DeviceNet™ With ADR Option Kit CM012

Applicable products: F7U, G7U, P7U, G5M (Spec F), and G5M (600V) drives. For G5U (HHP) drives, refer to IG.G5HHP.16.

1. **Unpack the *DeviceNet Option Kit CM012* and verify that all components are present and undamaged.**

DeviceNet Option Kit CM012 Parts	Qty.
DeviceNet Option Card (UTC000180)	1
Installation Guide (IG.AFD.16)	1

2. **Connect power to the Yaskawa AC drive and verify that the drive functions correctly.**

   This includes running the drive from the operator keypad. Refer to the appropriate drive technical manual for information on connecting and operating the drive.

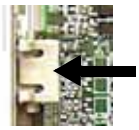
3. **Remove power from the drive and wait for the charge lamp to be completely extinguished.**

   Wait at least five additional minutes for the drive 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.

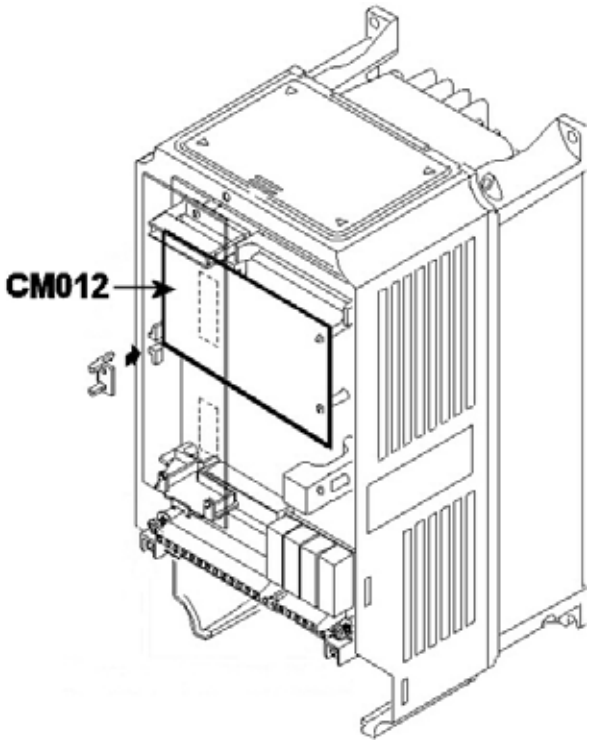
4. **Remove the operator keypad and drive cover.**
   a. Remove the operator keypad.
   b. Remove the terminal and control covers.
   c. Remove the option card hold-down plug by carefully compressing the top and bottom until it becomes free of its holder. Lift it out.



Option card hold-down plug

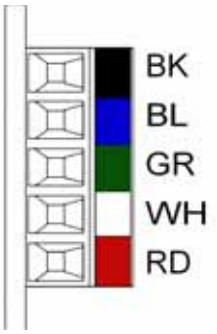
5. **Mount the DeviceNet Option Card.**
   a. Remove the DeviceNet connector and attach the DeviceNet network cable as shown below.
   b. Reconnect the DeviceNet connector to the Option Card.
   c. Align the J2 connector on the back of the DeviceNet Option Card to its mating 2CN connector on the front of the drive control board.
   d. Align the two stand-offs on the front of the drive control board with the two holes on the right side of the DeviceNet Option Card.
   e. Press the DeviceNet Option Card firmly onto the drive 2CN connector and stand-offs until the J2 connector is fully seated on 2CN and the drive stand-offs have locked into their appropriate holes.
   f. Route the DeviceNet network cable along the left inside of the drive enclosure.
   g. Replace the Option Card hold-down plug.

   Note: *Do not ground the DeviceNet Option Card (UTC000180).*



6. DeviceNet Network Connection

Connect the DeviceNet cable to the 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).

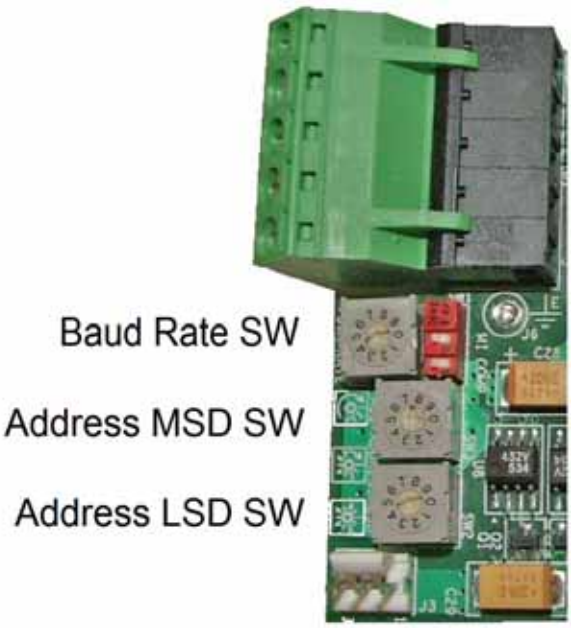


Terminal	Color	Name	Wire Color	Description
1	Black	V-	Black	Network Common
2	Blue	CAN_L	Blue	CAN Data Low
3	Green	Shield	Green	Cable Shield
4	White	CAN_H	White	CAN Data High
5	Red	V+	Red	+24VDC

7. Set the DeviceNet Option Card Baud Rate

Set the drive baud rate by selecting the appropriate **Baud Rate SW** 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



8. Set the DeviceNet Option Card 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 CM012 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 vendor's 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.

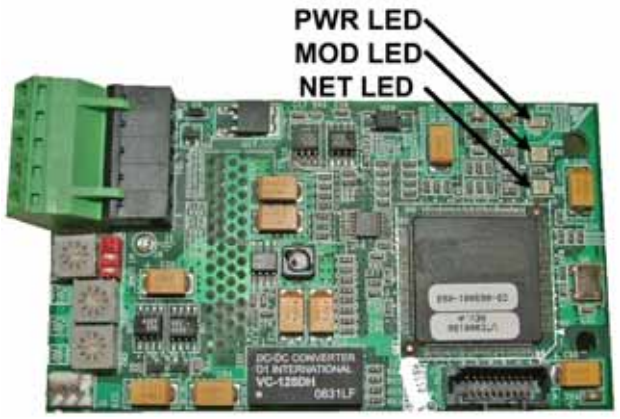
Note: *The drive's power must be cycled to accept new switch settings.*

9. 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.

10. 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



11. Set Drive Parameters

Set drive parameters b1-01 and b1-02 to their appropriate values. Refer to the table to the right for available b1-01 and b1-02 values.

Parameter	Function	Data	Description	Default
b1-01	Reference Source	0	Digital Operator	1
		1	Terminal Strip	
		2	Built-in Modbus RTU RS-485 Terminals	
		3	**Option Kit *(DeviceNet Option)***	
		4	Pulse Input (F7 and G7 Only)	
b1-02	Run Command Source	0	Digital Operator	1
		1	Terminal Strip	
		2	Built-in Modbus RTU RS-485 Terminals	
		3	**Option Kit *(DeviceNet Option)***	

12. 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 o1-03) (U1-01)							
	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[1]	Network Run Command[1]	–	–	Fault Reset	Run Reverse	Run Forward
	1	Reserved							
	2	Speed Reference (Scaled by Parameter o1-03) (U1-01)							
	3								
Note:	[1] Not available for G5								

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 o1-03) (U1-01)							
	3								
	4	Torque Reference (0.1%) (FVC Mode Only, A1-02 = 3) (U1-09)							
	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[1]	Network Run Command[1]	–	–	Fault Reset	Run Reverse	Run Forward
	1	Reserved							
	2	Speed Reference (Scaled by Parameter o1-03) (U1-01)							
	3								
	4	Torque Reference (0.1%) (FVC Mode Only, A1-02 = 3) (U1-09)							
	5								
Note:	[1]	Not available for G5							

13. 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 S8[1]	Terminal S7	Terminal S6	Terminal S5	Terminal S4	Terminal S3	Terminal S2	Terminal S1
	1	Terminal M5-M6	Terminal M3-M4	Terminal M1-M2	–	–	–	Fault Reset	External Fault
	2	Speed Reference (Scaled by Parameter o1-03) (U1-01)							
	3								
	4	Torque Reference (0.1%) (FVC Mode Only, A1-02 = 3) (U1-09)							
	5								
	6	Torque Compensation (0.1%) (FVC Mode Only, A1-02 = 3)							
	7								
Note:	[1]	G5, F7, and G7 Only							

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 S8[1]	Terminal S7	Terminal S6	Terminal S5	Terminal S4	Terminal S3	Terminal S2	Terminal S1
	1		Terminal M5-M6	Terminal M3-M4	Terminal M1-M2	–	Function Bit 2[2]	Function Bit 1[2]	Fault Reset	External Fault
	2		Speed Reference (Scaled by Parameter o1-03) (U1-01)							
	3									
	4		Register Number							
	5									
	6		Data							
	7									
Notes:	Refer to output assembly instance 155 (9Bh) for response.									
	[1]		G5, F7, and G7 Only							
	[2]		Bit 1	Bit 2	Function Description					
			0	0	No Function					
			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 S8[1]	Terminal S7	Terminal S6	Terminal S5	Terminal S4	Terminal S3	Terminal S2	Terminal S1
	1	–	–	Terminal S12[2]	Terminal S11[2]	Terminal S10[2]	Terminal S9[2]	Fault Reset	External Fault
	2	Terminal P4-C4[2]	Terminal P3-C3[2]	Terminal M5-M6	Terminal M3-M4	Terminal M1-M2	–	–	–
	3	Reserved							
	4	Analog Output Terminal FM (Terminal 21 on G5) (-726 ~ +726 (-11VDC ~ +11VDC))							
	5								
	6	Speed Reference (Scaled by Parameter o1-03) (U1-01)							
	7								

Notes:
[1] G5, F7, and G7 Only
[2] G7 only

14. 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	Motor Speed (Scaled by Parameter o1-03) (Not Available in V/F Control Mode, A1-02 = 0) (U1-05)							
	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[1]	Network Run Command[1]	Drive Ready	Running in Reverse	Running Forward	Alarm	Fault
	1	Reserved							
	2	Motor Speed (Scaled by Parameter o1-03) (Not Available in V/F Control Mode, A1-02 = 0) (U1-05)							
	3								

Note:
[1] Not available for G5

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	Motor Speed (Scaled by Parameter o1-03) (Not Available in V/F Control Mode, A1-02 = 0) (U1-05)							
	3								
	4	Torque Reference (0.1%) (FVC Mode Only, A1-02 = 3) (U1-09)							
	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[1]	Network Run Command[1]	Drive Ready	Running in Reverse	Running Forward	Alarm	Fault
	1	Reserved							
	2	Motor Speed (Scaled by Parameter o1-03) (Not Available in V/F Control Mode, A1-02 = 0) (U1-05)							
	3								
	4	Torque Reference (0.1%) (FVC Mode Only, A1-02 = 3) (U1-09)							
	5								

Note:
[1] Not available for G5

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]							
	1	Register Number							
	2								
	3	Data							
	4								
Notes:	Refer to input assembly instance 100 (64h) for command.								
	[1] 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	Zero Servo Complete[1]	–	Terminal M5-M6	Terminal M3-M4	Terminal M1-M2	Local Mode	Power Loss Ride Thru	OPE Error
	2	Output Frequency (Scaled by Parameter o1-03) (U1-02)							
	3								
	4	Torque Reference (0.1%) (FVC Mode Only, A1-02 = 3) (U1-09)							
	5								
	6	Output Current (0.01A or 0.1A, Based on Drive Capacity) (U1-03)							
	7								
Note:	[1] Flux Vector Control Mode Only (A1-02 = 3)								

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 M5-M6	Terminal M3-M4	Terminal M1-M2	Local Mode	Function Bit 2[1]	Function Bit 1[1]	Undervoltage	OPE Error
	2	Output Frequency (Scaled by Parameter o1-03) (U1-02)							
	3								
	4	Register Number							
	5								
	6	Data							
	7								
Notes:	Refer to input assembly instance 105 (69h) for command.								

[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	Zero Servo Complete[3]	–	–	–	–	Local Mode	Undervoltage	OPE Error
	2	Terminal S10[2]	Terminal S9[2]	Terminal S8[1]	Terminal S7	Terminal S6	Terminal S5	Terminal S4	Terminal S3
	3	Terminal P4-C4[2]	Terminal P3-C3[2]	Terminal M5-M6	Terminal M3-M4	Terminal M1-M2	–	Terminal S12[2]	Terminal S11[2]
	4	Analog Input Terminal A1 Monitor (Terminal 13 on G5) (0.1%) (U1-16)							
	5								
	6	Output Frequency (Scaled by Parameter o1-03) (U1-02)							
	7								
Notes:	[1] G5, F7, and G7 only								
	[2] G7 Only								
	[3] Flux Vector Control Mode Only (A1-02 = 3)								

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 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:

- ***G5U Technical Manual*** **- TM.4515**
- ***GPD515/G5 Modbus Technical Manual*** **- TM.4025**
- ***F7U Drive User Manual*** **- TM.F7.01**
- ***F7U Drive Programming Manual*** **- TM.F7.02**
- ***F7U Drive Parameter Access Technical Manual*** **- TM.F7.11**
- ***G7U Drive Technical Manual*** **- TM.G7.01**
- ***G7U Drive Parameter Access Technical Manual*** **- TM.G7.11**
- ***P7U Drive User Manual*** **- TM.P7.01**
- ***P7U Drive Programming Manual*** **- TM.P7.02**
- ***P7U Drive Parameter Access Technical Manual*** **- TM.P7.11**
- ***DeviceNet Option Kit CM012 Technical Manual*** **- TM.AFD.16**

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