PreciFUEL

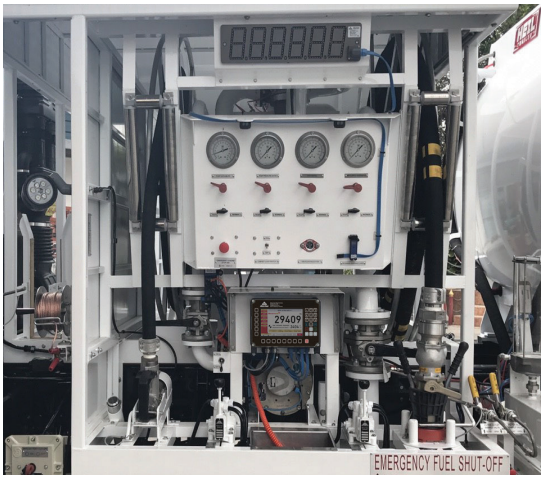
APPLICATION:
AIRCRAFT REFUELLING

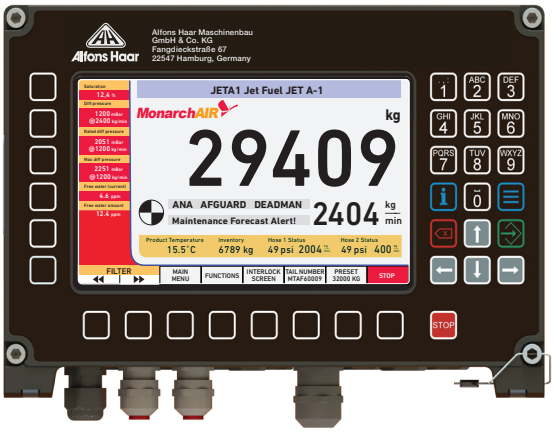
Alfons Haar

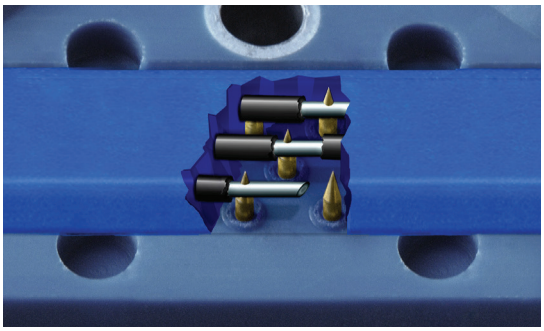
PreciFUEL System

The most modern technology available for refuellers and dispensers

- \+ ATEX/IECEx approved bus system PreciBUS (no junction boxes, no PLC necessary)
- \+ Error safe installation of all PreciFUEL components – "Lego for tanker builders!"
- \+ All electronics are 100% potted, no problems with vibration, corrosion, or humidity!
- \+ Maintainable by mechanics!
- \+ Adaptation by configuration – no software debugging required
- \+ Integrated Logbook
- \+ DP monitoring and density sensor optional
- \+ Automatic diagnosis on power up
- \+ Scalability protects the investment to meet future needs
- \+ Download system documentation directly from each ARU-Master
- \+ Public EN 15969-1 FTL interface to OBC
- \+ AFGUARD ready
- \+ Optional safety features, such as a comprehensive 360˚check







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Suitable for low temp. operations

Modes

Interlock state secured | Interlock state in use | Actor state enabled | Actor state disabled | Ignore

No.	E8004-0 Mode	E8005-0 Operation	E8011-0 Deadman	interlock left	interlock right	cabinet door	ladder	railing	coupling left	coupling right	line valve pressure	line valve suction	automatic valve 1	automatic valve 2	hose reel brake left	hose reel brake right
1	Fuelling u/w left	Fuelling	Yes								✕	✕	✓			
2	Fuelling u/w	Fuelling	Yes								✕	✕		✓		
3	Fuelling overwing		Fuelling								✕	✕	✓			
4	Defuelling left	Fuelling	No								✓	✓	✕	✕		
5	Recirculation left	Regeneration	No								✕	✕	✓	✕		
6	Recirculation right	Regeneration	No								✕	✕	✕	✓		
7	Gravity discharge	Emptying of residues	No								✕	✕	✕	✕		
8	Pump Station	Transfer out	No								✕	✕	✕	✕		
9	Refuelling from ext	Fuelling	Yes								✕	✕	✓	✕		
10	Load compartment	Loading	No								✕	✕	✕	✕	✕	✕
	Click to add mode															

Interlocks

Interlock Name	HelpText	E8001-0 Interlock Type	E8002-0 Help Text
Interlock left	underwing nozzle left stowed	Secured in 'on' position	may be bypassed for time limit
Interlock left	underwing nozzle right stowed	Secured in 'on' position	may be bypassed for time limit
Cabinet door	cabinet not closed	Secured in 'on' position	may be bypassed till next loading
Ladder	ladder unstowed	Secured in 'on' position	must not be bypassed
Railing	railing unstowed	Secured in 'on' position	must not be bypassed
Coupling left	couplings not disconnected (L)	Secured in 'on' position	may be bypassed till next loading
Coupling right	couplings not disconnected (R)	Secured in 'on' position	may be bypassed till next loading
Click to add interlock			

Indicator lights

Full Lift Control

Lift up/down
Lift/platform wands
Pantograph drift monitoring
Alarm signals
Lift interlock system (Park position, door, refuelling adapters)

Overhead display

PreciNODE ODIS - Red color LED display for better visibility

High efficiency LED illumination

PreciNODE M Lux RGB - multicolor status indicator

Automatic Refill

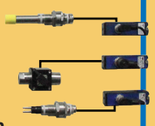
AFGUARD - free water detection!

For each refuelling:
Check level and alarm level monitoring according to JIG Bulletin No. 130 / Data Storage Function

Trend analysis for the last 50 fuellings!
Log data for all fuelling operations since FWS/FM change!

Air monitoring

PreciNODE M I1

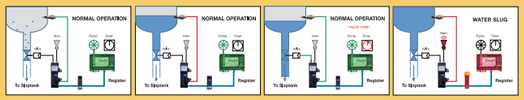


Flow rate based differential pressure monitoring

PreciNODE M AI4...20mA

Inline water monitoring & water slug detection

PreciNODE M I1



Alfons Haar now also implements state of the art bus technology in aircraft refuelling applications

ATEX approved bus system **PreciBUS** for Zone 1

Reduced installation, improved transparency and maintenance simplification, no terminal boxes, plug-in wiring

Cost and weight reduction due to reduced number of components and very light weight devices

Power and communication within one cable

Inline connections and piercing technology results in minimum wiring effort

The PreciBUS members can be contacted at any position of the bus cable

Full scalability, easily extendable, any bus topology is possible

PreciBUS PreciBUS PreciBUS PreciBUS

No more boxes!

Integrated tank level gauging

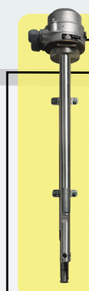
Fill volume calculated with calibration table

Alarm settings (highs and lows)

Remote stock reconciliation

2-in-1 Overfill Sensor

EuroSENS-LMS integrates individual levels for VOC and truck side shut down



Vent valve control and monitoring

Verifies conditions for fuelling operations and brake interlock

Analog input module PreciNODE M AI4...20mA

Plug & play for standard 4-20mA analog sensors (EEx i)

Integrated diagnose functions through PreciBUS

Digital input/output module PreciNODE C I4/O3

Plug & play for 4 standard NAMUR sensors (EEx i)

Reduced pneumatic installation by up to 3 integrated solenoid valves

Additives PreciMIX

Up to 4 additives can be injected with injection verification

M I5 - Master interface

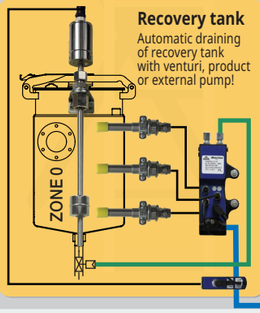
Up to 12 in-/outputs
Adaptive Motor Control
PTO & Handbrake Control

Power supply

10% of conventional systems

Recovery tank

Automatic draining of recovery tank with venturi, product or external pump!



ARU Master 5

Master meter head, secondary meter head, deadman, interlock display

Seamless integration of all control functions in one controller

RFID

Seal-less Pulser

Up to 2 vane meters / turbines

Density Measure-ment

Deadman

Wired
+
Wireless

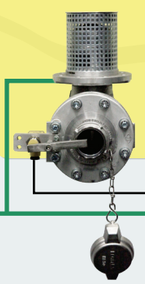
Guided fuelling

Automatic valve control embedded into fuelling process relieves operator

Observes interlock, vent valve, overfill states etc. with plain text messages on screen

Guided draining

Verification of draining rules and electronic protocol saves overhead



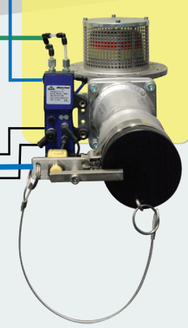
Low level indicator

Ensures minimum level during fuelling operations without blocking draining operations

Guided loading

Automatic interlock recognition and valve control relieves operator

LED status indication (foot valve status, overfill warning etc.)



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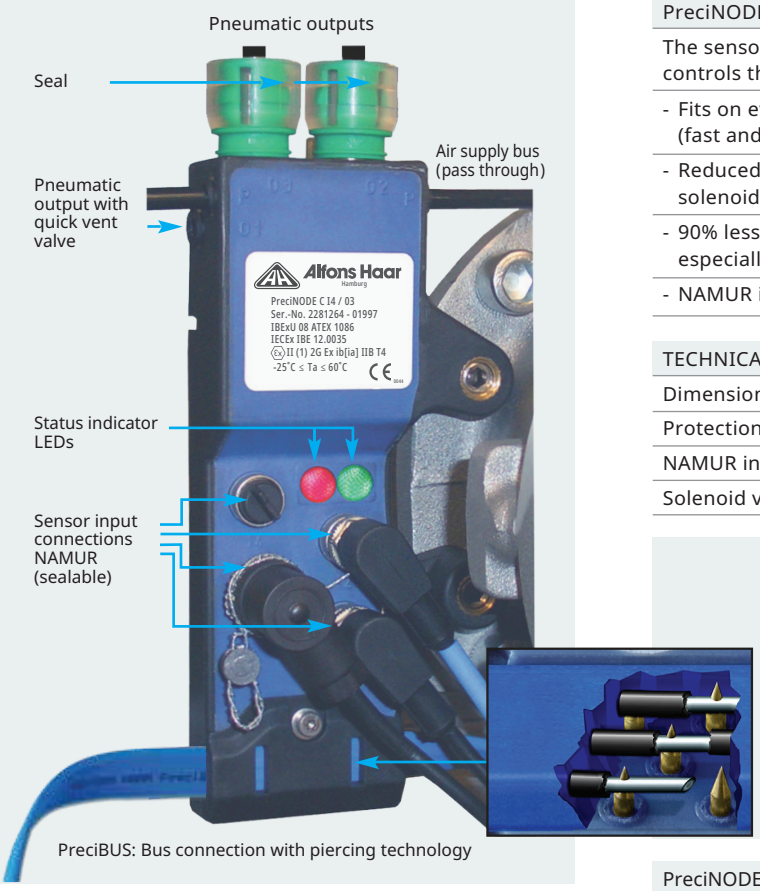
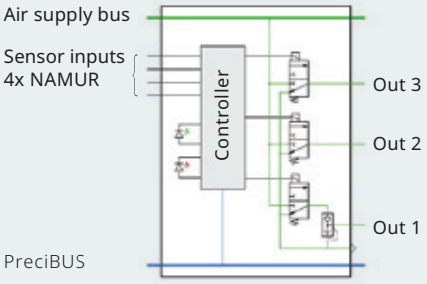


PreciBUS: Bus connection with piercing technology

PreciNODE C I4/O3
The sensor/actor module PreciNODE monitors and controls the fittings on the truck:
- Fits on every standard flange, no drilling, no tapping (fast and safe)
- Reduced pneumatic installation by integrated solenoid valves
- 90% less power consumption conserves truck battery especially in winter
- NAMUR inputs, potted electronics, manipulation-safe

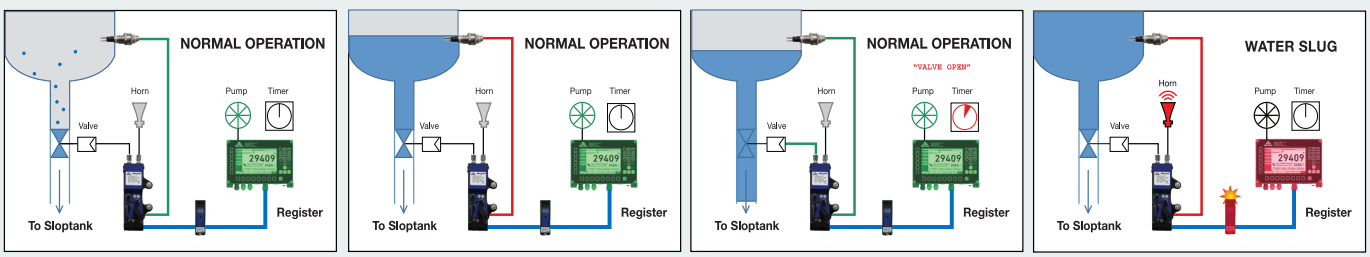
TECHNICAL DATA	
Dimensions:	WxHxD 82x198x33mm
Protection class:	IP 67
NAMUR inputs	4
Solenoid valve outputs	3



PreciBUS
The AH PreciBUS offers the following advantages:
- ATEX approved for Zone 1
- In-line connections and piercing technology with minimum wiring effort, no terminal boxes, no bolting
- The PreciBUS members can be contacted at any position of the bus cable
- Special AH bus cables prevent from reverse polarity
- Power and communication within one cable
- Easily extendable, any bus topology is possible

PreciNODES	
In addition to PreciNODE C I4/O3 the following PreciBUS members are offered:	
Mini I/O Module (1 NAMUR input)	PreciNODE M I1
Mini I/O Module (1 pneum. output)	PreciNODE M O1
Analog Input Module (4-20mA)	PreciNODE M AI4...20mA
Overhead display	PreciNODE ODIS
LED Illumination Module/ Multicolor status indicator	PreciNODE M Lux RGB
2-Axis Inclination Sensor	PreciNODE M Inclino
RFID tag identification	PreciNODE M RFID
Density evaluation	PreciNODE M SI

WATER SLUG DETECTION



ALFONS HAAR MASCHINENBAU GMBH & CO. KG · Fangdieckstrasse 67 · D-22547 Hamburg · TEL +49 40 83391-0 · FAX +49 40 844910
www.alfons-haar.de · sales@alfons-haar.de · shop.alfons-haar.de