

AUS

AUTOMATIC UNLOADING SYSTEM

Shinko AUS automatic unloading systems have been developed to simplify the unloading of cargo from crude oil tankers and product carriers, and to reduce unloading time.



AUS AUTOMATIC UNLOADING SYSTEM

GENERAL CHARACTERISTICS

- 1 The anti-cavitation control operation
- 2 Unloading time can be reduced since the stripping work can be done by a large capacity cargo pump alone.
- 3 As stripping work can be performed automatically.
- 4 When applying this system to crude oil washing (COW), sludge control can be also performed.



SPECIFICATION

Item	Model	Model						
		AUS 300	AUS 350	AUS 400	AUS 453	AUS 453A	AUS 454	AUS 502
Cargo pump model applied		KV 300	KV 350	KV 400	KV 450-3	KV 450-3A	KV 450-4	KV 500-2A
Separator	(m ³)	1.02	1.38	1.80	3.49	3.49	4.08	4.86
Discharge control valve		Pneumatic operated, non tight butterfly valve						
Loading air pressure	(MPaG)	0.7						
Bore	(mm)	300	350	400	450	500	500	550
Vacuum pump		Water ring type						
Model		NSW80 × 2sets				NSW100 × 2sets		
Maximum capacity	(Nm ³ /h/set)	320				630		
Maximum vacuum	(kPa)	-73						
Motor		22kW × 1200min ⁻¹ × 2sets				37kW × 1200min ⁻¹ × 2sets		
Sealing tank	(m ³)	0.21				0.29		
Gas extraction valve		Pneumatic operated, reverse action piston valve						
Loading air	(MPaG)	0.6~0.7						
Bore	(mm)	100				125		
Recirculation valve		Pneumatic operated, reverse action piston valve						
Loading air	(MPaG)	0.6~0.7						
Bore	(mm)	40				50		

Generally, the AUS 3002, 3502, 4002, 4532, 4532A, 4542 or 5022 are employed in product carriers, and are provided with one set of a vacuum pump unit for each cargo pump respectively. And the AUS 4532A/4542 is provided with one set of the NSW 80 vacuum pump unit instead of two sets of the NSW 100 vacuum pump units.

CONTROL SYSTEM

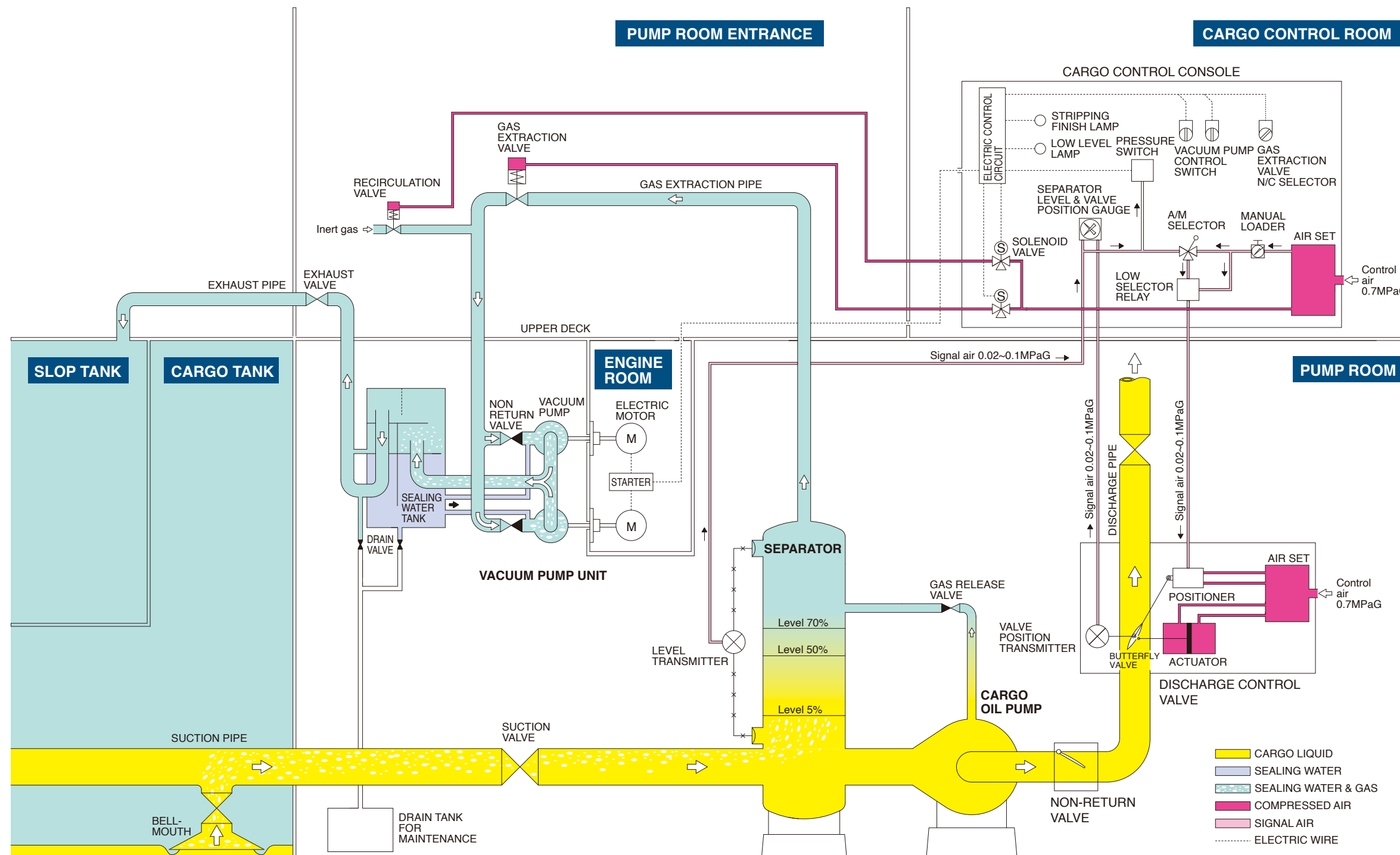
This system has been installed to implement automatic cargo unloading with only cargo pumps to prevent not only cavitation but also gas and vapor intake.

The basic operation of this system is described as follows:

1

After starting the cargo pump, on the cargo control console:

- (1) The NOR/CLOSE selector, which acts on the gas extraction valve, is set to "NOR".
- (2) The control switch, which acts on the vacuum pumps, is set to "AUTO".
- (3) The AUTO/MANUAL selector, which acts on the discharge control valve, is set to "AUTO".



2

When approaching the final unloading stage, the cargo liquid level in the cargo tank lowers and part of the cargo becomes vapor, which accumulates in the upper portion of the separator, and the separator level begins to lower.

3

When the separator level lowers to 50%, the vacuum pumps start from an air signal sent from the level transmitter.

At the same time, the gas extraction valve is opened and the discharge control valve is throttled.

4

When the vapor is extracted by the vacuum pumps, the separator level rises again.

If the level rises to 70%, the gas extraction valve closes.

And, in 20 seconds, the vacuum pumps stop and the discharge control valve opens.

5

The above-mentioned unloading process is repeated many times so as to prevent the vapor from entering into the cargo pump when the vapor accumulates in the separator.

6

When the level in the cargo tank lowers further, a vortex takes place around the suction bell mouth and gas is taken in. This gas is separated from the cargo in the separator, and is accumulated at the upper portion of the separator, which is the same process as with the vapor.

7

If the level in the cargo tank lowers much further, the liquid level around the bell mouth fluctuates heavily and a large amount of gas is taken in.

The separator level lowers substantially even if the two vacuum pumps continue to run simultaneously and the discharge control valve is at a very small opening degree.

If the separator level reaches 5%, the orange low level lamp on the console turns on to indicate that the unloading process has entered into the end of the stripping stage.

8

When this condition continues for about 3 minutes, the orange stripping finish lamp on the console flickers with a buzzing sound, which indicates the completion of the unloading work using this system.