

Delta Solenoid Products

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Thailand Plants

Bangpoo - Automotive Plant

- Established: 1990
- ISO9001, ISO14001, OHSAS18001, TLS8001, QC080000, ISO17025, ISO14064-1, ISO14067 & ISO50001 certified
- Major products: Automotive Electronics
- Floor space 272,550 sq. ft. (25,320 sq. m)



Bangpoo - Power Supply Plant

- Established: 1999
- ISO9001, ISO14001, OHSAS18001, TLS8001, TS16949, TL9000 QC080000, ISO17025, ISO14064-1, ISO14067, ISO50001, ISO27001 certified
- Major products: DC-DC Converters, Telecom Power Systems, and Power Supplies for Consumer, Electronics, Networking, Energy Storage
- Floor space 778,250 sq. ft. (72,300 sq. m)



Wellgrow Plant

- Established: 2001
- ISO9001, ISO14001, OHSAS18001, TLS8001, TS16949, TL9000, **IATF 16949 (2018)**
QC080000, ISO17025, ISO14064-1, ISO14067, ISO50001, ISO27001 certified
- Major products: DC Fans, EMI Filters and Solenoids
- Floor space 376,600 sq. ft. (35,000 sq. m)

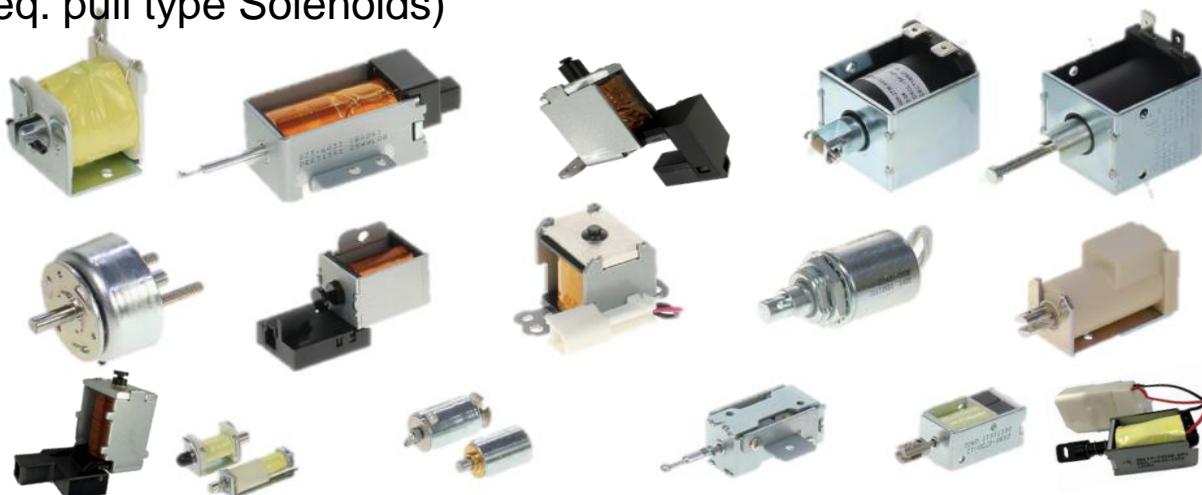
Total floor space 1,427,400 sq. ft. (132,620 sq. m)





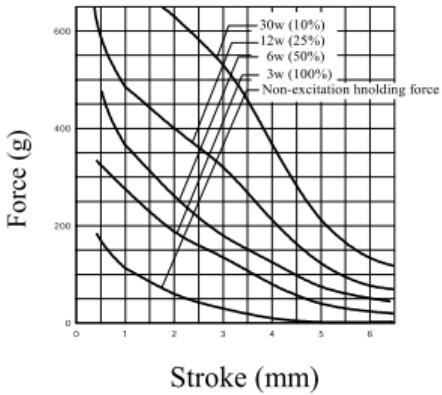
Delta Solenoid Portfolio

- On/Off Solenoids (eq. linear and miniature type Solenoids)
- Shift Solenoids (eq. push type Solenoids)
- Open frame solenoids (eq. D / C / U type frame Solenoids)
- DC latching Solenoids (eq. holding type Solenoids)
- Linear Solenoids (eq. pull type Solenoids)
- Tubular solenoid
- AC type solenoid
- Coil of solenoids

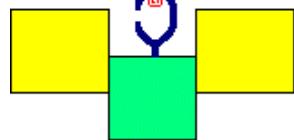
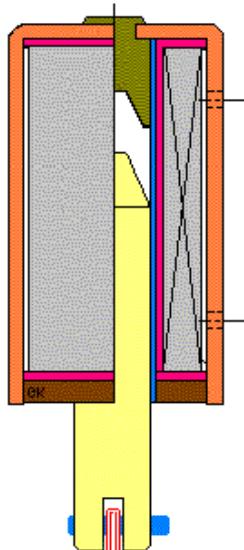
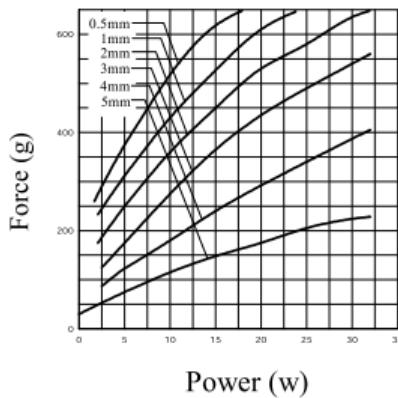




■ Stroke and Force



■ Power and Force



Solenoids Applications

 = USER'S APPLICATION LOAD

An overview of the key function

Application Overview

Open Frame Solenoid



Application

- Vending Machine
- Ice Cube Cabinets (Crusher)
- Gaming Machine
- Cash Drawer Machine
- Electronics Locks

Features

- Wide range of AC or DC input
- Open frame
- Flexible Duty Cycle, Continuous or Intermittent
- Stroke - force Maximization

Automotive Solenoid



Application

- High Beam Assist System
- Transmission
- Key Fob Locks
- Steering Locks
- Electronic stability control (ESC) systems

Features

- Compact open frame type
- TS16949 approval
- 12VDC 8W for 100% duty cycle
- Compliant with Automotive Standard SAE and VDA

Tubular / Rotary Solenoid



Application

- Electronics Safe
- Circuit Breaker
- ATM Machine
- Textile Machine
- Game Machine

Features

- Permanent magnet latching type
- Miniature compact tubular type
- Intermittent duty cycle for power saving
- Compact D-frame / tubular type

Solenoid Pump, Valve and Rotary Pump



Application

- Coffee and Espresso Machines
- Beverage Dispenser
- Water Filtration System
- Steam Machine

Features

- 18 Bar pressure suitable for espresso machine
- 8 Bar pressure max. for filtration system
- Low Operation Noise
- NSF or WRAS Material Available



Market for Solenoids

Solenoid

Strategic Partner

Technology

- High speed actuation endurance
- Actuation noise
- Durability life cycles

Quality

- Application compliance
- Reliability concern
- Harsh environment protection concern
- Design for Automation

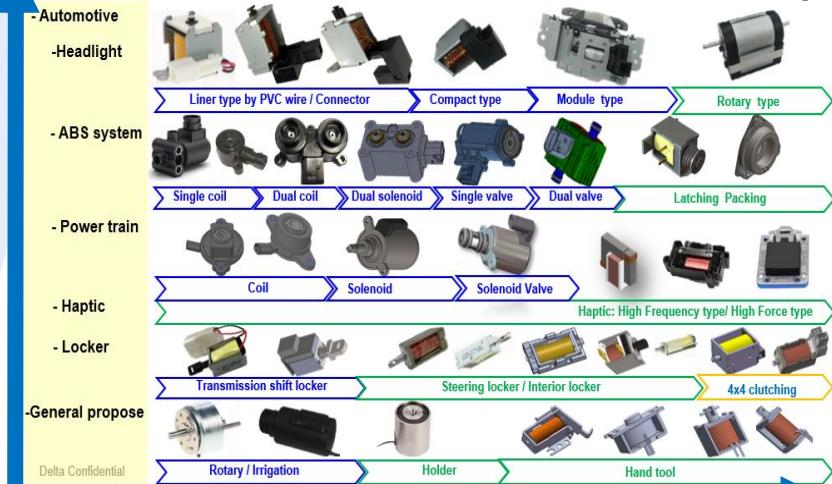
Application

- Headlight
- ABS
- Transmission
- Steering lock
- Interior locker
- 4x4 clutching
- Brake

- Corrosion Resistance Test
- Over molding quality
- Winding quality



Product Roadmap



2019

2021

2023

6



1. Solenoid in vending & ice cube



Features & Benefits

- QS 9000 certification
- 120Vac 60Hz 95VA
- Force 0.9Kg ~3.5Kg
- Stroke 0 ~ 19mm
- Can be design to configure with customer requirement

Typical application

- Vending machine
- Ice cube cabinets
- ATM machine
- Cash drawer machine

Application example:





2. Solenoid for Lawn Care/Sprinkler

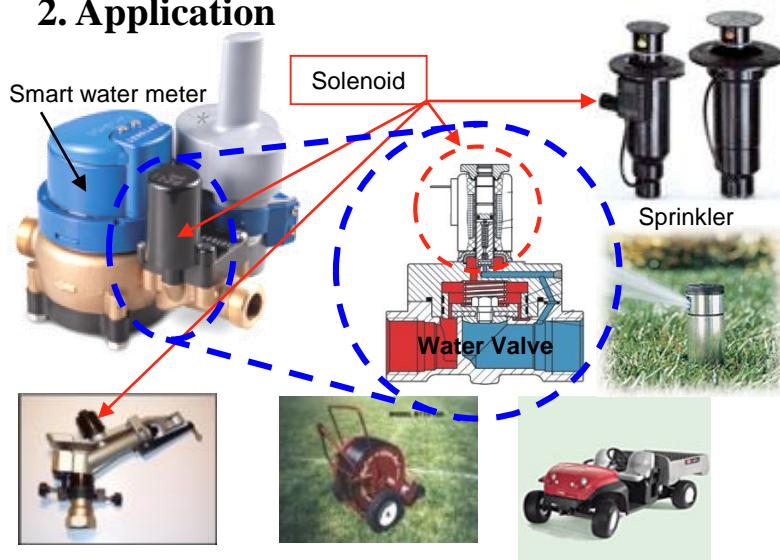
1. Solenoid



P/N

87T-10078 / 87T-12015

2. Application



Features & Benefits

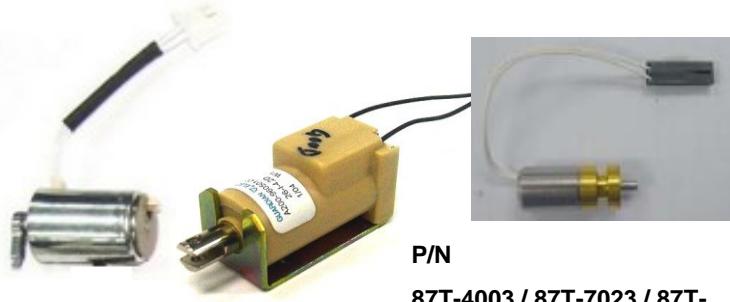
- Min. power 2.9Vdc @ 0.5A
- 0.2 second PWM operated
- Water pressure 175 PSI
- Stroke 0.5mm / 1.2mm
- High Reliability
- Can be design to configure with customer requirement

Typical application

- Smart water meter
- Sprinkler / Irrigation

3. Solenoid for safety box

1. Safety Lock Solenoid



2. Application

: SAFE Electronic Lock



Features & Benefits

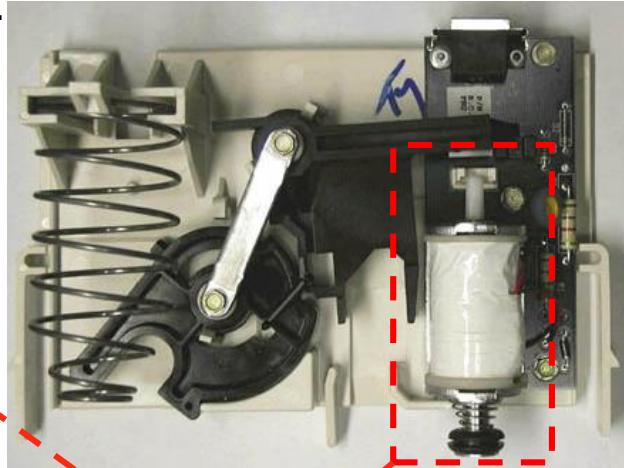
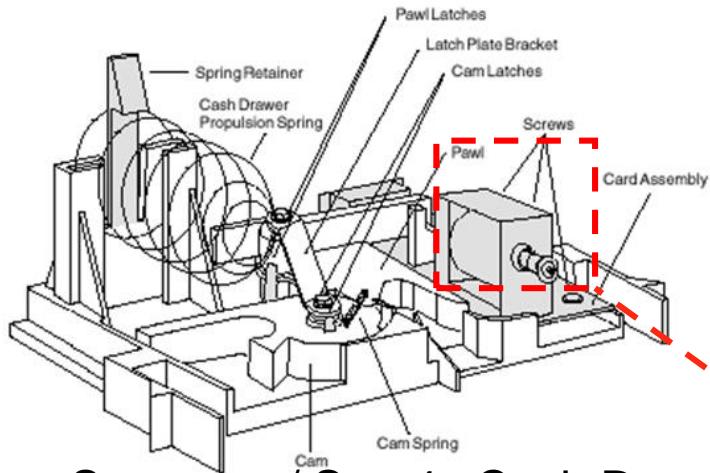
- QS 9000 certification
- Low power 5Vdc – 0.2A
- Stroke 2.7mm
- Force 0.2N ~ 1.2N
- Can be design to configure with customer requirement





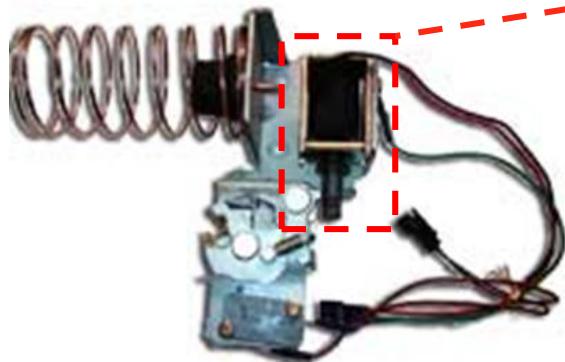
4. Solenoid for cash drawer

IBM pre-2002 solenoid actuator:



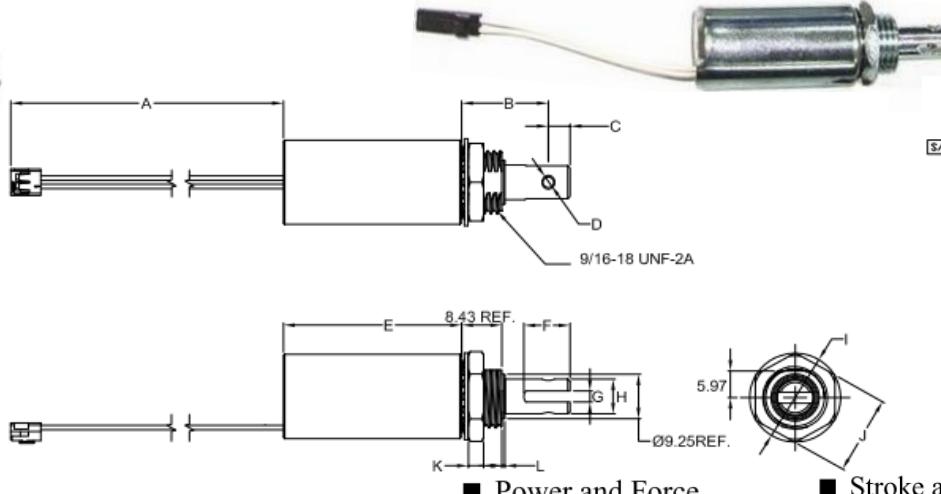
Samsung / Sam4s Cash Drawer Mechanism:

Solenoid





5. Solenoid for ATM industry



UNIT : mm.	
A	= 100 \pm 9.7
B	= 19.05 \pm 0.38
C	= 4.76 \pm 0.25
D	= 2.40 $^{+0.06}_{-0.02}$
E	= 39.37 MAX
F	= 9.52 \pm 0.25
G	= 2.50 \pm 0.30
H	= Ø7.82 \pm 0.08
I	= 19.56 MAX
J	= 17.50 REF.
K	= 3.30 \pm 0.25
L	= 0.66 \pm 0.2

In Solenoid Selection, Delta will provide
Detailed Product Specifications
Performance Curves
Drawings

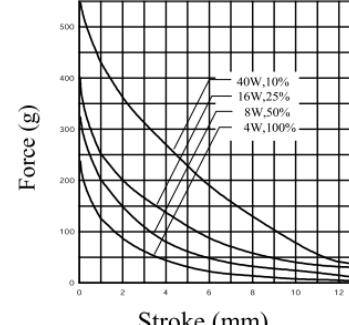
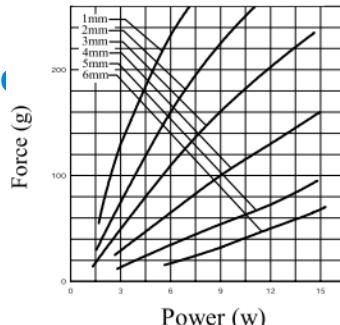
Key features and benefits:

Life from 3 million cycles

Cash Dispensing and Cash Recycling Applications Expertise

Quiet Solenoids for Through-the-Wall ATM's

High Environmental Resistance



6. Solenoid for circuit breaker

1. Circuit Breaker

S



P/N

87T-3171 / DSOS-0416 / 87T-7030

2. Application

Circuit breaker AFCI / GFCI /
CAFCI



Features & Benefits

- QS 9000 certification
- AC120 / 250V
- Stroke 3.6mm
- Force 2 ~ 12oz
- Can be design to configure with customer requirement

7. Rotary solenoid

1. Rotary solenoid



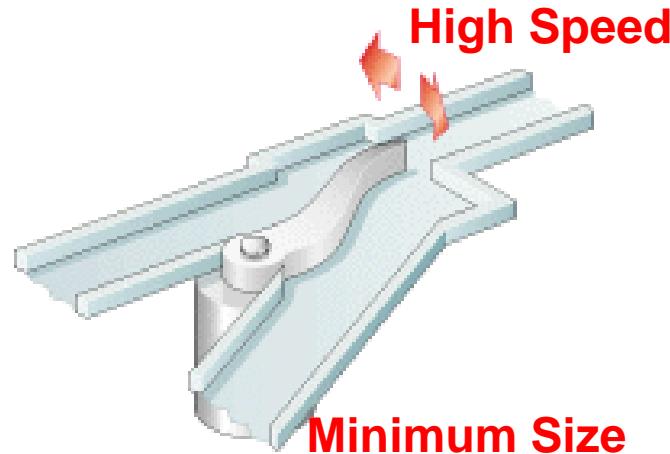
2. Applications:

Textile machinery
Automatic tellers
Ticket machines
Copiers
Game machines

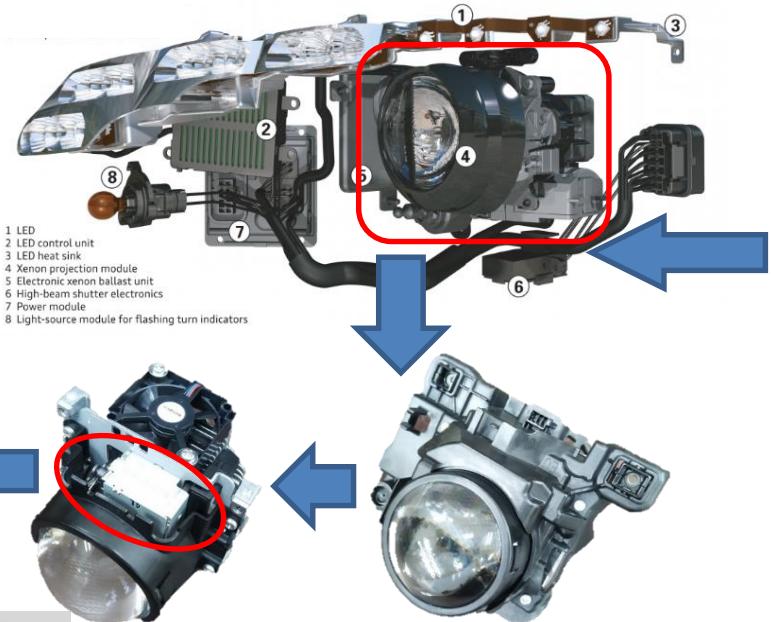


Benefits:

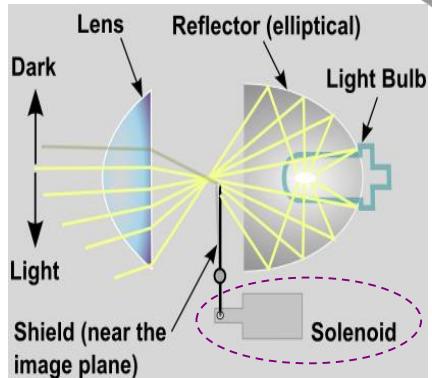
- Rotate $45^\circ \sim 90^\circ$
- High speed
- Minimum size
- Can be design to configure with customer requirement



8. Solenoid on headlight



➤ Function



➤ Category

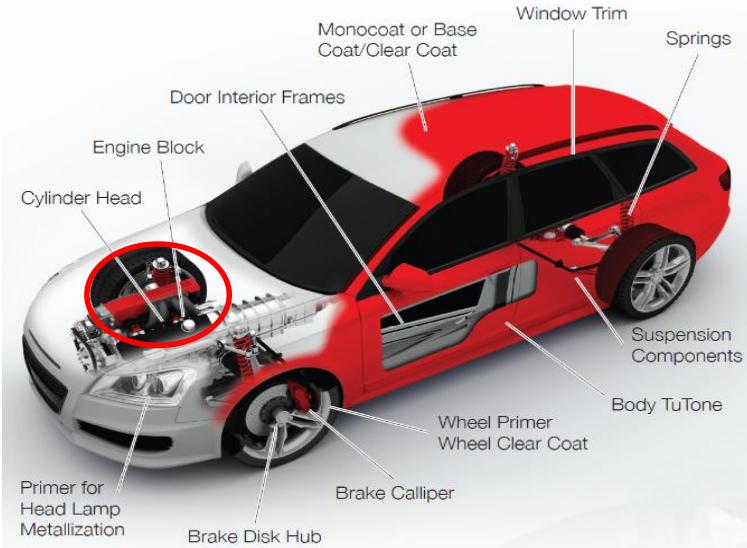


➤ Liner type by PVC wire / Connector

➤ Compact type

➤ Module type

➤ Rotary type



9. Solenoid on shift lock



D08-44



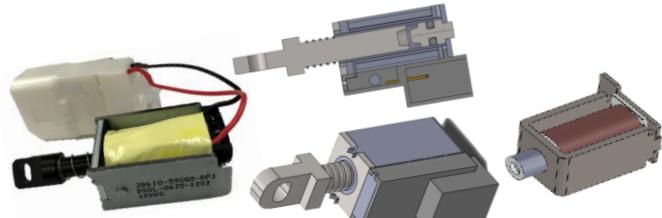
T08-29



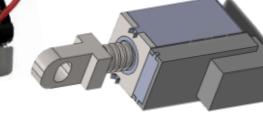
T08-40



T06-38



D06-35



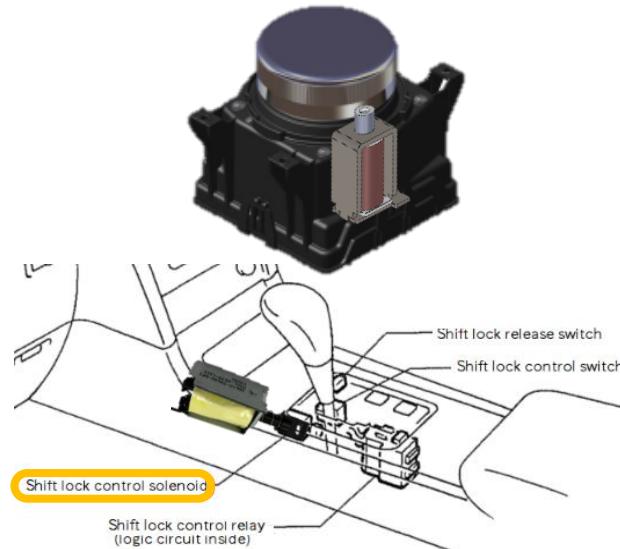
D06-35



D04-35

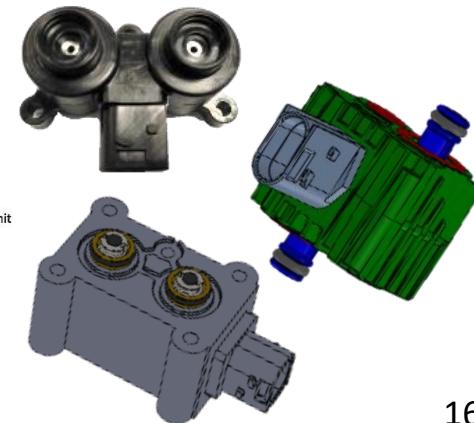
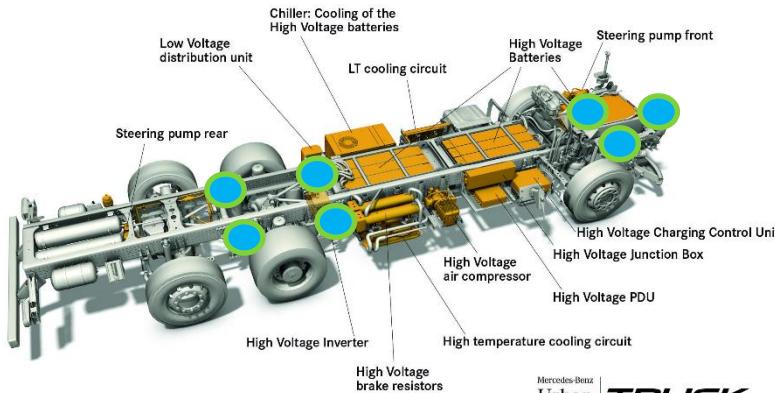
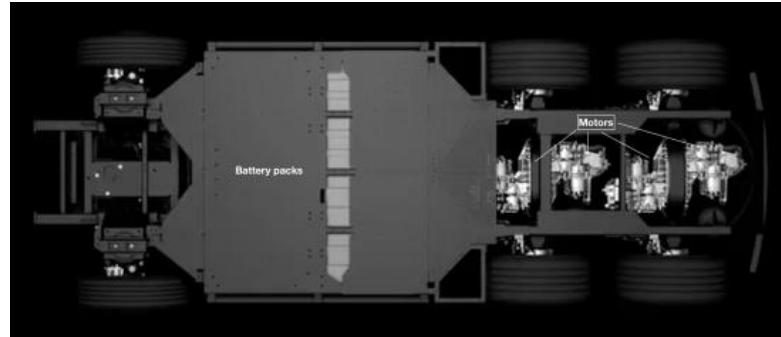
➤ Features

- **Vibration** passed by JIS D 1601 1-B
- **Dust proof** passed by IEC 60529 IP5X
- **Thermal shock** 90~30°C 10 cycles at DC12V
- **Hot loading operation** by DC14V at -30 / 85°C
- **Moisture resistance** by 100% duty cycle at 50°C RH95%
- **Operating noise** lower than 42dBA
- **Life cycles** over than 500K by 12V 1sec. On/Off at 130 °C





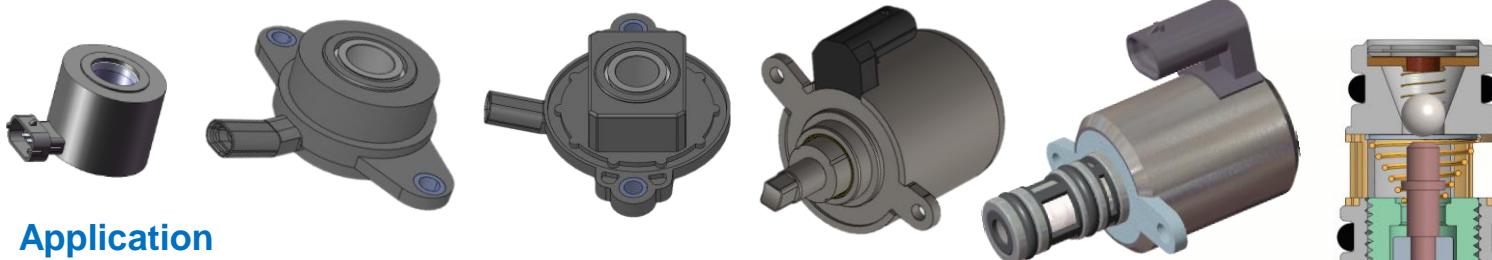
Truck / Electric Truck



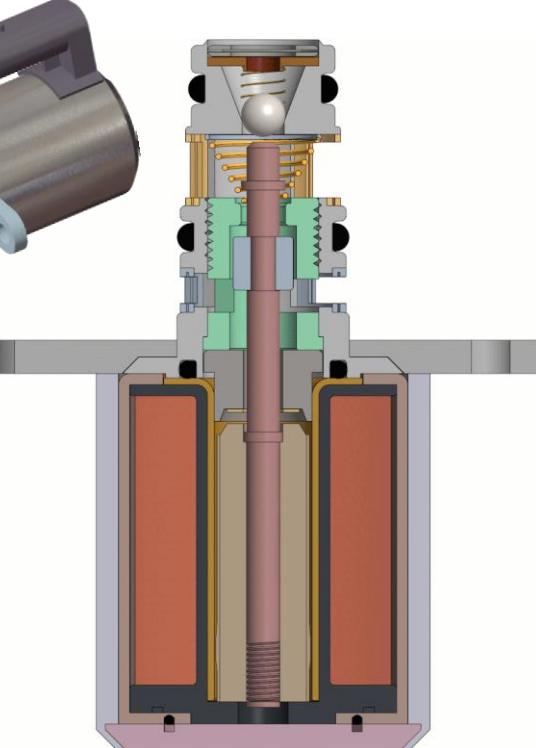
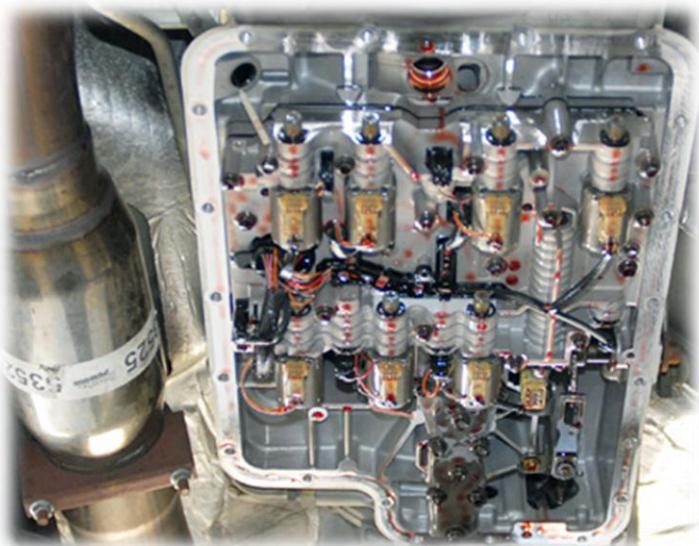


11. Solenoid for vehicle transmission

Coil / Solenoid / Valve



Application



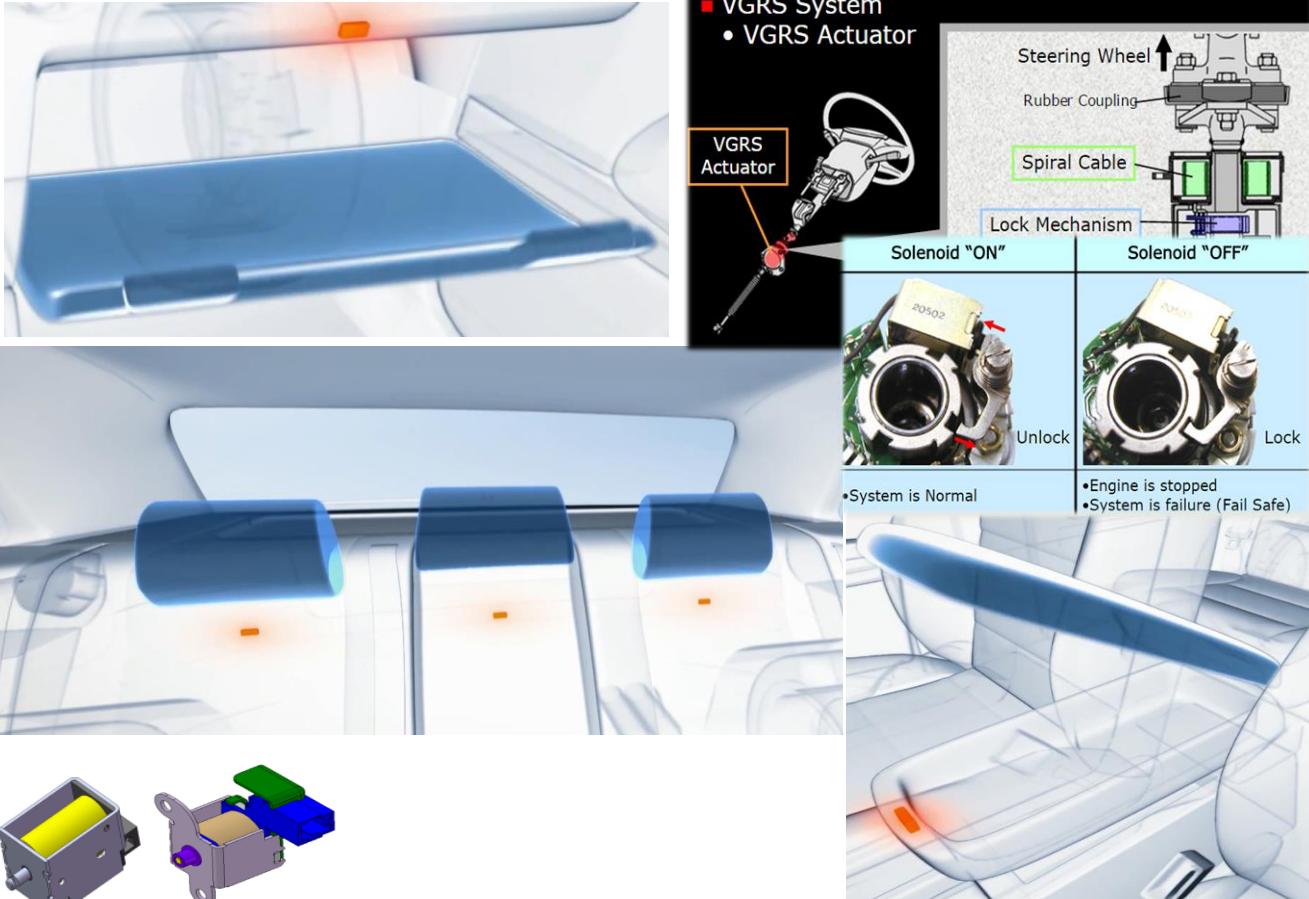
Coil + Plunger + Port = Solenoid Valve

12. Solenoid for vehicle interior locker



Locking system:

- Glove box
- Center Console
- Rear seat remote
- Head- & Backrest
- Steering



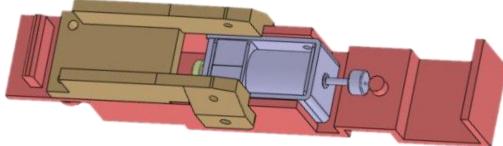


13. Solenoid for E. Power / Packing

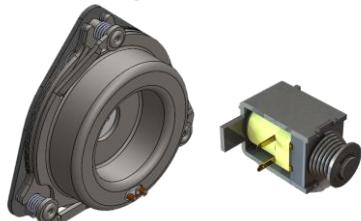
E. Power Charging Station
7.2kW AC Wall box



50kW DC Quick Charger



Packing System
E packing brake



14. Solenoid on Haptic actuator



Infotainment system

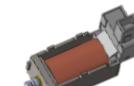
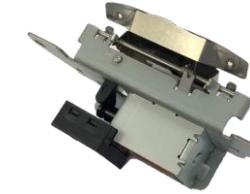
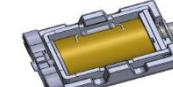


Haptic actuator

Armless system



Product Roadmap – Solenoid

	2020	2023	2025	2028	2030
-Driving	 Headlamp	 Headlamp	 Headlamp	 Headlamp module	 Pneumatic Valve for Driving Adjustment
-Safety	 Shifter locker	 4x4 clutching		 Transmission Hydraulic system	 Speed Control Solenoid Valve
-Controller	 ABS/EBS solenoid	 Steering locker	 Air-compression	 Differential Locking	 Coolant controller
-Comfort	 Interior locker	 Air intake	 Haptic	 Solenoid trunk locker	 Parking brake
	 Ascent holding	 Speed sensor		 Air suspension	

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