ will be the time displayed. Time display continues if the source fails.

Serial

Address	Some serial data protocols may contain an address. The device accepts the data only if the address matches the serial address selection at this tab. If the device has more than one display each gets its own address.
----------------	---



“GPI” Tab: Programming GPI as Input or Output

Connection

Profile

System

Source

Ethernet

LTC

Real-Time

Display

GPI

GPI 1

No Operation

compare to

0 : 00 : 00

Mode

Active Low

GPI 2

No Operation

compare to

0 : 00 : 00

Mode

Active Low

GPI 3

No Operation

compare to

0 : 00 : 00

Mode

Active Low

GPI 4

No Operation

compare to

0 : 00 : 00

Mode

Active Low

Pulse Duration

500ms

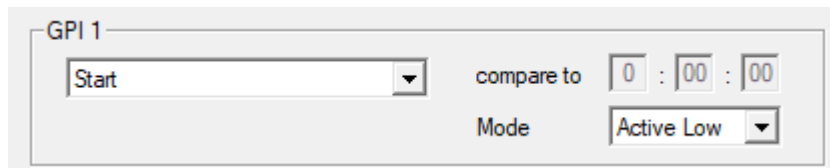
Four GPIs can get a function independently from each other, as an input or as an output. Select the function from the drop-down lists. For technical details please refer to chapter “Specifications”. The input or output mode of the GPI will be determined by the selected function.

No Operation	GPI has no function.
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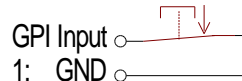


GPI Inputs

Selecting any input function will activate the “mode” box:

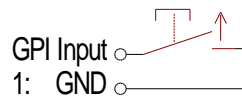


Mode: “Active Low” (please refer to chapter “Specifications” for technical details).



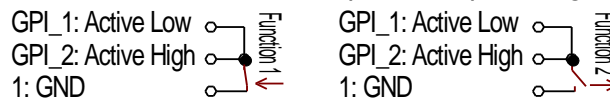
Example: Function becomes active if input state changes from “open” to “closure to GND”.

“Active High” (please refer to chapter “Specifications” for technical details).



Example: Function becomes active if input state changes from “closure to GND” to “open”.

If one GPI input has “Mode = Active Low” and another “Mode = Active High”, both functions can be executed alternatively with only one signal:



Function	Description																
Start Stop Reset Hold Start/Stop Reset+Start Reset+Continue Reset if stopped	<p>These commands come in effect only if the device displays any timer: local timer (independent on “Source” selection) or any MTD timer A ... F (in this case, displays in mode LTC(MTD) should have the RS485 at MTD terminal block connected to the central MTD generator).</p> <p>At devices with two displays (UDD25, UD300D, UD300LD, UD300ED) only the 1st display will be controlled.</p> <table border="0"> <tr> <td>Start</td><td>Timer starts.</td></tr> <tr> <td>Stop</td><td>Timer stops.</td></tr> <tr> <td>Reset</td><td>Timer stops and will be set to zero.</td></tr> <tr> <td>Hold</td><td>Display “freezes” the timer value, timer keeps running.</td></tr> <tr> <td>Start/Stop</td><td>Alternating commands.</td></tr> <tr> <td>Reset+Start</td><td>Reset command followed by a Start command.</td></tr> <tr> <td>Reset+Continue</td><td>“Reset” if selected timer stays in stop mode. “Reset+Start” if selected timer is running.</td></tr> <tr> <td>Reset if stopped</td><td>Timer will be set to zero, but only if the timer was stopped.</td></tr> </table>	Start	Timer starts.	Stop	Timer stops.	Reset	Timer stops and will be set to zero.	Hold	Display “freezes” the timer value, timer keeps running.	Start/Stop	Alternating commands.	Reset+Start	Reset command followed by a Start command.	Reset+Continue	“Reset” if selected timer stays in stop mode. “Reset+Start” if selected timer is running.	Reset if stopped	Timer will be set to zero, but only if the timer was stopped.
Start	Timer starts.																
Stop	Timer stops.																
Reset	Timer stops and will be set to zero.																
Hold	Display “freezes” the timer value, timer keeps running.																
Start/Stop	Alternating commands.																
Reset+Start	Reset command followed by a Start command.																
Reset+Continue	“Reset” if selected timer stays in stop mode. “Reset+Start” if selected timer is running.																
Reset if stopped	Timer will be set to zero, but only if the timer was stopped.																
Toggle Display UD with 2 Displays: Toggle Displays Toggle Display 1 Toggle Display 2	<p>Switches the display on/off alternating.</p> <p>In “off” state, one decimal point will light up weakly to indicate that the unit is operating.</p>																



Local + Start Local + Stop Reset + Real-Time	<p>Control the timer as with Start, Stop and Reset (see above), but also switches display mode.</p> <p>Local + Start Switch to local timer and start it. Local + Stop Switch to local timer and stop it. Reset + Real-Time Reset the timer and switch to Real-Time.</p>
Switch Display Off UD with 2 Displays: Switch Displays Off Switch Display 1 Off Switch Display 2 Off	<p>Switches the display on/off by use of an external switch.</p> <p>If "Mode = Active Low", a closure to ground or a "Low" state will turn the display "off" (one decimal point will light up weakly to indicate that the unit is operating); switch open or a "High" state will turn the display "on".</p>
Next Display Mode UD with 2 Displays: Display 1: Next ... Display 2: Next ...	<p>Switches the display to the next mode - according to the "Mode" drop-down list at the "Display" tab. The available modes are depended on the source selection. After switching, the display shortly indicates the selected mode.</p>
Previous Display Mode UD with 2 Displays: Display 1: Previous... Display 2: Previous...	<p>Switches the display to the previous mode - according to the "Mode" drop-down list at the "Display" tab. The available modes are depended on the source selection. After switching, the display shortly indicates the selected mode.</p>
--- Main Timer --- Main 1 = Time Main 1 = Date Main 1 = Timer A Main 1 = Timer B Main 1 = Timer C Main 1 = Timer D Main 1 = Timer E Main 1 = Timer F Main 2 = Time ... Main 3 = Time ...	<p>Switches the „Main“ timers: Main 1, Main 2, Main 3.</p> <p>Conditions: LTC(MTD): "Source = LTC(MTD)", and RS485 at MTD terminal block connected to the central MTD generator. Ethernet: "Source = MTD".</p> <p>Features of the "Main" timers are described in: "The MTD System – Installation and Operation Manual".</p>
PPS Input	<p>If "Source = Serial" only: GPI will be configured as a pulse-per-second input.</p>
Display Mode ... UD with 2 Displays: Display 1 Mode: ... Display 2 Mode: ...	<p>Selecting display modes directly. The available modes are depended on the source selection. The new display mode will not be stored internally, i.e. after powering on the unit the display selects that mode which has been set by the configuration program (at "Display" tab).</p>



Profiles

Load Profile 1
Load Profile 2
Load Profile 3
Load Profile 4
Load Profile 5

The "Load Profile" function enables to change the complete set-up in a comfortable way.

Please notice chapter "Profile Tab: ..." as well.

Please remember to program all GPI functions correctly before you execute a "Store Profile".

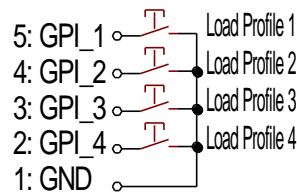
Example 1: Four different signals/buttons recall four different set-ups. Each set-up has all GPIs configured as follows:

GPI 1 = Load Profile 1, "Mode = Active Low";

GPI 2 = Load Profile 2, "Mode = Active Low";

GPI 3 = Load Profile 3, "Mode = Active Low";

GPI 4 = Load Profile 4, "Mode = Active Low".

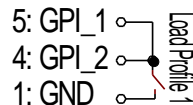


Example 2: One signal/switch changes over from first set-up to second. Both set-ups have GPIs configured as follows:

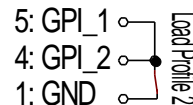
GPI 1 = Load Profile 1, "Mode = Active High";

GPI 2 = Load Profile 2, "Mode = Active Low".

Switch open:



Switch closed:



Example 3: One signal/button recalls five different set-ups one after another. The set-ups have GPIs configured as follows:

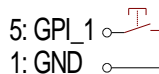
Profile 1: GPI 1 = Load Profile 2, "Mode = Active Low".

Profile 2: GPI 1 = Load Profile 3, "Mode = Active Low".

Profile 3: GPI 1 = Load Profile 4, "Mode = Active Low".

Profile 4: GPI 1 = Load Profile 5, "Mode = Active Low".

Profile 5: GPI 1 = Load Profile 1, "Mode = Active Low".



GPI Outputs

GPI OUT functions work as a time comparator. A fixed time value entered at the **compare to** entries will be compared with the time of the display or the time of a selected timer. A match leads to an impulse output. The pulse duration is adjustable.

Selecting any output function will activate the “compare to” and “mode” boxes:

compare to: Select hours (0–23) : minutes (0–59) : seconds (0–59).

Mode: “Active Low” or “Active High” mode, please refer to chapter “Specifications.”

The GPI OUT drop-down list offers different functions depending on the selection at “Source”. The “Display” function compares the current time shown at the display. All other functions compare the selected timer or the selected time – no matter of the display mode.

Functions – dependent on “Source” selection:

Function	Description	available for “Source = ...”
Display UD with 2 Displays: Display 1 Display 2	Comparison with the time currently shown at the display.	LTC(MTD) LTC, IRIG, Serial, MTD Slave, MTD, NTP
Local	Comparison with the local (internal) stop timer.	LTC(MTD) LTC, IRIG, Serial, MTD Slave, MTD, NTP
Real-Time	Comparison with the real-time decoded out of the MTD data.	LTC(MTD) MTD
Time	Comparison with the received time.	LTC, IRIG, Serial MTD Slave NTP
Time Zone 1 Time Zone 2	If a real-time operating mode has been selected: Comparison with the time of the selected time zone.	LTC, IRIG, Serial NTP
Timer A ... F	Comparison with the selected MTD timer A ... F.	LTC(MTD) MTD
Main 1 ... 3	Comparison with the selected MTD “main time” 1 ... 3.	LTC(MTD) MTD
MTD TC	Comparison with the time addresses of the time code of the central MTD generator.	LTC(MTD) MTD

Pulse Duration

GPI output: Pulse duration 100/200/500 ms, 1 second, or 2 seconds.



1.8. Special Features

Colour Changing Modes

Configuration "**Color = Auto**" at the **Display** tab.

If "Source = LTC(MTD)" or "Source = MTD" has been selected: The display decodes the colour of the LED's out of the **MTD Data**. These data contain status data which set the LED colour. At the central MTD time code generator the colour can be selected and a dynamic change of colour at special events can be realized. For example, the following features can be programmed at the MTD time code generator:

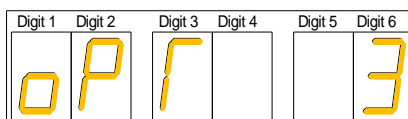
- Select the basic colour: red, yellow or green.
- Activate a colour changing mode:
 - No colour changing mode.
 - Change colour in case of a minus sign, new colour can be red, yellow or green.
 - Change colour in case of time ≥ 12 o'clock (PM time), new colour can be red, yellow or green.

This feature is not available for displays of type UD126 and UD178. This is a standard feature for all other UD Series displays.



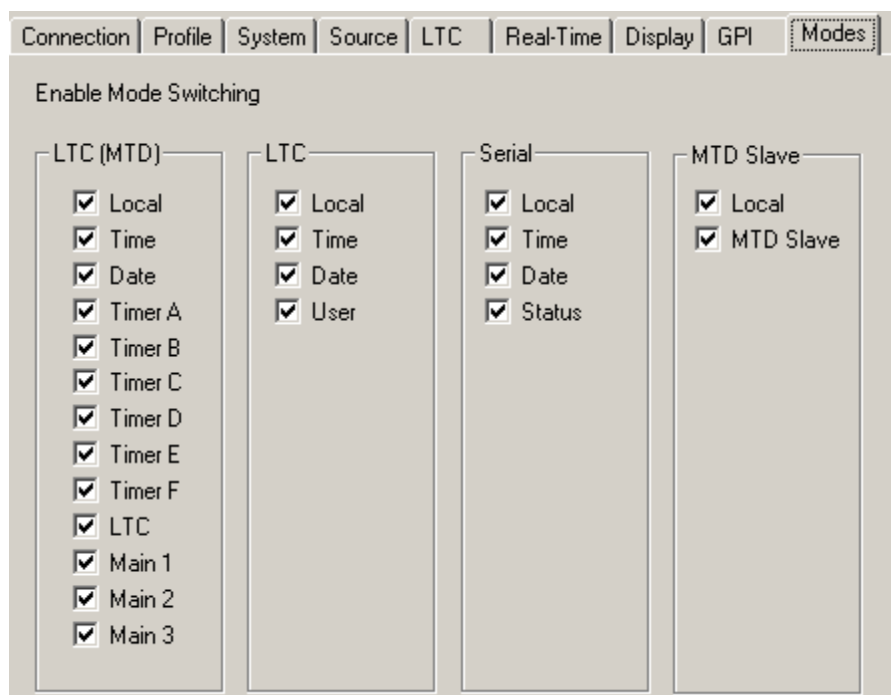
Switching the Display Mode by a Button

A special firmware and hardware are required for this functionality. After power-on, the display additionally indicates the option "3":



This feature enables the switching of the display mode by pressing a button located at the rear of the unit. The button is connected internally to GPI_1; so, GPI_1 no longer is available for other functions. After power-on, the unit enters the last selected mode.

There is a configuration by the **UD SC Config.exe** PC program provided. At the special **Modes** tab all the available modes for each "source" can individually enabled or disabled for this switching:



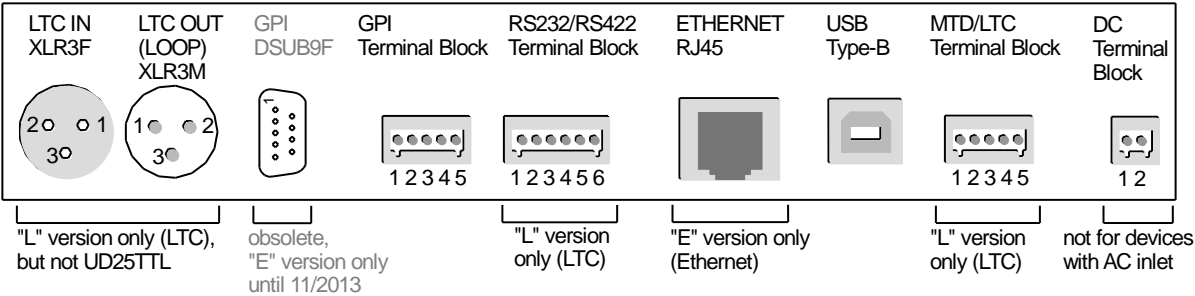
After switching, the display shortly indicates the selected mode (at digits 5 and 6):

LTC(MTD)		LTC		Serial		MTD Slave	
Local	□ L	Local	□ L	Local	□ L	Local	□ L
Time	r Γ	Time	L Γ	Time	S Γ	MTD Slave	□ S
Date	r d	Date	L d	Date	S d		
Timer A	Γ A	User	L U	Status	S S		
Timer B	Γ b						
Timer C	Γ C						
Timer D	Γ d						
Timer E	Γ E						
Timer F	Γ F						
LTC	Γ L						
Main 1	□ 1						
Main 2	□ 2						
Main 3	□ 3						



2. Technical Data

2.1. Connections at the Rear




Pin assignments

GPI			RS232/RS422		
DSUB9F	Terminal		Terminal Block		
GND	9	1	1: GND		
GPI_4	6	2	2: Vout		
GPI_3	5	3	RS232	RS422	RS485
GPI_2	4	4	3: CTS In	TB+ Out	TRB+ In/Out
GPI_1	3	5	4: RTS Out	RA- In	
			5: RxD In	RB+ In	
			6: TxD Out	TA- Out	TRA- In/Out

MTD/LTC Terminal	LTC IN XLR3F	LTC OUT (Loop) XLR3M	DC Terminal Block
GND	1	1	
LTC_IN_B	2	3	1: V-
LTC_IN_A	3	2	2: V+
RS485 TRB	4		
RS485 TRA	5		



Signal descriptions

GND	Signal ground.
GPI_1, GPI_2 GPI_3, GPI_4	Programmable General-Purpose Interfaces: Inputs or Outputs.
Vout	DC voltage output.
	ATTENTION: Using "Vout" please make sure not to exceed the total power rating of the connected Power Supply adapter.
CTS, RTS, RxD, TxD	Inputs and outputs of the serial interface in the RS232 operating mode: "Interface = RS232" has been selected at the Serial configuration.
TB+, RA-, RB+, TA-	Inputs and outputs of the serial interface in the RS422 operating mode: "Interface = RS422" has been selected at the Serial configuration.
TRB+, TRA-	Inputs and outputs of the serial interface in the RS485 operating mode: "Interface = RS485" has been selected at the Serial configuration.
LTC_IN_A, LTC_IN_B	Balanced LTC (Linear Time Code) or IRIG input. The LTC OUT signals at the XLR connector are just hard-wired to LTC input signals.
RS485 TRA, RS485 TRB	Balanced in- or outputs of a RS485 serial interface. This interface is preferably used for communication in the MTD system.
V-, V+	Power supply input: V- = GND V+ = DC voltage input



2.2. Specifications

LTC input

Format	According to ANSI/SMPTE 12M-1-2008, balanced
Input impedance	18 k Ω
Signal level	50 mV _{p-p} to 5 V _{p-p} , auto-ranging
Frequency	21–33 frames/s

IRIG input

Format	Modulated 1 kHz carrier signal, unbalanced IRIG-B 123 or IRIG-B 127 according to IRIG STANDARD 200-04 AFNOR time code according to AFNOR NF S 87-500
Input impedance	18 k Ω
Signal level	200 mV _{p-p} to 4 V _{p-p} , auto-ranging ("Mark" amplitude)

RS485 at LTC/MTD connector

RS485(MTD) Format	9600/8/E/1
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Ethernet

Medium	10Base-T or 100Base-T, automatic detection
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CTS/RXD inputs at RS232/RS422 connector

Voltage range	-15 to +15 V
Threshold "Low"	+0.8 V minimum
Threshold "High"	+2.4 V maximum
Impedance	\approx 5 k Ω typical

GPI

Input specification	Voltage range: -20 to +20 V Threshold "Low": +0.7 V minimum Threshold "High": +2.0 V maximum Impedance: \approx 24 k Ω typical Frequency: 0–10 kHz
Output specification	Open Collector output of an NPN Darlington transistor. Internal 33 k pull-up resistor. Max. power dissipation: 250 mW. "High" state: 2.4 V (no load). For higher switching levels an external pull-up to a positive power source of less than or equal to 24 VDC is needed, typically 1 k Ω when connected to an external +5 VDC power source. "Low" state: output switched to GND. Max. collector current: 200 mA DC, not fused. Collector-emitter saturation voltage: @ 20 mA: typical 0.72 V (\leq 0.85 V) @ 100 mA: typical 0.9 V (\leq 1.1 V) Frequency: 0–1 kHz



Vout

Output of the DC power supply	Reversible fused. A continuous current of up to 120 mA can be applied over the whole specified operating temperature range. At an ambient temperature of e.g. 22 °C the output switches to a high-resistance state after a few seconds if a current of 400 mA is applied.
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Free-run accuracy

Real-time operating modes	≈ 3 ppm (deviation ± 260 ms each day)
Local timer operating mode	≈ 50 ppm (deviation ± 1 second within 5½ hours)

Other common specifications

Environmental characteristics, operating	Temperature: +5 °C to +40 °C Relative humidity: 30 % to 85 %, non-condensing
Environmental characteristics, non-operating	Temperature: -10 °C to +60 °C Relative humidity: 5 % to 95 %, non-condensing

Operating voltage and power consumption

Model	Operating voltage DC	Operating voltage AC	Power consumption
UD25...	V+: 10–30 VDC (*)	Option UD-AP: 88–264 VAC/47–63 Hz	≈ 6 W
UD25-8	V+: 10–30 VDC (*)	Option UD-AP: 88–264 VAC/47–63 Hz	≈ 8 W
UDD25...	V+: 10–30 VDC (*)	Option UD-AP: 88–264 VAC/47–63 Hz	≈ 12 W
UD56...	V+: 15–30 VDC (*)	Option UD-BP: 88–264 VAC/47–63 Hz	≈ 8 W
UD56-8	V+: 15–30 VDC (*)	Option UD-BP: 88–264 VAC/47–63 Hz	≈ 10 W
UD56S...	V+: 15–30 VDC (*)	Option UD-BP: 88–264 VAC/47–63 Hz	≈ 15 W
UD300...	V+: 15–30 VDC (*)	Option UD-BP3: 90–264 VAC/47–63 Hz	≈ 22 W
UD300D...	V+: 15–30 VDC (*)	Option UD-BP3: 90–264 VAC/47–63 Hz	≈ 25 W
UD126...		85–264 VAC/47–63 Hz	≈ 35 W
UD178...		85–264 VAC/47–63 Hz	≈ 40 W

* If power is supplied via PoE and DC simultaneously, DC should be in the range of 24–30 V.

Readability of the display up to a distance of ...

Version	maximum distance
UD25..., UDD25...	10 m
UD56...	22 m
UD300...	22 m
UD300 attached display	10 m
UD126...	50 m
UD178...	60 m



Dimensions and Weight

UD25, UD25-C, UD25-8, UD25L, UD25E UDD25, UDD25L, UDD25E	Front plate: 19"/1 RU Electronic case W x H x D: 425 x 41 x 44 mm 16.73 x 1.61 x 1.73 in Weight: ≈ 0.7 kg
UD25TT, UD25TTL, UD25TTE	Front plate: 212 x 44 x 3 mm Electronic case W x H x D: 210 x 41 x 45 mm 8.27 x 1.61 x 1.77 in Weight: ≈ 0.4 kg
UD56, UD56-8, UD56L, UD56E, UD56S, UD56LS, UD56ES	Front plate 19"/2 RU Electronic case W x H x D: 448 x 86 x 45 mm (since April 2011) 17.64 x 3.39 x 1.77 in 448 x 86 x 56 mm (from April 2011) 17.64 x 3.39 x 2.21 in Weight: ≈ 1.0 kg
UD300, UD300L, UD300E	Square W x H x D: 324 x 324 x 60 mm 12.76 x 12.76 x 2.36 in Weight: ≈ 3,1 kg
UD300D, UD300LD, UD300ED	Square + Add-On: 324 x 382 x 60 mm 12.76 x 15.04 x 2.36 in Weight: ≈ 3.7 kg
UD126, UD126L, UD126E UD178L, UD178, UD178E	Electronic case W x H x D: 808 x 237 x 90 mm 31.81 x 9.33 x 3.54 in Weight: ≈ 7.0 kg

Option **UD-AP** alters the weight and the depth of the unit (chapter → "AC/DC Power Supplies → UD-AP: Attached AC Power Inlet").



2.3. AC/DC Power Supplies

EPSW: External Power Adapter

The “EPSW” AC/DC adapter is an accessory for the Plura *UD Series Displays*.

It has a fully enclosed plastic case, a three pole AC inlet according to IEC/EN 60320-1/C14 protection class 1, and a DC output cable with a jack suitable to connect to the DC terminal block of the UD display. The power supply cord must match the AC outlet of your country and is not part of the delivery.



Please notice the following specifications:

Input	100–240 VAC / 0.6 A / 47–63 Hz
Output	24 VDC, 850 mA, 20 W max.
Length of output cable	115 cm / 45.3 in
Dimension (W x H x D)	50 x 30 x 110 mm / 1.97 x 1.18 x 4.33 in
Weight	165 g (incl. output cable)
Environment	Operating: Temp. +0 °C to +40 °C, humidity 20 % to 80 % Storage: Temp. –20 °C to +85 °C, humidity 10 % to 95 %
Safety standards	EN60950, UL listed



UD-AP: Attached AC Power Inlet

With UD-AP an UD25 device receives an AC/DC adapter attached to the rear. This enables to directly connect an AC power cord.



ATTENTION



UD-AP is firmly attached to the UD housing. Please do not try to detach it.

Input:

Inlet socket	According to IEC/EN 60320-1/C14, protection class 1
Line voltage range	88–264 VAC, auto-ranging
Power line frequency	47–63 Hz
Input current	700 mA @ 115 VAC, 400 mA @ 230 VAC
Inrush current	30 A @ 230 VAC
Efficiency	84 % typical

Output:

Output voltage	24 VDC $\pm 1\%$
Output current	0–1.1 A
Ripple & Noise	$\leq 120 \text{ mV}_{\text{p-p}}$
Line regulation	$\pm 0.5\%$
Load regulation	$\pm 0.5\%$
Hold-up time at 100% load	80 ms @ 230 VAC, 14 ms @ 115 VAC

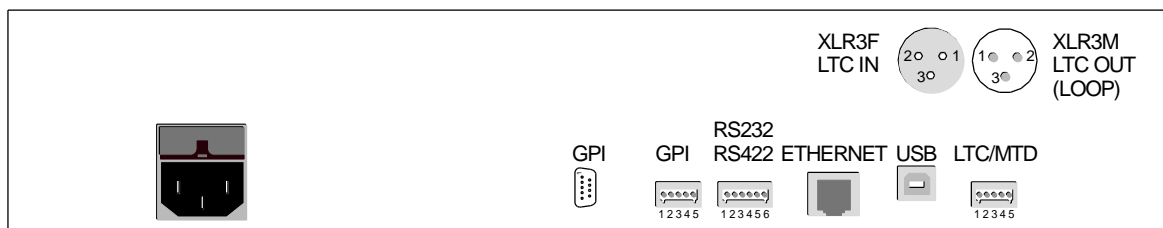
Others:

Weight	$\approx 330 \text{ g}$
Mechanical	W x H x D: 130 x 39 x 57 mm; 5.12 x 1.54 x 2.24 in
Environmental characteristics, operating	Ambient temperature: -20°C to $+70^\circ\text{C}$ Relative humidity: 20 % to 90 %, non-condensing
Environmental characteristics, non-operating	Temperature: -40°C to $+85^\circ\text{C}$ Relative humidity: 10 % to 95 %, non-condensing
Safety standards	UL60950-1, EN60950-1

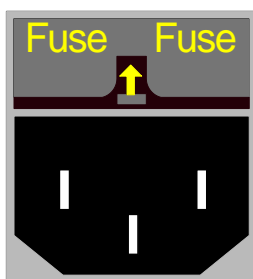


UD-BP: Integrated AC Power Inlet

With UD-BP an UD56 device receives an integrated AC/DC adapter. This enables to directly connect an AC power cord.




The power entry module incorporates a 2-pole fuse-holder.



To access the fuses please proceed as follows:

1. Disconnect the mains plug.
2. Press the clip as shown and remove the fuse-drawer.

Type of fuse	250 V, 1 A T (slow acting), 5 x 20 mm
	Warning: To avoid fire hazard, use only type of fuse as specified above.

The technical data of the power supply confirm to the power supply described at chapter "UD-AP: Attached AC Power Inlet".

UD-BP3: Integrated AC Power Inlet

With UD-BP3 an UD300 or UD300-D device receives an integrated AC/DC adapter. This enables to directly connect an AC power cord.



PI: Ethernet Power Injector for UD-PoE

The “PI” AC/DC adapter is an accessory for the Plura UD Series Displays with **UD-PoE**.

Features:

- Fully enclosed plastic case.
- IEEE802.3af (PoE) and IEEE802.3at (PoE+) compliant.
- Gigabit compatible.
- Short circuit protection and overload protection.
- Three pole AC inlet according to IEC/EN 60320-1/C14 protection class 1.
- RJ45 connector **IN** for data I/O, RJ45 connector **OUT** for data I/O + power output.
- Three diagnostic LEDs (see description below).



Input:

Inlet socket	According to IEC/EN 60320-1/C14, protection class 1
Line voltage range	90–264 VAC, auto-ranging
Power line frequency	47–63 Hz
Input current	1000 mA @ 90 VAC, 550 mA @ 240 VAC
Efficiency	78 % typical

Output:

Total output power	33.6 W
DC output voltage	56 V
Minimum load	0 A
Maximum load	0.60 A
Ripple & Noise	≤ 100 mV _{p-p}

Others:

Weight	≈ 290 g
Mechanical	W x H x D: 65 x 36 x 140 mm; 2.56 x 1.42 x 5.51 in
Environmental characteristics, operating	Ambient temperature: -20 °C to +50 °C Relative humidity: 5 % to 90 %, non-condensing
Environmental characteristics, non-operating	Temperature: -20 °C to +65 °C Relative humidity: 5 % to 95 %, non-condensing
Safety standards	UL60950-1, EN60950-1



Diagnostic LEDs: ON, PoEPLUS, CONNECT

- Power-up sequence: All LEDs will light up for two seconds. After two seconds, LED **ON** illuminates green indicating that DC output voltage is available.
- PoE detection sequence: Once a compliant load is attached to RJ45 OUT, LED **CONNECT** will illuminate green. LED **PoEPLUS** will illuminate green if the load is classified as class 4 PD, otherwise this LED will stay off. In case of a non-compliant load the LEDs will blink:
 1. Incorrect resistive signature: **CONNECT** and **PoEPLUS** will blink three times.
 2. Incorrect capacitive signature: **ON** will blink three times.
 3. Incorrect offset voltage: **CONNECT** and **ON** will blink three times.
 4. Unstable current measurement: **CONNECT** will blink three times.
 5. Low voltage sensed (overload): **PoEPLUS** will blink three times.Blinking continues until a correct load is applied.
- Fault sequence: In case of an overload or short circuit condition, all three LEDs will blink five times within two seconds and then go off. The power supply again will try to detect a valid load.

Notes on PoE Operation

PoE is built-in with UD25, UD25-C, UD25-8, UDD25, UD56, UD56-8, UD56S, UD300 and UD300D displays. PoE is available as an option basically for and most UD displays of version "E". PoE is **not** available for: UD126, UD126E, UD178 and UD178E.

If PoE is applied to the following models, the output power should be compliant to standard IEEE802.3at (**PoE+**): UDD25, UDD25E, UD56ES, UD300, UD300E, UD300D, and UD300ED.

- UD displays will detect the PoE standard of the power supply: PoE or PoE+. If PoE is detected while PoE+ is needed, the display will allow LED brightness in the range of steps 1–3 only.
- Our recommended power supply "**PI**" conforms to the PoE+ standard (please refer to chapter "PI: Ethernet Power Injector for UD-PoE").
- UD displays are able to receive power via DC input and via PoE/PoE+ simultaneously. In this case, the DC power gains priority. In this case, the DC voltage should be in the range of 24–30V, otherwise the unit may be damaged caused by overload. For example, the EPSW DC power supply can be used (please refer to chapter "EPSW: External Power Adapter").



Safety Precautions

The general safety information in this part is for both operating and service personnel. Plura products and accessories are only to be used as directed. Review the following safety instructions to avoid injury and prevent damage to the product or any products connected to it.

RECOMMENDED INSTALLATION



1. EPSW: Make sure that the power cord is not inserted when you plug the DC output connector to the terminal block of your device. Make use of the strain relief plate to avoid stressing the conductors.
2. Insert the power cord into the three pole AC inlet.
If available, please use the locking mechanism to avoid stressing the power cord.
3. Plug the power cord into the wall outlet.

WARNING



Use a power supply cord that matches the power supply voltage of the AC power outlet. The power supply cord you use must have been approved by and comply with the safety standards of your country.

Never modify the power cord or excessively bend, twist, or pull it. Do not place any heavy objects on the power cord or expose it to heat. Damage to the cord may cause shock or fire.

Use only the AC adapter specified for the Plura product. Never use a voltage other than that for which the AC adapter is rated.

Do not place any objects onto the AC adapter and do not use the AC adapter outdoors. Keep the AC adapter away from heat sources.

Never touch the AC adapter while your hands are wet. To avoid injury or fire hazard, do not operate in an explosive atmosphere.

Immediately unplug the power cord from the wall outlet or extension cord and refer servicing to qualified servicing personnel, when the power cord or plug is damaged, split or broken.

CAUTION



Do not expose the AC adapter to dripping or splashing water.

Make sure that the power cord is fully inserted into the wall outlet or extension cord.

Make sure that you unplug the AC adapter from an outlet before attempting to move it to another location.

Always carefully disconnect the plug by pulling on the plug and not on the cord.

PREVENTIVE MAINTENANCE, QUALIFIED SERVICE PERSONNEL ONLY



Visually inspect the AC adapter for signs of damage. If you discover heat damage, try to determine the cause of the overheating before replacing the AC adapter; otherwise, the damage may repeat.

At least once a year, unplug the AC adapter from the power outlet and clean the area around the prongs of the plug. Dust accumulated around the prongs - especially under high humidity conditions - can result in fire.



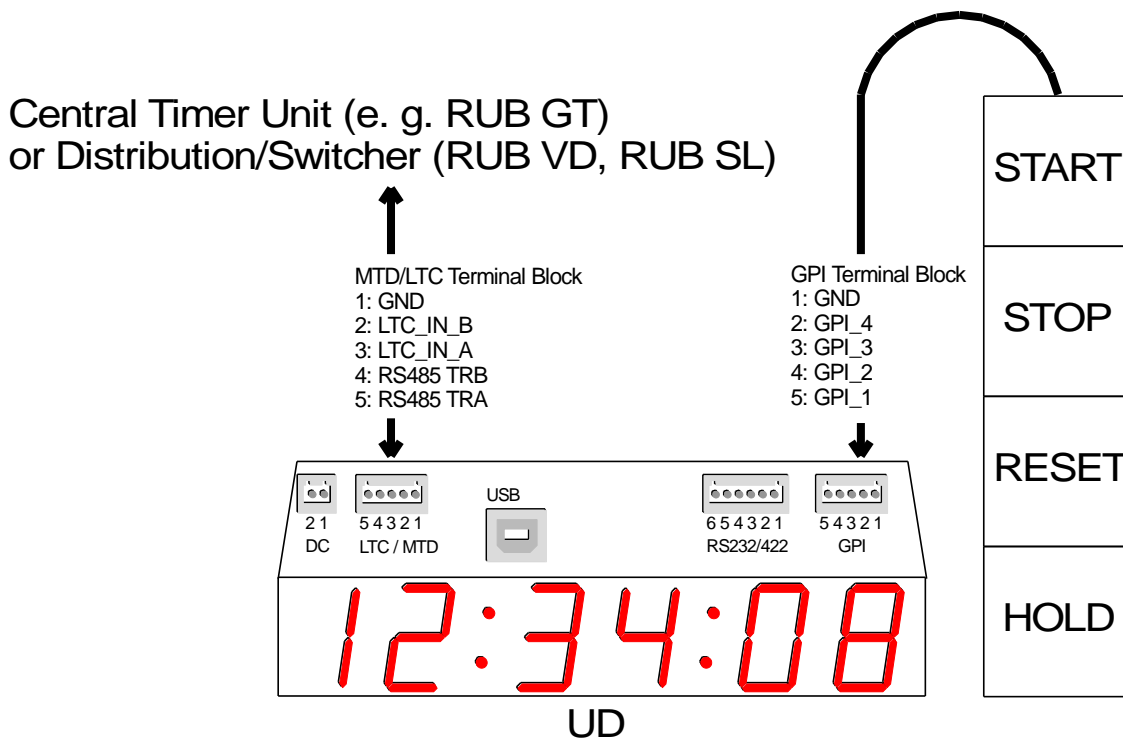
3. Applications

3.1. Controlling MTD Stop Timers by Use of GPI Commands

UD Series Displays equipped with GPI and MTD/LTC interfaces can control MTD timers (A – F) of the *Plura* timer system. Connect external buttons to the GPI inputs, the RS485 interface to the central timer unit and the LTC(MTD) as the signal source.

The GPI inputs can be programmed to trigger timer commands – see chapter „Configuration – GPI Tab“. Each command will be transmitted to the central timer unit via RS485 interface. The current timer values will be decoded out of the LTC(MTD).

Connecting example:

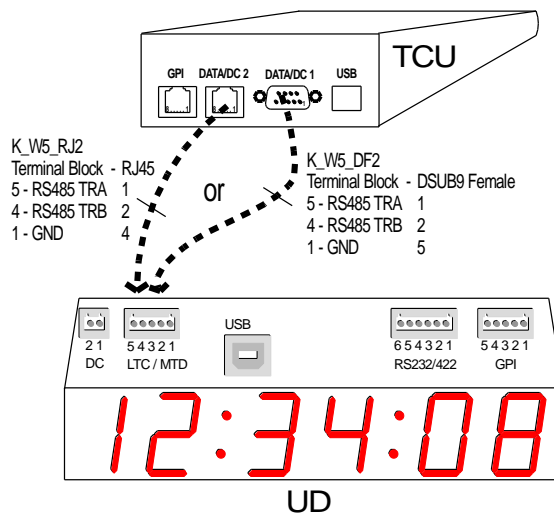


3.2. MTD Slave: Local Stop Timer and External Displays

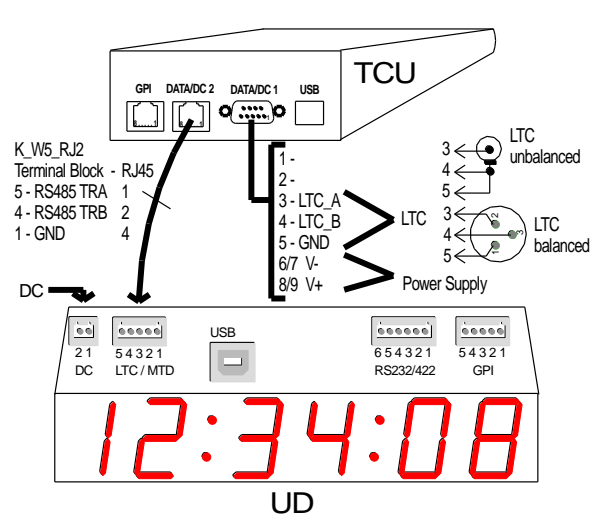
“Universal” and “L” version displays only.

The unit displays a time received as a serial data string from the **RS485** interface. Other sources will be switched off. This operating mode requires a data link to any “MTD Master” unit, for example the TCU switched to mode “Master, Mode 4”. Thus, the local stop timer of the “MTD Master” will be displayed at the external UD unit as well.

Connecting example “Local Stop Timer”



Connecting example “Stop Timer + LTC”



LTC connected to the TCU can extend the functionality of the “local timer”.

Timer Mode	Function Key at TCU	Program Code	Display at TCU and UD
Counter UP	UP	01	Up-counting timer
Counter DOWN	DOWN	02	Down-counting timer
LTC time + offset	OFFSET TC	06	LTC time + offset. If offset = 0 the display shows the current time of the LTC. Any offset can be set at TCU.
Difference of a fixed time value to the current LTC time	DIFF TC	08	Fixed time value minus LTC time. E.g. this will be a down-counting time showing the remaining time if the fixed time value is > than the LTC time. Any fixed time value can be set at TCU.



3.3. Real-Time Display with a GPS16/GPS17 Reference

“Universal” and “L” version displays only.

The external GPS receiver transmits a serial data string and a PPS signal (pulse-per-second) every second. The device decodes these data and is able to show the time, the date or some status information. Please also refer to the manual of the GPS receiver.

For these types of GPS receivers, the device has to get the following configuration:

- **Source = Serial.**
- Configuration at the **Serial** tab:

The screenshot shows the 'Serial' tab in the configuration window. The 'Interface' is set to 'RS232'. The 'Protocol' is 'NMEA 0183 (GPRMC)'. The 'Baudrate' is '4800'. The 'Data Bits' are '8'. The 'Parity' is 'None'. The 'Stop Bits' are '1'. The 'Use Timeout' checkbox is unchecked. The 'Timeout [ms]' is set to '10'.

- Versions before May 2011 only: PPS input at GPI_1. Current versions have the PPS at RS232 CTS connected. Configuration at the **GPI** tab for versions before May 2011:

The screenshot shows the 'GPI' tab in the configuration window. 'GPI 1' is set to 'PPS Input'. 'GPI 2', 'GPI 3', and 'GPI 4' are all set to 'No Operation'.

- The GPS receiver transmits UTC. Configuration at the **Real Time** tab enables to convert the UTC to any local time zone. The “Enable Real-Time” checkbox has to be checked. Example for converting UTC → CET/CEST:

The screenshot shows the 'Real-Time' tab in the configuration window. The 'Enable Real-Time' checkbox is checked. Under 'Reference Time Zone', 'Offset from UTC' is set to '+ 0 : 0'. The 'Automatically set Daylight Saving Time' checkbox is unchecked. 'DST Bias' is set to '+ 0 : 0'. 'DST Start' is set to 'Last Sunday of March at 2 : 0'. 'DST End' is set to 'Last Sunday of October at 3 : 0'. Under 'Local Timezone 1', 'Offset from UTC' is set to '+ 1 : 0'. The 'Automatically set Daylight Saving Time' checkbox is checked. 'DST Bias' is set to '+ 1 : 0'. 'DST Start' is set to 'Last Sunday of March at 2 : 0'. 'DST End' is set to 'Last Sunday of October at 3 : 0'.

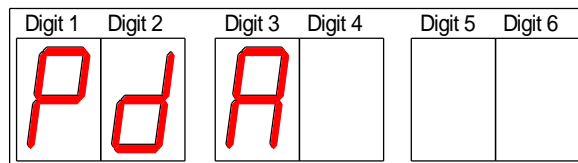


- At the **Display** tab you can select the kind of data to be displayed:

Mode = Time Time of the GPS receiver, if the "Real-Time" mode has been disabled. Local (converted) time, if the "Real-Time" mode has been enabled.

Mode = Date Date of the GPS receiver, if the "Real-Time" mode has been disabled. Local (converted) date, if the "Real-Time" mode has been enabled.

Mode = Status Some information about the GPS receiver state – this may help on fault finding. After power-on the GPS receiver needs some minutes – dependent on receiving conditions – until valid data and a PPS will be transmitted. As soon as the PPS is present the GPS receiver transmits a reliable time.



Digit 3: **A** = Data are valid.

u = Data are invalid (GPS has not synchronized).

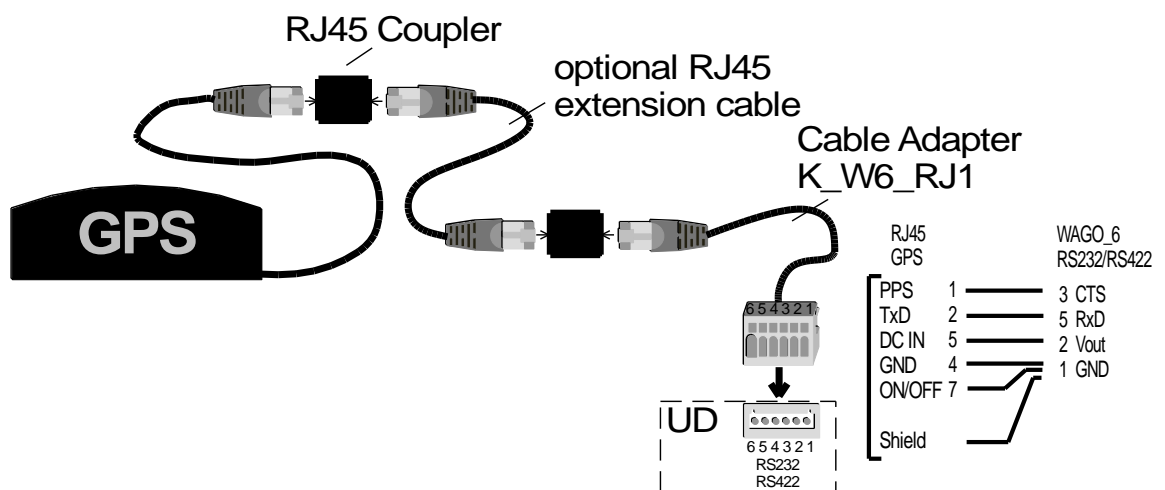
Digit 2: **d** = Serial data are present.

- = Serial data are not present.

Digit 1: **P** = PPS (pulse-per-second) is present.

- = PPS is not present.

Connecting example (current version):



The cable adapter and RJ45 couplers are accessories, the product ordering id is **UD-G**.

For placing the antenna please refer to the manual of the GPS receiver!



3.4. Real-Time Display with a RUB GPS 10 MHz Reference

“Universal” and “L” version displays only.

The external GPS receiver transmits a serial data string and a PPS signal (pulse-per-second) every second. The device decodes these data and is able to show the time, the date or some status information. Please also refer to the manual of the GPS receiver.

For these types of GPS receivers, the device has to get the following configuration:

- **Source = Serial.**
- Configuration at the **Serial** tab:

The screenshot shows the 'Serial' tab in the configuration window. The tabs at the top are: Connection, Profile, System, Source, Serial, Real-Time, Display, and GPI. The Serial tab is active. The configuration options are as follows:

Interface	RS232
Protocol	Meinberg Std.
Baudrate	2400
Data Bits	7
Parity	Even
Stop Bits	1
Use Timeout	<input type="checkbox"/>
Timeout [ms]	10

- Versions before May 2011 only: PPS input at GPI_1. Current versions have the PPS at RS232 CTS connected. Configuration at the **GPI** tab for versions before May 2011:

The screenshot shows the 'GPI' tab in the configuration window. The tabs at the top are: Connection, Profile, System, Source, Serial, Real-Time, Display, and GPI. The GPI tab is active. The configuration options are as follows:

GPI 1	PPS Input
GPI 2	No Operation
GPI 3	No Operation
GPI 4	No Operation

- The GPS receiver transmits UTC. Configuration at the **Real Time** tab enables to convert the UTC to any local time zone. The “Enable Real-Time” checkbox has to be checked. Example for converting UTC → CET/CEST:

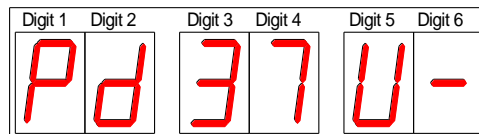
The screenshot shows the 'Real-Time' tab in the configuration window. The tabs at the top are: Connection, Profile, System, Source, Serial, Real-Time, Display, and GPI. The Real-Time tab is active. The configuration options are as follows:

<input checked="" type="checkbox"/> Enable Real-Time	
Reference Time Zone	
Offset from UTC	+ 0 : 0
<input type="checkbox"/> Automatically set Daylight Saving Time	
DST Bias	+ 0 : 0
DST Start	Last Sunday of March at 2 : 0
DST End	Last Sunday of October at 3 : 0
Local Timezone 1	
Offset from UTC	+ 1 : 0
<input checked="" type="checkbox"/> Automatically set Daylight Saving Time	
DST Bias	+ 1 : 0
DST Start	Last Sunday of March at 2 : 0
DST End	Last Sunday of October at 3 : 0



- At the **Display** tab you can select the kind of data to be displayed:

- Mode = Time** Time of the GPS receiver, if the "Real-Time" mode has been disabled. Local (converted) time, if the "Real-Time" mode has been enabled.
- Mode = Date** Date of the GPS receiver, if the "Real-Time" mode has been disabled. Local (converted) date, if the "Real-Time" mode has been enabled.
- Mode = Status** Some information about the GPS receiver state – this may help on fault finding. After power-on the GPS receiver needs some minutes – dependent on receiving conditions – until valid data and a PPS will be transmitted. As soon as the PPS is present the GPS receiver transmits a reliable time.



Digit 1: **P** = PPS (pulse-per-second) is present.

– = PPS is not present.

Digit 2: **d** = Serial data are present.

– = Serial data are not present.

Digit 3: – = GPS receiver has not synchronized.

1 = GPS receiver has synchronized, but its position is still not defined.

3 = GPS receiver has synchronized and determined its position.

Digit 4: **1 ... 7** = day-of-week, 1 = Monday.

– = No valid day-of-week present.

Digit 5: **U** = GPS receiver transmits UTC.

S = GPS receiver transmits DST (daylight saving time).

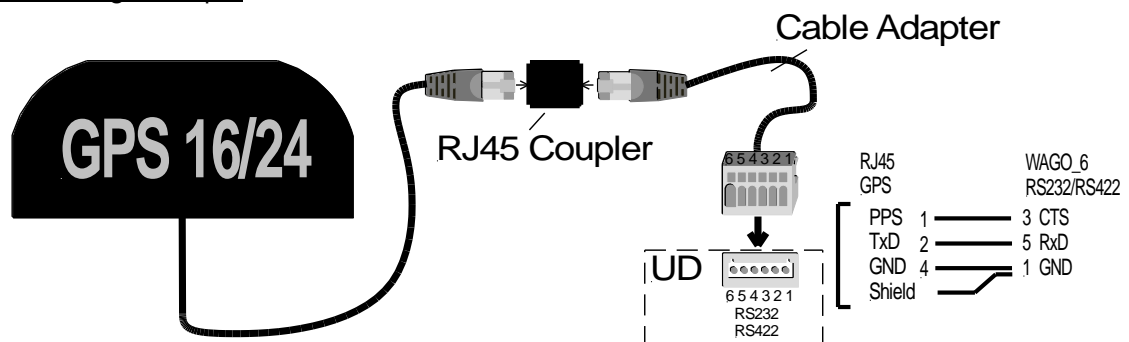
– = GPS receiver transmits standard time (no DST).

Digit 6: **A** = Announcement of a DST switching.

L = Announcement of a leap second.

– = No announcement.

Connecting example



The cable adapter / RJ45 coupler is an accessory, the product ordering id is **UD-G**.

For placing the antenna, please refer to the manual of the GPS receiver!



4. Installation

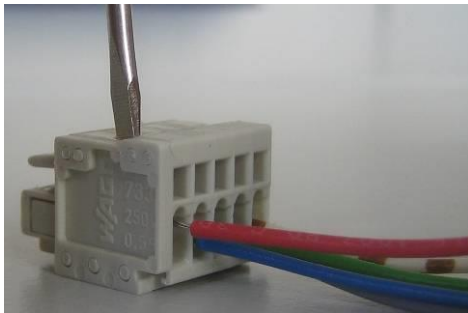
4.1. Terminal Block Connections

The terminal block connection consists of the male connector fixed to the printed board and the pluggable female connector. The terminal blocks are protected against mismatching.

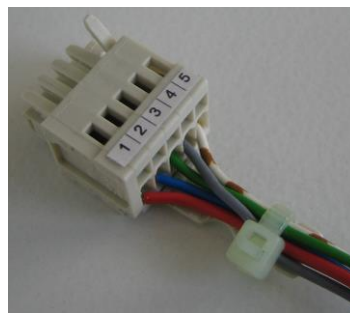
Conductors have to be inserted into the clamping units. A clamping unit consists of a spring pressure connecting system which safely clamps the inserted conductor.

For installation please detach the pluggable part.

To introduce (or pull out) the conductor the clamping spring has to be opened. Use a small screwdriver or a similar tool with a fine tip ($\approx 2.5 \times 0.4 \text{ mm}$ / $\approx 0.098 \times 0.016 \text{ in}$). Insert this tool into the operating slot and push it to open the clamping spring. Then immediately push the conductor in up to the stop (or pull it out). Please refer to picture 1.



Picture 1



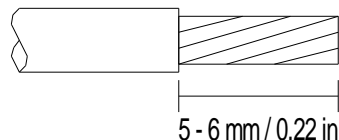
Picture 2

Acceptable wires: Solid, stranded, fine-stranded or tip bonded stripped conductors.

Sizes: cross sections $0.08 - 0.5 \text{ mm}^2$, AWG 28 – 20, $\varnothing 0.33 - 0.96 \text{ mm}$.

Conductor material: copper or tin-plated copper.

Stripping:



The female connector has marker strips. Additional coding is possible by removal of coding finger(s). Using the strain relief plate is recommended to avoid stressing the conductor. Please refer to picture 2.



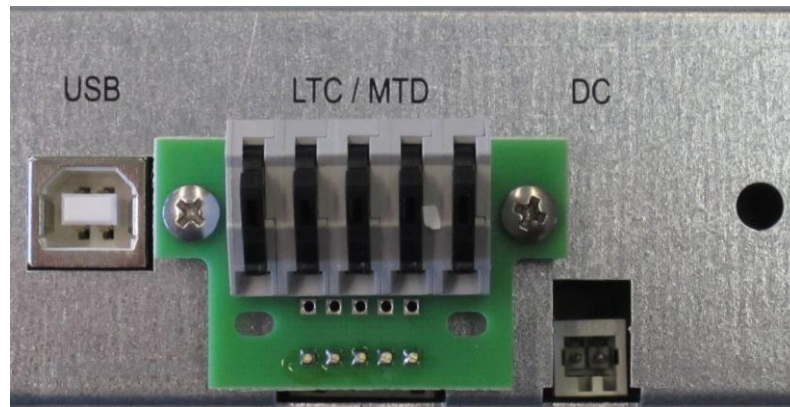
CAUTION: These connectors can only be mated and unmated at voltages below 42V and in the "no load" condition.



4.2. LTC/MTD Loop Adapter

Available for “universal” or “L” version displays.

The female connector of the LTC/MTD terminal block accepts wires with cross sections up to 0.5 mm^2 only. This may not allow looping signals to other units. This adapter, which can be plugged to the male LTC/MTD connector and attached to the housing by two screws, can fulfil this application.



Clamping spring can be opened tool-less using the black coloured lever.

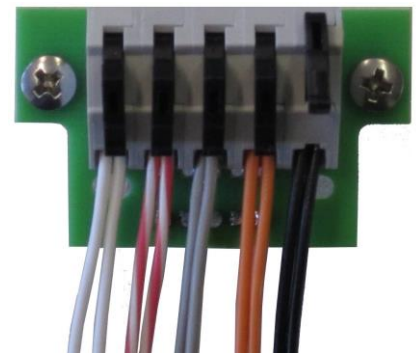
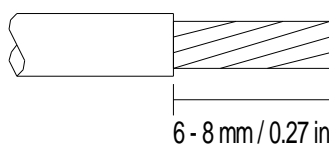
Acceptable wires:

Solid, stranded, fine-stranded or tip bonded stripped conductors.

Sizes: Cross sections $0.08 - 1.0 \text{ mm}^2$,
AWG 28 – 18, $\varnothing 0.33 - 1.02 \text{ mm}$.

Conductor material: Copper or tin-plated copper.

Stripping:



This accessory is available on request.



4.3. Strain Relief for Connecting Cables

Utilizing Cable Tie Holders

Two plastic cable tie holders are supplied accessories. Insert these snap-in elements through the drilling holes ($\varnothing = 4.8 \text{ mm}$) at the rear of the housing. Connection cables can be secured in conjunction with cable ties.

Example:



4.4. Wall, Tripod, and Table Mount Kits

UD56-W

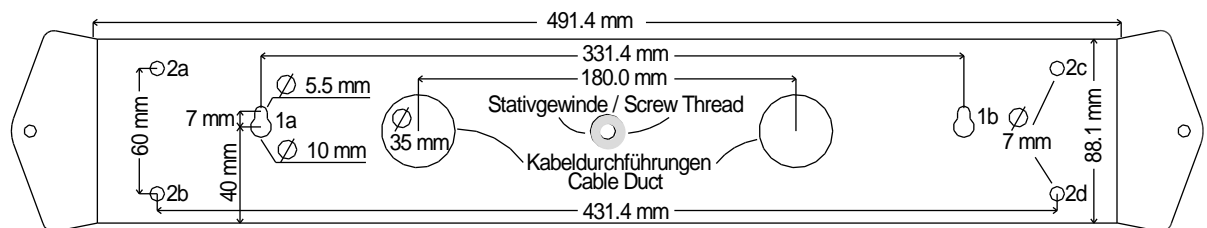
The UD56-W wall and table mount kit is an option for UD56, UD25 and UDD25 displays. Please order separately.



Parts List:

Qty	Item
1	Mounting bracket 2 mm aluminium
2	Holding bracket 2 mm aluminium
4	Screws + washers
2	Knurled screws
4	Case feet

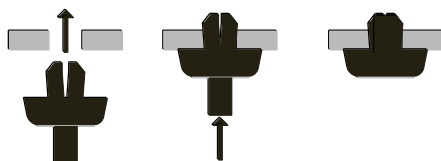
- 1a. Wall mount: Mount the mounting bracket at the wall. For a vertical wall and to keep it detachable use the 1a and 1b drilled holes; otherwise use the 2a – 2c holes.



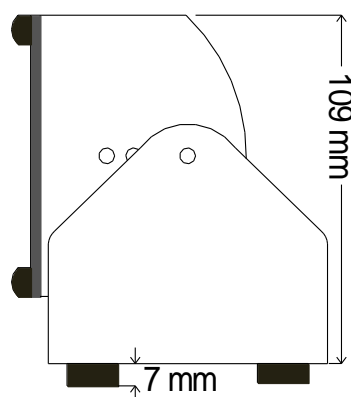
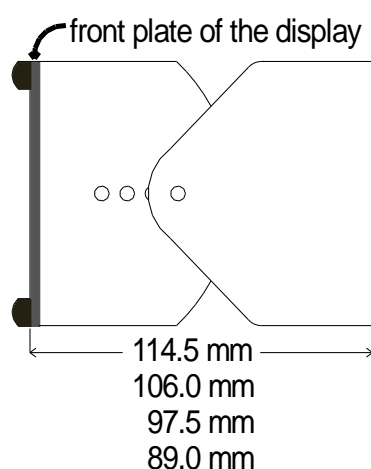
- 1b. Tripod mount: The mounting bracket is fitted with a 3/8" UNC screw thread.



- 1c. Table mount: Snap-in the case feet into the 2a – 2c drilled holes of the mounting bracket. Press in the pin completely to lock. Simply release by pushing the pin from other side.



2. Mount the holding brackets right and left of the device screwing them tight at the front plate – see picture above.
3. Fasten the device at the mounting bracket using two knurled screws. Before tightening the knurled screws adjust the inclination of the device.



UD25-W

The UD25-W wall and table mount kit is an option for UD25 and UDD25 displays. Please order separately.



Parts List:

Qty	Item
1	Mounting bracket 2 mm aluminium
2	Holding bracket 2 mm aluminium
4	Screws + washers
2	Knurled screws
4	Case feet



UD25TT TM

The UD25TT TM tri-pod mount kit is an option for UD25TT displays. Please order separately. It adds a 3/8" UNC screw thread to a UD25TT.



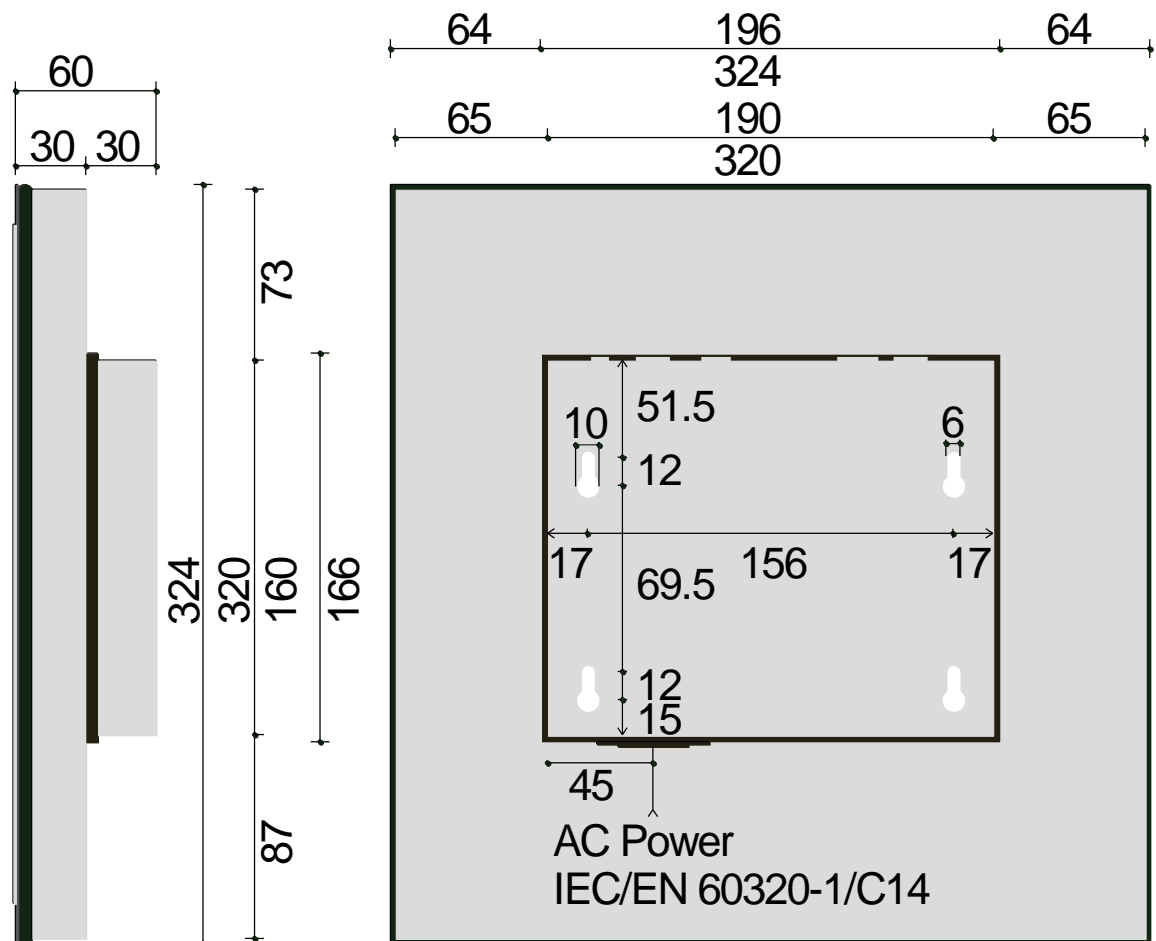
4.5. UD300: Wall Mounting

Square housing

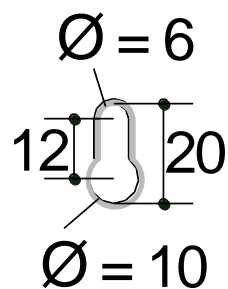
All dimensions in millimetres.

Side view

Rear view



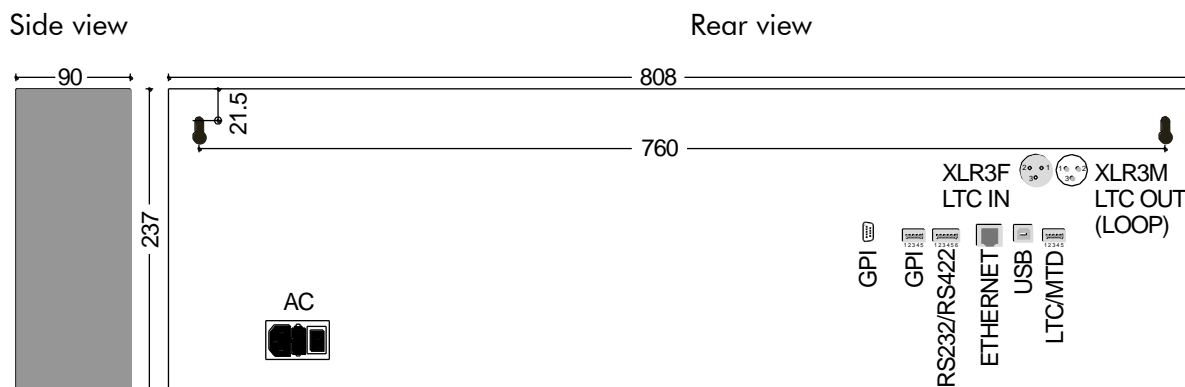
Screws or hooks with diameters up to 6 mm (0.236 in) can be used.



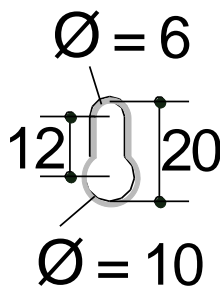
4.6. UD126, UD178: Mounting and Technical Data

Wall Mounting

All dimensions in millimetres.

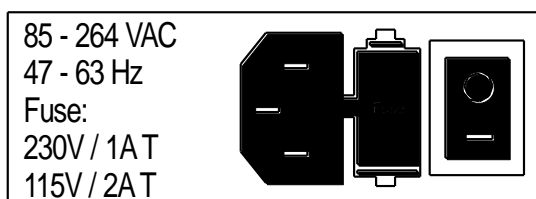


Screws or hooks with diameters up to 6 mm (0.236 in) can be used.



Power Inlet

The power entry module incorporates a 2-pole fuse-holder, which is located between the inlet and the ON/OFF switch.



To access the fuses please proceed as follows:

3. Turn power switch to off (position **O**).
4. Disconnect the mains plug.
5. With the aid of a tool (e.g. flat pliers or two small screwdrivers) the two clips can be pressed, and the fuse-drawer can be removed.

Type of fuse	250 V, 1 A T (slow acting), 5 x 20 mm 120 V, 2 A T (slow acting), 5 x 20 mm
	Warning: To avoid fire hazard, use only type of fuse as specified above.

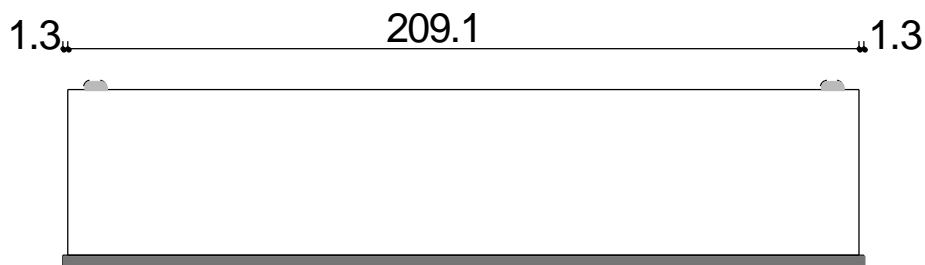


4.7. UD25TT: Space Saving Housing

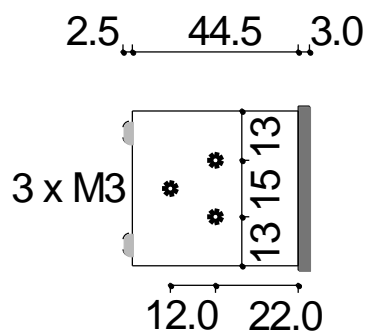
This space saving housing offers three M3 threaded holes at each side.

All dimensions in millimetres.

Top view:



Side view:



Attention: Two screws at the right side should not be screwed in more than 2.5 mm!



Contact Us



Corporate Offices:
Plura Broadcast, Inc.
Ph: +1-602-944-1044
Sales@plurainc.com



Plura Europe GmbH
Ph: +49-6725-918006-70
Sales@plurainc.com

GERMANY



Plura MEA
Ph: +971-50-715-9625
Sales@plurainc.com



Plura Asia
Ph: +82-10-6688-8826
Sales@plurainc.com

S. KOREA

