INSTALLATION MANUAL

ControlD

Controller Module for Proportional Valve Control

EMERSON
Industrial Automation

numatics®

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ControlD

ESD

CAUTION

OBSERVE PRECAUTIONS FOR HANDLING ELECTROSTATIC SENSITIVE DEVICES

This product contains electronic components sensitive to electrostatic discharge. An electrostatic discharge generated by a person or object coming in contact with the electrical components can damage or destroy the product.
To avoid the risk of electrostatic discharge, please observe the handling precautions and recommendations contained in standard EN 100015-1. Do not connect or disconnect the device while it is energised.

CAUTION! Dangerous operating conditions may occur when using the programming interface on the valve as the valve may possibly not react to the analog setpoint any more.
Provide for protection against uncontrolled movement of equipment when putting the valve into operation and before making any modifications to the valve settings.

DECLARATION OF INCORPORATION

according to Machinery Directive 89/392/EEC, Annex II B

We herewith declare that the version of the product described in this installation manual is intended to be incorporated into or assembled with other machinery and that it must not be put into service until the machinery into which it is to be incorporated has been declared in conformity with the provisions of Council Directive 89/392/EEC, Annex IIB.
Handling, assembly and putting into service and all settings and adjustments must be done by qualified, authorised personnel only.

CE

This product complies with the essential requirements of the EMC Directive 89/336/EEC and its amendments. It is **CE**-approved. A separate Declaration of Conformity is available on request.
A separate Declaration of Incorporation relating to the EU Directive 89/392/EEC Annex II B is available on request. Please provide ordering code and serial numbers of products concerned.

NOTICE

The information in this manual is subject to change without notice.
In no event shall Numatics be liable for technical or editorial errors or omissions. Neither is any liability assumed for accidental or consequential damages arising out of or in connection with the supply or use of the information contained herein.

1. Description

From open-loop control to closed-loop control to cascaded process control – everything is possible with the **CONTROL^{D}** controller module from Numatics. As a stand-alone component, the controller module is designed to control proportional valves by regulating the current in the valve's solenoid coil. The maximum value of the solenoid coil's current is automatically determined with the auto-adapt function. Higher precision requirements can be met by controlling flow, temperature, pressure, force etc. using additional analog feedback inputs. More complex requirements are satisfied through a cascaded control with feedback from the actuator and a process variable.

The **CONTROL^{D}** can be installed on a DIN rail in a control cabinet. The analog inputs and outputs are connected with screw terminals.

A serial RS232 or a USB interface allows communication with a PC. All configurations (command signal settings in all commonly used signal variables, open-loop or closed-loop control, cascaded control etc.) are simple to set up with the Windows-based Numatics DigiCom software. Analog inputs and outputs and PID control variables can be viewed using the software's scope function. Control parameters can easily be customized to a specifict application

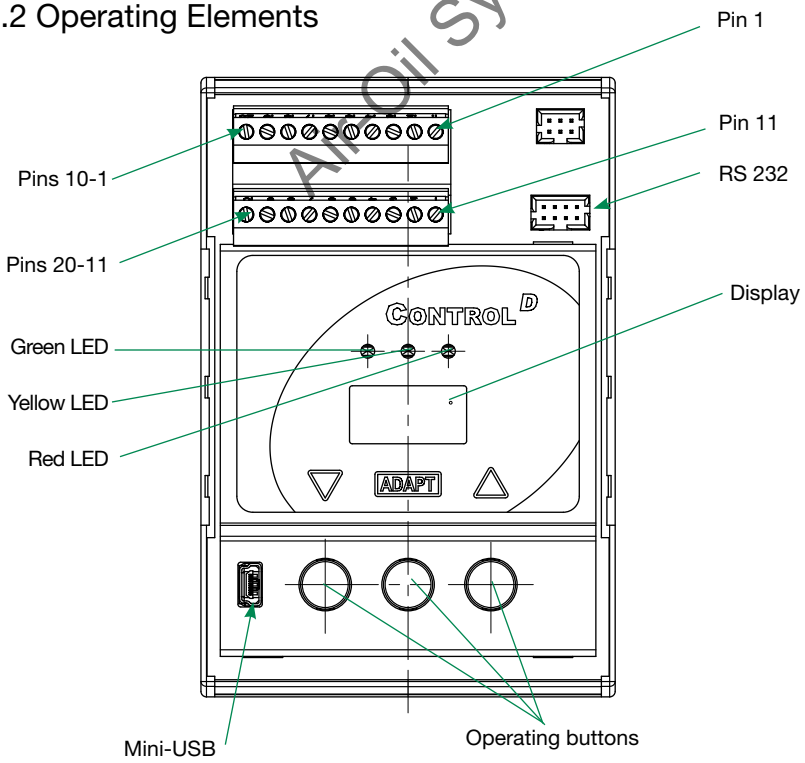
Three buttons and a three-digit LED display on the module enable manual setpoint setting and display of feedback without the need for PLC control during start-up.

Additional LEDs show the operating state and any error messages (e.g. low voltage, overvoltage, setpoint not reached) that may occur.

1.1 How to Order

DESCRIPTION	CATALOG NUMBER
CONTROL^{D} control device - 12 V DC	60300117
CONTROL^{D} control device - 24 V DC	60300118

1.2 Operating Elements



Green LED
- OFF: Setpoint ≠ feedback
- ON: Setpoint = feedback
- Flashing: Overtemperature

Yellow LED
- OFF: Normal
- ON: Manual operation
- Flashing: AUTOSAFE enabled

Red LED
- OFF: Normal
- ON: Low voltage
- Flashing: Overvoltage

1.3 Manual Adjustment

1.3.1 Manual Operation

After an interruption in the power supply, press both arrow buttons located beneath the display during power up to switch to the manual mode. This operating mode is indicated by the letters “H n d” in the display.

The "H n d" display disappears when the arrow buttons are released.

Press the left arrow button or DOWN arrow to reduce the output value, press the right arrow button or UP arrow to increase the output value. The yellow LED is on permanently during manual mode.

Exit this operating mode by pressing both arrow buttons simultaneously or by turning off the power supply for a short time.

1.3.2 Auto-Adapt

This function should only be activated when the module is set to current control. In the event of an interruption in the power supply, the module will enter into the Auto-Adapt mode by pressing the ADAPT button underneath the display when switching on the power supply. The Auto-Adapt mode is indicated by the letters "AdA" in the display. The valve output is supplied with power for 3 seconds. After this period, the maximum current is measured and displayed for 3 seconds. The module then switches back to the normal operating mode.

Caution: When measuring the maximum current, the output is activated with the supply voltage. The module can be damaged when using solenoid coils that require a supply voltage of more than 2000 mA.

All parameters must be read, copied and written again on return to the normal operating mode from the Auto-Adapt mode in order to update max. current, setpoint offset and setpoint span.

1.4 Operating Modes

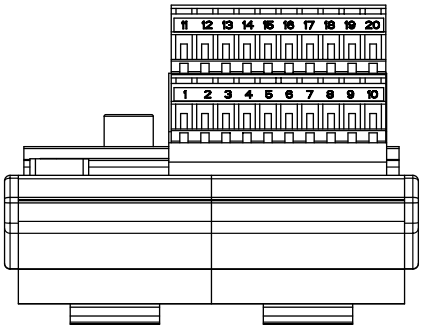
Shut-off:
If the command signal falls below 0.5 %, the control valve is switched off.

Overtemperature:
If the temperature of the internal control electronics exceeds 120°C, the operating mode is switched to AUTOSAFE and the green LED starts to flash.

Undervoltage / overvoltage:
If the supply voltage is less than 20 V or more than 30 V, the valve is switched off and fully exhausted. The red LED lights up constantly to indicate undervoltage or flashes to indicate overvoltage.

Autosafe:
When autosafe is activated, the pulse width signal for the coil current is limited to a duty cycle of 70% ED after 20 seconds. Every 4 seconds, the duty cycle is switched to 100% ED for 0.5 seconds. The yellow LED flashes.

2. Electrical Connection



PIN	DESCRIPTION	PIN	DESCRIPTION
1	Supply +VDC	11	Command Signal
2	Supply +0VDC common	12	Command signal common
3	Earth ground	13	Digital input +VDC
4	Frequency input	14	Digital input +0VDC common
5	Sensor 1 supply +VDC	15	Valve / coil +VDC
6	Sensor 1 analog input	16	Valve / coil +0VDC common
7	Sensor 1 supply +0VDC common	17	Digital output +VDC
8	Sensor 2 supply +VDC	18	Digital output +0VDC common
9	Sensor 2 analog input	19	Analog output common
10	Sensor 2 supply +0VDC common	20	Analog output

3. Factory Settings

The **CONTROL^{D}** is supplied in a Current Controller configuration as standard.

Numatics DigiCom files for the Current Controller configuration (standard), a simple Process Controller configuration and a Cascaded Process Controller configuration are included on the supplied CD-ROM.

The following configurations and pinouts apply for the supplied Numatics DigiCom files:

Open loop control		
Pin 1	Voltage supply	Supply +VDC
Pin 2	Voltage supply	GND
Pin 3	Earth ground	
Pin 11	Command signal	0 - 10 V
Pin 12	Command signal	GND
Pin 15	Solenoid coil	
Pin 16	Solenoid coil	
Closed loop control		
Pin 1	Voltage supply	Supply +VDC
Pin 2	Voltage supply	GND
Pin 3	Earth ground	
Pin 5	Voltage supply	Supply +VDC
Pin 6	Feedback	0 - 10 V
Pin 7	Sensor supply	GND
Pin 11	Command signal	0 - 10 V
Pin 12	Command signal	GND
Pin 15	Solenoid coil	
Pin 16	Solenoid coil	
Cascade control		
Pin 1	Voltage supply	Supply +VDC
Pin 2	Voltage supply	GND
Pin 3	Earth ground	
Pin 5	Voltage supply	Supply +VDC
Pin 6	Feedback from slave loop	0 - 10 V
Pin 7	Sensor supply	GND
Pin 8	Sensor supply	Supply +VDC
Pin 9	Feedback from master loop	0 - 10 V
Pin 10	Sensor supply	GND
Pin 11	Command signal	0 - 10 V
Pin 12	Command signal	GND
Pin 15	Solenoid coil	
Pin 16	Solenoid coil	

If you have any questions on the configuration or parameter settings of this product, please contact our Technical Support at: techsupport@numatics.com or (248) 596-3333

4. Field-Programmable Settings

Display

The solenoid coil's actual current is displayed in Ampere units during regular operation.

Other displays:

Hnd	indicates that the Manual mode has been selected.
Err	Internal overflow.
AEr	Autozero overflow
AdA	Auto-adapt is active

Push Buttons

To enter the Manual mode, press and hold both push buttons simultaneously during power up.
"Hnd" appears in the display.
Use the UP button to increase the coil current and the DOWN button to decrease it. The actual coil current is displayed.
Quick presses on the buttons allow you to make slight changes in the current setting.
Longer presses allow you to make quick changes to the current setting.
Press both push buttons simultaneously to exit the manual mode.

5. Technical Characteristics

5.1 General

Nominal voltage: 24/12 VDC
Max. current: 2A
Ambient temperature: -4°F to 122°F (-20°C to +50°C)

5.2 Construction

Body: PA (Polyamid)
Protection: 1P20
Seals: pluggable terminal block (0.08 - 1.5 mm^2)

5.3 Electrical Characteristics

Supply voltage:	(U_N) : 24 VDC ± 10%, max. ripple 10% : 12 VDC ± 15% -5%, max. ripple 10%
Max. output current at full load:	(I_{FL}) : 2 A
Setpoint input:	(U_C) = 0 - 10 VDC, (I_{CX}) = 0 - 20 mA, (I_C) = 4 - 20 mA
Feedback input:	(U_C) = 0 - 10 VDC, (I_{CX}) = 0 - 20 mA, (I_C) = 4 - 20 mA, (F_X) = 0 - 1.000 Hz
Feedback output, rotatable by 180°:	0 - 10 V, 0/4 to 20mA
Current control:	0 - 2 A
Pressure control:	0 - 100%
Process control:	0 - 100%
Ramp:	optional ON/OFF adjustable between 0.1 and 20 seconds
Adjustable switching frequency:	20 to 2.000 Hz

6. Accessories

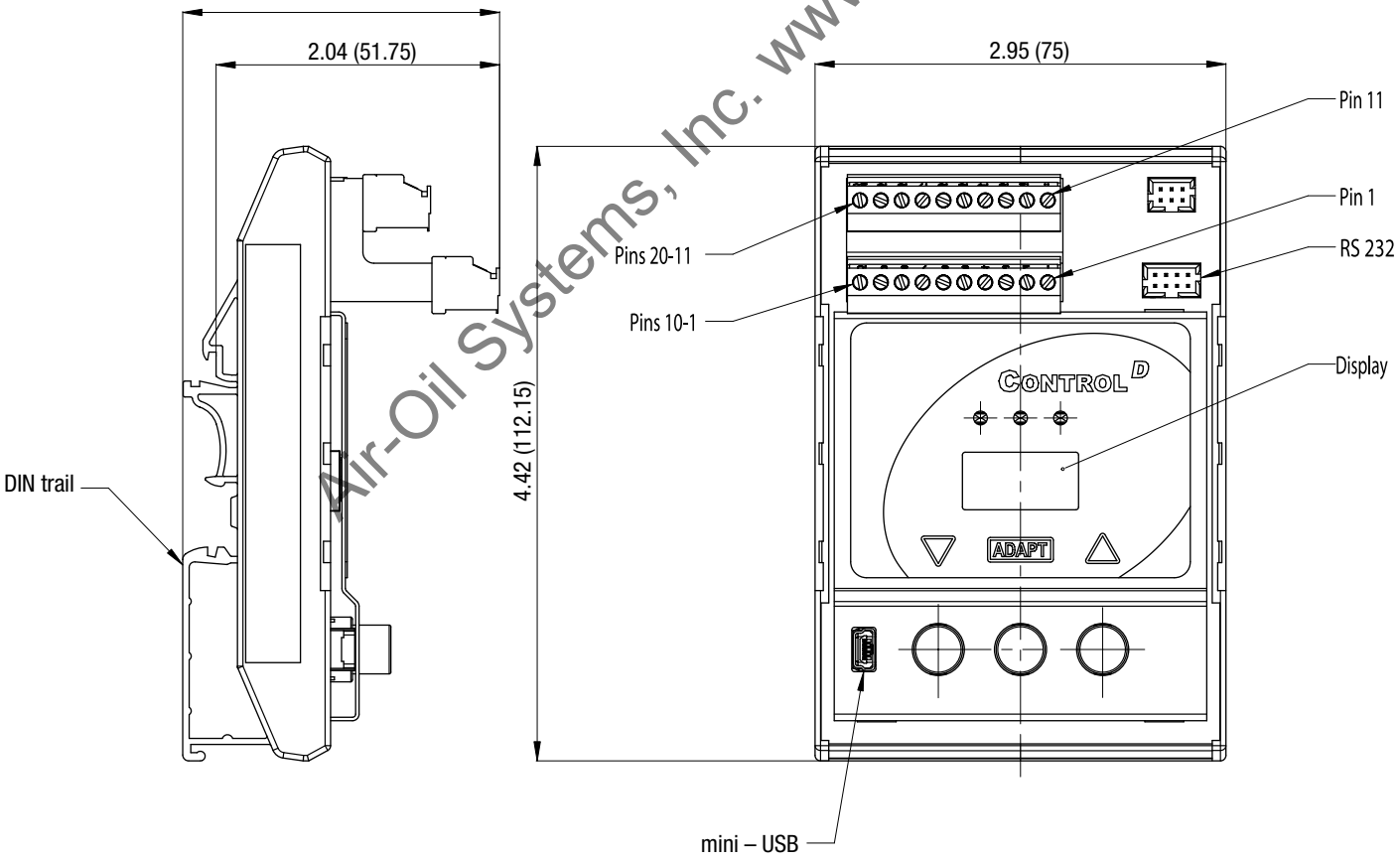
DESCRIPTION	HOW TO ORDER NUMBER
"Numatics-DigiCom-Expert" CONTROL^{D} software on CD-ROM	881 00 892
RS-232 cable converter, 2 m cable with 9-pin Sub-D	881 00 732
USB cable for CONTROL^{D} to PC connection	881 00 894

7. Maintenance and Care

No special maintenance or care required.

8. Dimensions and Weight

Weight: 0.33 (0.15)



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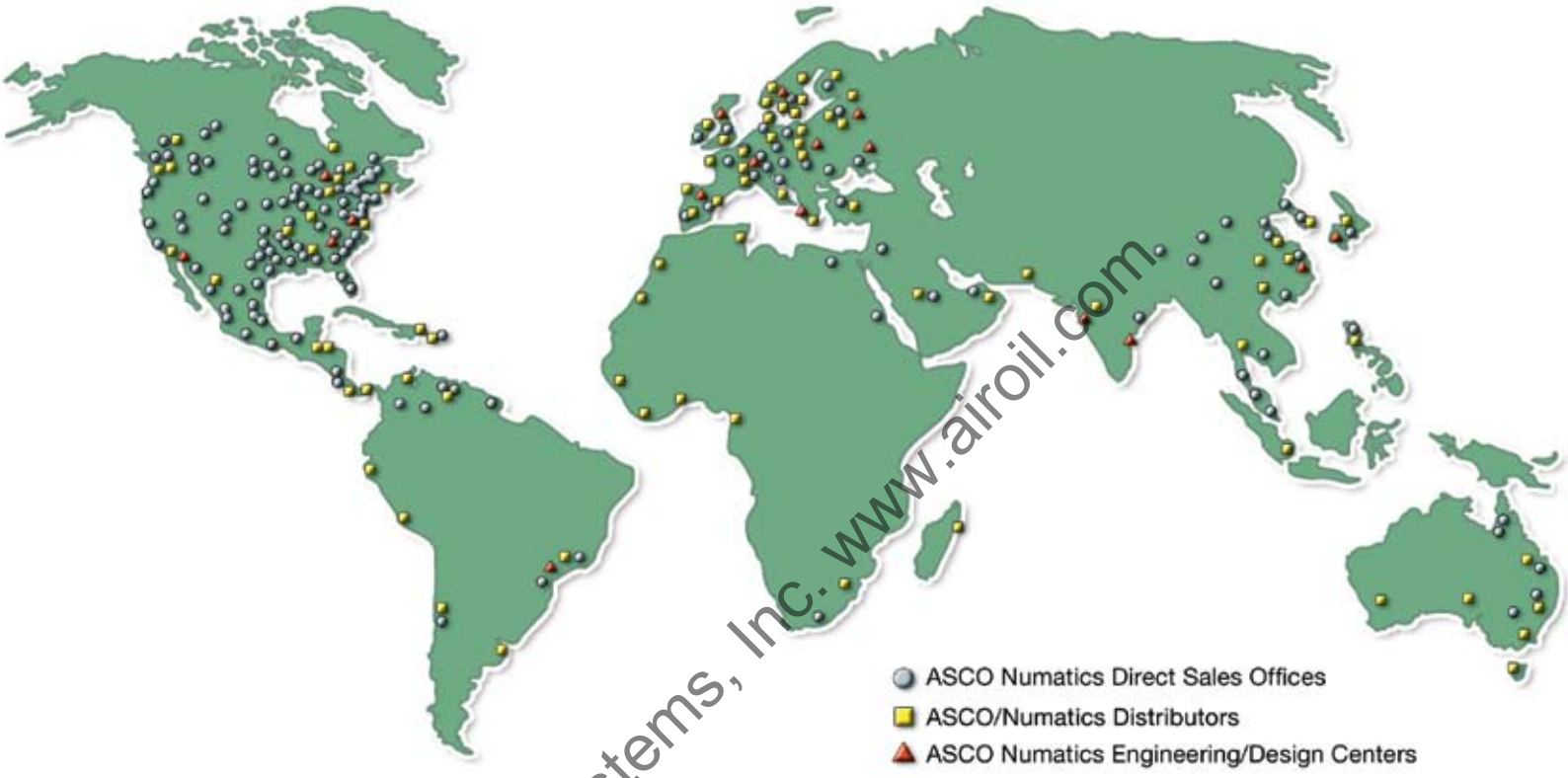

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