V7 DeviceNet™ With ADR Option Kit CM013

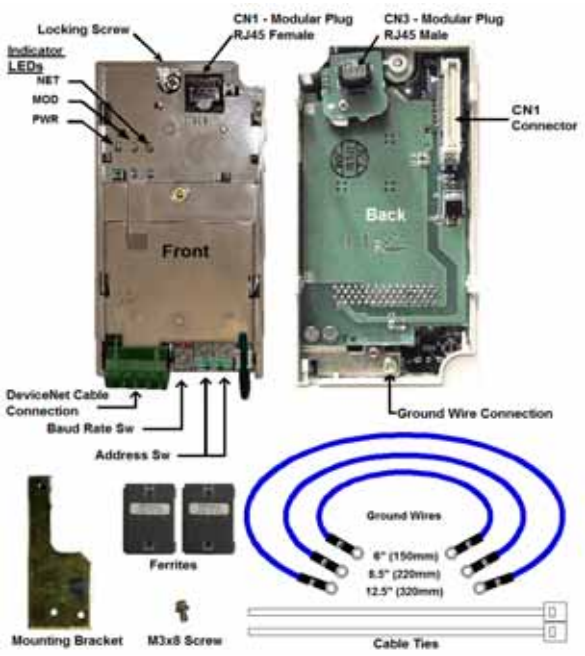
1. **Applicable products: Standard V7 drives CIMR-V7AM*) with Communication specific software installed (not V74X or V7N). Check V7 keypad monitor U-10 or the PRG # on the V7 nameplate for version 8340 or 8350 software.**

   Note: *To order a V7 with Communication specific software, use the following part number format: CIMR-V7AM****1-057.*

2. **When using this Kit, it is strongly recommended that no connections be made to the V7 drive's DC Bus terminals (+1 and -) on models CIMR-V7AMxxxx1, where xxxx is 25P5, 27P5, 45P5, or 47P5. A connection for a DC reactor (+1 to +2) or braking resistor (B1 to B2) is allowed.**

3. **Unpack the *V7 DeviceNet Option Kit CM013* and verify that all components are present and undamaged.**

DeviceNet Option Kit CM013 Kit Parts	Qty.
V7 DeviceNet Option Ring Kit (72606-EZZ08465 ring kit containing UTC000180 card)	1
Option Mounting Bracket	1
Mounting Bracket Screw (M3x8)	1
Ferrite (Power & Motor Leads) (Steward 28A5776-0A2)	2
Cable Ties (UWS-0137)	2
6" Ground Wire (150mm)	1
8.5" Ground Wire (220mm)	1
12.5" Ground Wire (320mm)	1
Installation Guide (IG.V7.16)	1



4. **Connect power to the Yaskawa V7 Drive and verify that it functions correctly.**

   This includes running the V7 from the operator keypad. Refer to the ***V7 Drive Technical Manual,*** TM.V7.01, for information on connecting and operating the V7 drive.

5. **Remove power from the V7 and wait for the charge lamp to be completely extinguished. Wait at least five additional minutes for the V7 to be completely discharged. Measure the DC bus voltage and verify that it is at a safe level.**

> **⚠ WARNING**
>
> Dangerous voltages in excess of 400VDC (230V drives) or 800VDC (460V drives) are present at the DC bus terminals of the drive.

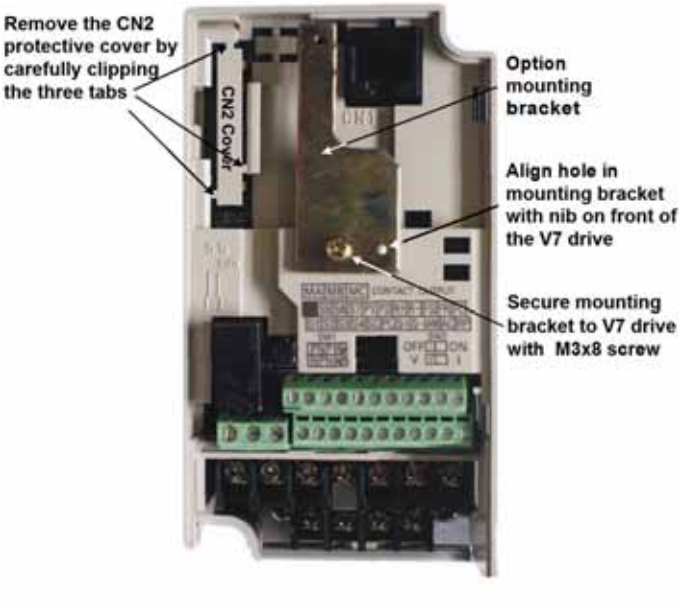
6. **Remove the operator keypad and V7 drive cover.**

   a. Remove the terminal cover by removing the retaining screw and lifting out the cover.

   b. Remove the operator keypad.

7. **Remove the CN2 cover from the V7 drive housing.** Carefully snip the 3 tabs connecting the CN2 cover to the V7 housing and remove the cover.

8. **Attach the Mounting Bracket.** Align the mounting bracket as shown in the figure to the right. Secure the mounting bracket to the V7 drive housing using the M3x8 screw provided.



9. Wire the V7 Drive power, motor and I/O terminals prior to mounting the *V7 DeviceNet Option Kit*, as the option will obscure the terminals when mounted.

10. Mount the *V7 DeviceNet Option Kit* on the V7 Drive.

a. Connect a ground wire of appropriate length from the ground wires provided to the ground terminal on the back of the *DeviceNet Option CM013*.

b. Connect the other end of the ground wire to the V7 drive ground terminal.

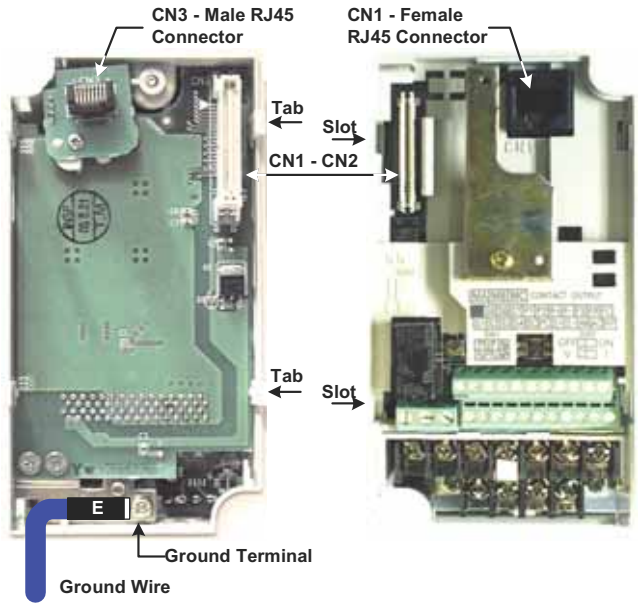
c. Align the CN1 connector on the back of the option with its mating CN2 connector on the front of the V7 drive.

d. Simultaneously align connector CN3 (male RJ-45) on the back of the option with connector CN1 (female RJ-45) on the front of the V7 drive.

e. Align the tabs on the option with their corresponding slots on the front of the V7.

f. Press the option and the V7 drive together until the tabs lock into their associated slots.

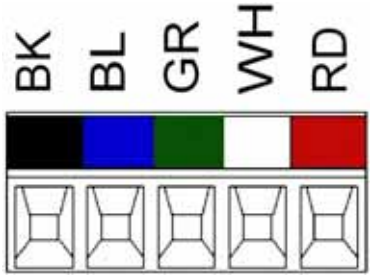
g. Secure the option to the V7 by tightening the locking screw at the top-center of the option.



11. Network Connection

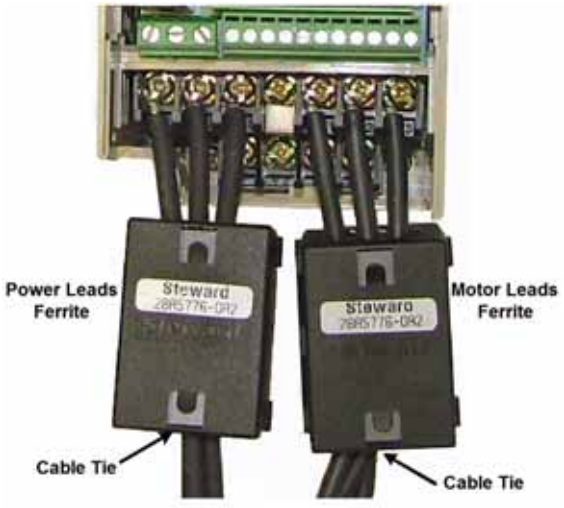
Connect the DeviceNet cable to the DeviceNet connector as shown. If the drive is the last device on a network segment make sure to install the terminating resistor (120Ω, 1%, metal film, 1/4W) between the CAN terminals 2 (Blue) and 4 (White).

Terminal	Color	Name	Wire Color	Description
1	Black	V-	Black	Network Common
2	Blue	CAN_L	Blue	CAN Data Low
3	Green	Shield	Green	Cable Shield
4	White	CAN_H	White	CAN Data High
5	Red	V+	Red	+24VDC



12. Connect the Ferrites to the V7 Power and Motor Leads

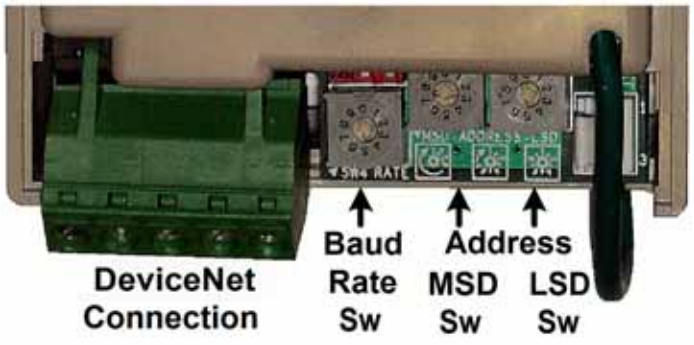
Attach the provided ferrites (Steward 28A5776-0A2) to the V7 drive motor and power leads as close to the V7 Drive terminals as possible (typically within one foot). Secure the ferrites to the motor and power leads with the provided cable ties. If the ferrites cannot be mounted in your installation, please contact Yaskawa for application assistance.



13. Set the DeviceNet Option Baud Rate

Set the drive baud rate by selecting the appropriate **Baud Rate Switch** setting. Settings of 3 through 8 will load the previously stored baud rate. A setting of 9 will enable **Auto Sense**. The factory default setting is 3.

Setting	Description
0	125 kbps
1	250 kbps
2	500 kbps
3 ~ 8	NVRAM (last stored baud rate) (3 = default setting)
9	Auto Sense



14. Set DeviceNet Option MAC ID

Set the drive MAC address by selecting the appropriate settings of the address **MSD** and **LSD** switches. The **MSD** switch sets the MAC address tens digit while the **LSD** switch sets the ones digit. Valid MAC addresses are 0 through 63 although addresses of 0, 1, 62, and 63 are typically reserved.

- Settings of 0 ~ 63: The MAC address will be selected from the MSD & LSD switch settings.
- Settings of 64 ~ 99: The MAC address will be set to the last saved MAC address. The CM013 kit comes from the factory with the MAC address switches set to 63 and the MAC address last saved to 63 (for use with some vendors' faulted or automatic device recovery features).
- For use with ADR-enabled controllers/scanners, power off the drive and set the MAC ID rotary switches to 63. Power cycle the drive ON and OFF. Change the MAC ID rotary switch setting to 64. Power the drive ON. The MAC ID will be set at 63 and will be resettable through the DeviceNet network.

Note: *The drive's power must be cycled to accept new switch settings.*

15. Set Drive Parameters

Set the drive parameters n003 (Run Command Source Selection) and n004 (Speed Reference Source Selection) to their appropriate values.

	Data	Run Command Source Selection
n003	0	Digital Keypad
	1	Terminal Strip
	2	Built-in Modbus RTU RS-485 Terminals
	3	**Option Kit (DeviceNet CM013)**

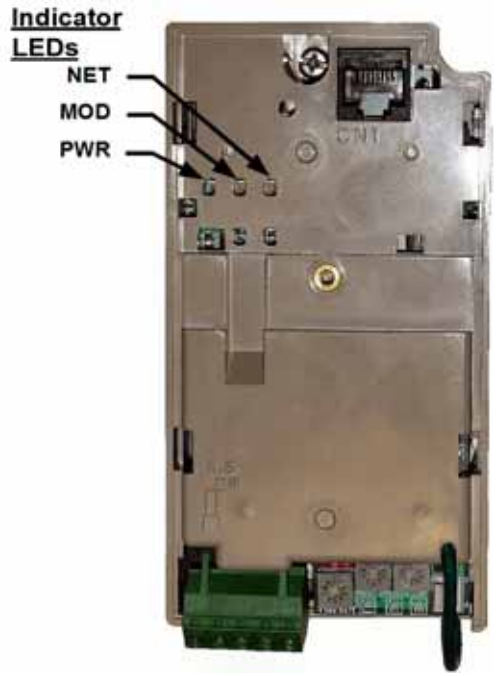
	Data	Speed Reference Source Selection
n004	0	Digital Keypad Potentiometer
	1	Digital Keypad
	2	Voltage Reference (0 - 10VDC)
	3	Current Reference (4 - 20mA)
	4	Current Reference (0 - 20mA)
	5	Pulse Train Reference (Terminal RP)
	6	Built-in Modbus RTU RS-485 Terminals
	7	Multi-Function Analog Input (0 - 10VDC)
	8	Multi-Function Analog Input (4 - 20mA)
	9	**Option Kit (DeviceNet CM013)**

16. EDS Files

EDS files can be obtained from the CD that was included with the drive or downloaded from **www.yaskawa.com**. Select **Downloads, By Inverter Drives, By Product**, and **Network Comms-DeviceNet**. Then select the appropriate EDS file based on the option kit and drive series and the latest version from those listed. EDS files for individual drive models are compressed into a single Zip file and need to be unzipped into a temporary directory in order to be installed. It is recommended that the EDS file be downloaded from **www.yaskawa.com** to be sure that the latest version is used. Install the EDS file into the DeviceNet configuration tool (i.e. RSNetworx® for DeviceNet). There is a separate EDS file for each drive model. Verify that the correct EDS file has been installed for the drive model configured. Refer to the documentation that came with the DeviceNet master configuration tool for information on installing EDS files and configuring a DeviceNet node.

17. LED Status

LED	State	Indication
MOD	Off	No Power
	On Green	**Device Operational**
	Flash Green	Device in Standby
	Flash Red	Minor Fault
	On Red	Unrecoverable Fault
	Flash Red-Green	Device Self-Test
NET	Off	Not Powered/Not On-line
	Flash Green	On-Line/Not Connected
	On Green	**Link OK/On-Line and Connected**
	Flash Red	Connection Time-Out
	On Red	Critical Link Failure
	Flash Red & Green	Communication Faulted



18. Supported Input Instances

Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
20 (14h) Basic Speed Control 4 Bytes	**0**	–	–	–	–	–	Fault Reset	–	Run Forward
	1	Reserved							
	2	Speed Reference (Scaled by Parameter n152) (U-01)							
	3								

Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
21 (15h) Extended Speed Control 4 Bytes	**0**	–	Network Reference	Network Run Command	–	–	Fault Reset	Run Reverse	Run Forward
	1	Reserved							
	2	Speed Reference (Scaled by Parameter n152) (U-01)							
	3								

19. Supported Input Instances

Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
22 (16h) Basic Speed and Torque Control 6 Bytes	**0**	–	–	–	–	–	Fault Reset	–	Run Forward
	1	Reserved							
	2	Speed Reference (Scaled by Parameter n152) (U-01)							
	3								
	4	Reserved							
	5								

Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
23 (17h) Extended Speed and Torque Control 6 Bytes	**0**	–	Network Reference	Network Run Command	–	–	Fault Reset	Run Reverse	Run Forward
	1	Reserved							
	2	Speed Reference (Scaled by Parameter n152) (U-01)							
	3								
	4	Reserved							
	5								

20. Yaskawa Supported Input Instances

Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
100 (64h) Modbus Message 5 Bytes	**0**	Function Code (Only Modbus functions register read (03h) and register write (10h) are supported)							
	1	Register Number							
	2								
	3	Data							
	4								
Note: Refer to output assembly instance 150 (96h) for response.									

Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
101 (65h) Standard Control 8 Bytes	**0**	–	Terminal S7	Terminal S6	Terminal S5	Terminal S4	Terminal S3	Run Reverse	Run Forward
	1	Terminal P2-PC	Terminal P1-PC	Terminal MA~MC	–	–	–	Fault Reset	External Fault
	2	Speed Reference (Scaled by Parameter n152) (U-01)							
	3								
	4	Reserved							
	5								
	6	Reserved							
	7								

Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
105 (69h) Enhanced Control/ Modbus Message 8 Bytes	**0**	-	Terminal S7	Terminal S6	Terminal S5	Terminal S4	Terminal S3	Terminal S2	Terminal S1
	1	Terminal P2-PC	Terminal P1-PC	Terminal MA~MC	–	Function Bit 2^{1}	Function Bit 1^{1}	Fault Reset	External Fault
	2		Speed Reference (Scaled by Parameter n152) (U-01)						
	3								
	4		Register Number						
	5								
	6		Data						
	7								

Note: Refer to output assembly instance 155 (9Bh) for response.

Note 1:

Bit 1	Bit 2	Function Description
0	0	None
0	1	Read Register
1	0	Write Register
1	1	No Function

Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
107 (6Bh) Standard DI/ DO Control 8 Bytes	**0**	–	Terminal S7	Terminal S6	Terminal S5	Terminal S4	Terminal S3	Terminal S2	Terminal S1
	1	–	–	–	–	–	–	Fault Reset	External Fault
	2	–	–	Terminal P2-PC	Terminal P1-PC	Terminal MA~MC	–	–	–
	3	Reserved							
	4	Analog Output Terminal AM Refer to n066 for range and setting.							
	5								
	6	Speed Reference (Scaled by Parameter n152) (U-01)							
	7								

21. Supported Output Instances

Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
70 (46h) Basic Speed Control 4 Bytes	0	–	–	–	–	–	Running Forward	–	Fault
	1	Reserved							
	2	Output Frequency (Scaled by parameter n152) (U-02)							
	3								

Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
71 (47h) Extended Speed Control 4 Bytes	0	Speed Agree	Network Reference	Network Run Command	Drive Ready	Running Reverse	Running Forward	Alarm	Fault
	1	Reserved							
	2	Output Frequency (Scaled by parameter n152) (U-02)							
	3								

Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
72 (48h) Basic Speed and Torque Control 6 Bytes	0	–	–	–	–	–	Running Forward	–	Fault
	1	Reserved							
	2	Output Frequency (Scaled by parameter n152) (U-02)							
	3								
	4	Motor Torque (0.1%) (Available in OLV control mode only (n002 = 1) (U-08)							
	5								

Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
73 (49h) Extended Speed and Torque Control 6 Bytes	0	Speed Agree	Network Reference	Network Run Command	Drive Ready	Running Reverse	Running Forward	Alarm	Fault
	1	Reserved							
	2	Output Frequency (Scaled by parameter n152) (U-02)							
	3								
	4	Motor Torque (0.1%) (Available in OLV control mode only (n002 = 1) (U-08)							
	5								

22. Yaskawa Supported Output Instances

Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
150 (96h) Modbus Message 5 Bytes	0	Function Code*							
	1	Register Number							
	2								
	3	Data							
	4								

Note:	
	Refer to input assembly instance 100 (64h) for command.
*	A Modbus message error is returned if the function code has the MSB (bit 80h) set.

Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
151 (97h) Standard Control 8 Bytes	0	Fault	Alarm	Drive Ready	Speed Agree	Fault Reset	Running in Reverse	Zero Speed	Running Forward
	1	–	–	Terminal P2-PC	Terminal P1-PC	Terminal MA~MC	Local Mode	Power Loss Ride Thru	OPE Error
	2	Output Frequency (Scaled by parameter n152) (U-02)							
	3								
	4	Reserved							
	5								
	6	Output Current (0.1A) (U-03)							
	7								

Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
155 (9Bh) Enhanced Control/ Modbus Message 8 Bytes	**0**	Fault	Alarm	Drive Ready	Speed Agree	Fault Reset	Running in Reverse	Zero Speed	Running Forward
	1	Terminal P2-PC	Terminal P1-PC	Terminal MA~MC	Local Mode	Function Bit 2[1]	Function Bit 1[1]	Undervoltage	OPE Error
	2	Output Frequency (Scaled by parameter n152) (U-02)							
	3								
	4	Register Number							
	5								
	6	Data							
	7								

Note:				
	Refer to input assembly instance 105 (69h).			
	1	Bit 1	Bit 2	Function Description
		0	0	None
		0	1	Message Accepted
		1	0	Message Error
		1	1	Complete

Instance	Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
157 (9Dh) Standard DI/ DO Control 8 Bytes	**0**	Fault	Alarm	Drive Ready	Speed Agree	Fault Reset	Running in Reverse	Zero Speed	Running Forward
	1	–	–	–	–	–	Local Mode	Undervoltage	OPE Error
	2	–	–	–	Terminal S7	Terminal S6	Terminal S5	Terminal S4	Terminal S3
	3	–	–	Terminal P2-PC	Terminal P1-PC	Terminal MA~MC	–	–	–
	4	Reserved							
	5								
	6	Output Frequency (Scaled by parameter n152) (U-02)							
	7								

Notes:

Copies of this Installation Guide along with all technical manuals in ".pdf" format and support files may be obtained from either the CD supplied with the V7 drive or from www.yaskawa.com. Printed copies of any Yaskawa manual may be obtained by contacting the nearest Yaskawa office. Information on DeviceNet may be obtained from www.odva.org.

Reference Documents:

***V7 Drive Technical Manual* – TM.V7.01**

***V7 Drive Parameter Access Technical Manual* – TM.V7.11**

***V7 DeviceNet Option Kit CM013 Technical Manual* – TM.V7.16**

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