

# Hydrogen Recovery

## GENERON<sup>®</sup> Membrane Technology



### Typical Applications

- Methanol production
- Hydro-cracker purge gas
- FCC overhead gas
- CO purification
- H<sub>2</sub>:CO-ratio adjustment in syn gas
- H<sub>2</sub>-PSA purge gas
- Cold box down-stream
- Desulphurization purge gas
- Ammonia purge gas
- Amine production off-gas
- Gas-to-liquid fuel production (Fisher Tropsch)

Hydrogen requirements are growing world wide due to the increased use of hydro-treating and hydro-cracking for cleaner and higher-value fuels as well as demand for chemical products and production of electronics. The processes using and/or generating hydrogen, typically create residual gas streams or by-products that still contain a significant amount of valuable pressurized hydrogen. GENERON<sup>®</sup> membrane modules are applied to economically recover hydrogen from such gas streams with minimal losses of 1 to 10% of your valuable hydrogen. Using GENERON<sup>®</sup> membrane modules in such separations will achieve hydrogen product purities from 90 to 99.9%.

Alternate technologies to recover and purify hydrogen rich gas streams include PSA (pressure swing adsorption) technology. Generon offers HYDROSWING<sup>®</sup> PSA technology to customers that require ultra-pure hydrogen (99.9% to 99.999+%).

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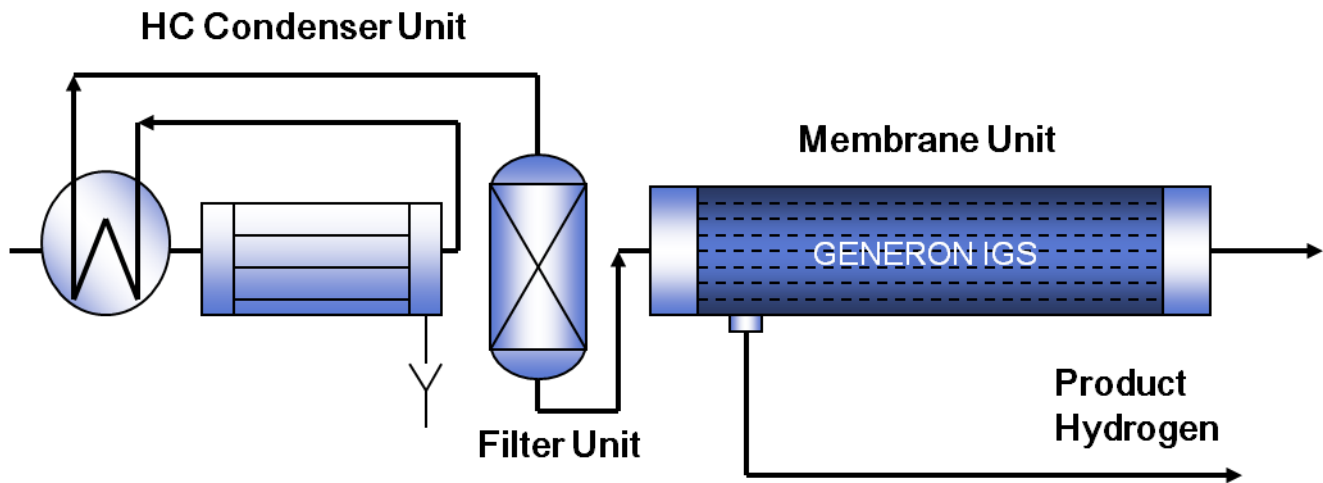
### The GENERON<sup>®</sup> Advantage

- Skid mounted process units are easy to connect and commission
- Built to your specifications and for your convenience
- Engineering support from concept to completion
- Remote control operation
- Operation flexibility with automated part-load



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In a typical GENERON<sup>®</sup> membrane system for hydrogen recovery the feed gas is cooled to remove the higher hydro-carbons that would otherwise condense inside the membrane fibers during the separation process. After subsequent particle and condensate removal steps the feed gas is then heated to an optimum operation temperature and ready to enter the GENERON<sup>®</sup> membrane modules. Hydrogen gas permeates preferred through the membrane walls. The permeated gas is the purified hydrogen product. The “slower” permeating gases are collected in the non-permeate (“retentate”).



### The GENERON<sup>®</sup> Membrane System Performance:

- Feed gas pressures up to 2,000 psi (138 bar)
- 90% to 99% hydrogen recovery
- Lower maintenance cost (no switching valves) compared to H2-PSA
- Hydrogen purities to 99.9%
- Flow rates of 10 to 150,000 SCFM
- Better economics than H2-PSA (lower price + faster deliveries, commissioning and start-up)

When you require ultra-pure hydrogen, i.e. 99.9% to 99.999+%, we will propose our HYDROSWING<sup>®</sup> PSA (pressure swing adsorption) technology.



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Pioneering Gas Solutions from Concept to Completion