

UL2.2 UREA DOSING SYSTEM

AN INNOVATION IN
AFTERTREATMENT
THAT'S ALWAYS ON.



ALWAYS ON



INTRODUCING THE LATEST IN UREA DOSING TECHNOLOGY

The UL2.2 liquid-only dosing system is one of Cummins' newest products that help reduce oxides of nitrogen (NOx) in both low-flow and high-flow Selective Catalytic Reduction (SCR) systems and is backward compatible* to our earlier UL2 model.

FREEZE-ROBUST BY DESIGN

The continual presence of Urea within the unit prevents doser crystallization, making the UL2.2 the sole liquid-only dosing system on the market to offer freeze-robustness with improved reliability. Technological benefits include:

- No power requirement after key-off – providing freeze-robustness
- Compared to other offerings available in the market, offers quicker dosing readiness at key on – avoids priming issue with pump, as no purge is necessary
- Quicker NOx treatment – prevents system damage during intentional or unintentional interruption of power
- High-flow dosing rate capability

ERADICATING UREA CHALLENGES

This innovative system has been designed to withstand and overcome many of the urea obstacles that competitors' systems cannot tolerate during the dosing process. The UL2.2 successfully:

- Uses potted electrical components to prevent infiltration
- Utilizes static-only sealing to avoid urea leakages and short circuits
- Prevents crystallization by continuously keeping urea present within the unit

*Depending on software



HOW HAS THIS SYSTEM EVOLVED?

BUILDING ON THE SUCCESS OF THE UL2

The development of existing technology, and introduction of minimal external and interface change, allows the UL2.2 to be compatible with its UL2 predecessor while offering enhanced and superior product to market:

COST EFFICIENT DESIGN

- State-of-the-art design for measurement precision and lower current-consumption
- Integrated motor-board
- Cooling is done by urea, no coolant lines are required

IMPROVED FUNCTIONALITY

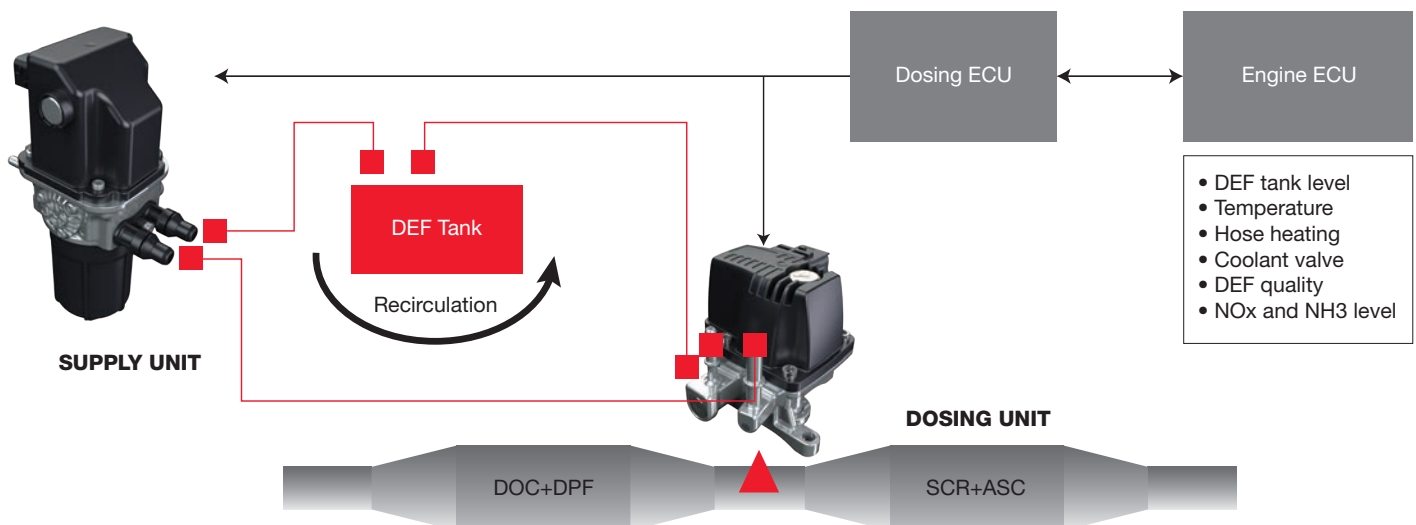
- Electronically controlled pressure relief valve (ePRV)
- Flapper Valve
- Suction side damping for improved line disturbance resistance
- Improved temperature resistance – one piece housing for optimized flow circulation
- New pressure sensor for higher vibration load and temperature resistance

IMPROVED RELIABILITY

- Debris free connectors
- Easier servicing: welded DEF connectors, inlet screen
- Frost concept inside of hydraulic area

RETAINED FEATURES

- Dosing accuracy, spray quality and freeze robustness
- Same shape, connector points and screw on dimensions for compatibility



SUPPLY UNIT SPECIFICATION

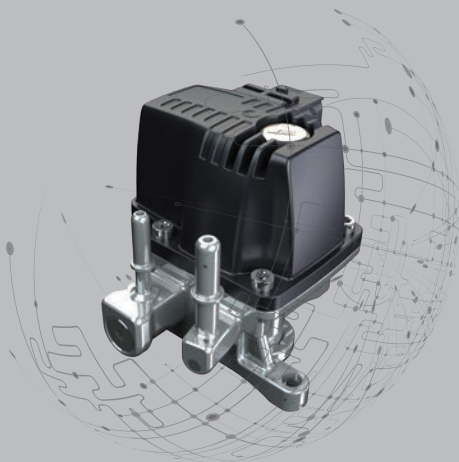
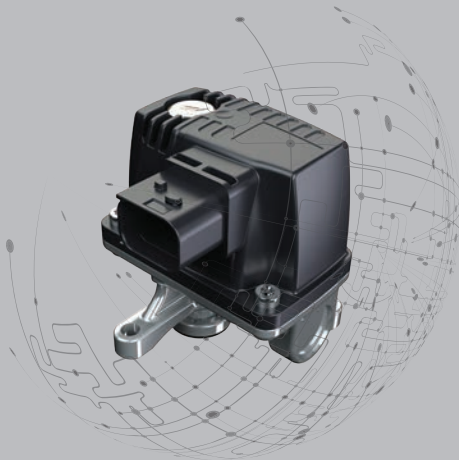
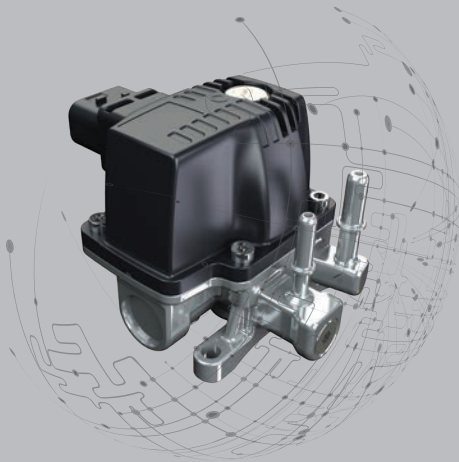


- Liquid only system with similar physical interface and flow capability as UL2
- Capable of meeting high flow dosing rates
- Improved performance, efficiency and reliability
- Flexibility and ease of integration
- Frost resistant components for fast thaw, no power required post key-off and crystallization prevention
- Safe shutdown – no purge necessary
- Increased thermal capabilities:
 - Ambient temperature limits up to ~+105°C
 - Increased frost robustness
- Plug connectors ensure debris-free assembly
- 12V and 24V options

TECHNICAL OVERVIEW

PRV	ePRV
Temperature	-40... +85°C (temporarily up to +105°C)
Pressure Sensor	No
Space (L x B x H)	approximately 233x148.2x93
Installation	2 Screw

DOSER UNIT SPECIFICATION



- Liquid only system with similar physical interface and flow capability as UL2
- Capable of higher vibration for off-highway segment
- Improved performance, efficiency and reliability
- Increased thermal capabilities:
 - Ambient temperature limits up to ~+150°C
 - Increased frost robustness
- Improved inlet screen:
 - Increased inlet screen capacity (80% more than UL2)
 - Improved serviceability (no connector disassembling)
- 12V and 24V Options

TECHNICAL OVERVIEW

Concept	One-piece housing
Temperature	-40... +130°C (temporarily up to +150°C)
Sensor	Yes
Space (L x B x H)	approximately 97x101x99.4
Flow	Depending on nozzle between 5-16kg/hr available. Flow rates can be customized to meet customer requirements.
Installation	3 Leg

*These are the nozzle designs currently available. We also have the ability to design a bespoke nozzle for any customer to achieve any flow rate (within reason).

LEADERS THROUGH EXPERIENCE AND EXPERTISE

Cummins Emissions Solutions (CES) is a global leader in the design, manufacture and integration of exhaust aftertreatment solutions. CES offers individual system components to fully integrated aftertreatment systems that meet ever-higher demands for efficiency, durability and optimized performance levels for on-highway commercial vehicles and off-highway heavy equipment markets.

We leverage our unrivalled technical understanding to offer the right technology and support, committing millions of dollars annually to research and development (R&D) to ensure we are always one step ahead of constantly evolving environmental and industrial regulations.

Our reputation for continually meeting the highest standards combined with a flexible, customer-orientated approach ensures we deliver correct and timely solutions for every project.

CUMMINS DOSING TECHNOLOGY BUSINESS

CES' urea dosing technology offers best-in-class spray capabilities and easy vehicle integration features. Market leading OEMs rely on Cummins' components to meet the most stringent emission regulations, including Euro VI/EPA 2013 On-highway standards and Stage V and Tier 4 Final Off-highway regulations. Our global presence makes us accessible to customers across the world and our broad product portfolio of urea dosing systems offers the best fit to any SCR application, while providing market leading performance.

QUALITY AND VALUE

Engineering and innovation are only as good as a company's ability to manufacture and deliver the highest quality product at the best value.

We have an unrivalled dosing production capacity and capability to build systems in different regions like Mexico, China, Europe, America and India.

This enables economies of scale that others can't match. The proximity of manufacturing centers to our global customers helps to lower transportation costs and ensure timely delivery.



2,400+

employees across
five continents



7

manufacturing facilities
and seven engineering
& commercial centers
worldwide



10+

years of emission
solutions experience

FEATURES OF UL DOSING TECHNOLOGY

FROST ROBUSTNESS

- Quick dosing readiness and NOx treatment
- Prevention of crystallization
- Elimination of power need after engine key-off
- Avoidance of pump priming and purging
- Electrical heating enabling fast thawing even at very low temperatures

FLEXIBILITY AND EASE OF INTEGRATION

- Simplified design
- Fluid recirculation cools injector and counteracts heat soak from exhaust
- Option of controls technology
- No negative effect of DEF within solenoid

PRESSURE SWIRL ATOMIZER

- Small spray droplet size
- Large customized spray angle
(Design variability from 30° to 90°)
- Customized flow rates
- Elimination or reduction of deposits

CONSTANT DEF-COOLING

- Enabled through return flow orifice
- High effective cooling of dosing unit
- Pressure decrease to ambient without energy loss

PRESSURE SENSOR

- Sensor within the dosing unit
- Closed loop pressure control at injection nozzle
- Dosing amount independent from installation position





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