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U2L converter

IFSF protocol with LON interface
to Tokheim UDC protocol
with RS-485/RS-422/RS-232 interface

TECHNICAL GUIDE

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CONTENT

PURPOSE OF THE DOCUMENT

This Technical Guide is intended for studying of U2L converter. It contains basic information regarding its appointment, technical characteristics, software features, set-up parameters and operation modes.

Information regarding connection to specific fuel dispensers and correspondent configuration of U2L controller can be received upon request to Technotrade LLC company.

During the system development process given Technical Guide is also expanded and updated and new chapters are added. Latest version of this Technical Guide can be downloaded from the U2L converter web-page: *https://www.technotrade.ua/ifsf-lon-converter.html*.

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In case if you find any mistakes, omissions in this document or have any suggestions on improvements to this document, please feel free to e-mail them to our support mailbox: *support@technotrade.ua*. We will be grateful to you for this valuable information.

All technical questions regarding the U2L converter are welcome to be asked on support mailbox: *support@technotrade.ua*. Our support team will be glad to help you.

Also, you can call to us or visit us on:

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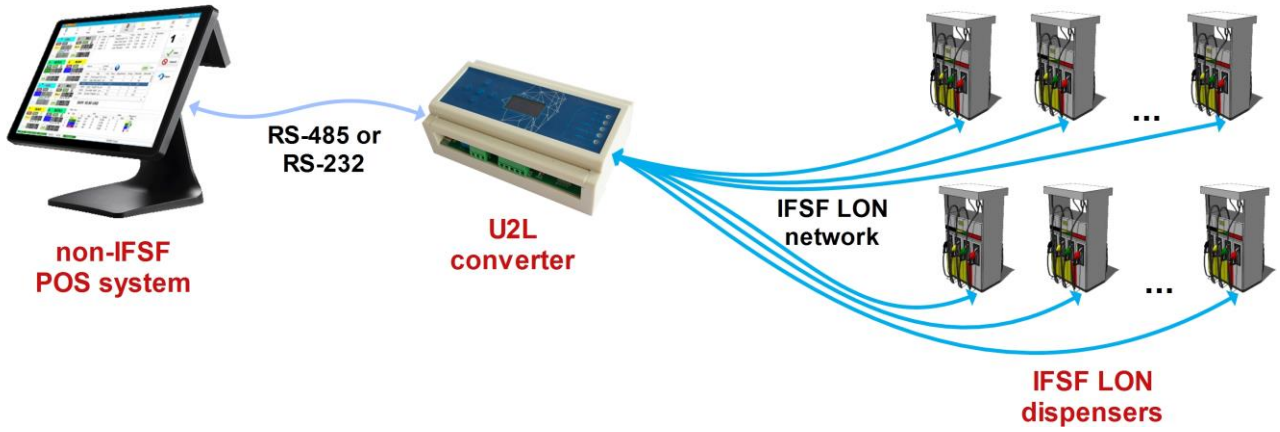
TECHNICAL FEATURES

Appointment

U2L converter converts from IFSF protocol with LON interface to Tokheim UDC protocol with RS-485/RS-422/RS-232 interface and backwards. It allows POS systems and forecourt controllers, which are not compliant with IFSF protocol and LON interface, to communicate through RS-232 or RS-485 interfaces with fuel dispensers having LON interface and IFSF protocol.

U2L interface converter can be applied for communication with all dispensers able to connect to the IFSF-LON network including Tokheim, Neotec, DEM G. Spyrides, others.

U2L converter is an embedded device that successfully transforms IFSF-LON communication from fuel dispensers into Tokheim UDC protocol. It is designed to connect any type of IFSF-LON compatible dispensers to a non-IFSF forecourt control devices or POS.



Technical characteristics

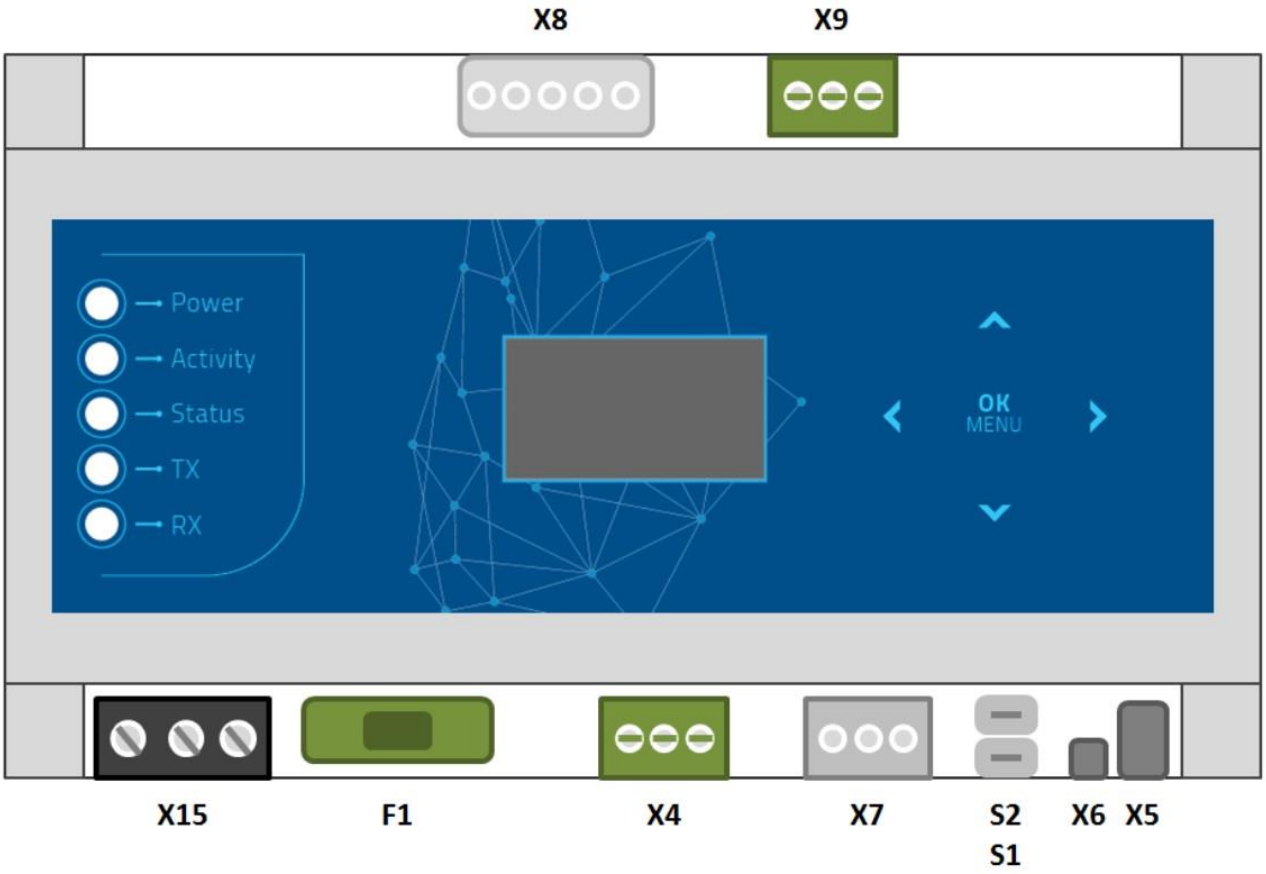
##	PARAMETER	VALUE
1	**Power supply voltage**	100 V – 270 V AC
2	**Sealing**	IP20
3	**Material**	ABS Plastic
4	**Temperature range**	from 0°C to +40°C
5	**Supported dispenser brands**	All brands with IFSF-LON certification passed
6	**Weight**	0.45 kg
7	**Overall dimensions**	160 x 95 x 55 mm

Communication

##	PARAMETER	VALUE
1	**Input protocol for RS-485 and RS-232 ports for connection to POS**	Tokheim UDC
2	**Output protocol for dispensers**	IFSF
3	**Interface for dispensers' connection**	LON

CONNECTIONS

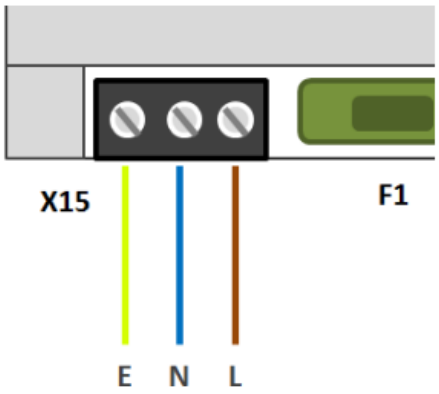
Connectors overview



CONNECTOR	DESCRIPTION
X15	Main power connector
F1	Protection fuse, type T1AL250V
X4	RS-232 interface
X7	Debug/Auxiliary RS-232 interface
S1 and S2	Buttons used for cold-start and reset
X6	Micro USB-B device (not used in the current firmware release)
X5	USB 2.0 connector – for firmware update and loggings
X9	LON interface connector
X8	RS422/RS485 connector

Connector X15

X15 is the connector where the main power is connected to U2L.

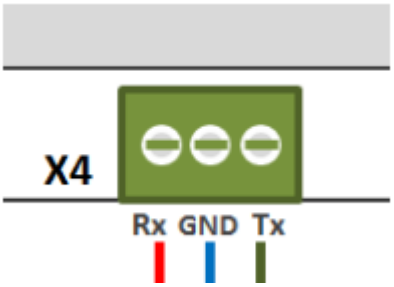


CONNECTOR	DESCRIPTION
E	Earth
N	Neutral
L	Line

CAUTION! High voltage is supplied to the device. A potential of shock hazard exists. Always connect and disconnect the power terminals only when the main power supply is turned off!

Connector X4

X4 is the connector for RS-232 interface of the control system using UDC protocol.



Connector X5

X5 is USB host connector (standard USB 2.0 type-A jack), it is currently used for firmware update as well as capturing of debug information on log-files.

Connector X6

USB device. Micro USB-B connector. Will be used in future software releases.

Connector X7

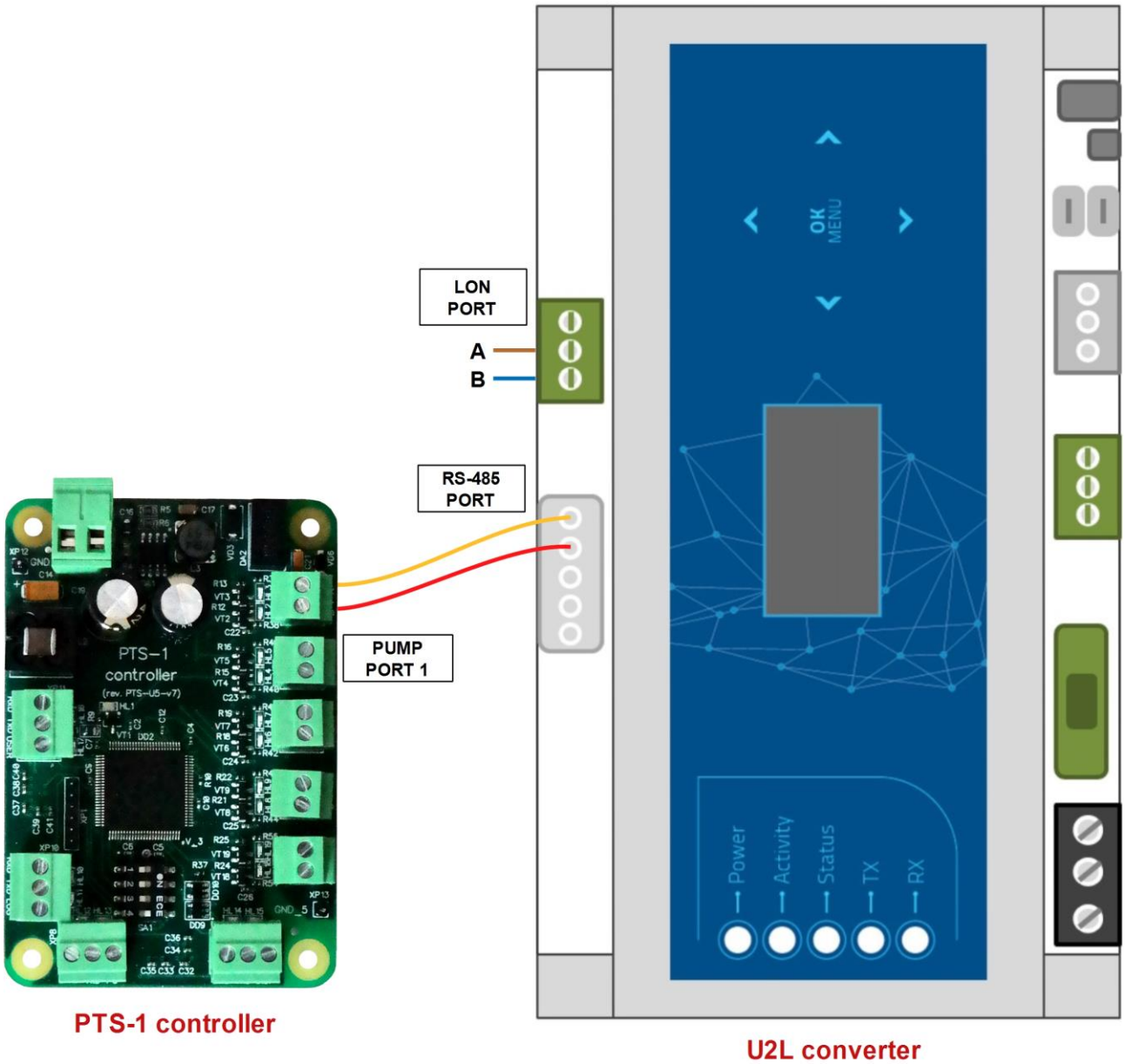
Another RS-232 interface connector used for debug purposes. Do not connect.

Connector X8

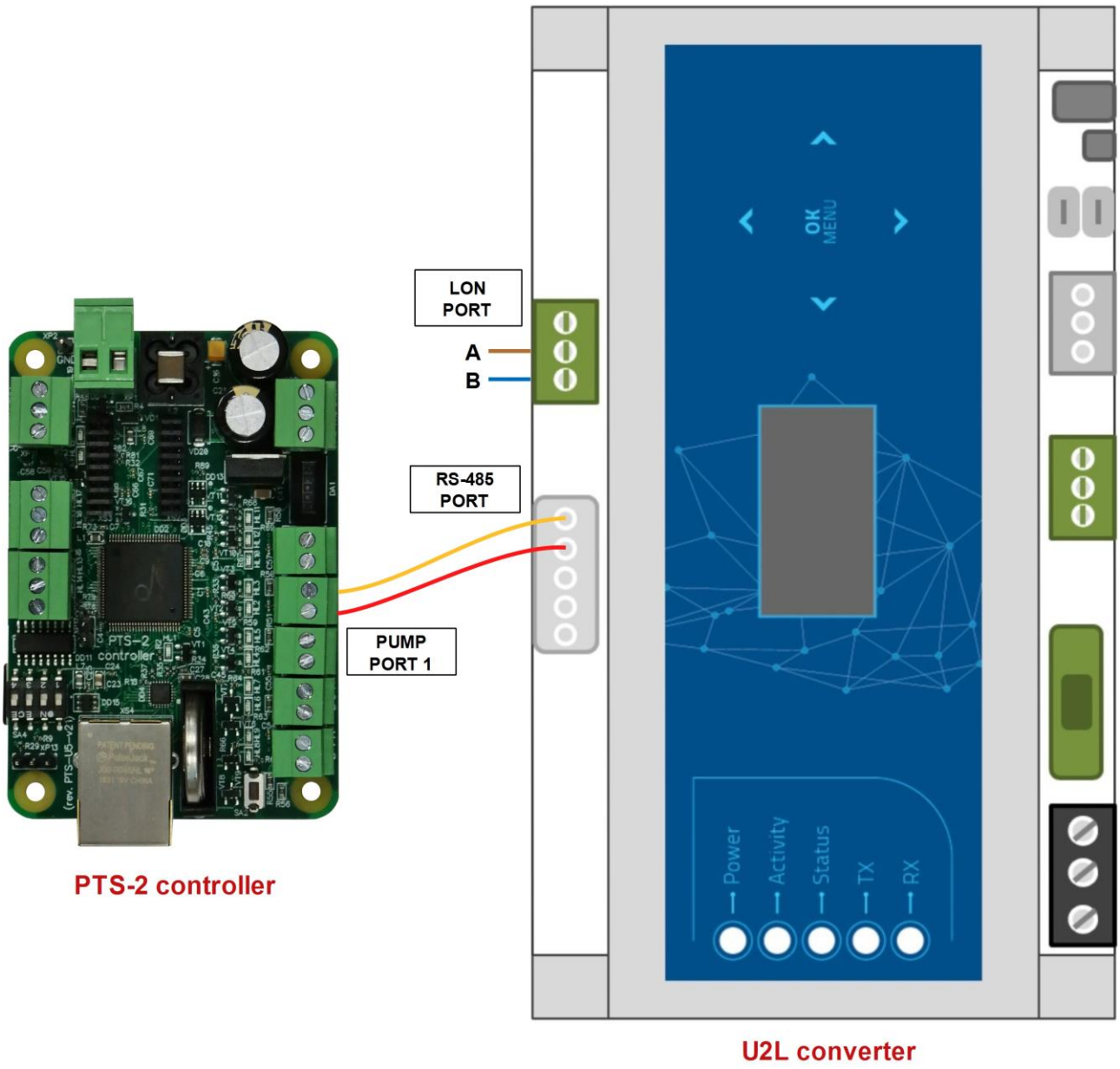
X8 is the connector for RS-485/RS-422 interfaces of the control system using UDC protocol.

CONNECTOR	DESCRIPTION
Rx+	Serves as line A in RS-485 interface. Also, is used for RS-422 interface.
Rx-	Serves as line B in RS-485 interface. Also, is used for RS-422 interface.
COM	Common for connection to cable shield or foil
Tx+	Used for RS-422 interface only
Tx-	Used for RS-422 interface only

Example of connection to PTS-1 controller:

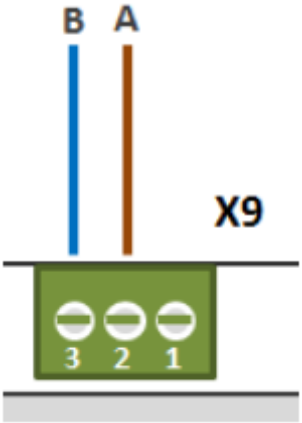


Example of connection to PTS-2 controller:

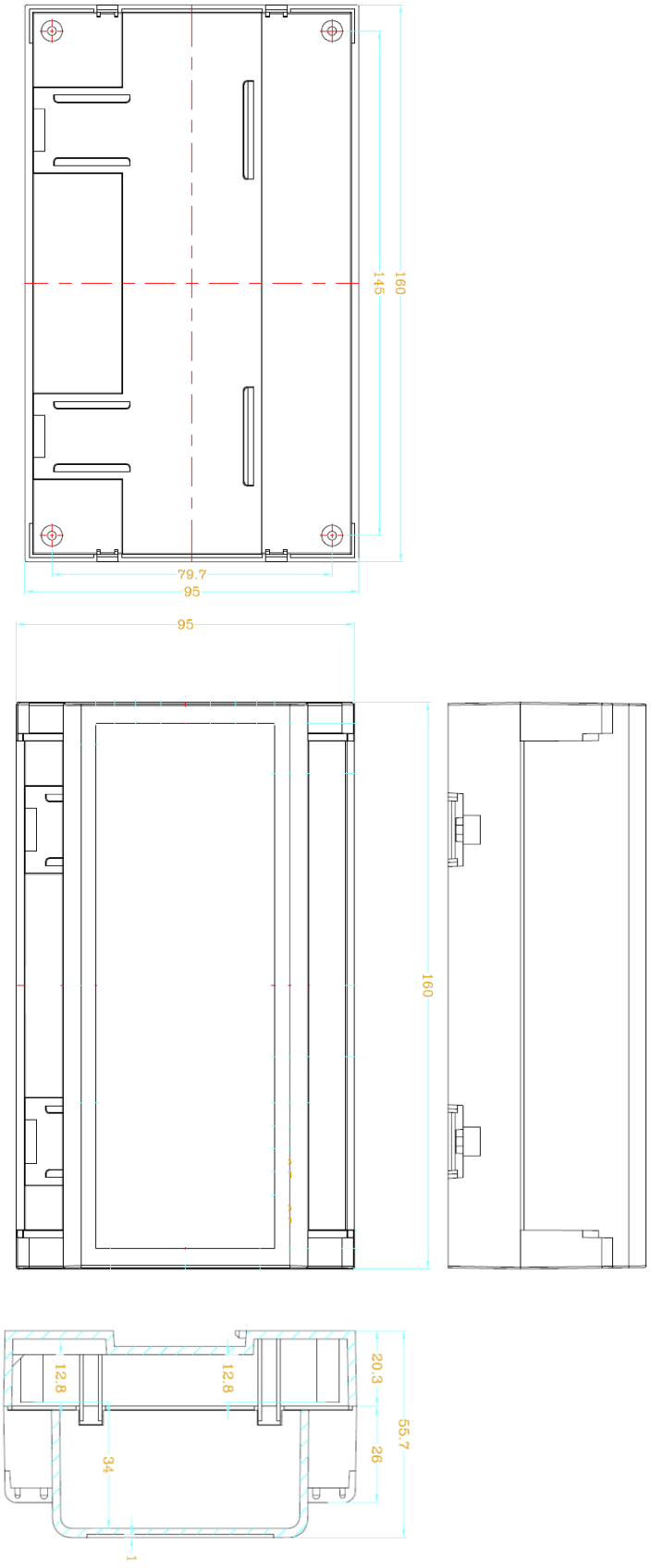


Connector X9

LON interface connector for connection to LON network of pumps. As the LON interface is two-wire differential there is no polarity of the terminals.



MECHANICAL DIMENTIONS

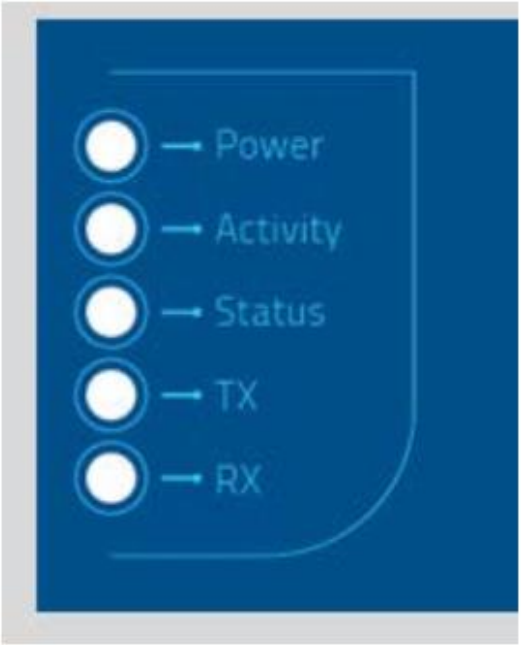


USER INTERFACE

S1 and S2 buttons

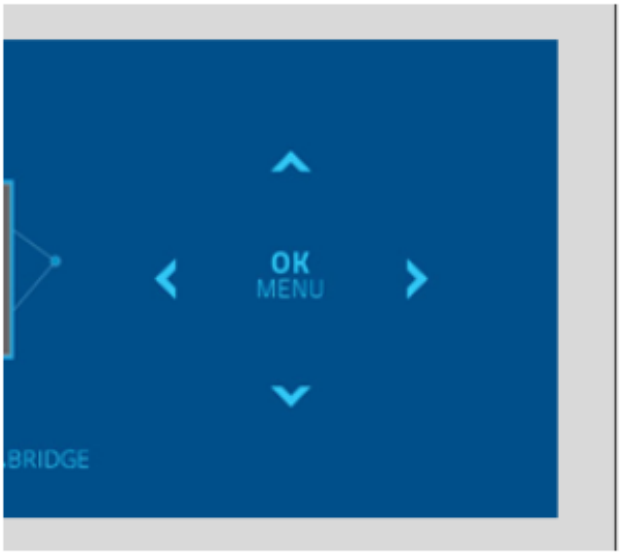
Buttons S1 and S2 are used to set the U2L converter in preliminary defined state according to IFSF-LON specification. By pressing and keeping both of these buttons pressed in power-off state at powering on the device all of the configuration parameters are reset to their default values.

Indication LEDs



LED NAME	FUNCTION	ON CONDITION	OFF CONDITION	COLOR
POWER	Indicates when the main power is applied	Main power presence	Main power is off	Orange
Activity	Indicates proper activity	Blinking with 1 second interval		Green
Status	Indicates system error			Green color for OK Red color for error
TX	Indicates transmitting over RS-485 interface			Green
RX	Indicates reception over RS-485 interface			Red

Control keys

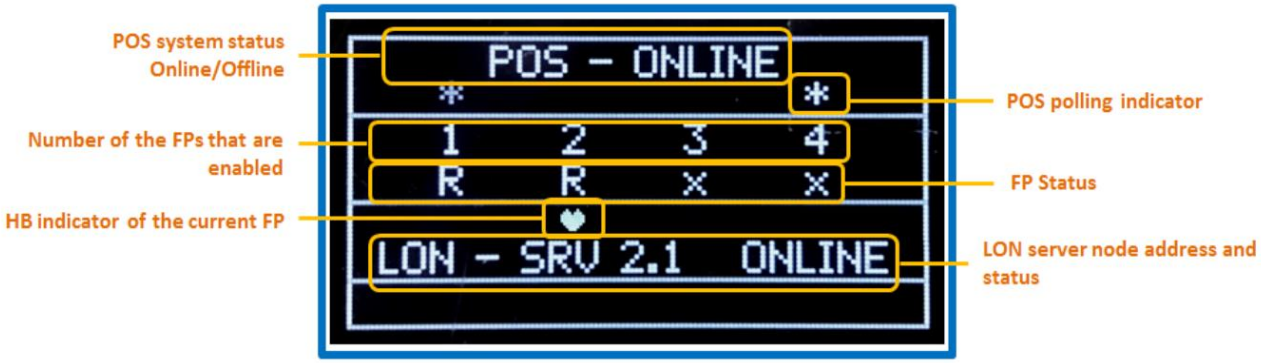


NAME	FUNCTION
OK / MENU	When U2L converter is in the main screen pressing on this key leads to entering the menu. When modifying a parameter from the settings pressing this key confirms the changes.
UP	Navigates through menus or parameters up increasing the value of the parameter with 1
DOWN	Navigates through menus or parameters down decreasing the value of the parameter with 1
LEFT	Goes back from sub-menu. Confirms a parameter change.
RIGHT	Go to a sub-menu. Select a parameter to be modified.

CONFIGURATION

Menu description

Main screen



Fields description:

- POS system status (Online/ Offline): provides indication whether the POS is connected to the converter and active in polling with requests.
- POS polling indicator: indicates when POS requests were received by the converter.
- Number of FPs enabled: sequential number of the enabled fueling points (FPs).
- FP Status: real-time status of each FP.
- HB indicator per FP: this shows the heartbeat received over IFSF-LON for each FP.
- LON-server node address and status: shows the node address and the current status (online/offline) of the internal LON server.

Main menu

Pressing the OK/MENU key on the front panel causes the device to show the first level of the main-menu options:

##	SUB-MENU	DESCRIPTION
1	**SETTINGS**	Includes all device settings in set of sub-menus
2	**DEVICE INFO**	Current software revision of U2L converter

SETTINGS

SETTINGS menu is accessed by pressing the OK/MENU key while in main-menu level and the cursor is on "SETTINGS" row (you see it inversed).

This menu contains the following sub-menus:

##	SUB-MENU	DESCRIPTION
1	**DEVICE**	Set device parameters
2	**POS**	Set POS-side parameters
3	**LON**	Set LON-network parameters
4	**IFSF**	Set IFSF-protocol parameters
5	**PUMP**	Set PUMP specific parameters

SETTINGS > DEVICE

This menu contains the following sub-menus:

##	SUB-MENU	DESCRIPTION	REMARK
1	**COMMON**	Set device common features.	
2	**DEBUG LEVEL**	Set POS and LON communication debug levels.	These parameters only affects the service logging. No impact on the normal communication flow.
3	**RESET**	Performs software reset of U2L Bridge.	
4	**COLD START**	Cold start will bring the device to factory default setting	

SETTINGS > DEVICE > COMMON

This menu allows adjustment of the following device-parameters:

##	PARAMETER	DESCRIPTION	OPTIONS	DEFAULT VALUE
1	**LANGUAGE**	Set the default menu language for the device	ENG – English SWH – Not supported	ENG
2	**LCD CONTRAST**	Set LCD contrast.	1-9	8
3	**SCR FADE EN**	Enable fading the LCD contrast after the set time expired and no activity is detected.	YES / NO	YES
4	**SCR FADE TIME**	Set the time in seconds after which the LCD starts fading.	1 - 250	30
5	**SCR BLACKOUT EN**	Enable turning-off the LCD after the set time expired and no activity is detected. It is strictly recommended to keep this option enabled. The LCD screen may be damaged (burned-in) if it stays always on with a static image on it.	YES / NO	YES
6	**SCR BLACKOUT TIME**	Set the time in seconds after which the LCD turns OFF.	1 - 250	30
7	**SCR SAVER EN**	Enables/Disables the screen saver.	YES / NO	YES
8	**SCR SAVER TIME**	Time in sec to activate the screen saver.	1 - 250	10
9	**SCR SAVER CONTRAST**	Set the contrast of the screensaver.	1 - 9	1

SETTINGS > DEVICE > DEBUG LEVEL

Adjust device debug levels. These parameters are used only for service purposes during logging and do not affect the normal communication of U2L with the other devices. Below the parameters included in the menu:

##	SUB-MENU	DESCRIPTION	REMARK
1	**POS DEBUG LEVEL**	Set POS debug level.	0-2
2	**LON DEBUG LEVEL**	Set LON debug level.	0-2

For take a log you need to have a clean and formatted USB-memory (FAT32) to be inserted to the USB-port of U2L converter. Set the LON debug level to the maximum (value 2) and restart the device. Then wait for 12-13 minutes (a file is created every 10 minutes), remove the USB and send the generated log file written on it to the manufacturer.

SETTINGS > DEVICE > RESET

Device reset. For activating the reset press OK and then by UP/Down keys select ‘YES’ and then push OK button. The reset is executed when quitting this menu.

SETTINGS > DEVICE > COLD START

Perform a cold start on the device. A cold start will bring the device to factory default configuration. A 4 digits password is needed to enter to that option.

After entering the password the screen and actions are similar to RESET menu. The Cold Start is executed when quitting this menu:

Cold start can be also dine using buttons S1 and S2 on the board. For cold start hold both S1 and S2 buttons during the power on of the U2L converter for at least 5 seconds.

SETTINGS > POS

Adjust communication parameters with the POS system.

The following parameters in sub-menus are included:

##	SUB-MENU	DESCRIPTION	REMARK
1	**COMM**	Sets the communication parameters	
2	**DECIMAL**		

SETTINGS > POS > COMM

##	PARAMETER	DESCRIPTION	OPTIONS	DEFAULT VALUE
1	**PROT**	Defines the POS protocol options.	UDC	UDC
2	**INTERFACE**	Defines the possible communication interfaces.	RS-485, RS-422, RS-232	RS-485

SETTINGS > POS > DECIMALS

When entering this menu on the U2L device a 4 digits password is needed to enter to that option.

The default password is: **2345**

When properly entering the following screen is opened:

The below menu specified the decimal position of the following parameters:

##	PARAMETER	DESCRIPTION	OPTIONS	DEFAULT VALUE
1	**AMOUNT**	Decimal position of the amount data.	0-3	0
2	**VOLUME**	Decimal position of the volume data.	0-3	2
3	**PRICE**	Decimal position of the unit price.	0-3	0

SETTINGS > LON

SETTINGS > LON > COMMON

Set the LON-network node address. It is important to make sure that the device is set with a unique address in the connected LON-network. From pumps prospective the U2L-bridge appears as POS-system and its node-address.

##	SUB-MENU	DESCRIPTION	OPTIONS
1	**NODE ADDRESS**	Set LON node address.	1-127

SETTINGS > IFSF

##	SUB-MENU	DESCRIPTION
1	**COMMON**	Defines common IFSF parameters
2	**PROD NB**	Assign product to nozzle number

SETTINGS > IFSF > COMMON

##	PARAMETER	DESCRIPTION	OPTIONS	DEFAULT VALUE
1	**HB INTERVAL**	Set the interval in seconds when U2L sends heartbeat message to the pumps	0-255	10
2	**MAX BL LEN**	Defines the length of each message block in bytes.	0-255	32
3	**COUNTRY CODE**	The dial code of the country where the equipment is installed. 0000 or 9000 is treated as country independent.	XXXX	0359
4	**OPT LIGHT MODE**	The mode of the OPT light (not used)	2	1-255
5	**AUTH STATE MODE**	The state of the authorization mode	1	0-1
6	**MAX TIME WO PROG**	Operational timeout	240	

SETTINGS > IFSF > TP

This menu assign product to nozzle number. By default all products are assigned to nozzles with same number.

SETTINGS > PUMP

This sub-menu contains the common settings for proper pump control.

SETTINGS > PUMP > COMMON

This sub-menu arranges the relation between the fuelling dispensers (pumps) on the field, their filling positions (FPs) and the addresses assigned to them.

##	SUB-MENU	DESCRIPTION	OPTIONS
1	**PUMP**	Sequential Pump number. This number is for the logical pump in the converter.	1-16
2	**ACTIVE**	Defines whether this address is active.	YES/NO
3	**NODE**	The node-address of the real pump assigned to this position.	1 - 99
4	**SUBNODE**	The sub-node address of above node that is defined in the pump (each pump side can have a sub-node address).	1-2
5	**NB NOZZLES**	How many real nozzles has the assigned pump	0-8
6	**REAL ADDRESS**	The address assigned from POS-side	1-16
7	**NOZ**	Nozzle number	1-8
8	**PROD NB**	Product assigned to this nozzle	1-16