

The Application Note is pertinent to all of our AC and DC Drives

Using the Drives +24vdc Supply for External Devices

Our drives include a +24vdc power supply which is intended primarily for providing a power source for LOCAL logic inputs. In general, we would prefer that one use an independent external +24vdc power supply rather than use the drives supply for driving external devices. However, this power supply can be used to power external relays and possibly other LOCAL devices if one stays within the Power Rating of the power supply. It should be noted that an emphasis has been placed on the fact that the devices connected to the drives +24vdc supply should be LOCAL to the drives versus REMOTE. An example of LOCAL devices would be Pushbuttons, Switches, LED indicating lights etc that are located close to the drive like on the front door of a drive cabinet or enclosure.



When these devices extend further out into the Industrial environment, these longer wire lengths make them more susceptible to noise pickup as well as being subject to inadvertent shorts to earth or worse, to 115vac sources. These negative realities have a direct affect on the drive. Obviously noise can cause erratic or intermittent unpredictable effects whereas shorts can cause drive tripping or outright failures should the +24v wiring come in contact with 115v sources. For these reasons, we like to see Installers use an independent +24vdc supply.

For information on **Driving External Relays** click here → [CTAN154](#)

Drive Series	Available 24vdc supply current
Mentor II	200mA
Quantum III	100mA
Commander SK	100mA
Commander GP20	200mA
Unidrive SP	200mA
Affinity	200mA
Mentor/Quantum MP	200mA

*The above supply currents are absolute max current available.
Load demands exceeding this amount will cause a 24v power supply trip.*

On occasion, one may be applying an Interfacing option of some sort (local to the drive) which requires +24vdc and cost constraints prohibit the use of an independent +24v supply. These options might include a Signal Conditioner or a Communications option of some sort. You might find that, although you've verified the specs on the +24vdc supply requirements for the option is within the maximum stated from the previous table, yet still results in a 24v Power Supply Overload trip indication- **O.Ld I**. In these cases, the problem arises from the inrush current (or outrush from the drives 24v supply) to the option device. Most electronic devices have power supply filtering capacitors which become charged during the initial application of power. This input current can be substantial but only lasts for a short duration.

In these cases, if you could stay below the drives +24v current trip point – at least during the charge up phase of the option device during application of power, you could eliminate the **O.Ld I** trip problem.

To limit the outrush current to 200mA we would need a minimum series limiting resistor of :

$$R_{lim} = \frac{24v}{200mA} = \mathbf{120ohms} \quad \frac{1}{4} \text{ or } \frac{1}{2} \text{ watt}$$

I would suggest using 150 ohms

But after the charge up phase, we would like to remove that resistor to allow the external device to have a full 24volts . Otherwise, the device would not see the full 24v. For example, let's say the external device requires 50mA. The voltage the device would see would be only:

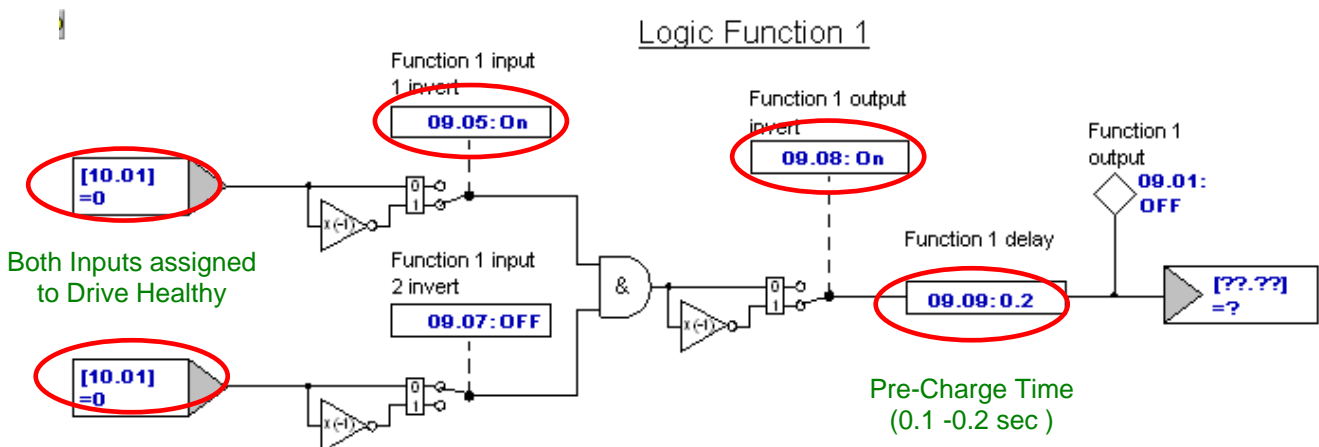
$$24v - (50mA \times 150ohms) = 24 - 7.5 = \mathbf{16.5volts}$$

Which may be insufficient for reliable operation of the external device.

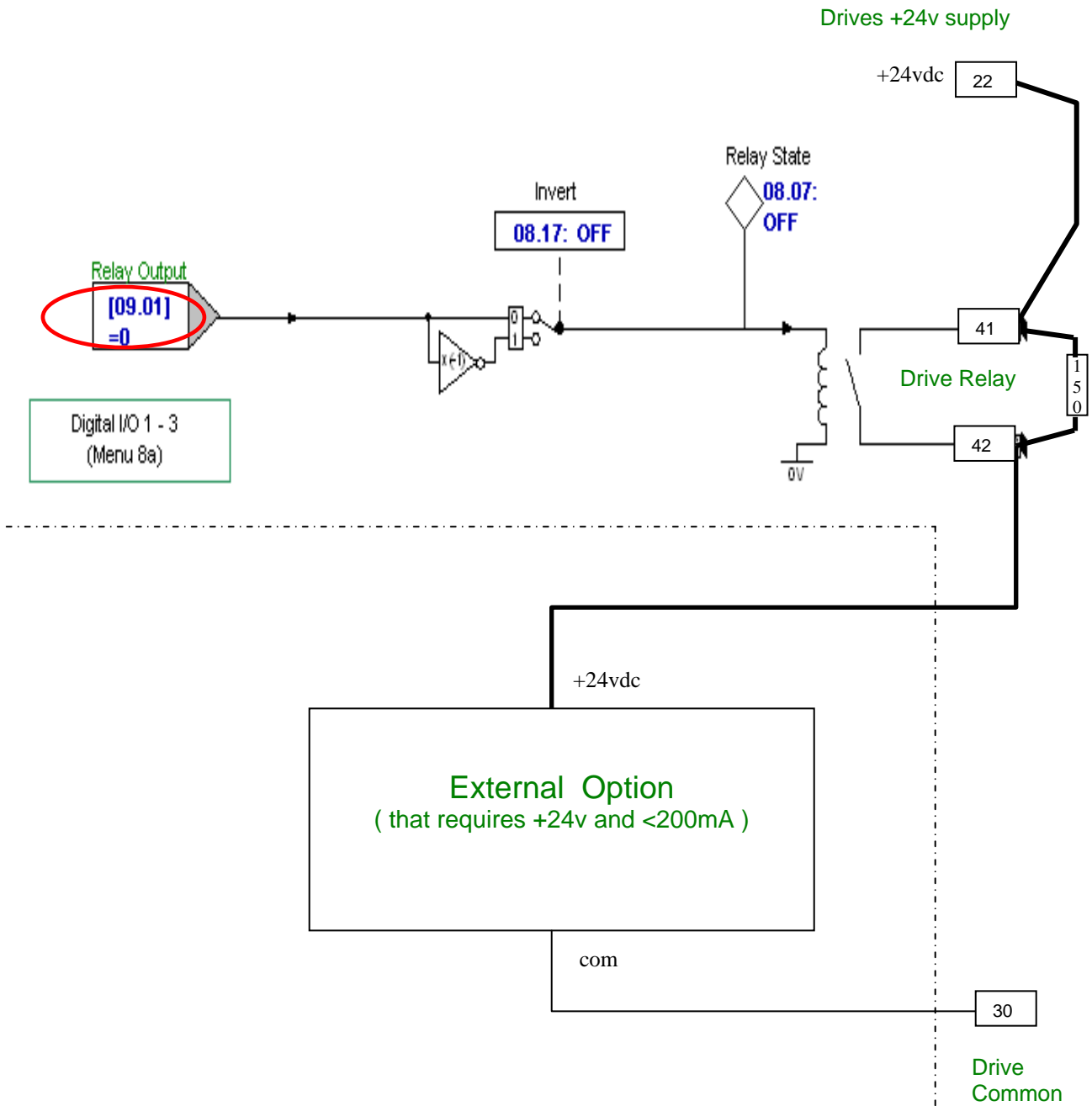
What to do ?

We could use a bit of drive logic to come up with an automatic scheme to “pre-charge” the capacitors on the external optional device then by-pass the outrush limiting resistor after this pre-charging is complete.

We could utilize Logic Function #1 for this scheme.



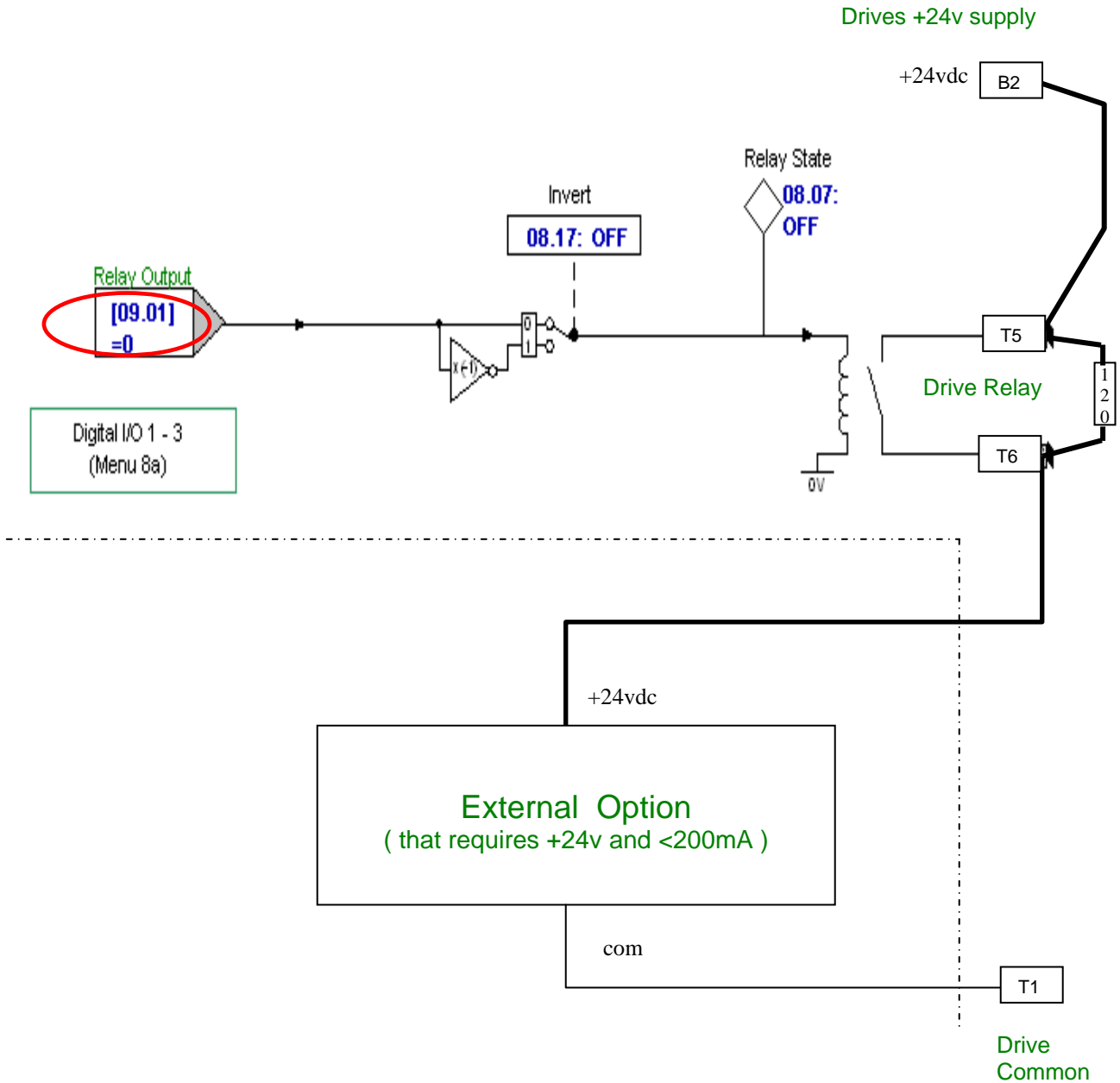
The solution below is for Unidrive SP, Commander GP20 or the Affinity series



Parameter Setting Summary for above Pre-Charge Scheme

Parameter	Set to:	Comment	
#9.04	10.01	Drive Healthy	
#9.05	ON		
#9.06	10.01	Drive Healthy	
#9.08	ON		
#9.09	0.1 - 0.3 sec	Pre-Charge Time	Adjust as necessary
#8.27	9.01	Drive Relay	Terminals 41 & 42

The solution below is for Commander SK series



Parameter Setting Summary for above Pre-Charge Scheme

Parameter	Set to:	Comment	
#9.04	10.01	Drive Healthy	
#9.05	ON		
#9.06	10.01	Drive Healthy	
#9.08	ON		
#9.09	0.1 or 0.2 sec	Pre-Charge Time	Adjust as necessary
#8.27	9.01	Drive Relay	Terminals T5 & T6

Questions ?? Ask the Author:

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