

Delta Solenoid Products

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June 30, 2020



Bangpoo - Automotive Plant

- Established: 1990
- ISO9001, ISO14001, OHSAS18001, TLS8001, QC080000, ISO17025, ISO14064-1, ISO14067 & ISO50001 certified
- Major products: Automotive Electronics
- Floor space272,550 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 space778,250 sq. ft. (72,300 sq. m)

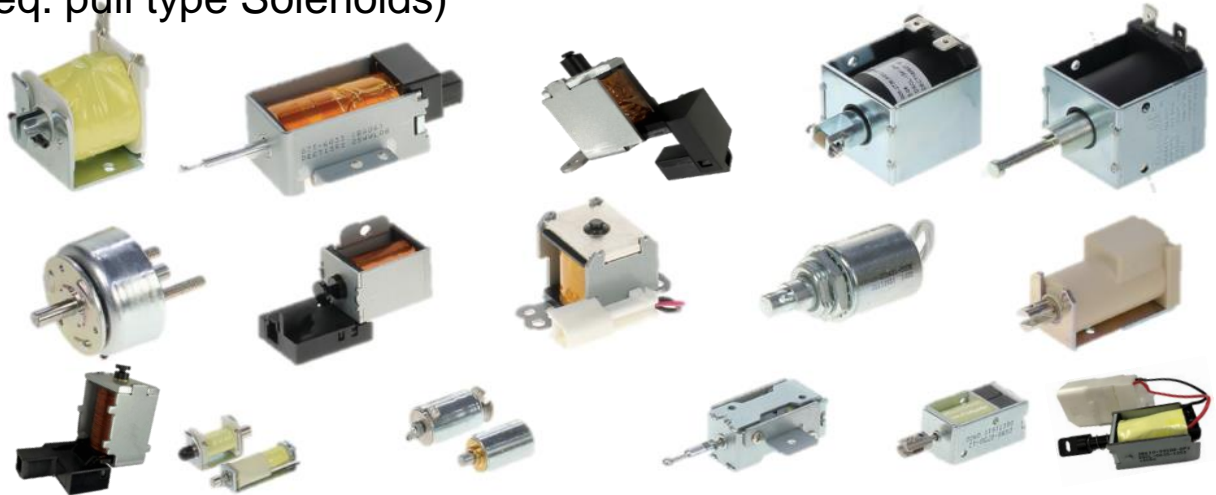
Wellgrow Plant

- 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 space376,600 sq. ft. (35,000 sq. m)
- Total floor space..... 1,427,400 sq. ft. (132,620 sq. m)



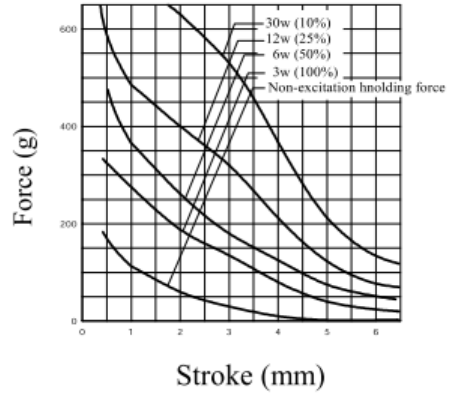
Delta Solenoid Portfolio

- 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

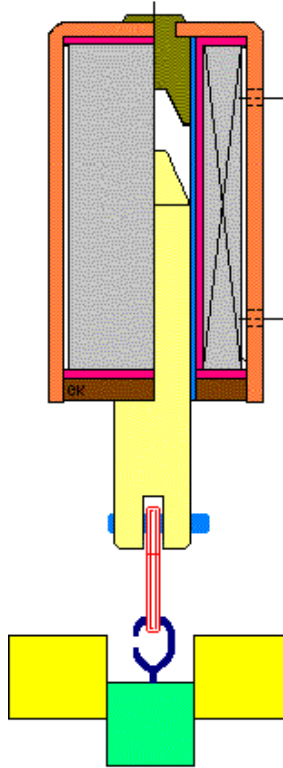
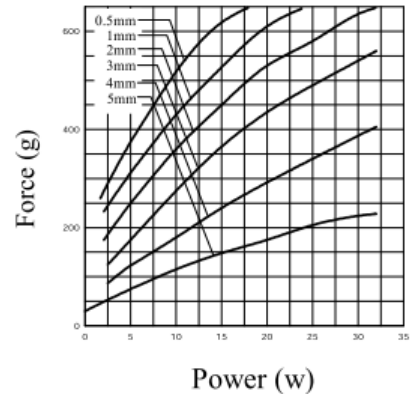




■ Stroke and Force



■ 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 6W 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

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

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

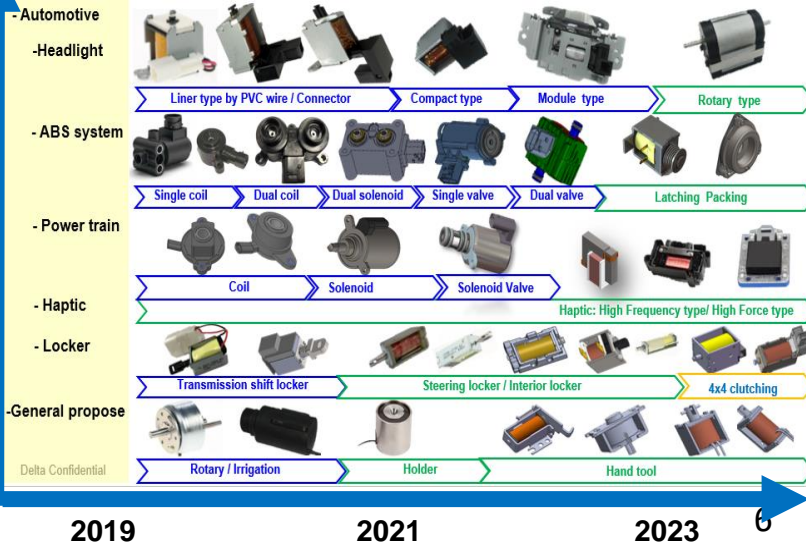
Application

- Headlight
- ABS
- Transmission
- Steering lock
- Interior locker
- 4x4 clutching
- Brake
- Corrosion Resistance Test
- Over molding quality
- Winding quality

Customer Product



Product Roadmap



1. Solenoid in vending & ice cube



P/N

87T-6029B / 87T-12016

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

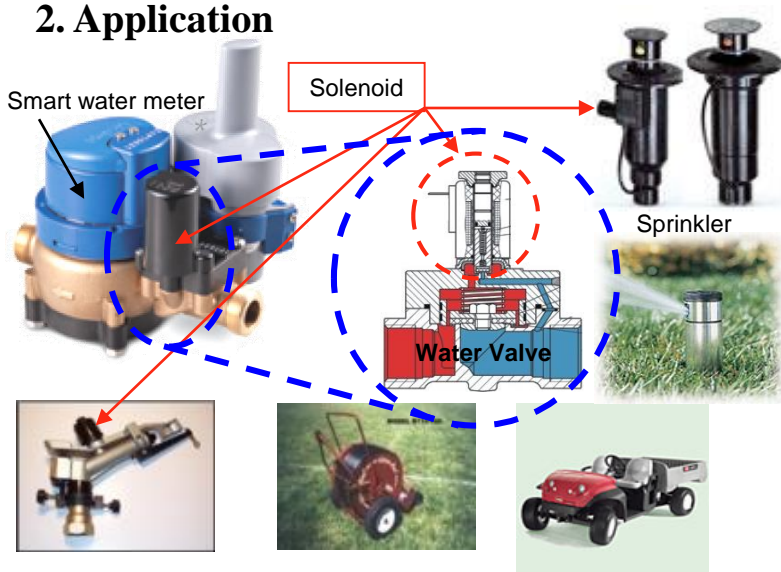
1.Solenoid



P/N

87T-10078 / 87T-12015

2. Application



Features & Benefits

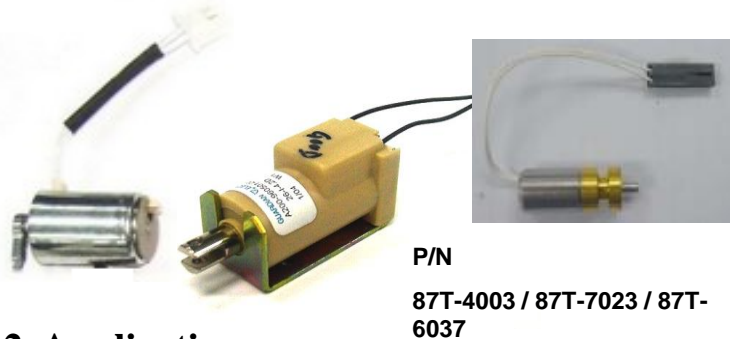
- Min. power 2.9Vdc @ 0.5A
- 0.2 second PWM operated
- Water pressure 175 PSI
- Stroke 0.5mm / 1.2mm
- High Reliability
- Can be design to configure with customer requirement

Typical application

- Smart water meter
- Sprinkler / Irrigation

3. Solenoid for safety box

1. Safety Lock Solenoid



2. Application

: SAFE Electronic Lock



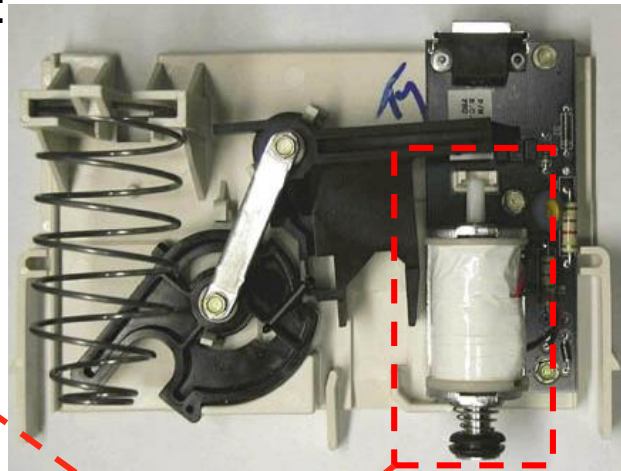
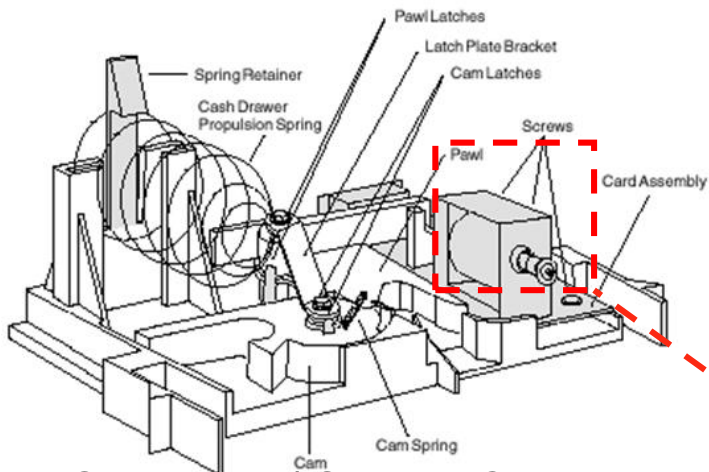
Features & Benefits

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

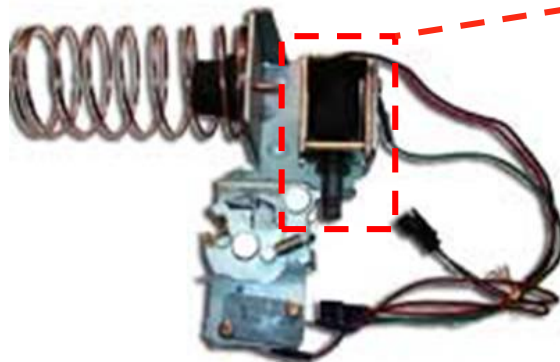


4. Solenoid for cash drawer

IBM pre-2002 solenoid actuator:

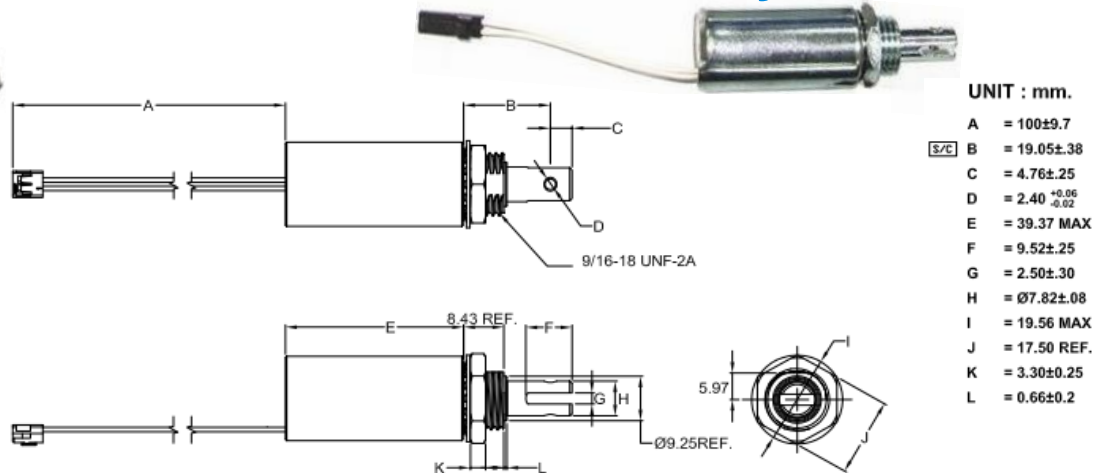
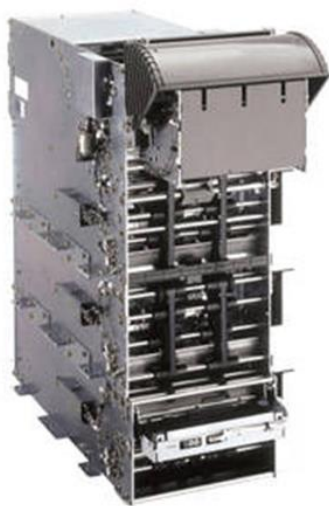


Samsung / Sam4s Cash Drawer Mechanism:

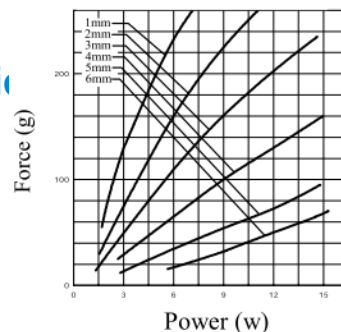


Solenoid

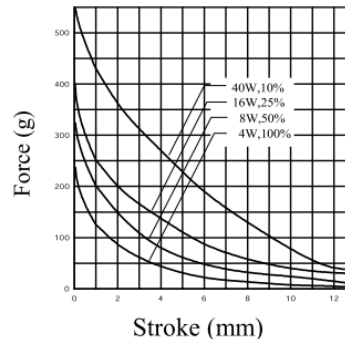
5. Solenoid for ATM industry



■ Power and Force



■ Stroke and Force



**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

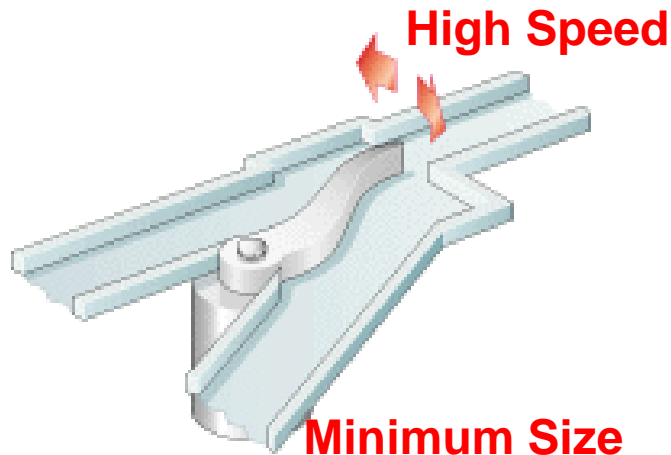


Benefits:

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

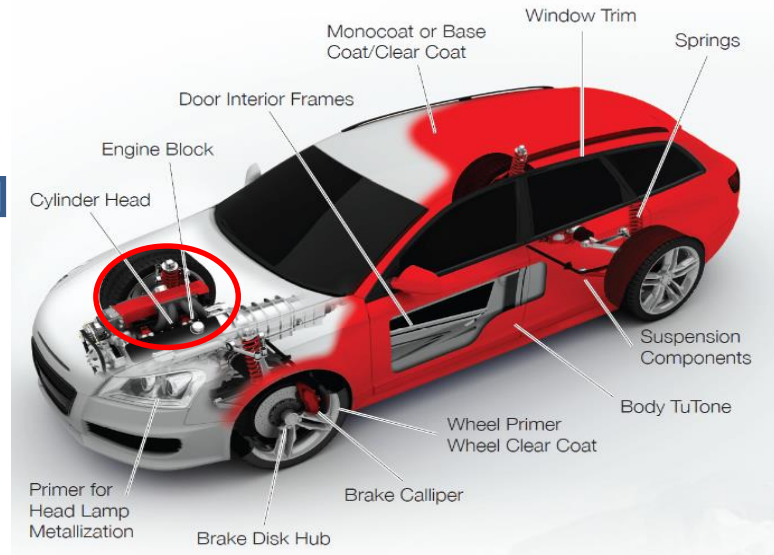
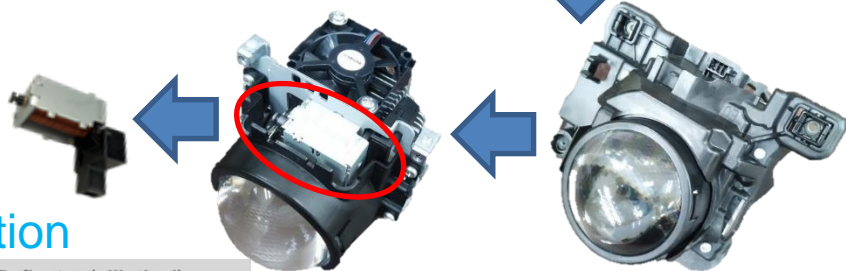
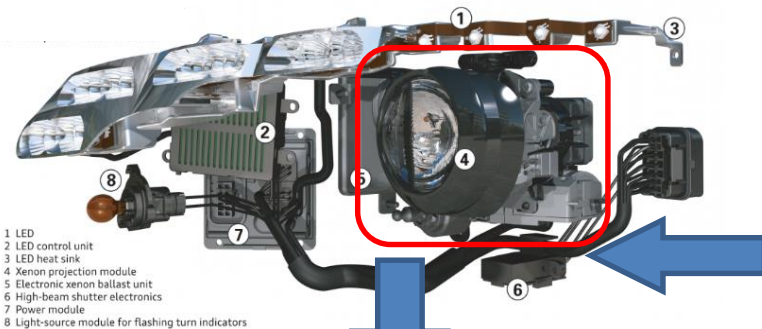
2. Applications:

Textile machinery
Automatic tellers
Ticket machines
Copiers
Game machines

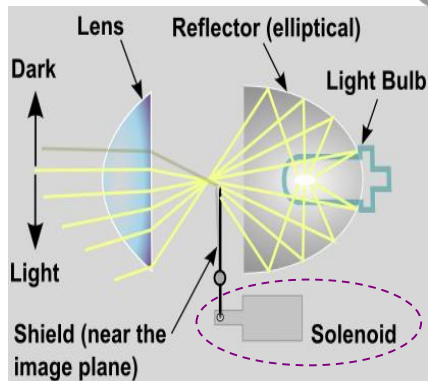




8. Solenoid on headlight



> Function



> Category



Liner type by PVC wire / Connector

Compact type

Module type

Rotary type

9. Solenoid on shift lock



D08-44



T08-29



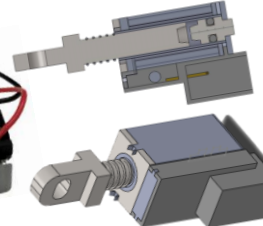
T08-40



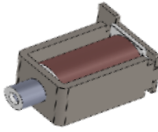
T06-38



D06-35



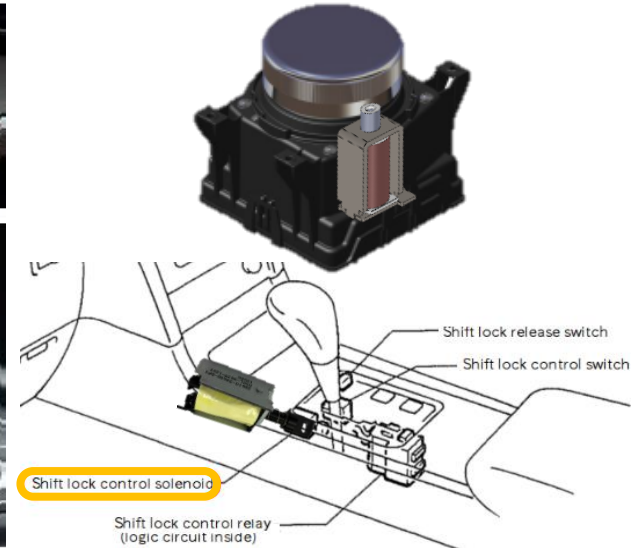
D06-35



D04-35

► Features

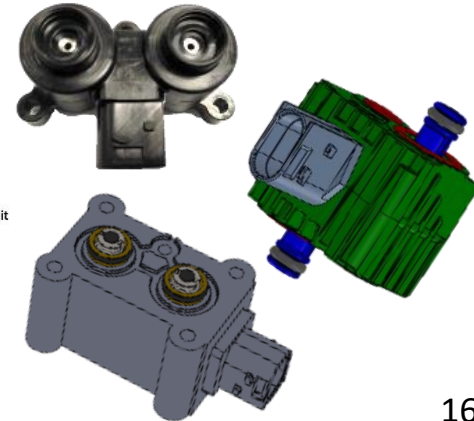
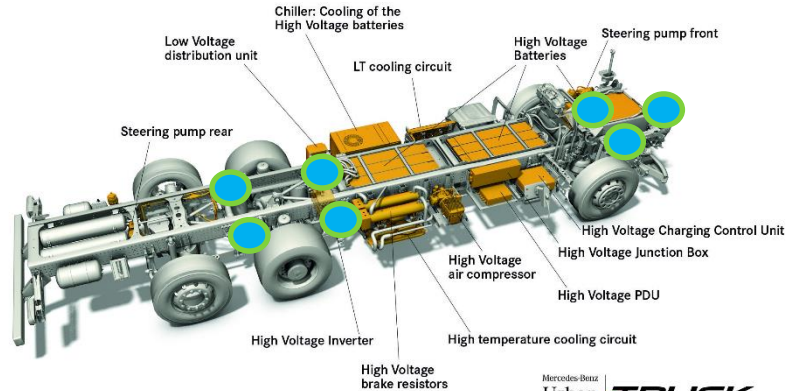
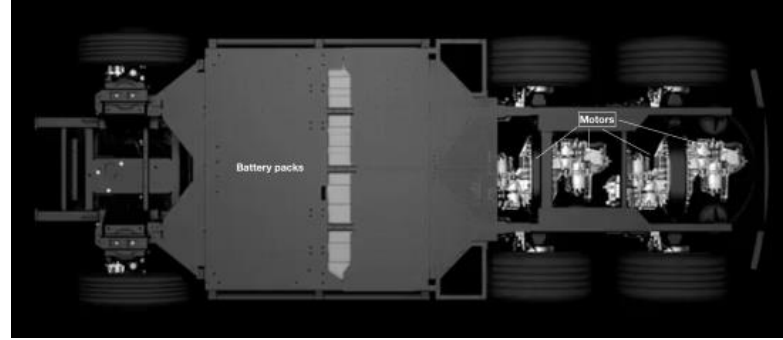
- **Vibration** passed by JIS D 1601 1-B
- **Dust proof** passed by IEC 60529 IP5X
- **Thermal shock** 90~-30°C 10 cycles at DC12V
- **Hot loading operation** by DC14V at -30 / 85°C
- **Moisture resistance** by 100% duty cycle at 50°C RH95%
- **Operating noise** lower than 42dBA
- **Life cycles** over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





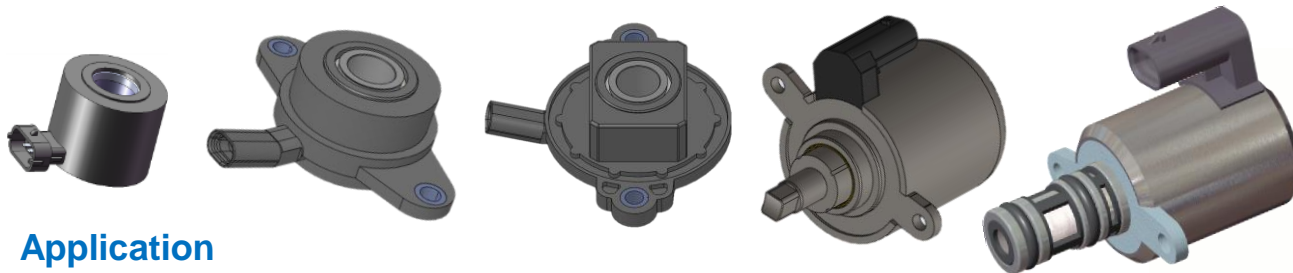
Truck / Electric Truck

10. Solenoid for ABS/EBS/ESP

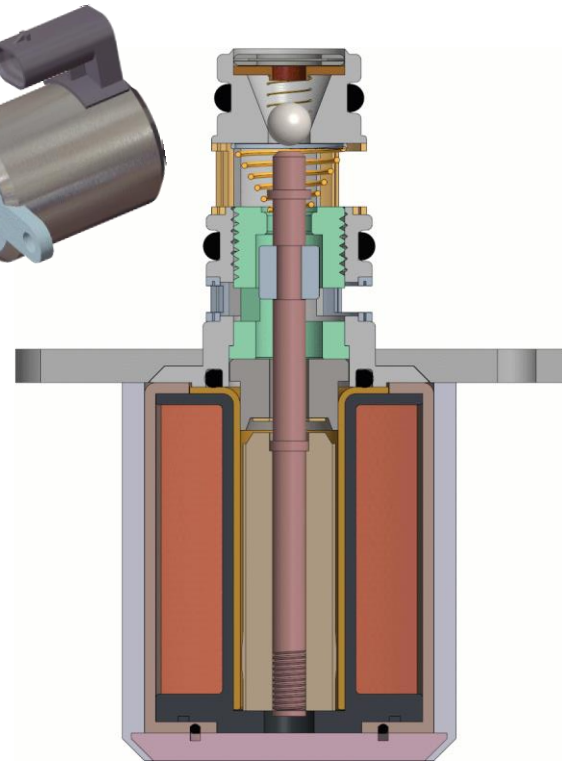
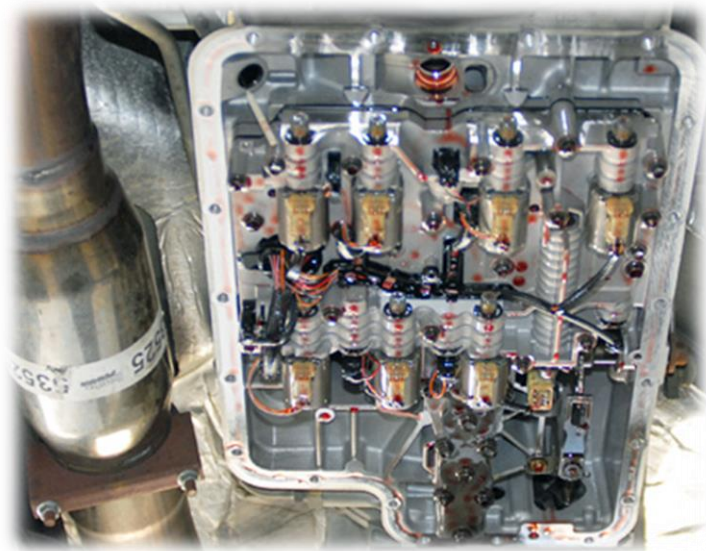


11. Solenoid for vehicle transmission

Coil / Solenoid / Valve



Application



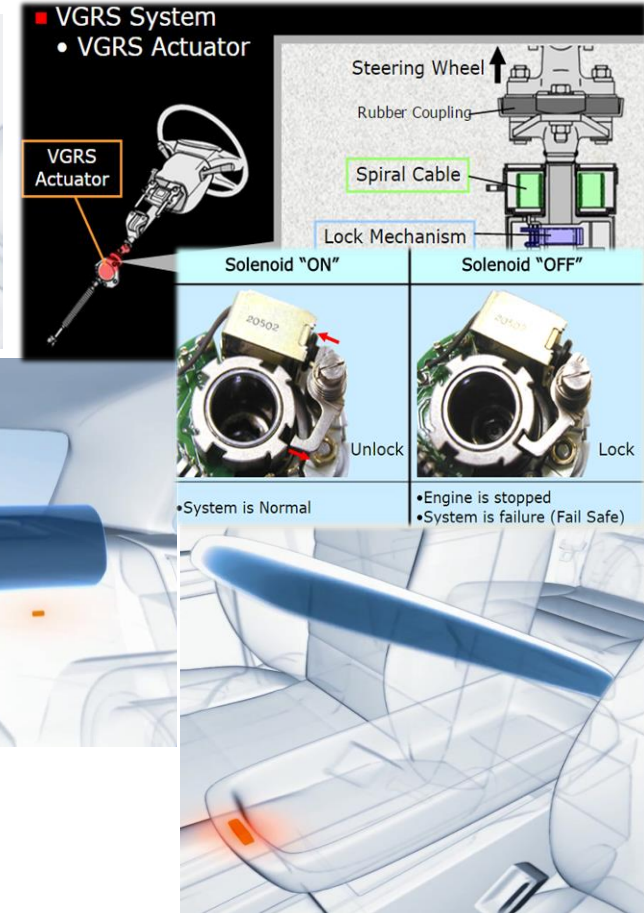
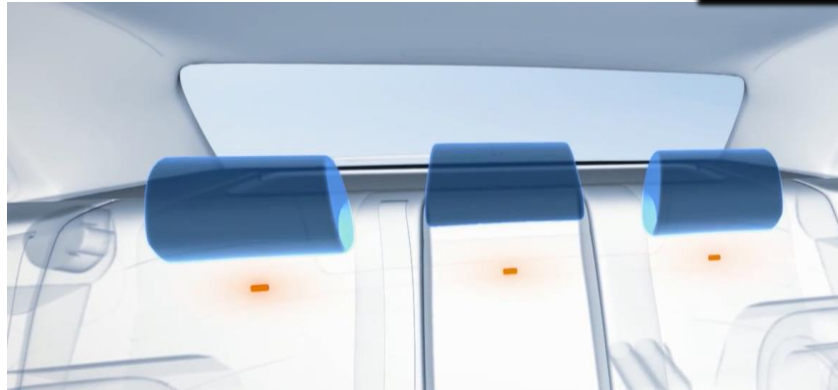
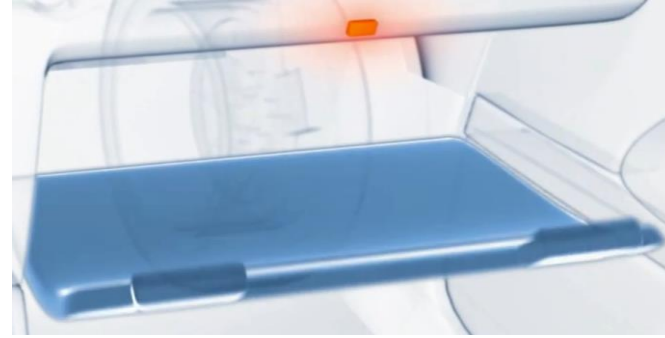
Coil + Plunger + Port = Solenoid Valve

12. Solenoid for vehicle interior locker



Locking system:

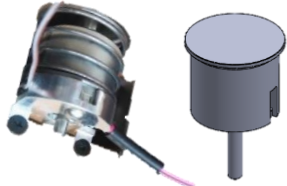
- Glove box
- Center Console
- Rear seat remote
- Head- & Backrest
- Steering



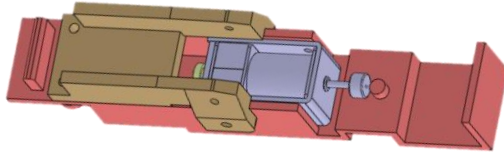


13. Solenoid for E. Power / Packing

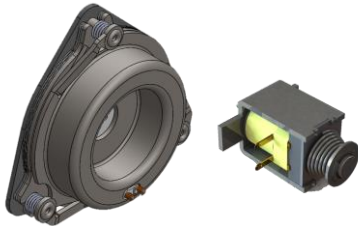
E. Power Charging Station
7.2kW AC Wall box



50kW DC Quick Charger



Packing System
E packing brake



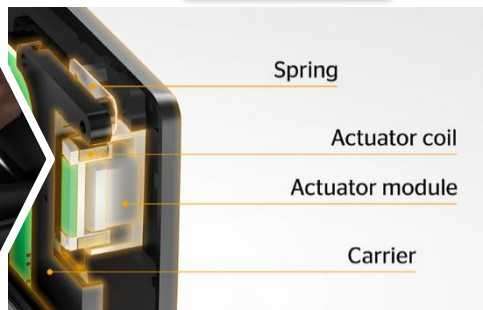
14. Solenoid on Haptic actuator

Infotainment system



Haptic actuator

Armless system



Product Roadmap – Solenoid

2020

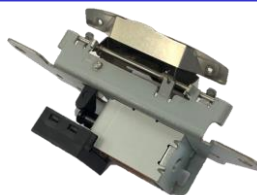
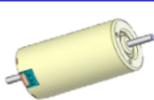
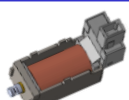
2023

2025

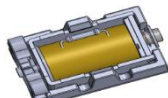
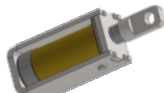
2028

2030

-Driving



-Safety



Headlamp module



Speed Control Solenoid Valve



ABS/EBS solenoid



Steering locker



Air-compression

Transmission Hydraulic system

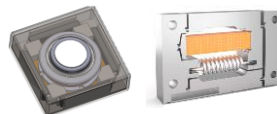
-Controller



Interior locker



Air intake



Haptic



Differential Locking



Coolant controller

-Comfort



Ascent holding



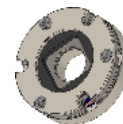
Speed sensor



Solenoid trunk locker



Air suspension



Parking brake

Smarter. Greener. Together.

To learn more about Delta, please visit
www.deltaww.com.

