Atlas DMC™
A Complete Digital Motion System
Welcome to the Atlas DMC™ family of highly innovative, totally integrated motion controllers. Designed to control position, torque, and/or speed of brushless PM motors, these units also offer superior programming flexibility and matched motor/control performance in the power range from 500W to nearly 15kW. The powerful PL2™ programming language with tools that work in Windows™ adds even more user friendliness. All of this combined with Atlas Copco’s indisputable quality, an affordable price and an unprecedented 5-year product warranty clearly makes these units an alternative to all other motion controllers.

Small Space-Saving Design
Small physical size has been made possible thanks to advanced technology in the switching circuit design. Low power losses and efficient thermal design have eliminated the need for fans – improving reliability.

Modular Concept
All units in the Atlas DMC family are built according to modular concept where height and depth are the same for all controllers. This simplifies the design of cabinet layouts and facilitates efficient combination of units with different power ratings.

Stand-Alone or Multi-Axis Configurations
The Atlas DMC controllers are available as stand-alone versions with integral power supply and shunt-regulator for direct connection to single-phase 120 or 3-phase 240 and 400 VAC main supply.

Flexible Digital I/O
An integrated PLC function can be programmed to read 12 digital inputs and activate 6 digital outputs (plug-in options for up to 32 I/O can fit inside the unit). Two isolated relay outputs – one under program control for control of a motor brake etc., and the other to indicate “controller enable.”

You can also order controls without internal power supply for saving space in multi-axis applications. Ask about our complementary stand-alone DC bus power supplies.

No Isolation Transformer Required
The Atlas DMC power circuit is totally isolated from the signal circuit, so no isolation transformer is needed. A simple auto transformer can be used to adapt to other voltages.

Wide Power Range To Fit Your Application Needs
Four continuous current ratings (5, 10, 20 and 40 A) and three bus voltage levels (170*, 340 and 570 VDC) cover a wide power range from 500 to 15,000 W. We also have matching motors with stall torque ranging from 0.6 to 50 Nm at speeds up to 6000 rpm. Refer to our Atlas DMC Application Manual for controller/motor data.

Up to 15 Atlas DMCs can be networked to a PC or a host controller using the RS422 link.

* under development.
Analog I/O
In addition, 2 analog inputs and 2 analog outputs under full program control can be used as set-point values for torque and speed, or as process interface to other transducers. Outputs can be used as test outputs or as analog interfaces to other equipment.

Robust Feedback Technology
The Atlas DMC uses a resolver integral to the motor as feedback element. This concept enhances reliable operation due to the lack of electronic components in the resolver. Reliable operation of the machine is further improved by the quasi-absolute feedback of machine position which eliminates the risk of losing pulses such as could happen in encoder-based systems.

Second Resolver Input For Greater Flexibility
An added feature is an auxiliary resolver input which is provided as standard with Atlas DMC. It can be used as a reference position input in a master/slave follower application, for slippage control in conveyor systems, as a manual position offset control, or as a second resolver input for absolute multi-turn positioning.

Optimum User Benefits

Fast And Simple Installation
The unique space-saving design lets you mount directly to a mounting plate using only two mounting brackets.

High Reliability
The Atlas DMC units have been conservatively designed and are rated to fulfill the highest demand on reliability. This is what you should expect from a company which delivers thousands of brushless drives, every month, to the largest most demanding robot manufacturer in the world.

Greater Flexibility
The versatility of the digital controller lets you use Atlas DMC for almost any machine application whether it be variable speed, positioning or torque control applications. Different option boards can be used to adapt to many needs. The Atlas DMC concept can solve many of your motion applications and reduce the number of different motor control systems required in your company.

Powerful Programming Language with Auto-tuning
The Atlas DMC features digital positioning and speed loops which are fully programmable using Atlas Copco Controls ProMOTION™, a powerful user-friendly development environment which includes linked software modules for engineering, programming, installation and troubleshooting of the Atlas DMC products — all running under Windows 3.1. And, the Atlas DMC Auto-tuning feature makes start-up a breeze.

Heavy Duty Industrial I/O
The Atlas DMC controllers have an industrial hardened interface built right in. The I/O can handle severe noise, transients and short circuits. And it can be used with standard 24 VDC signal levels, so there's no need for auxiliary interfaces or termination to ensure reliable operation of your machine.

Highest Noise Immunity
A motion controller which is to operate reliably must reject electrical noise which is so often generated in industrial environments. The Atlas DMC controller has been designed for the highest possible noise immunity, both transient bursts and electromagnetic interference. The product line has gone through meticulous testing and fulfills the tough new EC requirements.

Low RFI (Radio Frequency Interference)
Designing a controller that is not susceptible to noise is an accomplishment in itself. Designing a controller which does not generate a lot of noise was an added challenge taken seriously by our engineers. The Atlas DMC fulfills both the EC and FCC requirements, assuring the operation of your motion controller does not adversely affect the operation of other equipment.
The programming of the DMC is done with the ECT program in our ProMOTION™ user environment which is supplied with the unit. The language used is Atlas Copco’s PL2, a basic-like language with simple to use syntax. The ECT application consists of a Windows™ text editor with useful features including a help system that provides the user with extensive syntax help and programming examples. The ECT can be used as an on-line or off-line development tool. With an Atlas DMC controller connected to a PC and using the terminal window in the ECT, it is possible to execute instructions immediately. PL2 instructions can also be executed during motion. In fact, entire programs or program segments can be changed on the fly. This powerful feature allows the user to optimize parameters and directly observe the results thus simplifying the prototype phase of development. The use of Macro instructions takes the pain out of repetitive sets of instructions. When a program has been written it is compiled in the ECT. The compiler will point out any syntax errors and the help function can be used to find the correct syntax before downloading to the controller.

The Fix-IT™ application is a part of the ProMOTION™ environment. It provides specific, configuration sensitive installation details. Here you get connection diagrams, examples of hook-up, shielding and grounding requirements, and wire sizes. You have access also to mechanical installation details or you can use the on-line/off-line troubleshooting tools to help you find most any problem with your hook-up.

The ProMOTION™ ECT combines a feature-filled text editor, a compiler, and a terminal function all under Windows 3.1™. A comprehensive help function can assist you with syntax and examples, and a library of macro functions takes the pain out of adjusting the Atlas DMC. The ECT makes programming, compiling, and testing/debugging really user friendly.
**Application Examples**

- **CUT-TO-LENGTH** systems.
- **FLYING SHEAR** and **ROTARY KNIFE** type applications.
- **FEEDING** mechanisms like press feeders, indexing systems, etc.
- **TENSIONING** systems using the Atlas DMC programmable torque control.
- **CAM SHAFT** simulation using built-in cam function.
- **HARD SYNCHRONIZATION** of two shafts.
- **TIME SYNCHRONIZATION** of up to 15 axes.
- **ELECTRONIC GEARING** using the Atlas DMC GEAR function.
- **MASTER FOLLOWER** system where the master can be an analog transducer, resolver or encoder.
- **REGISTRATION CONTROL** using the high speed input to capture registration mark and synchronize motion to the mark.

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### Function Specifications

#### GENERAL
- Efficiency at full current, aprr. 99%.
- Speed accuracy: <1%.
- Position accuracy to 1/2000 shaft rev.
- Max. pos. resolution: 8000 incr./rev.
- Torque linearity: ±1% full scale plus ±2% of command.
- Current loop bandwidth: 4 kHz.
- Current ripple frequency: <10 kHz.
- Ambient temperature: 0 to 60°C.
- Storage temperature: -20°C to 80°C.
- Humidity: 95% non-condensing.
- Protection class: IP20, Nema 1.
- Noise immunity: pr EN50081/2-2.

#### DIGITAL INPUTS
- No. of inputs: 10 (extendible to 17).
- Dedicated hardware ENABLE.
- Max. voltage: 30 VDC.
- Thermistor/PTC Inputs: 2.

#### ANALOG INPUTS
- No. of inputs: 4 differential.
- Max. input voltage: ±10 VDC.

#### RESOLVER INPUTS
- No. of resolvers supported: 2.
- No. of phases: Programmable.

#### DIGITAL OUTPUTS
- No. of outputs: 13 (extendible to 256).
- Max. voltage: 30 VDC.
- Max. current: 100 mA.

#### RELAY OUTPUTS
- Dedicated READY output: 1.
- Relay output under program control: 1.

#### ANALOG OUTPUTS
- No. of outputs: 2.
- Max. output voltage: ±10 VDC.

* 0 to 40°C at full rating. 0 to 60°C at derated output.

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### SERIAL COMMUNICATIONS
- RS232 or RS422 single port, full duplex.
- Baud Rate: 300 to 9600.
- XON/XOFF.
- Serial port permits cascading up to 15 units.
- External optional I/O devices such as thumbwheels.

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### Software Specifications

#### CONTROLLER TYPE
- PLD regulator with Velocity and Acceleration Feed Forward.

#### CONTROL MODES
- Speed controller.
- Torque controller.
- Position controller.

#### TYPE OF MOTION
- Incremental move.
- Absolute move.
- Individually programmable accel. and decel.
- Simple trapezoidal motion profile (change profile on the fly).
- Complex multi segment profile (change profile in the fly).
- S-curves.
- Programmable Jerk Limit.
- Master and one Slave motion with synchronization in both directions.
- Master and many Slaves synchronized to the master.
- Programmable Jog.
- Programmable Home.
- Abort/Controlled Stop/Controlled Start (programmable).
- Electronic Gear Box.
- Position Lock Cam function.
- Time Lock Cam function.

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### PL2 LANGUAGE
- Interpreter based.
- Fast interpreter (up to 8000 instructions/sec).
- 1 ms servo cycle.
- Similar to Basic, sequential with interrupt capability.
- Interactive (program can be altered while running).
- Modular design. (object oriented).
- 256 programmable 32 bit registers.
- Extended registers mapped to hardware and firmware functions.
- 32 bit math arithmetic (+, -, *, /).
- Boolean (AND, OR, XOR).
- Subroutine calls.
- High speed (<5 μs) registration input of time, speed and position.
- Extensive programmable interrupt system.

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### COMPILER FEATURES
- User labels with up to 16 characters.
- User defined instructions (macros).
- Compiler time arithmetic.
- Automatic register designation.
- "Include" files.
Optional Function Boards

The already flexible Atlas DMC can be equipped with one of several internal options which can be used in special applications.

**Option H**
High resolution tracking R/D with pulse encoder outputs for applications requiring encoder loop closure and resolution up to 15 bits. Provides two quadrature outputs at 1024 p/r plus index marker.

**Option F**
High resolution, high speed sampling type R/D for applications requiring high accuracy (1.4 bits) and high tracking rates (to 400 rps).

**Option E**
Pulse I/O interface. These versatile options provide three functions (some of which can be done simultaneously):
- Synchronous serial absolute encoder interface with programmable resolution from 16 to 24 bits.
- Incremental encoder interface with external clear input, max. frequency 1 MHz quadrature interface with multiplication of 4 circuit.
- Pulse train command input, pulse & direction or pulse per direction with scalable pulse rate.

**Option O**
Extra digital I/O with 7 optocoupled inputs and 7 outputs for applications requiring more I/O than the basic Atlas DMC.

**Fieldbus Options**
In addition to the option boards there is also a possibility to equip Atlas DMC with a fieldbus which is particularly suited for networking and communications with host controllers. Under development are CAN-bus and PROFIBUS versions. Please contact Atlas Copco Controls for more info.

Typical Block Diagram

Note: The block diagram shows an Atlas DMC with integral supply.
# Hardware Specifications

## POWER OUTPUT AND MECHANICAL SPECIFICATIONS

### DC SUPPLY MODELS
(for use with external power supply)

<table>
<thead>
<tr>
<th>170 VDC Models</th>
<th>DMC10515</th>
<th>DMC11025</th>
<th>---</th>
<th>---</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cont. current</td>
<td>A</td>
<td>5</td>
<td>10</td>
<td>---</td>
</tr>
<tr>
<td>Peak current</td>
<td>A</td>
<td>15</td>
<td>25</td>
<td>---</td>
</tr>
<tr>
<td>Cont. output power</td>
<td>kW</td>
<td>0.7</td>
<td>1.4</td>
<td>---</td>
</tr>
<tr>
<td>Bus voltage</td>
<td>VDC</td>
<td>170 + 10% - 30%</td>
<td>---</td>
<td>---</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>340 VDC Models</th>
<th>DMC30515</th>
<th>DMC31025</th>
<th>DMC32050</th>
<th>DMC34080</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cont. current</td>
<td>A</td>
<td>5</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>Peak current</td>
<td>A</td>
<td>15</td>
<td>25</td>
<td>50</td>
</tr>
<tr>
<td>Cont. output power</td>
<td>kW</td>
<td>1.4</td>
<td>2.9</td>
<td>5.8</td>
</tr>
<tr>
<td>Bus voltage</td>
<td>VDC</td>
<td>340 + 10% - 30%</td>
<td>---</td>
<td>---</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>670 VDC Models</th>
<th>DM50412</th>
<th>DM50720</th>
<th>DMC51540</th>
<th>DM50800</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cont. current</td>
<td>A</td>
<td>4</td>
<td>7</td>
<td>15</td>
</tr>
<tr>
<td>Peak current</td>
<td>A</td>
<td>12</td>
<td>20</td>
<td>40</td>
</tr>
<tr>
<td>Cont. output power</td>
<td>kW</td>
<td>1.9</td>
<td>3.4</td>
<td>7.4</td>
</tr>
<tr>
<td>Bus voltage</td>
<td>VDC</td>
<td>570 + 10% - 20%</td>
<td>---</td>
<td>---</td>
</tr>
</tbody>
</table>

### AC SUPPLY MODELS
(with integral power supply and shunt regulator)

<table>
<thead>
<tr>
<th>120 VAC Models</th>
<th>DMC10515P</th>
<th>DMC11025P</th>
<th>---</th>
<th>---</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cont. current</td>
<td>A</td>
<td>5</td>
<td>10</td>
<td>---</td>
</tr>
<tr>
<td>Peak current</td>
<td>A</td>
<td>15</td>
<td>25</td>
<td>---</td>
</tr>
<tr>
<td>Cont. output power</td>
<td>kW</td>
<td>0.7</td>
<td>1.4</td>
<td>---</td>
</tr>
<tr>
<td>Bus voltage</td>
<td>VAC</td>
<td>1 x 120 + 10% - 30%</td>
<td>---</td>
<td>---</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>240 VAC Models</th>
<th>DMC30515P</th>
<th>DMC31025P</th>
<th>DMC32050P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cont. current</td>
<td>A</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>Peak current</td>
<td>A</td>
<td>15</td>
<td>25</td>
</tr>
<tr>
<td>Cont. output power</td>
<td>kW</td>
<td>1.4</td>
<td>2.9</td>
</tr>
<tr>
<td>Bus voltage</td>
<td>VAC</td>
<td>3 x 240 + 10% - 30%</td>
<td>---</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>400 VAC Models</th>
<th>DMC50412P</th>
<th>DMC50720P</th>
<th>DMC51540P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cont. current</td>
<td>A</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>Peak current</td>
<td>A</td>
<td>12</td>
<td>20</td>
</tr>
<tr>
<td>Cont. output power</td>
<td>kW</td>
<td>1.9</td>
<td>3.4</td>
</tr>
<tr>
<td>Bus voltage</td>
<td>VAC</td>
<td>3 x 400 + 10% - 20%</td>
<td>---</td>
</tr>
</tbody>
</table>

### Outline Dimensions

(all dimensions in mm)

- **DMC10515**
  - Cont. current: A
  - Peak current: A
  - Cont. output power: kW
  - Bus voltage: VDC
  - Unit width: mm
  - Weight: Kg

- **DMC11025**
  - Cont. current: A
  - Peak current: A
  - Cont. output power: kW
  - Bus voltage: VDC
  - Unit width: mm
  - Weight: Kg

- **DMC30515**
  - Cont. current: A
  - Peak current: A
  - Cont. output power: kW
  - Bus voltage: VDC
  - Unit width: mm
  - Weight: Kg

- **DMC31025**
  - Cont. current: A
  - Peak current: A
  - Cont. output power: kW
  - Bus voltage: VDC
  - Unit width: mm
  - Weight: Kg

- **DMC32050**
  - Cont. current: A
  - Peak current: A
  - Cont. output power: kW
  - Bus voltage: VDC
  - Unit width: mm
  - Weight: Kg

- **DMC30412**
  - Cont. current: A
  - Peak current: A
  - Cont. output power: kW
  - Bus voltage: VDC
  - Unit width: mm
  - Weight: Kg

- **DMC31540**
  - Cont. current: A
  - Peak current: A
  - Cont. output power: kW
  - Bus voltage: VDC
  - Unit width: mm
  - Weight: Kg

- **DMC50720**
  - Cont. current: A
  - Peak current: A
  - Cont. output power: kW
  - Bus voltage: VDC
  - Unit width: mm
  - Weight: Kg

- **DMC30412P**
  - Cont. current: A
  - Peak current: A
  - Cont. output power: kW
  - Bus voltage: VAC
  - Unit width: mm
  - Weight: Kg

- **DMC31025P**
  - Cont. current: A
  - Peak current: A
  - Cont. output power: kW
  - Bus voltage: VAC
  - Unit width: mm
  - Weight: Kg

- **DMC32050P**
  - Cont. current: A
  - Peak current: A
  - Cont. output power: kW
  - Bus voltage: VAC
  - Unit width: mm
  - Weight: Kg

- **DMC50720P**
  - Cont. current: A
  - Peak current: A
  - Cont. output power: kW
  - Bus voltage: VAC
  - Unit width: mm
  - Weight: Kg

- **DMC34080**
  - Cont. current: A
  - Peak current: A
  - Cont. output power: kW
  - Bus voltage: VAC
  - Unit width: mm
  - Weight: Kg

- **DMC51540P**
  - Cont. current: A
  - Peak current: A
  - Cont. output power: kW
  - Bus voltage: VAC
  - Unit width: mm
  - Weight: Kg

- **DMC53080**
  - Cont. current: A
  - Peak current: A
  - Cont. output power: kW
  - Bus voltage: VAC
  - Unit width: mm
  - Weight: Kg

- **PS380160**
  - Cont. current: A
  - Peak current: A
  - Cont. output power: kW
  - Bus voltage: VAC
  - Unit width: mm
  - Weight: Kg

- **PS530160**
  - Cont. current: A
  - Peak current: A
  - Cont. output power: kW
  - Bus voltage: VAC
  - Unit width: mm
  - Weight: Kg

Rating: 40°C ambient

*Under development*
Why you should select Atlas Copco Controls as your next motion control supplier

Atlas Copco is recognized worldwide as an industrial product manufacturer with manufacturing plants in 17 countries. We stand behind our products and services with knowledgeable applications staff and field support organizations. Our wide applications experience is available to you during your design phase and you can be sure that we will be there to support you — for years to come! Atlas Copco Controls stands for “Quality First.” You can expect quality products designed for the highest reliability manufactured in our ISO9001 production facility. Our products are designed to fulfill tough national safety and performance requirements in many countries — increasingly important if you are manufacturing machines for export.

Using Atlas Copco brand control products in your machine is certain to meet with approval from demanding machine users and manufacturing plants all over the world.

Atlas DMC™ — The Alternative to All Other Motion Controllers!

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