TECHNOTRADE
PETROL STATION TECHNOLOGIES

www.technotrade.ua
mail@technotrade.ua
+38 044 502 46 55
Ukraine, 04114 Kiev, Priorska str. 10

L2D converter

IFSF protocol with LON interface
to DART protocol with RS-485 interface

TECHNICAL GUIDE

Review date: 1 December, 2021

CONTENT

PURPOSE OF THE DOCUMENT

This Technical Guide is intended for studying of L2D 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 L2D 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 L2D converter web-page: *https://www.technotrade.ua/ifsf-lon-dart-converter.html*.

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 L2D 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:

Technotrade LLC

Ukraine, 04114 Kiev, Priorska str. 10, office 1
Tel: +38-044-502-46-55, +38-044-502-46-77
Web: *www.technotrade.ua*
Mail: *mail@technotrade.ua*

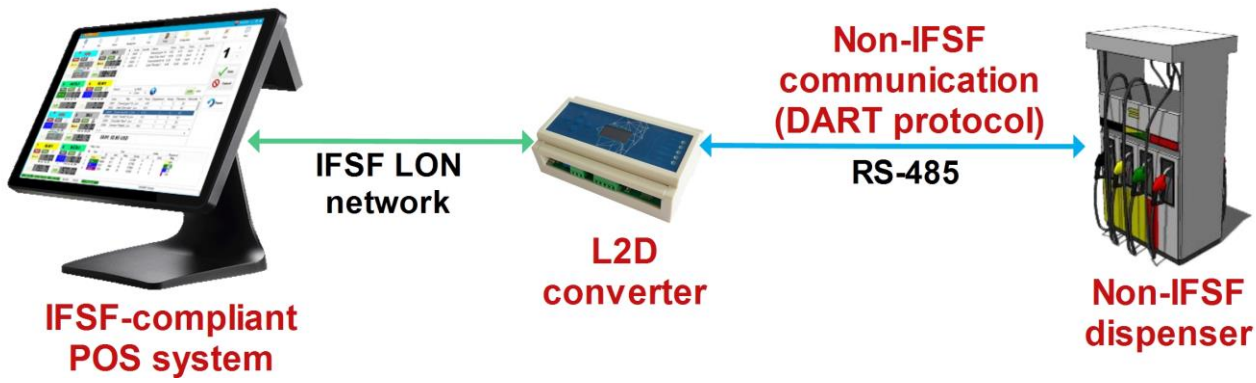
TECHNICAL FEATURES

Appointment

L2D converter converts from IFSF protocol with LON interface to any dispenser, which supports DART protocol with RS-485 interface and backwards. It allows POS systems and forecourt controllers, which use only IFSF-LON, to communicate with any dispenser using DART communication protocol. L2D device is absolutely transparent in communication providing only conversion of the protocol and interface, so the POS system thinks that it communicates with IFSF-LON dispenser, no changes from POS are needed.

L2D interface converter can be applied with any POS system able to work with IFSF protocol LON interface for provision of control over dispensers.

L2D converter is an embedded device that successfully transforms IFSF-LON communication from POS into DART protocol. It is designed to connect any type of IFSF-LON compatible POS to a non-IFSF dispenser.



Technical characteristics

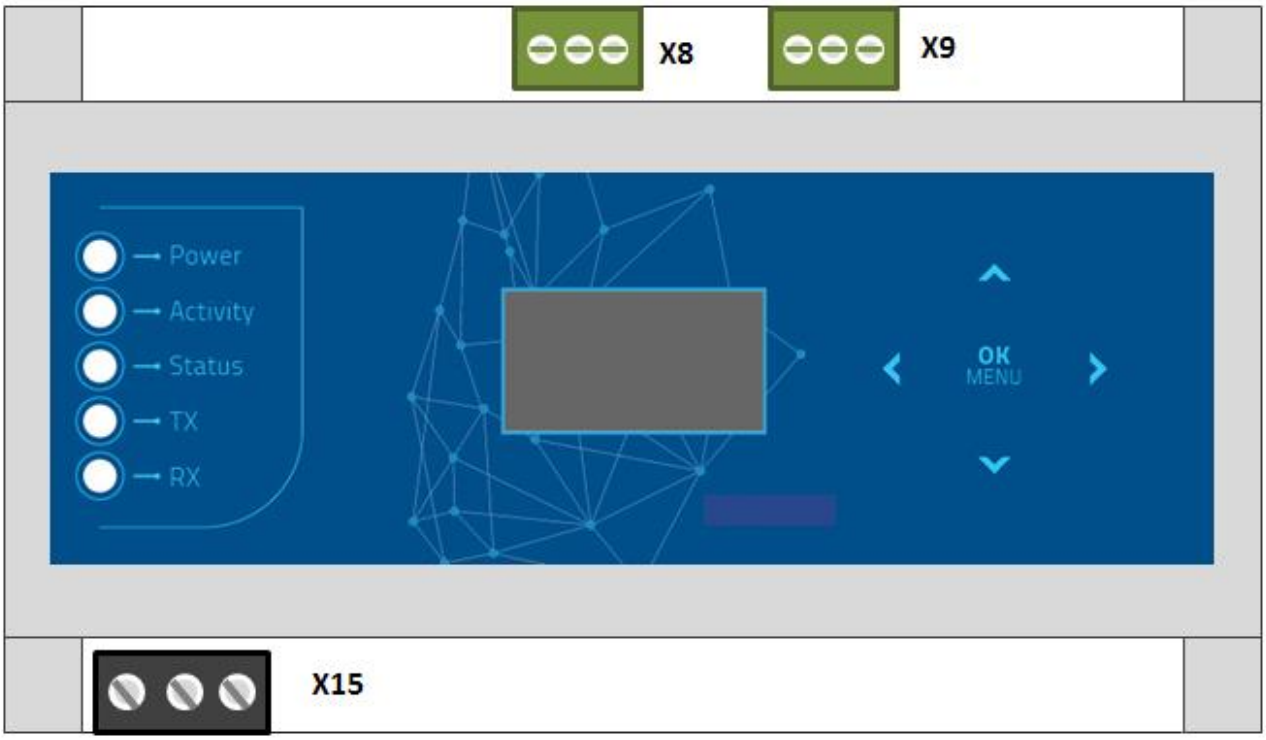
##	PARAMETER	VALUE
1	**Power supply voltage**	100 V – 270 V AC
2	**Sealing**	IP20
3	**Material**	ABS Plastic
4	**Temperature range**	from 0°C to +40°C
5	**Weight**	0.45 kg
6	**Overall dimensions**	160 x 95 x 55 mm

Communication

##	PARAMETER	VALUE
1	**Input protocol for connection to POS**	IFSF
2	**Interface for POS connection**	LON
3	**Output protocol for dispensers**	DART
4	**Interface for dispenser connection**	RS-485

CONNECTIONS

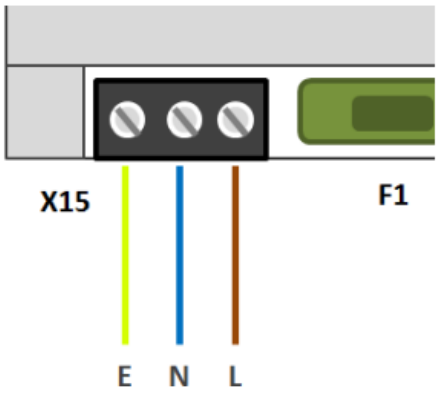
Connectors overview



CONNECTOR	DESCRIPTION
X15	Main power connector
X9	LON interface connector
X8	RS-485 interface connector

Connector X15

X15 is the connector where the main power is connected to L2D.



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 X8

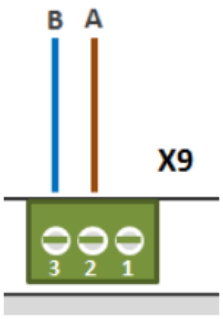
X8 is the connector for RS-485 interfaces of the dispenser using DART protocol.

PINS	DESCRIPTION
1	Line A in RS-485 interface
2	Line B in RS-485 interface
3	Common for connection to cable shield or foil
4	-
5	-

Connector X9

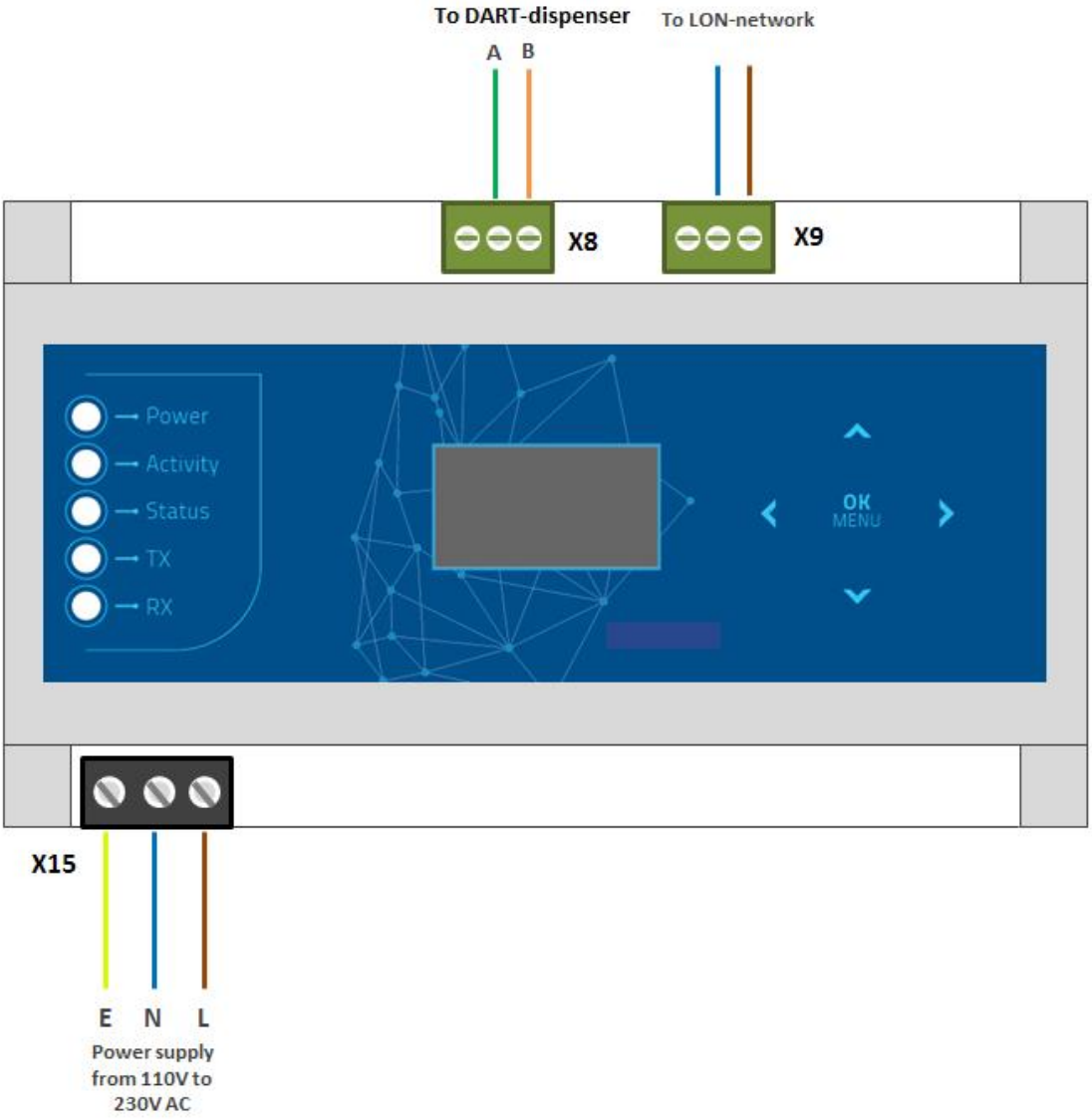
LON interface connector for connection to LON network of POS. As the LON interface is two-wire differential there is no polarity of the terminals.

PINS	DESCRIPTION
1	Earth
2	Line A
3	Line B



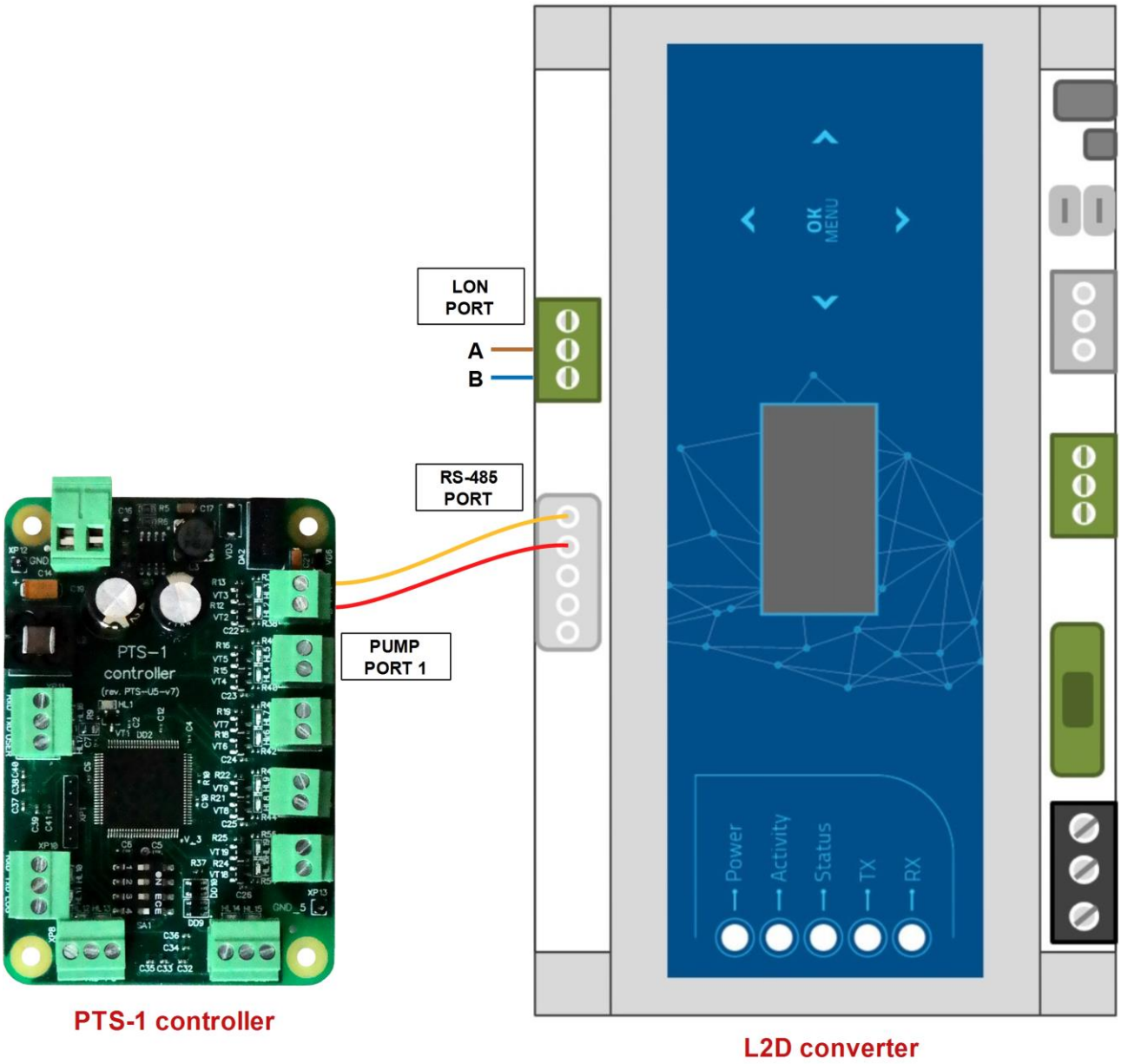
Connection diagram

The below diagram describes graphically the way of connecting L2D for bridging the DART dispenser with the IFSF-LON network where the POS systems(s) and the other fuel dispensers are.

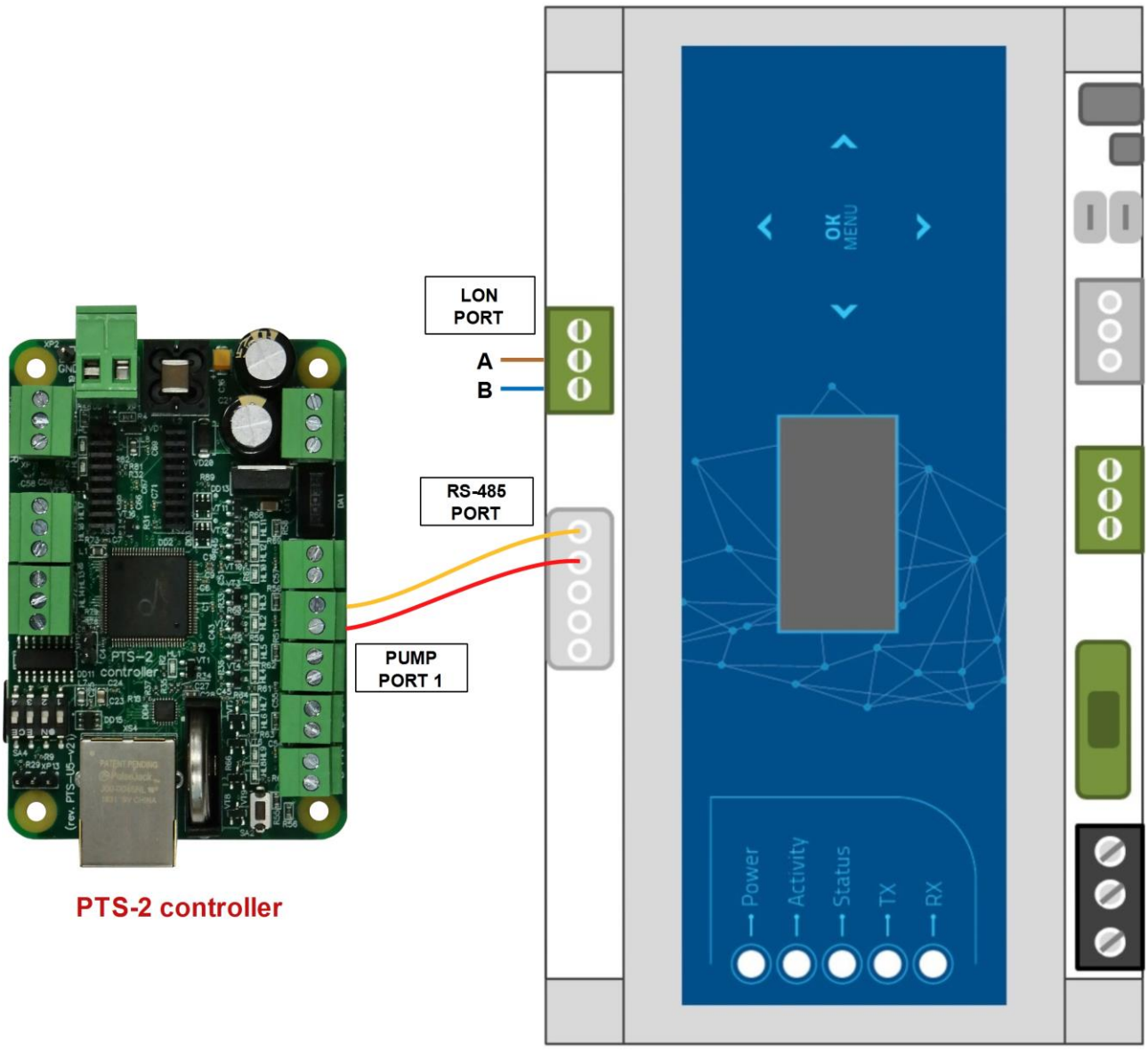


In case if L2D converter is used together with PTS-1 or PTS-2 controllers – then they can convert the protocol to any other pump protocol.

Example of connection to PTS-1 controller:



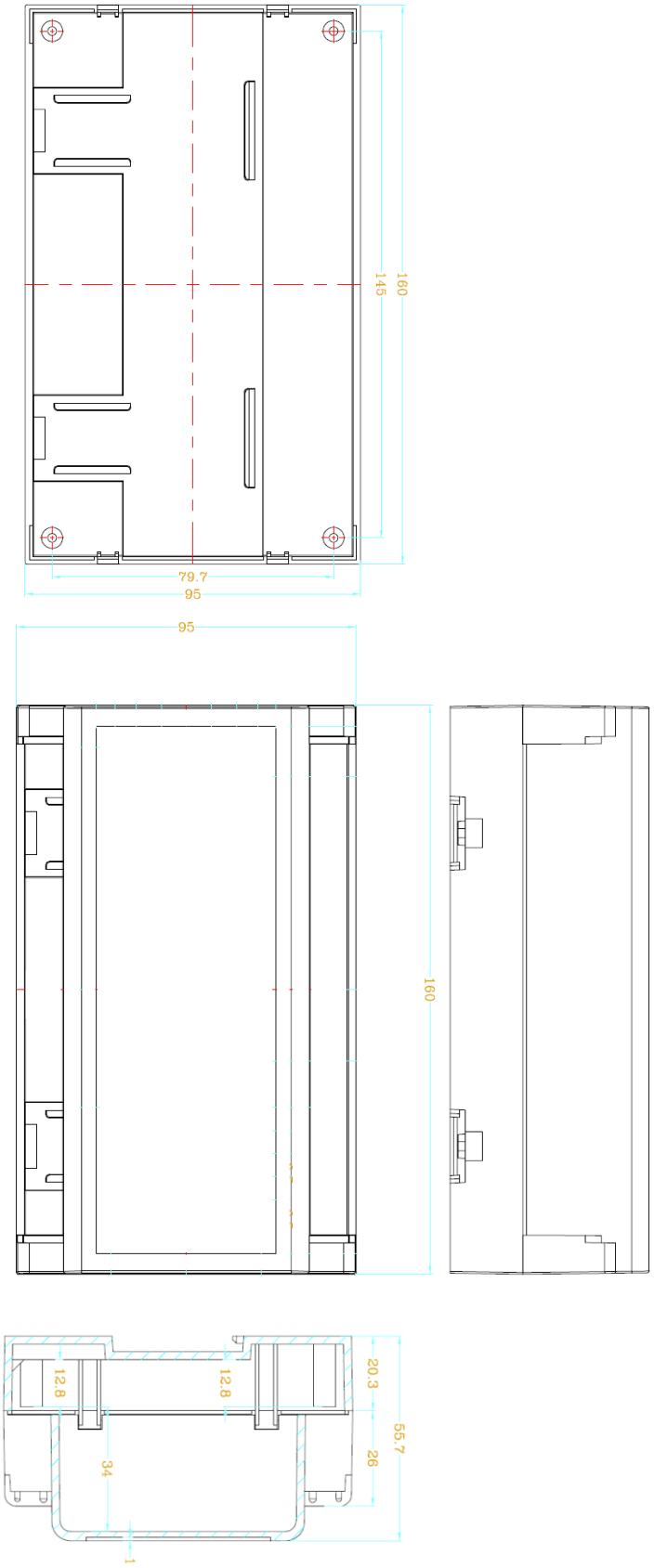
Example of connection to PTS-2 controller:



PTS-2 controller

L2D converter

MECHANICAL DIMENTIONS

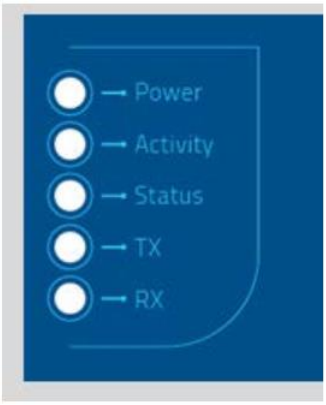


USER INTERFACE

S1 and S2 buttons

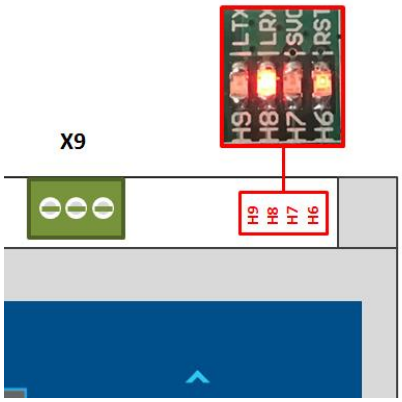
Buttons S1 and S2 are used to set the L2D converter in preliminary defined state according to IFSF-LON specification. By pressing and keeping both of these buttons pressed in power-off state at powering on the device all of the configuration parameters are reset to their default values.

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

LEDs for X9 connector



LED NAME	FUNCTION	ON CONDITION	OFF CONDITION	COLOR
H6 - LON RST	LON Reset state	Reset is applied	Reset is released	Red
H7 - LON SVC	Service message	Service message is ongoing		Green
H8	LON Rx			Red
H9	LON Tx			Green

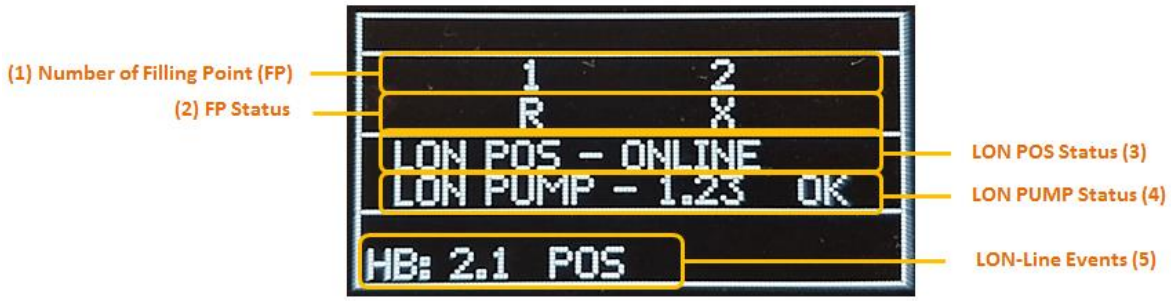
Control keys

NAME	FUNCTION
OK / MENU	When L2D 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:

1. The number of filling points (FPs) configured to be active (from 1 to 4);
2. Status of each FP – 'X' – disconnected, 'R' – ready (online), etc.
3. LON POS status – describes whether the POS over IFSF-LON is online or offline.
4. LON PUMP Status – describes what pump status is sent by L2D over the IFSF-LON network;
5. LON-line events – shows all related events (like heartbeats) over the IFSF-LON network;

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 L2D 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 L2D 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	**LCD FADE EN**	Enable fading the LCD-contrast after the set time expired and no activity is detected.	YES / NO	YES
4	**LCD FADE TIME**	Set the time in seconds after which the LCD starts fading.	1 - 250	30
5	**LCD 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	**LCD BLACKOUT TIME**	Set the time in seconds after which the LCD turns OFF.	1 - 250	30

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 L2D with the other devices. Below the parameters included in the menu:

##	SUB-MENU	DESCRIPTION	REMARK
1	**PUMP DEBUG LEVEL**	Set pump debug level.	0-4
2	**LON DEBUG LEVEL**	Set LON debug level.	0-2

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 (default password is **2345**).

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

SETTINGS > POS

SETTINGS > POS > DECIMALS

A 4 digits password is needed to enter to that option (default password is **2345**).

After entering the proper password the following parameters are seen:

##	PARAMETER	DESCRIPTION	OPTIONS	DEFAULT VALUE
1	**AMOUNT DECIMALS**	Set the amount number of digits after the decimal point.	0-2	0
2	**VOLUME DECIMALS**	Set the volume number of digits after the decimal point.	0-3	2
3	**PRICE DECIMALS**	Set the price number of digits after the decimal point.	0-2	0

SETTINGS > LON

Adjust communication parameters with the POS system.

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 POS-system prospective the L2D-bridge appears as dispenser and its node-address.

##	PARAMETER	DESCRIPTION	OPTIONS
1	**NODE ADDRESS**	Set LON node address	1-127

SETTINGS > IFSF

##	SUB-MENU	DESCRIPTION
1	**COMMON**	Set the common IFSF parameters
2	**FP**	Set FP parameters

SETTINGS > IFSF > COMMON

Specifies the pump parameters that are needed for the proper work of the IFSF-protocol and they (or some of them) are not provided by the real dispenser over the protocol.

##	PARAMETER	DESCRIPTION	OPTIONS	DEFAULT VALUE
1	**NB FP**	Set the number of filling points in use.	0-4	4
2	**NB PRODUCTS**	Set the number of products in use.	0-4	4
3	**COUNTRY CODE**	Specifies the country code.	0000 - 9999	0255

SETTINGS > IFSF > FP

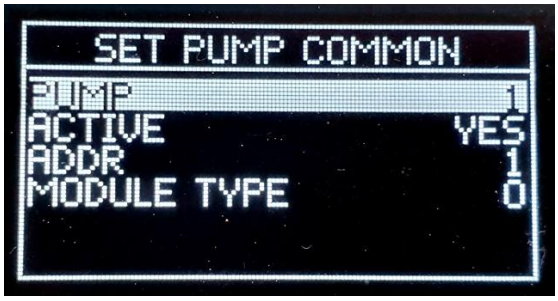
Specifies the FP (filling point) parameters that are needed for the proper work of the IFSF-protocol. This is in case if some of these parameters are not provided by the real dispenser over the protocol.

##	SUB-MENU	DESCRIPTION	OPTIONS	DEFAULT VALUE
1	**NB FP**	Filling point number that the other parameters are related	1-4	1 (use the keys to select)
2	**NB LOGICAL NOZZLE**	Number of logical nozzles for that FP	1-4	4
3	**NOZ**	Nozzle number of that FP	1-4	1 (use the keys to select)
4	**NB PROD**	Product assigned to that nozzle	1-4	Same as nozzle number

SETTINGS > PUMP

##	SUB-MENU	DESCRIPTION
1	**COMMON**	Set the common pump parameters
2	**COMM**	Set pump communication parameters
3	**DECIMAL**	Set the decimal points for the pump

SETTINGS > PUMP > COMMON



This menu sets the parameters from pump-control side of L2D converter.

##	PARAMETER	DESCRIPTION	OPTIONS	DEFAULT VALUE
1	**PUMP**	Specifies the number of FP that the other parameters are related.	1-4	1 (use the keys to select)
2	**ACTIVE**	Defines whether the FP is Active or not	YES/NO	Yes
3	**ADDR**	Specifies the address (ID) of pump's FP assigned to this number.	1-17	Same as the FP
4	**MODULE TYPE**	Not used.	-	-

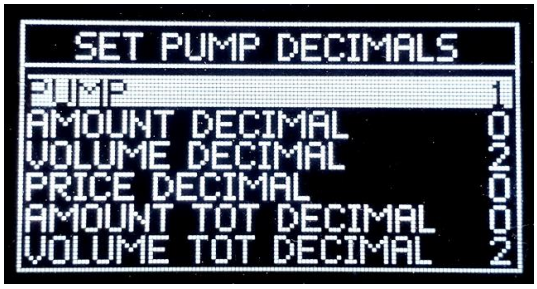
SETTINGS > PUMP > COMM

##	PARAMETER	DESCRIPTION	OPTIONS	DEFAULT VALUE
1	**PROT**	Specifies the communication protocol b/w the pump and L2D.	DART	DART
2	**INTERFACE**	Specifies the HW interface b/w the pump and L2D.	RS485	RS485

SETTINGS > PUMP > DECIMAL

A 4 digits password is needed to enter to that option (default password is **2345**).

After entering the proper password the following parameters are seen:



Each FP (PUMP) can have its own decimal point settings.

##	PARAMETER	DESCRIPTION	OPTIONS	DEFAULT VALUE
1	**PUMP**	Specifies the number of FP that the other parameters are related.	1-4	1 (use the keys to select)
2	**AMOUNT DECIMALS**	Set the amount number of digits after the decimal point.	0-2	0
2	**VOLUME DECIMALS**	Set the volume number of digits after the decimal point.	0-3	2
3	**PRICE DECIMALS**	Set the price number of digits after the decimal point.	0-2	0
4	**AMOUNT TOT DECIMALS**	Set the amount totalizer number of digits after the decimal point.	0-2	0
5	**VOLUME TOT DECIMALS**	Set the volume totalizer number of digits after the decimal point.	0-3	2