POWERTOOL COMPONENTS
Vision  Continuously invest in innovative technologies, consolidate / refine business composition, optimize existing product range.

愿景  持续投资创新技术，整合业务组合，优化现有产业。

Mission  Deliver superior quality and long lasting products to the Power Tool Markets at a reasonable price level.

使命  向电动工具客户提供高质素、耐久、以及价格合理的元件。
Introduction

In a challenging and dynamic environment, Defond has grown to be the biggest switch maker in Hong Kong. Since 1978 Defond has become a reputed supplier of components for home appliances and various industrial applications.

Defond possesses the unique combination of electronic, electrical and mechanical expertise. Vertically integrated manufacturing technologies are applied in plastic molding, metal forming and plating, coil winding, through-hole and surface mount electronics assemblies. The company is committed to providing customers with a total solution from the initial design stages through to manufacturing, delivering outstanding product quality, fast turnaround time and competitive pricing.

在一个极具挑战但又充满活力的市场环境下，目前，德丰已成为香港最大的开关制造集团。自1978年始，德丰为市场提供家用电器开关及多种工业配件而享有盛誉。

德丰拥有独特的电子元件、电器与机械上的专业技术，垂直整合制造技术，广泛应用于塑胶模具、金属冲压、电镀、线圈、自动插件及表面贴装电子组装。德丰从专业设计到生产高质量产品，具有最快的周转期和价格优势，忠实地为客户提供全方位解决方案。
<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>First company acquired UL61058 CTDP in Asia Pacific Regions</td>
</tr>
<tr>
<td>2007</td>
<td>ISO 13485 certified</td>
</tr>
<tr>
<td>2005</td>
<td>ISO 14001 certified</td>
</tr>
<tr>
<td>2004</td>
<td>Further expansion in Qingyuan with 11,000 employees; Acquisition of ODE, S.r.l., Italy</td>
</tr>
<tr>
<td>2003</td>
<td>Extension into Professional Power tool brands (both AC &amp; DC, Europe, Japan and US)</td>
</tr>
<tr>
<td>2000</td>
<td>Started second factory in Humen, Dongguan / Acquire Kautt &amp; Bux</td>
</tr>
<tr>
<td>1998</td>
<td>Managing Director (Mr. Wilson Chu) won Young Industrialist Awards of Hong Kong</td>
</tr>
<tr>
<td>1997</td>
<td>First customized microprocessor PCB control; First switch to incorporate SMD; First customized SM board, First DC Variable Switch for DIY Market</td>
</tr>
<tr>
<td>1996</td>
<td>ISO 9000 certified; Start PCBA (printed circuit board assembly) as third product area</td>
</tr>
<tr>
<td>1995</td>
<td>Started EMS (Electronics Manufacturing Service); Major expansion of China facility with 4,000 employees</td>
</tr>
<tr>
<td>1994</td>
<td>Started joint venture with SAIA Burgess</td>
</tr>
<tr>
<td>1990</td>
<td>First earth leakage device, ALCI; Started joint venture with SIBER</td>
</tr>
<tr>
<td>1989</td>
<td>Formed DNA with SEI Inc. in N. America</td>
</tr>
<tr>
<td>1984</td>
<td>Started first factory in Hongmei, Dongguan with 50 employees</td>
</tr>
<tr>
<td>1983</td>
<td>1 million switches per month; 160 employees</td>
</tr>
<tr>
<td>1980</td>
<td>First UL approved switches</td>
</tr>
<tr>
<td>1978</td>
<td>Started with 26 employees</td>
</tr>
</tbody>
</table>
Facilities

**Total Site Area:**
300,000m²

**Production Floor Space:**
150,000m²

**Accreditation:**
- ISO 9001:2008
- ISO 13485:2007
- ISO 14001
- TS 16949
- FDA-registered manufacturing site

**Major Businesses:**
- Power Tools Controls
- Switches
- Automotive Components
- Current Leakage Protectors
- Electro-Mechanical Modules (EMM)
- Electronic Manufacturing Services (EMS)
- Fluid Control Components
- LED Modules

**Stamping Shop:**
- 100 Presses
- High Speed Precision Press
- Multi-Slide Forming Machines
- CNC Integrated Stamping/Welding Station

**Molding Shop:**
- Injection Machines
- Electrical Molding Machine
- Vertical Molding Machine
- Central Material Drying and Feeding System
Tool Shop:
- CNC High Speed Machining Centers
- CNC High Speed Graphite Center
- CNC Wire Cut Machines
- CNC EDM
- CNC Lathes (4-1/2 axis)
- CNC High Precision Optical Profile Grinders
- CNC High precision Surface Grinder
- CNC High Precision Jig Grinder
- CNC Precision Cylindrical Grinder
- CAD/ CAM/ CAD System

Electronics Assembly:
- SMT Lines
- Lead Free Wave Solder Lines
- AOI, X-ray, ICT

Metrology Lab:
- CMM
- X-Ray Scanners
- Optical Measuring Systems
- 1000 x Optical Microscope
- Goniophotometer
- Spectroradiometer
- Digital Hardness Meter (Portable type)

Test Lab:
- Safety Standard Approval Test Lab - UL and DEMKO Certified
- Electrical & Mechanical Test - Endurance Test
- Environmental Test
- Chemical Lab
- EMC Lab (Pre-Compliance)
- Photometric Lab

Assembly:
- Automatic & Manual Lines
General Information

- **Technical data**
  The technical data are referred to basic standard products. Different additional features are available for enhanced or customer’s specific versions.

- **Approvals**
  Defond’s switches are generally tested and approved by international agencies and the relative certification mark is applied on the body. For certificates or file numbers contact our sales department.

- **Ratings**
  Ratings specified in the catalogue are those approved for basic products. Higher ratings are available for specific versions. Most Defond switches conform with the new standards UL61058, IEC61058.

- **Life**
  Switch life depends on operating or testing conditions. The life of the switches exceeds the number of cycles required for agency approvals by a factor of 1.2 to 10. Life tests under practical usage conditions are normally made in agreement with our customers.

- **EMC**
  Electro magnetic compatibility is responsibility of the tool manufacturer. Defond switches and electronic controls are designed to accommodate commonly used suppression devices. For recommendations or support contact us.

- **Materials**
  Switches, accessories and packing are made using environmental friendly materials. Easy to reuse and recycle to ISO 14000.

- **Quality**
  Defond’s Quality System is certified ISO 9001.
Defond is keeping close contact to all major brands in the market and is well aware of the latest requirements against product and environmental safety. We started with RoHS, PFOS, PAHS, REACH (16 substances of very high concern) and are now working on the latest 46 SVHC requirements.

Defond is determined to keep pace with the global trend, be a good global citizen and will continuously following all relative laws and regulations.

We reserve the right to modify switches in accordance with technical improvements. The data specified in the catalogue (e.g. dimensions, photos, drawings) are not binding.

Since all data in this catalogue refer exclusively to the switches supplied by us, the customers themselves are responsible whether our switches are suitable for the individual application.
AC Switches
10
ART-DPY
High current bench top switches

12
ASW
Dust resistance slide switches

13
CGK-BGE-BGY
Large angle grinder switches

16
CGK-mini
Large angle grinder switches

17
BGV-DGV
Overhang trigger style switches

20
DGU-SRC
Trigger switches on/off

22
CGE-CGN
Trigger switches on/off “Euro shape”

25
DPX-FPB
Push button switches

27
CGQ
Trigger switches with variable speed US style

29
DGQ
Trigger switches with variable speed Euro style
**ART-DPY** High current bench top switches

**ART**

High current bench-top tools. It is widely used in US style of tools where in Europe relay switches like DPY are more common. The built-in removable lock button is a safety feature to make sure the tools will not be activated unauthorized or by accident. Defond can offer a range of customized printings and colours to match different requirements.

**Features**
- High make and break current
- Safety lock
- Standard and customized colours and printings
- Designed for customized actuators
- Dust protected

**DPY** is a flush mount coil actuated switch designed for use in stationary or bench-top tools. It is designed to meet the dust spreading and oil splashing conditions common with those applications.

**Features**
- Double pole double break contacts for increased reliability
- Additional terminal (optional) for connecting a remote switch or a safety device such as thermal overload protector
- Switches off in case of power failure
- Coil Voltage/frequency options!

**Options**
Mounting front plate with holes for screw fixation. Black cover plate apart from standard yellow colour. Alternative mounting brackets.

<table>
<thead>
<tr>
<th>Models</th>
<th>Configuration</th>
<th>Approvals</th>
</tr>
</thead>
<tbody>
<tr>
<td>ART</td>
<td>SPST/SPDT/DPST/DPDT</td>
<td>20A 125-277Vac, 1HP 250Vac; 2A 125Vac, 2HP 250Vac; 2A 125Vac, 2HP 250Vac</td>
</tr>
<tr>
<td>DPY</td>
<td>DPST</td>
<td>6(4)A/10(8)A/10(10)A 250Vac 564185155 or 155</td>
</tr>
</tbody>
</table>

**Customized Version**
**ASW** Dust resistance slide switches

**ASW** is a high rated on/off slide switch. It is based on a long time proven spring clip design with positive snap action switching. It is designed for soldering on a printed circuit board. The high rating and long life make it suitable as line voltage switch for medium range tools.

**Features**
- Compact size, interchangeable with similar type switches
- Solder legs for direct PCB mounting
- Dust proof

<table>
<thead>
<tr>
<th>Models</th>
<th>Configuration</th>
<th>Approvals</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASW</td>
<td>SPST</td>
<td>8R(8A) 125Vac,5E4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8(8A) 125Vac,5E4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4(4A) 250Vac,5E4</td>
</tr>
</tbody>
</table>

Circuit Schematic
CGK-BGE-BGY Large angle grinder switches

CGK series are high rated switches for heavy duty applications like large angle grinders, or other tools frequently used under rough environmental conditions. CGK features a unique patented cascade snap action system maintaining high contact pressure, preventing contact teasing or chattering. It is available in several sizes and with several wiring options and trigger configurations, including bi-stable versions.

**Features**
- Dust tight design for rough environmental conditions
- Patented double snap action contacts for long trouble free operation
- High rating, up to 12/12A 250 VAC
- Lock-on, lock-off, or no lock options
- Optional suppression capacitor
- Interchangeable with most common sizes and type on the market
- Standard and customized Trigger Options

**BGE** is a simple robust double pole switch designed for use in traditional large angle grinders. The high rating covers all common applications. It features the mechanical lock on and lock off functions. Trigger and lock functions are integrated in the front plate and can be customized to requirements. The switch itself is standardized to a high degree for cost efficiency.

**Features**
- Reliable robust design
- High degree of standardization keeps cost down
- High rating
- Insensitive dust

**BGY** series have NVR (No-Voltage Release) function for new Europe regulation of Power Tools. The switches are high rated for heavy duty applications such as LAG (Large Angle Grinder), Polisher. BGY features full integrated electronics for most functions commonly used in high-end large angle grinders combined with a snap-on design preventing contact teasing.

**Features**
- Restart protection to cut off tools when the power supply is interrupted
- Intergraded E-switch
- Soft start
- Overload protection
- Snap On design to perform Anti-tease function (Patented)
- Well protected against dust

<table>
<thead>
<tr>
<th>Models</th>
<th>Configuration</th>
<th>UL Approvals</th>
</tr>
</thead>
<tbody>
<tr>
<td>CGK</td>
<td>DPST</td>
<td>12(12)A 250Vac, 5E4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>12(12)A 250Vac, 5E4</td>
</tr>
<tr>
<td>BGE</td>
<td>DPST</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>12(12)A 250Vac, 5E4</td>
</tr>
<tr>
<td>BGY</td>
<td>E-switch</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Customized switch and module combination
**CGK-mini** Large angle grinder switches

**CGK-mini** series are a smaller version of the standard CGK high rated switches for heavy duty applications like 2Kg or 5Kg hammers, demolition hammers or other tools frequently used under rough environmental conditions but with limited space where the standard CGK cannot be used.

CGK features a unique patented cascade snap action system maintaining high contact pressure, preventing contact teasing or chattering.

It is available in several sizes and with several wiring options and trigger configurations. Including bi-stable versions.

**Features**
- Dust tight design for rough environmental conditions
- Patented double snap action contacts for long trouble free operation
- High rating, up to 12(12)A 250 VAC
- Lock on or no lock button option
- Optional suppression capacitor
- Interchangeable with most common sizes and type on the market
- Standard and customized Trigger Options

**Models and Configurations**

<table>
<thead>
<tr>
<th>Model Type</th>
<th>Configuration</th>
<th>Approvals</th>
</tr>
</thead>
<tbody>
<tr>
<td>CGK-mini</td>
<td>DPST</td>
<td></td>
</tr>
<tr>
<td></td>
<td>16(16)A 125Vac, 5E4</td>
<td>10(10)A 250Vac, 5E4</td>
</tr>
<tr>
<td></td>
<td>16(16)A 125Vac 5E4</td>
<td>16(16)A 125Vac 5E4</td>
</tr>
</tbody>
</table>

**Customized Version**

- Push button
- Trigger with lock on button

**Approvals**

- UL
- CE
BGV-DGV Overhang trigger style switches

**BGV**

BGV and DGV are overhang trigger switches commonly used in high rated bench top and handheld electrical tools. In most applications they are interchangeable with each other and with current models on the market. Triggers are common on both DGV and BGV. BGV has its electrical connection at the bottom side of the switch housing, DGV at the ends for increased wiring options in confined spaces.

**Features**

**BGV**
- Double pole single throw or single pole double throw with brake
- Fail-safe
- Lock on, safety lock, no lock button option
- Labyrinth sealed housing for increased dust protection

**DGV**
- Double pole single throw or single pole double throw with brake
- Lock on, safety lock, no lock button option
- Selection of screw terminal and tab terminal
- Fail-safe
- Double break for increased safety

### Models Configuration

<table>
<thead>
<tr>
<th>Models</th>
<th>Configuration</th>
<th>UL Approvals</th>
<th>CEC Approvals</th>
</tr>
</thead>
<tbody>
<tr>
<td>BGV</td>
<td>DPST/3PDT</td>
<td>15R(15)A 125Vac, 5E4 15RA 125Vdc, 5E4 22R(22)A 125Vdc, 5E4</td>
<td>12.5(12.5)A 250Vac, 5E4 22(22)A 125Vdc, 5E4</td>
</tr>
<tr>
<td>DGV</td>
<td>DPST/3PDT</td>
<td>10R(10)A – 15R(15)A 125Vac, 5E4 10RA – 15RA 125Vdc, 5E4</td>
<td>10(10)A – 12.5(12.5)A 250Vac, 5E4 (OPST) 22(22)A 125Vdc, 5E4</td>
</tr>
</tbody>
</table>

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**AC Switches**
BGV

AC Switches

DC Switches

Standard Electronic Controls

Circuit Schematic

Trigger Options

Lock Button Options
DGU-SRC are traditional US style switches that have been applied and are still used in a wide variety of handheld tools. A wide selection of triggers, lock on buttons or safety locks assure proper choice for all existing or new applications. The high ratings make it ideally for heavy duty use such as circular saws, miter saws, routers or chain saws. Switches are standard with push-in terminals but also with screw terminals to meet global requirements.

**Features**
- Single pole single throw
- Screw terminals
- Optional capacitor terminals
- Lock on, safety lock, no lock button

**SRC** is a design based on the long time proven SR series. The SRC lines offer a wide scope of trigger, lock button and wiring options to meet all regular customer demand with decades of proven performance. It features some redesign allowing use of newer and more cost efficient materials as well as improved manufacturing technologies. This makes it in particular a cost efficient concept at applications requiring high ratings.

Within the scope of the redesign improvements have been made on protection against dust ingress and trigger feeling. All trigger and lock button styles available on SR series can be used on SRC as well.

**Features**
- Various terminal options: screws, push-in and spade terminals in any practical combination for ease of wiring
- Lock on, safety lock, no lock button or dummy lock button (for mounting purposes)
- Double break contact system rated up to 10 Amps
- Wide selection of standardized and customized switches
- Insensitive to dust

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<table>
<thead>
<tr>
<th>Models</th>
<th>Configuration</th>
<th>Approvals</th>
</tr>
</thead>
<tbody>
<tr>
<td>DGU</td>
<td>SPST</td>
<td>11/6.5A 125/250Vac, 8(8)A 250Vac, SE4, 11(11)/13(13)/15(15)/19A 125/250Vac, SE4, T85</td>
</tr>
</tbody>
</table>

---

**Circuit Schematic**
**AC Switches**

**DC Switches**

**Standard Electronic Controls**

---

**DGU**

**Trigger Options**

- A
  - 41.58
  - 15.04
  - 11.1
  - 8.48
  - **LOCK OFF**

**Lock Button Options**

- 10.71
- 6.5

---

**SRC**

**Circuit Schematic**

**Trigger Options**

- A
  - B
  - C
  - D

**Lock Button Options**

- A
  - B

**Housing Options**

- A11
  - B12
  - C1B
  - D14
  - E50
  - F16
  - G71

---
CGE is an Euro shaped switch designed for extreme conditions and dusty environments. It is available with the most common standard triggers and lock button styles, customized triggers on request.

Features
- Lock on, safety lock, no lock button or dummy lock button (for mounting purposes)
- Extremely long switch life, mechanical and electrical. Insensitive to dust
- Single pole and double pole versions
- Screw terminals
- Dust proof

CGN is an in-line trigger switch in Euro shape and interchangeable with most similar switches in use. It features a unique patented spring system which makes the switch unteasible and not sensitive to arcing and fast contact wear. Contact pressure at both opening and closing is held to its maximum force until switching.

This makes CGN in particular suitable for high current applications, AC and DC, in critical or potentially dangerous tools like saws.

Features
- Dust prove
- Unique contact system makes it not sensitive for tease and arcing
- Extremely long switch life both mechanical and electrical
- Lock on, lock off, no lock button version
- Screw terminals
- Single and double pole versions

<table>
<thead>
<tr>
<th>Models</th>
<th>Configuration</th>
<th>Approvals</th>
</tr>
</thead>
<tbody>
<tr>
<td>CGE</td>
<td>DPST</td>
<td>6(6)A 125Vac, 5E4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CGN</td>
<td>DPST/SPST</td>
<td>15.1A 125Vac, 5E4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Trigger Options**

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Trigger Option A" /></td>
<td><img src="image2" alt="Trigger Option B" /></td>
<td><img src="image3" alt="Trigger Option C" /></td>
<td><img src="image4" alt="Trigger Option D" /></td>
<td><img src="image5" alt="Trigger Option E" /></td>
<td><img src="image6" alt="Trigger Option F" /></td>
</tr>
</tbody>
</table>

**Lock Button Options**

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image7" alt="Lock Button Option A" /></td>
<td><img src="image8" alt="Lock Button Option B" /></td>
<td><img src="image9" alt="Lock Button Option C" /></td>
<td><img src="image10" alt="Lock Button Option D" /></td>
<td><img src="image11" alt="Lock Button Option E" /></td>
<td><img src="image12" alt="Lock Button Option F" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image13" alt="Lock Button Option G" /></td>
<td><img src="image14" alt="Lock Button Option H" /></td>
<td><img src="image15" alt="Lock Button Option I" /></td>
<td><img src="image16" alt="Lock Button Option J" /></td>
</tr>
</tbody>
</table>
DPX is a push button switch commonly used in small angle grinders (SAG) or other power tools where insensitivity to dust in combination with high reliability, high current draw and long life are a requirement.

**Features**
- Single and double pole versions available for DPX
- Momentary-ON
- Full dust protection on the actuator prevents sticking
- Internal fail-safe contact mechanism for longer life and reliability, weld safe
- Optional integrated holder for common size capacitors
- Bi-stable

**FPB** series are high rated push button switches commonly used in middle range angle grinders or other power tools where insensitivity to dust in combination with high reliability, high current draw and long life are a requirement.

**Features**
- Double pole and single throw
- Momentary ON
- Anti-tease contact system (Patented)
- Weld-safe contact system
- High voltage DC rating capable
- Well protected against dust
- Compatible with industry standard
- Optional integrated holder for common size capacitors

<table>
<thead>
<tr>
<th>Models</th>
<th>Configuration</th>
<th>Approvals</th>
</tr>
</thead>
<tbody>
<tr>
<td>DPX</td>
<td>SPST/DPST</td>
<td>UL: 8(8)A/10(10)A 125Vac, 5E4, 4(4)A—8(8)A 250Vac, 5E4, 5(5)A 250Vac, 5E4</td>
</tr>
<tr>
<td>FPB</td>
<td>DPST</td>
<td>UL: 14(14)A/15(15)A 127Vac, 5E4, 8(8)A/10(10)A 250Vac, 5E4, 8(8)A/10(10)A 127Vac, 5E4</td>
</tr>
</tbody>
</table>

**Customized Version**
DPX

Circuit Schematic

FPB

Circuit Schematic
**CGQ** is a multi-speed trigger switch in a US style enclosure. This makes the mounting dimensions of the switch identical to DGH, DGC and DGU as well as to other US shaped switches. It is applied in drills, hammer drills, jig saws and other tools where speed control is preferred. Switch and electronics are layed out for a long troublefree operation in rough and dusty environments. Primarily the design is for markets where 125 Volt is common but 230 Volt versions are available as well to allow global use.

**Features**
- Proven reliable multi-speed electronic for smooth speed change and long life
- Speed setting wheel option
- Various trigger and Lock Button Options
- Integrated reversing switch or no reverse
- Brake options

<table>
<thead>
<tr>
<th>Models</th>
<th>Configuration</th>
<th>Approvals</th>
</tr>
</thead>
<tbody>
<tr>
<td>CGQ VSC</td>
<td>4R(4)A ~ 8R(8)A 125Vac, 5E4</td>
<td>4R(4)A ~ 8R(8)A 125/250Vac, 5E4</td>
</tr>
</tbody>
</table>

**Customized Version**

**Circuit Schematic**

**AC Switches**
### Trigger Options

<table>
<thead>
<tr>
<th>Soft Trigger</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>E</th>
<th>F</th>
<th>G</th>
</tr>
</thead>
</table>

### Lock Button Options

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
</tr>
</thead>
</table>

### Reversing Lever Options

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>D</th>
<th>E</th>
</tr>
</thead>
</table>
DGQ Trigger switches with variable speed Euro style

DGQ is a multi-speed trigger switch in Euro style dimensions for use in portable power tools like drills, hammer drills and jigsaws. It is designed for use in dusty environments and to withstand mechanical shocks and unstable varying electric current conditions. Switch contact mechanism and electronics are laid out to meet all practical ratings as high as 15A at 125 Volt.

**Features**
- Reliable multi-speed control provides smooth speed changes over the total tool life.
- Internal electronics on choice SCR or TRIAC; external version for high currents.
- With potentiometer version available / feasible
- Lock-on buttons in various standard sizes
- Lock-off Version (300N)
- Optional dial wheel for pre-set speed setting
- Push in connections for RFI capacitor for ease of wiring
- Optional snap-on type reversing switches in various styles both push in and spade connection types
- Customized triggers and levers. Standard triggers and levers in common dimensions available
- Dust proof

<table>
<thead>
<tr>
<th>Models</th>
<th>Configuration</th>
<th>Approvals</th>
</tr>
</thead>
<tbody>
<tr>
<td>DGQ</td>
<td>ON/OFF;VSC;Poti</td>
<td>3(3)A—15R(15)A 125Vac,5E4</td>
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<tr>
<td></td>
<td></td>
<td>3(3)A—8(8)A 250Vac,5E4</td>
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<tr>
<td></td>
<td></td>
<td>3(3)A—10(10)A 125Vac,5E4 (VSC)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3(3)A—13(13)A, 125Vac, 5E4</td>
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<td>3(3)A/4(4)A/6(6)A 250Vac,5E4</td>
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</table>

AC Switches

DC Switches

Standard Electronic Controls
POWERTOOL COMPONENTS

DC Switches
34
**CGJ**
DC variable speed trigger switches with electronics

43
**BGH-EGA**
DC variable speed switches for brushless applications

37
**CGW**
DC variable speed trigger switches with electronics

45
**BGB**
DC variable speed trigger switches with Li-ion electronics

39
**CGP-EGA**
DC variable speed trigger switches

46
**EGD**
Compact variable speed trigger switches with Li-ion electronics

41
**BGC-BGL**
DC variable speed trigger switches

47
**BSW**
DC dust resistance slide switches
CGJ switches are a high efficient compact design. They have an integrated reversing switch and no external wiring. The FET is external but the compact switch dimensions allow use of a fixed wrap around heat sink. It features auxiliary input wire and a switch for added on features or for run mode selection.

**Features**
- VSC (Variable Speed Control), on/off or Poti switch with integrated reversing switch
- Various FET mounting options for optimized heat removal
- Solder, or pre-wired motor connection
- Minimized wiring
- Auxiliary output for LED
- Various duty cycle options
- Various frequency options
- Optional integrated micro switch for LED or signal to activate remote electronic
- Optional multiple electronic functions can be integrated
- Poti version for remote electronics

<table>
<thead>
<tr>
<th>Models</th>
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<th>Approvals</th>
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<tr>
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<td>UL 15 &amp; CSA</td>
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<td>8A/10A/12A/15A</td>
<td>Max. 24Vdc, 5E4</td>
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<tr>
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<td>20.1A</td>
<td>Max. 24Vdc, 5E4</td>
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### Trigger Options

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<th>C</th>
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<th>G</th>
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### Reversing Lever Options

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<th>I</th>
<th>J</th>
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<td><img src="image8.png" alt="Reversing Lever Options I" /></td>
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<table>
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<th>K</th>
<th>L</th>
<th>M</th>
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<td><img src="image11.png" alt="Reversing Lever Options L" /></td>
<td><img src="image12.png" alt="Reversing Lever Options M" /></td>
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</table>
CGW series are high current, high voltage variable speed switches for professional cordless tool applications up to 36V. They combine a compact size with high performance and durability. A wide scope of heatsinks and Mosfets options makes it easy to adapt to various tool requirements.

**Features**
- VSC (Variable Speed Control), on/off switch with integrated reversing switch
- Compact size
- Various wrap around heatsink shapes both copper or aluminium
- Optional remote heatsink
- Various duty cycle options
- Brake option
- Optional integrated micro switch for LED or signal to activate remote electronic

<table>
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<tr>
<th>Models</th>
<th>Configuration</th>
<th>Approvals</th>
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</thead>
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<tr>
<td>CGW SPDT; VSC</td>
<td>8A/10A/12A/15A/20.1A/25.1A Max. 36Vdc, 5E4</td>
<td>UL, CE</td>
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</table>
Trigger Options

- A
- B
- E

Reversing Lever Options

- 32.1
- 32.1
- 30.2
CGP series offer a wide scope of heavy-duty high rated in-line trigger switches. With integrated potentiometer. Main application is to switch on and control cordless tools with remote electronics. They are frequently used for lithium ion driven tools. They are available with numerous options including brake, reversing switch, diode wiring and battery terminals. Voltage goes up to 42VDC and continuous currents as high as 45A. Due to the demanding applications dust protection is to a high degree.

**Features**
- High power contact for applications up to 45A 42VDC
- F/R box with switch
- Brake option
- Step or stepless potentiometer
- Solder or pre-wired input/output
- Diode option
- Dust proof
- Customized trigger and reversing lever

EGA series offer high rated in-line trigger switches with integrated potentiometer in very compact dimensions allowing space saving and optimal ergonomics of the tool handle. Yet still maintaining a trigger travel of over 8 mm. Main application is to switch on and control cordless tools with remote electronics. They are frequently used for lithium ion driven tools. They are available in various options including brake, reversing switch, wiring and battery terminals. Voltage goes up to 24Vdc and continuous currents as high as 35A.

**Features**
- Forward / reverse (switch) option
- Brake option
- Various wire and potentiometer connections
- Pre-wired to specifications

<table>
<thead>
<tr>
<th>Models</th>
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<th>Approvals</th>
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<tr>
<td>CGP</td>
<td>SPST Poti switch</td>
<td>20.1A 12—42Vd.c.,1E4</td>
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<tr>
<td>EGA</td>
<td>SPDT Poti switch</td>
<td>8A—15A 24Vd.c.,1E4</td>
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</table>
Circuit Schematic

Lever Options

EGA

Circuit Schematic
**BGC-BGL** DC variable speed trigger switches

**BGC** & **BGL** series are high rated switches for applications rated up to 35A, 42V. They are available as on-off versions for high rated DC tools like circular saws and as versions with potentiometer. The BGL has a double pole contact structure for extreme applications.

**Features**
- High power contact
- Snap action contact system
- Multistep or stepless potentiometer option
- Brake option
- Solder or pre-wired input/output
- Diode option
- Dust Proof
- Double pole version (BGL)

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<table>
<thead>
<tr>
<th>Models</th>
<th>Configuration</th>
<th>Approvals</th>
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<tbody>
<tr>
<td>BGC</td>
<td>SPDT</td>
<td></td>
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<tr>
<td></td>
<td>8A/10A/12A/15A/20.1A, Max. 42Vdc, 1E4</td>
<td>UL, CEJ CE</td>
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<tr>
<td>BGL</td>
<td>DPDT</td>
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<tr>
<td></td>
<td>8A – 20A, 42Va.c., 5E4</td>
<td>-</td>
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---

**Models Configuration**

- **BGC**
  - SPDT
  - 8A/10A/12A/15A/20.1A, Max. 42Vdc, 1E4
- **BGL**
  - DPDT
  - 8A – 20A, 42Va.c., 5E4
BGH series is adapted to be used in brushless applications. High rated switches for applications rated up to 45A, 42Vdc. It features all the functions needed to switch on and control cordless brushless tools with remote electronics. Besides the potentiometer, it also features a forward/reverse signal indication.

**Features**
- Multi-step or stepless potentiometer
- Signal to indicate reverse position
- Diode option
- Output signal options
- Various wire and potentiometer options
- Pre-wired to specifications

EGA series small footprint makes it an excellent choice for small brushless tools. It features all the functions needed to switch on and control cordless brushless tools with remote electronics.

**Features**
- Stepless potentiometer
- Various wire and potentiometer options
- Pre-wired to specifications

<table>
<thead>
<tr>
<th>Models</th>
<th>Configuration</th>
<th>Approvals</th>
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<tbody>
<tr>
<td>BGH SPST Poti switch</td>
<td>20.1A 12—42Vdc.c.5E4</td>
<td>20.1A 12—42Vdc.c.5E4</td>
</tr>
<tr>
<td>EGA SPST Poti switch</td>
<td>8A—15A 24Vdc.c.,1E4</td>
<td>8A—15A 12—24Vdc.c.,1E4</td>
</tr>
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</table>
BGB switches are designed for high performance cordless drills and screwdrivers that use Lithium Ion batteries. BGB switches do not have a mechanical by-pass and are equipped with additional input and output wires to guard battery status and tool parameters. This allows the tool automatically to be switched off in case of critical or unsafe conditions regardless the trigger position. All operation and safety functions are combined in a compact switch not exceeding the dimensions of regular switches.

Features
- Electronic Bypass
- Integrated F/R Box
- Brake option
- Soft start
- Under-voltage protection
- Overload and over current protection
- Over heat of MOSFET protection
- Battery temperature protection
- Optional signal pin(s) for the front light, fuel gauge and ID pin

<table>
<thead>
<tr>
<th>Models</th>
<th>Configuration</th>
<th>Approvals</th>
</tr>
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<tbody>
<tr>
<td>BGB</td>
<td>E-switch</td>
<td>8A—16.1A 36Vd.c.,5E4</td>
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</table>

Circuit Schematic

Trigger Options

Lever Options

Customized Version

BGB DC variable speed trigger switches with Li-ion electronics
EGD is an ultra compact DC VSC switch with all standard functions needed to control and protect a Li-ion tool integrated. It can be used for applications up to 30A, 16Vdc. It offers great advantages on assembly in the tool because of less wires and no remote electronic module. Tools can be more compact and ergonomic because of the small size of the EGD.

Features
- Ultra compact size
- Electronic bypass
- Integrated F/R box
- Brake option
- Soft start
- Under voltage protection
- Overload protection
- Battery temperature protection
- Optional signal pins for LED, fuel gauge or ID pin
- External MOSFET option

<table>
<thead>
<tr>
<th>Models</th>
<th>Configuration</th>
<th>Approvals</th>
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<tr>
<td>EGD</td>
<td>E-switch</td>
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<tr>
<td></td>
<td>8RA/10RA/12RA/16.1RA, Max.16Vdc, 1E4</td>
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</tbody>
</table>

Circuit Schematic
BSW DC dust resistance slide switches

The BSW series are small slide DC switches with one normally closed contact and one normally open contact. The normally closed contact can be used as a signal contact to activate remote electronic, the normally open contact has a higher rating suitable to switch the motor current. The BSW series is a dust proof switch.

**Features**
- Dust proof design for rough environmental conditions
- Normally closed contact to be used as a signal contact
- Normally open contact to be used to switch motor current up to 25.1A at 24Vdc
- Small footprint

<table>
<thead>
<tr>
<th>Models</th>
<th>Configuration</th>
<th>Approvals</th>
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</thead>
<tbody>
<tr>
<td>BSW</td>
<td>SPDT</td>
<td>25.1RA 12Vdc-24Vdc, 5E4 (N.O.)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1RA 12Vdc-24Vdc, 5E4 (N.C.)</td>
</tr>
</tbody>
</table>

Circuit Schematic
Standard Electronic Controls
50

**L03**
AC speed control with by-pass

51

**LIP**
Li-ion battery protection

52

**ICL, ICL-mini, NVR**
In rush current limiters


**L03 AC speed control with by-pass**

L03 dial wheel speed control is designed as a standard adjustable speed control mostly for universal motors in a variety of applications such as jigsaws, sanders or polishers. Both 125 and 230 Volt versions are available. It features a bypass in the highest setting. It needs to be applied in combination with an on off switch.

**Features**
- Full-wave or half wave upon request
- Internal or remote SCR or TRIAC
- Application related (customized) conduction angles
- Distinct fine tuned speed setting, clearly marked
- Mechanical by-pass contact, electronic by-pass upon request
- Dust proof (optional)

<table>
<thead>
<tr>
<th>Models</th>
<th>Configuration</th>
<th>Approvals</th>
</tr>
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<tbody>
<tr>
<td>L03</td>
<td>VSC</td>
<td>UL, cUL</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6A/8A, 125Vac</td>
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</tbody>
</table>

**Circuit Schematic**

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**Standard Electronic Controls**
Li-ion batteries are commonly used in cordless power tools offering advantages in operation, weight, and dimensions. Due to their nature, they require precise monitoring and fast reaction in case of unfavorable or critical conditions. Apart from customized versions, Defond offers a standardized package for integration in detachable battery packs, yet with flexibility in connection options. It monitors:
- Temperature cut-off at 65°C.
- Under voltage.
- Over voltage.
- Over current.
In case of an unsafe condition, a signal is given to the tool control or the battery charger for instantaneously switching off, thus protecting both battery and tool.

Features
- Compact dimensions
- Other parameters upon request
- Various interface options
- Potted and enclosed versions
- With integrated battery connections and signal interfaces
ICL, ICL-mini, NVR

<table>
<thead>
<tr>
<th>ICL</th>
<th>ICL-mini</th>
<th>NVR</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ICL</strong></td>
<td><strong>ICL-mini</strong></td>
<td><strong>NVR</strong></td>
</tr>
<tr>
<td>is an in-line inrush current limiter reducing the starting current of heavy duty tools and provide a smooth ramp up to full speed for operator comfort and safety. It has compact dimensions and is fully sealed to deal with rough operations conditions.</td>
<td>is a smaller version of the ICL with the same features but without the Triac/heatsink integrated. This modular design gives the tool maker more flexibility in mounting the ICL-mini and the Triac/heatsink in the tool.</td>
<td>is a standard AC control module featuring the no-volt release function. This function prevents a tool from being started in locked position after a power failure or after unplugging when locked thus avoiding a potentially harmful situation. Beside the NVR function the module also has feature like soft start, overload protection and constant speed control. Beside this standard module Defond can offer customized modules according to customer specifications.</td>
</tr>
<tr>
<td><strong>Features</strong></td>
<td><strong>Features</strong></td>
<td><strong>Features</strong></td>
</tr>
<tr>
<td>- Compact pre-wired unit</td>
<td>- Very compact control unit</td>
<td>- No volt release (NVR)</td>
</tr>
<tr>
<td>- Wire lengths to specifications</td>
<td>- Wire lengths to specifications</td>
<td>- Soft start</td>
</tr>
<tr>
<td>- Various Triac options to cope with different motor sizes and voltages</td>
<td>- Various Triac and heatsink options to cope with different motor sizes and voltages</td>
<td>- Overload protection</td>
</tr>
<tr>
<td>- Heatsink shape options for screw mounting</td>
<td></td>
<td>- Constant speed control</td>
</tr>
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</table>

**Customized Version**

- Optional customized
Development of DC Applications

Back in the year 2004, Defond has developed a brand new DC trigger switch platform to cope with the high standard of Li-ion battery technology specification. The platform, CGP, rated 45A that operate continuously at maximum 36V. Based on this foundation, we keep on offering the power tool markets more varieties of switch selections that fulfill different requirements from application specific to size concern. We do provide comprehensive solutions in SAM (Switch And Module) package that can ease the tool production.

In recent years, we start to have integrated switch versions debut to avoid lots of wiring assembly. Moreover, that could be a viable solution that could help customer to speed up their product development. Development of Li-ion battery technology seems to be very strong and Defond will continue our effort to provide better and cost efficient support in this segment.

In the other corner, investing in brushless motor power tool is getting serious. A standard platform, BGH, has been invented by Defond 3-4 years ago and became one of the market standard that could work nicely with customized electronic design from major brands. Apart from this, Defond has developed several customized switch platforms and OEM electronics module over last two years. Switch platform and electronics control brushless motor will continue to become the driving force for power tool markets in the next 3-5 years.
直流工具发展趋势

在二零零四年，德丰投入可观的资源开发新一代直流电动工具开关CGP，以配合锂电池高效能的要求，在实际应用上的电流规格可承受连续负载45安培，以及应用于14.4Vdc~36Vdc的工具上；而依此基础我们在短短的几年间，就创造许多应用于锂电池工具的开关平台，以满足客户对于工具的特性，装配空间大小的需求。

为简化顾客组装电动工具的需要，我们更提供SAM (Switch And Module)组合；近几年我们亦开始有Integrated switch (结合型开关版本) 投产，这类型开关更可帮助电动工具制造商提升生产效率，以及加快电动工具开发的周期。

锂电池电工具应用热潮似乎未有退减，反而发展空间更见广阔，德丰会继续努力不懈，为市场提供更多全方位解决方案及价钱合理的元件。

新的一股潮流，无刷马达开关及控制回路结合锂电池保护装置的应用，现在已经慢慢炽热起来，因应而生的新开关平台BGH在三年前诞生，现在已经成为市场当中一个新的无刷马达开关应用平台主流；与此同时德丰也在近两年光景，为各大品牌电动工具客户开发客制化的无刷马达开关，以及各种OEM的无刷马达控制回路/保护装置；相信无刷马达开关及控制回路结合锂电池保护装置，将会是未来三至五年电动工具市场上发展的主流。
Customized power tool switches and controls

Within the lines of standard components and switches Defond manufactures the majority is customized since they are usually tuned for one-tool application only. Triggers, levers, lock buttons and options are often customer specific and match tool design. Apart from customizing switches on base of existing series Defond designs and manufactures controls that are exclusive to one customer and are designed to their specific needs and applications. Often existing concepts or components may be used to keep investment and cost down. Normally those projects are carried out in close cooperation with our customers engineering teams.

Example

Entirely customer specific switches for AC application

Motorcontrols with brushes and integrated switches in various sizes and combinations

Brush holder units

Combinations of heavy duty on off switches with electronic speed control

Low pressure overmolding capability

SAM (Switch and Module)

Contact our sales representatives for information
## Quick Finder

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# Sales and Support Channels

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<td>Head Office</td>
<td>Defond Europe</td>
</tr>
<tr>
<td>5/F Chaiwan Industrial Centre</td>
<td>Po Box 6314</td>
</tr>
<tr>
<td>20 Lee Chung Street</td>
<td>6074ZG Melick</td>
</tr>
<tr>
<td>Chaiwan</td>
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<tr>
<td>Tel</td>
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<tr>
<td>(852) 2897-5603</td>
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<td>ESI</td>
<td>DNA Group Inc.</td>
</tr>
<tr>
<td>213 Marlton Road, Woodstown</td>
<td>2841 Plaza Place</td>
</tr>
<tr>
<td>NJ 08098, USA</td>
<td>Raleigh</td>
</tr>
<tr>
<td>Tel : (1) 856-769-1173</td>
<td>NC 27612, U.S.A.</td>
</tr>
<tr>
<td>Fax : (1) 856-769-5457</td>
<td>Tel : (919) 881-0889</td>
</tr>
<tr>
<td>E-mail : <a href="mailto:jim@elephantus.net">jim@elephantus.net</a></td>
<td>Fax : (919) 818-0144</td>
</tr>
<tr>
<td>Website : <a href="http://www.esi.com">www.esi.com</a></td>
<td>Website : <a href="http://www.dnagroup.com">www.dnagroup.com</a></td>
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| SOUTH KOREA                  | |
| KhROSS electronics co.       | |
| #3106, MA-dong, Joongang cir. complex 1258, Kurobon-dong, Kuro-Gu, Seoul, S.Korea | |
| Tel : (82) 2-2681-8316        | |
| Fax : (82) 2-6679-7725        | |

**Defond Group**

**EUROPE**

Defond Europe  
Po Box 6314  
6074ZG Melick  
The Netherlands  
E-mail: Info@grpdfond.com  
Website: www.grpdfond.com

**RUSSIA AND FORMER SOVIET UNION**

ESI  
213 Marlton Road, Woodstown  
NJ 08098, USA  
Tel: (1) 856-769-1173  
Fax: (1) 856-769-5457  
E-mail: jim@elephantus.net

**NORTH AMERICA**

DNA Group Inc.  
2841 Plaza Place  
Raleigh  
NC 27612, U.S.A.  
Tel: (919) 881-0889  
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**SOUTH KOREA**

KhROSS electronics co.  
#3106, MA-dong, Joongang cir. complex 1258, Kurobon-dong, Kuro-Gu, Seoul, S.Korea  
Tel: (82) 2-2681-8316  
Fax: (82) 2-6679-7725

**CHINA**

广东省东莞市洪梅镇第一工业区  
Hongmei Second Industrial Area, Hongmei  
Town, Dongguan, China  
Tel: (86) 769 8622 7012  
Fax: (86) 769 8843  
Website: www.grpdfond.com

**TAIWAN**

钛和企业有限公司  
台中市40450北区进化路642巷12-2号  
Tel: (04) 022 314 272  
Email: daiwa.san@msa.hinet.net