EPAC Implement control
893000

JRsystems

Implement control, function

The system gives a pulsewidthmodulated output signal (PWM-signal), proportional to the lever position. The signal controls the vehicle's directional valve.

An extra on/off-signal is available to control a loading valve in a load sensing hydraulic system. The system offers automatic control functions, which means that the control signal is continued even when the lever is in released position (automatic lift & automatic tilt functions).

Up and down ramp are used to recieve a "smooth" control over a function by delaying the reaction time of the lever.

Parameters

All the parameters can be adjusted from 0 to 99.
The four acces codes have to be entered before programming of the parameter(s) 0 - 9 is possible.
The acces codes are programmed in the same way as all other parameters, and does not have to be reprogrammed as long as the unit is switched on.
Please read the manual through before trying to program the unit.

A0, adjusting the potentiometer

Correct value

UU 09-01 00 01-09 UU

Potentiometer under lowest value

Potentiometer over highest value

A0, adjusting the lever

The lever has to be adjusted properly in order to obtain high precision from the potentiometer. Normally this is done in the factory. The potentiometer is adjusted in parameter A0 the value should be as close to 00 as possible. In case of adjustment, please contact your local dealer or Morse-Controls directly.

Programming

Programming is done with the programming switch and the lever. Use the switch to change parameter number and the lever to change the parameter value.

1. Press the programming switch several times to reach access code 4. Release the switch - the present parameter value 00 will be displayed.
2. Enter the code 35 using the lever. Move the lever in one direction to increase the parameter value and in the oposit direction to decrease the parameter value.
3. Confirm the value by pressing the programming switch once and you will get access to the first parameter -0.
4. Go to the parameter which need to be adjusted by stepwise pressing the programming switch. After a second the present parameter setting will be displayed. It is possible to adjust the parameter value in the same way as the code was entered into the system. Se point 2 and 3 above.
5. Once the desired parameters have been changed, locate the parameter (--), wait a second - the values are saved and programming terminated.

If you do not want to save the parameter values, locate parameter (-), wait a second - programming is terminated without saving the parameter values.

Display

Programming switch

Access codes
Code 1= 00
Code 2= 00
Code 3= 00
Code 4= 35

Parameter description

(-0) to (-3) Start- and end current
The start current can be described as the amount of current necessary to move the directional valve's spool to the activation point. The start current is adjustable between 130 mA and 1.6 A positive (-0) and negative (-2).
The end current can be described as the amount of current nescessary to obtain maximum desired flow in the directional valve. The value is adjustable between 130 mA and 1.6 A positive (-1) and negative (-3). The end current can never be programmed to a lower value then the start current.
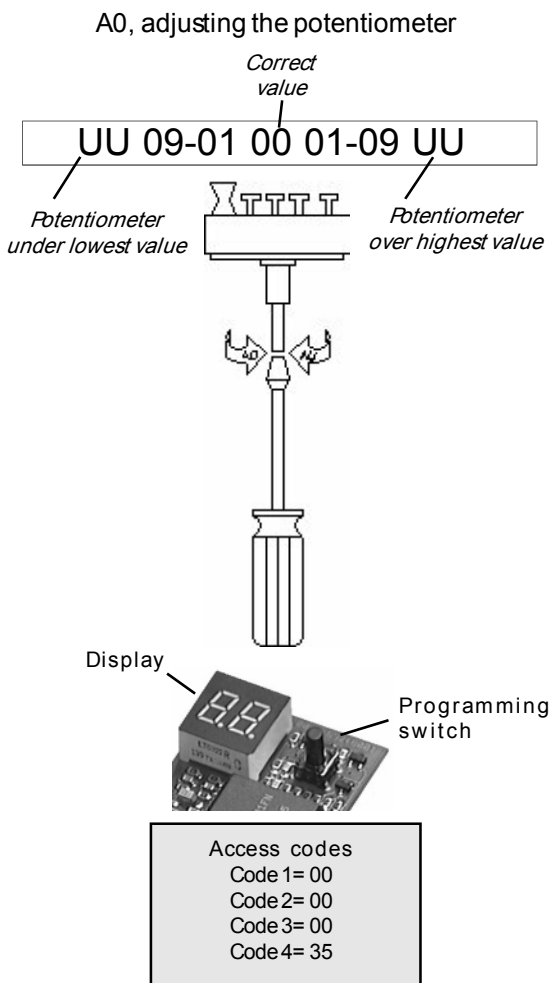
Parameter description, continued

(-4) Up ramp (dampning)
This parameter is used to produce a soft and slow start of the control signal. The parameter adds a delay (up ramp) on the ouput signal to ensure a soft start of the control signal.
The right display digit shows the positive output ramp value and the left display digit shows the ramp value for the negative output signal. The value is adjustable in from 1 to 9, where 9 = 2.25 sec. ramp.

(-5) Down ramp (dampning)
This parameter is used to produce a soft and slow end of the control signal. The parameter adds a delay (up ramp) on the ouput signal to ensure a soft end of the control signal.
The right display digit shows the positive output ramp value and the left display digit shows the ramp value for the negative output signal. The value is adjustable in from 1 to 9, where 9 = 2.25 sec. ramp.

(-6) AUTO function
This parameter sets the controls units automatic function mode. This function is used to recieve a continous output signal. The function is preselected by depressing the AUTO-switch.
An example;
If value 21 is programmed, the function will be as follows;
1) Activation point 10% of
2) positive direction
3) if the kickout input is high
4) deactivation point 50% of negative direction
5) or if the kickout input is low.

Parametervalues 6X* and 7X* gives an automatic stop function. The positive output signal is ramped down to 0 when the positive limit-switch input is activated. The ramp time is programmed with the right digit X*.

(-7) Extra function
The parameter sets the function of the extra output.
An example; if value 62 is programmed, the function will be as follows;
1) Activation point 20% of
2) positive direction
3) if the function is preselected with the switch
4) deactivation point 50% of negative direction
5) or with the switch
6) positive PWM-output activated, negative PWM-output deactivated.

(-8) SLOW function
The output signal (parameter -1 and -3) is decreased by a percentage value (in steps of 10%) when the SLOW-function is activated.
The value can be programmed between 1=10% of maximum speed and 9=90% of maximum speed . Value 0=function not activated. The left display digit represents the output during negative lever movment and the right digit reprecents the output during positive lever movement.

(-9) Current step
It is possible to add a current step to ensure maximum output from the hydraulic valve. Parameter value 00=no step function and parameter value 1-9 (10-90% of the total lever movement) sets the treshold where the current step is activated. The left display digit represents the negative output and the right digit the right output.

(A1) Calibration of the center-/end-positions
This parameter automatically calibrates the unit with the lever potentiometer.
Locate the parameter (A1), the display shows 00.
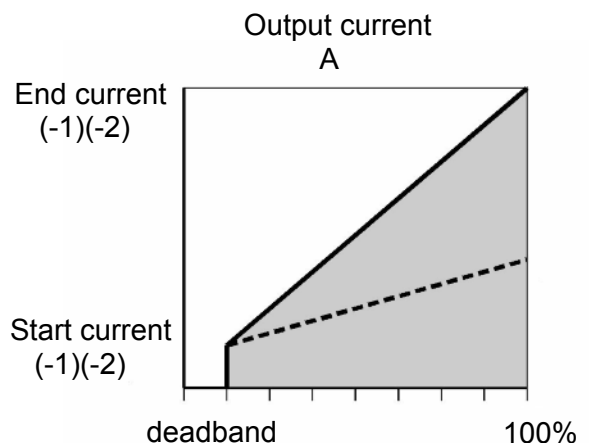Move the lever to the far left and to the far right.
Wait, the unit saves the potentiometer values and terminates programming mode.

Programming table AUTO				
Parameter value	Activation		Deactivation	
	Lever	Limit switch	Lever	switch
0	-	-	-	-
0X	Pos/Neg	12/24V	-	0V
1X	Pos/Neg	0V	-	12/24V
2X	Pos	12/24V	50% Neg	0V
3X	Pos	0V	50% Neg	12/24V
4X	Neg	12/24V	50% Pos	0V
5X	Neg	0V	50% Pos	12/24V
6X*	-	12/24V	-	0V
7X*	-	0V	-	12/24

1   2   3   4   5

X=activation point (10-100% of lever movement)
X*=ramp time (0.25-2.25sek)

Programming table Extra function					
Parameter value	Activation		Deactivation		PWM Output
	Lever	Switch	Lever	Switch	
0	–	On		Off	–
0X	Deadband	–	Deadband	–	–
1X	Pos/Neg X	–	Pos/Neg X	–	–
2X	Pos X	–		–	–
3X	Neg X	–		–	–
4X	Pos X	Preselect	50% Neg	Preselect	P=0 N=0
5X	Neg X	Preselect	50% Pos	Preselect	P=0 N=0
6X	Pos X	Preselect	50% Neg	Preselect	P=1 N=0
7X	Neg X	Preselect	50% Pos	Preselect	P=0 N=1
8X	Pos/Neg	–	Time	–	–

1   2   3   4   5   6

X=activation point (10-100% of lever movement)
X*=ramp time (0.25-2.25sek)

Output current A

End current (-1)(-2)

Start current (-1)(-2)

deadband   100%

Parameter list

A0	Adjusting the lever potentiometer
I	Access code 1
II	Access code 2
III	Access code 3
IIII	Access code 4
-0	Start current, positive output
-1	End current, positive output
-2	Start current, negative output
-3	End current, negative ouptut
-4	Up ramp (damping)
-5	Down ramp (damping)
-6	AUTO function
-7	Extra function
-8	SLOW function
-9	Current step
A1	Calibration center/endpositions
A2	Not used for implement control
--	Exit and save programming mode
-	Exit without saving programming mode

Technical specifications

Supply voltage	12 V DC (10 - 18 V DC)
	24 V DC (20 - 30 V DC)
Max output current	1.6 A / output PWM-signal
	1.6 A extra signal
PWM frequency	125 Hz
Max ramptime	2.25 sek
Temperature	- 40° C - +70° C
Lever deadband	± 2°
Totalt lever travel	± 20°
Limit switch input	12/24 V DC
In- and outputs	Shortcircuit protected
EMC- protected	

Error codes

E11, the control lever was moved outside the lever deadband when the unit was switched on. The outputs are deactivated. This function is to prevent unintentional moving of the machine. To reset you have to turn the power off.
E12, the unit has picked up values outside the control levers limit. The outputs are deactivated. This function is to prevent unintentional moving of the machine if the lever fails.

Notes

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JRsystems

Important information about our control/ecu units

- Check that the contents of the package are according to order confirmation and that the items are in good condition. Put in claim for incorrectness to supplier as soon as possible.

- Ensure a stable voltage source for optimal function. This is true about electric forklift trucks in particular. Supply voltage is 12V or 24V and should be secured with a fuse.

- Wiring harness between the control/ecu unit and the actuator should not be drawn together with the vehicle's power cables or next to power connections on electric engines, radio transmitters, etc. Do not draw the control unit harness in a closed circle, or through circles of other cables.

- Disturbing effects from relays and other inductive loads used in the vehicle should be neutralised. NOTE: This is not valid for PWM-coils.

- Remove the vehicle voltage feed and ground connection from the vehicle if welding is necessary.

- Make sure that you protect the vehicle against static electricity whenever you work with it. Connect the chair armrest to the vehicle chassis in order to lead away static electricity caused by friction between the driver and the chair. Outgoing negative voltage from any DC/DC converter preferably be connected to the vehicle chassis.

- Do not open the control/ecu unit. Contact the service organisation if error occurs. If the control unit is opened or modifies the JRsystems AB guarantee will expire. If the control unit modifies without JRsystems AB permission we disclaim our responsibility for the product.

- Do not expose the control/ecu unit to impacts. If someone drop the control unit or similar it should be sent to supplier for control.

- Clean the control unit regularly with a damp rag with mild soap solution. The control unit cannot be soaked in water, washed with high-pressure wash or have any other direct contact with water.

- The control unit is to be placed on an armrest to give the best ergonomic benefits. Choose an armrest with switch in the joint of the chair. Supply voltage shall be disconnected when the armrest is raised.

- Turn off the control/ecu unit if error indication occurs and search for and correct the reason. If the problem is in the control unit it should be sent to supplier for repair. Do never use a vehicle with a control unit with error indication.

- Use shielded wires to sensors and connect the shield to the grounded box. Shielded wires should only have one ground connection point.

- Use sealed connectors and gold plated pins/sockets for analogue signals.

- Include the control unit in the daily inspection of the vehicle before every start-up. Check that the control unit is in good condition especially the bellow, the lever and the buttons. If possible check the harness and the connector. Contact the vehicle manufacturer for advice or service if you have any hesitations.

- Recommended wire areas: $1,5mm^2$ for supply voltage and ground. Other wires $0,6mm^2$. *For EMMI*: For use of 5A (Dig out 1 and Dig out 2) $1,5mm^2$ is recommended.

- *Only valid for EMMI:* To secure the specified EMC requirements even in extreme circumstances, we recommend a ferrite placed on the harness as closed to the control unit as possible. Requirements of the ferrite: Impedance 168 at 25Mh, 250 at 100 MHz, 300 at 300 MHz and 205 at 500Mhz. JRsystems AB part number 848782 or 848783.