

DP10 CONTROL SERIES

DART

CONTROLS

Instruction Manual

Variable Speed Control



**P.O. Box 10
5000 W. 106th Street
Zionsville, Indiana 46077**

**Phone (317) 873-5211
Fax (317) 873-1105
www.dartcontrols.com**

Table of Contents

Introduction	2
General Features	2
Models & Options	3
Specifications	3
DP10 Electrical	3
DP10 Mechanical	3
Environmental.....	3
DC24 Electrical.....	3
Mechanical Installation	4
Exploded Panel View	4
Cut-out and Mounting Dimensions	4
Installation & Diagrams	5
P1 & P9 Terminal Block Hook-Up Diagram.....	5
P1 & P9 Terminal Block Descriptions	5
Basic Operating Information	6
Device Configuration	6
Mode of Operation	7
Visual Reference	7
Troubleshooting	8
Technical Support Options	8
What's Special About www.dartcontrols.com ?	8

Introduction

The DP10 is a panel mounted, multi-purpose signal conditioner that allows the operator easy access to make adjustments to system operations. The DP10 may be used in OEM equipment designs, plant operation or laboratory applications. Most other signal conditioners are DIN rail mounted inside a panel and designed to be set up once - many applications require frequent adjustments to meet application needs. The DP10's unique front-panel design addresses this by making output adjustment easily accessible via convenient up and down pushbuttons with a large, easy to read LED display.

General Features

- Microprocessor design digital accuracy and repeatability
- Digital design offers long-term stability in a variety of environments
- Dual-Mode operation: **Signal Scaling**, or **Signal Generation**
- Works in either voltage (DC) or mA output modes
- Universal power supply accepts supply voltages of 85-265VAC @ 50-60Hz without switches or jumpers settings.
- Transient voltage protection protects device in harsh industrial environments
- 1/8 DIN panel mount is rated up to NEMA 4X in similarly rated panel
- Large 4 digit, 1/2" LED display is easy to read in indoor or outdoor applications
- Euro style terminal strip standard - pluggable terminal strip optional
- Wide operating temperature -10C to +45C (14F to 113F)
- Jumper selectable signal type - Voltage or Current (mA) signal

Models & Options

Models & Options

Model	Description
DP10	Voltage or Current (mA) signal conditioner with terminal strip
DC24	Optional 120VAC/24Vdc Wall Adapter power supply

Specifications

DP10 Electrical

Line Input Voltage	Any Voltage from 85-265 VAC
Line Input Frequency	Any Freq. from 48-62 Hertz
Voltage Signal Input	0-5 VDC
Voltage Output Range	5-20 VDC
Voltage Signal Output	0-Vset (with 24V Power Supply on P9-3 & P9-4)
mA Signal Input	4-20mA
mA Signal Output	4-20mA (may require 24V Excitation Power Supply)
Display Range	0 – 100.0
Units of Operation	%
Onboard Power Supply (Externally Accessible)	5V @ 50mA
Isolated Alarm Relay Output Ratings	250VAC @ 5A

DP10 Mechanical

Display Type	LED, Red, 4 Digit, ½" Height
Housing Type (with supplied gasket in NEMA 4X panel)	1/8 DIN NEMA 4X
Connector Style	3.5mm & 5mm European Style
Terminal Block Torque Setting	4.4 in. lb. Max or .5Nm
Faceplate Material	Polycarbonate with Lexan Overlay
Housing Material	Aluminum
Length (Required Panel Depth)	4.625", 117.48mm
Faceplate Width	4.539", 115.29mm
Weight DP10	0.900 lb, 14.4 oz, 408.22g

Environmental

Operating Temperature Range	-10C to 45C (14F to 113F)
Operating Humidity Range	95%, non-condensing

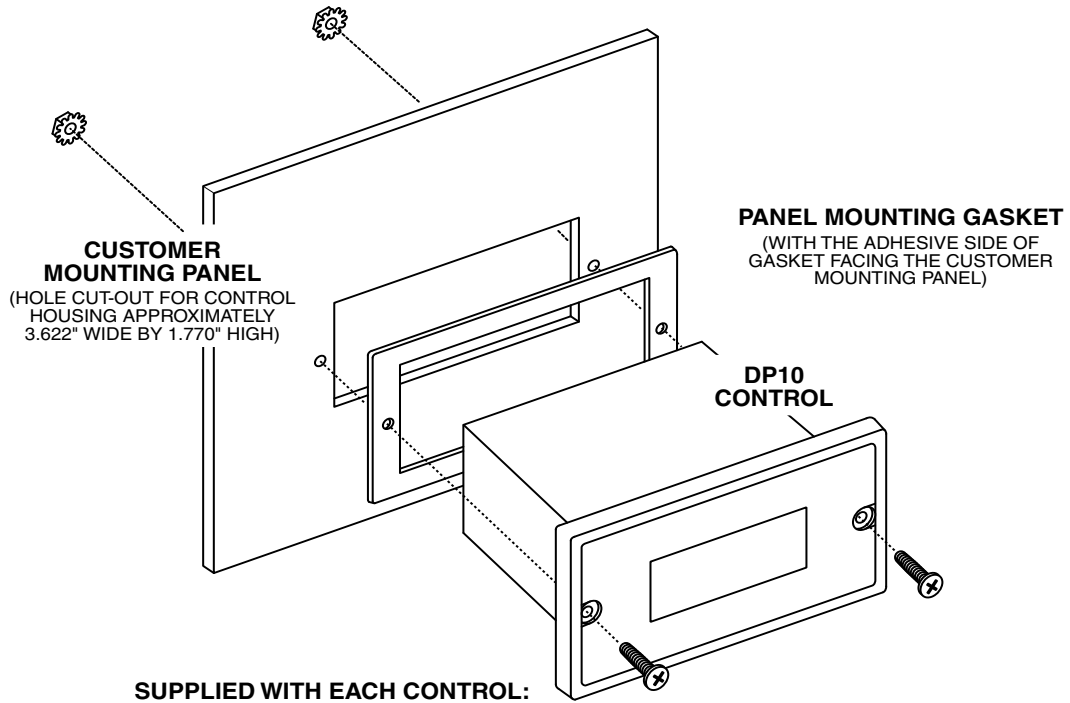
DC24 Electrical

Line Input Voltage	Any Voltage from 90-264 VAC
Line Input Frequency	Any Freq. from 48-62 Hertz
Output Voltage	24V ± 5%
Output Voltage Ripple	150mVpp Maximum
Output Current	0.5A Maximum

Note: The DC24 is a separately purchased item and is not included as part of the DP10 control.

Mechanical Installation

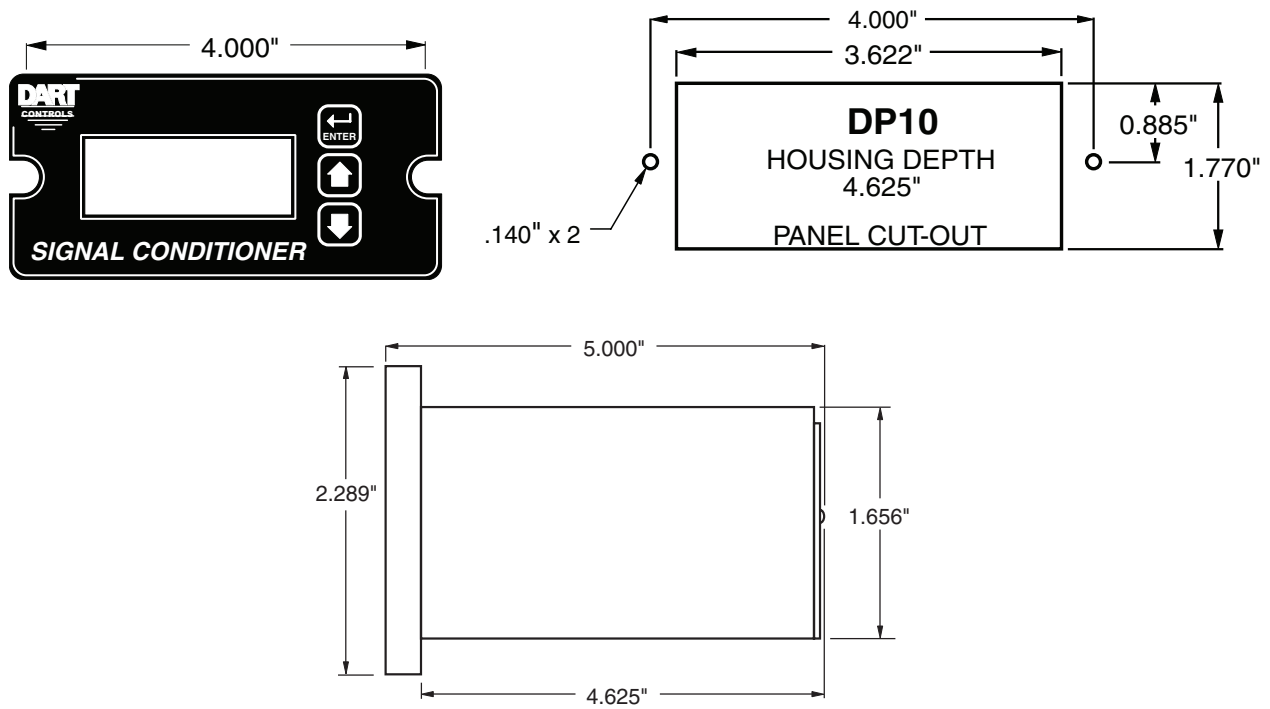
Exploded Panel View



SUPPLIED WITH EACH CONTROL:

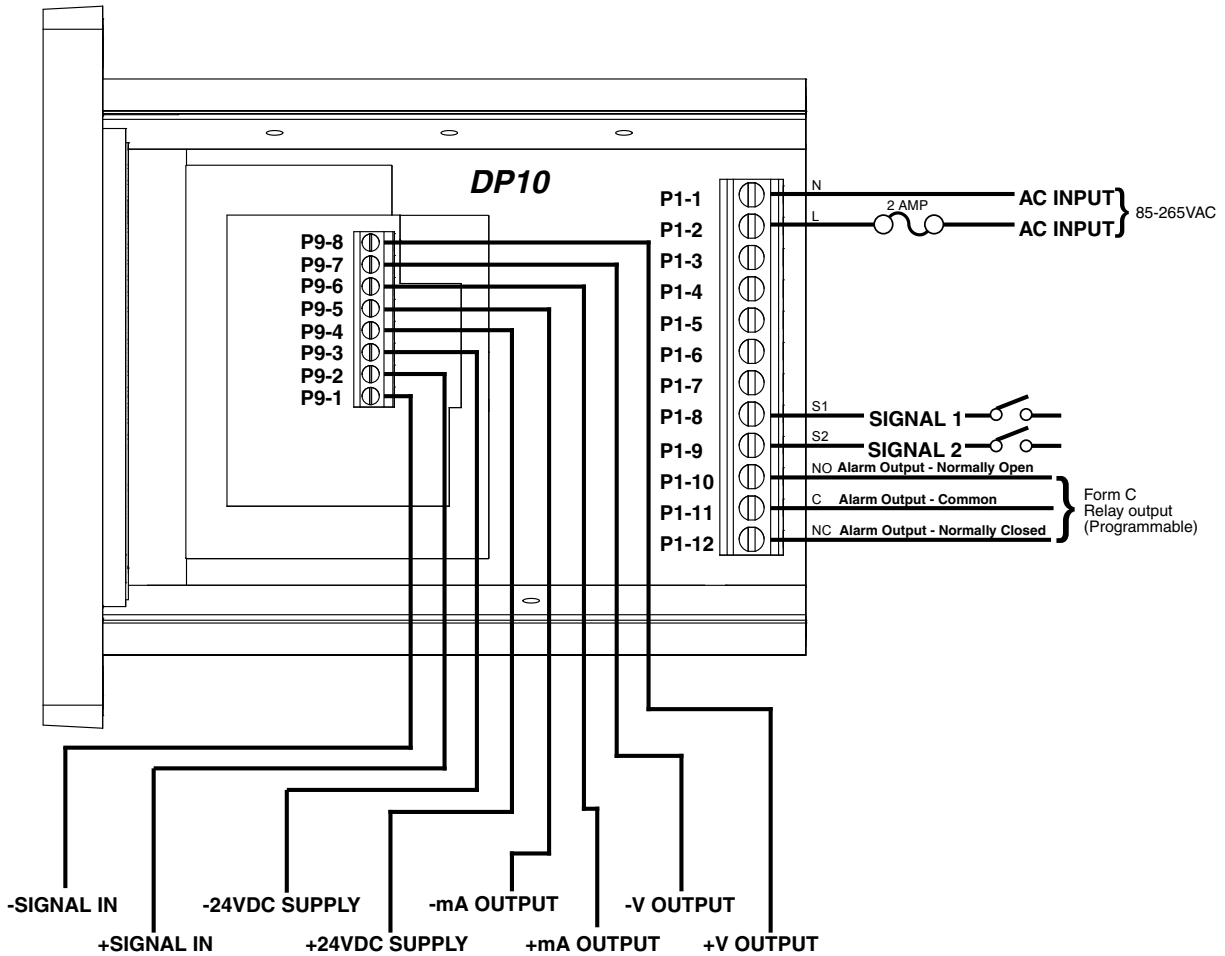
- 1) GASKET
- 2) (2) 6-32 X 3/4 PANHEAD BLACK OXIDE STAINLESS SCREWS
- 3) (2) #6 NUT WITH LOCKWASHER

Cut-out and Mounting Dimensions



Installation & Diagrams

P1 & P9 Terminal Block Hook-Up Diagram



P1 Terminal Block Descriptions

- P1-1 (AC / N) – For single phase AC lines connect the Neutral side of your AC line to this terminal. For systems with two hot AC lines, connect either of the Hot AC lines to this terminal.
- P1-2 (AC / L) – For single phase AC lines connect the Hot side of your AC line to this terminal. For systems with two hot AC lines, connect either of the Hot AC lines to this terminal.
- P1-3 Not Used
- P1-4 Not Used
- P1-5 Not Used
- P1-6 Not Used
- P1-7 Not Used
- P1-8 (S1) – This is the programmable signal 1 input. It can be configured to perform a number of special features including inhibit.
- P1-9 (S2) – This is the programmable signal 2 input. It can be configured to perform a number of special features including inhibit.
- P1-10 (1NO) – This is the normally-open contact of the user assignable relay output.
- P1-11 (1C) – This is the common contact of the user assignable relay.
- P1-12 (1NC) – This is the normally-closed contact of the user assignable relay output.

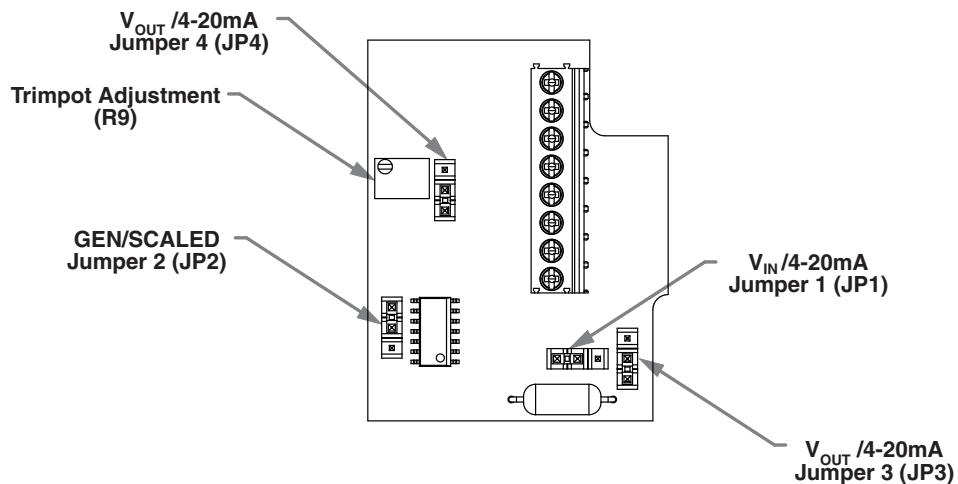
- P9-1 (-SIGNAL IN) – In Scaled Mode, connects to Negative or Common of voltage or current signal to be attenuated.
- P9-2 (+SIGNAL IN) – In Scaled Mode, connects to Positive of voltage or current signal to be attenuated.
- P9-3 (-24VDC SUPPLY) – When Scaling or Generating a Current (mA) signal, an external customer provided 24VDC supply is required. The Negative or Common of this supply connects here.
- P9-4 (+24VDC SUPPLY) – When Scaling or Generating a Current (mA) signal, an external customer provided 24VDC supply is required. The Positive of this supply connects here.
- P9-5 (-mA OUTPUT) – The negative connection for either Scaled or Generated mA current output signal.
- P9-6 (+mA OUTPUT) – The Positive connection for either Scaled or Generated mA current output signal.
- P9-7 (-V OUTPUT) – The Negative connection for either Scaled or Generated voltage output signal.
- P9-8 (+V OUTPUT) – The Positive connection for either Scaled or Generated voltage output signal.

Basic Operating Information

The DP10 Signal Conditioner is a panel-mounted multiple function device used to either attenuate (scale or reduce), convert, or generate control signals typically used in laboratory/R&D or plant/industrial applications. The input signals are analog in nature and specifically in the 0-5VDC or 4-20mA range. The output signal can be either 4-20mA or zero to the Vset voltage.

Device Configuration

Configuration is accomplished via jumper settings and (for Voltage Outputs only) a trimpot adjustment. All of these are accessible on the top "daughter" board inside the DP10. Location is as follows:



Mode of Operation

There are three Modes of Operation for the DP10, established by the JP1, JP2, and JP3 jumper settings:

1. JP1 - If the DP10 is receiving a signal to be Scaled or Converted, this setting defines the input signal type (0-5Vdc or 4-20mA Current).
2. JP2 - Defines whether the DP10 is receiving an external signal to be scaled/converted; or is simply generating a signal.
3. JP3 - Determines the Output Signal type - Vdc or mA Current.
4. JP4 - Determines the Output Signal type - Vdc or mA Current.

Important Note - The DP10 ALWAYS requires an external 24VDC supply voltage connected across P9-3 and P9-4. If 24Vdc is not available, use option DC24 wall adapter power supply.

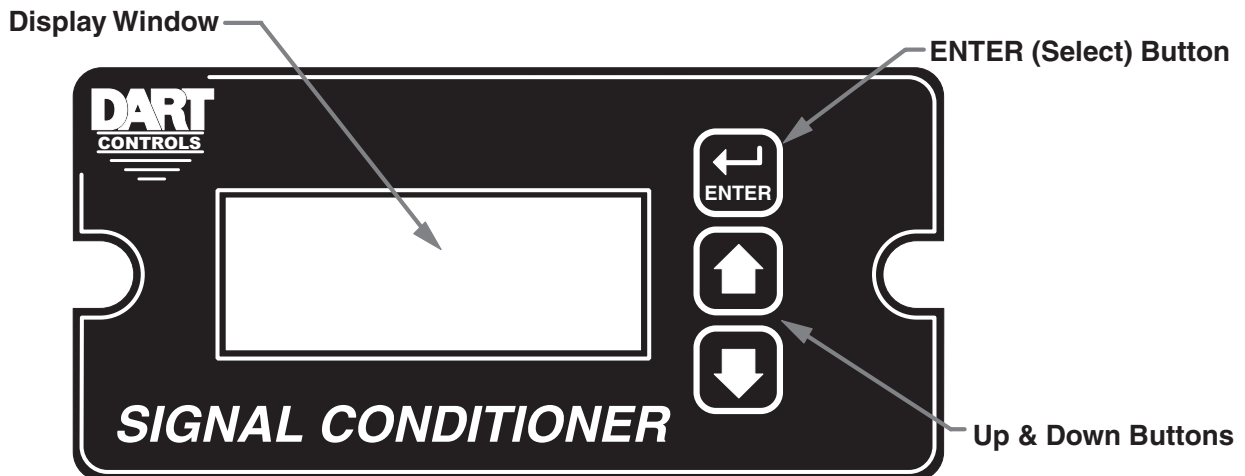
The four jumper settings allow the DP10 to operate as:

- 4-20mA Input/Scaled 4-20mA or 0-20Vdc Output
- 0-5Vdc Input/Scaled 4-20mA or 0-20Vdc Output
- No Input/Generator 4-20mA or 0-20Vdc Output

Note: Both JP3 and JP4 must be set correctly.

Signal accuracy and stability is established using a 12-bit microcontroller with a crystal oscillator. The multi-turn trimpot (R9) adjusts the output level when Voltage output is selected. Adjust R9 for desired voltage output (Vset); measure Vset across P9-7 and P9-8.

Visual Reference



The Up/Down buttons are used to Scale or Set the output level, in percent. The Minimum Scaling/Generator output is 0.0%. The Maximum Scaling/Generator output is 100.0%. On power up, the factory default setting is "Last Value".

The Enter button is generally not used. However, there are some parameter programming changes available (such as Power Up Value) that can be changed in the field - to make those changes the Enter button will be used. **Please call the Dart Factory for assistance if programming changes are desired.**

Troubleshooting

Problem	Possible Case	Solution
Display is blank	Power not applied	Using a volt meter, verify that a voltage between 85 and 265VAC is measured between the L and N terminal block positions.
	Defective unit	Contact technical support for additional help and instructions.
Display is dim	Display intensity parameter is too low	Editing and increasing the display intensity parameter should cause the display digits to become brighter.
When power is applied, "LF-L" is displayed	AC line supplying power to unit has too much noise	Review routing of power wires in machine to minimize electrical noise. Look for other devices which share the same circuit which may be producing unacceptable levels of line noise. In some applications, such as welding equipment, a careful regiment of applying an AC line filter, re-routine wires, dividing circuits, using shielded cable, and properly grounding devices will usually solve the problem.
	AC line supplying power to unit has an abnormally low frequency	The unit is designed to operate with AC lines from 48-62 Hertz (cycles per second). This is typically not a problem because the international standards are 50 and 60 Hertz.
When power is applied, "LF-H" is displayed	AC line supplying power to unit has too much noise	Review routing of power wires in machine to minimize electrical noise. Look for other devices which share the same circuit which may be producing unacceptable levels of line noise. In some applications, such as welding equipment, a careful regiment of applying an AC line filter, re-routine wires, dividing circuits, using shielded cable, and properly grounding devices will usually solve the problem.
	AC line supplying power to unit has an abnormally high frequency	The unit is designed to operate with AC lines from 48-62 Hertz (cycles per second). This is typically not a problem because the international standards are 50 and 60 Hertz.
The alarm output does not seem to function	Alarm output parameters not configured properly	Alarm output parameters not configured properly Review alarm output parameters. The alarm relay output can be tested by selecting the "Always On" value for the Activation Condition parameters for the alarm output. When doing this, the relay click should be audible and the NC (Normally Closed) and C (Common) terminals should become internally shorted at the terminal block.

Technical Support Options

- Visit the Dart Controls Web Site at: www.dartcontrols.com
- Email technical support at: sales@dartcontrols.com
- Telephone technical support at 317-873-5211

What's Special About www.dartcontrols.com?

- Changes to printed material and product offerings first appear online
- Product manuals and other literature are easily accessible
- All information can be easily displayed or printed as needed

- Notes -

- Notes -

REPAIR PROCEDURE

In the event that a Product manufactured by Dart Controls Incorporated (DCI) is in need of repair service, it should be shipped, freight paid, to: Dart Controls, Inc., 5000 W. 106th Street, Zionsville, IN. 46077, ATTN: Repair Department. Please include Name, Shipping Address (no P.O. Box), Phone Number and if possible, e-mail address.

Those orders received from anyone without an existing account with DCI must specify if they will be paying COD or Credit Card (Master Card/Visa/American Express). This information is required before work will begin. If you have an account with Dart your order will be processed according to the terms listed on your account. Products with Serial Number date codes over 5 years old will automatically be deemed Beyond Economical Repair (BER). A new, equivalent device will be offered at a substantial discount.

Completed repairs are returned with a Repair Report that states the problem with the control and the possible cause. Repair orders are returned via UPS Ground unless other arrangements are made. If you have further questions regarding repair procedures, contact Dart Controls, Inc. at 317-873-5211.

YOUR MOTOR SPEED CONTROL SOLUTIONS PROVIDER



125D SERIES
AC INPUT - VARIABLE DC OUTPUT
1/50 HP through 1.0 HP



250G SERIES
AC INPUT - VARIABLE DC OUTPUT
1/50 HP through 2.0 HP



65 SERIES
DC INPUT - VARIABLE DC OUTPUT
CURRENT RATINGS OF 20, 40, AND
60 AMPS



700/COMMUTROL SERIES
DC BRUSHLESS
5 & 20 Amp for
12,24,& 36VDC Inputs



MDP SERIES
PROGRAMMABLE
CLOSED LOOP DC
SPEED CONTROL



DM SERIES
FIELD PROGRAMMABLE
DIGITAL TACHOMETER

Dart Controls, Inc. is a designer, manufacturer, and marketer of analog and digital electronic variable speed drives, controls, and accessories for AC, DC, and DC brushless motor applications.

Shown above is just a sampling of the expanded line of Dart controls that feature the latest in electronic technology and engineering. Products are manufactured in the U.S.A. at our Zionsville (Indianapolis,

Indiana) production and headquarters facility - with over 2,000,000 variable speed units in the field.

In addition to the standard off-the-shelf products, you can select from a wide variety of options to customize controls for your specific application. For further information and application assistance, contact your local Dart sales representative, stocking distributor, or Dart Controls, Inc.

Dart Controls, Inc.

Manufacturer of high quality DC and AC motor speed controls and accessories since 1963.

P.O. Box 10
5000 W. 106th Street
Zionsville, Indiana 46077
Phone: (317) 873-5211
Fax: (317) 873-1105