DRYER 4.1 BATTERY LIMITS

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00	IFP	18/03/2026	First release	V. Goddi	L. Giobbi	F. Bucaccio

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1 PURPOSE

This document analyses the requirements for factory acceptance testing for the

2 FIELD OF APPLICATION

DRY4.1 35 bar version, 8 bar version

Product codes DRY412535A2VXX, DRY411008A2VXX

3 DEFINITIONS AND ABBREVIATIONS

DRY41	Dryer 4.1
P&ID	Piping and Instrumentation Diagram
User	The integrator of the DRY41 in a larger system
Warranty	A written guarantee, issued to the purchaser of a DRY41 by Enapter, promising to repair or replace it as outlined in “Enapter’s Factory Warranty”

4 REFERENCE DOCUMENTS

Code	Name
DRY41-PID-00001	Dryer 4.1 P&ID
DRY41-MAN-00001	Dryer 4.1 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.

6 DRYER 4.1 INTERFACES

The following figure shows the positions of the DRY41 physical interfaces. All interfaces are located on the front panel.

7 INTERFACE SPECIFICATIONS

The values set in the following tables are operative values to be considered in the user system interface with DRY41.

7.1 H_2 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.

Name	H_2 IN
Fitting Type	1/4" double ferrule female compression fitting (Swagelok)
Fitting Material	316L Stainless Steel
Fluid	H_2
Flowrate	8 bar version: 0-1000 NL/h 35 bar version: 0-2500 NL/h
Pressure	8 bar version: 0-8 barg 35 bar version: 0-35 barg
Temperature	55 °C

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

7.2 H_2 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.

Name	H_2 OUT
Fitting Type	1/4" double ferrule female compression fitting (Swagelok)
Fitting Material	316L Stainless Steel
Fluid	H_2
Flowrate	8 bar version: 0-1000 NL/h 35 bar version: 0-2500 NL/h
Pressure	8 bar version: 0-8 barg 35 bar version: 0-35 barg
Temperature	55 °C

- 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_2O < 5 ppm and O_2 < 5 ppm.
- The user should connect piping with compatible material – i-e. 316L Stainless Steel.

7.3 H_2 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.

Name	PURGE
Fitting Type	1/4" double ferrule female compression fitting (Swagelok)
Fitting Material	316L Stainless Steel
Fluid	$H_2 + H_2O$
Flowrate	Intermittent, up to 14 NL H_2/h during operational states. Up to 47 NL H_2 is purged when the system is shut down (max. momentary flow rate of 169 Nm^3/h).
Pressure	8 bar version: 0-8 barg (transient) 35 bar version: 0-35 barg (transient)
Temperature	Max. 150 °C

- No blockage or valves should be present on the user's side of the interface as critical DRY4.1 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_2 in the DRY4.1 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 or transport of the dryer. Remove the cap to depressurise the dryer. **Never the remove the cap during operation of the dryer! Only trained personnel is allowed to remove the cap.**

Name	DEPR.
Fitting Type	1/4" plug for Swagelok tube fitting
Fitting Material	316L Stainless Steel
Fluid	H_2
Flowrate	--
Pressure	8 bar version: 8 barg 35 bar version: 35 barg
Temperature	55 °C

7.5 POWER

This inlet port is needed to provide power to the DRY41. The connector needed to plug into this interface is provided by Enapter.

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

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

7.6 ETHERNET

This port is needed to provide Ethernet connection to the DRY4.1.

Name	ETH
Fitting Type	RJ45 – Jack to Jack
Shielding	Fully shielded, 360° shielding contact
Fitting Material	PA (polyamide)