# E2 setup with M400 VFD drive for 527-0431

This document will guide you through setting up and commissioning the M400 Control Techniques VFD Drive in the E2 controller.

Note that Open MODBUS Description files require *E2* firmware version 3.01F01 or higher.

The keypad and display gives information about the operating status of the drive and trip codes. It provides the ability to change parameters, stopping and starting the drive, and the ability to perform a drive reset.



Figure 1 - Unidrive M400 keypad details



Keypad number	Keypad description
1 (Enter)	The Enter button is used to enter parameter view or edit mode, or to accept a parameter edit.
2 (Navigation)	The navigation keys can be used to select individual parameters or to edit parameter values. In keypad mode, the "Up" and "Down" keys are also used to increase or decrease the motor speed.
3 (Start)	The Start key is used to start the drive in keypad mode.
4 (Stop/Reset)	The Stop / Reset key is used to stop and reset the drive in keypad mode. It can also be used to reset the drive in terminal mode.
5 (Escape)	The Escape key is used to exit from the parameter edit/view mode or disregard a parameter edit.

## Step 1: Configuring M400 VFD drive

Note: Do not connect the device communications to E2 controller.

- 1. Press right/ left arrow key and go to **Pr MM.000** then press . Select **Reset 60Hz defs** then press . Note: Pressing \_ allows you to enter and exit parameter edit mode.
- 2. Press *for* to return the drive into the **No Action** display.
- 3. Go to Pr 00.005 (Drive Config), then press 🔁. Select Preset, then press 🤁.
- 4. Set Pr 00.010 (User Security Status), then press 🔁. Select All Menus, then press 🔁.
- 5. Set Pr 06.004 (Start/Stop Logic), then press 🔁. Select 6, then press 🔁.
- 6. Set Pr 11.023 (Serial Address), then press 🔁. Select 2, then press 🔁.
- 7. Set Pr 11.024 (Serial Mode), then press . Select 8 1 NP, then press .
- 8. Set **Pr 11.020** (Serial Reset), then press : Select **On** to reset communications. Note: The device will flash to **On** and returns to **Off**, press :
- 9. Set Pr 12.000 (Parameter mm.000), then press 🔁. Select Save Parameters, then press 🤁.
- 10. Press *for* to return the drive into the **No Action** display.

Note: The drive is now ready to communicate with the E2 controller and ready for test/run.

## Step 2: Uploading the description file to the E2 controller

- 1. From UltraSite, connect to your E2 controller.
- 2. Right-click on the E2 icon and select **Description File Upload**.
- 3. Browse to the location of the description file and click Upload.
- 4. Once the upload is complete, **reboot** the E2 controller.

Trence's Desk     Trence's Desk     Condenses     Global Data     Global		E2 Description File Upload
Wegmans     FILE - Click Browse to select the Ne to upload     Browse	Condensers     C	EVSE dic
Upload Remove Close	<ul> <li>O UNITED SUPERMARKETS TEXAS</li> <li>Wegmans</li> </ul>	FILE - Click Browse to select the file to upload Browse Upload Remove Close

Figure 2 - E2 description file upload window

### Step 3: Activating the license of the device

- 1. From the E2 front panel (or via Terminal Mode), press (Marg.), <sup>8</sup>/<sub>7</sub> (System Configuration) and <sup>1</sup>/<sub>9</sub> (Licensing).
- 2. Press **F1** (ADD FEATURE) and enter the license key. Press **F1** to save changes.

-20-11 🔍 🍞 🛄	RX-300 Unit 1 Add License	Ø	14:04: *ALAR
Licensed Features- 06/2 For controller model tu	0/2011 - 14:03:48 - Re pe: RX-300	v: 3.01	B16
Feature	Maximum In	-Use I	License
EUSE Area Controller Log Group Condenser Control	Activate Feature		
Digital Combiner Analog Combiner Heat/Cool Control Time Schedule Holidau Schedule	Enter License key activate a Feature	to :	
Power Monitoring			
Analog Sensor Ctr.			
Loop/Sequence Ctr:			
Conversion Cell	128	ß	
Pulse Accumulation	16	ត	
Digital Import Point	64	0	
Analog Import Point	64	0	
HVAC Simulation	16	0	
nter decired text			
neer destred cext			
\		L	F5: CANCEL

Figure 3 - add license screen

#### Step 4: Setting the baud rate in the E2 controller

- 1. Press Merry, <sup>\*</sup>7 (System Configuration), <sup>\*</sup>4 (Remote Communication) and <sup>#</sup>3 (TCP/IP Setup).
- 2. Press **F2** (NEXT TAB) to shift over to the Serial tab. Select COM port, then set Baud rate to **19200**, Data Size to **8**, Parity to **None** and Stop Bits to **1**.

07-0 Use	3-14 ♦	CX Tabs	B	X-400 Unit 1 SETUP			10:14:0 *ALARM
C1:	General C2: F	ing Units	C3: Serial	C4: TCP/IP	C5: Peer	<sup>r</sup> Netwrk	ADVISORY SUMMARY
C6:	Web Server   C7: S	System	C8:	C9:	CO: MOR		Fails 1
		Genera]	Setup: GENE	RAL SERV		_	Alarms 0 Notices <mark>30</mark>
	Serial	Value					
	COM1 Connection	Serial				Ť.	
	COM1 Baud	: 115.2	(baud				NETWORK OVERVIEW
	COM2 Connection	: MODBUS-	-3				MODBUS-1 🔶
	COM2 Baud	: 9600 ba	bud				
	COM2 Data Size		8				
	COM2 Parity	: None					
	COM2 Stop Bits		1				
	COM3 Connection	: No Mode	en i				
	COM4 Connection	: MODBUS-	-1				
	COM4 Baud	: 9600 ba	bud				
	COM4 Data Size		8				
	COM4 Parity	: None					
	COM4 Stop Bits	:	1				
	COM6 Connection	: MODBUS-	-2				E2 Unit01
	COM6 Baud	: 19.2 Ki	aud				
	COM6 Data Size		8				Rev 4.07801
	COM6 Parity	: None					IP 10.212.237.52
							English-US
Scr	oll using Next/Pr	ev keys	Connection T	ype for COM1			
	F1: PREV TAB	F2: NEXT	TAB	F3: EDIT	F4: L00k	UP	F5: CANCEL

Figure 4 - set the baud rate, data size, parity and stop bits

#### Step 5: Wiring the M400 VFD device

Wire the device as shown below. Note: Do not connect device communications to the E2 controller.



Figure 5 - Wire the M400 VFD Device

## Step 6: Adding the device to the E2 controller

- 1. Press Merry, 🕴 (System Configuration), 🐐 (Network Setup), 💈 (Connected I/O Boards & Controllers).
- 2. Press **F2** (*NEXT TAB*) to shift over to the *C4: Third Party* tab. The name of the device will display in the list. Highlight the device name and enter the number of devices. Then press **F2** to save changes.

Use Ctrl-X to 3	∭ Select	CX Tabs		SETUP		FULL	15:47
C1: This Unit	C2:	IO Network	C3: ECT	C4: Third Pa	artų C5:	Echelon	ADVISORY SUMMAR
C6:	C7:	Num Net	C8: twork Ctrls	c9: s: NetSetup	C0:		_ Fails Alarms
	Third	Party Boa	rd Type	Quantity	Max		Notices <mark>19</mark>
		#1 : 01 1	1400 VFD	_ 1	<u>'</u>		NETWORK OVERVIE Modbus-1
							E2 Unit01
							Rev 4.05F02 IP 10.212.237.5
							English-US
Enter 0 to 1	Enter	desired n	umber of t	hese boards			
F1: PREV TA	IB 🔶	F2: NEX1	TAB	F3: EDIT			F5: CANCEL

Figure 6 - third party tab

## Step 7: Commissioning the device to the E2 controller

- 1. Press (Network Setup), 🕴 (Network Setup), 🕴 (Network Summary).
- 2. On the *Network Summary* screen, press **F4** (*COMMISSION*) and select the preferred MODBUS port. Select the MODBUS device address and press **F5**.

07-17-14 🔮 💮		RX-300 Uni Network Sum	: 1 nary	6 FULL	17:05: <mark>*Alar</mark>
Name E2 Unit01 CT M400 UFD0	Type RX300-Refri DT CT H400 VFD	Matuack Addessr HDDBUS-1 Devices 1. (Unused) 2. (Unused) 3. (Unused) 4. (Unused) 5. (Unused) 7. (Unused) 8. (Unused) 9. (Unused) 10. (Unused) 11. (Unused) 12. (Unused) 13. (Unused) 14. (Unused) 15. (Unused) 15. (Unused) 16. (Unused) 17. (Unused) 18. (Unused) 18. (Unused)	Rev 4.05F82 0.00	Status This Controller No Port	ADUISORY SUHHARY Fails 2 Alarns 1 Notices 196 NETHORK OVERUTEN HODBUS-1 E2 Unit01 Rev 4.05F02 IP 10.212.237.53 English-US
Press menu n	umber or scroll	to selection			ES. CANCEL

Figure 7 - select the MODBUS port

07-17-14 🔍 🤭			RX-300 Unit 1 Network Summary		FULL		15:29:1 *ALARM
Name  E2 Unit01 CT M400 U	Τυνα	Notwork	CT M400 UFD001 Oddvocc Pou	5+5+11	ntroller	ADUISORY S Fails Alarms Notices	SUMMARY 3 1 <mark>196</mark>
	Setting Phy	sical Address	s for: CT 11400 V	FD 001		NETWORK OU Modbus-1	JERVIEW •
	Specify Phy	isical Addres	s Of Controller				
	Ado	ress: _2					
						E2 Unit01	
						Rev 4.05F IP 10.212	02 .237.53
						English-US	S

Figure 8 - enter the MODBUS device address

3. After setting and saving the device address, press **F2** to go to the *Status* screen.

-18-14 ؋ 🍞 📖		RX-300 Unit 1 CT M400 VFD	i FULL	15:56:2 *ALARI
Namo		11012	15	ADVISORY SUMMARY
nalie		31810	//	Alarms 1
				Notices 196
СТ М40	0 VED001	HEALTHY DRIVE	NOTAC	
01 1110	0 NILDOOT	ACTIVE DRIVE	NOTAC	
			NUTHE	
		FREQ7 SFD	HUTHC	100803-1
0U	TPUTS	ALARI	1S	
		CURRENT LIMIT	NOTAC	
FREQ OUT	NONE	AC SUPPLY LOSS	NOTAC	
RPM OUT	NONE	MOTOR OVELOAD	NOTAC	
101 70	NOUE	DRIVE OVER TEMP	NOTAC	
	NUNE	DRIVE WARNING	NUTAC	
20MD 2MQ	NONE	PHHSE LUSS DEADV/NO DUN	NOTAC	
PCT <sup>2</sup> LOAD	NONE		normo	
		TRIP CODE Over	Speed	E2 Unit01
		PTC #1 NONE		
RUN COST	NONE	PTC #2 NONE		Rev 4.05F02
MWH	NONE	PTC #3 NONE		IP 10.212.237.53
KWH	NONE	PTC #4 NONE		
				English-US
ress enter for a	list of actions.		ET+ SENSUBS	ES+ SETIIP
	F2: CONDENSER	λ	F4: SEHSORS	

Figure 9 - device status screen

4. Press **F5**, **F2**, **F2** to shift over to the *Setpoints* tab. Set values for **Motor Voltage**, **Motor RPM** and **Motor FLA** from the motor plate of the device.

Figure 10 - setpoints tab

5. Press to go back to the Status screen. Connect device communications to the E2 controller, then the device will appear **Online**.

-18-14 🔹 🦪 📖		RX-300 Unit 1 CT M400 VFD	۵ FUL	16:17: *ALARI
Name		STATI	s	ADVISORY SUMMARY
				Alarms 1
				Notices 196
CT M40	0 VFD001			
		ZERO EREO		NETWORK OUERUIEW
		FREQ/SPD	OFF	MODBUS-1 0
00	TPUTS	ALARM	s	
		CURRENT LIMIT	OFF	
FREQ OUT	0	AC SUPPLY LOSS	OFF	
RPM OUT	0	MOTOR OVELOAD	OFF	
		DRIVE OVER TEMP	OFF	
VOLTS	0	DRIVE WARNING	OFF	
	0	PEADIN (NO DINN	UFF	
RELS HEPS	8	KEHDY/NU KUN	NU	
FCI& LUHD	0			E2 Unit 01
		PTC #1 0		
RUN COST	8	PTC #2 8		Rev 4.05E02
MWH	0	PTC #3 0		IP 10.212.237.53
KWH	0.26	PTC #4 0		
				English-US
ress enter for a	list of actions.			
	F2: CONDENSER	ļ	F4: SENSORS	F5: SETUP

Figure 11 - M400 VFD device status

6. Press Ener to go to the Actions menu, then select 9 (Application Commands).

7-18-14 🔹 🧖 💷		RX-300 Unit 1 CT M400 VFD	6 16:18:2
Name	Antions Ho	zuter	ADUISORY SUMMARY Fails 2 Alarms 1
	ACCIONS ME		Notices <mark>196</mark>
CT M400		UN	
	5. Setup		
	6. Detail	ed Status OFF	
	<ol><li>Applic</li></ol>	ation Logs/Graphs	HODBUS-1
01170	9. Applic	ation Commands ORMS	
FREO OUT	8	AC SUPPLY LOSS OFF	
RPM OUT	0	MOTOR OVELOAD OFF	
		DRIVE OVER TEMP OFF	
VOLTS	0	DRIVE WARNING OFF	
KW OUT	9	PHASE LOSS OFF	
RMS AMPS	9	READY/NO RUN OFF	
PCT% LOAD	9		
		TRIP CODE	E2 Unit01
		PTC #1 0	
RUN COST	0	PTC #2 0	Rev 4.05F02
MWH	9	PTC #3 0	IP 10.212.237.53
KWH	0.26	PTC #4 0	
			English-US
Press menu number o	r scroll to sele	ction	
			F5: CANCEL

Figure 12 - actions menu

7. Select 3 (Send E2 Cfg to Device), to send all information to the drive.

7-18-14 🔍 🦿 🖤		RX-300 Uni CT M400 VR	1 🕅	FULL
Name	Application	Commands	STATUS	ADUISORY SUMMARY Fails 2 Alarms 1 Notices 196
CT M400			ON OFF	
	1. NUM_SAU	IE	0FF	MODBUS-1
	3. Send E	Cfg to Device	ARMS	
RPM OUT	4. Send De	evice Cfg to E2	D OFF EMP OFF	
UOLTS KW OUT			G OFF OFF	
PCT% LOAD	6 6	TRIP CODE	IN UFF	E2 Unit01
RUN COST	6	PTC #1 PTC #2	8 6	Rev 4.05F02
КМН	0 0.26	PTC #3 PTC #4	6 9	IP 10.212.237.53
Select a command to se	nd to this app]	lication.		
		Ţ	ļ	F5: CANCEL

8. Press to go to the *Actions* menu, then select (application Commands), (*NUM\_SAVE*). All parameter values are now saved in NVM (Memory).

89-17-14 🌻 🧑 া		BX-400 Unit 1 CT M400 UFD		10:04:10 ED INS
CT M400 CT M400 OUTPUT FREQ OUT RPM OUT UGLTS KW OUT RNS ANPS PCT& LOAD	Application ( 1. DRIVE-RE: 2. NUM SAUE 3. Send E2 ( 4. Send Dev: NONE NONE	Commands 69 69 NO SET NO 80 SFg to Device 100 ARHS_ 80 ARHS_ 80 ARHS_ 80 ARHS_ 80 80 	- 60 FAC FAC FAC FAC FAC FAC FAC FAC FAC FAC	ADUISURY SUMMARY Fails 3 Alarms 3 Notices 43 NETWORK OVERVIEW IDNet-1 MODBUS-1 HODBUS-2 Echelon BACnet MSTP-1
RUN COST HWH KWH Select a command to so	NONE NONE NONE end to this applic	TRIP CODE PTC #1 NONE PTC #2 NUME PTC #3 NONE PTC #4 NONE cation.		E2 Unit01 Rev 4.07801 IP 10.212.237.52 English-US
\			/	F5: CHNGEL

Figure 14 - Application Commands - NUM\_SAVE

9. Press to go to the Actions menu, then select (Application Commands), (DRIVE-RESET). The drive is now reset with the needed configuration.

-17-14 🔹 🍞 🔟		BX-400 Uni CT M400 U	t 1 FD	1 FULL	10:03 ED INS
			CTATUC		ADVISORY SUMMAR
NHRE			]."""		Alarms
	Application C	ommands	60.00		Notices 4
СТ М400			NOTAC		
CI 11400			NOTAC		
	1. DRIVE-RES	ET	NOTAC		NETWORK OVERVIE
			NUTHC		IUNPC-1 MODDUS-1
OUTPUT	2. NUM_SAVE		ARMS		MODBUS-2
	0 0 1 50 0	Carta Davidaa	. NOTAC		Echelon
FREQ OUT	a. senu ez c	fg to Device	SS NOTAC		BACnet MSTP-1
RPM OUT	4. Send Devi	ce Cfa to E2	AD NOTAC		
		<b>,</b>	EMP NOTAC		
ANT UNIT					
RMS AMPS	NONE	READY/NO R	UN NOTAC		
PCT% LOAD	NONE				
		TRIP CODE			E2 Unit01
		PTC #1	NONE		
RUN CUST	NUNE	PIC #2	NUNE		Rev 4.07801
KMH	NONE	PTC #4	NONE		11 10.212.237.5
					English-US
elect a command to se	and to this applic	ation.			
			ļ		F5: CANCEL

Figure 15 - application commands - DRIVE-RESET

#### Step 8: Verification of settings

- 1. After commissioning the new device, verify that the following values are set in the drive:
- 0.009 (MOTOR\_PWR\_FACTOR) = 0.85 or the value that you set
- 6.004 (Start/Stop Logic) = 6
- 8.023 (Digital input 3) = 0.000

The following parameters must be set up in the Inputs tab to run the drive.

- DRIVE\_SW\_ENABLE (ON)
- DR\_RUN\_FWD (ON)
- REF\_SPEED (The speed you want the motor to run)

Press	F5	, <b>F2</b>	, F2	, F2	to shift over to the <i>Inputs</i> tab.
-------	----	-------------	------	------	---

Note: To enter values, press F3 (EDIT), (Alternate I/O Format).

Use	17-14 🔶 🌈 🛄 Ctrl-X to Sel	ect CX Tabs	I	X-300 Unit 1 SETUP	FUL	15:07:
C1:	General	C2: Config	C3: Setpoin	ts C4: Inputs	C5: Outputs	ADVISORY SUMMARY
C6:	Alarms	C7: Overrides	C8: Energy	C9: Menu Ø	0:	_ Fails 3
		CI 114	00 OFD: CI M40			Notices 196
	Inputs	Area	Ctrl Applica	ation Output		
	DRIVE_SW_ENA	IBLE :				
	DRIUE-RESET	FTR -				
	REF-SPEED					100000
	VFD CTRL RES	ET :				
						E2 Unit01
						Rev 4.05F02 IP 10.212.237.53
						English-US
		I Budan Frank	le Software			
Ent	ter Controller	I DEIVE ENAD				
		I Budue Feet	le Software			

Figure 16 - setting up inputs tab

2. Use Table 1- Menu 0 Guide to verify values set in the M400 drive. Note: Table 1- Menu 0 Guide gives diagnostic information about the system. It allows you to double check to make sure that the E2 controller sent the correct parameters.

Menu 0 Pr	Description	Value to write	Comments	Parameter	Туре
1	Drive configuration	Preset	Sets drive mode to Preset.	11.034	Mode
2	Serial baud rate	19200	Sets baud to 19200.	11.025	Mode
3	Serial address	2	Set the address for each drive on network.	11.023	Mode
4	Serial mode	8 1 NP	Set to match mode of E2E.	11.024	Mode
5	Reset serial communications	Toggle ON/	Set this to ON / OFF to reset communications. Connects	11.02	Mode
6	Motor rated current	See Motor	Set from motor nameplate.	5.007	Motor
7	Motor rated speed	See Motor	Set from motor nameplate.	5.008	Motor
8	Motor rated voltage	See Motor	Set from motor nameplate.	5.009	Motor
9	Motor power factor	See Motor	Set from motor nameplate. (Use 0.85 if absent.)	5.010	Motor
10	Security / parameter access	Set to All Menus	Set to all Menus to see access menu 1 to 22.	11.044	Access

12	STO 1 State	RO	0=disabled, 1=enabled	8.039	Info
13	STO 2 State	RO	0=disabled, 1=enabled	8.040	Info
14	Reference Selected	RO	Shows reference selected. Hz desired.	1.001	Info

Table 1 - menu 0 guide

Menu 0 Pr	Description	Value to write	Comments	Parameter	Туре
15	Value of reference in rpm	RO	Shows reference in rpm.	1.069	Info
16	Hz sent from controller	RW	Can see speed sent from controller here.	1.021	Info

20	Preset speed 2 (manual)	RW	Use this to set manual / test speed.	1.022	Manual
21	Preset selector	0 or 2	Use this to turn on manual / test speed.	1.015	Manual
30	Current trip (Trip 0)	RO	Gives code for current trip. (Trip 0)	10.020	Trip
31	Trip 1	RO	Previous trip - before Trip 0	10.021	Trip
32	Trip 2	RO	Previous trip - before Trip1	10.022	Trip
33	Trip 3	RO	Previous trip - before Trip 2	10.023	Trip
34	Trip 4	RO	Previous trip - before Trip 3	10.024	Trip
35	Trip 5	RO	Previous trip - before Trip 4	10.025	Trip
36	Trip 6	RO	Previous trip - before Trip 5	10.026	Trip
37	Trip 7	RO	Previous trip - before Trip 6	10.027	Trip
38	Trip 8	RO	Previous trip - before Trip 7	10.028	Trip
39	Trip 9	RO	Previous trip - before Trip 8	10.029	Trip

Table 1 - menu 0 guide



#### About Copeland

Copeland is a global leader in sustainable heating, cooling, refrigeration and industrial solutions. We help commercial, industrial, refrigeration and residential customers reduce their carbon emissions and improve energy efficiency. We address issues like climate change, growing populations, electricity demands and complex global supply chains with innovations that advance the energy transition, accelerate the adoption of climate friendly low GWP (Global Warming Potential) and natural refrigerants, and safeguard the world's most critical goods through an efficient and sustainable cold chain. We have over 18,000 employees, with feet on the ground in 50 countries - a global presence that makes it possible to serve customers wherever they are in the world and meet challenges with scale and speed. Our industry-leading brands and diversified portfolio deliver innovation and technology proven in over 200 million installations worldwide. Together, we create sustainable solutions that improve lives and protect the planet today and for future generations. For more information, visit <u>copeland.com</u>.

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