BRAND HYDRAULICS
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ISO 9001:2000 WITH DESIGN
Certificate #02.002.1

Sealed Interface Control: EC20300

FEATURES:

- Weather tight control package
- Pulse Width Modulated output
- Waterproof altitude pressure and vapor release vent allows enclosure to "breathe".
- Protected against reverse polarity, short circuit, and over voltage conditions.
- Current controlled output, maintains output current regardless of supply voltage and coil resistance variations.
- On board proportional indicators for input signal and output signal. Also includes an on/off power and potentiometer status indicator.
- Two Enable lines are provided, one with adjustable soft stop, both with adjustable soft start.
- Independent ramp adjustments up and down, 0.1 -12 seconds.
- Minimum and Maximum current adjustment for fine tuning the outputs span.
- Wide voltage supply range 12-30 VDC, one control for 12 or 24VDC systems.

APPLICATION:

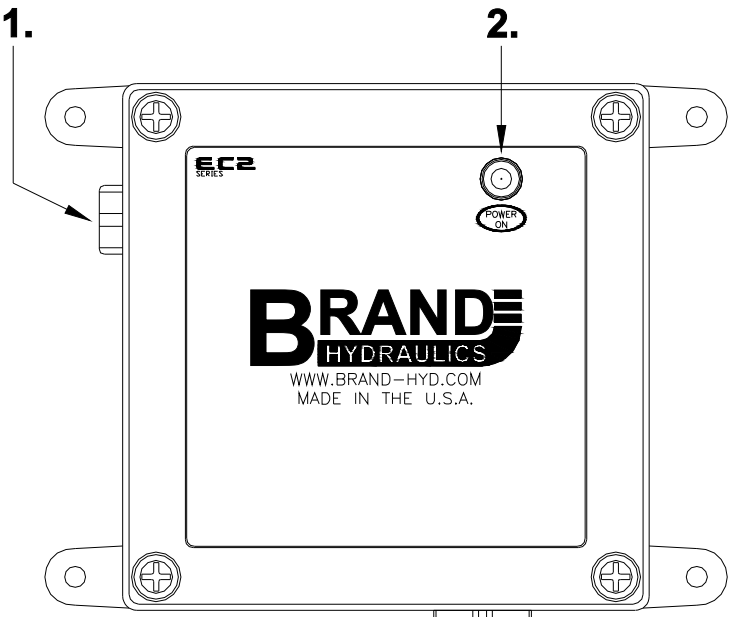
The EC20300 conveniently interfaces a PLC or transducer with a proportional solenoid.

DESCRIPTION:

The EC20300 has been designed to meet the various requirements of mobile and industrial hydraulic control applications. EC20300 controls are versatile, cost effective and easily integrated into new or pre-existing designs. Much of this is a result of the unique ability each card has to accept 4 different signals. The EC20300 can accept any of the following input types: Potentiometer, 0-10V, 0-5V, or 4-20mA. The control takes these signals and converts them into a PWM output suitable for a Brand EFC-Series valve or other proportional valves that meet the proper specifications.

GENERAL SPECIFICATIONS:	
Voltage Supply	12-30 VDC
PWM Output Current	2.0 Amps Max Continuous
PWM Output Description	PWM , Pulse Width Modulation, 0-100% Duty cycle
PWM Output Frequency	107Hz +/- 5 Hertz
Environmental Ratings	IP66 / NEMA 4
Operating Temperature	-40°C - 85°C (-40°F - 185°F)
Storage Temperature	-40°C - 85°C (-40°F - 185°F)

CONTROL LAYOUT:



Functions

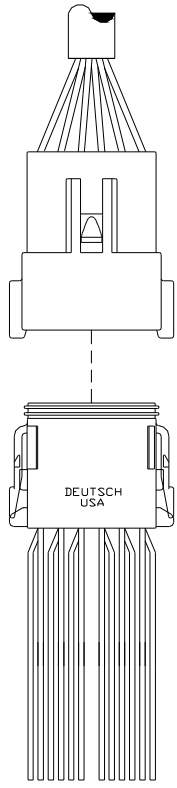
1. Waterproof altitude pressure and vapor realese vent.
2. Master power indicator.

E1947 Output Cable

Pin 1, Wire #1, Positive 12-30 VDC Supply Input
Pin 2, Wire #2, 4-20 mA Input
Pin 3, Wire #3, 0-5 Volt Input
Pin 4, Wire #4, 0-10 Volt Input
Pin 5, Wire #5, Signal Ground
Pin 6, Wire #6, 10 Volt Reference
Pin 7, Wire #7, Potentiometer Wiper Input
Pin 8, Wire #8, Potentiometer Ground
Pin 9, Wire #9, Enable Input
Pin 10, Wire #10, Positive EFC Output
Pin 11, Wire #11, Ground
Pin 12, Wire Green/Yellow, System Ground

E1914 Mating Output Cable

Pin 1, Red Wire, Positive 12-30 VDC Supply Input
Pin 2, Yellow Wire, 4-20 mA Input
Pin 3, Violet Wire, 0-5 Volt Input
Pin 4, Gray Wire, 0-10 Volt Input
Pin 5, Black Wire, Signal Ground
Pin 6, Orange Wire, 10 Volt Reference
Pin 7, White Wire, Potentiometer Wiper Input
Pin 8, Brown Wire, Potentiometer Ground
Pin 9, Pink Wire, Enable Input
Pin 10, Blue Wire, Positive EFC Output
Pin 11, Black Wire, EFC Ground
Pin 12, Green Wire, System Ground



Brand P/N: E1947
Deutsch Connector P/Ns:
Receptacle Body: DT04-12PB-E004
Secondary Wedge: W12P
Terminals, Male: 0460-202-16141

Brand P/N: E1914
Deutsch Connector P/Ns:
Plug Body: DT06-12SB-P012
Secondary Wedge: W12S-P012
Terminals, Female: 0462-201-16141
Wire: GXL Cross-Link, 16-AWG

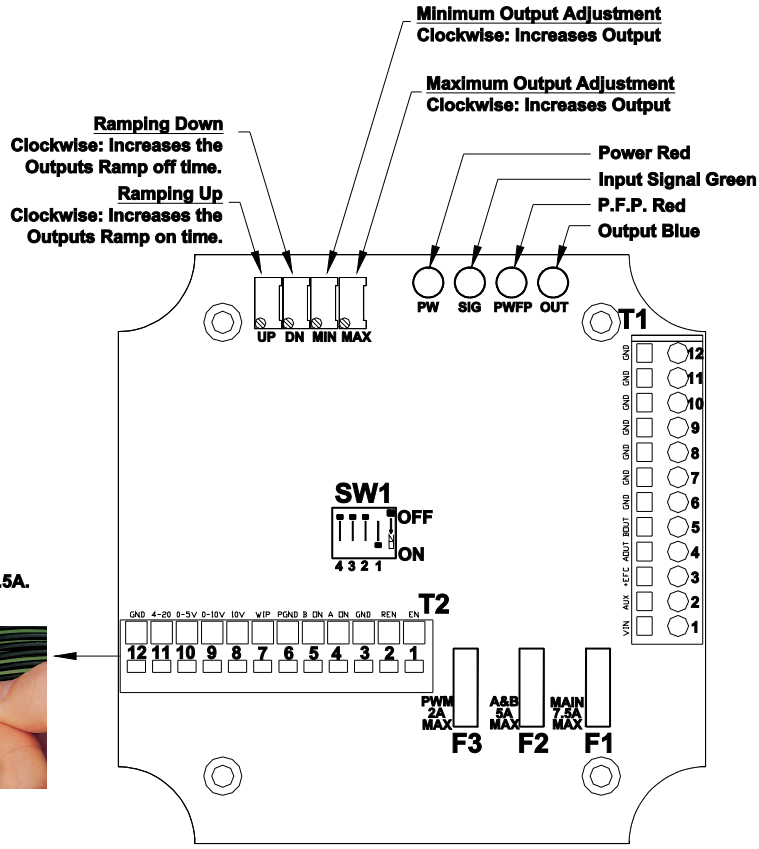
INTERNAL LAYOUT:

Power LED
LED indicates when board has DC power present. LED turns off when the enable input becomes active (switched low).

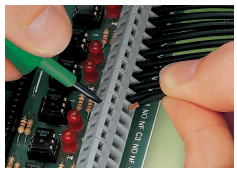
Input Signal LED
Proportional to the level of input signal.

Output Signal LED
Proportional to the level of output current.

P.F.P. Potentiometer Fault Protection
A saftey feature: P.F.P will shutdown the boards wiper input if the potentiometers ground becomes open or disconnected.



Terminal Block Wiring



T1
1. Positive 12-30 VDC Input
2. Auxiliary Supply Voltage output, Not to Exceed 2.5A.
3. Positive output for EFC
4. Output A positive output
5. Output B positive output
6. System Ground Input
7. Ground
8. Ground
9. Ground
10. Ground
11. Ground
12. Ground

T2
1. Enable input, apply a ground to disable the board or leave open for normal operation.
2. Ramping Enable input, apply a ground to disable the board or leave open for normal operation.
3. Ground
4. Output A activation pin. Sending 6-30VDC to this pin will activate the A output (T1/pin4).
5. Output B activation pin. Sending 6-30VDC to this pin will activate the B output (T1/pin5).
6. Ground for Potentiometer. (Note: Wiper input will not function without the potentiometer being grounded at this pin.)
7. Potentiometer wiper input, Not to Exceed 10V. Input impedance is 10K Ohms.
8. 10V Reference for potentiometer.
9. Positive 0-10V signal input, Not to Exceed 10V. Input impedance is 10K Ohms.
10. Positive 0-5V signal input, Not to Exceed 5V. Input impedance is 10K Ohms.
11. Positive 4-20mA input. Current input only do not apply voltage to this pin. Input impedance is 250 Ohms.
12. Signal Ground, Negative loop return.

Dip Switches

1. ON: EFC output will be active when power is applied to the PCB.
1. OFF: EFC output will be active when power is applied to the A ON or B ON input.

2. ON: Applying power to the A ON input activates the EFC output and turns the Coil A output on.
2. OFF: Applying power to the A ON input only turns the Coil A output on.

3. ON: Applying power to the B ON input activates the EFC output and turns the Coil B output on.
3. OFF: Applying power to the B ON input only turns the Coil B output on.

4. Not Used

Factory Settings

Ramping Up, set for minimum delay.
Ramping Down, set for minimum delay.
Minimum Output, Set for 0.2 Amp.
Maximum Ouput, Set for 1.00 Amp.

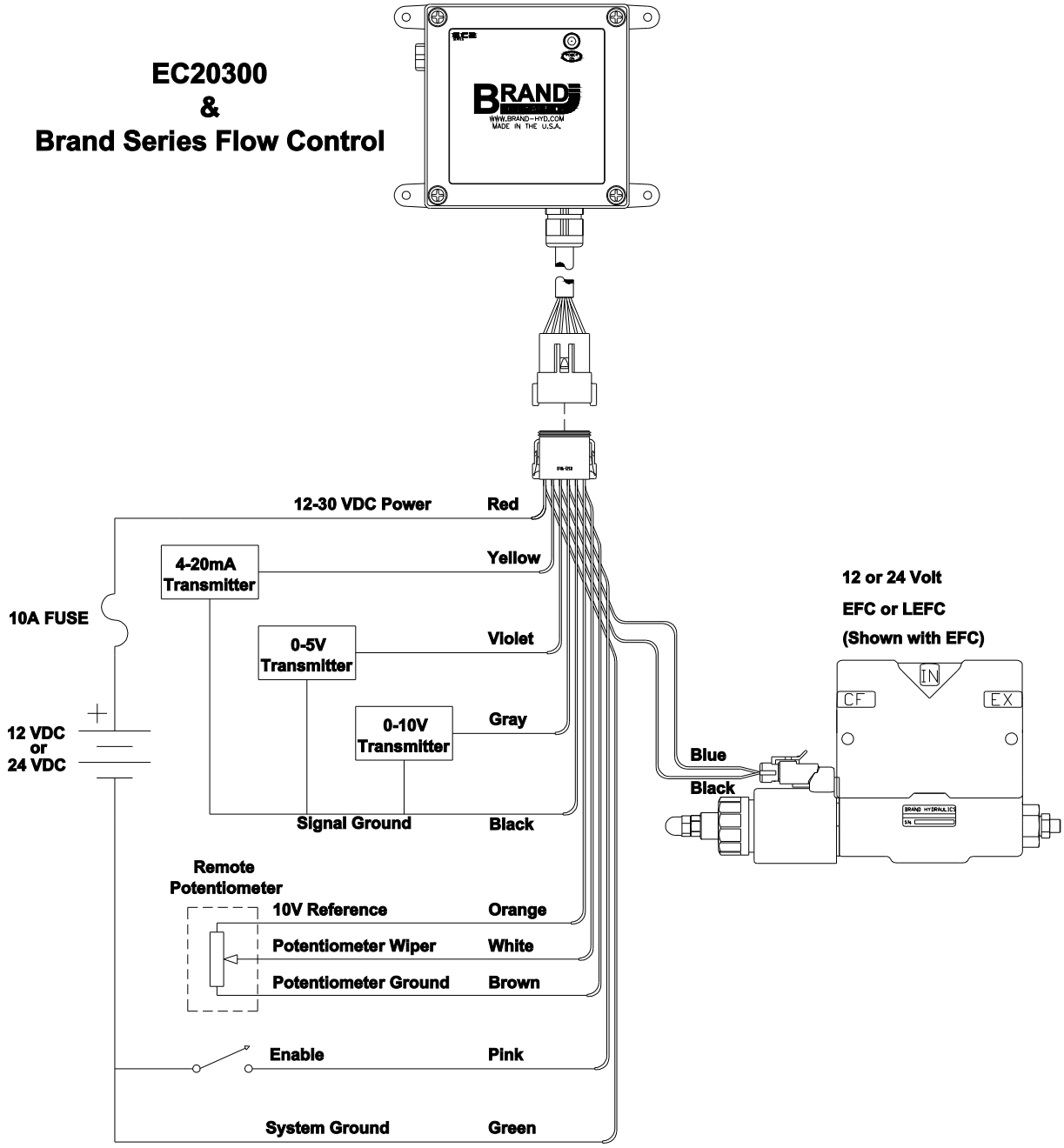
Factory Switch Settings

1. On
2. Off
3. Off
4. Not used

Fuses

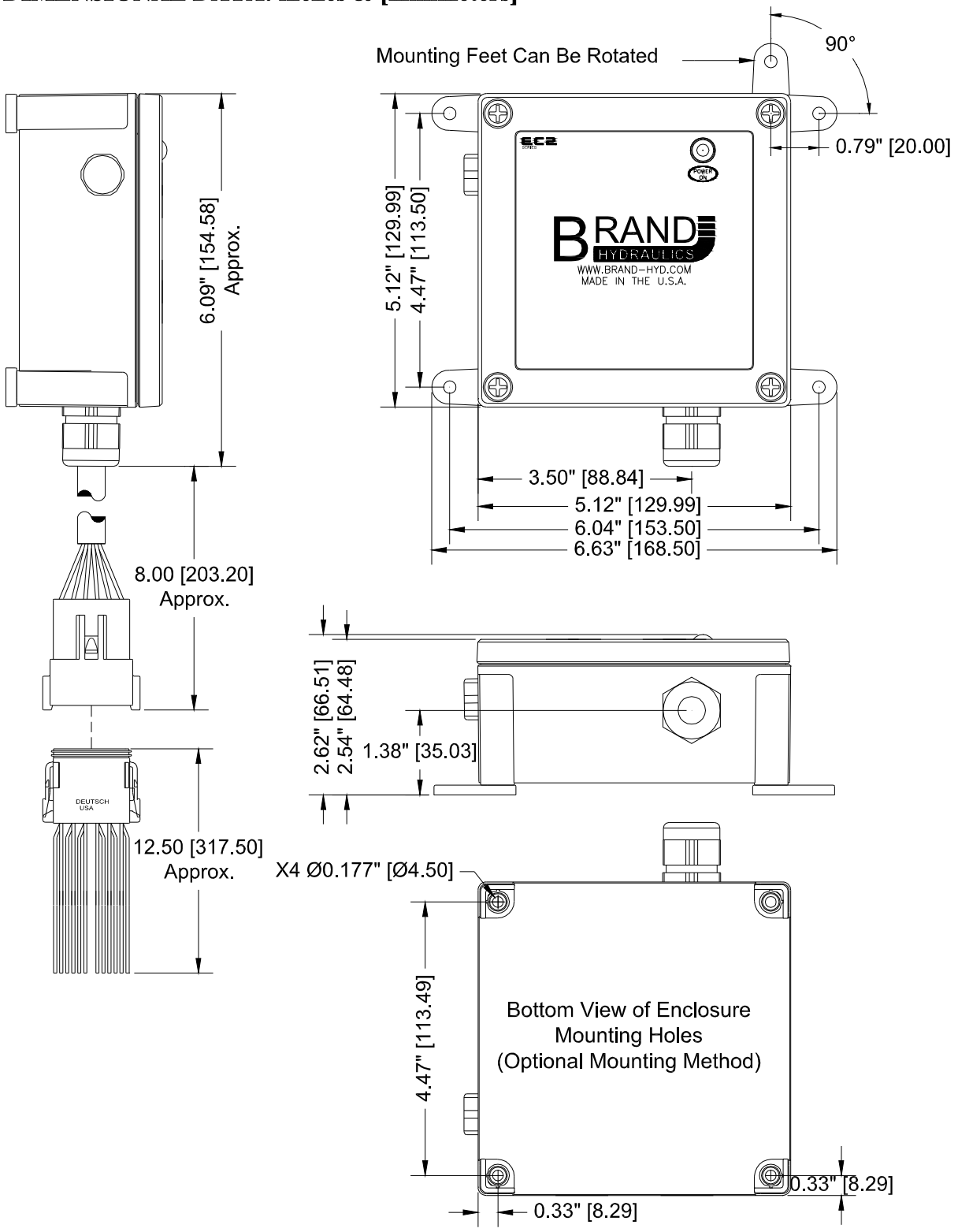
F1. Main fuse, 7.5A max, ATM-7-1/2.
F2. Coil A and B Output fuse, 5A max, ATM-5
F3. EFC output fuse, 2A max, ATM-2.

TYPICAL SYSTEM CONFIGURATIONS:



NOTE: Brand Hydraulics recommends a 10 amp fuse be placed within 18 inches of this controls power source. The fuse and power source are customer supplied parts. Also, ensure that all unused wires are capped, and electrically isolated from each other and ground.

DIMENSIONAL DATA: inches & [millimeters]



INPUT SPECIFICATIONS:	
Potentiometer	
Wiper Input Impedance	10K Ohms
Wiper Input range	0-10V
Potentiometer guidelines	
Resistance	2K-10K Ohms
Minimum Power rating	1/8th Watt
0-10 Volt Input	Terminal block 2, Pin 9
Input Impedance	10K Ohms
Step response	Output current will equal: ((Input voltage x 0.1) (max current - min current)) + (min current) For every volt of input, output will change 1/10 its full range.
0-5 Volt Input	Terminal block 2, Pin 10
Input Impedance	10K Ohms
Step response	Output current will equal: ((Input voltage x 0.2) (max current - min current)) + (min current) For every volt of input, output will change 1/5 its full range.
4-20mA Input	Terminal block 2, Pin 11
Input Impedance	250 Ohms
Step response	Output current will equal: ((Input current - 4mA) (0.0625) (max current - min current)) + (min current) For every milliamp of input, output will change 1/16 its full range.
Enable Input	When Enable is left open (high) the unit is operational. When the enable line is connected to ground (low) the board output immediately goes to 0 Amps.
Input Impedance	Greater than 1M Ohms
High state EN pin voltage	1.04V +/- 0.1V, Reading taken with a 40M Ohm Load
Source current while pulled low	5.11uA
Ramping Enable Input	When Enable is left open (high) the unit is operational. When the enable line is connected to ground (low) the board output ramps down to the minimum output setting at the rate set by ramp adjustments.
Input Impedance	5.444K Ohms
High state REN pin voltage	5.98V +/- 0.15V Reading taken with a 40M Ohm Load
Source current while pulled low	5.11uA
Solid State Outputs (A & B) Input Specifications	A and B outputs are activated by applying power to the A on or the B on inputs located on Terminal Block 2, Pins 4 and 5.
Input Impedance	Greater than 20K Ohms
Output Off Input Voltage Range	0.0 – 1.1V
Output Undetermined (Unstable)	1.1 – 6.0V Caution, avoid input voltages that fall within this range.
Output On Input Voltage Range	6.0 – 30V
Solid State Outputs (A & B) Output Specifications	Terminal block 1, Pin 4 and Pin 5
Switched DC Output Current	2.5 Amps Max Continuous Each Output (A and B)
Switched DC Output Voltage	Voltage Out = Voltage Supply – 0.7 Volts

Adjustments:	
Minimum output or zero setting	Clockwise rotation increases minimum output 0 - 1.5 Amps
Maximum output	Clockwise rotation increases maximum output 0.05 - 2 Amps Maximum output will always be 50 mA greater then the minimum output
Ramping Down, or Fall Time	Clockwise rotation increases ramp time 0.1 - 12 Seconds
Ramping Up, or Rise Time	Clockwise rotation increases ramp time 0.1 - 12 Seconds

ADJUSTMENT PROCEDURE:

Adjustments are made by turning a trim pot screw. The trimmers are 25 turn, end to end devices. The trimmers have a built in slip clutches so over rotations do not damage them. It may be necessary to turn the adjustment screw several turns to observe a change in output. Start by adjusting the min output, and then adjust the max output to the desired level. The best way to fine tune adjustments is to observe the function response or speed. It is important to make adjustments in the following order.

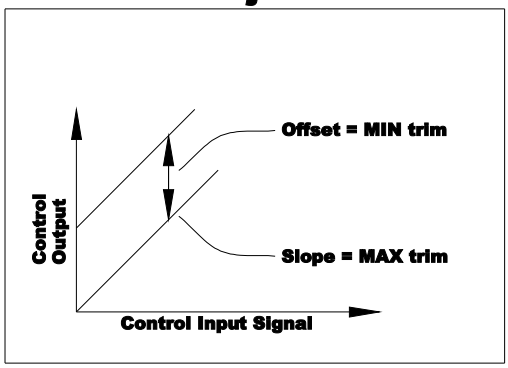
1. Minimum output: Start by setting the master Potentiometer or input signal to zero. Turn the trimmer clockwise until the function begins to move. Now turn the trimmer back counter clockwise, one full rotation past the point of any visible movement.

2. Maximum output: Start by setting the master Potentiometer to the 100 position on the dial. Turn the trim pot counter clockwise to decrease function speed. Turn the trim pot clockwise to increase function speed. Function maximum speed will be limited to the max flow capabilities of your hydraulic system. Do not rotate the trim pot past the point of an observable increase in function speed.

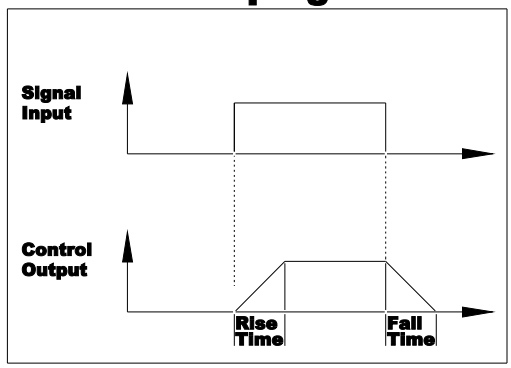
3. Ramp up: This feature changes how quickly the valve can open. Clockwise turns increase the amount of delay. Counterclockwise turns decrease the amount of delay.

4. Ramp down: This Feature changes how quickly the valve can close. Clockwise turns increase the amount of delay. Counterclockwise turns decrease the amount of delay. Use discretion when making this adjustment, this will affect how quickly your function stops.

MIN/MAX Adjustments



Ramping

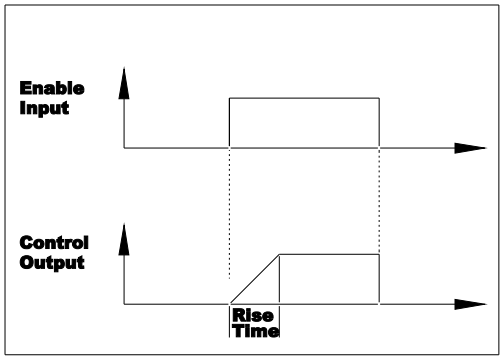


ENABLE INPUTS:

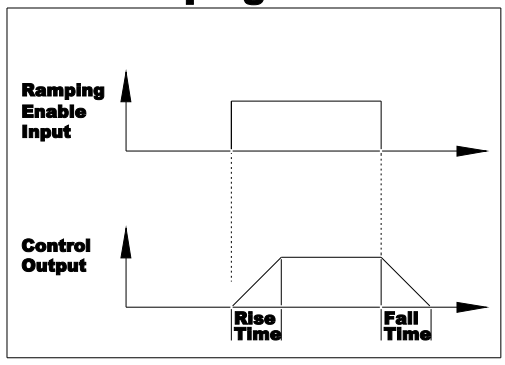
The Enable Inputs can be used to turn the controllers output on and off, without having to switch on/off the main power source. The EC0004A cards are supplied with two unique types of Enable inputs, EN and REN. When the EN line is switched to ground the control will go into sleep mode. It will be as if the controls power source has been turned off. When the EN line is switched back to its normal state, open to ground, the control output will again respond to user input. A soft start can be achieved using the controllers Ramp Up adjustment.

The Ramping enable input, REN, allows for soft start and soft stop enabling. The REN input is also activated by being switched to ground. When the REN is activated the control will respond as if the user input signal has been turned off and the controls output will ramp down to the set minimum output value. When the REN input is returned to its normal state the control output will ramp up to the output level that corresponds with the user input signal. Soft start ramp and Soft stop ramp times are set using the onboard trim pots that are labeled UP and DOWN.

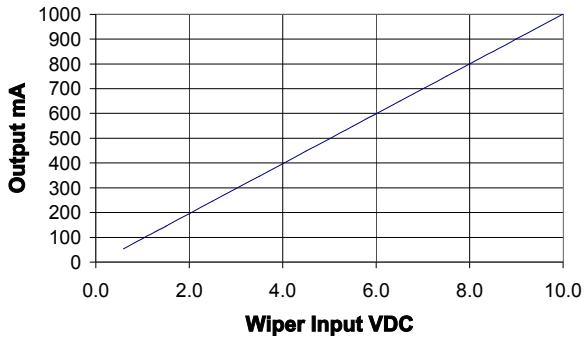
Enable



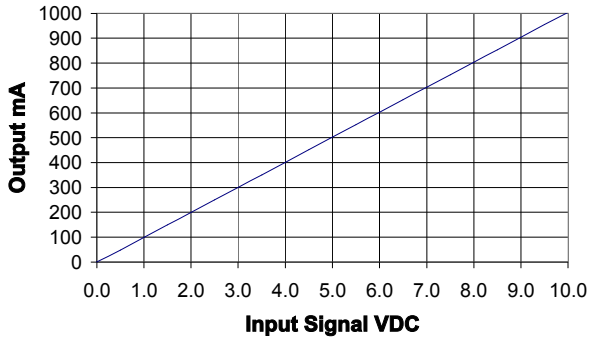
Ramping Enable



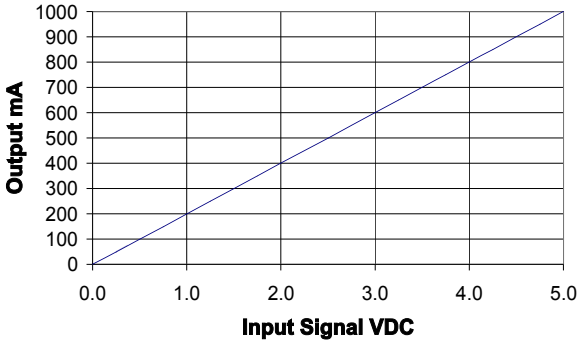
Output Current vs. Potentiometer Wiper Input



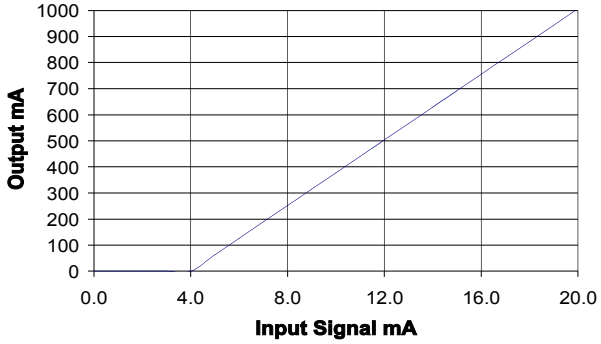
Output Current vs. 0-10V Input Signal



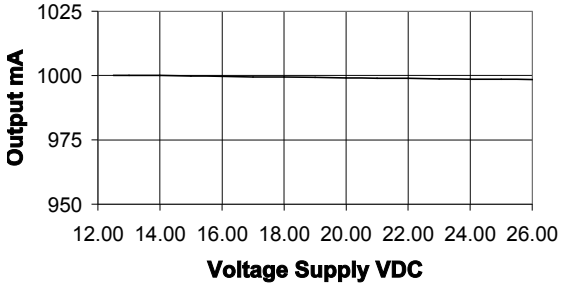
Output Current vs. 0-5V Input Signal



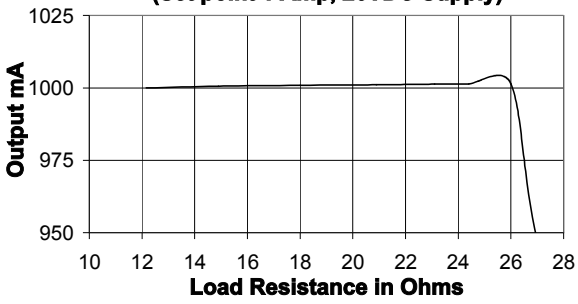
Output Current vs. 4-20mA Input Signal



Output Current vs. Voltage Supply Fluctuation



Output Regulation vs. Load Resistance (Set point 1 Amp, 26VDC Supply)



Note: Unless stated otherwise the above readings were taken at 25°C, with control connected to a 14.6V supply, and the output was set for 1 amp.

PARTS AND ACCESSORIES:

E1803……...Potentiometer assembly 10K Ohm, 2 Watt, comes with 6'' leads
E1048……...Potentiometer dial plate, 2.125'' diameter
E1071……...Potentiometer seal nut
E1050……...Potentiometer knob, black with a light grey pointer
E1907……...Water proof pressure and vapor release vent
E1908……...Vent lock nut
E1902……...Mounting feet kit, includes 4 feet and 4 screws

Contact your local Brand Hydraulics distributor for pricing.

ATTENTION:

WARNING:

- All used and unused wires should be secured and electrically isolated from each other and any other possible connections. Not doing so could result in personnel injury, fire, or even death. If you have questions regarding installation consult with your distributor, the factory or an electronic technician.

CAUTION:

- Only mount the EC20200 on flat surfaces. Mounting to uneven surfaces can cause mounting feet to break.

- Not designed for use in AC voltage systems. Use an AC to DC power supply consult factory for appropriate sizing.

- Values and ranges stated in the General Specifications and other areas of this datasheet are Absolute Maximum Ratings. Absolute Maximum Ratings indicate limits beyond which this device should not be used or damage to the device may occur. Operating Ratings and Ranges indicate conditions for which the device is functional. Devices operated beyond the Absolute Maximum Ratings and Ranges may void the devices warranty.

- Terminal block 2 pin 6 is to be used for the potentiometers ground only. Never use a potentiometer with a resistance lower than 2K Ohms. The resulting damages caused by excessive currents will not be repaired under warranty.

- Never apply voltage to the 4-20 mA signal input terminal. Never apply more than 5 V to the 0-5V signal input terminal. Never apply more than 10V to the 0-10V and potentiometer wiper input terminals. Doing so will void the controls warranty.