

FUTURA[®] EG-Series T O O L S & T E C H N O L O G Y

Machine Control System



Instruction Manual

Ver. 1 September 2017

Table of Contents

System Description	1
System Components	2
Control Box Controls and Connections	3 - 4
Operator Menu Screens	5
Installer Menu	6
P.T. Valve Setup	9 - 10
ServoMotor Setup	11 - 12
Danfoss Valve Setup	13 - 14
PWM Prop Curr Valve Setup	15 - 16
System Installation	17 - 18
System Information	19
Power/Valve Cable	20
Optional Remote Cable	21
Valve Wiring Schematic	19

System Description

The EconoGrade Machine Control System was designed to let you achieve maximum control of your grading system, at a very friendly price. The EG Series system is versatile, and can be installed on a number of machines including box blades, box scrapers, graders, mini-graders and skid steers. The system controls any valve package, giving the user both LED and a real-time LCD display so you are always in touch with the blade position. The EconoGrade receiver can detect any rotating red beam laser within its 173mm (7") capture range, and in turn indicates the blade's position to within a 2mm (5/64") accuracy. The receiver has LED indicator lights that give the same output as the control box LED indicators. So whether you're standing on the field, or driving the machine you'll always know where your blade needs to be. The control box allows the user to configure the display to indicated variances from the on grade position in real time. The receiver is able to attach to a 45mm (1 3/4") standard pipe. The complete system requires 9 - 30vdc to operate. The valve output drive is rated for 5 amps.

System Components

Control System

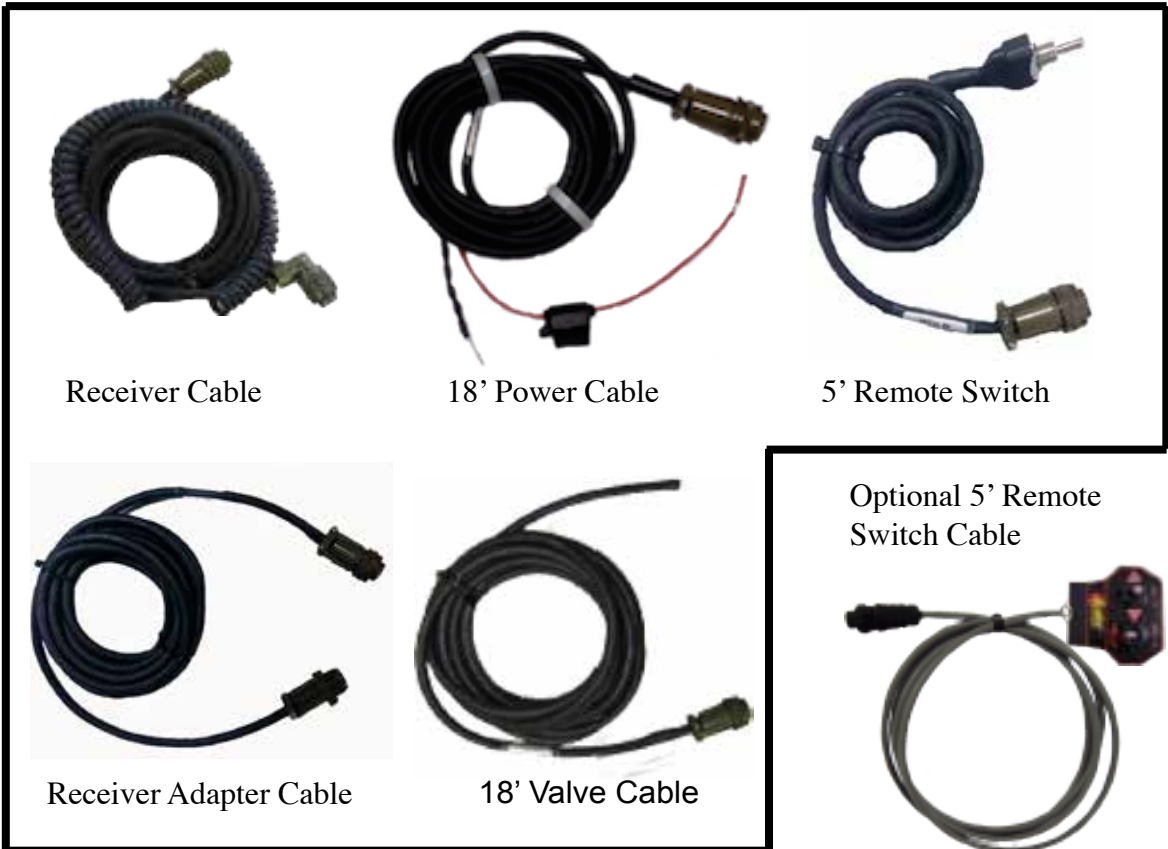


Control Box

Receiver

Optional
Telescoping Mechanical
Mast

Cable Set



Receiver Cable

18' Power Cable

5' Remote Switch

Receiver Adapter Cable

18' Valve Cable

Optional 5' Remote
Switch Cable



EG Series Control Box Controls (fig 1)



1) LED Grade Display - These LED's display whether you are above grade, below grade or on grade. The full 3 red or yellow LED arrows tell the user which direction the blade must move to achieve on grade, while the single up or down LED will flash when the receiver is within 10mm (0.39") of the desired on grade. The green LED's in the middle will flash when you are within your desired 'on grade'.

2) Power On/Off switch - Press the power button briefly to turn it on, and the button must be pushed and held for approximately two seconds to turn the system off.

3) Menu Button - This button is used to cycle through the menu system, and will only cycle through in one direction. If you miss the screen you're looking for the first time through, you have to keep cycling until you get to the home screen, then start again.

4) Hydraulic Indicator LED's - These LED's give the operator information on which valve is currently being driven. The left LED shows valve one, the right shows valve two. The green LED shows all valves are off

5) Auto/Manual button - This button switches the EG1 system between automatic and manual mode when the slope display is showing. This button also gains special functions with respect to some of the display screens shown below.

6) Valve Raise/Lower Switch - This toggle switch manually raises and lowers the hydraulics on your machine. The toggle also acts as a switch when in the menu and can be used to change any parameter that appears in the display.

7) LCD Display - This LCD displays system Information for the operator, like real time receiver ongrade offset and auto / manual control settings. This display is also used for menu settings while configuring the system at installation.

8. On-grade Offset - Controls the offset of the receiver's on-grade. If you wanted to adjust the on-grade setting by 54mm, you would do it with this control knob.



- | | | |
|-----|-------------------------|---|
| 1 - | Valve Cable Connector | - This is where the valve is connected to the control box. |
| 2 - | Remote Switch Connector | - Optional. The remote auto/raise/lower toggle switch assembly plugs into the control box via this connector. It allows you to manually control the hydraulic cylinder as well as the auto/manual functionality from a remote location. |
| 3 - | Communication Connector | - Receiver and other possible external devices plug into the control box via this port, their signals are transferred to the control box via this 4 pin connector. |
| 4 - | Power Cable Connector | - This is where the battery power is connected to the control box. |

EG Series Control Box

Display Screens and Menus



Splash Screen -The EG Series has many menu screens for setting up the system parameters. The first to show up after power on is the splash screen displaying system type and version. The version and version date may change as features and program modifications are implemented.

Main Control Screen



The Main Control Screens: This is the first screen displayed after the 10 second start up routine is complete. The value on the top left of the working screen is the actual value being received by the receiver. The value on the top right side of the working screen is the offset entered by the user.



The “No Beam Detected”- This image displays what the working screen will look like when the receiver loses the signal hit from the laser during operation. The user entered offset is still shown on the top right of the screen, however the actual on-grade value is replaced on the screen by dashes.



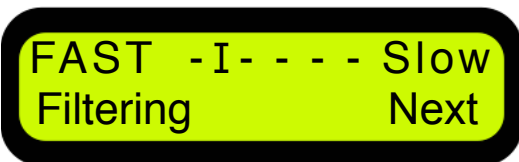
The “Laser Receiver Bad”- EG Series has self diagnostics to keep your system working at peak performance, if a problem occurs the main screen will display a message for the operator. This is the screen you will see if there is no receiver connected to the system, or if the control box can't communicate with the receiver. This may indicate a disconnected receiver or problem with the cables

Operator Menu

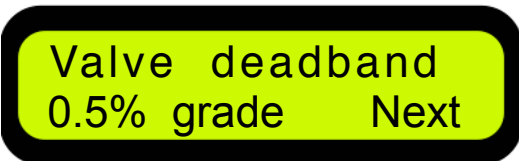
Operator menu - Entered by pressing the menu button.



System Lockout Screen - When entering the menu screens, the system lockout screen will appear. You must enter the system password to be able to go any further into the menu screens. If this option is not needed it may be disabled in the installation menu.



Filtering: The filtering rate is a mathematical averaging filter that can help to cure any jumpy behavior of the receiver. The best setting is one place to the right of Fast for most applications



On-Grade Dead band - Is the amount of allowable on-grade tolerance. The range is 1mm to 30mm at 1mm steps. When the receiver is receiving the laser light in the on-grade position, the valves will not activate until the dead band range is passed. If the on-grade dead band is set to 10mm, the valves will not be activated (Hydraulic Valve On) until the receiver readings are beyond 5mm in either direction.

Horn

Off
Next

Horn - Sets the function of the internal beeper (**Off, Alert, Indicate**). The **Alert** function has not been implemented at this time. Setting the **Indicate** mode will sound a detector style indication to the receiver position to on-grade. A double beep when too high, a single beep when too low and a solid beep when on grade while the system is in Automatic. Most operators leave this setting to Off.

Knob Adj Disabled
Change Next

Knob Adjust - Sets the function of the rotary knob from disabled (no function) to On Grade or VlvGain. When set to On Grade the knob will adjust the on grade position on the receiver up or down. If set to VlvGain, the knob will adjust the valve gain hydraulic setting. This gives the operator the ability to adjust the aggressiveness of the hydraulic system on the fly.

Use Inches
Change Next

Units - Set the system's units to Millimeter, Inches or Feet

LATEC Instr. Inc
5192354585 Next

Latec Info Screen - The final screen in the Operators Menu displays Latec Info, Name and phone number. Outside of North America, dial +01.519.235.4585.

Installer Menu

Note:

To access the Installation Menu , press the Menu and Auto/Manual buttons in UNISON while the LATEC info screen is displayed.

Valve type
Prop time Next

Installation Menu Enter Screen - The Installation menu area is for experienced installers, here is where the crucial system settings are adjusted and set. Some settings are intended to move hydraulic systems for setup reasons, **Caution Must Be Observed**. If you got here by accident, pressing the Power Button will exit this menu at any time.

Output Drive Types

Valve Types - EG Series can control Proportional Time ('bang-bang') valves, electric actuators up to 6 amps, proportional valves with ratio-metric integrated electronics (Danfoss) and proportional current (variable flow) valves, 50 Hz., 100 Hz., and 200 Hz.; Consult the valve manufacturer to find the proper type and dither frequency for your variable flow valve.

Valve type
Prop time Next

Proportional Time - The EG Series valve output is an on/off voltage, high current output; the output voltage will, during the valve on time, be equal to the DC input supply.

Valve type
ServoMotor Next

Servo Motor - The EG Series valve outputs are reconfigured to an H-Bridge style push-pull drive capable of driving electric actuators. This drive has a maximum current limit of 6 amps.

Valve type
Danfoss Next

Danfoss - setting, as well as producing the low power analogue control signal for the valve, also drives both of the high current valve outputs. One of those high current outputs can supply power to the Danfoss valve.

Valve type 100Hz
Prop Curr Next

Proportional Current - The EG Series valve output is a pulse-width-modulated signal with a settable dither frequency of 50, 100, 200 Hz. The output voltage will, during the valve on time, be equal to the DC input supply.

Valve Direction:
Normal Next

Valve Control Direction - The Valve Control Direction can be changed to alleviate the need to change wiring or hydraulic plumbing. To enter the Valve Direction menu, the Valve type menu needs to be active, press the **Menu and Power Button in Unison**, then press the Menu button soft key to switch between **Normal** and **Inverted** valve direction.

Menu Flow

Minimum PW 80ms
Test Next

Minimum Pulse Width - sets the Hydraulic Valves minimum speed.

Valve gain
35% Next

Valve Gain - The span of error between the onset of valve operation and the point at which the valve is fully on is determined by the valve gain setting. In this case, the units displayed (percentage) are arbitrary, but higher numbers suggest more vigorous valve action. With the gain set to 100%, the slightest error will fully open the appropriate valve. This setting should be left at 50% until after the Minimum Pulse width has been set and the hydraulics tested to see in which direction you would like to adjust this setting. The higher the number the more aggressive the hydraulic system. Conversely the lower the number the less aggressive the hydraulic system will be.

Derivative gain
Medium Next

Derivative Gain - To stabilize some machine control applications, it is necessary for the control box to know not only whether the machine is at the desired slope or not, but how fast the slope is changing and in what direction. This is known variously as velocity or derivative (dv/dt) feedback. The control box can vary the amount of velocity feedback added; choose among: "High" "Medium" "Low" or "Off" This setting can be left at medium for 99% of all installations.

Auto Return -Off
Change Next

Auto Return - This function is designed to return the blade to the receivers active range after being manually driven out of the laser light by the Valve Raise/Lower Switch, while in Automatic. The return valve drive times are adjustable in increments of 0.5 seconds with a range from 0.5 to 7.5 seconds. Once the receiver is within laser range Auto control will instantly return. To disable this feature set the time to Off.

Tilt Sensor -Off
Change Next

Tilt Sensing Off - This option is yet to be designed, please leave at off position and stay tuned for further updates!

Factory settings
Restore Next

Factory Settings - All of the EG 2 variables can be restored to their default values with this window displayed. The defaults are restored by pushing the Restore button.

Laser Receiver:
Latec Next

Laser Receiver - With optional cables, it is possible to add other manufactures receiver to our system. At this point only two manufactures are compatible: Apache and Topcon.

Pass Change 0000
--> Next

System Lockout Screen - This is the screen where you can enter a new password into the box. The factory default password in every system is "1000". If user would like this option to be disabled set password to "0000", the lockout will be disabled and all menu options will be available to the user.

P.T. Valve Setup

Valve setup - the setup menu flow changes depending on the valve drive type selected. Here we will go through the 4 control output types.

Valve type
Prop time Next

Proportional Time mode, the EG Series valve output is an on/off voltage, high current output; the output voltage will, during the valve on time, be equal to the DC input supply. Refer to the wiring diagram for the proper wire connections.

Valve cycle time
125ms Next

Valve Cycle Time - This menu function sets how often the valve pulses are sent to the hydraulic valve called hits per-second. The range is 1 to 15 hits per-second and unit is in milliseconds, to calculate the hits per-second divide 1 by the milliseconds. eg. $1/0.250 = 4$ hits per-second. The lower the number the more hits per-second. For most hydraulic systems starting at 100ms or 10 hits per-second is a good place to start. The faster you can hit the valve the finer the cylinder movements, the smoother the control. The valve response will differ for valve to valve.

Valve type
Curr.srce Next

Valve Drive Configuration - This menu function sets how the valve drive operates the valve coil. Set to **Curr.srce** the control box drive will provide a voltage to activate the valve coil, the other side of the coil will need to be connected to ground. Set to **Curr.sink** the control box drive will provide ground to activate the valve coil, the other side of the coil will need to be connected to + battery voltage.

Valve type
Curr.sink Next

Curr.Limit 4.8A
Disable Next

Valve Drive Current Limit - A few of the valves on the market may require a limited amount of drive current, as not to damage the valve itself. When the valve drive is set to **Curr.srce**, the next menu will allow you to enable the Current Limit and set a current limit to a maximum of 4.8 amps. If there is a current limit required the valve information will tell you, make sure to check all valve specification prior to setup.

Curr.Limit ---
-N/A- Next

When the valve drive is set to **Curr.sink** the current limit will not be available. For most of the hydraulic valves on the market, this function will not be required.

CAUTION:

THE FOLLOWING ITEMS WILL OPERATE THE HYDRAULIC VALVE. BE CAREFUL WITH THEIR USE! MAKE SURE YOUR AREA IS CLEAR.

Minimum PW 80ms
Test Next

Up PlsWdth 35ms
Chg Dir Stop

Down PW 25ms
Chg Dir Stop

Valve gain
35% Next

Valve cycle time
125ms Next

Minimum PW 80ms
Test Next

Valve deadband
0.5" grade Next

Minimum Pulse Width - EG Series needs information about the hydraulic system on your machine, as all hydraulic systems are not the same. Here we are telling the system the signal needed to move the cylinder at its slowest speed. Pressing the Power (Test) soft key will enter you in to this routine. Your hydraulics will begin to move, use the Up/Dwn buttons to increase or decrease the signal to the valve until you get a blade movement of approximately 0.25 inches per second (1 inch in 4 Seconds). Press the Power Chg Dir soft key to change the direction, then adjust the cylinder speed for the opposite direction. When the cylinder speed is OK then press the Menu (Stop) soft key and these values will be stored. There may be a need to enter different values for Up and Down to balance the over all minimum speed. This is due to gravity helping in the downward direction and the volume differences in the cylinder, from the cap end to rod end.

Note: Pressing the "Stop" soft key will turn off the valve drive, and return you to the Minimum PW window. Also, the valve will shut off automatically after 20 seconds without any buttons being pushed.

Valve Gain - The span of error between the onset of valve operation and the point at which the valve is fully open is determined by the valve gain setting. In this case, the units displayed (percentage) are arbitrary, but higher numbers suggest more vigorous valve action. With the gain set to 100%, the slightest error will fully open the appropriate valve. This setting should be left at 50% until after the Minimum Pulse width has been set and the hydraulics tested to see in which direction you would like to adjust this setting. The higher the number the more aggressive the hydraulic system. Conversely the lower the number the less aggressive the hydraulic system will be.

Balancing PT Valve Servo - These three settings as well as Valve Gain are important in Balancing the hydraulic servo. The most important of the three is the Valve Dead-band, it must be set to a realistic value that your machine's geometry can handle. The next in importance is the Minimum PW, this sets the hydraulics systems slowest speed, if too fast the servo will never have the ability to balance and control grade. The last setting, Valve Cycle Time sets the over all cylinder speed. If set too high the cylinder movements will be too large and the servo will never be able to balance. Conversely set too low the cylinder movements will be too small and a balanced servo will not be achieved. A balance in these three settings while the machine is working under it's normal load should give you good hydraulic control.

ServoMotor Setup

Valve type
ServoMotor Next

Servo Motor - The EG Series valve outputs are reconfigured to an H-Bridge style push-pull drive, capable of driving electric actuators. This drive has a maximum current limit of 6 amps. Refer to the wiring diagram for the proper wire connections.

Valve cycle time
125ms Next

Drive Cycle Time - This menu function sets how often the output pulses are sent to the actuator called hits per- second. The range is 1 to 15 hits per-second and unit is in milliseconds, to calculate the hits per-second divide 1 by the milliseconds. eg. $1/0.250 = 4$ hits per-second. The lower the number the more hits per-second. For most Actuator systems starting at 100ms or 10 hits per-second is a good place to start. The faster you can hit the actuator the finer the cylinder movements, the smoother the control. The actuator response will differ between actuator manufactures.

Valve type
Push-Pull Next

Push-Pull Drive - This menu function reconfigures the valve drive to operate as a Push-Pull output. This will provide a forward and reverse drive to the actuator.

Curr.Limit 4.8A
Disable Next

Actuator Drive Current Limit - If there is a current limit required for the actuator you can enable and set the current limit required for your actuator. Most actuators on the market today will not require current limit, you can disable the current limit. Be aware that our drive has a max current capability of 6 amps.

***** DAMAGE TO EG SERIES CAN HAPPEN *****
***** IF THE CURRENT DRAW IS TOO LARGE *****

CAUTION:

THE FOLLOWING ITEMS WILL OPERATE THE ACTUATOR DRIVE. BE CAREFUL WITH THEIR USE! MAKE SURE YOUR AREA IS CLEAR.

Minimum PW 80ms
Test Next

Up PlsWdth 35ms
Chg Dir Stop

Down PW 25ms
Chg Dir Stop

Valve gain
35% Next

Valve cycle time
125ms Next

Minimum PW 80ms
Test Next

Valve deadband
0.5" grade Next

Minimum Pulse Width - EG Series needs information about the actuator system on your machine, as all actuator systems are not the same. Here we are telling the system the signal needed to move the actuator at its slowest speed. Pressing the Menu (Test) button will enter you in to this routine. Your actuator will begin to move, use the Up/Dwn Buttons to increase or decrease the signal to the actuator until you get a blade movement of approximately 0.25 inches per second (1 inch in 4 Seconds). Press the menu button to change the direction, then adjust the actuator speed for the opposite direction. When the actuator speed is OK then press the menu soft key (Stop) and these values will be stored. There may be a need to enter different values for up and down to balance the over all minimum speed. This is due to gravity helping in the downward direction.

Note: Pressing the “Stop” soft key will turn off the valve drive, and return you to the Minimum PW window. Also, the valve will shut off automatically after 20 seconds without any buttons being pushed.

Valve Gain - The span of error between the onset of actuator operation and the point at which the actuator is fully on is determined by the valve gain setting. In this case, the units displayed (percentage) are arbitrary, but higher numbers suggest more vigorous actuator action. With the gain set to 100%, the slightest error will fully open the actuator. This setting should be left at 50% until after the Minimum Pulse width has been set and the actuator is tested to see in which direction you would like to adjust this setting. The higher the number the more aggressive the actuator system. Conversely the lower the number the less aggressive the actuator system will be.

Balancing Servo Motor - These three settings as well as Valve Gain are important in balancing the actuator servo. The most important of the three is the valve dead-band, it must be set to a realistic value that your machine's geometry can handle. The next in importance is the Minimum PW, this sets the actuator systems slowest speed, if too fast the servo will never have the ability to balance and control grade. The last setting, Valve Cycle Time sets the over all actuator speed. If set too high the actuator movements will be too large and the servo will never be able to balance. Conversely set too low the actuator movements will be too small, a balance servo will not be achieved. A balance in these three settings while the machine is working under it's normal load should give you good hydraulic control.

Danfoss/SCV Valve

For electrohydraulic Selective Control Valves (SCV), use the Danfoss settings during setup. The SCV uses a reference voltage from the tractor, whereas Danfoss uses a reference from the valve power circuit. A special SCV valve cable is required for this functionality.

Valve type
Danfoss Next

Danfoss Ratio-Metric - when this mode is selected, EG Series sets up the internal Valve Circuit to generate the proper signals to drive the Danfoss Ratio-Metric valve. Refer to the wiring diagram for the proper wire connections.

Valve type
Push-Pull Next

Valve Type- This setting will default to Push-Pull for the way the valve circuit has been reconfigured for the Danfoss Ratio-Metric setting.

Curr.Limit ---
-N/A- Next

Valve Drive Current Limit - There is no need for Current Limit for the Danfoss Ratio-Metric, the Current Limit will automatically come up "Not Available".

CAUTION:

THE FOLLOWING ITEMS WILL OPERATE THE VALVE DRIVE. BE CAREFUL WITH THEIR USE! MAKE SURE YOUR AREA IS CLEAR.

Minimum DC 35%
Test Next

Minimum DC - EG Series needs information about the hydraulic system on your machine, as all hydraulic systems are not the same. Here we are telling the system the signal needed to move the cylinder at its slowest speed. Pressing the Power (Test) soft key will enter you in to this routine. Your hydraulics will begin to move, use the Up/Dwn buttons to increase or decrease the signal to the valve until you get a blade movement of approximately 0.25 inches per second (1 inch in 4 Seconds). Press the Power Chg Dir soft key to change the direction, then adjust the cylinder speed for the opposite direction. When the cylinder speed is OK then press the Menu (Stop) soft key and these values will be stored. There may be a need to enter different values for up and down to balance the over all minimum speed. This is due to gravity helping in the downward direction and the volume differences in the cylinder, from the cap end to rod end.

Down PlsDC 20%
Chg Dir Stop

Up PulseDC 35%
Chg Dir Stop

Note that either the "Stop" soft key, or the Menu button will turn off the valve drive, and return you to the Minimum PW window. Also, the valve will shut off automatically and exit the Installer Menu after 20 seconds without any buttons being pushed.

Valve gain
35%

Next

Valve Gain - The span of error between the onset of valve operation and the point at which the valve is fully open is determined by the valve gain setting. In this case, the units displayed (percentage) are arbitrary, but higher numbers suggest more vigorous valve action. With the gain set to 100%, the slightest error will fully open the appropriate valve. This setting should be left at 50% until after the minimum pulse width has been set and the hydraulics tested to see in which direction you would like to adjust this setting. The higher the number the more aggressive the hydraulic system. Conversely the lower the number the less aggressive the hydraulic system will be.

Valve gain
35%

Next

Balancing Danfoss Ratio-Metric Servo - These three settings are important in balancing the hydraulic servo. The most important of the three is the valve dead-band, it must be set to a realistic value that your machine's geometry can handle. The next in importance is the Minimum DC, this sets the hydraulics systems slowest speed, if too fast the servo will never have the ability to balance and control grade. The last setting, Valve Gain sets the over all hydraulic aggressiveness. If set too high the cylinder speed changes will be too large and the servo will never be able to balance. Conversely set too low the cylinder speed changes will be too small, a balance servo will not be achieved. A balance in these three settings while the machine is working under it's normal load should give you good hydraulic control.

Minimum DC 35%
Test Next

Valve deadband
0.5" grade Next

Prop Curr Valve Setup

Valve type 50Hz
Prop Curr Next

Proportional Current mode, the EG Series valve output is a pulse-width-modulated, high current output; the output voltage will, during the valve on time, be equal to the DC input supply. Refer to the wiring diagram for the proper wire connections.

Valve type
Curr.srce Next

Valve Drive Current - This menu function sets how the valve drive operates the valve coil. Set to **Curr.srce** the control box drive will provide a voltage to activate the valve coil, the other side of the coil will need to be connected to ground. Set to **Curr.sink** the control box drive will provide ground to activate the valve coil, the other side of the coil will need to be connected to + battery voltage.

Valve type
Curr.sink Next

Curr.Limit 4.8A
Disable Next

Valve Drive Current Limit - A few of the valves on the market may require a limited amount of drive current, as not to damage the valve itself. When the valve drive is set to **Curr.srce**, the next menu will allow you to enable the Current Limit and set a current limit to a maximum of 4.8 amps. If there is a current limit required the valve information will tell you, make sure to check all valve specification prior to setup.

Curr.Limit ---
-N/A- Next

When the valve drive is set to **Curr.sink** the current limit will not be available. For most of the hydraulic valves on the market, they will not require this function to be enabled.

CAUTION:

THE FOLLOWING ITEMS WILL OPERATE THE VALVE DRIVE. BE CAREFUL WITH THEIR USE! MAKE SURE YOUR AREA IS CLEAR.

Minimum DC 35%
Test Next

Down PlsDC 20%
Chg Dir Stop

Up PulseDC 35%
Chg Dir Stop

Valve gain 35%
Next

Valve gain 35%
Next

Minimum DC 35%
Test Next

Valve deadband 0.5" grade
Next

Minimum DC - EG Series needs information about the hydraulic system on your machine, as all hydraulic systems are not the same. Here we are telling the system the signal needed to move the cylinder at its slowest speed. Pressing the Power (Test) soft key will enter you in to this routine. Your hydraulics will begin to move, use the Up/Dwn buttons to increase or decrease the signal to the valve until you get a blade movement of approximately 0.25 inches per second (1 inch in 4 Seconds). Press the Power Chg Dir soft key to change the direction, then adjust the cylinder speed for the opposite direction. When the cylinder speed is OK then press the Menu (Stop) soft key and these values will be stored. There may be a need to enter different values for Up and Down to balance the over all minimum speed. This is due to gravity helping in the downward direction and the volume differences in the cylinder, from the cap end to rod end.

Note: Pressing the "Stop" soft key will turn off the valve drive, and return you to the Minimum PW window. Also, the valve will shut off automatically after 20 seconds without any buttons being pushed.

Valve Gain - The span of error between the onset of valve operation and the point at which the valve is fully open is determined by the valve gain setting. In this case, the units displayed (percentage) are arbitrary, but higher numbers suggest more vigorous valve action. With the gain set to 100%, the slightest error will fully open the appropriate valve. This setting should be left at 50% until after the Minimum Pulse width has been set and the hydraulics tested to see in which direction you would like to adjust this setting. The higher the number the more aggressive the hydraulic system. Conversely the lower the number the less aggressive the hydraulic system will be.

Balancing Danfoss Ratio-Metric Servo - These three settings are important in balancing the hydraulic servo. The most important of the three is the valve dead-band, it must be set to a realistic value that your machine's geometry can handle. The next in importance is the Minimum DC, this sets the hydraulic system's slowest speed, if too fast the servo will never have the ability to balance and control grade. The last setting, Valve Gain, sets the over all hydraulic aggressiveness. If set too high the cylinder speed changes will be too large and the servo will never be able to balance. Conversely set too low the cylinder speed changes will be too small, a balance servo will not be achieved. A balance in these three settings while the machine is working under it's normal load should give you good hydraulic control.

Receiver Bad Manual Manual

Error Screens: EG Series control system has built in diagnostics to keep your system running at its peak performance. If a problem develops with the receiver connection, cable, or the device itself, it will be displayed in the main screen and scroll the led indicator to get the operators attention.

EG Series Options:



EG Series Remote Toggle Switch Assy - You can control your EG control box from a remote location with our optional two switch remote. One switch toggles the EG Series between automatic and manual mode, the other raises and lowers the control cylinder. The switch assembly attaches to any lever using the universal U-bolt assembly, or can be mounted any where with some fabrication.

EG Series Installation:

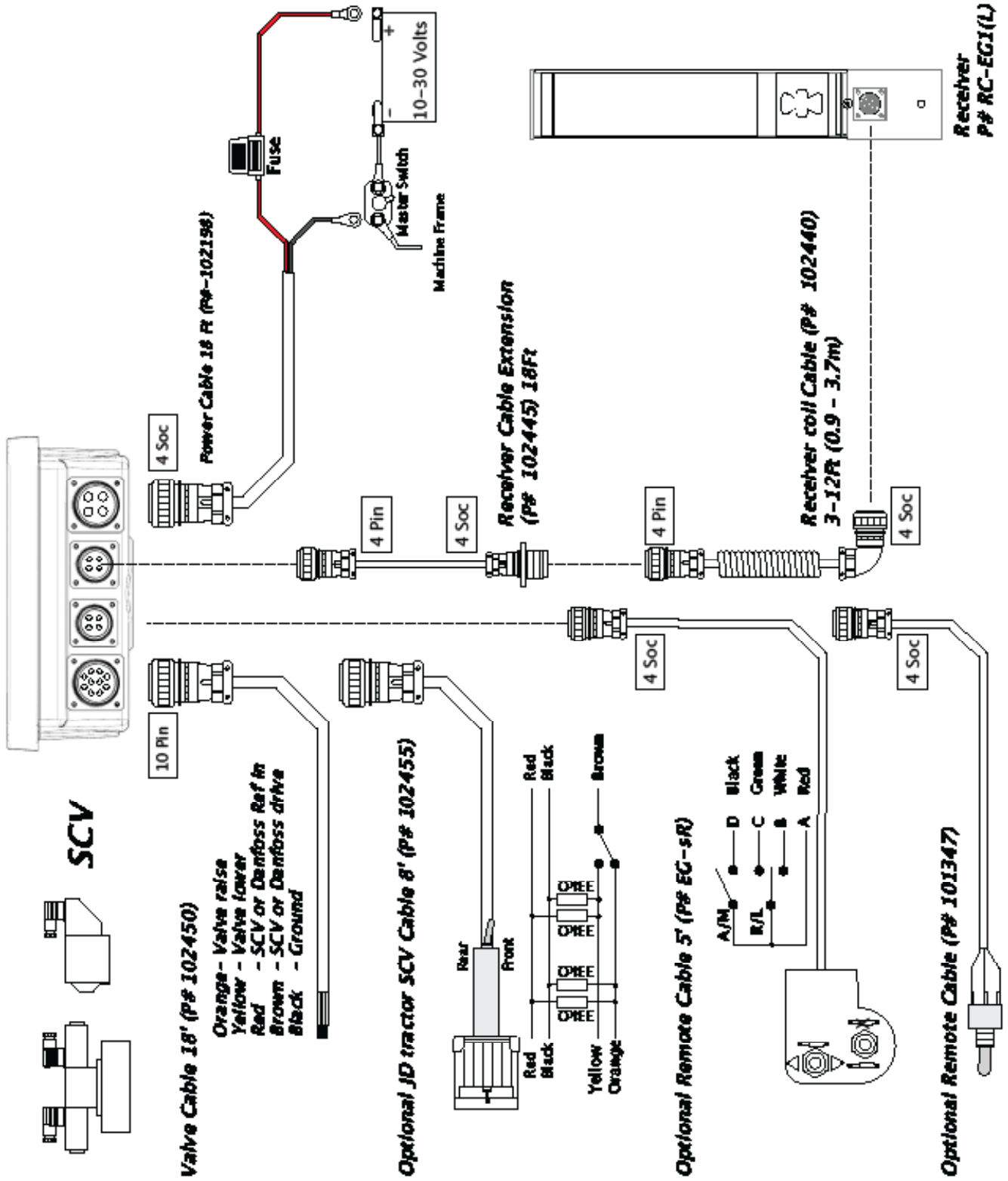
EG Series Installation - Control Box: To install the control box find an area in the cab which will allow for the control box to be easily viewed and controlled, but also does not interfere with the operator's controls and line of sight. To mount the control box use the supplied mount as a template and drill 4 holes in the appropriate place. Then screw the mount into position and attach the control box to the mount. The control box can now be adjusted for your optimum viewing pleasure.

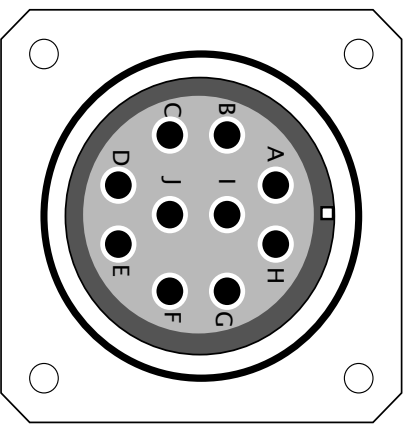
Adjustable Mast

Receiver - The receiver can be mounted with any 1 3/4" pipe or using the optional adjustable mast as a stand alone or with the optional shock mount bracket. It should be mounted so that the receiver can receive a laser hit from 360°. This means the receiver should clear any cab, stack or any other obstacle on the machine.

Suction Cup Control Box Mount - If a suction cup mount is required for installation, we offer a standard mount that will receive the existing mounting ball on the control box. This mount will allow you to stick the control box to any clean, smooth surface. The part number for the suction cup mount is P#: 101654 (not shown).

EG-1M Control Box P# CB-EG1-M(L)





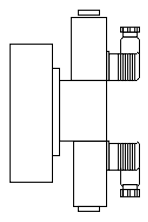
Connector

Connector	Cable	Function
E	- Yellow	Valve Lower Out
F	- Orange	Valve Raise Out
G	- Brown	Danfoss Ratio-Metric Out
H	- Red	Danfoss Reference
I	- Black	Valve Ground

Valve Cable

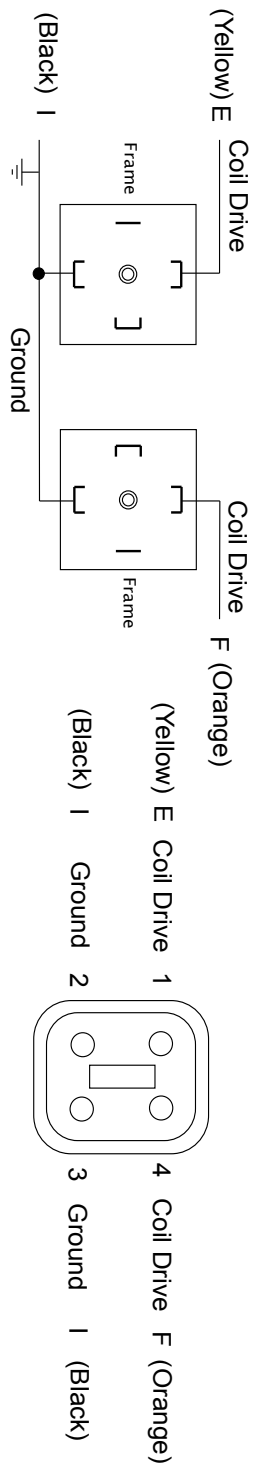
Proportional Time & 200, 100, 50 Hz Proportional Current:

(Information may differ between manufactures, consult manufactures manual)

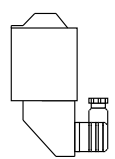


Hirschmann Connector

Deutsch Connector

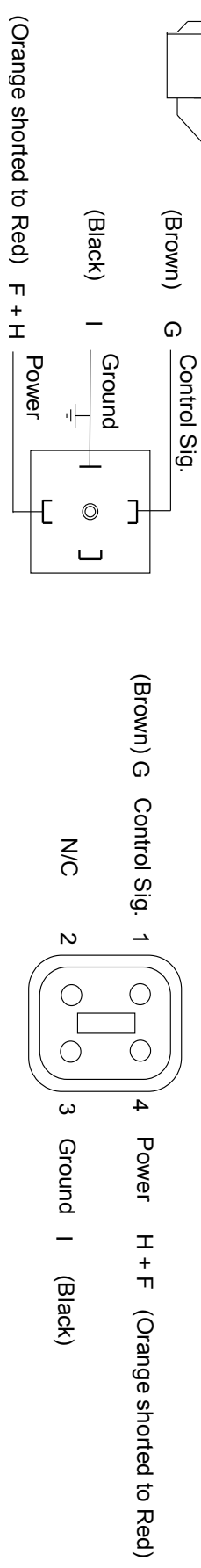


Proportional Voltage PVE: (Danfoss Ratio-Metric)



Hirschmann Connector

Deutsch Connector



Warranty

This EG Series system is warranted to the original purchaser to be free from defects in workmanship and material. Latec Instruments will repair or replace any defective part which may malfunction under normal and proper use within a period of **ONE YEAR** from the date of purchase without charge for parts and labour, once delivered and shipped prepaid to Latec Instruments together with proof of date and place of purchase. This warranty is not subject to misuse, abuse, assignment, or transfer. The exclusive remedy under any and all warrants and guarantees, expressed or implied, is limited to repair and/or replacement as provided herein, and Latec Instruments shall not be liable for damages from loss or delay of equipment uses, consequential, or incidental damage.



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