5

Programming Examples

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— Examples Using *Direct*LOGIC PLSs
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Examples Using *Direct*LOGIC PLCs

Register Usage

The OP–WINEDIT configuration software allows you to configure a panel to use a block of registers at a starting value that you define. For a DL05 CPU, the recommended memory to use is the general purpose data words starting at V1200. For a DL105, DL205, D3–350 or DL405 CPU the recommended memory to use is the general purpose data words starting at V2000. For the 305 family (except the D3–350) the recommended memory is the registers beginning at R400. Any block of registers within the data word range can be used.

The following table lists the data word register addresses for CPUs.

Data Word Registers for *Direct*LOGIC™ PLCs		
Family	**CPU**	**Control Relay Registers**
DirectLOGIC™ DL05	D0–05	V1200–V7377
DirectLOGIC™ DL105	F1–130	V2000–V2377
DirectLOGIC™ DL205	D2–230	V2000–V2377
	D2–240	V2000–V3777
	D2–250	V1400–V7377 and V10000–V17777
DirectLOGIC™ DL305	D3–330/D3–330P	R400–R563
	D3–340	R400–R563 and R700–R767
	D3–350	V1400–V7377 and V10000–V17777
DirectLOGIC™ DL405	D4–430	V1400–V7377
	D4–440	V1400–V7377 and V10000–V17777
	D4–450	V1400–V7377 and V10000–V37777

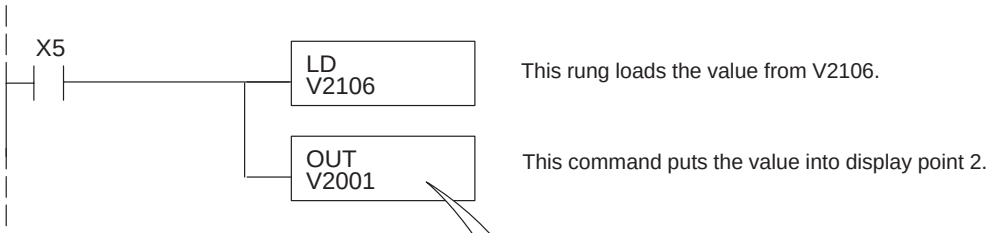
Examples Using DL05, DL105, DL205, D3–350 and DL405

Displaying Numeric Data

Displaying the numeric data in one of the six field points is a very simple process. During the initial configuration, make sure you define the point as a display point, not a setpoint. Displaying the numeric data requires that the PLC put the value to be displayed in the register(s) associated with the display data field.

The figure below illustrates a display application for a ***Direct***LOGIC 05, 105, 205, 350 or 405 PLC. *Notice that the base address is V2000, so V2001 is M+1.* Also, field point 2 is set for display in BCD format with 3 digits after the decimal.

To display a Binary number, configure the field point for display, Binary, and the required number of digits after the decimal.

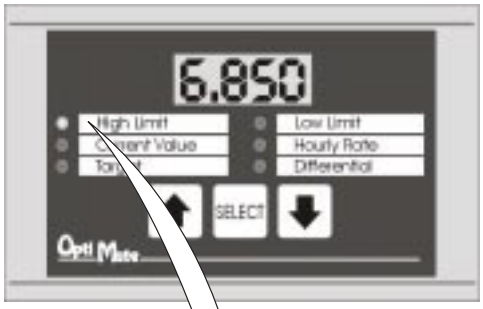


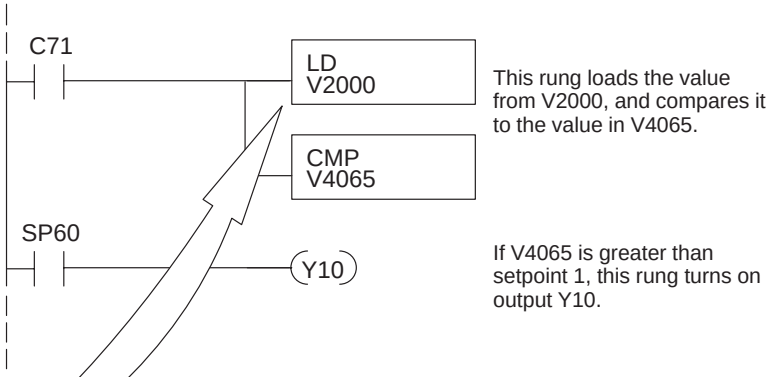
PLC Register	Example Address	Register Function
M+0	V2000	Field point 1 data cell
M+1	V2001	**Field point 2 data cell**
M+2	V2002	Field point 3 data cell
M+3	V2003	Field point 4 data cell
M+4	V2004	Field point 5 data cell
M+5	V2005	Field point 6 data cell
M+6	V2006	Field point force data cell
M+7	V2007	Force control

Reading a Setpoint The OP–413 continuously updates the registers of all setpoints with each setpoint's current value. To read a setpoint, simply access the register(s) that correspond to each setpoint. The data can be copied to another register for manipulation or it can be accessed in its field point register(s).

Again, notice that the base address is V2000, so V2000 is M+0. Also, field point 1 has been configured as a setpoint in BCD format with three digits after the decimal. In this example, field point 1 is a High Limit setpoint. When C71 is active, the program below compares the setpoint 1 with the value held in V4065. If the value exceeds the setpoint, Y10 will be turned on.

To read a setpoint configured as Binary, configure the field point for setpoint, Binary, and the required number of digits after the decimal. Then use the LD and CMP instructions. Make sure the CMP is a decimal value.





PLC Register	Example Address	Register Function
M+0	**V2000**	**Field point 1 data cell**
M+1	**V2001**	Field point 2 data cell
M+2	**V2002**	Field point 3 data cell
M+3	**V2003**	Field point 4 data cell
M+4	**V2004**	Field point 5 data cell
M+5	**V2005**	Field point 6 data cell
M+6	**V2006**	Field point force data cell
M+7	**V2007**	Force control

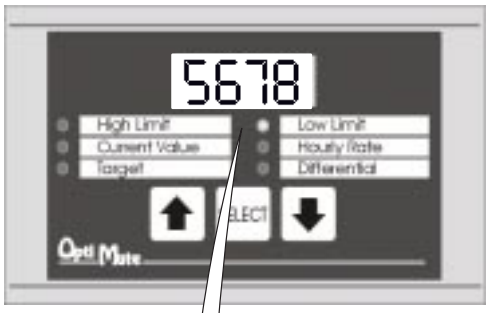
Forcing Setpoints

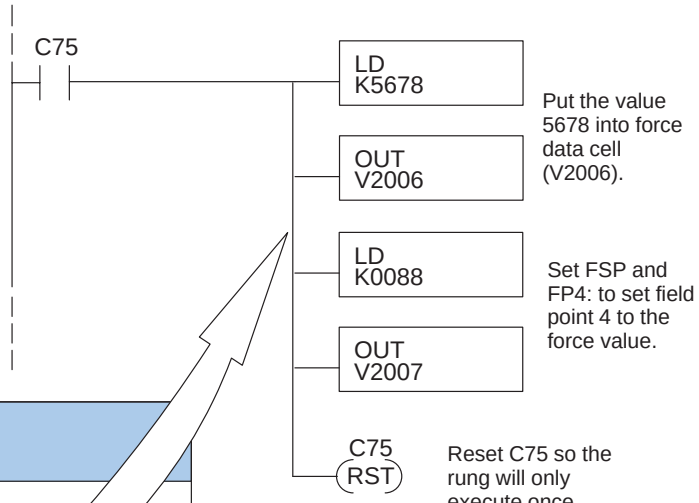
The OP–413 allows you to force a setpoint to a value from the PLC.
In order to force a setpoint to a value, place the value into register M+6. Then set the FSP and bit(s) corresponding to the setpoint(s) to be forced. When the panel has completed the force operation, it clears registers M+6 and M+7.

The example below shows setpoint 4 (FP4 is set), being forced to 5678 when C75 is active.

Notice that C75 is used as a set/reset type relay. The force command should be written to the force register once. The OP–413 will automatically clear this register when the force is complete. This will normally happen in less than a second. The PLC program can verify operation, if necessary, by checking the status of the registers to be cleared by the panel (M+6 and M+7).

NOTE: The Force Option must be selected (in OP–WINEDIT) in order to force setpoints.





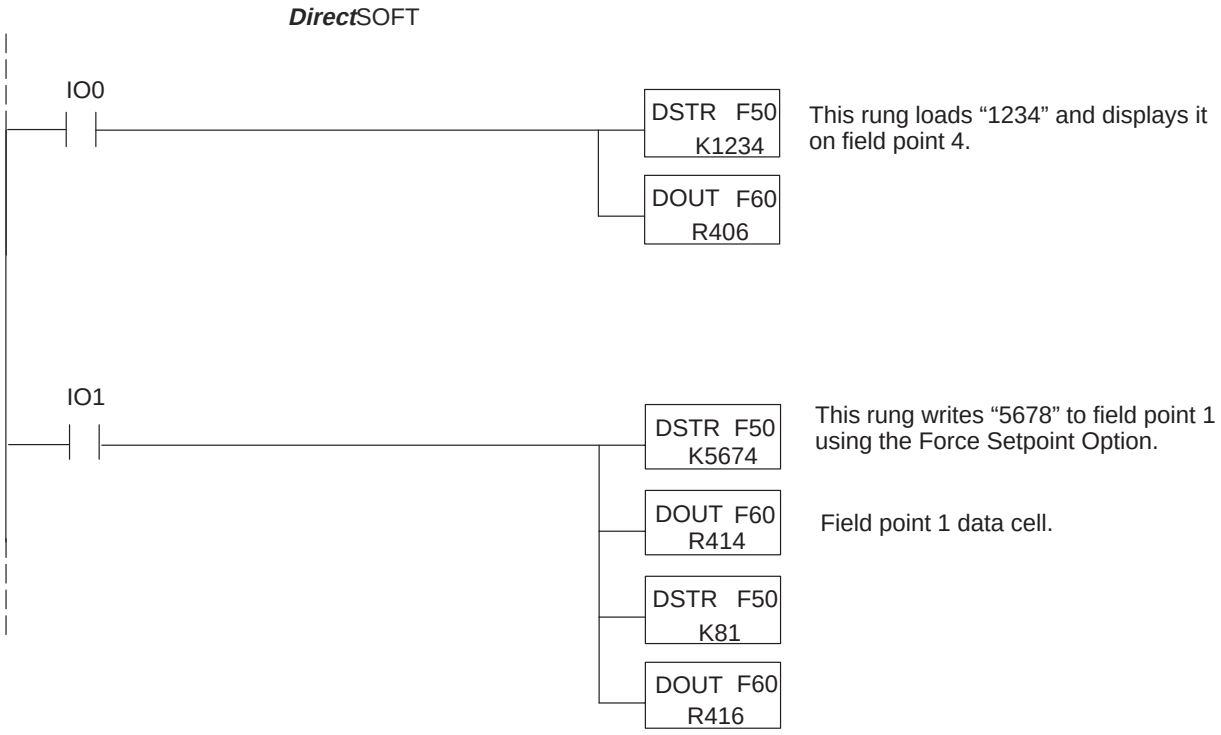
PLC Register	Register Function
M+0	Field point 1 data cell
M+1	Field point 2 data cell
M+2	Field point 3 data cell
M+3	Field point 4 data cell
M+4	Field point 5 data cell
M+5	Field point 6 data cell
M+6	**Field point force data cell**
M+7	**FSP** FP6 FP5 **FP4** FP3 FP2 FP1

15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0

Force control bits (bold if set)

Example Using D3–340

Register Usage The following example assumes that the OP–413 is configured for a base address of R400/R401.



PLC Register	Example Address	Register Function
M+0	**R400/401**	**Field point 1 data cell**
M+1	**R402/403**	Field point 2 data cell
M+2	**R404/405**	Field point 3 data cell
M+3	**R406/407**	**Field point 4 data cell**
M+4	**R410/411**	Field point 5 data cell
M+5	**R412/413**	Field point 6 data cell
M+6	**R414/415**	Field point force data cell
M+7	**R416/417**	

								FSP		FP6	FP5	**FP4**	FP3	FP2	FP1		
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0		

Examples Using Allen-Bradley SLC 5/03, 5/04 and Micrologix PLCs

Interfacing to A-B Memory

OptiMate panels interface to Allen-Bradley SLC 5/03, SLC 5/04 and Micrologix PLCs via integer file type N. The 5/03 and 5/04 have file type N7 as standard. Other "N" type files can be created. The Micrologix has a fixed file type N7. Please see A-B documentation for information on setting up and using "N" type files.

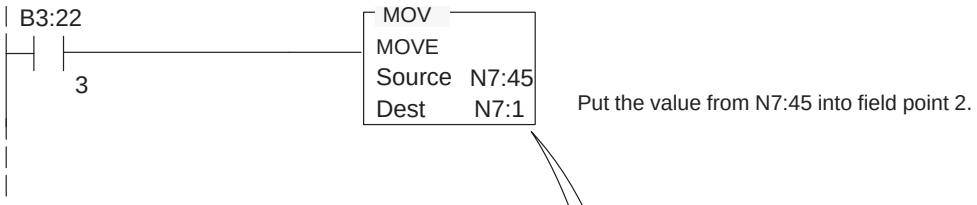
NOTE: When using an OP–413 with an Allen-Bradley PLC, always be sure that at least 7 words of memory are allocated to allow proper communications.

Displaying Numeric Data

Displaying the numeric data in one of the six field points is a very simple process. During the initial configuration, make sure you define the point as a display point, not a setpoint. Displaying the numeric data requires that the PLC put the value to be displayed in the register(s) associated with the display data field.

The figure below illustrates a display application for an A–B PLC. *Notice that the base address is N7:0, so N7:1 is M+1.* Also, field point 2 is set for display in BCD format with 3 digits after the decimal. A value held in N7:45 will be written to N7:1 (and displayed as field point 2) as long as B2:22/3 is active.

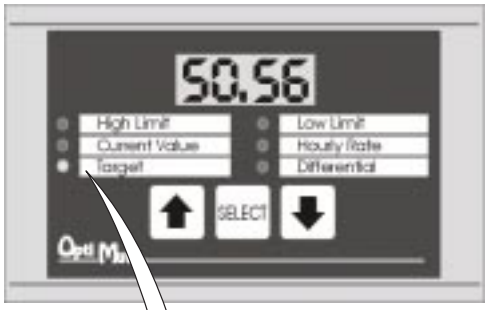
To display a Binary number, configure the field point for display, Binary, and the required number of digits after the decimal.

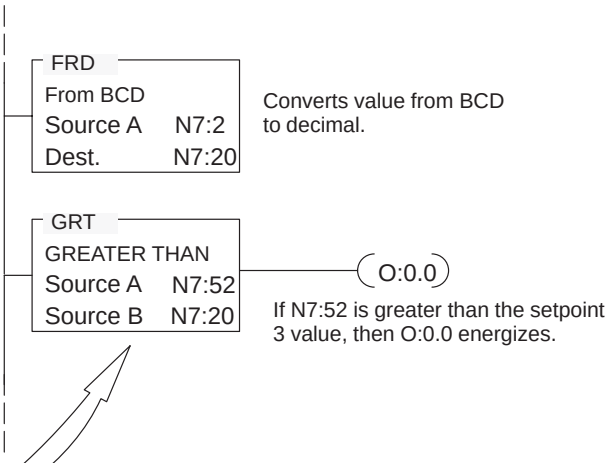


PLC Register	Example Address	Register Function
M+0	N7:0	Field point 1 data cell
M+1	N7:1	**Field point 2 data cell**
M+2	N7:2	Field point 3 data cell
M+3	N7:3	Field point 4 data cell
M+4	N7:4	Field point 5 data cell
M+5	N7:5	Field point 6 data cell
M+6	N7:6	Field point force data cell
M+7	N7:7	Force control

Reading a Setpoint The OP–413 continuously updates the registers of all setpoints with each setpoint's current value. To read a setpoint, simply access the register that corresponds to each setpoint. The data can be copied to another register for manipulation or it can be accessed in its field point register.

Again, notice that the base address is N7:0, so N7:2 is M+2. Also, field point 3 has been configured as a setpoint in BCD format with two digits after the decimal. In this example, field point 3 is a Target value setpoint. The program below compares the setpoint 3 with the value held in N7:52. Since the value in the compare is a decimal value, use the FRD instruction to convert the setpoint N7:2 from BCD to decimal. If the value exceeds the setpoint, O:0.0 will be turned on.





PLC Register	Example Address	Register Function
M+0	N7:0	Field point 1 data cell
M+1	N7:1	Field point 2 data cell
M+2	N7:2	**Field point 3 data cell**
M+3	N7:3	Field point 4 data cell
M+4	N7:4	Field point 5 data cell
M+5	N7:5	Field point 6 data cell
M+6	N7:6	Field point force data cell
M+7	N7:7	Force control

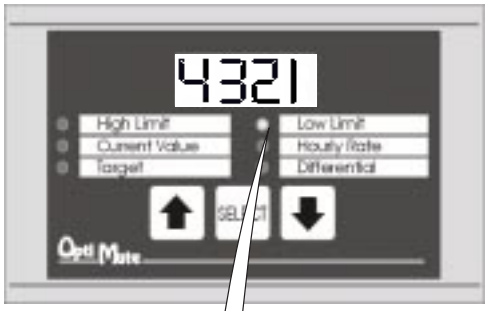
Forcing Setpoints

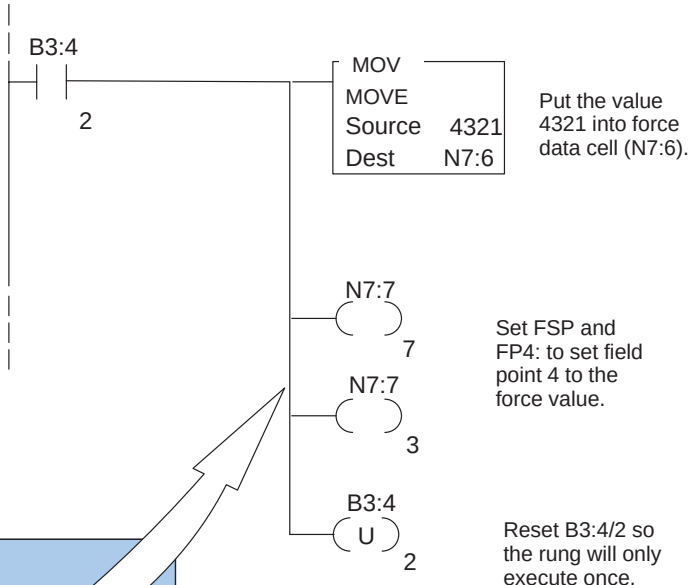
The OP–413 allows you to force a setpoint to a value from the PLC.
In order to force a setpoint to a value, place the value into register M+6. Then set the FSP and bit(s) corresponding to the setpoint(s) to be forced. When the panel has completed the force operation, it clears registers M+6 and M+7.

The example below shows setpoint 4 (FP4 is set) being forced to 4321 when B3:4/2 is active.

Notice that B3:4/2 is used as a latch/unlatch type relay. The force command should be written to the force register once. The OP–413 will automatically clear this register when the force is complete. This will normally happen in less than a second. The PLC program can verify operation, if necessary, by checking the status of the registers to be cleared by the panel (M+6 and M+7).

NOTE: The Force Option must be selected (in OP–WINEDIT) in order to force setpoints.





PLC Register	Register Function
M+0 (N7:0)	ld point 1 data cell
M+1 (N7:1)	eld point 2 data cell
M+2 (N7:2)	Field point 3 data cell
M+3 (N7:3)	Field point 4 data cell
M+4 (N7:4)	Field point 5 data cell
M+5 (N7:5)	Field point 6 data cell
M+6 (N7:6)	**Field point force data cell**
M+7 (N7:7)	**FSP** FP6 FP5 **FP4** FP3 FP2 FP1

Force control bits (bold if set)

Troubleshooting the OP-413 Panel

Troubleshooting

In this section, we explain how to isolate potential problems which may occur while using the OP–413. Because these panels have only a power supply connection and a communications connection, (no DIP switches or controls to set, and cannot be used in multiple panel arrangements), troubleshooting is very straightforward.

Power Supply Problems

If the panel LED display, the pushbutton indicators, and the RX and TX LEDs on the back of the panel do not illuminate, the panel is most likely not receiving input power. Carefully check your connections to make sure they are tight. If this does not help, see Chapter 2 and review the input power requirements.

Remember, all PLC's require that you use the OP–PS400 5V plug-in power supply (or equivalent) for configuration. Some PLC's also require that you use this power supply for operation. Make sure that the 120 VAC receptacle you plug the power supply into has power. Also, if you are using another 5V power supply, make sure that it has a center negative connector.

If using a PLC that supplies 5V for operation through the communications cable, check to make sure sure that pin 5 on the lead going into the panel has a 5V signal.

Configuration Problems

Make sure that you are using the proper configuration cable (OP–CCBL) and that it is securely connected. Check your configuration program and make sure the proper communications port is selected, such as COM1 or COM2. Review your configuration settings to make sure they are correct. Remember, the OP–WINEDIT Help screens provide a lot of valuable information.

Communication Problems

Observe the RX and TX LEDs on the rear panel. They should be steady flashing or glow (depending on the baud rate). If not, make sure that you are using the proper communications cable and that it is securely connected. Review your configuratiion settings and make sure that the communications information for your PLC, address number, baud rate, protocol type, etc. is correct. Check the user manual for your PLC for the proper settings.

Getting Help

See "Technical Support" in Chapter 1 for additional information.