




# Enapter

## DRYER 2.1 BATTERY LIMITS

DOCUMENT N°: DRY21-BLI-INT01


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## 1 PURPOSE

The scope of this document is to define and describe the battery limits of the Dryer 2.1. It illustrates the physical interface ports of the dryer, to allow its users to integrate it with the other equipment that composes their system.

## 2 FIELD OF APPLICATION

Product codes DRY212535A2VXX and DRY211008A2VXX

## 3 DEFINITIONS AND ABBREVIATIONS


DRY21	Dryer 2.1
P&ID	Piping and Instrumentation Diagram
User	The integrator of the DRY21 in a larger system
Warranty	A written guarantee, issued to the purchaser of a DRY21 by Enapter, promising to repair or replace it as outlined in “Enapter’s Factory Warranty”

## 4 REFERENCE DOCUMENTS

Code	Name
DRY21-PID-00001	Dryer 2.1 P&ID
DRY21-DRW-INT01	Dryer 2.1 Interfaces
DRY21-MAN-00001	Dryer 2.1 User Manual

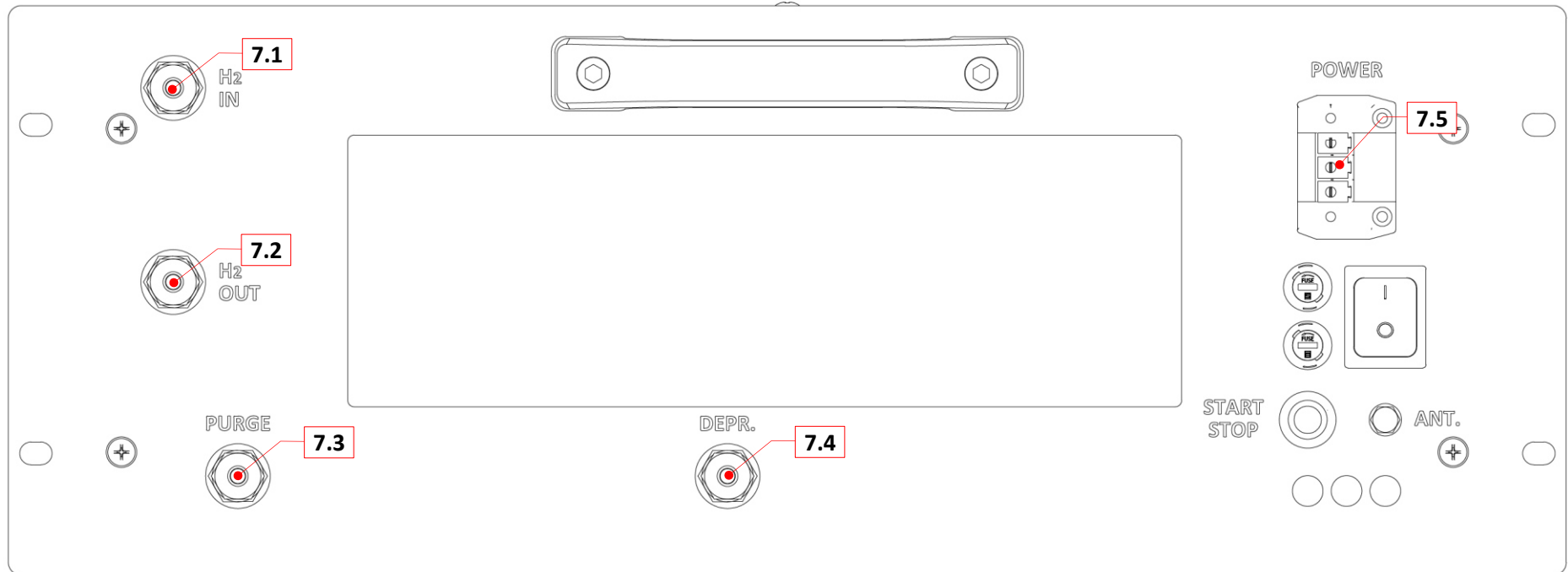
## 5 RESPONSIBILITIES


**User:** It is the user’s responsibility to adhere to the ranges and constraints set henceforth. Failure to do so may cause the system to behave in an unpredictable/unsafe behaviour and render void the product warranty.

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## 6 DRYER 2.1 INTERFACES

The following figure shows the positions of the DRY21 physical interfaces. All interfaces are located on the front panel.



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## 7 INTERFACE SPECIFICATIONS

The values set in the following tables are operative values to be taken into account in the user system interface with DRY21.

### 7.1 H<sub>2</sub> IN

This port is the inlet for the wet hydrogen to be dried. At the back of this port is a pressure transmitter that starts operation when incoming pressure is detected.

<b>Name</b>	H <sub>2</sub> IN
<b>Fitting Type</b>	¼" double ferrule female compression fitting (Swagelok)
<b>Fitting Material</b>	316L Stainless Steel
<b>Fluid</b>	H <sub>2</sub>
<b>Flowrate</b>	8 bar version: 0-1000 NL/h 35 bar version: 0-2500 NL/h
<b>Pressure</b>	8 bar version: 0-8 barg 35 bar version: 0-35 barg
<b>Temperature</b>	55°C


- The user should connect piping with compatible material – i.e. 316L Stainless Steel.

### 7.2 H<sub>2</sub> OUT

From this outlet port the dried hydrogen is released. It is internally protected by a check valve to eliminate the possibility of gas backflow.

<b>Name</b>	H <sub>2</sub> OUT
<b>Fitting Type</b>	¼" double ferrule female compression fitting (Swagelok)
<b>Fitting Material</b>	316L Stainless Steel
<b>Fluid</b>	H <sub>2</sub>
<b>Flowrate</b>	8 bar version: 0-1000 NL/h 35 bar version: 0-2500 NL/h
<b>Pressure</b>	8 bar version: 0-8 barg 35 bar version: 0-35 barg
<b>Temperature</b>	Ambient temperature

- Particular care should be taken not to attach any pressurised system with a pressure higher than 8 barg/ 35 barg to the system.
- The outlet pressure is regulated by the user's downstream equipment. Operative pressure range should stay between 0 and 8 barg for the 8 bar dryer and between 0 and 35 barg for the 35 bar dryer.
- The hydrogen coming out of the dryer always has a dew point below – 60.5 °Cdt. On average, the dewpoint is – 70 °Cdt, i.e. remaining impurities in the hydrogen are H<sub>2</sub>O < 5 ppm and O<sub>2</sub> < 5 ppm.
- The user should connect piping with compatible material – i.e. 316L Stainless Steel.

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### 7.3 H<sub>2</sub> PURGE

Through this outlet port the regeneration flow (mixture of hydrogen and water vapour) is expelled during operation. When the dryer is shut down, a solenoid valve is used to release the pressure and purge the internal hydrogen.


<b>Name</b>	PURGE
<b>Fitting Type</b>	¼" double ferrule female compression fitting (Swagelok)
<b>Fitting Material</b>	316L Stainless Steel
<b>Fluid</b>	H <sub>2</sub> + H <sub>2</sub> O
<b>Flowrate</b>	Intermittent, up to 14 NL H <sub>2</sub> /h during some operational states. Up to 47 NL H <sub>2</sub> is purged when the system is shut down, resulting in a max. momentary flow rate of 24 NL/s
<b>Pressure</b>	8 bar version: 0-8 barg (transient) 35 bar version: 0-35 barg (transient)
<b>Temperature</b>	Max. 150 °C

- No blockage or valves should be present on the user's side of the interface as critical DRY2.1 safety measures and correct functioning of the device are dependent on it. The port should be piped to a safe area open to atmosphere.
- The output from this port is not constant; it only occurs during certain operational sub-states and when the system is shut-down. During the purge, all the pressurised H<sub>2</sub> in the DRY2.1 is suddenly expelled. A transient high-pressure flow is expected, whose characteristics are dependent on the user piping side of this interface.
- The user should connect piping with compatible material – i.e. 316L Stainless Steel.

### 7.4 DEPRESSURISATION LINE

This port is used only before maintenance of the dryer. Remove the cap to depressurise the dryer. **Never remove the cap during operation of the dryer! Only trained personnel is allowed to remove the cap.**

<b>Name</b>	DEPR.
<b>Fitting Type</b>	¼" plug for Swagelok tube fitting
<b>Fitting Material</b>	316L Stainless Steel
<b>Fluid</b>	H <sub>2</sub>
<b>Flowrate</b>	--
<b>Pressure</b>	8 bar version: 8 barg 35 bar version: 35 barg
<b>Temperature</b>	Ambient temperature


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## 7.5 POWER

This inlet port is needed to provide power to the DRY21. The connector needed to plug into this interface is provided by Enapter.

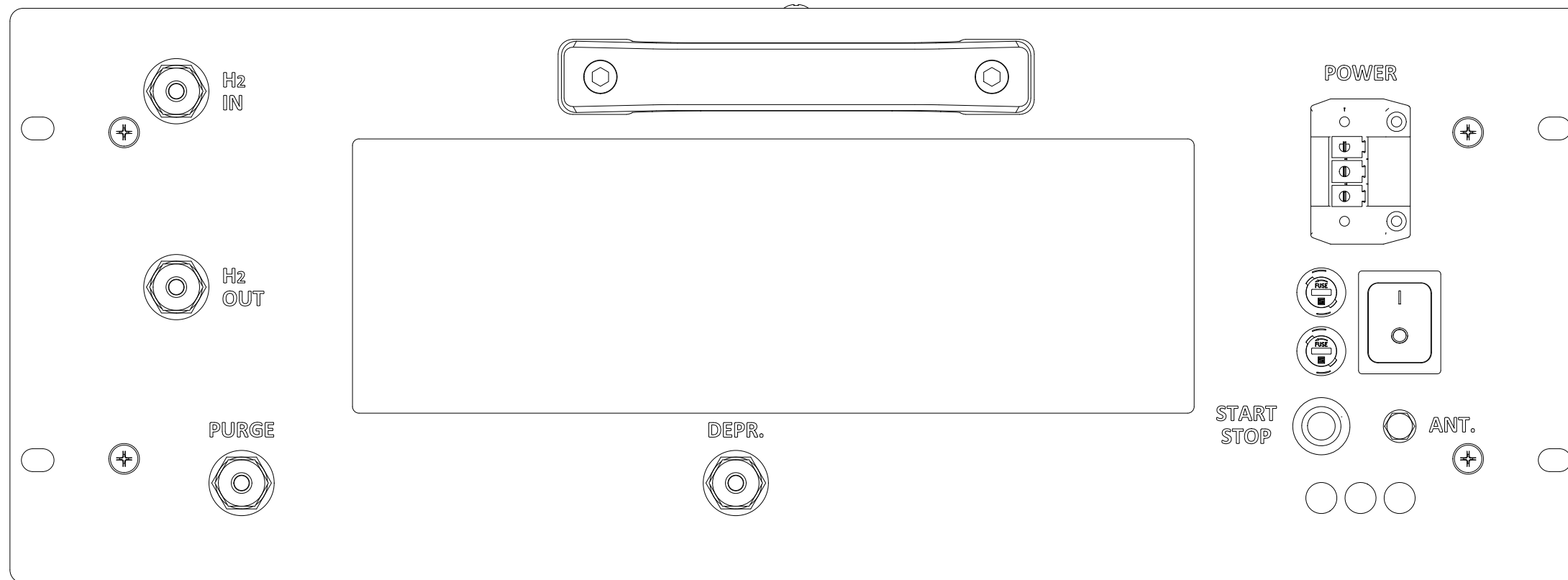
<b>Name</b>	POWER
<b>Fitting Type</b>	PCB 3-pin 7,62 mm pitch female connector
<b>Fitting Material</b>	PA (polyamide)
<b>Current</b>	0-1 A
<b>Voltage</b>	200-240 V <sub>AC</sub>
<b>Frequency</b>	50/60 Hz

- Enapter provides the male coupling to connect to this port. Conductors with a cross-section up to 4 mm<sup>2</sup> are compatible with the Enapter provided male coupling.

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## 8 APPENDIX: INTERFACE DRAWING DRY21-DRW-INT01





## DRYER 2.1 INTERFACE LIST

#	NAME	TYPE	MATERIAL	FLUID	FLOWRATE	PRESSURE	TEMPERATURE	CURRENT	VOLTAGE	FREQUENCY
A	H2 IN	¼" Double ferrule female compression fitting (Swagelok)	316L Stainless Steel	H2	8 bar version: 0-1000 NL/h 35 bar version: 0-2500 NL/h	8 bar version: 0-8 barg 35 bar version: 0-35 barg	55°C	/	/	/
B	H2 OUT	¼" Double ferrule female compression fitting (Swagelok)	316L Stainless Steel	H2	8 bar version: 0-1000 NL/h 35 bar version: 0-2500 NL/h	8 bar version: 0-8 barg 35 bar version: 0-35 barg	Ambient temperature	/	/	/
C	PURGE	¼" Double ferrule female compression fitting (Swagelok)	316L Stainless Steel	H2+H2O	Intermittent, up to 14 NL H2/h during some operational states. Up to 47 NL H2 is purged when the system is shut down. Maximum momentary flow rate of 24 NL/s.	8 bar version: 0-8 barg (transient) 35 bar version: 0-35 barg (transient)	Max. 150°C	/	/	/
D	DEPR.	¼" Double ferrule female compression fitting (Swagelok)	316L Stainless Steel	H2	/	8 bar version: 8 barg 35 bar version: 35 barg	Ambient temperature	/	/	/
E	POWER	PCB 3-pin 7.62 mm pitch female connector	PA (polyamide)	/	/	/	/	0-1 A	200-240 VAC	50/60 Hz

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			CHECKED	E. van der Put
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